Taraxacum californicum
(California Taraxacum)

5-Year Review:
Summary and Evaluation

Taraxacum californicum (California taraxacum).
Photocredit: Scott Eliason (San Bernardino National Forest) and Stacey Love (USFWS).

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

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5-YEAR REVIEW
Taraxacum californicum
(California Taraxacum)

I. GENERAL INFORMATION

Purpose of 5-year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

Taraxacum californicum is a thick-rooted perennial herb in the sunflower family (Asteraceae). Individual plants are less than 20 centimeters (cm) (8 inches (in)) tall, with basal leaves and yellow flowers clustered in heads on leafless stalks. This species occurs in the San Bernardino Mountains at elevations from 1,600 to 2,800 meters (5,300 to 9,000 feet) in San Bernardino County, California. At the time of listing, there were 20 known occurrences of *T. californicum* discontinuously distributed in moist meadows of Holcomb and Bear Valleys south to meadows in the Santa Ana River watershed. There are currently 23 extant occurrences within the same geographical range at the time of listing. The primary threats at listing were habitat loss and degradation due to alteration of hydrological conditions, urbanization, and off-highway vehicle activity. *Taraxacum californicum* was listed as endangered under the Act in 1998, and is not listed by the State of California.

Methodology Used to Complete This Review:

This review was prepared by Stacey Love at the Carlsbad Fish and Wildlife Office, following the Region 8 guidance issued in March 2008. We used information from the California Natural Diversity Database (CNDDB) maintained by the California Department of Fish and Wildlife (CDFW; previously known as California Department of Fish and Game), survey information from experts who have been monitoring various localities of this species, Geographic information system (GIS) analysis, and personal communications with experts as primary sources of information used to update the species' status and threats. We received no comments

from the public in response to our **Federal Register** notice initiating this 5-year review. This 5-year review contains updated information on threats to the species and an assessment of that information compared to that known at the time of listing and from our previous 5-year review in 2008. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes all this information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

Contact Information:

Lead Regional Office: Larry Rabin, Deputy Division Chief for Listing, Recovery, and Environmental Contaminants, and Lisa Ellis, Fish and Wildlife Biologist, Region 8; 916–414–6464.

Lead Field Office: Stacey Love and Bradd Baskerville-Bridges, Carlsbad Fish and Wildlife Office; 760–431–9440.

Federal Register Notice Citation Announcing Initiation of This Review:

A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the **Federal Register** on May 25, 2011 (USFWS 2011, pp. 12878–12883). No information relevant to *Taraxacum californicum* was received.

Listing History:

Federal Listing
FR Notice: 63 FR 49006–49022 (USFWS 1998)
Date of Final Rule: September 14, 1998
Entity Listed: *Taraxacum californicum* (California taraxacum), a plant species
Classification: Endangered

State Listing
None.

Associated Rulemakings:

Final Critical Habitat
FR Notice: 73 FR 47706
Date of Final Critical Habitat Rule: August 14, 2008

Review History:

The Service initiated a status review of *Taraxacum californicum* on February 14, 2007 (USFWS 2007, p. 7064). The results of the review were published in the **Federal Register** on March 25, 2009 (USFWS 2009, p. 12883) and no change in status was recommended.

Species' Recovery Priority Number at Start of 5-year Review:

The recovery priority number for *Taraxacum californicum* is 5 according to the Service's 2012 Recovery Data Call, based on a 1–18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (USFWS 1983a, pp. 43098–43105; USFWS 1983b, p. 51985). This number indicates that the taxon is a species that faces a high degree of threat and has a low potential for recovery.

Recovery Plan or Outline: None.

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy:

The 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 of species under the Act limits listing as distinct population segments to species of vertebrate fish or wildlife. Because the species under review is a plant, the DPS policy is not applicable, and the application of the DPS policy to the species' listing is not addressed further in this review.

Information on the Species and its Status:

The following sections on the habitat requirements, biology and life history, distribution, abundance, and genetics of *Taraxacum californicum* include information available at the time of listing as well as more recent information.

Species Description

Taraxacum californicum is a thick-rooted perennial herb. Individual plants are 5 to 20 cm (2 to 8 in) tall, with 10 to 20 basal leaves, light green, oblanceolate (much longer than broad, with rounded apex and tapering base), generally toothed, occasionally lobed proximally from 5 to 12 cm (2 to 5 in) long and 1 to 3 cm (0.4 to 1.2 in) wide. The yellow flowers are clustered in heads on leafless stalks. The outer phyllaries (bracts of the inflorescence) are erect, lanceolate to widely 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. Nonnative members of this genus within the range of *T. californicum* are distinguished from this species by leaves of their flowering plants being generally sharply cut and outer phyllaries reflexed (Munz and Johnston 1925, pp. 227–228; Brouillet 2011, pp. 2–3).

Spatial Distribution

Taraxacum californicum is endemic to the San Bernardino Mountains, ranging from the Holcomb and Bear Valleys to South Fork Meadows in the Santa Ana River watershed (USFWS 2005, p. 214). According to the listing rule (USFWS 1998), about 20 occurrences of the species were known at the time of listing, with sizes ranging from 2 to 300 individuals (USFWS 1998, 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 (USFWS 1998, p. 49009). Although not specifically identified in the listing rule, records in 2008 indicated 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, Lost Creek Meadow (known as "unnamed meadow east of South Fork Meadow" in 2008), Metcalf Meadow (2 occurrences), Mission Springs Meadow (known as "unnamed meadow east of Fish Creek Meadows" in 2008), North Shore Meadows, North Baldwin Meadow, Pan Hot Springs Meadow, Shay Meadow, South Fork 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, San Bernardino National Forest (SBNF), 2007a, pers. comm.). We now know that the occurrence in the unnamed meadow near the town of Sugarloaf was either extirpated or an erroneous record, as no meadow exists there (S. Eliason, SBNF, 2011a, pers. comm.). Therefore, current records indicate that 20 occurrences were in 19 meadows at the time of listing.

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 *Taraxacum californicum* by the SBNF (Bill 2007a, pers. comm.). 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 reported 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 2007a, pers. comm.). 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 2007a, pers. comm.). Thus, there are currently 23 extant occurrences of *T. californicum*.

Habitat

Habitat Affinities

In the listing rule, *Taraxacum californicum* was reported to occur in moist meadow habitats in the San Bernardino Mountains at elevations from 2,000 to 2,800 meters (6,700 to 9,000 feet), often associated with the endangered *Poa atropurpurea* (San Bernardino bluegrass) (USFWS 1998). 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 (USFWS 1998, p. 49009).

Since listing, the description of suitable habitat for *Taraxacum californicum* was refined by the 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 1,600 to 2,800 meters (5,300 to 9,000 feet). 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* appears to be more abundant in open patches of meadow habitat (S. Eliason, SBNF, 2007a, pers. comm.).

Habitat Conditions

As noted in the listing rule, significant loss of meadow habitats in Bear Valley began in the late 1880s with the construction of a dam that resulted in the formation of Big Bear Lake. Prior to construction of the dam, approximately 6,177 hectares (15,300 acres) of meadow were mapped within a majority of the range of *Taraxacum californicum*, including the Bear Valley region and to the south in the Big Meadow area of the Santa Ana River (Leiberg 1900, p. 147). Habitat occupied by *T. californicum* decreased by 81 percent with only 1,171 hectares (2,900 acres) remaining in 1932 (CFRES 1932, p. 1).

This loss of meadow habitat 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 and meadow habitat likely connected the meadow in Bear Valley to smaller outlying meadows. Since inundation, meadow habitat in 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, and Shay Creek) 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” (J. Bill, SBNF, 2007b, pers. comm.). “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

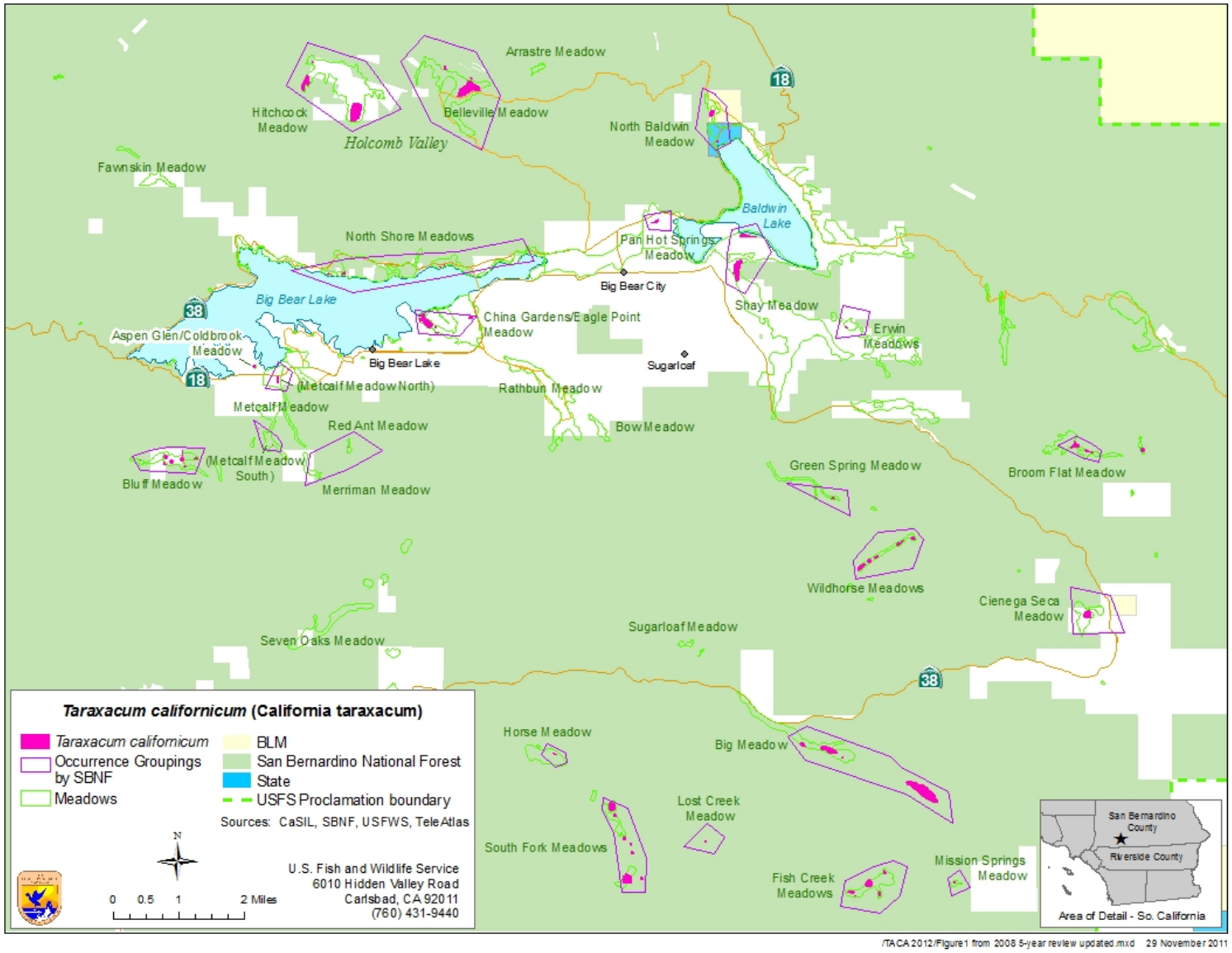

Figure 1: Distribution of extant occurrences of *Taraxacum californicum* (California taraxacum); produced for the 2013 5-year review.

