Cirsium loncholepis [*Cirsium scariosum* var. *loncholepis*]
(La Graciosa thistle)

5-Year Review:
Summary and Evaluation

Photo by Mark A. Elvin, USFWS 2007

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

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5-YEAR REVIEW

Cirsium loncholepis [*Cirsium scariosum* var. *loncholepis*] (La Graciosa thistle)

I. GENERAL INFORMATION

Purpose of 5-Year Review:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years to ensure that its classification as threatened or endangered provides the appropriate level of protection. We consider the best available scientific and commercial data on the species, and focus on new information since the species was listed. The purpose of our review is to evaluate whether or not the species' status has changed since listing, and whether reclassification or delisting should be considered. Our original listing of a species as endangered or threatened is based on the existence of 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 reclassification or delisting of a species. A 5-year review contains an analysis of updated information on the species' biology and threats, and we interpret progress towards recovery in the context of eliminating or reducing the five threat factors. 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:

Cirsium loncholepis [*Cirsium scariosum* var. *loncholepis*] (La Graciosa thistle) is a short-lived monocarpic perennial (a plant that blooms once, then dies) in the Asteraceae (sunflower family) that is well armored with spines on the leaves and flower heads (Hendrickson 1990, Keil and Turner 1993, Teed 2003). There have been several taxonomic revisions for this species since that date and *C. loncholepis* is currently recognized by the scientific name *Cirsium scariosum* var. *loncholepis* (see Changes in Taxonomic Classification or Nomenclature section below for reference to change in scientific name since listing). We refer to this species throughout the rest of the document as *Cirsium scariosum* var. *loncholepis*. Historically, *C. scariosum* var. *loncholepis* was found in coastal wetlands between Arroyo Grande Creek in San Luis Obispo County to the north and the Santa Ynez River in Santa Barbara County to the south. Currently, it is known from four populations that range from the southern Callender Dune Lakes area (San Luis Obispo County) in the north to the Santa Maria River (Santa Barbara County) in the south.

Methodology Used to Complete the Review:

This review was prepared by the Ventura Fish and Wildlife Office (VFWO), following the Region 8 guidance issued in March 2008. We used information from the recovery plan, survey information from experts who have been monitoring various localities of this species, and the California Natural Diversity Database (CNDDB) maintained by the California Department of Fish and Game. The recovery plan and personal communications with experts were our primary sources of information used to update the species' status and threats. This 5-year review

contains updated information on the species' biology and threats, and an assessment of that information compared to that known at the time of listing. 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:

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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 (FR) on May 21, 2010 (Service 2010). No information was received in relation to this species.

Listing History:

Original Listing
FR Notice: 65 FR 14888
Date of Final Listing Rule: March 20, 2000
Entity Listed: *Cirsium loncholepis*; a plant species
Classification: Endangered

State Listing
Cirsium loncholepis was listed as threatened by the State of California in 1990.

Associated Rulemakings:
Critical Habitat Designation: March 17, 2004 (69 FR 12553)
Revised Critical Habitat Designation: November 3, 2009 (74 FR 56978)

Review History: N/A

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for *Cirsium scariosum* var. *loncholepis* is 2 according to the Service's 2009 Recovery Data Call for the Ventura Fish and Wildlife Office, based on a 1-18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (Service 1983). This number indicates that the taxon is a species (as it is currently listed under the Act) that faces a high degree of threat and has a high potential for recovery.

Recovery Plan or Outline: We initiated a draft recovery outline for *Cirsium scariosum* var. *loncholepis* in 2008, but it has not been completed (Service 2008a). The draft recovery outline does not include information that we received during the development of the revised critical habitat rule.

II. REVIEW ANALYSIS

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

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

Information on the Species and its Status

Species Biology and Life History

Cirsium scariosum var. *loncholepis* (La Graciosa thistle) is a short-lived monocarpic perennial (a plant that blooms once, then dies) (Hendrickson 1990, Keil and Turner 1993, Teed 2003). It is a spreading, mound-like or erect plant in the sunflower family (Asteraceae) that is well armored with spines on the leaves and flower heads. The plants range from 4 to 39 (occasionally up to 59) inches (10 to 100 (occasionally up to 150) centimeters (cm)) tall, with one or more stems. The lower leaves are 4 to 12 inches (10 to 30 cm) long, with spiny petioles (leaf stalks), and are usually deeply lobed with secondary lobes or teeth. The leaves are wavy-margined. The leaf bases of the middle and upper leaves form short, spiny wings along the petiole. Flowering heads are 0.8 to 1.6 inches (2 to 4 cm) wide in tight clusters at the tips of the stems. The corollas (flowers) are 1 to 1.2 inches (25 to 30 millimeters (mm)) long and are nearly white with a purplish tube containing purple anthers. The achenes (fruit) are 0.01 to 0.02 inches (3 to 4 mm) long and topped by an umbrella of long awns (0.6 to 1.0 inch (15 to 25 mm)) that are ideal for wind dispersal (Keil and Turner 1993). Large individuals produce more flowering heads and more seeds per head (average = 473 seeds per plant) than smaller individuals (average = 168 seeds per plant), and therefore contribute disproportionately to the future seedbank of the population (M. Lea, California Polytechnic State University, San Luis Obispo, pers. comm. 2001).

Distribution

Below, we define various terms that are used for different assemblages of plants that we use in discussing the status of *Cirsium scariosum* var. *loncholepis*. In this rule we use the term "occurrence" to be consistent with the definition used by the CNDDB: a grouping of plants within 0.25 mile (0.4 kilometer (km)) of each other (CNDDB 2007). There may be (and occasionally are) one or more discrete polygons of plants within a single "occurrence." We use the term "population" to refer to a group of interbreeding individuals, in the biological sense of the word. There may be (and usually are) one or more "occurrences" within a single population. Our use of the term "location" in previous rules for *C. scariosum* var. *loncholepis* was interchangeable with "occurrence" and "population." In this rule "location" refers only to a particular site, area, or region, as in "at that location," with no relation to an assemblage of plants

(e.g., polygon, occurrence, population). The terms "site," "area," and "region" refer to physical places.

Cirsium scariosum var. *loncholepis* historically was found in mesic areas (areas with intermediate or medium moisture conditions that are neither very wet nor very dry) in back dune and coastal wetlands along a 32-mile (52-km) stretch of the coastal region of central California between Arroyo Grande Creek in San Luis Obispo County to the north and the Santa Ynez River in Santa Barbara County to the south (Hendrickson 1990, Service 2009a, Consortium of California Herbaria (CCH) 2010, CNDDB 2010). In this range, it occurred up to 16 miles (26 km) inland where it was documented at the Cañada de las Flores area on the south side of the Solomon Hills. Most of the known occurrences are associated with mesic sites in two dune complexes (the Santa Maria Valley Dune Complex and the Santa Ynez Valley Dune Complex) and along the drainages and tributaries of four major watersheds in this area (from north to south: Arroyo Grande Creek, Santa Maria River, San Antonio Creek, and Santa Ynez River) (see Figure 1).

