

Cirsium fontinale var. *obispoense*
(Chorro Creek Bog Thistle)

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



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

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5-YEAR REVIEW

Cirsium fontinale var. *obispoense* (Chorro Creek bog thistle)

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 U.S. Endangered Species Act (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:

Cirsium fontinale var. *obispoense* is endemic to perennial seeps and springs in serpentine soil and rock in western San Luis Obispo County, California. At the time of listing in 1994 (Service 1994), it was known from a total of nine occurrences (a population separated by more than 0.4 kilometers (km) (0.25 miles) (mi) from any other population (California Department of Fish and Game 2011)) and with one of these presumed to be extirpated. The identified threats were cattle grazing (trampling and herbivory), proposed development and water diversions, road maintenance, inadequacy of existing regulatory mechanisms, stochastic events (in particular drought), and invasive plants (Service 1994). At that time, only one occurrence was entirely protected.

The taxon is now known from 19 occurrences, including the type locality on Camp San Luis Obispo with 1,872 individuals in 2008. Five occurrences are on public lands designated as nature or biological reserves, one occurrence is on public land designated as a park, and one occurrence is on private property with a conservation easement (to the City of San Luis Obispo). These eight occurrences are entirely protected. One occurrence is on private property with a landowner who wishes to conserve it, and it is presently safe. One occurrence is on private property and is presently safe because of its location on a steep slope and away from development. Part of one occurrence is on private property and it was reported to be "healthy" in 2012; however, we do not know the status of the plants on the adjacent land owned by the State of California and that are at risk because of nearby agriculture. One occurrence is on private property and is at risk because of proximity to development on the adjacent property. One occurrence is on public lands owned by the City of San Luis Obispo and the County of San Luis

Obispo; because part of this occurrence is in the right-of-way of Prefumo Canyon Road and with a utility post in its midst, it is threatened by road maintenance and utility maintenance. Five occurrences are on private properties and for which we do not know the status of or the immediate threats. No plants were seen at one occurrence in 2012, which is on private property and near development. Because there are many locations with potentially suitable habitat on private properties and public lands that have not been searched, it is highly likely that additional occurrences exist in San Luis Obispo County, and possibly also in Monterey and Santa Barbara Counties.

Invasive plants are a potential threat to five occurrences, and native plants are a threat to two occurrences. Stochastic events remain a threat to all occurrences. We identify the Eurasian flower-head weevil (*Rhinocyllus conicus*) and climate change as new threats.

Methodology Used to Complete This Review:

This review was prepared by staff in the Ventura Fish and Wildlife Office, following the Region 8 guidance issued in March 2008. We used information from our files, the California Natural Diversity Database (California Department of Fish and Wildlife (CDFW) 2013a), the published literature, and information from species experts. We received no information from the public in response to our Federal Register (FR) Notice initiating this 5-year review. 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 FR on May 25, 2011 (76 FR 30377). No information was received as a result of this request.

Listing History:

Original Listing

Notice: 59 FR 64613

Date of Final Listing Rule: December 15, 1994 (effective date: January 17, 1995)

Entity Listed: *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle)

Classification: Endangered

State of California Listing

Listing Date by California Fish and Game Commission: June 1993 (CDFW 2013b)

Classification: Endangered

Associated Rulemakings: None.

Review History: This is the third review of the taxon since listing, including the review we provided in the recovery plan (Service 1998). The first 5-year review, completed in September 2007, recommended no change to the listing classification of endangered.

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for *Cirsium fontinale* var. *obispoense* is 9 according to the Service's 2013 Recovery Data Call for the Ventura Fish and Wildlife Office, based on a 1 to 18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 FR 43098, September 21, 1983). This number indicates that the taxon is a subspecies facing a moderate degree of threat and with a high potential for recovery (48 FR 51985).

Recovery Plan or Outline

Name of Recovery Plan: Recovery Plan for the Morro Shoulderband Snail and Four Plants from Western San Luis Obispo County, California

Date Issued: September 26, 1998

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) policy

The U.S. 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 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

Description

Cirsium fontinale var. *obispoense* is a biennial or short-lived perennial plant up to 2 meters (m) (6.6 feet (ft)) tall in the aster and sunflower family (Asteraceae). The leaves are spiny with glandular hairs on the upper and lower surfaces. The flowers are white, pink, or lavender with a drooping posture (Figure 1). Each flower head produces an average of 73 seeds up that are up to 4 millimeters (mm) (0.2 inches (in)) long (Turner and Herr 1996). Seeds are topped with a pappus (set of bristles) that aids in dispersal.

Cirsium fontinale var. *obispoense* is one of three varieties of *C. fontinale* and is distinguished from the other two by a combination of morphological characteristics involving the stem, leaf, inflorescence, flower, and fruit. Baldwin et al. (2012) provide a complete description. Although we use Chorro Creek bog thistle as the common name, San Luis Obispo fountain thistle is also used (e.g., Baldwin et al. 2012).

Cirsium fontinale var. *obispoense* is geographically separated from the other two varieties. *Cirsium fontinale* var. *fontinale* (Crystal Springs fountain thistle; listed as endangered, Service 1995) occurs west of San Francisco Bay in San Mateo and San Francisco Counties, California. *Cirsium fontinale* var. *campylon* (Mount Hamilton fountain thistle) occurs southeast of San Francisco Bay in Alameda, Santa Clara, and Stanislaus Counties, California (Consortium of California Herbaria 2011), approximately 176 km (109 m) north of the nearest occurrence of *Cirsium fontinale* var. *obispoense*.

Biology and Life History

Cirsium fontinale var. *obispoense* typically live 2 or 3 years. The plant forms a rosette of leaves in the first year that can attain up to 0.9 m (3 ft) in diameter. The majority of seedlings that survive the first winter rapidly increase in size during that winter, and then the following spring each produces a branched, flowering stalk up to 2 m (6.6 ft) in height (Chipping 1994). The plants usually flower during the second spring and then die after flowering. However, some plants may persist into a third year if sufficient energy reserves remain (Chipping 1994). Flowering occurs generally during May to July and occasionally extends into September or October (Magney 2006).

Development of buds and flower heads is much faster in drought-stressed plants than in plants growing in more optimal conditions, and stressed plants contain fewer flowering buds. Stalk development during flowering is more vigorous in plants with access to abundant water and less vigorous in plants with marginal amounts of water. These may be survival strategies for producing seeds quickly before the substrate dries (Chipping 1994).

Cirsium fontinale var. *obispoense* is a serpentine endemic (Chipping 1994; Safford et al. 2005). The plants occupy perennial seeps and springs in serpentine soil and rock (Figure 2), and they often grow in colonies (spatial groups of presumably separate individuals). At the occurrences where dense, non-native grasses grow (e.g., Laguna Lake Park), many individuals are unable to

spread their leaves into a typical rosette. Instead, the plants somewhat resemble spiny romaine lettuce, most of which flower and set seed. As the grasses die back in mid-summer, the leaves of the plant fall outward and form a carpet around its center, which suppresses future grass growth. This results in a substantial amount of seed germination within the circle of old leaves during the following year and very little germination beyond the circle (Chipping 1994).

Distribution

Cirsium fontinale var. *obispoense* occupies perennial seeps and springs in serpentine soil and rock in western San Luis Obispo County, California (Figure 3). The plants usually occur on slopes, with existing records at 37 to 381 m (120 to 1,250 ft) elevation (CDFW 2013a). The taxon is currently known from 19 occurrences, and multiple colonies comprise most occurrences (1, 2, 3, 4, 6, 8, 9, 12, 14, 15, 16, 17). As additional colonies are found, two occurrences may coalesce (for example, occurrences 4 and 5).

The known geographic range comprises 462 square km (178 square mi), extending from San Simeon Creek (35.630897°N, 121.060711°W) to the vicinity of the city of San Luis Obispo (a distance of 56 km (35 mi)). Because there are many locations with potentially suitable habitat on private properties and public lands that have not been surveyed, it is highly likely that additional occurrences exist in San Luis Obispo County, and possibly also in Monterey and Santa Barbara Counties.

Ten additional occurrences have been found since listing (occurrences 10 to 19), and six of these are new (newly reported) since the previous 5-year review (occurrences 14 to 19; Table 1; Appendix A). These 10 additional occurrences expand the geographic range 11 percent (based upon the area of a convex polygon containing the occurrences) beyond that known at listing, and four of these are the most eastern for the taxon. The geographic range comprised 412 square km (159 square mi) at listing. In 2014, the geographic range comprises 462 square km (178 square mi). Three of the additional occurrences are on public lands owned by the City of San Luis Obispo (occurrences 14, 15, 16). One occurrence (occurrence 13) is on private property with a conservation easement to the City of San Luis Obispo, and one occurrence (occurrence 12) is on private property with a conservation easement to the County of San Luis Obispo (2006). One occurrence (occurrence 17) is on two properties, one of which is privately owned and the other owned by the State of California. Four additional occurrences (occurrences 10, 11, 18, 19) are on private properties. See Appendix A for locations of the 19 occurrences, along with elevations and land ownership.