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. The SBNF estimated that there are approximately 1,132 hectares (2,803 acres) of meadow habitat remaining across 23 meadows that contain occurrences of *Taraxacum californicum*. Of this remaining meadow habitat, 9 percent (encompassing 3 occurrences) was categorized as "not functioning"; 70 percent (encompassing 11 occurrences) was "somewhat altered but functioning"; and 21 percent (encompassing 10 occurrences) was considered "unaltered." Functional habitat and unaltered meadow habitat account for 1,030 hectares (2,546 acres), which is divided between Federal lands (455 hectares (1,128 acres); 44 percent, SBNF); State and municipal lands (155 hectares (385 acres); 15 percent); and private lands (417 hectares (1,033 acres); 41 percent) (S. Eliason, SBNF, 2007d, pers. comm.; S. Love, USFWS, 2011, pers. obs.).

Abundance, Population Trends, Demographic Features and Demographic Trends

To date, no systematic surveys have been conducted for *Taraxacum californicum*. This species is primarily identified and distinguished from the nonnative *T. officinale* (common dandelion) and *T. erythrospermum* (red-seeded dandelion) when flowering (Brouillet 2011, p. 1). 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 that have thick meadow grass vegetation because the basal leaves are hidden. The flowering period for *T. californicum* spans approximately 1 month and the start of the flowering period varies widely year to year due to variable weather pattern. Furthermore, the flowering period varies geographically within years based on elevation and meadow moisture and plants may not flower at all in very dry years (SBNF 2002, pp. 149–150). Therefore, planning and carrying out systematic surveys throughout the range in any one season would be difficult.

Surveys were conducted by the SBNF from 1999 to 2002 at 21 meadows, although not all sites were visited each year. (See Appendix 1 for survey results within each year). Overall, the highest count of individuals seen rangewide and in a single year was in 2000, with about 925 plants in the 16 meadows that were surveyed that year. In at least 1 year during the surveys, 6 meadows each had a minimum of 100 individuals, with a maximum of 187 individuals detected at 1 of these meadows. One meadow had approximately 53 individuals. However, 5 meadows surveyed were never found to have more than 36 plants and another 5 meadows were never found to have more than 10 plants. No plants were found in four meadows that historically supported *Taraxacum californicum*. Though presumed extant, 10 of these meadows that historically supported *T. californicum,* have not been surveyed since listing; 7 of these occurrences are on private land.

In recent years, plants have not been redetected in some meadows (e.g., Merriman/Red Ant Meadows), or low numbers of individuals were only detected in one location where they were previously found throughout the meadow (e.g., North Shore Meadows) (Table 1). These recent findings, along with rangewide findings of low numbers of individuals and no detections in meadows that historically supported *Taraxacum californicum* 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 10 seed collections of *T. californicum* (RSABG 2010, p. 9). Germination tests were conducted on seven of these collections. Seedling development was healthy in tests of five of these collections, but two of the collections displayed abnormal seedling development, which may be some cause for concern. Additionally, RSABG observed 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; however, there are no data to test these hypotheses (RSABG 2009, p. 4; RSABG 2010, pp. 4, 9; M. Wall, RSABG, 2011, pers. comm.). It may be difficult to develop effective conservation strategies to maintain genetic diversity of small populations of *T. californicum* until we have a better understanding of the breeding system.

In summary, there is very little consistent rangewide 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 has not been collected throughout the range in any one season. 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, persistence of seed in the soil, 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*. We currently believe that *Taraxacum californicum* is extant in 23 occurrences (Appendix 1).

Changes in Taxonomic Classification or Nomenclature

Neither the taxonomic classification nor the nomenclature of *Taraxacum californicum* has changed since listing.

Genetics

No contemporary genetic analysis has been completed.

Persistence of a species in small populations suggest that loss of genetic variation, genetic drift, and potential inbreeding depression might occur over prolonged periods of time. See **FACTOR E** for analysis of this phenomenon.

Species-specific Research and/or Grant-supported Activities

As mentioned above under "Abundance, Population Trends, Demographic Features and Demographic Trends," RSABG has established conservation seed collections of *Taraxacum californicum* and conducts seed germination tests on these collections, which ensure viability of seeds within the cryogenic collection. These conservation actions were funded by SBNF and are expected to continue (S. Eliason, SBNF, 2011b, pers. comm.).

Vulnerability Factors

Species may be vulnerable to threats for a variety of reasons. Primack (2006, p. 159) outlined five categories of species considered most vulnerable to extinction as:

1) Species with very narrow geographical ranges;
2) species with only one or a few populations;
3) species in which population size is small (identified as one of the best predictors of species extinction rate);
4) species in which population size is declining; and
5) species that are hunted or harvested by people.

Consideration of these categories and its life history traits can provide a vulnerability profile for *Taraxacum californicum*. Fiedler and Ahouse (1992, p. 32) consider ecology, biotic competition, population dynamics, reproductive biology, and genetics among the factors affecting the rarity of a plant taxon, which would be reflected in numbers two and three above. These traits may render the species more vulnerable to the threats discussed below and must be considered in management actions. Vulnerability factors for *T. californicum* include the following:

1) The species has limited numbers of individuals at most occurrences.
2) The population size of *Taraxacum californicum* appears to be declining across its range.
3) The species may be hybridizing with nonnative dandelions, further reducing population size.
4) Competition with other plant species may prevent growth and reproduction.

Life history and habitat specificity traits create natural limitations for *Taraxacum californicum.* The threats described below in the five-factor analysis exacerbate the vulnerabilities described above.

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of 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. In the 2008 5-year review, we updated these threats as follows: 1) We broadened the threat of OHV activity to "unauthorized vehicular use" and the threat of campground development to "developed recreation"; and 2) Roads, dispersed recreation, and habitat fragmentation were identified as additional significant threats to *Taraxacum californicum* (USFWS 2008a, pp. 11–15). Though vandalism was also mentioned in the listing rule, it was not recognized as a threat in 2008 and is not a current threat. In summary, we identify the following as current threats under Factor A to *T. californicum* and its habitat: 1) alteration of hydrological conditions, 2) urbanization, 3) roads and unauthorized OHV use, 4) developed and dispersed recreation, 5) mining activities, 6) grazing, and 7) competition with other plant species. In this review, impact from habitat fragmentation has been incorporated into discussion of the threat of alteration of hydrological conditions, and the threats of grazing and competition with other plant species has been moved from Factor E to Factor A.

Updated information regarding the magnitude of these threats to habitat where *Taraxacum californicum* occurs is discussed below.

Alteration of Hydrological Conditions

The listing rule identified alteration of hydrological conditions as a significant threat to *Taraxacum californicum* habitat, noting potential impacts from roads and OHV activity (USFWS 1998, pp. 49012–49013).

As discussed in our 2008 review, 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 type of 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).

Habitat fragmentation, from alteration of hydrological conditions and from direct removal due to urbanization (discussed below under Urbanization), increases the spatial isolation of *Taraxacum 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). Although there are no data on pollen and seed dispersal mechanisms or distances for *T. californicum*, 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 alteration of hydrological conditions and ensuing habitat fragmentation. This may have been exacerbated by the significant historical loss and fragmentation of meadow habitat from inundation of Bear Valley.

Alteration of hydrological conditions continues to impact habitat at 19 of 23 occurrences (Table 1) and is considered a substantial rangewide threat.

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 (USFWS 1998, p. 49009). Of these, four occurrences located at 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 (USFWS 1998, p. 49013). The listing rule noted the apparent extirpation of the occurrence at Rathbun Meadow (T. Krantz, Environmental Consultant, 1993, pers. comm.).

Development currently remains a threat to meadow habitat of five *Taraxacum californicum* occurrences on private land in the Big Bear area. Another six *T. californicum* occurrences are located in meadow habitat adjacent to developed areas and are threatened by indirect effects related to urbanization. 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.

GIS data provided by the SBNF were used to identify and calculate ownership within each meadow. The majority of habitat within the City of Big Bear Lake is privately-owned (over 93 percent of each of the meadows, except Metcalf Meadow at 55 percent) and potentially threatened by development in the future. The three remaining occurrences within the City of Big Bear Lake (north Metcalf Meadow, China Gardens/Eagle Point Meadows, and Pan Hot Springs Meadow) have various levels of protection. Since our 2008 review, we have confirmed that a portion of the China Gardens/Eagle Point Meadow occurrence (China Gardens plants) has been extirpated by residential development (Eliason 2011a, pers. comm.).

According to an analysis by the SBNF, the habitat supporting the north occurrence at Metcalf Meadow was identified as partly “not functioning” and partly destroyed (Eliason 2007d, pers. comm.). In our 2008 review, we stated that this occurrence was likely extirpated by residential development, but this was not confirmed. We know now that the north Metcalf Meadow occurrence is extant (Eliason 2011a, pers. comm.) Representing the westernmost occurrences in the Bear Valley, north Metcalf Meadow and China Gardens/Eagle Point Meadows are significant to the distribution of *Taraxacum californicum* (T. Krantz, University of Redlands, 2007, pers. comm.). Development is a significant threat to this occurrence and the surrounding meadow habitat, as the old drive-in movie theater site where it occurs is currently up for sale. All of the

adjacent private properties—except one—with suitable meadow habitat that may support *T. californicum* are also up for sale (S. Eliason, SBNF, 2011b, pers. comm.).

Other occurrences in the Big Bear area were identified in the 2008 review as threatened by development within Erwin Meadows, Shay Meadow, Pan Hot Springs Meadow, and an unnamed meadow near the town of Sugarloaf. We believe that the occurrence near the town of Sugarloaf is either extirpated or an erroneous record (Eliason 2011a, pers. comm.). The majority of the land at Erwin Meadows (84 percent) and Shay Meadow (96 percent) are privately-owned. Pan Hot Springs Meadow is privately-owned, with a deed-restriction to protect meadow habitat for co-occurring federally-listed species *Thelypodium stenopetalum* (slender-petaled mustard) and *Sidalcea pedata* (pedate checker-mallow), but does not encompass all meadow habitat occupied by *Taraxacum californicum* nor the water source, which is located off the property.

Urbanization is a substantial threat to *Taraxacum californicum* habitat at 11 of 23 extant occurrences. Five *T. californicum* occurrences are in privately-owned meadow habitat in the Big Bear area, including north Metcalf Meadow, China Gardens/Eagle Point Meadows, Pan Hot Springs Meadow, Erwin Meadows, and Shay Meadow. For more detailed information regarding the threat of urbanization at each of these meadows, see Appendix 2. Additionally, six *T. californicum* occurrences are located in meadow habitat adjacent to developed areas and are threatened by indirect effects related to urbanization including OHV use, dispersed recreation, and introduction of nonnative plants, which are discussed in more detail below.

