

Monolopia (=Lembertia) congdonii
(San Joaquin woolly-threads)

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



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

June 2010

5-YEAR REVIEW
***Monolopia (=Lembertia) congdonii* (San Joaquin woolly-threads)**

INFORMATION

I.A. Methodology used to complete the review: The Sacramento Fish and Wildlife Office of the U.S. Fish and Wildlife Service (Service) initiated a 5-year review of the San Joaquin woolly-threads (*Monolopia congdonii*) in February 2007. The Service solicited information from the public through a Federal Register notice (72 FR 7064). We considered the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998), office files, available literature, NAIP (2005) imagery, California Natural Diversity Database (CNDDDB), a statewide data base maintained by the California Department of Fish and Game, new survey information, and interviews of individuals involved with surveying, research, and management of this species.

I.B. Contacts

Lead Regional Office: Larry Rabin, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning, Pacific Southwest Region; 916-414-6464.

Lead Field Office: Kirsten Tarp, Recovery Branch, Sacramento Fish and Wildlife Office; 916-414-6600.

I.C. Background

I.C.1. FR Notice citation announcing initiation of this review: On February 14, 2007, the Service announced initiation of the 5-year review for *Monolopia (=Lembertia) congdonii* and requested information from the public regarding the species status (72 FR 7064). No information was received.

I.C.2. Listing History

Original Listing

FR notice: 55 FR 29361

Date Listed: July 19, 1990

Entity listed: Species. *Lembertia congdonii*

Classification: Endangered

I.C.3. Associated rulemakings: None

I.C.4. Review History: No status reviews have been conducted for this species since listing.

I.C.5. Species' Recovery Priority Number at start of review: The recovery priority is 1 (based on a 1 to 18 ranking system where 1 is the highest-ranked recovery priority and

18 the lowest). The species has a high degree of threat and a high potential for recovery. Priority number 1 defines it as a monotypic genus, which is a genus with only one species (see Taxonomy section below).

I.C.6. Recovery Plan or Outline

Name of plan: *Recovery Plan for Upland Species of the San Joaquin Valley, California* (recovery plan)

Date issued: September 30, 1998

II. REVIEW ANALYSIS

Species overview

Monolopia congdonii, an herbaceous annual and member of the Asteraceae (sunflower family), has tiny yellow flower heads which are clustered at the tips of the stems and branches. The common name “woolly-threads” is derived from the many long (up to 18 inches), trailing stems covered with tangled hairs. This species occurs in the grasslands of the hills and plateaus west of the San Joaquin Valley and is associated with the valley saltbrush scrub habitat in the valley floor.

Historically, *Monolopia congdonii* was reported in seven counties: San Benito, Fresno, Kings, Tulare, Kern, San Luis Obispo, and Santa Barbara. By the time of listing, *Monolopia congdonii* had been extirpated from Tulare County. In the final rule we stated that 19 populations of *Monolopia congdonii* were extant.

Of the 91 occurrences currently reported in the CNNDDB, several are decades old and 25 the occurrences are described as “possibly extirpated” (Figure 1). An occurrence as defined by the CNDDDB is a location separated from other locations of the species by at least one-fourth mile that may contain populations, individuals, or colonies. We considered 23 of the 25 “possibly extirpated” occurrences as “extirpated” in our final listing rule.

Currently, the CNDDDB indicates that of the 66 occurrences listed as “presumed extant,” 11 occurrences have not been surveyed in over 20 years and another 44 have not been surveyed in 15 to 20 years (CNDDDB 2009). Seven occurrences have been surveyed during the last 5 years (CNDDDB 2009). Because surveys have not been performed at many of these occurrences in 15 or more years, the specific status of many of these occurrences is not known at this time.

II.A. Application of the 1996 Distinct Population Segment (DPS) Policy

II.A.1. Is the species under review listed as a DPS?

Yes
 No

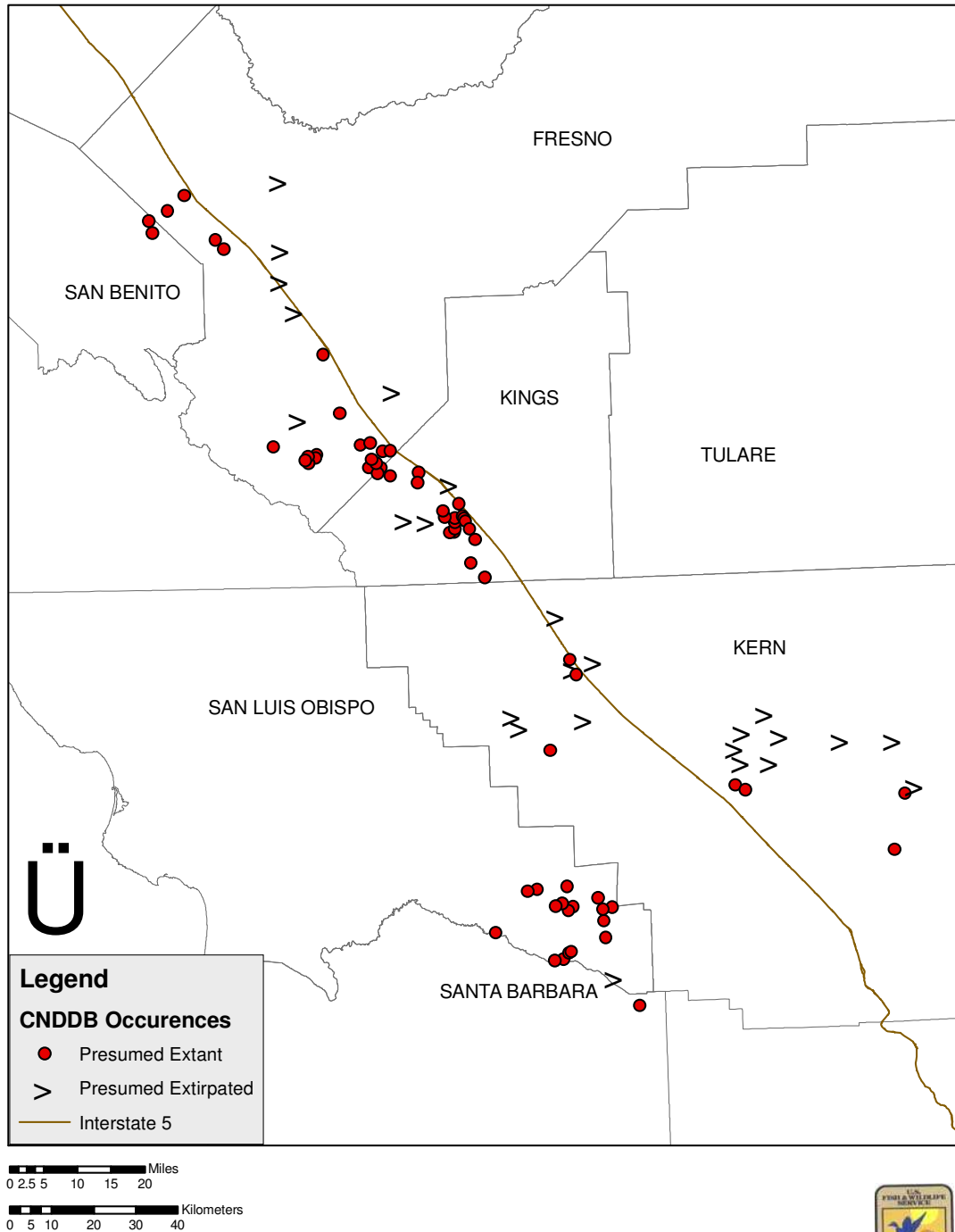


Figure 1. *Monolopia congdonii* (San Joaquin woolly-threads) distribution

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 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.