All known occurrences of *Cirsium fontinale* var. *obispoense* are west of the outer coast ranges of the Central Coast Region in San Luis Obispo County, California. Occurrence 1 at San Simeon Creek is disjunct from other occurrences, with 38 (24 mi) separating it from the nearest occurrence to the southwest (occurrence 9 at San Bernardo Creek). The other 18 occurrences are clustered together in three watersheds (Chorro Creek, 5 occurrences; San Luis Obispo Creek, 12 occurrences; Los Osos Creek, 1 occurrence), with a maximum distance of 5.8 km (3.4 mi) separating any two occurrences. Occurrence 2 at Laguna Lake Park in the city of San Luis Obispo comprises multiple colonies at three groups of springs. Occurrence 13 is 1.8 km (1.1 mi) to the southeast on the same serpentine outcrop in the city of San Luis Obispo. Occurrences 4, 5,

7, 8, 15, 16, and 19 occupy a serpentine outcrop in the Irish Hills and southwest of the city of San Luis Obispo. Occurrence 12 (also in the Irish Hills) is on a separate serpentine outcrop 4.2 km (2.6 mi) west of these occurrences. Occurrences 10, 11, and 14 occupy a serpentine outcrop immediately north and east of the city of San Luis Obispo. Occurrences 3, 6, 9, 17, and 18 occupy serpentine outcrops in foothills north and west of the city of San Luis Obispo.

Abundance

We have limited information on the abundance of *Cirsium fontinale* var. *obispoense* because census data are lacking for most years (Table 1). Monitoring for all occurrences is informal, irregular, or does not occur. Six occurrences have been reported to comprise more than 1,000 plants at particular points in time: occurrence 1 at San Simeon Creek (1,076 plants in 1993; CDFW 2013a), occurrence 2 at Laguna Lake Park (approximately 2,075 plants in 2006; M. Elvin, Service, pers. obs. 2006), occurrence 3 at Camp San Luis Obispo (1,872 plants in 2008; Holland 2009), occurrence 6 in the El Chorro Biological Reserve (2,200 plants in 1993; Chipping 1994), occurrence 10 at Miossi Creek (more than 1,000 plants in 1997; CDFW 2013a), and near Serpentine Lane (more than 4,000 plants in 2001; CDFW 2013a). The other 13 occurrences are each likely comprised of fewer than 1,000 plants in 2014, with the most recent estimates ranging from 0 to 800 plants per occurrence (Table 2).

Five-Factor Analysis

At listing, *Cirsium fontinale* var. *obispoense* was known from nine occurrences, with an estimate of less than 3,000 individuals (Service 1994). The identified threats were cattle grazing (trampling and herbivory), proposed development and water diversions, road maintenance, lack of protection from existing regulatory mechanisms, stochastic events (in particular drought), and invasive plants (Service 1994). Predation by the introduced, Eurasian flower-head weevil (*Rhinocyllus conicus*) was discussed and dismissed as a threat.

The recovery plan (Service 1998) identified the threats to the 10 known occurrences in 1998 to be trampling by cattle, proposed development and water diversions, road maintenance, and stochastic events (in particular drought). Invasive plants and the Eurasian flower-head weevil were considered possible threats because sufficient information was lacking. However, herbivory by cattle was stated to not be a threat because the plant "...is not usually eaten by cattle, probably due to its spiny leaves" (Service 1998, p. 28).

In the first 5-year review in 2007 (Service 2007), the primary identified threats to the 13 known occurrences were cattle grazing (trampling), proposed development and water diversions, road maintenance, inadequate protection from existing regulatory mechanisms, stochastic events (in particular drought), and invasive plants. Herbivory by cattle and predation by the Eurasian flower-head weevil were discussed and not considered primary threats.

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

Occurrence 1. This occurrence is in the San Simeon Creek watershed and includes colonies on several private properties and along roads "in a one square mile area" (Wikler and Morey 1992, p. 4). The Nature Conservancy assisted several private landowners with fencing to protect some colonies in the early 1990's, and one private landowner was interested in conserving the plants. Road maintenance (including grading, road expansion, mowing, herbicide application) and water diversions were identified as potential threats at that time (Wikler and Morey 1992). Chipping (1994) reported cattle in the habitat and noted that one private landowner intended to conduct grading within the habitat. We have no additional information regarding Factor A threats and this occurrence.

Occurrence 2. This occurrence is in Laguna Lake Park (152 hectares (ha (375 ac)) on land that is owned by the City of San Luis Obispo. It is protected from grazing, development and water diversions, and road maintenance. Controlled grazing (horses, sometimes cattle) occurs for fuel reduction. Most colonies of *Cirsium fontinale* var. *obispoense* are protected by fencing, but some are expanding beyond the fenced exclosures. Although the serpentine substrate is not conducive for most invasive plant species (Harrison et al. 2006.), *Cortaderia* (pampas grass) became established in the habitat and which the City of San Luis Obispo removed in 2010. The City of San Luis Obispo conducts informal monitoring on an irregular basis (N. Havlik, City of San Luis Obispo, pers. comm. 2011).

Occurrence 3. This occurrence is at seeps adjacent to a tributary of Chorro Creek on Camp San Luis Obispo (2,271 ha (5,612 ac)). It is protected from cattle grazing, development and water diversions, and road maintenance. The California Army National Guard conducted formal monitoring with surveys and census from 1994 to 2008; now it conducts only informal monitoring on an irregular basis.

The Service (1997) issued a biological opinion to the California Army National Guard for controlled cattle grazing in habitat of *Cirsium fontinale* var. *obispoense* on Camp San Luis Obispo. Several species of native (*Scirpus* (bulrush), *Eleocharis macrostachya* (spikerush)) and invasive (*Festuca* (rye grass)) plants were becoming dense in the habitat up to that time. Although the controlled grazing conducted between April 15 and May 14, 1998, removed less than 5 percent of the vegetation in the habitat, the total number of *Cirsium fontinale* var. *obispoense* increased by 68 percent following the disturbance (juvenile plants increased 727 percent; C. Mardesich and T. Laughlin, Harding Lawson Associates, pers. comm. 1998). However, the number of established plants decreased (bolting plants decreased 61 percent, other established plants decreased 82 percent). Later, Magney (2006) reported that the invasive *Sonchus asper* (prickly sow thistle) was invading the habitat and that it was being eradicated.

In 2012, this occurrence of *Cirsium fontinale* var. *obispoense* appeared stable. However, it is threatened by dense vegetation in and near the habitat, including native (*E. macrostachya*, *Distichlis spicata* (salt grass)) and invasive species (*Helminthotheca echioides* (bristly ox-tongue), *Centaurea calcitrapa* (purple star-thistle), *S. asper*) (J. Olson, Colorado State University, pers. comm. 2012). To reduce the potentially competitive plants in and near the

habitat, the California Army National Guard (2012) is proposing to conduct controlled cattle grazing from September 1 to October 15.

It is possible that a controlled grazing regime (such as during September and October in the fall) could benefit *Cirsium fontinale* var. *obispoense* by (1) reducing potentially competitive plants in and near the habitat, and (2) providing favorable sites for germination of seeds (California Army National Guard 1997, 2012; R. Bransfield, Service, pers. comm. 1997). In any event, cattle grazing in habitat of the Chorro Creek bog thistle must be controlled and monitored for the benefits to outweigh the adverse effects.

Occurrence 4. This occurrence is in the Irish Hills Nature Reserve (its northern edge near Prefumo Canyon Road; 381 ha (941 ac)) on land that is owned by the City of San Luis Obispo. The colonies are at four locations in tributaries of Prefumo Creek: a waterfall, two nearby gullies (Chipping 1994), and a creek 0.3 km (0.2 mi) to the east of the waterfall. This occurrence is protected from cattle grazing, development and water diversions, and road maintenance. The City of San Luis Obispo conducts informal monitoring on an irregular basis.

Occurrence 5. This occurrence is in the Irish Hills Nature Reserve (its northern edge) and in the adjacent ditch (the right-of-way) along Prefumo Canyon Road. It is approximately 0.54 km (0.33 mi) northwest of the waterfall in occurrence 4. The plants are threatened by road maintenance (County of San Luis Obispo) and utility maintenance (a post in the midst of the colony identifies underground lines). The City of San Luis Obispo conducts informal monitoring on an irregular basis. We are communicating with the County of San Luis Obispo regarding *Cirsium fontinale* var. *obispoense* in the right-of-way along Prefumo Canyon Road and implementing best management practices during routine maintenance.

Occurrence 6. This occurrence is along the East Fork of Pennington Creek (near the headwaters of Pennington Creek) in the El Chorro Biological Reserve (81 ha (200 ac)), which is owned by California Polytechnic State University. It is protected from cattle grazing, development and water diversions, and road maintenance. California Polytechnic State University conducts informal monitoring on an irregular basis. In 2012, the occurrence was in “good shape” (D. Chipping, California Polytechnic State University, pers. comm. 2012).

Occurrence 7. This occurrence is along Froom Creek just beyond the mouth of Froom Canyon on private property (14 ha (35 ac)) adjacent to the Irish Hills Nature Reserve. Havlik (pers. comm. 2012) saw no plants here in 2012. Chipping (1994) reported 10 plants in 1992, and the CDFW (2013a) has a record of 15 plants in 1986. N. Havlik has seen scattered individuals in the creek upstream of this location, which may comprise an unknown occurrence. We viewed images of the property (dated July 2012) using Google Earth on September 9, 2013, and the occurrence is within 50 m (164 ft) of buildings. The property is zoned for commercial use (County of San Luis Obispo 2013).