Roads and Unauthorized Off Highway 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 (USFWS 1998, p. 49013).

Authorized and Unauthorized Vehicular Use

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, pp. 22–23). 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).

Driving off classified roads remains a threat at Holcomb Valley (Belleville and Hitchcock Meadows), North Baldwin Meadow, Bluff Meadow, Broom Flat Meadow, and North Shore Meadows. Although the CDFW and SBNF have continued their efforts to construct and maintain structures blocking OHV use in these meadows, these structures are still being breached, or OHV activities are occurring in new areas or other areas beyond their control

(SBNF 2002, pp. 33, 41, 42, 46, 48; S. Eliason, SBNF, 2010, pers. comm.; Eliason 2011a, pers. comm.; E. Konno, CDFG, 2011, pers. comm.). For more detailed information regarding the threat of OHV use at some of these meadows, see Appendix 2.

Upper Wildhorse Meadow was fenced by SBNF and protected from vehicles (Butler 2000, p. 56; SBNF 2002, p. 69).

Road Maintenance Activities

As discussed in our 2008 review, 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 also affect hydrology (USFWS 2005, p. 23). Since 2008, chronic maintenance problems with USFS roads in several areas of Hitchcock Meadow that were "adversely affecting meadow species and habitat" were corrected and are no longer a threat (SBNF 2002, p. 51; Eliason 2011a, pers. comm.). Similarly, road maintenance activities are no longer a threat to Pan Hot Springs Meadow (Eliason 2011b, pers. comm.). Maintenance of Highway 18 is a threat to the Metcalf Meadow north occurrence (Eliason 2011a, pers. comm.).

Summary of Roads and Unauthorized OHV Use

Roads and unauthorized OHV use has been ameliorated at two occurrences through management actions of the SBNF (fencing, etc.), but continues to be a moderate threat to meadow habitat at 13 of 23 *Taraxacum californicum* occurrences. Nine of these occurrences are within or partially within CDFW and SBNF lands, though they continue to pose management challenges. Four occurrences entirely within private land in the Big Bear area are threatened by roads and unauthorized OHV use 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* habitat in Cienega Seca Meadow (also referred to as Blue Sky Meadow) and North Shore Meadows (USFWS 1998, p. 49013). The SBNF identified dispersed recreation as a threat in addition to developed recreation (campgrounds) in their 2002 Meadow Habitat Management Guide. 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). Although dispersed recreation has the potential to affect all occurrences of *Taraxacum californicum*, occurrences near roads and concentrated dispersed use areas are more likely to be affected (USFS 2005a, p. 354).

At this time, we believe campground development is not a current threat to Cienega Seca Meadow, and the threat from dispersed recreation has been minimized at this location. Approximately 82 percent of Cienega Seca Meadow is privately owned by the Los Angeles

County Outdoor Science School (LACOSS), which employs a Preserve Manager who strictly enforces rules protecting the meadow (R. Hawke, LACOSS, 2007, pers. comm.).

Developed and dispersed recreation remains a moderate threat to meadow habitat at 17 of 23 *Taraxacum californicum* occurrences (Appendix 1). Since listing, developed and dispersed recreation due to close proximity to campgrounds has been identified as a threat at five additional meadows (in addition to North Shore Meadows identified at listing): Bluff Meadow, Hitchcock Meadow and Belleville Meadow in Holcomb Valley, Red Ant Meadow, and Merriman Meadow. Additionally, a popular dispersed campsite on the SBNF (referred to as Yellow Post Site 25) threatens adjacent *T. californicum* habitat in Metcalf Meadow. 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. For more detailed information regarding the threat of developed and dispersed recreation at each of these meadows, see Appendix 2.

Mining Activities

At the time of listing, mining activities were identified as a habitat threat to *Taraxacum californicum* in the vicinity of Holcomb Valley (USFWS 1998, p. 49014).

Since listing, the SBNF further described threats from mining activities 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 2007d, pers. comm., 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 USFS, which is subject to consultation requirements under section 7 of the Endangered Species Act (36 CFR 228A, pp. 138, 141–143). However, effects from prospecting in Belleville Meadow may still occur (USFS 2005a, pp. 357, 359).

We have not received any new information to change our conclusion from the 2008 5-year review that mining is a current threat to *Taraxacum californicum* habitat at one occurrence (USFWS 2008a, p. 14).

Grazing

In the listing rule, trampling by livestock and indirect effects of grazing and browsing was identified as a threat to *Taraxacum californicum* (USFWS 1998, pp. 49016–49017). 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 (USFWS 1998, 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 (USFWS 1998, p. 49017). As mentioned below under **FACTOR C** and **FACTOR E**, 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 (USFWS 1998, pp. 49012, 49013, 49016).

Horse Grazing

Grazing was not considered a threat to Bluff Meadow in 2002; however, horse grazing still occurs in private land in Hitchcock Meadow (SBNF 2002, p. 51; Eliason 2011b, pers. comm.). We stated in the 2008 5-year review that voluntary landowner agreements were made to relocate equestrian activities away from sensitive meadow habitat in Shay Meadow (SBNF 2002, p. 35). However, most of the landowners who entered the agreements have since sold their property (S. Eliason, SBNF, 2011c, pers. comm.). Therefore, horse grazing remains a threat at this meadow. Adjacent to Shay Meadow, we now know that horse grazing is also a threat to an occurrence of *Taraxacum californicum* within Erwin Meadows, which is privately-owned (Eliason 2011b, pers. comm.). Although horse grazing was noted as a threat to Pan Hot Springs Meadow in our 2008 review, grazing has not been observed in recent years and is no longer considered a threat there (Eliason 2011a, pers. comm.). Paradoxically, termination of grazing has increased the threat from an invasive plant species at this site (as discussed below under Competition with Other Plant Species); thus, there may be some benefit to meadow habitat from carefully controlled grazing (Krantz 2008, pp. 8, 11, 16).

Cattle Grazing

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

Burro Grazing

In 1998, wild burros were removed from Bear Valley; however, Broom Flat Meadow is within the wild burro herd management area (USFS 2005a, p. 352; Eliason 2007e, pers. comm.; Eliason 2011a, pers. comm.). In 1997, we issued a biological and conference opinion (USFWS 1997) in response to the Wild Burro Management Plan, allowing burros in Broom Flat Meadow. The presence of *Taraxacum californicum* at Broom Flat Meadow was not known at the time (USFWS 1997, pp. 6, 8–9). Burros have been occasionally reported in this area and at Wildhorse Meadows (Eliason 2007e, pers. comm.). We now know that wild burros have also been observed at Shay Meadow and North Baldwin Meadow (Eliason 2010, pers. comm.; Eliason 2011b, pers. comm.). Occupied habitat of *T. californicum* outside of Broom Flat Meadow (i.e., in Shay Meadow and Wildhorse 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). In 2010, approximately 50 burros were removed from the Shay Meadow area. SBNF planned to remove approximately 10 burros from this area in 2011, but this activity was cancelled due to lack of funds (Eliason 2011b, pers. comm.). Thus, burro grazing remains a threat at the following 4 meadows: Broom Flat Meadow, North Baldwin Meadow, Shay Meadow, and Wildhorse Meadow.

Summary of Grazing

Grazing is a moderate threat to 26 percent (6 of 23) of *Taraxacum californicum* occurrences. Horse grazing continues to threaten *T. californicum* and its habitat at three occurrences on private land. Significant steps were taken by the BLM and SBNF to reduce cattle and wild burro grazing within habitat occupied by *T. californicum* such that cattle grazing is not a substantial threat at this time. Although burro grazing has been reduced, it still threatens *T. californicum* and its habitat at four occurrences.

Competition with Other Plant Species

In the listing rule, competition with other plant species was identified as a Factor E threat to *Taraxacum californicum*; however, no specific areas were discussed where other plant species are a concern (USFWS 1998, pp. 49016–49017). Impact by other plant species is discussed as a habitat threat in this section below.

Since listing, the SBNF identified invasion of invasive nonnative plants as a threat to *Taraxacum californicum* in their Meadow Habitat Management Guide (SBNF 2002, p. 24). According to the management guide, invasive nonnative plants are present in every known meadow occurrence. Additionally, competition with native species is also a threat. *Taraxacum californicum* occurs in open patches of meadow habitat, as discussed above under *Habitat Affinities*. Therefore, invasive nonnative species along with native species that dominate meadow habitat may alter the habitat thereby preventing *T. californicum* from reestablishing.

Currently, the most abundant invasive native and nonnative species in meadow habitat are *Taraxacum officinale*, *Poa pratensis, Bromus tectorum* (cheatgrass), *Erodium cicutarium* (red-stemmed filaree), *Elymus hispidus* (intermediate wheatgrass), and *Melilotus alba* (no common name) (SBNF 2002, p. 24; G. Wallace, USFWS, 2011, pers. obs.). Invasion of cheatgrass 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). SBNF is proposing to burn Juniper Point Meadow (a meadow within North Shore Meadows) where *T. californicum* have not been detected in recent years in an effort to restore meadow habitat.

Since our 2008 5-year review, intermediate wheatgrass has been identified as a threat to occurrences at China Gardens/Eagle Point Meadows, North Baldwin Meadow, North Shore Meadows (specifically, Observatory Meadow), Pan Hot Springs Meadow, and Shay Meadow (Eliason 2010, pers. comm.; Eliason 2011b, pers. comm.). This native species poses a

significant threat to Pan Hot Springs Meadow, as intermediate wheatgrass occupies approximately 50 percent of available meadow habitat within the Pan Hot Springs Habitat Management Plan Area to the near-exclusion of most other meadow species (Krantz 2008, p. 8). Control methods, such as burning or mowing, have proven ineffective against this species because the grass is a perennial that returns in subsequent years (Eliason 2010, pers. comm.). The draft Pan Hot Springs Habitat Management Plan recommends a pilot program of seasonally-restricted and low-intensity grazing in areas without sensitive plants to determine the effectiveness of this control method (Krantz 2008, pp. 11, 16).

Alteration of habitat, through competition with other plant species continues to be a rangewide and moderate threat to meadow habitat at all 23 *Taraxacum californicum* occurrences.

Summary of Factor A

All meadow habitat supporting *Taraxacum californicum* is impacted by Factor A threats, which in combination pose a substantial threat to this species. Alteration of hydrological conditions, roads and unauthorized vehicular use, developed and dispersed recreation, and other plant species threaten *T. californicum* habitat rangewide. Urbanization poses a more localized, but substantial threat to habitat at approximately one-half of *T. californicum* occurrences. Grazing is a moderate threat to six *T. californicum* occurrences. Mining is a moderate threat to *T. californicum* habitat at one occurrence.

Protective regulatory mechanisms (discussed below in **FACTOR D**) that have changed since listing include a revision of the USFS planning rule, the development of revised land and resource management plans and the Meadow Habitat Management Guide (SBNF 2002), and the designation of critical habitat. These mechanisms provide a more comprehensive level of conservation planning that is likely reducing the magnitude of Factor A threats (e.g., unauthorized OHV use and recreation) by varying degrees within occurrences of *Taraxacum californicum* located on USFS lands (13 occurrences in whole and 4 in part). Conservation actions taken by the SBNF since listing include protecting two occurrences from unauthorized vehicular use and relocating recreational activities away from one occurrence. The BLM has protected one occurrence from cattle grazing.