II.B. Recovery Criteria

II.B.1. Does the species have a final approved recovery plan containing objective, measurable criteria?

Yes
 No

The recovery plan includes recovery criteria that, when achieved, will permit consideration of (1) reclassifying the listing status of *Monolopia congdonii* from endangered to threatened, and (2) removal of *M. congdonii* from the list of endangered and threatened species.

II.B.2. Adequacy of recovery criteria.

II.B.2.a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

Yes The recovery plan does not have numerical population size targets stated within the recovery criteria. The recovery criteria calls for monitoring in specified recovery areas to show that populations are stable or increasing in all protected areas. However, the recovery plan, within the species recovery strategy section, does state that land should be protected in blocks of at least 160 acres that have an average density of *Monolopia congdonii* plants of at least 400 plants per acre.
 No

II.B.2.b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

Yes
 No All of the 5 listing factors that are relevant to the species are addressed in the listing criteria. However, there are new threats (see II.C.2.a and II.C.e for discussion).

II.B.3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been achieved, citing information. For threats-related recovery criteria, please note which of the 5 listing factors* are addressed by that criterion. If any of the 5-listing factors are not relevant to this species, please note that here.

The recovery plan lists two types of criteria: generalized and site-specific. To reclassify *Monolopia congdonii* from endangered to threatened status, the recovery plan recommends achievement of the following generalized criteria: (a) 95 percent of occupied habitat on public land is secured and protected from incompatible uses; (b) a management plan is approved and implemented for recovery areas that include survival of the species as an objective; and (c) population monitoring in specified recovery areas shows stable or increasing numbers in all protected areas through one precipitation cycle. A precipitation cycle is defined as a period when annual rainfall includes average to 35 percent above-average through 35 percent below-average and back to average or greater. The recovery plan does not list any site specific downlisting criteria for *Monolopia congdonii*.

Generalized Downlisting Recovery Criteria

- a. 95 percent of occupied habitat on public land is secured and protected from incompatible uses.

Criterion (a) addresses listing factor A.

Public lands where *Monolopia congdonii* occur include: the Carrizo Plain-Elkhorn Plain, Jacalitos Hills, Kettleman Hills, and Panoche Hills. The Carrizo Plain-Elkhorn Plain area and part of the Kettleman Hills fall within the jurisdiction of the Bakersfield Field Office of the Bureau of Land Management (BLM). The Panoche Hills, Jacalitos Hills and part of the Kettleman Hills fall within the jurisdiction of the Hollister Field Office of the BLM.

On January 17, 2001, the Carrizo Plain National Monument was established by Presidential Proclamation and placed under the authority of the BLM. The Carrizo Plains National Monument was established on 250,000 acres of the area previously known as the Carrizo Plains Natural Area (BLM 2009). The Carrizo Plains National Monument consists of protected lands and encompasses 204,107 acres of Federal land. Other landowners include California Department of Fish and Game, The Nature Conservancy, and other private landholders (e.g., farmers) (BLM 2010a). *Monolopia congdonii* currently is known to occupy scattered areas that total approximately 3,000 acres of pastures in the Carrizo and Elkhorn Plains (Service 1998).

*1) Present or threatened destruction, modification or curtailment of its habitat or range;
2) Overutilization for commercial, recreational, scientific, or educational purposes;
3) Disease or predation;
4) Inadequacy of existing regulatory mechanisms;
5) Other natural or manmade factors affecting its continued existence.

Portions of the Jacalitos Hills, Kettleman Hills, and Panoche Hills are within Areas of Critical Environmental Concern (ACECs). An ACEC is a designated area on BLM lands where special management attention is required (1) to protect and prevent irreparable damage to fish and wildlife; important historic, cultural, or scenic values; or other natural systems or processes or (2) to protect life and safety from natural hazards. All known *Monolopia congdonii* occurrences within the jurisdiction of the Hollister Field Office occur within the Panoche-Coalinga ACEC (R. O'Dell, BLM, *in litt.* 2010). The ACEC was established in recognition of the rare species habitat, including *Monolopia congdonii* habitat, and in recognition of the significant fossil record (BLM 2010b).

The BLM's Kettleman Hills ACEC consists of 6,730 acres within the Kettleman Hills of western Kings County. The BLM lands, however, are mostly in a checkerboard pattern of 640-acre and smaller parcels. It is not known how much of the ACEC supports the *Monolopia congdonii*.

Twenty-four *Monolopia congdonii* occurrences are entirely on BLM lands:

- one occurrence is split between the Panoche-Coalinga ACEC and Kettleman Hills ACEC
- twelve occurrences are entirely within the Carrizo National Monument on BLM lands
- eight occurrences are entirely within the Panoche-Coalinga ACEC
- three occurrences are entirely within the Kettleman Hills ACEC

Six *Monolopia congdonii* occurrences are on both BLM lands and private lands:

- two occurrences are partially on the Carrizo National Monument and either CDFG lands or private lands
- two occurrences are partially on the Panoche-Coalinga ACEC and private lands
- two occurrences are partially on the Kettleman Hills ACEC and private lands

Although progress has been made, this criterion has not yet been achieved because some areas of occupied habitat are not protected from incompatible uses. Several of the occurrences are close (within 500 feet) to the boundary of either the Panoche-Coalinga ACEC or the Kettleman Hills ACEC and are subject to external influences. Additionally, threats from oil and gas development and exploration may still occur (See section II.C.2.a for further discussion). Because the extent of protection in each parcel is unclear, at this time it cannot be determined what percentage of habitat has been protected in perpetuity.

b. A management plan is approved and implemented for recovery areas that include survival of the species as an objective.

Criterion (b) addresses listing factors A, C, D, and E.

The BLM jurisdictions where *Monolopia congdonii* occurs are administered by the Hollister and Bakersfield offices. The BLM is currently revising the Resource Management Plan (RMP) that provides management direction for most of the public lands managed by the Bakersfield Field Office. A separate RMP that covers the Carrizo

Plain National Monument was completed in April 2010 (BLM 2010c). The RMP for the Hollister Resource Area was finalized in 2007.

The objective of including survival of *Monolopia congdonii* populations is not currently contained in the BLM-Hollister RMP. However, the goals of BLM for management of special status species are to: (1) protect and/or improve habitat necessary to recover populations of special status species; and (2) manage BLM lands to maintain, restore, or enhance populations and habitat of special status fish, wildlife, and plant species.