Occurrence 8. This occurrence is at a seep and spring-fed stream (a tributary of Froom Creek) on private property (31 ha (76 ac)) immediately east of the Irish Hills Nature Reserve. Chipping (1994) recorded 250 plants at three locations in 1993, which he referred to as Froom Ranch South (A), Froom Ranch North Spring (B), and Froom Ranch Gully Confluence (C). In 2012,

Havlik (pers. comm. 2012) reported 500 or more plants at Froom Ranch South (A) and approximately 300 plants at Froom Ranch North Spring (B), with a description of “robust and healthy.” He saw no plants at Ranch Gully Confluence (C). We viewed images of the property (dated July 2012) using Google Earth on September 9, 2013. Although the property is undeveloped, the location of Froom Ranch South (A) is approximately 50 m (164 ft) downslope of a dirt road and a building on the adjacent property. The property is zoned for commercial use (County of San Luis Obispo 2013).

Occurrence 9. This occurrence is at seeps and springs along a tributary of San Bernardo Creek on private property (approximately 297 ha (733 ac)). The plants are in bogs near an inactive, open-pit chromite mine and other excavations. Chipping (1994) is the primary source of information, who reported the bogs to be heavily grazed. We viewed images of the property (dated September 17, 2011) using Google Earth on September 9, 2013, and it is mostly undeveloped with exception of the mined areas. The property is zoned for grazing (County of San Luis Obispo 2013). Based on similar geology and landform, Chipping (1994, p. 23) believed that additional occurrences likely exist nearby to the east, including a "probable site of a population" on private properties approximately 1.3 km (0.8 mi) to the southeast along another tributary of San Bernardo Creek.

Occurrence 10. This occurrence is in seeps and springs on a northeast-facing slope above Miossi Creek on private property (217 ha (535 acres (ac)) immediately east of California Polytechnic State University. The primary source of information is a report dated 1997 (CDFW 2013a), with observation of cattle in the habitat. We viewed images of the property (dated October 2012) using Google Earth on September 9, 2013, and it is undeveloped. The property is zoned for grazing (County of San Luis Obispo 2013).

Occurrence 11. This occurrence is known from only two specimens that were collected in 1987 (CDFW 2013a). It is supposedly on a south slope near the junction of Reservoir Canyon Creek and Hampton Creek, which is immediately east of the city of San Luis Obispo. Nic Huber (Service, pers. obs. 2006) looked for this occurrence in the Reservoir Canyon Nature Reserve in 2006 but without success. Neil Havlik (C. Kofron, Service, pers. comm. 2012a) stated that the location is likely on private property. We communicated with one of the collectors (B. Penkala, Goleta Valley Junior High School, per. comm. 2013), but he was unable to provide any additional information.

Occurrence 12. This occurrence is at three seeps (headwaters of Los Osos Creek) on private property (8.1 ha (20 ac)) near the junction of Serpentine Lane and Prefumo Canyon Road, with a conservation easement (three parcels totaling 1 ha (2 ac)) granted to the County of San Luis Obispo (2006). The occurrence is on the northern part of the property near the boundary line (L. Althouse, Althouse and Meade, Inc., pers. comm. 2012). We viewed images of the property (dated September 17, 2011) using Google Earth on September 9, 2013. It is mostly undeveloped, with one building on the southwestern corner of the property. Because of what appear to be similar landform and geology, it is likely that *Cirsium fontinale* var. *obispoense* occurs also on the private properties immediately to the north and the east. The property is zoned for rural use (County of San Luis Obispo 2013), and it seems that a house is proposed in

the northern half of the property. The occurrence has not been visited by a biologist since L. Althouse in 2001 (CDFW 2013a), who is the primary source of information.

Occurrence 13. This occurrence is on private property (16 ha (41 ac)) in the central part of the city of San Luis Obispo, with a conservation easement granted to the City of San Luis Obispo. Although the property is used for cattle grazing, trampling is not a threat because the plants are at a seep on a steep, rocky slope. In addition, the City of San Luis Obispo monitors informally on an irregular basis, and it has authority to conduct management activities that it deems necessary to protect *Cirsium fontinale* var. *obispoense*. In 2012, the occurrence appeared healthy and stable (Havlik, pers. comm. 2012). We viewed images of the property (dated July 2012) using Google Earth on September 11, 2013, and it is undeveloped with exception of communication facilities on approximately 0.5 ha (1 ac). The property is zoned for commercial use (County of San Luis Obispo 2013). The property is adjacent to the South Hills Open Space (19.8 ha (49 ac)), which is owned by the City of San Luis Obispo, and a private property (40.1 ha (99 ac)) with a conservation easement granted to the City of San Luis Obispo. This occurrence is protected from cattle grazing, proposed development and water diversions, and road maintenance.

Occurrence 14. This occurrence is immediately east of the city of San Luis Obispo in the Reservoir Canyon Nature Reserve (210 ha (520 ac)) on land that is owned by the City of San Luis Obispo. The occurrence comprises four colonies in a steep tributary of Reservoir Canyon Creek (Carter 2002, Lutz 2013), which is a tributary of San Luis Obispo Creek. Carter (2002) reported approximately 270 plants in 2001 with a patchy overstory (*Umbellularia californica* (California bay), *Salix breweri* (Brewer's willow)). Lutz (2013) recorded 689 plants in 2013, and he reported an extensive overstory (Brewer's willow, California bay, California coffee berry (*Frangula californica*), *Heteromeles arbutifolia* (toyon)) with shade that appeared to be impacting *Cirsium fontinale* var. *obispoense*. Lutz (2013) trimmed part of the overstory, and the City of San Luis Obispo intends to monitor for response by *Cirsium fontinale* var. *obispoense* (F. Otte, City of San Luis Obispo, pers. comm. 2013). This occurrence is protected from cattle grazing, development and water diversions, and road maintenance.

Occurrence 15. This new occurrence is along a tributary of Froom Creek near an old mine in the central part of the Irish Hills Nature Reserve, which is on land owned by the City of San Luis Obispo. The City of San Luis Obispo conducts informal monitoring on an irregular basis. *Cortaderia* became established in the habitat, which the City of San Luis Obispo removed in 2010 and 2011 (Havlik, pers. comm. 2012). This occurrence is protected from cattle grazing, development and water diversions, and road maintenance.

Occurrence 16. This new occurrence is at Poppy Spring near Froom Creek in the central part of the Irish Hills Nature Reserve (Havlik, pers. comm. 2012), which is on land owned by the City of San Luis Obispo. The City of San Luis Obispo conducts informal monitoring on an irregular basis. It is protected from cattle grazing, development and water diversions, and road maintenance.

Occurrence 17. This new occurrence is at a seep on a hillslope on private property immediately southwest of the confluence of Pennington Creek and Chorro Creek (32 ha (78 ac)). The

occurrence appeared “healthy” in January 2012 when viewed across the fence line from Camp San Luis Obispo, with no evidence of cattle grazing (P. Waldburger, California Army National Guard, pers. comm. 2012). The property is zoned for grazing and urban use (County of San Luis Obispo 2013). We viewed images of the property (dated September 17, 2011) using Google Earth on September 11, 2013, and it is undeveloped. David Keil (California Polytechnic State University, pers. comm. 2012) subsequently informed us that he observed *Cirsium fontinale* var. *obispoense* in this vicinity along Chorro Creek. The latter location is on a property (18 ha (45 ac)) owned by the State of California and zoned for government use (County of San Luis Obispo 2013). We viewed images of the property (dated September 17, 2011) using Google Earth on September 11, 2013, and it is mostly undeveloped. However, a small area (approximately 2 ha (5 ac)) of the property on the northern side of Chorro Creek is planted with row-crops, and likewise the adjacent property. This agriculture is in close proximity to *Cirsium fontinale* var. *obispoense* in Chorro Creek and is not compatible with its survival. We have no additional information.

Occurrence 18. This new occurrence is at a perennial seep and spring along a tributary of San Luisito Creek on private property (128 ha (320 ac)). Nancy Siepel (California Department of Transportation, pers. comm. 2012) has viewed the occurrence several times and estimated approximately 200 plants in July 2011. She stated that the occurrence is “doing well” and appears stable. The landowners first observed the plants in 2000. They wish to conserve the plants and they conduct informal monitoring on an irregular basis. Light, controlled cattle grazing is conducted in the habitat, which appears to benefit *Cirsium fontinale* var. *obispoense* by reducing invasive plants (Siepel, pers. comm. 2012). Invasive species include *Conium maculatum* (poison hemlock) in the habitat and *Centaurea calcitrapa* nearby, which the landowners are attempting to eradicate. We viewed images of the property (dated July 2012) using Google Earth on September 11, 2013, and it is undeveloped. The property is zoned for grazing and rural use (County of San Luis Obispo 2013). This occurrence is presently safe from cattle grazing (although light, controlled cattle grazing occurs), development and water diversions, and road maintenance.

Occurrence 19. This new occurrence is at a seep and a small creek (a tributary of San Luis Obispo Creek) on a steep hillslope on private property (89 ha (220 ac)) between the Irish Hills Nature Reserve and the Johnson Ranch Open Space. Although cattle grazing occurs on the property, the location with *Cirsium fontinale* var. *obispoense* is not accessible to cattle. *Cortaderia* is growing near the habitat, and it has been targeted for removal by the City of San Luis Obispo. We are not aware of any additional threats. Havlik (pers. comm. 2012) found this occurrence in 2012, which is the southernmost known occurrence of the taxon. We viewed images of the property (dated July 2012) using Google Earth on September 11, 2013, and it is undeveloped with exception of a wine facility on approximately 2 ha (5 ac). The property is zoned for grazing (County of San Luis Obispo 2013).