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. In the 2008 5-year review, we noted that we had no evidence that this threat continued. Since 2008, we have no new information to support this potential threat, and do not believe that overutilization for commercial, recreational, scientific, or educational purposes poses a threat to *Taraxacum californicum* at this time.

FACTOR C: Disease or Predation

Disease is not known to be a threat to *Taraxacum californicum*. Predation of *T. 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 under Factor E. Other effects of grazing, such as destruction of habitat by trampling and alteration of site hydrology are discussed under **FACTOR A**.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At the time of listing, regulatory mechanisms thought to have some potential to protect *Taraxacum californicum* included: 1) the California Environmental Quality Act (CEQA); 2) USFS management policies; 3) conservation provisions under section 404 of the Clean Water Act; and 4) land management by Federal, State, or local agencies, or by private groups and organizations. The final listing rule (USFWS 1998, pp. 49015, 49020, 49021) provides an analysis of the level of protection that was anticipated from those regulatory mechanisms. In the 2008 5-year review, we updated the discussion of USFS management policies. Below, we discuss all regulatory mechanisms discussed in the listing rule. We added discussions on the California Endangered Species Act (CESA), Native Plant Protection Act (NPPA), National Environmental Policy Act (NEPA), and the Act.

State Protections

California Endangered Species Act (CESA) and Native Plant Protection Act (NPPA)

CESA (California Fish and Game Code, section 2080 *et seq*.) prohibits the unauthorized take of State-listed threatened or endangered species. NPPA (Division 2, Chapter 10, section 1908) prohibits the unauthorized take of State-listed threatened or endangered plant species. CESA requires State agencies to consult with CDFW on activities that may affect a State-listed species and mitigate for any adverse impacts to the species or its habitat. Pursuant to CESA, it is unlawful to import or export, take, possess, purchase, or sell any species or part or product of any species listed as endangered or threatened. The State may authorize permits for scientific, educational, or management purposes, and to allow take that is incidental to otherwise lawful activities.

Furthermore, with regard to prohibitions of unauthorized take under NPPA, landowners are exempt from this prohibition for plants to be taken in the process of habitat modification. Where landowners are notified by the State that a rare or endangered plant is growing on their land, the landowners are required to notify CDFW 10 days in advance of changing land use in order to allow salvage of listed plants. CESA generally requires an incidental take permit for activities that would result in take of a State-listed species. Among other requirements for a State incidental take permit, a project proponent must demonstrate that any such take will be fully mitigated. *Taraxacum californicum* is not listed by the State of California as rare, threatened, or endangered and therefore receives no protection under the CESA or NPPA. However, it can co-occur with other State-listed species and may receive indirect protection under CESA and NPPA.

California Environmental Quality Act (CEQA)

CEQA is the principal statute mandating environmental assessment of projects in California, and applies to projects proposed to be undertaken or requiring approval by State and local public

agencies (http://www.ceres.ca.gov/topic/env_law/ceqa/summary.html). The purpose of CEQA is to evaluate whether a proposed project may have an adverse affect on the environment and, if so, to determine whether that effect can be reduced or eliminated by pursuing an alternative course of action or through mitigation.

CEQA requires disclosure of potential environmental impacts and a determination of "significant" if a project has the potential to reduce the number or restrict the range of a rare or endangered plant or animal. Although *Taraxacum californicum* is not State-listed, it is identified by the California Native Plant Society as a California Rare Plant Rank 1B (formerly known as "List 1B") plant (CNDDB 2011, p. 1; http://cnps.org/cnps/rareplants/ranking.php). CDFW recognizes that the majority of plants identified on California Rare Plant Ranks 1A, 1B, and 2 would normally qualify for State listing, and therefore, any impacts to these plants, including *T. californicum*, must be addressed under CEQA (Morey and Berg 1994, p. 23; M. Showers, CDFG, 2011, pers. comm.).

Projects may move forward if there is a statement of overriding consideration. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

California Department of Fish and Wildlife (CDFW)

Baldwin Lake Ecological Reserve

The CDFW owns and conserves 55 hectares (138 acres) of habitat in North Baldwin Meadow. Most of this land, which was originally purchased by The Nature Conservancy and transferred to CDFW in 1986, is now designated as the Baldwin Lake Ecological Reserve (Reserve). The Reserve includes 1 hectare (3 acres) of wet meadow habitat supporting *Taraxacum californicum*. A management plan and "Operations and Maintenance Schedule" for the Reserve and adjacent lands were completed in August 1989 pursuant to a cooperative endeavor involving CDFW, The Nature Conservancy, and USFS. Past management actions included rerouting of trails to avoid rare plant habitat, installation of fencing along State Highway 18 to limit access, and surveying in 2000 (SBNF 2002, pp. 32–33). Additionally, the Friends of the Forest (the official interpretive association of the Big Bear Ranger District) renovated an abandoned building in the Reserve in 1992 for use as a visitor center, which provides information on endangered and threatened species in the Big Bear area, including *T. californicum*. Currently, funding for management of the Reserve is provided through a Federal grant, which allows CDFW to employ maintenance staff (Konno 2011, pers. comm.). As mentioned above under **FACTOR A**, the fence along North Baldwin Meadow needs continual maintenance, as cars breach this barrier (Konno 2011, pers. comm.).

Federal Protections

National Environmental Policy Act (NEPA)

All Federal agencies are required to adhere to the National Environmental Policy Act (NEPA) of 1970 (42 U.S.C. 4321 *et seq.*) for projects they fund, authorize, or carry out. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. The Council on Environmental Quality's regulations for implementing NEPA state that agencies shall include a discussion on the environmental impacts of the various project alternatives (including the proposed action), any adverse environmental effects that cannot be avoided, and any irreversible or irretrievable commitments of resources involved (40 CFR part 1502). Its public notice provisions provide an opportunity for the Service and others to review proposed actions and provide recommendations to the implementing agency. NEPA does not impose substantive environmental obligations on Federal agencies—it merely prohibits an uniformed agency action. However, if an Environmental Impact Statement is prepared for an agency action, the agency must take a "hard look" at the consequences of this action and must consider all potentially significant environmental impacts. Effects on threatened and endangered species is an important element for determining the significance of an impact of an agency action (40 CFR § 1508.27). Thus, although NEPA does not itself regulate activities that might affect *Taraxacum californicum*, it does require full evaluation and disclosure of information regarding the effects of contemplated Federal actions on sensitive species and their habitats. Federal agencies may include mitigation measures in the final Environmental Impact Statement as a result of the NEPA process that help to conserve *T. californicum* and its habitat and these may include measures that are different than those required through the section 7 consultation process.

Clean Water Act (CWA)

Congress passed the Federal Water Pollution Control Act Amendments of 1972 and the CWA of 1977 to provide for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's lakes, streams, and coastal waters. Primary authority for the implementation and enforcement of the CWA rests with the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers (Corps). Section 404 of the CWA is the principal Federal program that regulates activities affecting the integrity of wetlands. Section 404 prohibits the discharge of dredged or fill material in jurisdictional waters of the United States, unless permitted by the Corps under § 404 (a) (individual permits), 404 (e) (general permits), or unless the discharge is exempt from regulation as designated in § 404 (f). The limits of jurisdictional waters of the United States are determined by: (1) In the absence of adjacent wetlands, jurisdiction extends to the ordinary high water mark; (2) when adjacent wetlands are present, jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands; or (3) when the water of the United States consists only of wetlands, jurisdiction extends to the limit of the wetland. Big Bear Lake is considered a jurisdictional wetland; however, in other areas where *Taraxacum californicum* occurrences are found (such as ephemeral drainages) require a significant nexus determination (G. Salas, Corps, 2011, pers. comm.). A site-specific jurisdictional delineation will be required to determine whether a section

404 CWA permit from the Corps would be required for those actions proposed for these areas. Thus, the CWA may not provide protections for all meadow habitat where *T. californicum* is found.

Endangered Species Act of 1973, as amended (Act)

The Endangered Species Act of 1973, as amended (Act), is the primary Federal law that provides protection for *Taraxacum californicum*. The Service is responsible for administering the Act, including sections 7, 9, and 10. Section 7(a)(1) of the Act requires all Federal agencies to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species. Section 7(a)(2) of the Act requires Federal agencies, including the Service, to satisfy two standards in carrying out their program. Federal agencies must ensure that actions they fund, authorize, or carry out are not likely to (1) jeopardize the continued existence of any listed species or (2) result in the destruction or adverse modification of designated critical habitat. A jeopardy determination is made for a project that is reasonably expected, either directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing its reproduction, numbers, or distribution (50 C.F.R. § 402.02). Critical habitat has been designated for this taxon (USFWS 2008b, pp. 1–63).

The section 7(a)(2) prohibition against jeopardy applies to plants as well as animals, but other protections of the Act are more limited for plant species. There is no prohibition against the taking of a protected plant under section 7(a)(2), thus no incidental take statement is prepared in the analysis of effects associated with a project. A non-jeopardy opinion for plants therefore would not include reasonable and prudent measures to minimize incidental take. However, voluntary conservation recommendations may be included. These are discretionary actions the action agency can implement relevant to the proposed action and consistent with their section 7(a)(1) authority to minimize or avoid adverse effects of an action on listed species or critical habitat, to help implement recovery plans, or develop information; however, they are not a precondition for a finding of no jeopardy (or adverse modification).

The Service has an extensive section 7(a)(2) consultation history with the USFS in southern California, including the Mountaintop District of the SBNF. Most recently, the USFS submitted a biological assessment to review the effects of ongoing management activities of SBNF (USFS 2012a). This assessment is intended to tier to and update the Service's consultation on the 2005 revision of the Land and Resource Management Plans for the Four Southern California Forests, including the SBNF Land Management Plan (USFS 2005b). The biological assessment provides updated site-specific information on existing conditions and effects of USFS management within the SBNF for *Taraxacum californicum* and other federally listed plants and their critical habitat; it also outlines features to minimize effects to listed species and critical habitat that may result from activities implemented under several USFS management programs (USFS 2012a, p. 5).

Under the taking prohibitions of section 9(a)(2) of the Act, it is unlawful to remove and reduce to possession (i.e., collect) any endangered species of plant from areas under Federal jurisdiction; maliciously damage or destroy any such species on any such area; or remove, cut, dig up, or damage or destroy such species. For areas outside Federal jurisdiction, there are no restrictions

on killing, damaging, or removing plants or plant parts unless State law prohibits these acts and it can be shown that there was a knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law. The protection of section 9 afforded to endangered species is extended to threatened wildlife and plants by regulation. Additionally, federally listed plants may be incidentally protected if they co-occur with federally listed wildlife species.

The Cooperative Endangered Species Conservation Fund (Conservation Fund), under section 6 of the Act, provides grants to States and Territories to participate in voluntary conservation projects for candidate, proposed, and listed species. The program provides funding to States and Territories for species and habitat conservation actions on non-Federal lands. Four grant programs are available through this the Conservation Fund: Conservation Grants, HCP Assistance Grants, HCP Land Acquisition Grants, and Recovery Land Acquisition Grants.