To achieve these goals BLM has established the following objectives: manage listed, proposed, or candidate threatened or endangered species to comply with the provisions of the Act; manage special status plants consistent with BLM policy on Special Status Species Management (BLM Manual 6840); prevent the need for listing proposed, candidate, and sensitive species under the Act; improve the condition of special status species and their habitats to a point where their special status recognition is no longer biologically warranted.

The Carrizo Plain National Monument spans 246,852 acres in Kern and San Luis Obispo Counties. The RMP applies to the approximately 206,500 acres administered by BLM only. Additional acres of the Monument include 8,702 acres administered by the California Department of Fish and Game, 607 acres administered by other state agencies, 75 acres administered by the Nature Conservancy; approximately 31,000 acres are privately owned.

The Carrizo Plain National Monument RMP includes the survival of the species as an objective in the management plan. Implementation of an updated plan is expected to occur in 2010 (L. Saslaw, BLM, pers. comm. 2007).

The Caliente RMP (BLM 1997) covers the Kettleman Hills ACEC. The objective of the Kettleman Hills ACEC is to provide protection to significant paleontological resources and federally listed plant and animal species and allow continued oil exploration and development.

Criterion (b) addresses listing factors A, C, D, and E but has not been achieved because management plans, where they do exist in recovery areas (Table 1), have not been implemented at this time.

c. Population monitoring in specified recovery areas shows stable or increasing numbers in all protected areas through one precipitation cycle.

Criterion (c) addresses listing factors A and E but has not been achieved. Population monitoring in 5 of the 6 specified recovery areas has not occurred and has not therefore shown stable or increasing numbers through one precipitation cycle.

Information available to the Service reports population counts in select areas of public lands. On the BLM lands of the Jacalitos and Kettleman Hills, no surveys were conducted from 1997 to 2006; consequently we have no data from that period from which

to determine status and trends. In other years, counts ranged from 0 in 1992 to a high of 762 in 2008 (O'Dell *in litt.* 2009). On the BLM lands of the Carrizo Plains National Monument, population counts recorded for CNDDDB occurrences range from one to millions of individual plants within separate occurrences (CNDDDB 2009).

In summary, although progress has been made, none of the generalized downlisting criteria have been achieved for *Monolopia congdonii*.

Generalized Delisting Recovery Criteria

To delist *Monolopia congdonii*, the following generalized criteria need to be achieved: (a) 640 acres (260 hectares) or more of occupied habitat in the Lost Hills (Kern County) and one or more other sites on the San Joaquin Valley floor of 640 acres or more has been secured and protected from incompatible uses; (b) population monitoring in specified recovery areas shows no decline after downlisting, if declining, determine cause and reverse trend. Though not explicitly stated, the delisting criteria include meeting all of the downlisting criteria (Service 1998).

These generalized delisting criteria address listing factors A, C, and E. No monitoring on the land in the Lost Hills and San Joaquin Valley Floor Recovery Areas as specified in criterion (b) has occurred. Consequently, we have no information that criterion (a) has been achieved on these areas.

The recovery plan's site specific reclassification criteria to achieve delisting are displayed in Table 1.

Table 1. Recovery plan's site specific criteria for delisting *Monolopia congdonii*.

Site Name	County	Ownership	Protection Level
Carrizo Plain-Elkhorn Plain	San Luis Obispo	BLM ¹ /CDFG ² /TNC ³	95 percent of occupied habitat
Jacalitos Hills	Fresno	BLM	95 percent of occupied habitat
Kettleman Hills	Fresno/Kings	BLM	95 percent of occupied habitat
Lost Hills	Kern	Private	640 acres
Panoche Hills	Fresno/San Benito	BLM	95 percent of occupied habitat
San Joaquin Valley floor (may be within Lost Hills)	Any	Any	640 acres

¹BLM = Bureau of Land Management, ²CDFG = California Department of Fish and Game, ³TNC = The Nature Conservancy

II.C. Updated Information and Current Species Status

II.C.1. Biology and Habitat

Distribution

At the time of listing, we reported *Monolopia congdonii* occurring from Fresno, Kings, Kern, San Benito, San Luis Obispo, and Santa Barbara Counties. Nineteen populations of *Monolopia congdonii* were extant (55 FR 29361). Twelve populations remained in the San Joaquin Valley and adjoining foothills from the vicinity of Panoche Pass (San Benito County) southeasterly to Caliente Creek east of Bakersfield (Kern County). Another seven populations occurred to the southwest in the Cuyama Valley (San Luis Obispo and Santa Barbara Counties) and Carrizo Plain (San Luis Obispo County). Thirty-three of 52 historical populations had been lost (55 FR 29361), including a population from Tulare County (Taylor 1989).

Currently, 66 occurrences of *Monolopia congdonii* are presumed extant scattered in Fresno, Kings, Kern, San Benito, San Luis Obispo, and Santa Barbara Counties.

Table 2. Comparison of number of extant or presumed extant occurrences of *Monolopia congdonii* at time of listing and currently.

Counties	At Time of Listing	Currently
Fresno	4	20
Kings	1	19
Kern	5	7
San Benito	2	2
San Luis Obispo	5	15
Santa Barbara	2	3
Totals	19	66

The increased number of occurrences of *Monolopia congdonii* is due to increased survey effort and not due to a range expansion. Bureau of Land Management biologists conducted extensive surveys for *Monolopia congdonii* in the early 1990s.

The distributions of these occurrences are within the metapopulations described in the recovery plan. The recovery plan (Service 1998) describes four meta-populations and several small, isolated populations. The recovery plan defines metapopulation as scattered groups of individuals that may function as a single population due to occasional interbreeding. Genetic research to confirm interbreeding has yet to be completed. The largest metapopulation occurs on the Carrizo Plain National Monument, San Luis Obispo County. Much smaller metapopulations are found in Kern County near Lost Hills, in the Kettleman Hills of Fresno and Kings Counties, and in the Jacalitos Hills of Fresno County. The isolated occurrences are known from the Panoche Hills in Fresno and San Benito Counties, the Bakersfield vicinity, and the Cuyama Valley.

Abundance

Numbers of individual plants reported as an occurrence in the CNNDDB range from 1 to an estimate of millions. As an annual herb, *Monolopia congdonii* varies widely in its abundance from year to year depending upon rainfall and location across its range. According to Denis Kearns of BLM, representative Carrizo Plain populations “appeared to be doing well” in 2005 and 2006 such that he concluded rigorous surveys were not warranted (D. Kearns, BLM, *in litt.* 2007). We therefore have no current specific information on the abundance of individuals on the Carrizo Plain. In the Jacalitos and Kettleman Hills, BLM staff report an average of 182 individuals and a range of 0-762 from the years 1991-2009. The Center for Natural Lands Management owns a 270-acre site, Sand Ridge, in eastern Kern County where *M. congdonii* has been reported in the past. Due to lack of funding, however, surveys are not conducted on the site and the manager reports that regular tours of California Native Plant Society members to Sand Ridge report no observations of *M. congdonii*. The California Department of Fish and Game owns a parcel contiguous with Sand Ridge and also reports no occurrences of *M. congdonii* though habitat is present. The Kern Water Bank has two occurrences. No plants were found during surveys conducted in 2009 (CNDDDB 2009).