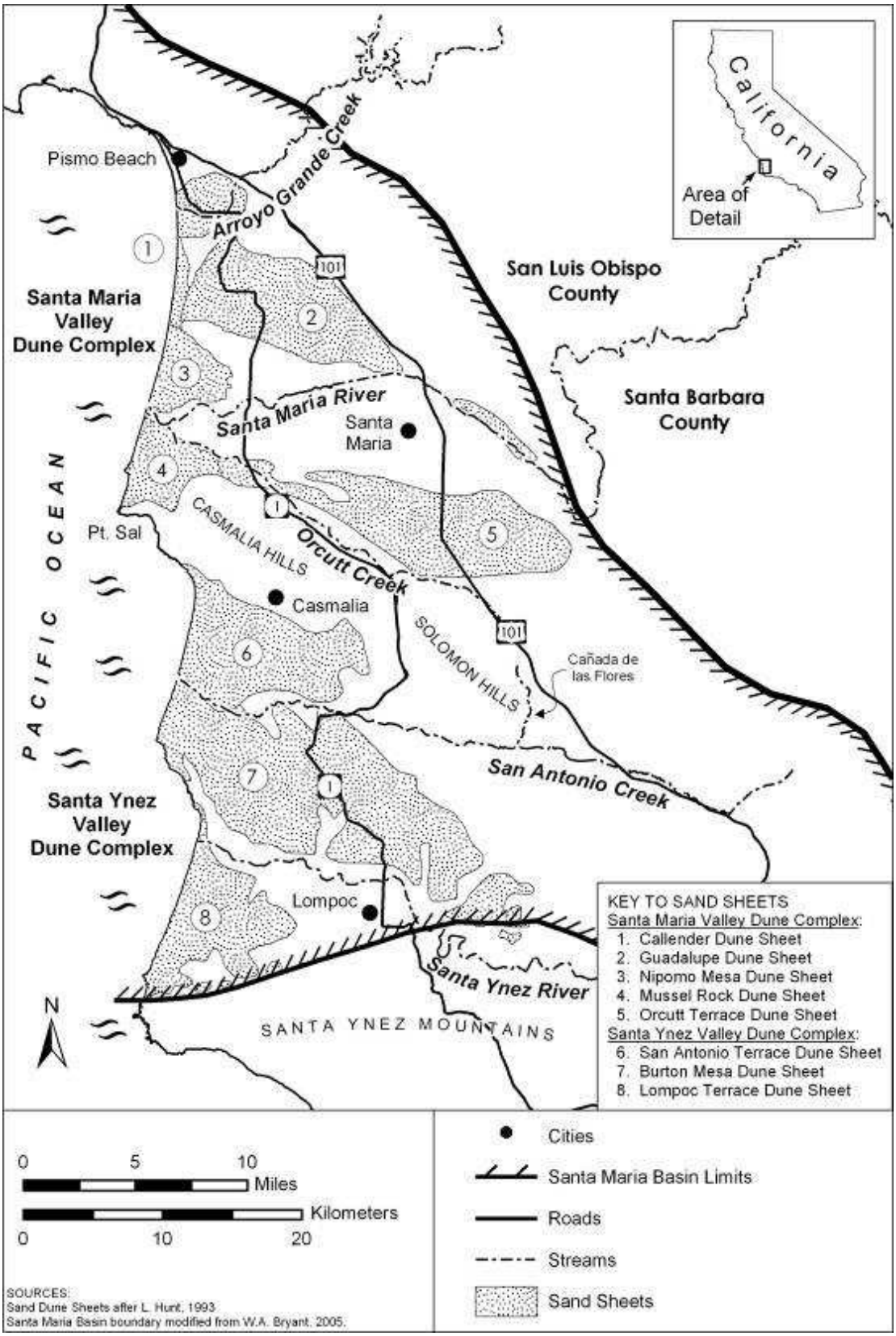

Figure 1. *Cirsium scariosum* var. *loncholepis* place and feature names.

Abundance and Population Trends

Historically, *Cirsium scariosum* var. *loncholepis* has been reported or documented from a total of 21 occurrences that have been grouped among 10 populations ranging from the dunes near Pismo Beach inland to hillside seeps at Cañada de las Flores and south to the floodplains of the Santa Ynez River (Service 2009a, CNDDB 2010, CCH 2010). These 10 populations are: Oceano, northern Callender Dune Lakes, southern Callender Dune Lakes, Oso Flaco, southern Guadalupe Dunes, Santa Maria River, Guadalupe, La Graciosa (type locality – the geographical location for the collection of the type specimen or the specimen that fixes a name to a species), Cañada de las Flores, and Santa Ynez River. See: Hendrickson (1990); Service 2000a, 2004a, 2008a, 2009a; and CNDDB (2009, 2010) for additional and more in-depth discussions on the historical habitats, distribution, and range of *C. scariosum* var. *loncholepis*.

At the time of the listing in 2000, there were 17 recorded occurrences of *Cirsium scariosum* var. *loncholepis*. After reviewing the historical records at that time, we determined that 11 of the 17 occurrences were extant (still in existence). These 11 extant occurrences were distributed among 7 populations. At the time of listing, the extant occurrences ranged from the northern Callender Dune Lakes in the Callender Dunes in the north to the seeps at Cañada de las Flores in the south (CNDDB 1998, Service 2000a). Since the time of listing, *C. scariosum* var. *loncholepis* has experienced considerable declines throughout its range in the number of populations, occurrences, and individuals (CNDDB 2009, 2010; Service 2009a). Currently, *C. scariosum* var. *loncholepis* is considered to be extant at eight occurrences that are distributed among four populations: southern Callender Dune Lakes, Oso Flaco, southern Guadalupe Dunes, and Santa Maria River. The eight extant occurrences consist of five occurrences that were identified in the final listing rule in 2000 as well as three new occurrences that have been identified since that time (Elvin 2006, 2007a; CNDDB 2010). The extant occurrences range from the southern Callender Dune Lakes in the north to the Santa Maria River in the south. See Figure 2 for the current and historical distributions of *C. scariosum* var. *loncholepis.*

Table 1: Population records for *Cirsium scariosum* var. *loncholepis* collated from various sources.

Identification Number (CNDDB unless noted otherwise)	Location Name, County	Current Status	Last Observed/ Documented	Pop Size/Year Surveyed[1]	Reference
Oceano					
14	Pismo Beach, San Luis Obispo	Extirpated	1931	Present (1910) Present (1931) 0 (1990)	*Condit s.n.* (UC [2]), *Hoffmann s.n.* (SBBG[2]), CCH 2010, CNDDB 2010
North Callender Dune Sheet Lakes					
10	Mud Lake, San Luis Obispo	Possibly extirpated	1983	10 (1981) 100+ (1983) 0 (1986)	Hendrickson 1990, CNDDB 2010
11	Dune Lakes, San Luis Obispo	Possibly extirpated	1988	Present (1958) Present (1973) <10 (1981) <50 (1984) 20 (1988)	*Smith 5841* (RSA, RSA, SBBG, SBBG[2]), *Smith 10673* (MIN, RSA, SBBG, SD, UCR, UCR, UCSB, UCSB[2]), CCH 2010, CNDDB 2010

Identification Number (CNDDB unless noted otherwise)	Location Name, County	Current Status	Last Observed/ Documented	Pop Size/Year Surveyed[1]	Reference
South Callender Dune Sheet Lakes					
8	NNW of Jack Lake, San Luis Obispo	Presumed extant	1998	<50 (1990) 2 (1998)	Hendrickson 1990; J. Chesnut, biologist, *in litt.* 1998; Chesnut 1998; CNDDB 2010
9	Jack Lake, San Luis Obispo	Possibly extirpated	1990	Present (1958) Present (1964) Present (1968) Present (1981) 63 (1990) 0 (1998)	*Blakley 2416* (JEPS, SBBG, UC[2]); *Griffiths s.n.* (OBI[2]); *Holden 363* (OBI[2]); *Hoover 9264* (UC[2]); *Philbrick s.n.* (SBBG, SBBG[2]); *Thorne 37769* (RSA[2]); Hendrickson 1990; Chesnut, *in litt.* 1998; Chesnut 1998; CCH 2010; CNDDB 2010
20	Callender Dunes, San Luis Obispo	Possibly extirpated	1990	11 (1990) 0 (1998)	Hendrickson 1990; Chesnut 1998, CNDDB 2010
Oso Flaco Lake/North Guadalupe Dune Sheet					
12	Surprise Lake, San Luis Obispo	Presumed extant	2008	<50 (1981) 0 (1986) 50 (1987) 25 (1988) 27 (1990) 7 (1998) 10 (2008)	*Elvin 6008* (IRVC[2]*);* Chesnut, *in litt.* 1998; Chesnut 1998; CNDDB 2010
13	Oso Flaco Lake, San Luis Obispo	Possibly extirpated	1990	Present (1949) Present (1960) 34 (1990) 0 (1998)	*Blakley 3506* (JEPS, SBBG[2]); *Nobs 849* (POM, UC[2]); Chesnut, *in litt.* 1998; Chesnut 1998; CCH 2010; CNDDB 2010
30	SW of Oso Flaco Lake, San Luis Obispo	Possibly extirpated	1975	Present (1975) 0 (1998)	*Keefe 1675* (UCSB[2]), Chesnut 1998, CCH 2010, CNDDB 2010
N/A[3]	NW shore of Oso Flaco Lake, San Luis Obispo	Possibly extirpated	1962	Present (1962) 0 (1998)	*Fuller 9229* (CDA, CDA, CDA, CDA[2]), CCH 2010
31	Guadalupe-Nipomo Dunes National Wildlife Refuge, San Luis Obispo	Presumed extant	2008	Present (2007) Present (2008)	*Elvin 5411* (IRVC[2]), *Elvin 5624* (UCR[2]), Service 2008b
South Guadalupe Dune Sheet					
18	Chevron, San Luis Obispo	Presumed extant	2006	137 (1990) 31 (1995) Present (1998) 25 (2006)	*Keil 28199* (OBI, OBI, OBI[2]), Hendrickson 1990, Elvin 2006, CNDDB 2010
32	Chevron entrance, San Luis Obispo	Presumed extant	2006	<50 (2006)	Elvin 2006, CNDDB 2010,
6 (in part)	North of Santa Maria River, San Luis Obispo	Presumed extant	2006	Present (1998) Present (2006)	*Keil 28198* (OBI[2]), Elvin 2006, CNDDB 2010,