Under Section 10(a)(1)(A) of the Act, there are provisions for collection of plants or plant parts for scientific purposes or to enhance the propagation and survival of the species. For projects without a Federal nexus that would likely result in incidental take of listed species, the Service may issue incidental take permits to non-Federal applicants pursuant to section 10(a)(1)(B). To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved Habitat Conservation Plan (HCP) that details measures to minimize and mitigate the project's adverse impacts to the listed species. Therefore, HCPs provide an additional layer of regulatory protection to plants as well as animals.

National Forest Management Act (NFMA)

The National Forest Management Act (NFMA) (36 C.F.R. 219.20(b)(i)) has required USFS to incorporate standards and guidelines into Land and Resource Management Plans, including provisions to support and manage plant and animal communities for diversity and for the long-term, rangewide viability of native species.

A new NFS land management planning rule (planning rule) was recently adopted by the USFS (effective May 9, 2012) (USFS 2012). The new planning rule guides the development, amendment, and revision of land management plans for all units of the NFS to maintain and restore NFS land and water ecosystems while providing for ecosystem services and multiple uses. Land management plans (also called Forest Plans) are to be designed so as to (1) provide for the sustainability of ecosystems and resources; (2) meet the need for forest restoration and conservation, watershed protection, and species diversity and conservation; and (3) assist the USFS in providing a sustainable flow of benefits, services, and uses of NFS lands that provide jobs and contribute to the economic and social sustainability of communities. A land management plan does not authorize projects or activities, but projects and activities must be consistent with the plan (USFS 2012b, p. 21261). The plan must provide for the diversity of plant and animal communities including species-specific plan components in which a determination is made as to whether the plan provides the ecological conditions necessary to contribute to the recovery of federally listed species (USFS 2012b, p. 21265).

The most recently revised Land and Resource Management Plans for the four southern California national forests includes strategic direction in the form of land use zoning and standards (USFS 2005c). The land use zoning and standards indicates that for projects under the plans, new activities will be neutral or beneficial to *Taraxacum californicum* and expansion of existing facilities or new facilities will focus recreational use away from *T. californicum* habitat. Exceptions were included for fuel abatement activities ("fuel treatments") in wildland-urban interface areas and to allow for projects with short-term effects but long-term benefits (USFS 2005c, pp. 5–6). However, projects proposed outside of the scope of the Plans may still impact the species.

Meadow Habitat Management Guide

In 2002, SBNF completed the Meadow Habitat Management Guide (SBNF 2002). This guide updates the status of *Taraxacum californicum* on USFS land and on private lands and describes location-specific management strategies to promote the recovery of this species. Management direction and prescriptions are based on existing laws, regulations, and USFS policy (SBNF 2002, p. 1). On USFS land, examples of recommended management actions include: 1) analyzing meadow hydrology and restoring watersheds as necessary, 2) avoiding or minimizing impacts to source and surface hydrology that affects meadow habitat, 3) rerouting of trails and roads, 4) limiting accessibility, 5) developing a weed management plan for controlling nonnative plants, and 6) monitoring for *T. californicum* (SBNF 2002, pp. 26–28). On private lands, management actions may include cooperating with land owners (i.e., CDFW, City of Big Bear Lake, cabin owners) to conserve meadow habitat or discourage impacts (SBNF 2002, pp. 29–70).

Local Agencies

San Bernardino County Land Use/Fire Hazard Abatement Division

The San Bernardino County Land Use/Fire Hazard Abatement Division inspects open area parcels, homes that have a significant amount of tall weeds, and responds to complaints regarding weeds. Weed species are not identified in the San Bernardino County code; thus, there is no mechanism for discriminating between rare plants and weeds on the identified properties (County of San Bernardino 2011a, 23.0304). If the Code Enforcement Office determines a property could be a fire hazard, residents may receive a weed abatement order in the mail. Because mowing is conducted by private owners who wish to remove weeds under the weed abatement program (see **FACTOR E** discussion), nine occurrences of *Taraxacum californicum* within private lands may be impacted.

City of Big Bear Lake

The City of Big Bear Lake General Plan identifies significant biological resources within city boundaries, including *Taraxacum californicum* and its meadow habitat, and establishes a plan to ensure that future development is designed to preserve these resources where feasible or provide mitigation as appropriate (CBBL 2011, pp. 7, 11–12, 15–17). The plan also states that special consideration will be given to preservation of listed endangered species in conformance with

Federal and State laws (CBBL 2011, pp. 25–26). All known occurrences of *T. californicum* and its meadow habitat within city boundaries (Metcalf Meadow and China Gardens/Eagle Point Meadow) fall within areas mapped as "Potential Botanical Resource Areas" in the plan (CBBL 2011, Exhibit ER–2).

Big Bear City Community Services District

Taraxacum californicum occurs on property at Pan Hot Springs Meadow owned and managed by the Big Bear City Community Services District (CSD). This parcel includes 20 hectares (50 acres) of sensitive meadow and wetland habitat. Approximately 4 hectares (10 acres) of the property has been set aside as a rare plant preserve through a deed restriction, but this area does not encompass the entire *T. californicum* occurrence and is not managed.

Private Groups and Organizations

The Wildlands Conservancy

As mentioned above under **FACTOR A**, Bluff Meadow is privately owned and managed by The Wildlands Conservancy (TWC) in their Bluff Lake Reserve (TWC 2011). This meadow has the highest count of *Taraxacum californicum* individuals detected in a single meadow (7,474 plants in 2001) (Krantz 2001, p. 27). Several large gates and signs were installed by TWC in 2001 at access points around their property (SBNF 2002, p. 42). Additionally, TWC has an agreement with an adjacent youth camp to allow use of the lake and trails, but trespass on the meadow is not allowed. Starting with the 2012 summer season (June 1 to November 1), TWC is planning to have a ranger permanently stationed at the reserve. They are also planning to erect more signage (E. Welsh, TWC, 2011, pers. comm.).

Summary of Factor D

In summary, the Act provides the greatest regulatory protection to *Taraxacum californicum.* Many occurrences (13 in whole and 4 in part) are on USFS lands, and 1 occurrence is on both USFS and State land, where protection is afforded through land management plans. The NFMA in conjunction with the requirements of NEPA provides important guidance and policy for maintaining ecosystem and species-specific biodiversity on USFS lands via the development and implementation of land management plans (and environmental impact statements). This includes amendments or revisions to the land management plans, as well as conservation recommendations provided in the Meadow Habitat Management Guide (SBNF 2002). CDFW manages one occurrence within the Baldwin Lake Ecological Reserve. Finally, one occurrence on private land is owned and managed by TWC in their Bluff Lake Reserve. Thus, 15 occurrences in whole and 4 in part currently have some protections provided by Federal and State agencies, and private organizations. However, these protections are discretionary and subject to funding availability (USFS 2012a, p. 93). Therefore, current conservation measures are not sufficient to reduce all threats and are largely dependent on the federally listed status of *T. californicum*. As a result, regulatory mechanisms provided by other Federal, State, and local laws and ordinances do not independently or collectively provide adequate regulatory protection to *T. californicum*.

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

The final listing rule 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. In the 2008 5-year review, we included the threat of trampling by humans under the threat of recreation in Factor A and combined the threats of trampling by livestock, and indirect effects of grazing and browsing under the broader term "grazing." Since 2008, habitat impacts from the threat of grazing and competition with other plant species have been moved to Factor A and new threats identified under Factor E include: fire suppression measures, and climate change and drought. Updated information regarding the magnitude of these threats to *Taraxacum californicum* are discussed below.

Hybridization

In the listing rule, hybridization with the nonnative common dandelion, *Taraxacum officinale*, was identified as a threat to *T. californicum* (USFWS 1998, 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).

We indicated in our 2008 review that proximity to the invasive species *Taraxacum officinale* may result in hybridization with *T. californicum* and prevent or limit population growth of *T. californicum*. *Taraxacum officinale* is a widespread species that has a range of chromosome numbers based on a base number of n=8. One paper reports combinations up to a pentaploid species (2n=40) (Krahulcová 1993, p. 292). Since our 2008 review, we have learned that *T. officinale* may not have the ability to produce viable hybrid individuals with *T. californicum* due to potential differences in chromosome numbers between the species. The *Flora of North America* treatment for *Taraxacum* (Brouillet 2006, p. 248) reports that *T. californicum* has a chromosome count of 16 (2n=16), which would indicate at least the potential to cross with some *T. officinale*. However, upon follow-up with the author, this chromosome count report could be an error and needs further investigation (L. Brouillet, Université de Montréal, 2012, pers. comm.). Previously, *T. californicum* was reported to have a chromosome count of 31 (2n=31) (Lyman and Ellstrand 1998, p. 285), an abnormal number of chromosomes and therefore suggests hybridization with *T. officinale* is unlikely.

The SBNF reported that *Taraxacum officinale* is present at all *T. californicum* occurrences and plants that appear to be hybrids between the two species have been observed by USFS botanists (SBNF 2002, p. 113; Eliason 2007d, pers. comm.); however, individuals that appear to be hybrids could be a result of morphological variation in *T. californicum*.

Since our 2008 review, we received information indicating that hybridization with another nonnative dandelion, *Taraxacum erythrospermum* (red-seeded dandelion), may be a threat. Similar to *T. officinale*, it has a range of chromosome counts, including a count of 16 (2n=16, 32) (Brouillet 2006, pp. 245–246). This species has been identified at three occurrences in Big Meadow, Horse Meadow, and Holcomb Valley (CCH 2011, pp. 1–3; Eliason 2011a, pers. comm.).

In summary, hybridization is a potential rangewide threat to *Taraxacum californicum* that needs further investigation.

Limited Numbers of *Taraxacum californicum* Individuals

In the listing rule, we identified the limited number of *Taraxacum californicum* individuals as a threat to *T. californicum*; however, no specific meadow areas or population densities were identified (USFWS 1998, pp. 49016–49017).

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 and above under **FACTOR A**.

As discussed in our 2008 review, the highest count of individuals seen in a single year was in 2000, with about 925 plants in the 16 meadows surveyed (see Appendix 1). At Merriman Meadow (of Merriman/Red Ant Meadows), approximately 22 plants were observed in 2000, but none were found in 2007 (Appendix 1). Plants have not been found at either Merriman or Red Ant Meadow in recent years (SBNF 2011, p. 14; Eliason 2011a, pers. comm.). Similarly, at North Shore Meadows, 27 plants were found at Juniper Point in 2000, but none were found in recent years (CNDDB 2011, Occurrence Number 43; Eliason 2011a, pers. comm.). Of the four locations that comprise the North Shore Meadows occurrence (Division, East/West Observatory, Juniper Point, and Minnelusa), the only location where *Taraxacum californicum* has been detected in recent years is Minnelusa, with 10 plants in 2011 (SBNF 2011, pp. 2, 3, 5, 7, 13, 25; Eliason 2011a, pers. comm.). The number of plants reported at several occurrences has decreased in recent years, which may be indicative of a rangewide trend.