Surveys for *Monolopia congdonii* are not consistently performed throughout its range, and a majority of occurrences have not been surveyed for over 15 years. Thus, reliable values for population sizes and trends do not exist for the overall distribution of this species.

Habitat

Monolopia congdonii occurs in Nonnative Grassland, Valley Saltbush Scrub, Interior Coast Range Saltbush Scrub, and Upper Sonoran Subshrub Scrub communities (Service 1998). Plants that often occur with *Monolopia congdonii* include *Bromus rubens* (red brome), *Erodium cicutarium* (red-stemmed filaree), *Schismus* spp. (Arabian grass), *Lasthenia* spp. (goldfields), and *Vulpia myuros* (mouse tail fescue). *Monolopia congdonii* typically occupies microhabitats with less than 10 percent shrub cover, although herbaceous cover may be either sparse or dense, and cryptogamic crust (a layer of moss, lichen, and algae on the soil surface) may or may not be present.

Monolopia congdonii occurs on neutral to sub-alkaline soils that were deposited in geologic times by flowing water. On the San Joaquin Valley floor, this species typically is found on sandy or sandy loam soils, particularly those of the Kimberlina series, whereas on the Carrizo Plain, it occurs on silt rich soils. *Monolopia congdonii* frequently occurs on sand dunes and sandy ridges as well as along the high-water line of washes and on adjacent terraces. Occurrences have been reported at elevations ranging from approximately 200 to 850 feet on the San Joaquin Valley floor and surrounding hills, and from 2,000 to 2,600 feet in San Luis Obispo and Santa Barbara Counties (Service 1998).

Reproduction

The recovery plan (Service 1998) describes the following aspects of reproduction. Seed germination may begin as early as November but usually occurs in December and January. *Monolopia congdonii* typically flowers between late February and early April

(B. Delgado pers. comm. from Service 1998). Each plant may have from 1 to more than 400 flower heads. Seed production depends on plant size and the number of flower heads but can range from 10 to 2,500 seeds per individual (Mazer and Hendrickson 1993; Cypher 1994; E. Cypher unpublished data from Service 1998). The seeds are shed immediately upon maturity, and all trace of the plants disappears rapidly after their death in April or May. Seed dispersal agents are unknown, but possible candidates include wind, water, and animals. Insect pollinators are not known to be required for seed-set in *M. congdonii* (Mazer and Hendrickson 1993); however, animals may be important to this plant species in other ways. Burrowing animals may increase available soil nutrients and reduce competition from other plants (Cypher 1994a,b from Service 1998).

Taxonomy

At the time of listing, *Monolopia congdonii* was known as *Lembertia congdonii*. Baldwin (1999) published a new classification made in light of evidence from a phylogenetic study which placed the plant in the genus *Monolopia* and the family Asteraceae [Compositae]. Therefore in documents since that change, the plant name appears as *Monolopia* (= *Lembertia*) *congdonii* or simply *Monolopia congdonii*. This did not change the number of occurrences by adding populations that were formerly considered another species, or by the designation of occurrences, that were formerly considered conspecific, as another taxon.

Other

The demography of *Monolopia congdonii* was studied in the spring of 1993 at the following five locations: Carrizo Plain, Elkhorn Plain, Kettleman Hills, Jacalitos Hills, and Panoche Hills. Significant damage to marked *M. congdonii* was caused by kangaroo rats (*Dipodomys* spp.), cattle, and unknown herbivores (Cypher 1994

Effects of cattle grazing were compared in three populations of *Monolopia congdonii*, each of which was divided into grazed and ungrazed portions. Cypher (1994) reported that grazing appeared to have been beneficial to *M. congdonii* reproduction on the Carrizo Plain and Kettleman Hills, but was neutral or detrimental on the Elkhorn Plain. Information as to the numbers of cattle, their relative weight and size—which could be significant in terms of trampling and soil compaction, was not collected. Information on plant proximity to shade, shelter, and ponded water where cattle are known to congregate, also was not collected as part of this study.

The effects of grazing and competing vegetation on the survival of *Monolopia congdonii* were studied at the Carrizo Plain Natural Areas (Cypher 1996). The treatments evaluated included clipping, grazing and control at the Carrizo Plains. The study site was grazed from December 1st through April 30th during which time adjacent plots were also trampled. Survival of *M. congdonii* seedlings on clipped plots was significantly higher than on grazed and on trampled plots but did not differ from controls (Cypher 1996). Grazing may be detrimental if it continues into the flowering period of *M. congdonii* (Cypher 1996).

Grazing was shown be beneficial in some situations and neutral or detrimental in others. Grazing may be detrimental if it continues into the flowering period of *Monolopia congdonii*.

II.C.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

II.C.2.a. Factor A, Present or threatened destruction, modification or curtailment of its habitat or range:

At the time of listing the primary threats to *Monolopia congdonii* were the ongoing and threatened destruction and adverse modification of habitat due to agricultural land conversion and urbanization on the San Joaquin Valley floor (valley floor) (55 FR 29361). The remaining non-urbanized or non-converted lands, which largely occurred in the neighboring foothills and valleys were subject to livestock grazing, oil and gas development and exploration, off-road vehicle use, and other activities (55 FR 29361). Currently, these factors continue to threaten *M. congdonii*, though the effects of grazing are now thought to be more complex (see factors C and E for discussion). Additionally, the proposed siting of solar facilities in *M. congdonii* habitat is an emerging threat that has the potential to adversely affect the species, as discussed below. Approximately 55 percent of the presumed extant occurrences of *M. congdonii* are on private land and are not protected (CNDDB 2009).

Agricultural Conversion and Urbanization

The loss and modification of habitat due to agricultural conversion and urban development remain the largest threats to *Monolopia congdonii*. As discussed in the final listing rule (55 FR 29361), 96 percent of the native habitats of the valley floor had been lost primarily to urbanization and agricultural land conversion by 1987.

The Central Valley Project (CVP) is the largest surface water storage and delivery system in California, with a geographic scope covering 35 of the State's 58 counties. The project includes: 22 reservoirs, with a combined storage capacity of approximately 11 million acre-feet; eight powerplants and two pump-generating plants, with a combined generation capacity of approximately 2 million kilowatts; two pumping plants; and approximately 500 miles of major canals and aqueducts. The CVP supplies water to more than 250 long-term water contractors in the Central Valley, the Santa Clara Valley, and the eastern San Francisco Bay Area. Agricultural conversions and related operations either directly or indirectly facilitated by the Central Valley Project include: conversion of native habitats to agricultural fields; conversion of land use to more water intensive purposes; disposal of agricultural drainwater; application of pesticides; and other mowing and harvesting operations. Agricultural conversion and related operations have contributed to the loss and degradation of several habitat types, including grasslands and alkali scrub associated with declines of multiple listed species (Service 1998).