Summary of Factor A

- Seven occurrences of *Cirsium fontinale* var. *obispoense* are entirely on public lands owned by the City of San Luis Obispo (occurrences 2, 4, 14, 15, 16), California Polytechnic State University (occurrence 6), and the California Army National Guard

(occurrence 3). They are protected from cattle grazing, development and water diversions, and road maintenance.

- One occurrence (occurrence 13) is on private property with a conservation easement granted to the City of San Luis Obispo. It is protected from cattle grazing, development and water diversions, and road maintenance.
- One occurrence (occurrence 18) is on private property with a landowner who wishes to conserve it. This occurrence is presently safe, although light cattle grazing is conducted in the habitat, which appears to benefit *Cirsium fontinale* var. *obispoense* by reducing invasive plants in and near the habitat (Siepel, pers. comm. 2012).
- Occurrence 19 is on private property and is presently safe from cattle grazing, development and water diversions, and road maintenance because of its location on a steep slope and away from development.
- Part of occurrence 17 is on private property and it was reported to be "healthy" in 2012 (Waldburger, pers. comm. 2012); however, we do not know the status of the plants on the adjacent land owned by the State of California and that are at risk because of nearby agriculture.
- Occurrence 8 is on private property and is at risk because of proximity to development on the adjacent property.
- One occurrence (occurrence 5) is on public lands owned by the City of San Luis Obispo and the County of San Luis Obispo. Because part of this occurrence is in the right-of-way of Prefumo Canyon Road and with a utility post in its midst, it is threatened by road maintenance and utility maintenance.
- Five occurrences (occurrences 1, 9, 10, 11, 12,) are on private properties and for which we do not know the status of or the immediate threats.
- No plants were seen at one occurrence (occurrence 7) in 2012. It is on private property and near development.
- The threat posed to *Cirsium fontinale* var. *obispoense* by invasive (and native) plants is not fully known. *Cortaderia*, *Sonchus asper*, and *Conium maculatum* can invade the serpentine habitat of *Cirsium fontinale* var. *obispoense*. However, many other invasive species may not be able to (Harrison et al. 2006).

In sum, the status of *Cirsium fontinale* var. *obispoense* and Factor A threats in 2014 has improved substantially since the previous 5-year review in 2007 and since listing in 1994. This is because of an increased number of known occurrences, along with an increased number of occurrences that are protected from cattle grazing, development and water diversions, and road maintenance. Eight of the 19 known occurrences are entirely protected in 2014, whereas four of

the 13 known occurrences were protected at the time of the previous 5-year review in 2007 and one of the nine known occurrences was protected at listing in 1994.

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

Overutilization for any purpose is not a threat in 2014, and it has never been identified as a threat in the past (Chipping 1994; Service 1998, 2007). The Service has issued two recovery permits for *Cirsium fontinale* var. *obispoense*, which were to two botanic gardens in California for the purpose of enhancing its survival.

FACTOR C: Disease or Predation

Disease

Disease has never been reported as a threat to *Cirsium fontinale* var. *obispoense* (Wikler and Morey 1992; Chipping 1994; Service 1994, 1998, 2007).

Predation by Insects

The Eurasian flower-head weevil (*Rhinocyllus conicus*) has been intentionally introduced at multiple locations in North America since 1968 as a biocontrol agent for invasive *Carduus* (thistle) and invasive *Silybum* (milk thistle; Herr 2004), including San Luis Obispo County as early as 1973 (Goeden et al. 1985). As of 2005, the weevil occurred in at least 26 states and Canada with reports of it also predated native *Cirsium* (thistle; e.g., Dodge 2005), which Turner et al. (1987) described as unintended although not surprising.

The Eurasian flower-head weevil has been reported predated *Cirsium fontinale* var. *obispoense* at several sites (Service 1994), including San Simeon Creek (Chipping 1994; Herr 2004), Laguna Lake Park (Herr 2004), and Camp San Luis Obispo (California Army National Guard 2012). The Service initially dismissed predation by the Eurasian flower-head weevil as a threat in 1994, then considered it a possible threat in 1998, and then considered it not a primary threat in 2007 (Service 1994, 1997, 2007).

Adult Eurasian flower-head weevils congregate on young thistles in early spring to feed and mate. They lay eggs (averaging 192 eggs per female) on developing flower heads into which the subsequent larvae tunnel and feed on. Pupation occurs in the flower head, with the adults emerging in mid-summer. One generation per year is produced (Zwoller and Harris 1984). Turner and Herr (1996) reported a phenological difference in peak egg laying of Eurasian flower-head weevils in relation to flower head production of *Cirsium fontinale* var. *obispoense*.

In a study on one property at San Simeon Creek, 28 percent of the flower heads of *Cirsium fontinale* var. *obispoense* were infested throughout the plant's growing season, with 27 percent of the seeds destroyed on average in the predated flower heads. By extrapolation, the total seed predation was estimated to comprise 8 percent of the season's crop at the study site (Turner and Herr 1996; J. Herr, U.S. Department of Agriculture, pers. comm. 2012).

Herr (2004) reported the following other rates of infestation of *Cirsium fontinale* var. *obispoense*: San Simeon Creek, 42 percent (July 1995); and Laguna Lake Park, 32 percent (May 1996) and 5 percent (July 1995). Although Magney (2006) reported no infestation (September 2005) at Camp San Luis Obispo, the California Army National Guard (2012) subsequently observed Eurasian flower-head weevils feeding on the plants at this occurrence.

We consider the Eurasian flower-head weevil to be a threat to *Cirsium fontinale* var. *obispoense*. This insect was substantially and seasonally reducing the numbers of seeds of the plant at two of the 19 known occurrences (and possibly more). Lutz (2013) observed no Eurasian flower-head weevils or their damage at occurrence 14.

Herbivory by Cattle

There are two issues to consider regarding cattle grazing in and near the habitat of *Cirsium fontinale* var. *obispoense*: herbivory and trampling. Mardesich and Laughlin (pers. comm. 1998) studied the impact of cattle grazing on *Cirsium fontinale* var. *obispoense* at Camp San Luis Obispo. They observed a substantial decrease in established plants by trampling and herbivory and a substantial increase in juvenile plants. We discussed cattle grazing with Chipping (pers. comm. 2012), Havlick (pers. comm. 2012), and Siepel (pers. comm. 2012), all of whom have observed cattle grazing in the vicinity of *Cirsium fontinale* var. *obispoense*. In sum, we consider the effects of herbivory to be minor and not a threat because the spiny characteristics of the plants make them generally unpalatable. In contrast, however, trampling by cattle while grazing in the habitat could severely damage established plants, especially when water becomes limited to the cattle and they congregate at the seep or spring. Trampling by cattle is discussed under Factor A.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

Cirsium fontinale var. *obispoense* was listed as endangered under the California Endangered Species Act and the U.S. Endangered Species Act in 1993 and 1994, respectively. These two laws provide adequate protection on Camp San Luis Obispo; however, they have limited ability to protect the taxon on non-State and non-Federal land. At listing and in the previous 5-year review, the Service (1994, 2007) discussed that existing regulations were insufficient to reduce the impacts for Factor A, Factor C, and Factor E threats to *Cirsium fontinale* var. *obispoense*. The following is a brief summary of the primary Federal and State laws that apply.

Federal Regulations

U.S. Endangered Species Act of 1973, as Amended (Act)

This is the primary Federal law providing protection for *Cirsium fontinale* var. *obispoense*. The Service's responsibilities include administering the Act, including sections 7, 9, and 10 that address take. Since listing, the Service has analyzed the potential effects of Federal projects under section 7(a)(2), which requires Federal agencies to consult with the Service prior to authorizing, funding, or carrying out activities that may affect listed species. 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 Code of Federal Regulations 402.02 and 402.14). A non-jeopardy biological opinion may include reasonable and prudent measures that minimize the amount or extent of incidental take of listed species associated with a project.

Regarding federally listed plant species, section 7(a)(2) requires Federal agencies to consult with the Service to ensure any project they fund, authorize, or carry out does not jeopardize a listed plant species. Section 9 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 possession 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 on non-Federal land if they co-occur with federally listed wildlife species. In brief, this law has only limited ability to protect *Cirsium fontinale* var. *obispoense* on non-Federal land.

Cirsium fontinale var. *obispoense* is protected on Camp San Luis Obispo (State land) because the California Army National Guard, in coordination with the National Guard Bureau, receives Federal funding to conduct its activities. The California Army National Guard consults with the Service regarding its actions that may affect *Cirsium fontinale* var. *obispoense* on Camp San Luis Obispo.

Sikes Act

The Sikes Act (16 United States Code 670) authorizes the Secretary of Defense to develop cooperative plans with the Secretaries of Agriculture and the Interior for managing natural resources on public lands. The Sikes Act Improvement Act of 1997 requires Department of Defense installations to prepare Integrated Natural Resource Management Plans (INRMPs) that provide for the conservation and rehabilitation of natural resources on military lands consistent with the use of military installations to ensure the readiness of the Armed Forces. INRMPs incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military land uses. While INRMPs are not technically regulatory mechanisms because their implementation is subject to funding availability, they can be an added conservation tool in promoting the recovery of endangered and threatened species on military lands. The California Army National Guard (2011) prepared an INRMP for Camp San Luis Obispo, which includes a management program for *Cirsium fontinale* var. *obispoense*.