Identification Number (CNDDB unless noted otherwise)	Location Name, County	Current Status	Last Observed/ Documented	Pop Size/Year Surveyed[1]	Reference
Santa Maria River					
6 (in part)	Santa Maria River, San Luis Obispo and Santa Barbara	Presumed extant	2006	Present (1935) Present (1962) Present (1974) Present (1985) 6,000 (1986) 54,000 (1990) Present (1995) Present (1998) 500 (2001) <10 (2006)	*Blakley 5165* (JEPS, RSA[2]), *Carter 933* (UC[2]), *Chandler 921* (SBBG[2]), *Johnson s.n.* (CDA[2]), *Pritchett 11* (UCSB, UCSB[2]), Hendrickson 1990, Elvin 2006, CCH 2010, CNDDB 2010
19	Santa Maria, San Luis Obispo and Santa Barbara	Presumed extant	2006	100 (1991) Present (2006)	Elvin 2006, CNDDB 2010
Guadalupe					
28	Guadalupe, Santa Barbara	Extirpated	1983	Present (1983) 0 (2009)	*Bevier s.n.* (UCSB[2]), CCH 2010, CNDDB 2010
La Graciosa/San Antonio Terrace Dune Sheet					
4	La Graciosa, Santa Barbara	Extirpated	1906	Present (1906) 0 (1979) 0 (2007) 0 (2008)	*Eastwood 859* (CAS[2]); Eastwood 1906; Elvin 2007b; Wilken et al., 2008; M. A. Linn, *in litt*., 2008; CCH 2010; CNDDB 2010
Cañada de las Flores					
2	Cañada de las Flores, marshy area, Santa Barbara	Possibly extirpated	1989	Present (1973) Present (1987) Present (1989) 0 (1990) 0 (2007) 0 (2009)	*Smith 10638* (MIN, SBBG, SD[2]); *Smith 10658* (OBI, SBBG, SD, UCSB[2]); Hendrickson 1990; Elvin 2007c; R.D. Thornton, Nossaman LLP, *in litt.* 2008; Kisner, *in litt.* 2009; CCH 2010; CNDDB 2010
3	Cañada de las Flores, 2.5 miles N of Los Alamos, Santa Barbara	Possibly extirpated	1989	Present (1973) Present (1987) Present (1989) 0 (1990) 0 (2007) 0 (2009)	Hendrickson 1990; Elvin 2007c; Thornton, *in litt.* 2008; Kisner, *in litt.* 2009; CCH 2010; CNDDB 2010
Santa Ynez River					
1	Vandenberg Air Force Base (3 miles SE of Surf), Santa Barbara	Extirpated	1958	Present (1958) 0 (2007) 0 (2008)	*Smith 5820* (MIN, RSA, RSA, SBBG, SD, UCR[2]); Elvin 2007, 2008; Wilken et al. 2008, 2009a, *in litt.*; CCH 2010; CNDDB 2010

CNDDB identification number = occurrence number assigned by the California Natural Diversity Database (CNDDB 2010).

[1] Population sizes are pooled and summed when more than one polygon or occurrence is reported for a specific population.

[2] CAS – Herbarium of the California Academy of Sciences; CDA – California Department of Food and Agriculture Herbarium; IRVC – University of California Irvine Herbarium; JEPS – Jepson Herbarium at the University of California at Berkeley; MIN – University of Minnesota Saint Paul Herbarium; OBI - Robert F. Hoover Herbarium at California Polytechnic State University San Luis Obispo; POM – Herbarium of Pomona College at Rancho Santa Ana Botanic Garden; RSA – Herbarium of Rancho Santa Ana Botanic Garden; SBBG – Santa Barbara Botanic Garden Herbarium; SD – San Diego Natural History Museum Herbarium; UC – University Herbarium at the University of California at Berkeley; UCR – University of California Riverside Herbarium; UCSB – University of California Santa Barbara Herbarium.

[3] CNDDB includes this occurrence in Element Occurrence number 13, but herbarium specimen indicates that it is beyond the distance generally mapped by CNDDB.

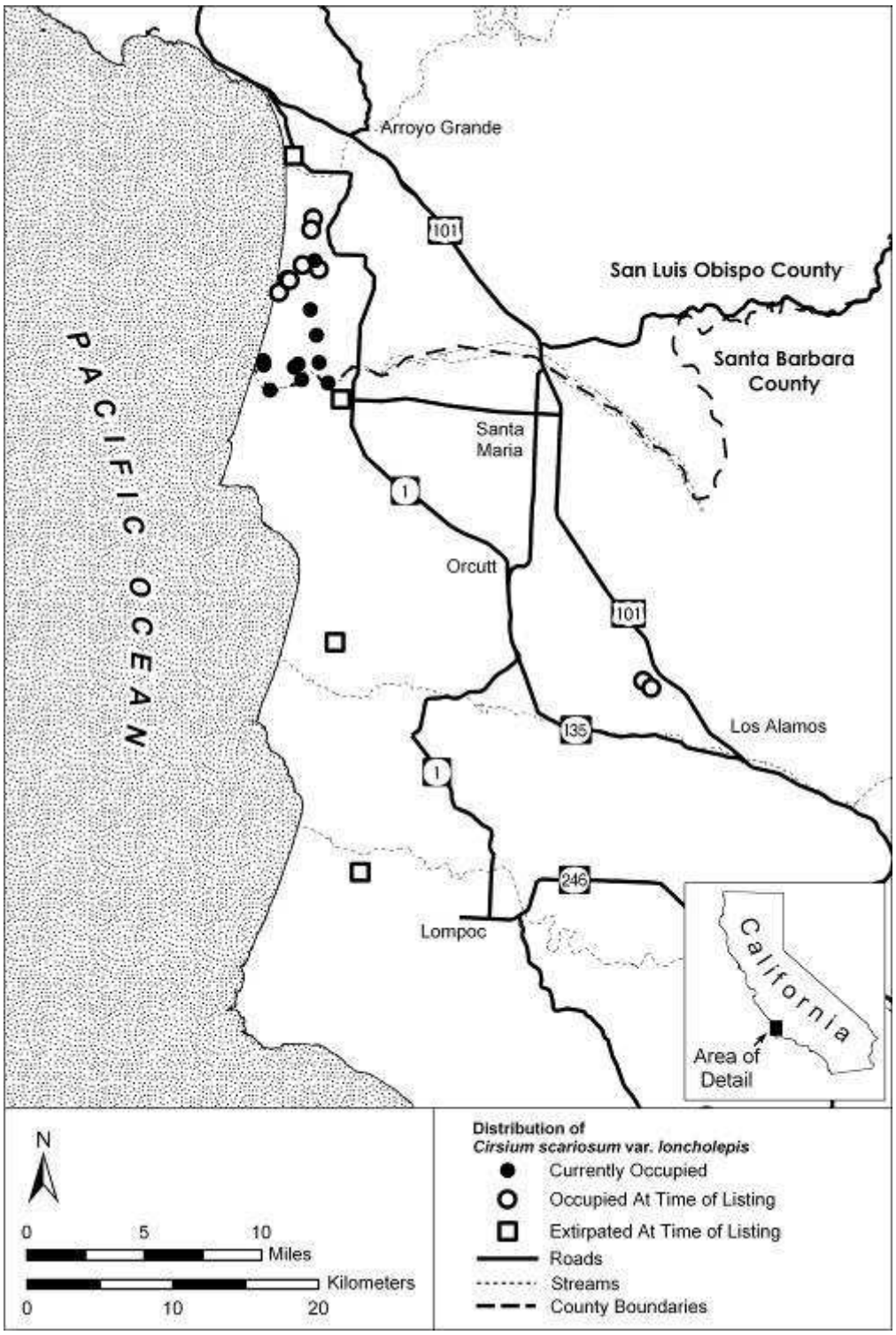

Figure 2. *Cirsium scariosum* var. *loncholepis* distribution. The points in this figure represent centroids (central points) for *C. scariosum* var. *loncholepis* occurrences, because some *C. scariosum* var. *loncholepis* occurrences contain more than one polygon. See Distribution section above for a discussion regarding the relationship of polygons within occurrences.