As mentioned previously, by the time of listing 96 percent of the native habitat, including *Monolopia congdonii* habitat, in the San Joaquin Valley, had been modified to

accommodate agriculture and urbanization (55 FR 29361). The 1998 Recovery Plan estimated the conversion to be 98 percent in 1996.

Currently, fewer than 150,000 acres on the San Joaquin Valley floor remain uncultivated; most of the remaining undeveloped land is located near, or in, the foothills at the valley perimeter. Significant portions of these lands not cultivated for agriculture or urbanized have been developed for petroleum extraction, strip-mined for gypsum and clay, or occupied by roads, canals, airstrips, oil-storage facilities, pipelines, and evaporation and percolation basins. In addition, natural communities have been permanently altered by the introduction and proliferation of nonnative plants, which now dominate many remaining natural habitats (USFWS 1998). Residual natural communities are typically comprised of marginal and highly fragmented habitats. Habitat conditions are so marginal in many of these residual communities that the elimination of listed species is likely, if catastrophic events such as drought or floods were to occur (Service 1998).

The increase in human settlement can be linked to subsidized imported water in the San Joaquin Valley. Completion of the San Luis Unit of the Central Valley Project and the California Aqueduct of the State Water Project resulted in rapid conversion of habitat to agriculture. The U.S. Bureau of Reclamation has facilitated conversion of habitat to agriculture by allowing delivery of Central Valley Project water beyond the legally authorized “place of use” (SWRCB 2000). The action resulted in a loss 45,390 acres of habitat in the Central Valley. Additionally, in a 2005 report, the U.S. Bureau of Reclamation states that approximately 15,708 acres of grassland within water and irrigation districts were converted to agriculture as a result of the Central Valley Project during the years 1993 to 2000 (U.S. Bureau of Reclamation 2005). These acres likely included suitable habitat for *Monolopia congdonii*.

The conversion of *Monolopia congdonii* habitat to agricultural use continues to be a threat to the plant on private lands on the San Joaquin Valley floor. For example, in August 2006, about 1,300 acres of *M. congdonii* habitat (saltbush scrub and sink scrub vegetative community) were disked for cultivation of melons on the Valley floor in southern Kings County (J. Vance, CDFG, pers. comm. 2006). One of the CNDDDB occurrences for *M. congdonii* was located in this area. Another instance of disking of *M. congdonii* habitat was reported on the Valley floor in Kern County (Krise *in litt.* 2006).

The California Department of Conservation (CDC) estimates that the conversion of farming or grazing land to residential or industrial uses between 2002 and 2004 in the San Joaquin Valley occurred at a rate of 26 acres per day (CDC 2007). The projected rate of development is anticipated to increase (American Farmland Trust 2007). As urbanization encroaches into valley floor agricultural areas, *Monolopia congdonii* habitats of the foothills are increasingly converted to perennial cropland. Crops such as pomegranates, pistachios, and almonds have increased in acreage at the western edge and foothills of the San Joaquin Valley in recent years (Phillips 2006). An analysis of soil type and prevalence might reveal the suitability of the former grasslands of the valley and foothills for *M. congdonii*; however, these soils have now been altered through tilling and other agricultural practices and such an analysis has not been conducted for this review.

In Fresno County, where *Monolopia congdonii* occurs, human population growth and urbanization have steadily increased. For the period between 1990 and 2000, population growth in Fresno County increased 16.5 percent (California Department of Finance 2007). Increased housing demand and urban development accompany the population growth in Fresno County. Growth of Fresno County human population is estimated to have increased an additional 18 percent from 2000 to 2010 and is expected to increase by another 18 percent from 2010 to 2020 (California Department of Finance 2007). Elsewhere, in Kern County, where *M. congdonii* also occurs, human population is estimated at 871,728 and is expected to reach 1,086,113 by 2020 (California Department of Finance 2007), an increase of almost 25 percent.

Conversion of habitat to agriculture is made possible via new water delivery and storage infrastructure. The San Joaquin Valley Branch of the Sacramento Fish and Wildlife Field Office, as of this writing, has under review proposals for two water banks or underground water storage reservoirs with ground water recharge potential. Though effects from these potential projects have yet to be fully analyzed, other similar proposals have resulted in loss of native habitat due to the installation of pumps, pipes, canals and surface water inputs that change the low rainfall adapted vegetation (J. Thomson, Bureau of Reclamation, pers. comm. 2007; J. Vance, CDFG, pers. comm. 2007).

Other effects due to agriculture include soil salinization resulting from irrigation; a pattern that has been observed throughout history (Jacobsen and Adams 1958) where agriculture land use dominates arid regions. Soil salinization due to agriculture is common in California's San Joaquin Valley (Schoups *et al.* 2005; T. Maurer, Service, pers. comm. 2010) and may result in impairment to soil that would make restoration of habitat unlikely.

The Pacific Gas and Electricity (PG&E) San Joaquin Valley Operations and Maintenance Program Habitat Conservation Plan (HCP) is a multi-species, 30-year plan that covers operations and maintenance activities on PG&E's existing facilities and utility right-of-ways in the San Joaquin Valley, as well as certain minor construction activities.

Within the 276,350-acre action area, there are five presumed extant occurrences of *M. congdonii* in existing PG&E right-of-ways (CNDDDB 2009). Two of these occurrences are located in Fresno County, two in Kings County, and one is located in the Kern County portion of the of the action area. These five occurrences occupy approximately 26 acres of existing PG&E right-of-ways within the 276,350-acre action area (CNDDDB 2009). Pacific Gas and Electricity estimated that ground-disturbing covered-activities implemented within the existing right-of-ways of the action area would directly disturb 3.35 acres of occupied *M. congdonii* habitat and permanently remove 0.029 acre of occupied habitat over the 30-year term of the Permit. Although PG&E will avoid *M. congdonii* occupied-habitat to the maximum extent practicable, some adverse effects to occupied habitat may result from covered activities. Compensation will be based on the actual acres of occupied plant-habitat directly and indirectly affected. The HCP's compensation ratios will be applied: 3:1 for permanent loss of occupied habitat, and

0.5:1 for temporary loss of occupied habitat. The Service anticipates that the combined direct and indirect effects of most ground-disturbing covered-activities would result in a permanent loss of occupied habitat for *M. congdonii*. Therefore, PG&E may provide between 1.8 acres and 10.1 acres of *M. congdonii* compensation over the 30-year Permit term.

Oil and Gas Extraction and Conveyance

Oil and gas extraction and conveyance continue to threaten *Monolopia congdonii*. Adverse effects of oil and gas development on *M. congdonii* include the loss of habitat, change in habitat quality, destruction of individuals or populations and their seedbank, habitat fragmentation, and increased competition from nonnative plant species due to habitat degradation.