As mentioned above under **FACTOR A**, Competition With Other Plant Species, SBNF is proposing to burn Juniper Point Meadow where *Taraxacum californicum* have not been detected in recent years. In addition to investigating the effectiveness of prescribed burns as a thatch removal method, SBNF intends to study whether this burn will facilitate germination of any existing *T. californicum* seed in the soil.

The limited number of *Taraxacum californicum* individuals is a substantial threat of particular concern at 18 of 23 occurrences (78 percent), and possibly rangewide (Appendix 1).

Fire Suppression Measures

Since 2008, implementation of fire suppression measures has been identified as a new threat at 9 of 23 extant *Taraxacum californicum* occurrences. The San Bernardino County Land Use/Fire

Hazard Abatement Division (see **FACTOR D** discussion) requires that owners must remove weeds and grasses in areas where this vegetation acts as a fuel that may pose a fire threat. Weeds and grasses are described by the County of San Bernardino generally as annuals that grow and dry out each year, and they did not discriminate for rare plants (County of San Bernardino 2011a, pp. 3–4; County of San Bernardino 2011b, p. 1). Weed and grass removal generally involves mowing, which damages or destroys individual *T. californicum* plants. If removal activities are conducted before or during *T. californicum* flowering and fruit development, the plants reproductive output and germination may be significantly impacted.

Climate Change and Drought

Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). The term "climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007a, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007a, p. 78).

Scientific measurements spanning several decades demonstrate that changes in climate are occurring, and that the rate of change has been faster since the 1950s. Examples include warming of the global climate system, and substantial increases in precipitation in some regions of the world and decreases in other regions. (For these and other examples, see IPCC 2007a, p. 30; and Solomon *et al*. 2007, pp. 35–54, 82–85). Results of scientific analyses presented by the IPCC show that most of the observed increase in global average temperature since the mid-20th century cannot be explained by natural variability in climate, and is "very likely" (defined by the IPCC as 90 percent or higher probability) due to the observed increase in greenhouse gas (GHG) concentrations in the atmosphere as a result of human activities, particularly carbon dioxide emissions from use of fossil fuels (IPCC 2007a, pp. 5–6 and figures SPM.3 and SPM.4; Solomon *et al*. 2007, pp. 21–35). Further confirmation of the role of GHGs comes from analyses by Huber and Knutti (2011, p. 4), who concluded it is extremely likely that approximately 75 percent of global warming since 1950 has been caused by human activities.

Scientists use a variety of climate models, which include consideration of natural processes and variability, as well as various scenarios of potential levels and timing of GHG emissions, to evaluate the causes of changes already observed and to project future changes in temperature and other climate conditions (e.g., Meehl *et al*. 2007, entire; Ganguly *et al*. 2009, pp. 11555, 15558; Prinn *et al*. 2011, pp. 527, 529). All combinations of models and emissions scenarios yield very similar projections of increases in the most common measure of climate change, average global surface temperature (commonly known as global warming), until about 2030. Although projections of the magnitude and rate of warming differ after about 2030, the overall trajectory of all the projections is one of increased global warming through the end of this century, even for the projections based on scenarios that assume that GHG emissions will stabilize or decline. Thus, there is strong scientific support for projections that warming will continue through the

21st century, and that the magnitude and rate of change will be influenced substantially by the extent of GHG emissions (IPCC 2007a, pp. 44–45; Meehl *et al*. 2007, pp. 760–764 and 797–811; Ganguly *et al*. 2009, pp. 15555–15558; Prinn *et al*. 2011, pp. 527, 529). (See IPCC 2007b, p. 8, for a summary of other global projections of climate-related changes, such as frequency of heat waves and changes in precipitation. Also see IPCC 2011(entire) for a summary of observations and projections of extreme climate events.)

Various changes in climate may have direct or indirect effects on species. These effects may be positive, neutral, or negative, and they may change over time, depending on the species and other relevant considerations, such as interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007a, pp. 8–14, 18–19). Identifying likely effects often involves aspects of climate change vulnerability analysis. Vulnerability refers to the degree to which a species (or system) is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the type, magnitude, and rate of climate change and variation to which a species is exposed, its sensitivity, and its adaptive capacity (IPCC 2007a, p. 89; see also Glick *et al*. 2011, pp. 19–22). There is no single method for conducting such analyses that applies to all situations (Glick *et al*. 2011, p. 3). We use our expert judgment and appropriate analytical approaches to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Although many species already listed as endangered or threatened may be particularly vulnerable to negative effects related to changes in climate, we also recognize that, for some listed species, the likely effects may be positive or neutral. In any case, the identification of effective recovery strategies and actions for recovery plans, as well as assessment of their results in 5-year reviews, should include consideration of climate-related changes and interactions of climate and other variables. These analyses also may contribute to evaluating whether an endangered species can be reclassified as threatened, or whether a threatened species can be delisted.

Global climate projections are informative, and, in some cases, the only or the best scientific information available for us to use. However, projected changes in climate and related impacts can vary substantially across and within different regions of the world (e.g., IPCC 2007a, pp. 8–12). Therefore, we use "downscaled" projections when they are available and have been developed through appropriate scientific procedures, because such projections provide higher resolution information that is more relevant to spatial scales used for analyses of a given species (see Glick *et al*. 2011, pp. 58–61, for a discussion of downscaling). With regard to our analysis for *Taraxacum californicum*, downscaled projections are available. We reviewed predictions from PRBO (2011, pp. 1–2), which summarizes recent regional climate models and relevant information from the literature by ecologically-defined regions, or "ecoregions." The Southwestern California Ecoregion encompasses the range of *T. californicum*. We also reviewed predictions from other sources.

Temperature Changes

According to historic climate data, the San Bernardino Mountains have already experienced a warming trend from 1951 to 2006, with warming more pronounced in higher elevations (PRISM Group 2007, pp. 1–3). We reviewed predictions from Cal-Adapt (*http://cal-adapt.org/*; CEC

2011), where projected changes in annual average temperature across the current range of *Taraxacum californicum* are available for the San Bernardino Mountains (areas encompassed by the following U.S. Geological Survey 7.5-minute quadrangle maps: Fawnskin, Big Bear City, Big Bear Lake, Moonridge, Onyx Peak, and San Gorgonio Mountain). Projected future temperatures averaged across the range of *T. californicum* under a low carbon emissions scenario (B1) indicate a 2.2°C (3.9°F) increase in temperature, and a 3.9°C (7°F) increase under a high emissions scenario (A2), between a baseline time period (1961 to 1990) and an end of century period (2070 to 2090) (CEC 2011; S. Love, USFWS, 2013, pers. obs.). High temperature events are expected to become more common in the Southwestern California Ecoregion, and taxa with very narrow temperature tolerance levels may experience thermal stress to the point of direct mortality or diminished reproduction (PRBO 2011, p. 42).

Precipitation Changes

There is a general lack of consensus of the effects of future climate change on precipitation patterns in the Southwestern California Ecoregion. Some models suggest almost no change, whereas others project decreases of up to 37 percent in the ecoregion by 2070 (PRBO 2011, p. 40). Qualitative indicators of changes in concentrated near-surface water vapor (atmospheric rivers) above the Pacific Ocean in current projections suggest flood risks in California from warm-wet storms, commonly known as "pineapple express" storms, may increase beyond those known historically, mostly in the form of occasional "more-extreme-than-historical" storm seasons (Dettinger 2011, p. 522).

Snowpack Changes

High elevation areas will be most severely impacted by temperature and moisture responses (Snyder *et al.* 2004, p. 600). Temperature and precipitation are key factors affecting snowpack, which is the amount of snow that accumulates on the ground. In a warming climate, more precipitation will be expected to fall as rain, not snow, in most areas—reducing the extent and depth of snowpack (EPA 2012a, p. 1). Projected changes in snow water equivalence (amount of water contained in snowpack) across the current range of *Taraxacum californicum* are available from Cal-Adapt for the San Bernardino Mountains (same area identified above under Temperature Changes). April snow water equivalence averaged across the range of *T. californicum* under a low carbon emissions scenario (B1) indicate a 77 percent reduction in snow water, and a 89.4 percent reduction in snow water under a high emissions scenario (A2), between a baseline time period (1961 to 1990) and an end of century period (2070 to 2090) (CEC 2011; Love 2013, pers. obs.).

Reduced snowpack will lead to reduced stream-flows, especially in the spring (USGCRP 2009, pp. 45–46; USEPA 2012b, p. 2). Additionally, rising temperatures cause snow to begin melting earlier in the year, which alters the timing of stream-flow in rivers that have their sources in mountainous areas (USGCRP 2009, pp. 45–46; USEPA 2013, pp. 1–2). Thus, taxa that rely on runoff from snowmelt will find streams and rivers drying up much earlier than before, and temperatures of the water are likely to increase due to a reduction in snowmelt contribution (Snyder *et al.* 2004, p. 600). Further, data specific to the Southwestern California Ecoregion

suggest reduced stream-flow from snow-fed rivers and streams may reduce riparian habitat and affect taxa associated within riparian areas (PRBO 2011, p. 42).

Groundwater Changes

Climate change could affect groundwater sustainability through: 1) decreasing groundwater recharge; 2) more severe and longer lasting droughts; 3) changes in evapotranspiration resulting from changes in vegetation; and 4) increasing demands for ground water as a backup source of water supply. Surficial aquifers, which supply much of the flow to streams, lakes, wetlands, and springs, are likely to be the part of the groundwater system most sensitive to climate change (Alley *et al.* 1999, p. 21).

Potential Effects on Taraxacum californicum and Habitat

Soil hydrology is likely a limiting factor in the distribution of *Taraxacum californicum* in moist meadows. Currently, altered hydrology is a rangewide threat to *T. californicum*, and may be exacerbated by climate change.

Five factors associated with a changing climate may affect the long-term viability of *Taraxacum californicum* occurrences in its current habitat configuration:

1) Drier conditions may result in less suitable moist meadow habitat, a lower percent germination and smaller population sizes, fewer and less reliable recovery cycles of abundant individuals;
2) higher temperatures may inhibit germination, dry out meadows, affect pollinator services;
3) a shift in the timing and nature of the annual precipitation may favor nonnative species or increase erosion and summer drought;
4) the timing of pollinator life-cycles may become out-of-sync with timing of flowering *Taraxacum californicum*; and
5) drier conditions may result in increased fire frequency, making the ecosystems in which *Taraxacum californicum* currently grows more vulnerable to the threats of subsequent erosion and nonnative/native plant invasion.

Although there is uncertainty in climate change projections and the effects of climate change on this particular species, it seems likely that *Taraxacum californicum*, a species restricted to montane meadows in a single small portion of a mountain range found on particular soils with particular hydrological needs, would be threatened rangewide by differences in climatic regimes brought on by changes to the climate in the future. Therefore, based on the best available scientific data at this time, we believe climate change and drought is likely a significant threat to this species.