Habitat or Ecosystem Conditions (e.g., amount and suitability)

Overall, marsh and riparian habitat along the Pacific coast in California continues to decrease both in quantity and quality. These changes are attributed primarily to increased development and urbanization; adverse effects from biostimulation, eutrophication, erosion, and sedimentation; inadequacy of existing regulatory mechanisms; nonnative species; and stochastic (i.e., random) events (Service 1993, 2000a; Mazer et al. 2000; Prince 2008a, 2008b; CNDDB 2009, 2010; California Native Plant Society 2010). Biostimulation is generally characterized as a state of excess growth of vegetation due to anthropogenic nutrient input into a system (California State Water Resources Control Board 2006a, California State Water Resources Control Board 2006b, Central Coast Ambient Monitoring Program 2002, Dodds et al. 1998). Biostimulation depends on a number of factors in addition to nitrogen and phosphorus concentrations such as dissolved oxygen, pH, shading or sunlight levels, temperature, and other factors (Creager et al. 2006).

Cirsium scariosum var. *loncholepis* has throughout time had a limited distribution in southwestern San Luis Obispo County and northwestern Santa Barbara County, California, within a unique geomorphic area known as the Santa Maria Basin (Hunt 1993). See Figure 1 for a map containing the locations of place and feature names in this region. The Santa Maria Basin stretches along a 39-mile (63-km) section of the coastal region of central California that is dominated by a system of dune complexes that are interspersed with several major drainages. The Santa Maria Basin is comprised of the Santa Maria Valley, in the north, and the Santa Ynez Valley, in the south. The Santa Maria Valley is located between the hills northeast of Pismo Beach and the Casmalia and Solomon Hills that end at Point Sal in the west. The Santa Ynez Valley is located between the Casmalia and Solomon Hills and the Santa Ynez Mountains (on the south side of the Santa Ynez River). The Santa Maria Basin is dominated by moderate to strong winds from the northwest (categorized as greater than 7.47 miles per hour (12.02 kilometers per hour) most of the time and throughout the year (Hendrickson 1990; National Oceanic and Atmospheric Administration Western Regional Climate Center (NOAA) 2007; Natural Resources Conservation Service 2008). These prevailing northwest winds are a major factor in shaping the terrain and creating the dunes such that the active dune and swale systems are aligned with these winds (Hunt 1993). Deflation areas (the swales between two parallel dunes and behind the foredunes) are often at or near the water table, creating the wetlands and back dune lakes (Hunt 1993). This terrain, the parallel ridges and swales, and the physical features that created and maintain it are essential for the conservation of *C. scariosum* var. *loncholepis*.

Santa Maria Valley

The Santa Maria Valley contains one major dune complex (the Santa Maria Valley Dune Complex) and three major riparian systems (or drainages): Arroyo Grande Creek, the Santa Maria River, and Orcutt Creek. The Santa Maria Valley Dune Complex contains five dune sheets (or associated sand depositional episodes): Callender, Nipomo Mesa, Guadalupe, Mussel Rock, and Orcutt Terrace. Individual dune sheets represent sequential and spatially overlapped depositional episodes within contiguous areas of any particular dune complex. Arroyo Grande Creek and its floodplain are at the northern edge of the Callender Dune Sheet (specifically) and the Santa Maria Valley Dune Complex (in general) (Hunt 1993). The junction of Arroyo Grande Creek and the Callender Dune Sheet also marks the northern limit for *Cirsium scariosum* var. *loncholepis*, which occurred here in the low "grassy" areas among the sand hills at the junction

of the dunes and Arroyo Grande Creek (*Condit s.n.*, July 26, 1910; University of California [Berkeley] Herbarium (UC) 2007). The Callender Dune Sheet reaches Oso Flaco Creek and Oso Flaco Lake at its southern extent. *Cirsium scariosum* var. *loncholepis* has occurred at numerous sites throughout the Callender Dunes (Hendrickson 1990; Chesnut, *in litt.* 1998; Chesnut 1998; CNDDB 2010; CCH 2010). The Guadalupe Dune Sheet extends from Oso Flaco Lake to the Santa Maria River. *Cirsium scariosum* var. *loncholepis* has occurred at numerous sites throughout the Guadalupe Dunes (Hendrickson 1990; Chesnut, *in litt.* 1998; Chesnut 1998; CNDDB 2010).

The Santa Maria Valley is a broad floodplain that is bounded by Orcutt Creek along its southern edge and by the Callender Dune Sheet and the Nipomo Dune Sheet (including Nipomo Mesa) along its northern edge. Between the city of Santa Maria and the coast 12 miles (19 km) to the west, the valley floor has historically been dotted with small settlements and a few oil fields, but the vast majority of the land has been converted to agriculture. A member of the Gaspar de Portola expedition to Monterey in 1769 noted that the expedition had difficulty getting through the Santa Maria Valley because of all the marshes (Companys 1983). As has been typical along the central coast of California, many of the valley's wetlands have been drained, filled, or modified for agricultural or water management activities (Hunt 1993); lakes such as Guadalupe Lake no longer exist in their historical capacities (L.E. Hunt, biologist, 1993; *in litt.* 2008). *Cirsium scariosum* var. *loncholepis* has occurred at numerous mesic sites throughout the Santa Maria River floodplain and the Guadalupe Dunes (Hendrickson 1990, CNDDB 2010). According to C.E. Turner (United States Department of Agriculture, Biological Control, *in litt.* 1983), Chesnut (1998), D.R. Wilken (Santa Barbara Botanic Garden, *in litt.* 2009a), and D.J. Keil (California Polytechnic State University, San Luis Obispo, pers. comm. 2006) the lowering of various water tables has adversely affected habitat conditions in the Santa Maria River Valley. Orcutt Creek and the Santa Maria River mark the northern edge of the Mussel Rock Dune Sheet and have supported multiple *C. scariosum* var. *loncholepis* occurrences (Hendrickson 1990, Hunt 1993, CNDDB 2010). Hunt (*in litt.* 2008) believes it is likely that *C. scariosum* var. *loncholepis* was associated with Guadalupe Lake, which was (and sometimes still is) the largest seasonal lake on the floor of the Santa Maria Valley. Hunt also believes the species is associated with the surrounding wetlands and swales on Orcutt Terrace (Hunt *in litt.* 2008). *Cirsium scariosum* var. *loncholepis* likely had a more widespread distribution within this area, but may have been eliminated from most of the locations by the vast conversion of this area to agriculture and extraction of groundwater before it could be documented (Hunt *in litt.* 2008). However, even with such conversion, current aerial photos and topographic maps show the persistence of numerous, small marshes, wetlands, and drainages in this area; some of these may still harbor small populations of *C. scariosum* var. *loncholepis*.

Santa Ynez Valley

The Santa Ynez Valley contains one major dune complex (the Santa Ynez Valley Dune Complex) and two major riparian systems (or drainages): San Antonio Creek and the Santa Ynez River. The Santa Ynez Valley Dune Complex contains three dune sheets: San Antonio, Burton Mesa, and Lompoc Terrace. The San Antonio Terrace Dune Sheet is at the northern edge of the Santa Ynez Valley Dune Complex. It supports numerous dune wetlands and swales and is very similar in habitat, physical, and geological features to the Callender and Guadalupe Dune Sheets (Hunt 1993, *in litt.* 2008). San Antonio Creek is downwind on the southern edge of the San Antonio Terrace Dune Sheet. The mouth of San Antonio Creek is within the area that is the

most likely site for the type locality (La Graciosa) for *Cirsium scariosum* var. *loncholepis* (Smith 1976, 1998; Oyler et al. 1995; Hendrickson 1990; Keil and Holland 1998; Service 2009a; Wilken, *in litt.* 2009b) and still harbors numerous small marshes and wetlands that are apparent in aerial imagery (Google Earth 2008). Based on Alice Eastwood's description of the area and route taken in her field notes the day the type specimen (*Eastwood 859* (CAS) was collected: "July 2, '06, Road to Casmalia and sand dunes") (Eastwood 1906), the associated species that she collected that day, and the additional information from Wilken (*in litt.* 2009b); the type location for *C. scariosum* var. *loncholepis* could be anywhere within a 10-mile (16-km) area centered around Casmalia that includes San Antonio Creek, the sand dunes of San Antonio Terrace to the southwest of Casmalia, the historical Guadalupe Lake, Orcutt Creek, and even the mouth of the Santa Maria River. The specimen was collected near Casmalia and sand dunes. We acknowledge that information regarding this collection and the specific location of "La Graciosa"' are not sufficient to be conclusive, and that some of this information indicates that the type location could be near Orcutt or the other areas mentioned. Hunt (*in litt.* 2008) believes that *Cirsium loncholepis* was historically much more widely distributed within the San Antonio Creek watershed. Historical collections indicate that *C. scariosum* var. *loncholepis* used to occur along the Santa Ynez River, somewhere between the towns of Surf and Lompoc, at the current edge of Vandenberg Air Force Base (VAFB) *Smith 5820* (MIN, RSA, RSA, SBBG, SD, UCR) (CCH 2010). Collections of the plant were made here in 1958; however, by 1988 when surveys were conducted to relocate this population, none could be found (Hendrickson 1990). Surveys were conducted on VAFB for *Cirsium scariosum* var. *loncholepis* from 1992 to 1994 (Keil and Holland 1998) and in 2008 (Wilken et al. 2008), but it was not observed during these surveys.