According to our HCP database (Service 2010), there are two HCPs that cover oil and gas production that include *Monolopia congdonii* as a covered species. These are the Chevron Pipeline HCP and the Nuevo-Torch HCP. Both of these HCPs occur in Kern County. The Chevron Pipeline HCP was permitted in 1996 for a 50-year permit term. The project size is 25.5 acres and the mitigation to be provided is 28 acres. The Nuevo-Torch HCP was permitted in 1999 for a 30-year permit term. The project size is 21,800 acres with 1,700 acres impacted. The mitigation includes 800 acres to be created, enhanced, or restored, and 840 acres to be protected.

Oil and gas development is often limited and linear in nature in terms of well pads and pipeline construction but where oil and gas fields are developed into production sites, the cumulative impact can be large. Three of the five largest U.S. oil fields are in Kern County and span more than one million acres.

On the BLM lands where *Monolopia congdonii* occurs, oil and gas exploration is also a threat to the species' survival and recovery. However, because these are federally owned lands, the land use activities are reviewed under the National Environmental Protection Act as well as the Endangered Species Act. These reviews provide an opportunity to avoid or minimize adverse effects to *M. congdonii*. In the Carrizo Plain National Monument approximately 130,000 acres of mineral rights are privately owned (Whitney 2008a,b; BLM 2010c), including 30,000 acres of privately-held subsurface mineral rights in the center of the monument (BLM 2008a). These privately owned mineral rights are not included in the Carrizo Plains RMP. The establishment of the Monument was subject to valid existing mineral rights. Accordingly, only those valid leases, claims, and other rights that existed as of the date of the Proclamation, January 17, 2001, may see mineral development on Federal lands within the Monument.

The Carrizo Plain National Monument is closed to new Federal leases on oil and gas. Exploration and development activities may still occur both on existing Federal leases and on private leases. Seismic exploration, road building, drilling new wells and re-working old wells, laying pipelines, and other activities may occur. The BLM received a request from a private mineral owner in early March 2008 to conduct seismic operations on the Carrizo Plain National Monument valley floor (BLM 2010c).

We issued a biological opinion on the Hollister RMP in 1994. Leases issued on approximately 3,840 acres of public land where populations *Monolopia congdonii* were found during botanical inventories conducted in 1991 would be issued subject to an Endangered Species Stipulation. This stipulation would prohibit any surface disturbing activity or use of vehicles off established roads on the lease until adequate biological inventories had been conducted and analysis had indicated that proposed activities would not jeopardize the continued existence of *M. congdonii* or be inconsistent with recovery or habitat management plans. According to Service files, 1,000 acres of *Monolopia congdonii* habitat was permanently impacted. The Hollister RMP was revised in 2007.

The Caliente Resource Management Plan of the BLM is currently under revision. According to BLM's announcement, the primary consideration for the revision is the need to properly evaluate the impacts of increased oil and gas activity on public lands (BLM 2009).

Habitat Threats from Solar Power Developments

Solar power development projects pose potential threats to and may impact large amounts of habitat. These projects can destroy, fragment, or impact *Monolopia congdonii* habitat by: altering landscape topography, vegetation, and drainage patterns; and reducing habitat quality through interception of solar energy normally reaching the ground surface, affecting ambient air temperatures through habitat shading, and altering soil moisture regimes (Smith 1984; Smith *et al.* 1987 as cited in J.R. Single, CDFG. *in litt.* 2010). Moreover, recently proposed solar projects tend to be large contiguous blocks of disturbance in undeveloped habitat lands, ranging from hundreds to several thousand acres.

Off Road Vehicle Use

Off road vehicle use for recreational purposes is among the threats to *Monolopia congdonii* recorded in the CNNDDB since 1990. The Kettleman Hills BLM population is reportedly under increasing threat from off road vehicle trespass (O'Dell *in litt.* 2007). Off road vehicle recreational use on Federal lands is often difficult to control due to limited staffing and area remoteness such as in the Kettleman Hills (O'Dell *in litt.* 2007). As of 2010, off road vehicle use continues to be a threat at Kettleman North Dome where BLM land is "checker-boarded" with Chevron oil fields. Chevron is making efforts to exclude off road vehicles by improving their fences and patrolling the area. There is also some existing threat of off road vehicle activity impact to the species and its habitat on Monocline Ridge, although this threat is lower than at the much more accessible Kettleman North Dome (O'Dell *in litt.* 2010).

Off road vehicle use has been reported as a minor threat on the Carrizo Plain National Monument (BLM 2009). The threat of off road vehicle recreation use on private lands where *Monolopia congdonii* persists is unknown.

Conservation Measures

Prior to listing, TNC purchased 82,000 acres on the Carrizo Plains. The BLM received funding from Congress to acquire 23,000 acres in 1988 and another 28,500 acres in 1989.

The California Wildlife Conservation Board purchased 3,000 acres from TNC in December 1988 and 2,500 acres in 1989 to be managed by CDFG. Currently, the Carrizo Plain National Monument (formerly the Carrizo Plain Natural Area) contains over 200,000 acres of natural habitat. The Monument is jointly managed by the BLM, CDFG and The Nature Conservancy (TNC) (California Resources Agency 2008). Although, as discussed above, 130,000 acres within the Monument are open to potential oil and gas development.

Though there are for-profit conservation banks located in the San Joaquin Valley, none have reported occurrences of *M. congdonii*. An occurrence is reportedly on the Center for Natural Lands Management's 270-acre Sand Ridge property in Kern County. But as discussed earlier the plant has not been observed there in recent years. The California Department of Fish and Game's Pleasant Valley Ecological Reserve in Fresno County conserves over 1,000 acres but only about one acre supports *M. congdonii*. We have no information as to the size or number of individual plants observed at this site.

The Service has initiated conservation measures for the benefit of the *Monolopia congdonii* via land acquired through the Central Valley Project Conservation Program. The 2,560-acre acquisition, known as a portion of the Elgorriaga Ranch located in Fresno County, supports two small populations of *Monolopia congdonii*. The two populations are estimated at approximately 100 individuals each, although in some years zero plants were observed (Delgado *in litt.* 2009). Conservation for the *M. congdonii* population will be administered by the BLM, the new owner of the parcel.

In 1996, the BLM placed 6,730 acres within the Kettleman Hills in Western Kings County in an ACEC. The BLM lands, however, are mostly in a checkerboard pattern, and are subject to external influences.

Summary

Approximately 55 percent of the presumed extant occurrences of *M. congdonii* are on private land and are not protected from agricultural conversion, urbanization, oil and gas development, off road vehicle use, and solar power development projects. Currently, there are 24 occurrences entirely on BLM lands and 6 occurrences that are on both BLM lands and private lands. The occurrences on public lands and are protected from the direct effects from urbanization and agricultural land conversion, but may still be subject to other threats including oil and gas exploration and conveyance.

II.C.2.b. Factor B, Overutilization for commercial, recreational, scientific, or educational purposes:

This factor was not determined to be a threat in the final rule (55 FR 29361) and we have no new information that it is currently a threat to *Monolopia congdonii*.