Summary of Factor E

In summary, limited numbers of *Taraxacum californicum* individuals is a substantial threat of particular concern at 18 of 23 occurrences, and possibly rangewide. Fire suppression is a

moderate threat at nine occurrences. Hybridization is a potential rangewide threat to *T. californicum* that needs further investigation. Climate change impacts to habitats and associated species, such as meadow habitat, are expected to intensify across the range. Although climate change data specific to *T. californicum* is currently limited, impacts continue to threaten this taxon across the range and are likely to increase in the future. The narrow range of *T. californicum* makes it particularly vulnerable to all threats. Therefore, we believe that these natural and man-made threats continue to substantially threaten *T. californicum*.

III. RECOVERY CRITERIA

No recovery plan or recovery outline has been prepared for *Taraxacum californicum*.

IV. SYNTHESIS

The entire known range of *Taraxacum californicum* is limited to vernally wet montane meadows or other montane wetland areas from 1,600 to 2,800 meters (5,300 to 9,000 feet) 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, competition with other plant species, and limited numbers of *T. californicum* individuals. However, the threat of hybridization to *T. californicum* needs further investigation. Since listing, roads, dispersed recreation, climate change and drought, and fire suppression measures have been identified as additional threats to *T. californicum*.

At the time of listing, records indicate that there were 20 occurrences of *Taraxacum californicum*. Currently, there are 23 extant 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 of *T. californicum* occurrences are within or adjacent to urbanized areas. The majority of occurrences (15 in whole and 4 in part) are afforded some protection through current land management plans (on USFS and CDFW lands) or land management practices that benefit *T. californicum* (on private organization land). However, 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. Roads and unauthorized OHV use continues to impact meadow habitat at 13 of 23 *Taraxacum californicum* occurrences; nearly one-third (7 of 23) of all *T. californicum* occurrences are recognized by the SBNF as particularly vulnerable to impacts from developed and dispersed recreation.

Comprehensive rangewide surveys have not been conducted for *Taraxacum californicum*. The highest count of individuals seen across most of the range in a single year was in 2000, with about 925 plants in the 16 meadows that were surveyed that year. In recent years, plants have not been redetected in some meadows or low numbers have been reported, suggesting the number of individuals may be 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 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*.

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

V. RESULTS

Recommended Listing Action:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (indicate reason for delisting according to 50 CFR 424.11):
    ____ *Extinction*
    ____ *Recovery*
    ____ *Original data for classification in error*
_X_ No Change

New Recovery Priority Number and Brief Rationale: No Change

We recommend no change in the recovery priority number of 5 at this time. The taxon is a species that faces a high degree of threat and a low recovery potential.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

The actions listed below are recommendations to be completed over the next 5 years. These will help guide recovery of *Taraxacum californicum* by providing information to better understand the biological and physical factors limiting the population growth and distribution. We recognize that the conservation of *T. californicum* will require extensive cooperation and coordination with partners, including Federal, State, and local agencies, to minimize impacts from current threats and aid future restoration. We will continue to assist in securing property easements or purchases of parcels of land with conservation value to *T. californicum* through the Act's section 6 funding.

1) Continue to work with the State to purchase *Taraxacum californicum* habitat from willing sellers (e.g., Shay Meadow, Metcalf Meadow).

2) Continue to work with the Big Bear City Community Services District to adopt and implement the draft Pan Hot Springs Habitat Management Plan and record the Restrictive Covenant per the plan.

3) Continue to work with local partners to identify an appropriate entity or entities to hold and manage conservation easements that protect *Taraxacum californicum* habitat.

4) Expand the 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.

5) Recommendation specific to threats from limited numbers of *Taraxacum californicum* individuals and hybridization: 1) Determine the breeding system of *T. californicum* and confirm the nature and extent of introgression with *T. officinale* and *T. erythrospermum*. Determine accurate rangewide chromosome counts of *T. californicum*, local *T. officinale* and *T. erythrospermum*. 2) Support SBNF efforts to conduct a prescribed burn of Juniper Meadow and study whether this burn will facilitate germination of any existing *T. californicum* seed in the soil.

6) Recommendation specific to threats from competition with other plant species: Promote research and work with partners to determine the extent to which buildup of thatch contributes to the decline of *Taraxacum californicum* and to conduct comparative work on thatch removal methods (i.e., study the benefits and risks of fire, mowing, and any other thatch removal methods). Support SBNF efforts to conduct a prescribed burn of Juniper Meadow.

7) Recommendation specific to threats from roads and unauthorized OHV use, and developed and dispersed recreation: Support SBNF efforts to identify additional key areas to close to human access (e.g., Yellow Post Site YP25 at Metcalf Meadows).

8) Recommendation specific to threats from inadequacy of existing regulatory mechanisms: Work with the State and San Bernardino County to help facilitate implementation of the weed abatement plan while minimizing impacts to rare plants including *Taraxacum californicum*.

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Appendix 1: Occurrence table for *Taraxacum californicum* (California taraxacum) occurrences; prepared for 2013 5-year review.

Occurrence	Presumed Extant	Meadow	Status			Meadow Condition	Acres	% of total occupied meadow habitat	% remaining meadow habitat unaltered	GIS IDs		Plant Counts		Owner	Threat
			At Listing	2008	2013					Butler OCC#	CNDDB EO#	Highest # Pre-listing (#)	Post-listing (#,Year)		
	N	Arrastre Meadow*	V	V	V		x	x	x	x	19	3	0 ("in recent years")	SBNF	
	N	Aspen Glen/Coldbrook Meadows	V	V	V		x	x	x	x	16	?		PVT	
1	Y	Belleville Meadow (Holcomb Valley area)	E	E	E	SABF	184	6.5	0	8,9,60	25	?	>105 (2000); 500 (2009)*	SBNF	1,3,4,5,6,8,9
2	Y	Big Meadow	E	E	E	U	180	6.4	100	16,17, 45,66	4,36	?	5 (2000); 8 (2009)*	SBNF	1,5*,8,9,10
3	Y	Bluff Meadow (Bluff Lake System)	E	E	E	SABF	80	2.8	0	11,12, 30,33, 48,49, 50	13,48*	?	30 (1999); 142 (2000)*[3]; 7,474 (2001)*; 1,000 (2009)*[3]	PVT/SBNF	1,2,3~~,4,5~~,8,9,11*
4	Y	Bow Meadow[1]	-	E	E	SABF/D	3.4	0.1	0	39	33	?	2 (2000)	SBNF	1,2,5*,8,9,10
5	Y	Broom Flat Meadow[1]	-	E	E	SABF	76	2.7	0	58,69	32	?	15 (2000); 100 (2001); 1 (2010)*	SBNF	1,3,5*,7,8,9,10*

6	Y	China Gardens/Eagle Point Meadows	E	E	E	SABF/ NF/D	180	6.4	0	2,3,6, 7,29,34	21,47*	~35*	40 (2009)*; 23 (2010)*	PVT	1,2,3,5*,8, 9,10,11*
7	Y	Cienega Seca Meadow	E	E	E	SABF	49	1.8	0	63	2	~~<~~101-1000	15 (2007)	PVT	1,~~3,4,5,~~8,9 ,10,11*
8	Y	Erwin Meadows	PE	PE	PE	SABF	15	0.5	0	64	26	?		PVT	1,2,3,7*,8, 9,10,11*
	N	Fawnskin Meadow	V	V	V		x	x	x	x	45	?	0 (2001)	PVT/SBNF	
9	Y	Fish Creek Meadows	E	E	E	U	71	2.5	100	18 54,55, 56,57	 6,~~31,37~~	50 ?	0 (2000) 187 (2000)	SBNF	5*,8,9
10	Y	Green Spring Meadow	E	E	E	SABF	34	1.2	0	23	12	?	0 (2000); 0 (2002)	SBNF	1,8,9,10
11	Y	Hitchcock Meadow (Holcomb Valley area)	E	E	E	SABF	286	10.2	0	5,10, 24	20	?	2 (1999)	PVT/SBNF	1,3,4,5,7,8 ,9,10,11*
12	Y	Horse Meadow	E	E	E	U	74	2.6	100	35	5,44	?	19 (2000); 35 (2002); 50 (2010)*	SBNF	3,5*,8,9,10
13	Y	Lost Creek Meadow* (formerly: Unnamed Meadow (E of Southfork Meadow))	E	E	E	U	0.7	0.02	100	65	11	?	0 (2007)*	SBNF	8,9,10
14	Y	Merriman/Red Ant Meadows (Merriman)[1,2]	-	E	PE	U	19	0.7	100	51	39	?	22 (2000); 0 (2007)*	SBNF	2,4,5,8,9,10
		Merriman/Red Ant Meadows (Red Ant)[1,2]					6.4	0.2	100	37	38	?	4 (2000); 0 ("in recent years")*		2,3,5*,8,9, 10
15	Y	Metcalf Meadow (south occurrence)	E	E	E	U	145	5.2	0.1	46,47, 59	29	?	6? (2000)*; 42+ (2007)*; 100	SBNF	1,2,3,5,8,9 ,~~10~~

												(2009)*			
16	Y	Metcalf Meadow (north occurrence)	E	PE	E	NF/D				13,14	16	?	14 (2009)*	PVT, CalTrans*	1,2,3,5*,8,9,10,11*
17	Y	Mission Springs Meadow* (formerly: Unnamed Meadow (E of Fish Crk Meadow))	E	E	E	U	15	0.5	100	67	10,46*	?	12 (2009)*	SBNF	1*,8,9,10
18	Y	North Baldwin Meadow	E	E	E	SABF	159	5.7	0	25, 26	17, 27	130*	2 (1999); 20 (2000)	SBNF/ STATE	1,2,3*,5*,7*,8,9,10
19	Y	North Shore Meadows (Division)	E	E	E	SABF	295	10.5	0	38	41	?	1 (2000); 0 (2011)*	PVT/SBNF	1,2,3,4,5,8,9,10,11*
		North Shore Meadows (East/West Observatory)								4,32	30	<50*	2 (1999); 0 (2000); 0 (2011)*		
		North Shore Meadows (Juniper Point)								40,41, 42	43	?	27 (2000); 0 (2011)*		
		North Shore Meadows (Minnelusa)								43,44	42	?	5 (2000); 10 (2009)*; 10 (2011)*		
20	Y	Pan Hot Springs Meadow	E	E	E	SABF	227	8.1	0	27	24	<10	12 (2008)*	PVT	1,2,~~3,7,~~8,9,10,11*
	N	Seven Oaks Meadow	V	V	V		x	x	x	x	14	?	0 (2002)	PVT/SBNF	
21	Y	Shay Meadow (proper)	PE	PE	PE	SABF	595	21.2	0	62	28	100-200		PVT	1,2,3,7*,8,9,11*
		Shay Meadow (South Baldwin)	-	E	E					36	40	?	158 (2000)	SBNF	
22	Y	South Fork Meadows	E	E	E	U	77	2.8	100	19		?	0 (2000)	SBNF	1,5*,8,9,10
										20		1	0 (2000)		
										21		?	0 (2000)		