State Regulations in California

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

The CESA (CDFW Code, section 2080 *et seq.*) prohibits the unauthorized take of State-listed threatened or endangered species. The NPPA (Division 2, Chapter 10, section 1908) prohibits the unauthorized take of State-listed threatened or endangered plant species.

The CESA requires consultation with the CDFW for activities that may affect a State-listed species and mitigation 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 that will be taken in the process of habitat modification. Where landowners have been notified by the State that a rare or endangered plant is growing on their land, the landowners are required to notify the CDFW 10 days in advance of changing land use in order to allow salvage of listed plants. In addition, the impacts to sensitive and listed species from agricultural operations, including grazing, are exempted from these two laws (Morey and Ikeda 2001). In sum, the CESA and the NPPA have only limited ability to protect *Cirsium fontinale* var. *obispoense*.

California Environmental Quality Act (CEQA)

The CEQA requires review of any project that is undertaken, funded, or permitted by the State or a local governmental agency. In general, if significant effects are identified, the lead agency may require project redesign to avoid impacts, or require development of measures to fully mitigate significant impacts, or make a finding that overriding considerations make full mitigation infeasible. Therefore, protection of *Cirsium fontinale* var. *obispoense* through CEQA is dependent upon the determination of the lead agency involved.

Summary of Factor D

The California Endangered Species Act and the U.S. Endangered Species Act provide adequate protection for *Cirsium fontinale* var. *obispoense* on Camp San Luis Obispo because the California Army National Guard uses Federal funds on State land. However, the combination of all Federal and State laws has only limited ability to protect *Cirsium fontinale* var. *obispoense* on non-Federal and non-State lands.

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

At the time of listing and in the previous 5-year review (Service 1994, 2007), we identified the threats of invasive plants and stochastic events under Factor E. In this 5-year review, we have moved invasive plants to Factor A because of their ability to destroy or modify the habitat of *Cirsium fontinale* var. *obispoense*. Also in this 5-year review, we identify climate change as a new threat.

Stochastic Events

Species with small populations are vulnerable to extinction by stochastic events (Ricklefs 2008). This means that chance or random events can cause the population size of the species to decrease, possibly below the level of sustainability and down to extinction. Examples include

severe droughts, storms, freezes, harsh winters, and fires, all which can have catastrophic effects on small populations (Mangel and Tier 1994).

Cirsium fontinale var. *obispoense* is a narrow endemic plant restricted to the specialized habitat of perennial seeps and springs in serpentine soil and rock in western San Luis Obispo County, California. It exists mostly as isolated occurrences in a relatively small geographic area. The geographic range comprised 412 square km (159 square mi) at listing in 1994, and 462 square km (178 square mi) in 2007 and 2014. Nineteen occurrences exist, with only six comprising more than 1,000 individuals. We consider stochastic events, in particular drought, an ongoing threat. Because *Cirsium fontinale* var. *obispoense* is associated with seeps and springs, a severe or prolonged drought could reduce or eliminate its specialized habitat and result in the extirpation of some occurrences.

Climate Change

We identify climate change as a new threat. Current climate change projections for terrestrial areas in the northern hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field et al. 1999; Cayan et al. 2005; Intergovernmental Panel on Climate Change 2007). Climate simulations have shown that California temperatures are likely to increase by 1.5 degrees Celsius (2.7 degrees Fahrenheit) under a lower emissions scenario, and by up to 4.5 degrees Celsius (8.1 degrees Fahrenheit) under a higher emissions scenario (Cayan et al. 2008). Because of the diversity of the landscape, it is unknown if climate change will result in a warmer trend in California with localized drying, higher precipitation events, or other effects. We lack adequate information to make specific and accurate predictions regarding how climate change in combination with other factors such as isolation at perennial seeps and springs will affect *Cirsium fontinale* var. *obispoense*. However, limited-ranged taxa are likely to be more vulnerable to extinction due to these changing conditions. Our major concern is the effects of extreme weather events (e.g., severe drought, severe storm, harsh winter) due to climate change on the 19 occurrences of *Cirsium fontinale* var. *obispoense*.

III. RECOVERY CRITERIA

Recovery plans provide guidance to the Service, States, and other partners and interested parties on ways to minimize threats to listed species, and on criteria that may be used to determine when recovery goals are achieved. There are many paths to accomplishing the 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 downlist or delist the species. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. 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 progress that

has been made toward recovery since the species was listed (or since the most recent 5-year review) by eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated.

Specific delisting criteria for *Cirsium fontinale* var. *obispoense* were not included in the recovery plan (Service 1998). The plan anticipated that as information on life history and management became available, recovery criteria would be revised and delisting criteria would be developed. No delisting criteria have been developed or recommended at this time.

Criteria for Downlisting

As stated in the recovery plan (Service 1998), the recovery objective is downlisting from endangered to threatened. The following criteria are for downlisting to threatened (Service 1998, 2007), and we evaluate the progress that has been made toward achievement.

1. Populations from throughout the range, each made up of multiple colonies, and their habitat at six sites are secure from human-induced threats, including water diversions or draw downs (addresses Factors A and E).

This criterion has been partially met. Eight occurrences and their habitats are secure in the San Luis Obispo Creek and Chorro Creek watersheds: occurrences 2, 3, 4, 6, 13, 14, 15 and 16. Of these, five occurrences are known to be comprised of multiple colonies (occurrences 2, 3, 4, 6, 14), and occurrences 15 and 16 together (both in the Irish Hills Nature Reserve) conceptually comprise a sixth site with multiple colonies. Occurrences with multiple colonies are required because they are more likely to persist through time (Service 2007). However, occurrences 1 and 12 are the sole occurrences in the San Simeon Creek and Los Osos Creek watersheds, respectively; neither of these is secure.

2. At least three of these sites are (a) in protected areas larger than 40 ha [100 ac] and (b) their populations are viable and stable or increasing as determined by monitoring over a precipitation cycle that includes multiple years of below average rainfall (addresses Factors A and E).

This criterion has been partially met.

(a) All seven of the sites mentioned in 1 above are in protected areas larger than 40 ha (100 ac):

- occurrence 2 at Laguna Lake Park (152 ha (375 ac))
- occurrence 3 at Camp San Luis Obispo (2,271 ha (5,612 ac) for the purpose of this analysis)
- occurrence 4 in the Irish Hills Nature Reserve (381 ha (941 ac))
- occurrence 6 in the El Chorro Biological Reserve (81 ha (200 ac))
- occurrence 13 on private property (17 ha (41 ac)) with a conservation easement to the City of San Luis Obispo, and which is adjacent to the South Hills Open Space (20 ha (49 ac)) City of San Luis Obispo owner) and to a private property (40 ha (99 ac)) with a conservation easement to the City of San Luis Obispo (total 77 ha (189 ac))

- occurrence 14 in the Reservoir Canyon Nature Reserve (210 ha (520 ac))
- occurrences 15 and 16 in the Irish Hills Nature Reserve (381 ha (941 ac))

(b) This criterion has been partially met. Although formal and regular monitoring is not conducted for any occurrence, the eight occurrences in 2(a) above were assessed to be stable in 2012 or 2013 as determined by informal and irregular monitoring.

Formal and regular monitoring was conducted previously for occurrence 3 at Camp San Luis Obispo from 1994 (1,845 individuals) to 2008 (1,872 individuals). This occurrence has experienced substantial variation in numbers of individuals from year to year (range 643 to 4,644 individuals per year).

3. Protected sites are being managed in a way that will support the continued existence of *Cirsium fontinale* var. *obispoense* and its wetland habitat (addresses Factor A).

This criterion has been partially met. All seven protected sites are being managed in a way that will support the continued existence of *Cirsium fontinale* var. *obispoense* and its wetland habitat:

- occurrence 2 at Laguna Lake Park (owned by City of San Luis Obispo).
- occurrence 3 at Camp San Luis Obispo (owned by California Army National Guard).
- occurrence 4 in the Irish Hills Nature Reserve (owned by City of San Luis Obispo).
- occurrence 6 in the El Chorro Biological Reserve (owned by California Polytechnic State University).
- occurrence 13 on private property with a conservation easement to the City of San Luis Obispo, and which is adjacent to the South Hills Open Space (owned by City of San Luis Obispo) and to a private property with a conservation easement to the City of San Luis Obispo.
- occurrence 14 in the Reservoir Canyon Nature Reserve (owned by City of San Luis Obispo).
- occurrences 15 and 16 in the Irish Hills Nature Reserve (owned by City of San Luis Obispo).

4. Management is effective, as shown by at least 10 years of monitoring (addresses Factor A and E).

This criterion has been partially met. Although all monitoring is informal and irregular, the status of the eight protected occurrences was reported as stable in 2012 or 2013.

IV. SYNTHESIS

Cirsium fontinale var. *obispoense* is endemic to perennial seeps and springs in serpentine soil and rock in western San Luis Obispo County, California. At listing in 1994 it was known from nine occurrences and with one of these presumed to be extirpated. The identified threats were cattle grazing (trampling and herbivory), proposed development and water diversions, road maintenance, inadequacy of existing regulatory mechanisms, stochastic events (in particular drought), and invasive plants. At that time, only one occurrence was entirely protected.