II.C.2.c. Factor C, Disease or predation:

In the final rule (55 FR 29361) we listed overgrazing (by domestic livestock) as a threat. Currently, we think that either the complete removal of grazing, uncontrolled grazing, or grazing that continues during the flowering time of *Monolopia congdonii* are threats to *M. congdonii*. Cattle grazing exclusion in one of BLM's populations in Jacalitos Canyon

appears to have resulted in extirpation of that population, coincident with heavy accumulation of annual grass biomass (O'Dell *in litt.* 2010). The Bakersfield BLM office has noted the same effect of livestock exclusion resulting in plant number declines on part of population at Kettleman Middle Dome (O'Dell *in litt.* 2010). In contrast, cattle grazing on one of BLM's populations at Kettleman North Dome has maintained grass biomass low to the ground, which has greatly benefitted *Monolopia*, resulting in a population numbering in the thousands that is continuing to increase in size (O'Dell *in litt.* 2010). Grazing may be detrimental if it continues into the flowering period of *M. congdonii* (Cypher 1996).

Observers of the plant speculate that due to the plant's prostrate growth pattern, only occasionally altered in an adaptive response to compete with adjacent shading plants, cattle are unlikely to select *Monolopia congdonii* (J. Jones, Live Oak Consultants, pers. comm. 2007; L. Saslaw, pers. comm. 2007). The degree to which domestic sheep or goats may select the plant is unknown. Regardless of selection by domestic herbivores, the foraging behavior associated with grazing may result in adverse effects due to trampling, and soil compaction as discussed below in Factor E.

Grazing activities are likely to be considered in BLM management plans and grazing as a threat is generally reported in the CNDDDB by observers other than BLM managers. The Hollister BLM staff reports grazing exclusion fences around two of the *M. congdonii* populations in Silver Creek and Pete Merrill Canyon. The current grazing regime in BLM's Kettleman Hills is not perceived as a threat and is believed to be beneficial as it removes annual grass thatch (O'Dell *in litt.* 2007).

Herbivory by giant kangaroo rats has been shown to reduce the reproductive capacity of individual *Monolopia congdonii* plants by up to 30 percent. The intensity of the damage to individual plants is correlated with distance from a burrow (Mazer and Hendrickson 1993). *Monolopia congdonii* growing on kangaroo rat precincts has been noted and attributed to the suggestion that the species is a poor competitor with introduced annual grasses (Taylor 1989). On the Carrizo Plain, greater *M. congdonii* plant size and flower head production has been associated with giant kangaroo rat activity (Mazer and Hendrickson 1993) as have been earlier seed germination and maturation (Cypher 1994).

We have no other information that any other wild herbivores consume or show a preference for *Monolopia congdonii*. We also have no information to indicate that disease presents a threat to this species at this time.

II.C.2.d. Factor D, Inadequacy of existing regulatory mechanisms:

At the time of listing, we did not identify the inadequacy of existing regulatory mechanisms as a threat. Current regulatory mechanisms that protect *Monolopia congdonii* are described in this section.

There are several State and Federal laws and regulations that are pertinent to federally

listed species, each of which may contribute in varying degrees to the conservation of federally listed and non-listed species. These laws, most of which have been enacted in the past 30 to 40 years, have greatly reduced or eliminated the threat of wholesale habitat destruction, although the extent to which they prevent the conversion of natural lands to agriculture is less clear.

State Laws

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. If significant effects are identified, the lead agency has the option to mitigation through changes in the project or to require that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

Natural Communities Conservation Plans (NCCPs): California enacted a law similar to the Federal Habitat Conservation Plan portion of the Federal Endangered Species Act. The NCCP program provides a framework for entities to work together with the California Department of Fish and Game to formulate science-based regional long term conservation planning.

Federal Laws

Endangered Species Act of 1973, as amended: The Endangered Species Act of 1973, as amended (Act), is the primary Federal law that provides protection for *Monolopia congdonii*. 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 species. 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. Section 9 also makes illegal the international and interstate transport, import export and sale or offer for sale of endangered plants and animals. The protection of Section 9 afforded to endangered species is extended to threatened wildlife and plants by regulation. Federally listed plants may be incidentally protected in areas where they co-occur with federally listed wildlife species. In some cases, federally listed plants are included as covered species in habitat conservation plans (HCPs) prepared by non-Federal applicants as part of the terms and conditions for issuance of an incidental take permit for federally listed wildlife under section 10(a)(1)(B).

Currently, there are four Habitat Conservation Plans (HCP) authorized under section 10 of the Act that include *Monolopia congdonii* as a covered species: the Chevron Pipeline HCP, Kern Water Bank HCP, Nuevo-Torch HCP, and PG&E San Joaquin Valley

Operations and Maintenance HCP. These are discussed in the Factor A analysis earlier in this document. In areas not covered in HCPs, *M. congdonii* populations on private land are without protection under the Act.

Consultations under the Act pursuant to section 7 sometimes result in minimization measures that have taken the form of privately owned conservation banks. No conservation banks report occurrences of *Monolopia congdonii*. Kreyenhagen Conservation Bank owned by Wildlands Inc. is within approximately 2 miles of CNDDDB occurrence number 99; however, Wildlands, Inc. staff has not reported *M. congdonii* as occurring on the Kreyenhagen Conservation Bank. Habitat is less than optimal for the plant as the plant's preferred sandy loam soils are not evident in the hilly Kreyenhagen Conservation Bank terrain.

National Environmental Policy Act: The National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*) may afford some protection to populations affected by Federal activities. The NEPA requires all Federal agencies to formally document, consider, and publicly disclose the environmental impacts of Federal actions and management decisions affecting the human environment. The NEPA requires agencies to consider mitigation alternatives, but does not require or guide the actual implementation of mitigation for impacts.

Federal Land Policy and Management Act of 1976 (FLPMA): The BLM is required to incorporate Federal, State, and local input into their management decisions through Federal law. The FLPMA (Public Law 94-579, 43 U.S.C. 1701) was written “to establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development and enhancement of the public lands; and for other purposes.” Section 102(f) of the FLPMA states that “the Secretary [of the Interior] shall allow an opportunity for public involvement and by regulation shall establish procedures ... to give Federal, State, and local governments and the public, adequate notice and opportunity to comment upon and participate in the formulation of plans and programs relating to the management of the public lands.” Therefore, through management plans, the BLM is responsible for including input from Federal, State, and local governments and the public. Additionally, Section 102(c) of the FLPMA states that the Secretary shall “give priority to the designation and protection of areas of critical environmental concern” in the development of plans for public lands. Although the BLM has a multiple-use mandate under the FLPMA which allows for grazing, mining, and off-road vehicle use, the BLM also has the ability under the FLPMA to establish and implement special management areas such as Areas of Critical Environmental Concern, wilderness, research areas, etc., that can reduce or eliminate actions that adversely affect species of concern (including listed species).

The Carrizo Plains National Monument (Monument), which supports 12 entire occurrences and portions of 2 additional occurrences of *Monolopia congdonii*, was created on January 17, 2001, by Presidential Proclamation, designating approximately 204,107 acres as a National Monument. The Monument is administered by the Department of Interior, BLM. A management plan was recently completed (BLM 2010c).