Over the years much of the habitat for *Cirsium scariosum* var. *loncholepis* in the floodplain of the Santa Ynez River has been altered. According to Smith's notes, agricultural fields have been plowed to the banks of the drainage, willows have been bulldozed, and herbicides were sprayed to eradicate *C. vulgare* (bull thistle) (Smith 1976, 1998). According to Wilken (*in litt.* 2009a), the lowering of the water table has adversely affected habitat conditions in the Santa Ynez River Valley. Additionally, Wilken (*in litt.* 2009a) stated that the current hydrological processes in the Santa Ynez River may not be conducive to conditions favoring establishment of *C. scariosum* var. *loncholepis*. The anthropogenic changes to the hydrological processes in the Santa Ynez River (i.e., flood control; artificial manipulation of surface flow and aquifer levels through impoundments, surface water diversions, and groundwater extraction) are similar to those of the Santa Maria River. The effects of the current, altered hydrological regime and subsequent alteration of potential habitat for *C. scariosum* var. *loncholepis* should be considered in any plans for its successful recovery. Because this area historically supported the southernmost documented *C. scariosum* var. *loncholepis* populations, and because some habitat still remains today, it is considered an important area for the conservation of *C. scariosum* var. *loncholepis* (Morey 1989, 1990; Service 2008a, 2009a).

Changes in Taxonomic Classification or Nomenclature

Cirsium scariosum var. *loncholepis* was originally described as *Cirsium loncholepis* in 1917 based on a specimen collected by Alice Eastwood in 1906 at "La Graciosa" (Petrak 1917). *Cirsium scariosum* var. *loncholepis*, the currently recognized name, was originally listed by the Service as endangered under the name *Cirsium loncholepis* (Service 2000a). In 2006, Dr. David Keil revised the treatment for the genus *Cirsium* in North America for the Flora of North America north of Mexico by taking a broad view of the genus and the overlap in ranges of

variation in morphologic characters (visible plant characteristics) (Keil 2006). Dr. Keil synonymized (lumped) *C. loncholepis* with *C. scariosum* var. *citrinum* (La Graciosa thistle, same common name as the listed entity), a more widespread taxon whose distribution encompasses the following areas: the distribution of *C. loncholepis*, at the mouth of the Santa Maria River; *C. scariosum* populations in the San Emigdio Mountains (Kern and Ventura Counties); and *C. scariosum* populations in the uplands and lowlands of the Peninsular Ranges of southern California (Riverside and San Diego Counties) that continue south into northern Baja California, Mexico (Keil 2006). Dr. Keil currently recognizes *C. loncholepis* as a distinct entity with the same circumscription (the limits of the species characters and range) as before his 2006 treatment of the genus, as a subtaxon of *C. scariosum* (Keil 2010a) and it is currently listed as such in the online treatment for *Cirsium* as part of the online version of the second edition of The Jepson Manual: Higher Plants of California (Keil 2010b) and it will be listed as such in the upcoming hard copy version of the second edition of The Jepson Manual: Higher Plants of California (B. Baldwin, University of California, Berkeley, pers. comm. 2010). We consider this to be the best available scientific information. Accordingly, we continue to recognize *C. scariosum* var. *loncholepis* as a distinct entity.

Genetics

No new studies concerning the genetics of this taxon have been conducted since the time of listing.

Species-specific Research and/or Grant-supported Activities

There have been three species-specific research projects for this species since the time of listing. The first master's thesis project studied the population dynamics and demography of two populations of *Cirsium scariosum* var. *loncholepis* (Lea 2002), the second master's thesis project studied the ecology and population demography of *C. scariosum* var. *loncholepis* (Teed 2003), and the third master's thesis project studied the moisture requirements for the germination and early seedling survival of *C. scariosum* var. *loncholepis* (Huber 2005).

Five-Factor Analysis

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

In the final rule to list the species (Service 2000a), we stated in the Factor A discussion that threats to its continued existence consisted of (1) habitat fragmentation and alteration of species composition and vegetation structure; (2) reduced distribution resulting from (a) the loss of habitat, (b) the development and alteration of habitat from petroleum extraction, and (c) the loss of one third of the known populations); (3) additional habitat modifications due to continued energy-related operations, including maintenance activities, hazardous waste cleanup, and other commercial development; (4) ground water extraction in the Guadalupe Dunes and vicinity (thought to have diminished the total area of suitable habitat by lowering the water table and drying the wetlands); and (5) additional hydrological alterations (Smith 1976, Rindlaub et al. 1985, Hendrickson 1990, CDFG 1992, Service 2000a). In that rule we discussed modification or conversion of habitat under Factor E, but we now include it under Factor A. An analysis of these threats is contained in the final rule remains currently valid.

Since the time of listing, these threats to the species and its habitat have not diminished. Threats to the species and its habitat by degradation and loss of habitat have increased due to agricultural and urban development (see Abundance and Population Trends and Habitat or Ecosystem Conditions (e.g., amount and suitability) sections above) and conversion of marsh and riparian habitat due to indirect effects from development and urbanization (Service 2009a, CNDDB 2010). Some of this habitat degradation and loss occurs in watersheds that are recognized by the Regional Water Quality Control Board as having excessive amounts of nitrogen and other nutrients (e.g., Santa Maria River, Orcutt (Solomon) Creek, Oso Flaco Creek, Oso Flaco Lake) (California State Water Resources Control Board 2006a). These watersheds contain excessive nutrients (California State Water Resources Control Board 2006a, California State Water Resources Control Board 2006b, Central Coast Ambient Monitoring Program 2002, Dodds et al. 1998), which cause biostimulation and excessive growth of the vegetation can displace or outcompete *Cirsium scariosum* var. *loncholepis*.

Most of the historical occurrences and their surrounding areas are urbanized and/or indirectly impacted by urbanization (Service 2009a, CNDDB 2010). As mentioned above in the Abundance and Population Trends section, *Cirsium scariosum* var. *loncholepis* has experienced considerable declines throughout its range in the number of populations, occurrences, and individuals. It is only known to be extant at 8 of the 21 known occurrences (see Table 1). This decline in range, populations, occurrences, and individuals has further limited this species' ability to colonize or recolonize adjacent and intermediate locations of suitable habitat. These conditions also limit sites and opportunities for successful introductions and reintroductions.

Sea level rise, as a result of global climate change, has the potential to diminish the habitat of *Cirsium scariosum* var. *loncholepis* because of its proximity to the coastline. The impacts of climate change and sea level rise are further discussed in Factor E below.

In summary, threats to *Cirsium scariosum* var. *loncholepis* under Factor A that were discussed in the final rule to list the species have not diminished, to the contrary some of these threats have increased since that time, particularly the degradation, fragmentation, and loss of habitat and effects due to biostimulation.

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

In the final rule to list the species (Service 2000a), we stated in the Factor B discussion that overutilization was not known to be a factor/threat to this species (i.e., *Cirsium scariosum* var. *loncholepis* was not known to be sought after by collectors), but the species was thought to be vulnerable to overutilization because of its limited distribution. Vandalism was also considered to be a threat to this species. An analysis of these threats is contained in the final rule and remains currently valid, although, we have no data indicating that overutilization or vandalism is actively occurring to the species at this point.

FACTOR C: Disease or Predation

In the final rule to list the species (Service 2000a), we stated in the Factor C discussion that disease was not known to be a threat to the continued existence of *Cirsium scariosum* var.

loncholepis. We stated that cattle grazing occurred within the habitats of *C. scariosum* var. *loncholepis* and that heavy grazing had affected *C. scariosum* var. *loncholepis* individuals in the Guadalupe Dunes and along the Santa Maria River. An analysis of these threats is contained in the final rule and remains currently valid.