The taxon is now known from 19 occurrences, including the type locality on Camp San Luis Obispo with 1,872 individuals in 2008. Five occurrences are on public lands designated as nature or biological reserves, one occurrence is on public land designated as a park, and one occurrence is on private property with a conservation easement (to the City of San Luis Obispo). These eight occurrences are entirely protected. One occurrence is on private property with a landowner who wishes to conserve it, and it is presently safe. One occurrence is on private property and is presently safe because of its location on a steep slope and away from development. Part of one occurrence is on private property and it was reported to be "healthy" in 2012; however, we do not know the status of the plants on the adjacent land owned by the State of California and that are at risk because of nearby agriculture. One occurrence is on private property and is at risk because of proximity to development on the adjacent property. One occurrence is on public lands owned by the City of San Luis Obispo and the County of San Luis Obispo; because part of this occurrence is in the right-of-way of Prefumo Canyon Road and with a utility post in its midst, it is threatened by road maintenance and utility maintenance. Five occurrences are on private properties and for which we do not know the status of or the immediate threats. No plants were seen at one occurrence in 2012, which is on private property and near development. Because there are many locations with potentially suitable habitat on private properties and public lands that have not been searched, it is highly likely that additional occurrences exist in San Luis Obispo County, and possibly also in Monterey and Santa Barbara Counties.

Census data are available for 12 occurrences over the past 5 years (2008 to 2013). Five occurrences have not been censused since the 1990's, one occurrence has not been censused since 2001, and one occurrence is known only from two specimens that were collected on private property (precise location unknown) in 1987. Invasive plants are a potential threat to five occurrences, and native plants are a threat to two occurrences. There have been no triggers to invoke Federal and State regulations for protecting *Cirsium fontinale* var. *obispoense* on non-Federal and non-State lands. Stochastic events remain a threat to all occurrences. We identify the Eurasian flower-head weevil and climate change as new threats. In consideration of all the information, we determine that *Cirsium fontinale* var. *obispoense* still meets the definition of endangered, and we recommend no status change at this time.

V. RESULTS

Recommended Listing Action

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No Change

New Recovery Priority Number and Brief Rationale: Not applicable.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

1. Additional occurrences of *Cirsium fontinale* var. *obispoense* likely exist in San Luis Obispo County, and also possibly in Monterey and Santa Barbara Counties. We recommend that searches be conducted in potentially suitable habitat with serpentine soil and rock in San Luis Obispo, Monterey and Santa Barbara Counties (see Figures 3, 4 and 5).
2. We recommend that the Service seek partnerships with the private landowners for assisting them to manage *Cirsium fontinale* var. *obispoense* on their properties.
3. We recommend that a range-wide census of the 19 occurrences be conducted in 2015 as a team effort including the California Army National Guard, the California Native Plant Society (San Luis Obispo Chapter), California Polytechnic State University, the City of San Luis Obispo, the private landowners, and the Service. The methods should be standardized in advance.
4. We recommend that the relevant biologists, landowners, and land managers monitor for invasive plant species in and near the habitat of *Cirsium fontinale* var. *obispoense* and take the necessary actions to eliminate this threat.
5. We recommend that any cattle grazing in the habitat of *Cirsium fontinale* var. *obispoense* be controlled and monitored. A controlled grazing regime may benefit *Cirsium fontinale* var. *obispoense* by reducing other vegetation (invasive and native) in and near the habitat and by providing favorable sites for the germination of seeds. Herbivory of *Cirsium fontinale* var. *obispoense* would be minor because their spiny characteristics make them generally unpalatable. However, trampling could severely damage the established plants, especially when water becomes limited to the cattle and they congregate in the seep or spring.
6. The relevant biologists, landowners, and land managers should be aware of the introduced Eurasian flower-head weevil and the threat it poses to *Cirsium fontinale* var. *obispoense*. We recommend that they monitor for and report the presence of this introduced insect to the U.S. Fish and Wildlife Service, Ventura, California, and to the Department of Agriculture for San Luis Obispo County, California.

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

Cirsium fontinale var. *obispoense* (Chorro Creek bog thistle)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

Downlist to Threatened

Uplist to Endangered

Delist

No change needed

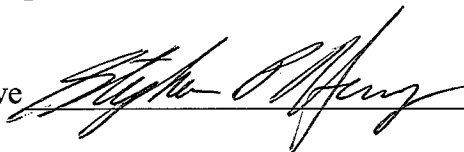
Appropriate Listing/Reclassification Priority Number: N/A

Review Conducted By: Christopher Kofron

FIELD OFFICE APPROVAL:

Field Supervisor, U.S. Fish and Wildlife Service

Approve



Date

6/18/14



Figure 1. A flower head of *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) on Camp San Luis Obispo, San Luis Obispo County, California. (May 12, 2005. Photo courtesy of David Magney, David Magney Environmental Consulting, Ojai, California).



Figure 2. Occurrence 13 of *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) in the city of San Luis Obispo, San Luis Obispo County, California. This occurrence comprises a single colony on a steep rocky slope on private property that is used primarily for cattle grazing. The landowner granted a conservation easement to the City of San Luis Obispo. (December 2011. Photo courtesy of Neil Havlik, Natural Resource Manager, City of San Luis Obispo, California).

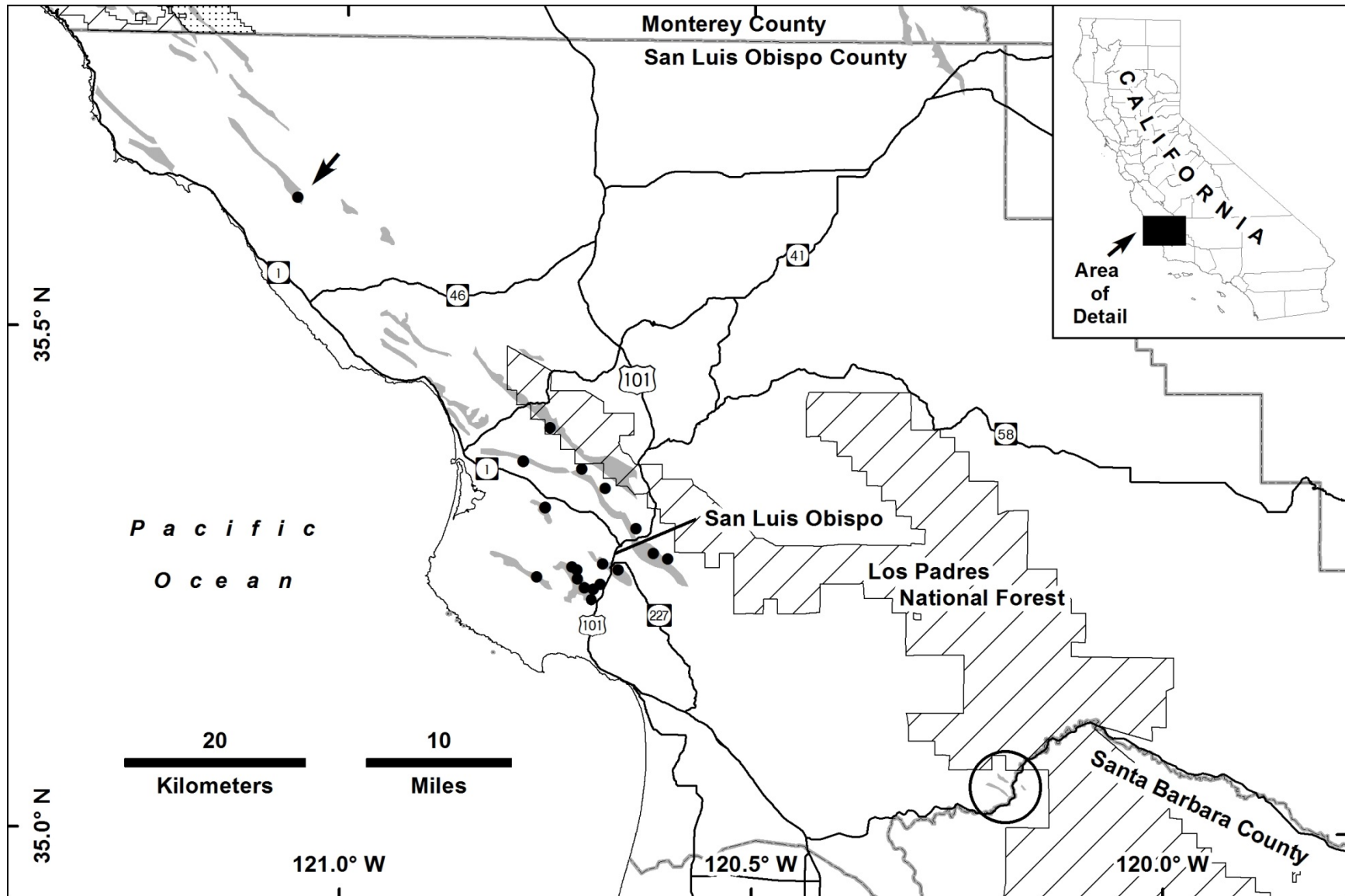


Figure 3. The known geographic distribution of *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) in western San Luis Obispo County, California. Black dots indicate the 19 occurrences, and the arrow indicates the northernmost known occurrence at San Simeon Creek. The taxon is endemic to perennial seeps and springs in serpentine soil and rock (shaded areas). We recommend searching for unknown occurrences in San Luis Obispo County in the serpentine soil and rock shown in this map. See also Figures 4 and 5.