										22		1	0 (2000)		
										31,52, 53	1,3	2?	53 (2000)		
	N	Sugarloaf Meadow	V	V	V		x	x	x	x	7	?	0 (2002)	SBNF	
-	N*	~~Unnamed Meadow (west of Shay Meadow in town of Sugarloaf)~~	~~V~~	~~V~~	~~V~~	-	~~3.3~~	~~0.1~~	~~0~~	~~28~~	~~9~~	~~?~~	~~1 (1999)~~	~~PVT~~	~~1,2,3,8,9,10~~
										1	34	?	40 (2000); 11 (2007)*		
										15		?	0 (2000)		
23	Y	Wildhorse Meadows	E	E	E	U	32	1.2	100	61	35	?	95 (2000); >10 (2008)*; 50 (2009)*; 37 (2010)*	SBNF	1,5*,7,8,9, 10*

Notes:
[1]New occurrence (since listing) found in meadow not previously known to support *Taraxacum*
[2]Grouped into one occurrence by SBNF. Merriman Meadow and Red Ant Meadow discussed
[3]Survey on SBNF only. Known occurrence on private land not visited.
*New information since 2008 5-year

Meadow Condition Key:
U - unaltered
SABF - somewhat altered but functioning
NF - not functioning
D - destroyed

Status Key:
E - Extant
PE - Presumed Extant
V - Vague record

Ownership Key:
PVT - private
SBNF - San Bernardino National
STATE - State

Sources:
Bill 2007a, pp. 1-2
Boyd and LaPre 1983
Butler 2000, pp. 56-59
CNDDB 2011
Denslow *et al*., 2002
Fraga 2011
Krantz 2001
SBNF 2002
SBNF 2011

Threats Key:
1 - Alteration of hydrological
2 - Urbanization/Development
3 - Roads and unauthorized
4 - Developed recreation
5 - Dispersed recreation
6 - Mining
7 - Grazing
8 - Hybridization with nonnative
9 - Competition with other plant
10 - Limited numbers of *T.*
11* - Fire suppression measures

Appendix 2: Additional information on threat status at *Taraxacum californicum* (California taraxacum) occurrences; prepared for 2013 5-year review.

Urbanization

China Gardens/Eagle Point Meadow

Since our 2008 review, we have confirmed that China Gardens plants of the China Gardens/Eagle Point Meadow occurrence have been extirpated by residential development (Eliason 2011a, pers. comm.).

The Eagle Point Meadow plants of the China Gardens/Eagle Point Meadow occurrence are within the Eagle Point Estates open space (also referred to as Lot K), 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).

Metcalf Meadow

According to an analysis by the SBNF, the habitat supporting the north occurrence at Metcalf Meadow was identified as partly "not functioning" and partly destroyed (Eliason 2007d, pers. comm.). In our 2008 review, we stated that this occurrence was likely extirpated by residential development, but this was not confirmed. We know now that the north Metcalf Meadow occurrence is extant (Eliason 2011a, pers. comm.) Representing the westernmost occurrences in Bear Valley, north Metcalf Meadow and China Gardens/Eagle Point Meadows (described above) are significant to the distribution of *Taraxacum californicum* (T. Krantz, University of Redlands, 2007, pers. comm.). Development is a significant threat to this occurrence and the surrounding meadow habitat, as the old drive-in movie theater site where it occurs is currently proposed for development (CBBL 2012, p. 1). Two adjacent private properties with suitable meadow habitat that may support *T. californicum* are also up for sale (Eliason 2011b, pers. comm.).

Pan Hot Springs Meadow

The plants at Pan Hot Springs Meadow occur on Big Bear City CSD property. In 1990, the Corps required the CSD to mitigate impacts elsewhere by placing a deed-restriction over 10 acres of the Pan Hot Springs property to protect co-occurring federally-listed species *Thelypodium stenopetalum* (slender-petaled mustard) and *Sidalcea pedata* (pedate checker-mallow) (BBCCSD 1990, p. 1). We now know that these species along with *Taraxacum californicum* and its meadow habitat occur both inside and outside of the boundaries of this 10-acre preserve area (BBCCSD 1990, p. 3; CDFG 1994, pp. 1, 3; Krantz 2008, p. 22). Additionally, the spring 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). The CSD has future plans to develop a community park and sports fields, which may overlap some of the meadow (BBVRPD 1996, p. 1; Krantz 2008, p. 10; T. Moran, CSD, 2011, pers. comm.). In response to our 2007 proposed critical habitat designation of the Pan Hot Springs area, the CSD funded the development of the draft Pan Hot Springs Habitat Management Plan (HMP), which provides direction to the CSD regarding management of an

135-acre plan area while establishing a restrictive covenant over approximately 40 acres of meadow habitat within the plan area (Krantz 2008, pp. 1–2). This proposed Covenant Area would include the existing 10-acre preserve and also encompass all known locations of *T. californicum* and other endangered plants within the surrounding meadow (BBCCSD 1990, p. 3; Krantz 2008, p. 8). The HMP has not yet been adopted and the restrictive covenant was not recorded due to lack of funding (Moran 2011, pers. comm.).

Erwin Meadows

In our 2008 review, we stated 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). Since 2008, the development of Hamilton Ranch was completed. The occurrence of *Taraxacum californicum* remains extant, and although no protection measures exist, the area is a fenced horse paddock; thus, there does not appear to be an immediate threat of development (Eliason 2011b, pers. comm.). Horse grazing and mowing pose more immediate threats to this occurrence.

Shay Meadow

Shay Meadow has an occurrence that had 100 to 200 individuals in 1988 and it is still undeveloped, but it is all privately owned (Butler 2000, pp. 57, 58). Like Erwin Meadows, horse grazing and mowing pose more immediate threats to this occurrence (Eliason 2011b, pers. comm.).

Roads and Unauthorized Off Highway Vehicular (OHV) Use

Holcomb Valley (Hitchcock and Belleville meadows)

As discussed in our 2008 review, 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; Eliason 2011a, pers. comm.). Since 2008, SBNF have continued their efforts to construct and maintain structures blocking OHV use in Belleville Meadow in Holcomb Valley, but these structures are still being breached (Eliason 2011a, pers. comm.). In Hitchcock Meadow (also in Holcomb Valley), construction of roadside fencing has corrected the problem on SBNF lands, but we do not have updated information regarding OHV activity on the rest of the meadow, of which the majority is privately-owned (Eliason 2011a, pers. comm.).

North Baldwin Meadow

North Baldwin Meadow was fenced and protected from vehicles (SBNF 2002, p. 33); however, the fence along North Baldwin Meadow has been noted as needing repairs in 2010 and 2011 (Eliason 2010, pers. comm.; Eliason 2011a, pers. comm.). This fencing is within California Department of Fish and Wildlife's (CDFW) Baldwin Lake Ecological Reserve. According to CDFW, the fence is in need of continual maintenance at this location, as it is damaged regularly by cars crashing through it; they are planning to make the repairs (Konno 2011, pers. comm.).

Broom Flat Meadow

The SBNF identified OHV use as a "significant threat" to Broom Flat Meadow. Some areas of the meadow have been fenced, but the fence is in poor condition (SBNF 2002, p. 46; Eliason 2011a, pers. comm.).

Metcalf Meadow

Evidence of OHV activity was observed at Metcalf Meadow (south occurrence) in 2011 (Eliason 2011b, pers. comm.).

Developed and Dispersed Recreation

Cienega Seca Meadow

At this time, we believe campground development is not a current threat to Cienega Seca Meadow, and the threat from dispersed recreation has been minimized at this location. Currently, 82 percent of Cienega Seca Meadow is privately owned by the Los Angeles County Outdoor Science School (LACOSS). Not a camp, the Blue Sky Meadow Outdoor Science School is coordinated by the Los Angeles County Office of Education and is conducted as a weekly California public school (LACOSS 2011, p. 1). The *Taraxacum californicum* occurrence is entirely on LACOSS land. There is a road on the perimeter of the meadow and one trail that bisects the meadow. Although there are no fences or signs, foot traffic on the meadow is not allowed. LACOSS employs a Preserve Manager who strictly enforces these rules and communicates them to each arriving group (Hawke 2007, pers. comm.). Additionally, the part of the meadow where *T. californicum* occurs is well away from the campground and trail (Eliason 2011b, pers. comm.).

North Shore Meadows

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; Eliason 2011a, pers. comm.). Very few *Taraxacum californicum* individuals remain at this occurrence (S. Eliason, SBNF, 2007c, pers. comm.; Eliason 2011a, pers. comm.).

Bluff Meadow

Forty-four percent of Bluff Meadow is privately owned and managed by The Wildlands Conservancy (TWC) in their Bluff Lake Reserve (TWC 2011, p. 1). Information received since 2008 indicates that this meadow has the highest count of *Taraxacum californicum* individuals detected in a single meadow rangewide (7,474 plants in 2001) (Krantz 2001, p. 27). As of 2008, TWC leased an area adjacent to the meadow to the San Bernardino County Regional Parks Division as an outdoor science education camp (TWC 2005, p. 1). In 2011, TWC sold the camp

and it is now the future site of a Jewish youth camp (HDCG 2011, p. 1). According to the SBNF, TWC installed several large gates and signs in 2001 at access points around their property (SBNF 2002, p. 42). Additionally, TWC has an agreement with the camp to allow use of the lake and trails, but trespass on the meadow is not allowed. Starting with the 2012 summer season (June 1 to November 1), TWC is planning to have a ranger permanently stationed at the reserve. They are also planning to erect more signage (Welsh 2011, pers. comm.). Although we stated in our 2008 review that there are no protective measures in place for the eastern portion of Bluff Meadow on SBNF land, we now know that this area is far from dispersed recreation, and therefore threats from these activities are low in this portion of the meadow (Eliason 2011a, pers. comm.). Additionally, we believe campground development is not a current threat to this occurrence at this time, and the threat from dispersed recreation will be minimized if protective measures are implemented by TWC as anticipated.

Hitchcock Meadow

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 2011, pp. 1, 5). *Taraxacum 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).

Belleville Meadow

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; Eliason 2011a, pers. comm.).

Red Ant Meadow

All of Red Ant Meadow is owned by the SBNF. However, it is adjacent to Deer Group Camp and may be threatened by dispersed recreation (SBNF 2002, pp. 63–64).

Merriman Meadow

Seventy-three percent of Merriman Meadow is privately owned by the Girl Scouts Greater Los Angeles (GSGLA) and is adjacent to their recreational and educational activity camp (Camp Osito Rancho) (GSGLA 2011, pp. 1–2). Although the only known *Taraxacum californicum* occurrence in Merriman Meadow is on SBNF land, it is immediately adjacent to the GSGLA property, and there are no known existing protection or restoration measures for the occurrence and its habitat (SBNF 2002, p. 58).

Metcalf Meadow

A popular dispersed campsite on the SBNF (referred to as Yellow Post Site 25) threatens adjacent *Taraxacum 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, 2007b, pers. comm.; Eliason 2011a, pers. comm.).

Fish Creek Meadows and South Fork Meadows

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 (USFWS 2005, p. 215).

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW

***Taraxacum californicum* (California Taraxacum)**

Current Classification: Endangered

Recommendation Resulting from the 5-year Review:

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

Review Conducted By: _____Carlsbad Fish and Wildlife Office_____

FIELD OFFICE APPROVAL:

ACTING

Lead Field Supervisor, U.S. Fish and Wildlife Service

AUG 2 3 2013

Approve _____ Scott A. Sobiech Date _____