Since the time of listing, the threat due to predation to *Cirsium scariosum* var. *loncholepis* and its habitat have not diminished. Herbivory by cattle continues, and has been noted at the Guadalupe-Nipomo Dunes National Wildlife Refuge (M.A. Elvin, pers. obs. 2007) and is reported to occur on plants along the Santa Maria River and in the southern Guadalupe Dune Sheet population (CNDDB 2010). While this plant may be able to withstand some herbivory, it may cause a reduction in its reproductive success due to the loss of flowers and the corresponding reduction in the production of seeds. The effects of predation on the species as a whole have yet to be fully documented.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

In the final rule to list the species (Service 2000a), we stated in the Factor D discussion that regulatory mechanisms thought to have some potential to protect *Cirsium scariosum* var. *loncholepis* included: (1) listing under the California Endangered Species Act (CESA); (2) the California Environmental Quality Act (CEQA); and (3) section 404 of the Clean Water Act. The analysis of the extent to which protections are afforded by these regulatory mechanisms is contained in the final listing rule (Service 2000a) and remains currently valid.

State Regulatory Mechanisms

Cirsium scariosum var. *loncholepis* was listed as threatened by the State of California in 1990. As such, projects that would affect *C. scariosum* var. *loncholepis* are subject to CESA and CEQA requirements. Conservation of listed species through CEQA is dependent upon the discretion of the lead agency involved. To the best of our knowledge, only one project (the Guadalupe Oil Field remediation and restoration project) has obtained a 2081 California incidental take permit for compliance under CEQA and CESA that directly impacted *C. scariosum* var. *loncholepis* since it was listed (CDFG 2000, 2008). Following provisions in both the 2081 permit and the Coastal Development Permit (see below) for the project, Unocal [Chevron] has: (1) developed and implements a project description to avoid and minimize adverse effects to *C. scariosum* var. *loncholepis* to the maximum extent practicable, which includes having a biological monitor present whenever project activities occur near *C. scariosum* var. *loncholepis*; (2). developed and implements a salvage, propagation, and replanting program; (3) when avoidance is not possible, salvages seeds or plants and reintroduces them to the same population; (4) as of 2010, over 1,600 individuals have been planted or replanted at the site with approximately 1,200 of those reported as surviving (CDFG 2000, 2008; Padre and Associates, Inc. 2010). These results indicate that this species may respond favorably to additional outplanting efforts in the future to increase the number of populations and occurrences within its historical range and that the *C. scariosum* var. *loncholepis* populations at the Guadalupe Oil Field appear to be the most stable for this species throughout its range.

California Coastal Act

The California Coastal Commission (CCC) considers the presence of listed species in determining environmentally sensitive habitat lands subject to section 30240 of the California

Coastal Act of 1976. Its mission is to protect, conserve, restore, and enhance environmental and human-based resources of the California coast and ocean for environmentally sustainable and prudent use by current and future generations (CCC 2010). Certain local jurisdictions have developed their own Local Coastal Programs (LCP) or Land Use Plans that have been approved by the CCC. The County of San Luis Obispo has an LCP that was approved by the CCC in 1988 and the County of Santa Barbara has an LCP that was partially certified by the CCC in 1981. This species occurs within the area covered by both the Santa Barbara County and San Luis Obispo County LCPs. Proposed projects that are not exempt and occur within the LCP jurisdictions would need to obtain approval from the County of Santa Barbara or San Luis Obispo. Protections of listed species through these LCPs are dependent upon the discretion of the Counties of Santa Barbara and San Luis Obispo. The County of San Luis Obispo issued a Coastal Development Permit/Development Plan (D890558D) for the Guadalupe Oil Field remediation and restoration project. The Coastal Development Permit/Development Plan issued by the County of San Luis Obispo has resulted in benefits to *Cirsium scariosum* var. *loncholepis* that are noted above in the State Regulatory Mechanisms section.

Federal Regulatory Mechanisms

Federal Endangered Species Act

Section 7(a)(2) of the Endangered Species Act requires Federal agencies to consult with the Service to ensure any project they fund, authorize, or carry out does not jeopardize federally listed species or destroy or adversely modify designated critical habitat. Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the "take" of federally endangered wildlife; however, the take prohibition does not apply to plants. Instead, plants are protected from harm in two particular circumstances. Section 9 prohibits (1) the removal and reduction to possession (i.e., collection) of endangered plants from lands under Federal jurisdiction, and (2) the removal, cutting, digging, damage, or destruction of endangered plants on any other area in knowing violation of a State law or regulation or in the course of any violation of a State criminal trespass law. Federally listed plants may be incidentally protected if they co-occur with federally listed wildlife species.

Since the time of listing, the Service has conducted six interagency consultations pursuant to section 7 of the Act that addressed *Cirsium scariosum* var. *loncholepis* or its designated critical habitat (Service 2000b, 2003, 2004b, 2007, 2008b, 2009b). Three of these projects are of such a nature that they are expected to be beneficial to the species and its habitat (e.g. habitat restoration), two have restoration and reintroduction components included as part of them, and one project is expected to result in loss of habitat for the species. While all of these biological opinions resulted in non-jeopardy and/or no adverse modification determinations, they have either not begun yet, are still in progress, or we have not received reports indicating the resulting effects to this species; therefore, at this time, we cannot determine the extent to which these projects may have adversely affected either the species or its habitat.

For projects without a Federal nexus that would likely result in incidental take of listed wildlife 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 listed species. There are no completed HCPs that include *C. scariosum* var. *loncholepis* as a covered species. *Cirsium scariosum* var.

loncholepis has been proposed as a covered species in a draft HCP being developed by the California Department of Parks and Recreation for the Oceano Dunes State Vehicular Recreation Area.

Clean Water Act
The purpose of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Various sections of the Clean Water Act may provide protections for listed species by protecting or improving water quality and wetlands.

Section 303 of the Clean Water Act requires states, territories, and tribes to develop lists of impaired waters, which do not meet water quality standards. Section 303 also requires the development of Total Maximum Daily Loads (TMDLs) for water pollutants that do not meet established standards. TMDLs attempt to list all sources of the pollutant and identify the maximum amount of a pollutant that can be discharged into a water body, while remaining within the established water quality criteria. TMDLs also develop allocations of the pollutant load among all of the dischargers that are contributing to the degradation of a water body, and lists implementation steps necessary to ensure the allocations are met. While this system is managed by the Environmental Protection Agency, the State of California is authorized to implement this program within California. Section 303 may provide protections for listed species by requiring the identification of waters that do not meet water quality standards, identifying the sources of the water pollution, and setting a limit on the amount of pollution that each source can contribute to the water body, while still meeting the established water quality standards.

Section 401 of the Clean Water Act requires any applicant for a federal license or permit that will conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters to certify with the State that any such discharge into waters will comply with water quality regulations promulgated by the State pursuant to the Clean Water Act. Certification under Section 401 is only issued if the proposed discharge would not cause or contribute to the exceedance of water quality standards. While this system is managed by the Environmental Protection Agency, the State of California is authorized to implement this program within California. Section 401 may provide protections for listed species by ensuring that discharges from federally licensed or permitted activities would not cause water quality to become degraded below criteria adopted by the State pursuant to the Clean Water Act. If the Act's protections for *Cirsium scariosum* var. *loncholepis* were removed, there would be no impact on requirements for Section 401 certification.

Section 402 of the Clean Water Act governs National Pollution Discharge Elimination System permits from a point source. While this system is managed by the Environmental Protection Agency, the State of California is authorized to implement the program within California. This means the State of California issues permits for discharges into waters directly to the discharging facilities. These permits require the use of "best management practices" to reduce pollutants to the "maximum extent practicable". Section 402 may provide protections for listed species by ensuring that facilities which discharge from a point source would not cause water quality to become degraded below criteria adopted by the State pursuant to the Clean Water Act.

Section 404 of the Clean Water Act is jointly administered by the U.S. Army Corps of Engineers and the Environmental Protection Agency and regulates the discharge of fill material into waters of the United States, which include navigable and isolated waters, headwaters, and adjacent wetlands (33 U.S.C. 1344). In general, the term "wetland" refers to areas meeting the Corps' criteria of hydric soils, hydrology (either sufficient annual flooding or water on the soil surface), and hydrophytic vegetation (plants specifically adapted for growing in wetlands). Any action with the potential to impact waters of the United States must be reviewed under the Clean Water Act. This review requires consideration of impacts to listed species and their habitats, and recommendations for mitigation of significant impacts. If a project falls within Corps jurisdiction and the Corps determines that listed species may be affected by project activities, interagency consultation (pursuant to section 7 of the Act) between the Service and Corps would occur to address the effects.