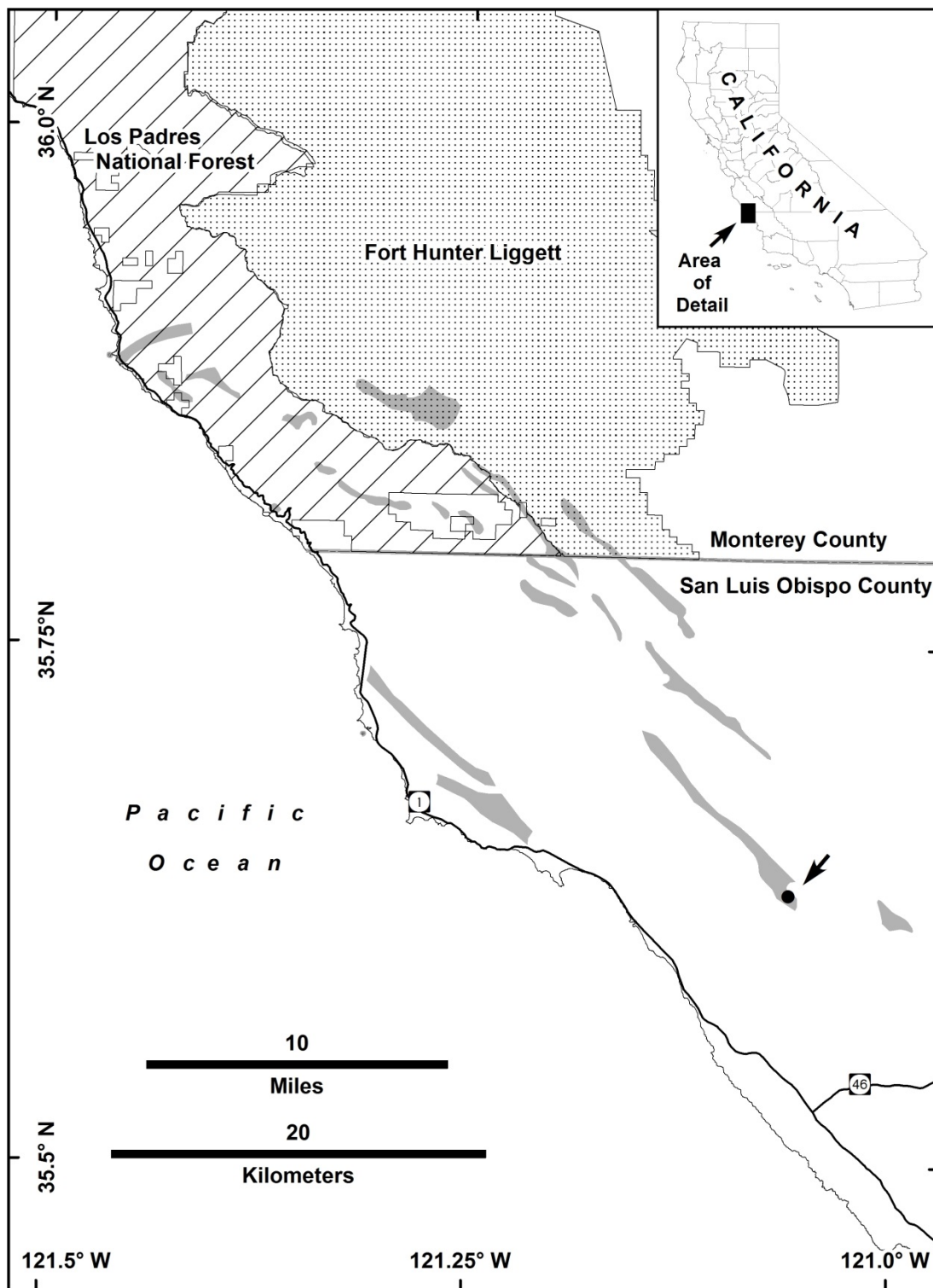


Figure 4. Serpentine soil and rock (shaded areas) in Monterey County, California. *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) is endemic to perennial seeps and springs in serpentine soil and rock in western San Luis Obispo County, as currently known. The arrow indicates the northernmost known occurrence at San Simeon Creek. We recommend searching for unknown occurrences in Monterey County in the serpentine soil and rock shown in this map. See also Figures 3 and 5.

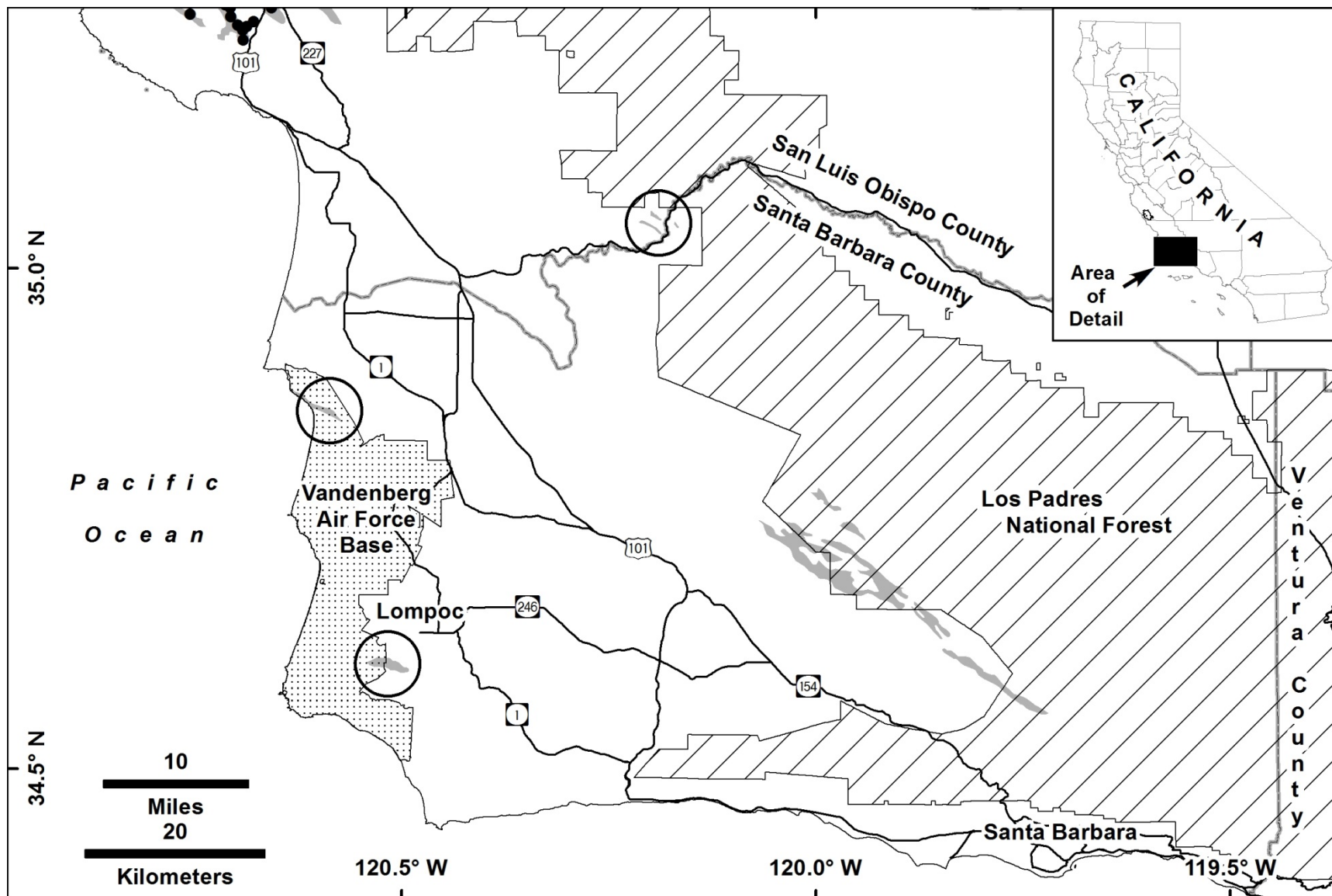


Figure 5. Serpentine soil and rock (shaded areas) in Santa Barbara County, California. *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) is endemic to perennial seeps and springs in serpentine soil and rock in western San Luis Obispo County, as currently known. The black dots (upper left) indicate the southernmost known occurrences in the vicinity of the city of San Luis Obispo. We recommend searching for unknown occurrences in Santa Barbara County in the serpentine soil and rock shown in this map. See also Figures 3 and 4.

Table 1. Status of the 19 known occurrences of *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) in western San Luis Obispo County, California, in 2014. Occurrences 1-13 are recorded in California Department of Fish and Wildlife (2013a). Occurrences 14-19 are new.

Occurrence	Location	Landowner	Protected	Status	Immediate threat
1	San Simeon Creek	several private	no	unknown	unknown
2	Laguna Lake Park	City of San Luis Obispo	yes	stable	potentially, invasive plant species ^f
3	tributary of Chorro Creek, Camp San Luis Obispo	California Army National Guard	yes	stable ^b	native, wetland plant species ^b invasive plant species ^b
4	Several tributaries of Prefumo Creek, Irish Hills Nature Reserve	City of San Luis Obispo	yes	stable	none
5	Tributary of Prefumo Creek, Irish Hills Nature Reserve and road right-of-way	City of San Luis Obispo, County of San Luis Obispo	yes no	at risk ^g	road and utility maintenance ^g
6	East Fork of Pennington Creek, El Chorro Biological Reserve	California Polytechnic State University	yes	stable ^c	none ^c
7	Froom Creek near mouth of Froom Canyon	private	no	no plants ^a	near development
8	Seep and tributary of Froom Creek	private	no	at risk	near development
9	Tributary of San Bernardo Creek	private	no	unknown	unknown
10	Slope above Miozzi Creek	private	no	unknown	unknown
11	Precise location unknown, near Reservoir Canyon Creek and Hampton Creek	likely private	no	unknown	unknown
12	Near Serpentine Lane, west of Prefumo Canyon	private	partially	unknown	unknown
13	Slope near Loma Bonita Drive in the city of San Luis Obispo	private with conservation easement to City of San Luis Obispo	yes	stable ^a	none ^a
14	Reservoir Canyon Nature Reserve	City of San Luis Obispo	yes	stable	shade from native trees ^h
15	Tributary of Froom Creek near old mine, Irish Hills Nature Reserve	City of San Luis Obispo	yes	stable ^a	potentially, invasive plant species ^a
16	Poppy Spring near Froom Creek, Irish Hills Nature Reserve	City of San Luis Obispo	yes	stable ^a	none ^a
17	Tributary of and along Chorro Creek, southwest of confluence with Pennington Creek	private, State of California	no no	unknown at risk	none ^d nearby agriculture
18	Seep and spring along a tributary of San Luisito Creek	private	no	stable ^c	potentially, invasive plant species ^c
19	Seep and small creek (a tributary of San Luis Obispo Creek)	private	no	stable	potentially, invasive plant species ^a

^aHavlik, pers. comm. 2012 ^bOlson, pers. comm. 2012 ^cChipping, pers. comm. 2012 ^dWaldburger, pers. comm. 2012 ^eSiepel, pers. comm. 2012 ^fHavlik, pers. comm. 2011 ^gKofron, pers. comm. 2012b ^hLutz 2013

Table 2. Approximate numbers of *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) in each of the 19 known occurrences in western San Luis Obispo County, California. Occurrences 1-13 are recorded in California Department of Fish and Wildlife (2013a). Occurrences 14-19 are new. Recent census data are not available for some occurrences.

Year	Occurrence																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2013														689 ⁿ					
2012							0 ^k	≥800 ^k									>100 ^l		300 ^k
2011		1400 ^f			150 ^f								500 ^g		≥500 ^k	63 ^k		200 ^m	
2010																			
2008			1872 ^e																
2007			762 ^d																
2006		2075 ^j	1565 ^c																
2005			1843 ^h										300 ^a						
2004			1759 ^h																
2003			643 ^a																
2002			3393 ^a																
2001			2792 ^a									>4000 ^a		270 ⁱ					
2000			4433 ^a																
1999		>3000 ^a	4644 ^a																
1998			822 ^a																
1997			1055 ^a							>1000 ^a									
1996			1782 ^a																
1995			2871 ^a																
1994			1845 ^a																
1993	1076 ^a	1025 ^a	250 ^c	557 ^b	70 ^b	2200 ^b		250 ^b	500 ^b										
1992	450 ^b						10 ^b												
1991	75 ^b																		
1990	450 ^a	>82 ^a																	
1989	450 ^a	100 ^a																	
1988	>100 ^a																		
1987	<150 ^a						15 ^a												≥2 ^a
1986	100 ^o	1000 ^o		150 ^b	50 ^b	1000 ^a													
1984				50 ^b															
1981		1000 ^a				1000 ^a													

^aCalifornia Department of Fish and Wildlife 2013a ^bChipping 1994 ^cHolland 2007 ^dHolland 2008 ^eHolland 2009 ^fKofron, pers. comm. 2011 ^gHavlik, pers. comm. 2011 ^hMagney 2006 ⁱCarter 2002 ^jElvin, pers. obs. 2006 ^kHavlik, pers. comm. 2012 ^lWaldburger, pers. comm. 2012 ^mSiepel, pers. comm. 2012 ⁿLutz 2013 ^oFriedman 1986

APPENDIX A: Locations of the 19 known occurrences of *Cirsium fontinale* var. *obispoense* (Chorro Creek bog thistle) in western San Luis Obispo County, California. Occurrences 1-13 are recorded in California Department of Fish and Wildlife (2013a). Occurrences 14-19 are new.

1. San Simeon Creek, approximately 0.3 km (0.2 mi) by road (San Simeon Creek Road) downstream of confluence of north and south forks (35.63091°N, 121.06072°W; 259 m (850 ft)); several private owners.
2. Laguna Lake Park, seeps on hillslope immediately north of lake (35.26783°N, 120.68376°W), city of San Luis Obispo; 61 m (200 ft); City of San Luis Obispo owner.
3. Seeps adjacent to a tributary of Chorro Creek (35.34302°N, 120.68178°W), Camp San Luis Obispo, approximately 0.8 km (0.5 mi) northeast of Chorro Reservoir; 244 m (800 ft); California Army National Guard owner.
4. Several tributaries of Prefumo Creek (south side of Prefumo Canyon Road, including a waterfall; 35.26154°N, 120.71560°W), Irish Hills Nature Reserve; 61 m (200 ft); City of San Luis Obispo owner.
5. Tributary of Prefumo Creek (south side of Prefumo Canyon Road; 35.26450°N, 120.72168°W), Irish Hills Nature Reserve and road right-of-way; 107 m (350 ft); City of San Luis Obispo and County of San Luis Obispo owners.
6. East Fork of Pennington Creek (35.36214°N, 120.71023°W), El Chorro Biological Reserve, 1.0-1.4 km (0.6-0.9 mi) west of Whiskey Spring; 381 m (1,250 ft); California Polytechnic State University owner.
7. Froom Creek near the mouth of Froom Canyon (35.24768°N, 120.68672°W; 14 ha (35 ac); 37 m (120 ft)); private owner.
8. Seep and tributary of Froom Creek immediately east of Irish Hills Nature Reserve (35.24263°N, 120.69505°W), 73 m (240 ft); private owner.
9. Springs and seeps along a tributary of San Bernardo Creek (35.40309°N, 120.74930°W), approximately 1.6-2.1 km (1.0-1.3 mi) southwest of Cerro Alto Peak; 305 m (1,000 ft); private owner.
10. Slope above Miossi Creek (35.30310°N, 120.64356°W), approximately 0.4 km (0.25 mi) east of California Polytechnic State University and 0.8 km (0.5 mi) north of Cuesta Canyon Park; 171 m (560 ft); private owner.
11. South slope near junction of Reservoir Canyon Creek and Hampton Creek, approximately 3.1 km (1.9 mi) east of city of San Luis Obispo, precise location unknown (35.27307°N, 120.60498°W used by CDFW 2013a); 383 m (1,255 ft); private owner.

12. Three seeps near Serpentine Lane (north of benchmark 1336, north side of Prefumo Canyon Road, west of Prefumo Canyon, in the Los Osos Creek watershed; approximately 35.256738°N, 120.765841°W); 381 m (1,250 ft); private owner. (Althouse, pers. comm. 2012).
13. Slope near Loma Bonita Drive (35.26189°N, 120.66533°W) in the city of San Luis Obispo; 76 m (250 ft; correction of CDFW 2013a); private owner with conservation easement to the City of San Luis Obispo. Chipping (1994) previously searched this area and found no *Cirsium fontinale* var. *obispoense*.
14. Seep in a steep canyon (approximately 35.278415°N, 120.621153°W) northeast of Sydney Street, Reservoir Canyon Nature Reserve; 320-381 m (1,050-1,250 ft); City of San Luis Obispo owner. (Carter 2002; Lutz 2013; new).
15. Tributary of Froom Creek (approximately 35.244041°N, 120.705040°W) near an old mine in the central part of the Irish Hills Nature Reserve; owned by City of San Luis Obispo. (Havlik, pers. comm. 2012; new).
16. Poppy Spring (approximately 35.252746°N, 120.713820°W) near Froom Creek, Irish Hills Nature Reserve; owned by City of San Luis Obispo. (Havlik, pers. comm. 2012; new).
17. Tributary of Chorro Creek (approximately 35.324141° N, 120.754010° W), immediately southwest of confluence of Pennington Creek and Chorro Creek on private property (Waldburger, pers. comm. 2012), and also along Chorro Creek in this vicinity on property owned by the State of California (Keil, pers. comm. 2012; new). Chipping (1994) previously searched this area and found no *Cirsium fontinale* var. *obispoense*.
18. Seep and spring along a tributary of San Luisito Creek (approximately 35.369722°N, 120.780703°W; 128 ha (320 ac)) in the Chorro Creek watershed; private owner. (Siepel, pers. comm. 2012; new).
19. Seep and a small creek (a tributary of San Luis Obispo Creek, approximately 35.239909°N, 120.699012°W) on a steep hillslope at 137-152 m (450-500 ft) elevation between the Irish Hills Nature Reserve and the Johnson Ranch Open Space; private owner. (Havlik, pers. comm. 2012; new).