The Corps interprets "the waters of the United States" expansively to include not only traditional navigable waters and wetlands, but also other defined waters that are adjacent or hydrologically connected to traditional navigable waters. However, recent Supreme Court rulings have called into question this definition. On June 19, 2006, the U.S. Supreme Court vacated two district court judgments that upheld this interpretation as it applied to two cases involving "isolated" wetlands. Currently, Corps regulatory oversight of such wetlands (e.g., vernal pools) is in doubt because of their "isolated" nature. In response to the Supreme Court decision, the Corps and the U.S. Environmental Protection Agency (USEPA) have recently released a memorandum providing guidelines for determining jurisdiction under the Clean Water Act. The guidelines provide for a case-by-case determination of a "significant nexus" standard that may protect some, but not all, isolated wetland habitat (USEPA and Corps 2007). The overall effect of the new permit guidelines on loss of isolated wetlands, such as vernal pool habitat, is not known at this time. We have conducted four interagency consultations with the Corps for effects on *Cirsium scariosum* var. *loncholepis* or its habitat (Service 2000b, 2003, 2007, 2009b), but it is not evident whether section 404 has afforded protections for this species.

In summary, inadequacies of existing regulatory mechanisms may continue to pose a threat to *Cirsium scariosum* var. *loncholepis* through portions of its range; however, some threats within parts of its range have been ameliorated due to the issuance of the CDFG 2081 permit and the County of San Luis Obispo Coastal Development Permit/Development Plan (D890558D) since the time of listing. Other Federal and State regulatory mechanisms (e.g., CEQA) provide discretionary protections for the species based on current management direction for the species. Therefore, other laws and regulations have a limited ability to protect the species.

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

In the final rule to list the species (Service 2000a), we stated in the Factor E discussion that there were potential threats to the existence of *Cirsium scariosum* var. *loncholepis* from: (1) displacement by nonnative weeds; (2) altered fire regimes; (3) facility accidents by oil companies or VAFB; (4) small population sizes; (5) loss of reproductive vigor in small populations (seeds of *C. scariosum* var. *loncholepis* in small back dune populations have been shown to be of limited viability (Hendrickson 1990)); (6) habitat fragmentation (due to residential, commercial, agricultural, and oil and gas development, roads and pathways); (7) herbicides used to control nonnative species; and (8) stochastic (i.e., random) extirpation events.

An analysis of these threats is contained in the final rule (Service 2000a) and appears to remain currently valid.

Since the time of listing, these threats to the species and its habitat have not diminished substantially. Although oil extraction activities have declined over the last two decades, this species and its habitat threats due to displacement by aggressive nonnative weeds, altered fire regimes, facility accidents by oil companies or VAFB, small population sizes, loss of reproductive vigor in small populations, habitat fragmentation, herbicides, and stochastic extirpation events have not diminished (Service 2009a, CNDDB 2010).

Threats to *Cirsium scariosum* var. *loncholepis* identified under Factor E since the time of listing include: (1) loss of connectivity between and among populations (i.e., long-distance dispersal) due to fragmentation and hydrological alterations (e.g., flood control, agricultural conversion of riparian areas), (2) water quality, (3) genetics as affected by small population sizes, (4) trampling of plants from cattle, and (5) climate change (Elvin 2007d; Service 2008a, 2009a; CNDDB 2010).

Loss of Connectivity between Populations (Long-Distance Dispersal)

In habitats that are fragmented and/or isolated, the trend for native plant species is one of decline (Soulé et al. 1992). The equilibrium theory of island biogeography (MacArthur and Wilson 1963, 1967) predicts that species with populations that are isolated and have more extirpation events than re-colonization events will decline to zero (extinction). Recent research on species that are long-distance dispersers (such as *Cirsium scariosum* var. *loncholepis*) determined that when the distances between suitable habitat sites for a species become greater than its dispersal distance (such as due to habitat fragmentation), its long-term survival will be threatened unless the long-distance dispersal between the sites can be re-established (Trakhtenbrot et al. 2005). The study by Trakhtenbrot et al. (2005) regarding long-distance dispersal species supports the study by Soulé et al. (1992) and the equilibrium theory of island biogeography (MacArthur and Wilson 1963, 1967). Based on these studies, comments received from peer reviewers during the revised critical habitat designation process (Service 2009a), and our current understanding of this species and its decline, we believe that solely preserving the areas with the remaining known occurrences and populations of *C. scariosum* var. *loncholepis* is not sufficient to recover the species. Alterations of hydrological regimes (e.g., flood control) have increased the lack of connectivity between populations (Service 2009a). Wilken (2009a) stated that the current hydrological regulatory process in the Santa Ynez River may not be conducive to conditions favoring establishment of *C. scariosum* var. *loncholepis*. Connectivity between populations, particularly natural riparian drainages in Santa Maria River, Orcutt Creek, San Antonio Creek, and Santa Ynez River that are not channelized or confined by barriers or dams, such that they have soft bottoms and sides and a natural flood plain (allowing uninterrupted water flows) is one of the primary constituent elements for *C. scariosum* var. *loncholepis* in the final critical habitat rule (Service 2009a) and is important to maintain connectivity between populations for see dispersal and the establishment of intermediate linkage populations that may be transitory in nature. Habitat that would provide connectivity between occurrences and populations is essential to recover *C. scariosum* var. *loncholepis* (Service 2009a). This is supported by Damschen et al. (2006), who showed that habitat patches that were connected by corridors benefitted wildlife and plants.

Water Quality

Threats identified since the time of listing discussed above under Factor A include excessive amounts of nitrogen and other nutrients in watersheds that either currently support or historically supported *Cirsium scariosum* var. *loncholepis*. These nutrient levels have a direct effect on the vegetation in these watersheds, which causes excessive growth that is consistent with biostimulation and eutrophication. Excessive nutrient inputs can lead to vegetation community composition changes due to biostimulatory effects (California State Water Resources Control Board 2006b, Central Coast Ambient Monitoring Program 2002, Dodds et al. 1998).

Genetics as Affected by Small Population Size

The limited gene pool of this species may depress its reproductive vigor. Human-caused or natural environmental disturbances (e.g., flood, drought, disease) could increase the risk of extinction of *Cirsium scariosum* var. *loncholepis*. Small populations are threatened by inbreeding depression (Ellstrand and Elam 1993). Small plant populations can have significantly lower germination rates than larger populations of the same species due to high levels of homozygosity (Menges 1991); this has already been observed in *C. scariosum* var. *loncholepis* (Hendrickson 1990). Genetic stochasticity results from changes in gene frequencies due to founder effect, random fixation, or inbreeding (Shaffer 1981). Low levels of genetic variation among and within populations could impair a species' ability to adapt to changes in the environment or contribute to inbreeding depression (i.e., loss of reproductive fitness or vigor) (Arias et al. no date).

The existence of less than 10 populations and the small number of individuals in these populations places *Cirsium scariosum* var. *loncholepis* at extreme risk of extinction due to low levels of genetic diversity. The conservation biology literature commonly notes the vulnerability of taxa known from very few locations and/or from small and highly variable populations (e.g., Shaffer 1981, 1987; Primack 2006; Groom et al. 2006). In particular, although the plants are apparently self-compatible and capable of self-fertilization, the small size of the population makes it difficult for this species to persist while sustaining the impacts of habitat alteration that favors nonnative species.

Trampling of Plants from Cattle

At the time of listing, we did not discuss impacts to *Cirsium scariosum* var. *loncholepis* due to trampling from cattle (Service 2000a). Cattle have been documented crushing and breaking *C. scariosum* var. *loncholepis* plants on the Guadalupe-Nipomo National Wildlife Refuge (Elvin 2007d). Trampling and crushing impacts from cattle have been documented in and among plants at the Chevron project site in the Guadalupe Dunes (Elvin 2006). *Cirsium scariosum* var. *loncholepis* was last reported at the Cañada de Las Flores population in 1989 (Service 2009a). This population has been overgrazed according one local rancher (Elvin 2007c). This overgrazing has reduced plant cover, compacted the soil, and may have crushed plants at this population. Trampling and crushing of plants and compaction of soil may have been an exacerbating circumstance that led to the possible extirpation of this species at this population. At the Guadalupe-Nipomo Dunes National Wildlife Refuge and Chevron Guadalupe Oil Field, fences have either been installed or are being installed to exclude cattle, which should reduce or eliminate this threat to *C. scariosum* var. *loncholepis* at these populations in the future; however, cattle still graze in the Santa Maria River and trampling from cattle is still a threat to it a.

Climate Change

At the time of listing *Cirsium scariosum* var. *loncholepis*, we did not discuss the potential effects of climate change on its long-term persistence (Service 2000a). Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, a rise in sea level, and increased summer continental drying (Field et al. 1999, Cayan et al. 2005, Intergovernmental Panel on Climate Change 2007). Recently, the potential impacts of climate change on the flora of California were discussed by Loarie et al. (2008). Based on modeling, they predicted that species' distributions will shift in response to climate change, specifically that the species will "move" or disperse to higher elevations and northward, depending on the ability of each species to do so. Species diversity will also shift in response to these changes with a general trend of increasing diversity shifting towards the coast and northwards with these areas becoming de facto future refugia. However, predictions of climatic conditions for smaller sub-regions such as California remain uncertain. It is unknown at this time if climate change in California will result in a warmer trend with localized drying, higher precipitation events, or other effects. The extent to which climate change could affect *C. scariosum* var. *loncholepis* is unknown at this time due to the general nature of these predictions.

Despite the uncertainty regarding the specific effects of climate change on this species, an increase in the rate of sea level rise has been predicted for the coast of California (CCC 2001, California Climate Change Center 2006, Heberger et al. 2009). In particular, dunes along the coast will be subject to greater and more frequent wave attack, resulting in erosion and shoreline retreat estimated to be between 459 and 1,083 feet (140 and 330 m), corresponding to an estimated loss of approximately 1.4 square miles (896 acres) of dunes in San Luis Obispo County by the year 2100 (CCC 2001, Heberger et al. 2009). Because *Cirsium scariosum* var. *loncholepis* occurs in coastal dune habitats, erosion of these areas and corresponding loss or decreased quality of habitat could potentially adversely affect the species.

In summary, most threats under Factor E that were discussed in the final rule to list the species remain and additional threats have been identified or have developed since that time. Some threats discussed in the final rule have diminished (e.g., threats from oil extraction activities), some have not noticeably changed (e.g., displacement by nonnative weeds), and some have increased (e.g., increased extirpation events; see also the discussion in the Abundance and Population Trends section). Maintaining long-distance dispersal vectors within and between occurrences and populations and minimizing the loss of connectivity between populations through habitat fragmentation are becoming increasingly important issues for recovering this species. Additional threats to *Cirsium scariosum* var. *loncholepis* identified since the time of listing include (1) loss of connectivity between and among populations (i.e., long-distance dispersal) due to fragmentation and hydrological alterations (e.g., flood control, agricultural conversion of riparian areas), (2) water quality issues, (3) genetics as affected by small population sizes, (4) trampling of plants from cattle, and (5) climate change. Any of these effects on the species and its habitat (i.e., fewer individuals and less available habitat) will likely increase the potential for additional adverse effects and the magnitude of any threats to the species should any stochastic events occur.

III. RECOVERY CRITERIA

Recovery plans provide guidance to the Service, States, and other partners on ways to minimize threats to listed species and on criteria that may be used to determine when recovery is achieved. There are many paths to accomplishing recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, we may determine that, over all, the threats have been minimized sufficiently, and the species is robust enough, to reclassify the species from endangered to threatened or perhaps to delist it. In other cases, new recovery opportunities unknown at the time the recovery plan was finalized may be more appropriate. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on how progress toward achieving recovery criteria has contributed to eliminating or reducing the listing threats discussed in the five-factor analysis.

A recovery plan for *Cirsium scariosum* var. *loncholepis* has not yet been developed, but a draft recovery outline has been initiated (Service 2008a). The following recovery objectives are in that draft outline: (1) expand the current range of *Cirsium scariosum* var. *loncholepis* to its historical range; (2) increase the number of populations to maintain viable metapopulations; (3) reduce threats from habitat alteration, competition with nonnative species, and other threats to the point that populations are self-sustaining; and (4) maintain habitat of sufficient quality and configuration to support all life history stages, including germination, growth, reproduction, and seed dispersal. Since the development of this draft outline, we have learned more about the importance of long-distance dispersal for this species in relation to habitat fragmentation, maintaining connectivity between metapopulations, and conserving the long-distance dispersal vectors within and between suitable habitat patches for this species. There was a consensus among the peer reviewers for the proposed revised critical habitat rule that habitat fragmentation increases the threats to a species, and that it increases the risk of extirpation and extinction events (Service 2009a). They discussed that the best way to conserve species affected by habitat fragmentation is to increase the total size of available habitat and connect remaining available habitat with habitat linkages. They further discussed that reconnections (of available and suitable habitat) can ameliorate the threats associated with small population sizes by promoting dispersal and gene flow.

IV. SYNTHESIS

The status of *Cirsium scariosum* var. *loncholepis* has declined since the time of listing in 2000. At that time, it was known from 17 recorded occurrences (in what we now consider to be 7 populations). Currently, *C. scariosum* var. *loncholepis* is considered to be extant at eight occurrences that are distributed among four populations. Threats identified at the time of listing are in general fairly consistent (some have increased in intensity and some have decreased in intensity) and new threats have been identified since that time, such as the loss of connectivity between and among populations, water quality issues, trampling of plants from cattle, and climate change.

The combination of low numbers of individuals, considerable constriction of its distribution, and the concentration of all occurrences in a small geographic area make this species vulnerable to extinction. Based on this information, we believe that *Cirsium scariosum* var. *loncholepis* still faces a high degree of threat, but has the potential for recovery if suitable habitat throughout its historical range is connected and managed and the plant is re-introduced to these areas. If recovery activities are implemented for this species, downlisting or delisting is feasible. We conclude that presently this taxon continues to be in danger of extinction throughout its currently known range and continues to meet the definition of endangered under the Act; therefore, no status change is recommended at this time.

V. RESULTS

Recommended Listing Action:

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

New Recovery Priority Number and Brief Rationale: No change at this time. The recovery priority number for *Cirsium scariosum* var. *loncholepis* is 2 according to the Service's 2009 Recovery Data Call for the Ventura Fish and Wildlife Office. This number indicates that it is a species (as it is currently listed under the Act) that faces a high degree of threat and has a high potential for recovery. The recovery potential for *C. scariosum* var. *loncholepis* is difficult to determine. We are allowed to rank the recovery potential as either high or low. We rank recovery potentials based on 1) biological and ecological timing factors (high – well understood and low – poorly understood), 2) threats to species' existence (high – well understood, easily alleviated and low – poorly understood or pervasive and difficult to alleviate), and 3) management needed (high – intensive management not needed, techniques well documented with a high probability of success and low – intensive management needed with a low probability of success or techniques unknown or still experimental) (Service 1983). The biological and ecological factors important for this species' conservation and recovery are fairly well understood. The threats to this species are fairly well understood and while they have not currently been alleviated, they can be alleviated, but it may take time to reach that point. This species' apparent successes in propagation and reintroduction efforts and its life history characteristics tend to indicate that recovery efforts for this species may have a high probability of success. The largest unknown will be the ability to reestablish connectivity between the various metapopulations, which would then preclude the need for intensive management.

Based on this information, we currently rank *Cirsium scariosum* var. *loncholepis* as having a high degree of threat and a high potential for recovery. Following publication of the name change of this species to a variety by the Service in the FR, it would then be appropriate to revise the recovery priority number to indicate that it is a subspecies or variety rather than a species.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

1. Convene a recovery team and develop a recovery plan for *Cirsium scariosum* var. *loncholepis*.

2. Work with the U.S. Air Force at VAFB to implement site-specific management activities to maintain suitable habitat on the base for this species.

3. Work with partners to reestablish this species at historical locations and establish new populations throughout its historical range in the near future to reduce the risk of extinction to *Cirsium scariosum* var. *loncholepis*.

4. Develop conservation and land use management plans or habitat conservation plans with the Counties of San Luis Obispo and Santa Barbara, the agricultural community, developers, local landowners and stakeholders, and flood control districts to facilitate this species occurring and migrating throughout its historical range.

5. Conduct research on seed dispersal, fragmentation, and metapopulation dynamics in relation to this species' survival and recovery and to determine an appropriate recovery and reintroduction strategy.

6. Conduct seed collections and propagate seed for introduction and re-introduction efforts.

7. Conduct updated surveys throughout the historical range for the species, particularly in the San Antonio Creek, Orcutt Creek, and Santa Ynez River watersheds, including along creeks, riparian areas, and other mesic areas such as seeps on hillsides in these watersheds.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Cirsium loncholepis* [*Cirsium scariosum* var. *loncholepis*]
(La Graciosa thistle)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

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

Review Conducted By: Mark A. Elvin

FIELD OFFICE APPROVAL:

Field Supervisor, U.S. Fish and Wildlife Service

Approve Diane K Noda Date 3/16/11