Summary

The Act, in relation to the NEPA is the primary Federal law providing protection for this species. Under the FLPMA, Secretary shall “give priority to the designation and protection of areas of critical environmental concern” in the development of plans for public lands. These two laws provide the primary legal protections for threatened and endangered plants.

II.C.2.e. Factor E, Other natural or human made factors affecting its continued existence:

The final listing rule (55 FR 29361) discusses the threat of nonnative grasses to *Monolopia congdonii* stating that invasive plants have the ability to alter the fire regime of plant communities and to out-compete or continue to compete with native plant communities. *M. congdonii* continues to be adversely affected by these human made factors today. Additionally, the effects of soil nitrification and climate change are emerging as new threats since the time of listing.

Competition from Nonnative Grasses

The southern San Joaquin Valley of California, as with much of western North America, has been invaded by nonnative plant species during the past 100 to 200 years. These include the following species: *Bromus rubens* (red brome), *Vulpia myuros* (mouse tail fescue), *Schismus arabicus* (Arabian grass), *Hordeum murinum* ssp. *glaucum* (known locally as foxtail and elsewhere as smooth barley), *Bromus diandrus* (ripgut brome), and *Bromus hordeaceus* (soft chess) (Biswell 1956; Heady 1977; Germano *et al.* 2001). These introduced grasses often germinate with the first October rains (J. Jones, Live Oak Associates, pers. comm. 2007) and become established before *Monolopia congdonii* seeds germinate. This allows nonnative plants to out-compete native plant species for water, nutrients, and sun light and places *M. congdonii* at a reproductive disadvantage. An overabundance of residual thatch from the previous year’s nonnative grass production can have similar adverse effects by shading out or obstructing *M. congdonii* seedlings. Competition from nonnative grasses affects *Monolopia congdonii* on both private and public lands including the Carrizo Plain National Monument.

The preponderance of nonnative grasses in *Monolopia congdonii* habitat in the San Joaquin Valley may be partly attributed to elevated levels of atmospheric nitrogen (N) deposition in ecosystems that are naturally N-limited. Weiss (1999) found that dry N deposition from smog in the San Francisco Bay Area has enabled the invasion of nonnative annual grasses into native grasslands on nutrient-poor soils. Other researchers found that increased levels of soil N from elevated atmospheric N deposition in the Mojave Desert could increase the dominance of nonnative annual grasses and thereby raise the frequency of fire (Brooks 1999; Brooks and Pyke 2001; Brooks 2003).

Nitrogen Deposition/Landscape Nitrification.

Elevated atmospheric nitrogen (N) deposition is particularly harmful to N-limited ecosystems such as *Monolopia congdonii* habitat in the arid southern San Joaquin Valley where it leads to increases in nonnative annual grasses which outcompete the native flora

(Fenn *et al.* 2003). Dry nitrogen deposition estimates for Bakersfield, Kern County near a CNDDDB *Monolopia congdonii* occurrence, are 10 to 20 kilograms of N per hectare per year (22 to 44 pounds of N per 2.5 acres per year) (Blanchard *et al.* 1996). Nitrogen-limited ecosystems of the western United States, such as the arid/semi-arid San Joaquin Valley, are adversely affected by N deposition as low as 3 to 8 kilograms of N per hectare per year (7 to 18 pounds of N per 2.5 acres per year) (Fenn *et al.* 2003). The majority of airborne N in the San Joaquin Valley is in reduced form as NH₃ (ammonia) and particulate NH₄⁺ (ammonium ion) primarily from the dairy, poultry, and beef industries (Gaffney and Shimp 1999; California Air Resources Board 2006). Predicted NH₃ emissions in 2010 for the San Joaquin Valley Air Basin are 465.4 tons per day (1,042,496 pounds per day) (San Joaquin Valley Air Pollution District 2003). Nitrogen oxides (NO_x) are another significant source of elevated N deposition in the southern San Joaquin Valley. In 2005, NO_x emission rates in the Kern County area of the San Joaquin Valley were 123.7 tons/day (277,088 pounds per day); 46 percent of the NO_x emissions were from stationary fuel combustion sources (primarily food and agricultural processing, manufacturing and industrial activities, and oil and gas production), 32 percent were from on-road motor vehicles (primarily heavy duty diesel trucks), and 21 percent were from other mobile sources (off-road equipment and trains) (California Air Resources Board 2006).

Trampling by Livestock and Soil Compaction

Trampling by livestock reduces survival of *Monolopia congdonii* in areas where livestock congregate, such as around water troughs. Trampling from livestock is a threat when it reduces or eliminates the reproductive ability of the plant by, for example, damaging blossoms or seeds. Soil compaction resulting from domestic livestock may be less of an effect in habitat areas where soils have a low clay fraction than in soils with a high clay fraction. In some areas, such as the valley floor, *M. congdonii* is typically found on sandy or sandy loam soils (Service 1998). The Kimberlina soil series, which the plant is known to occupy, consists of very deep, well drained soils on flood plains and recent alluvial fans (Natural Resources Conservation Service 2003). In other types of soil, compaction is likely a threat to individual *Monolopia congdonii*.

Climate Change

The change in global climate presents a threat to *Monolopia congdonii*. Climate models predict for California an overall warming of 1.7 degrees to 5.8 degrees Celsius (3.0 degrees Fahrenheit to 10.4 degrees Fahrenheit) by 2100 (Cayan *et al.* 2006) but vary in their predictions for precipitation. VanRheenen *et al.* (2004), however, predicts a decrease in precipitation in the southern San Joaquin Valley. Any significant changes in temperature or precipitation could have drastic effects on *M. congdonii* populations. Climate change will likely result in changes in the vegetative communities of *M. congdonii* habitat and potentially increase nonnative species. However, there is insufficient data available at this time to predict the specific effects of climate change on *M. congdonii*.

In summary, the threats attributable to Factor E, competition from nonnative grasses, and the emerging threats from landscape nitrification and climate change are landscape level

threats. The imminence of these threats to *M. congdonii* is not well understood; however, due to the landscape level effects likely to result from nonnative grasses, nitrification, and climate change, these threats should be considered large in magnitude.

II.D. Synthesis

When *Monolopia congdonii* was listed as endangered 1990 (55 FR 29361), we stated 19 populations of *Monolopia congdonii* were extant. Currently 66 occurrences are presumed to be extant (CNDDDB 2009). Of the occurrences now described as “presumed extant”, there are 24 occurrences entirely on BLM lands and 6 occurrences that are on both BLM lands and private lands. The remainder occur entirely on private land. The occurrences on public lands are protected from the direct effects from urbanization and agricultural land conversion, but may still be subject to other threats including oil and gas exploration and conveyance, competition with nonnative grasses, and emerging threats from landscape nitrification and climate change. Approximately 55 percent of the presumed extant occurrence of *M. congdonii* are on private land and are not protected (CNDDDB 2009).

Surveys for *Monolopia congdonii* are not consistently performed throughout its range, and a majority of occurrences have not been surveyed for over 15 years. Currently, the CNDDDB indicates that of the 66 occurrences listed as “presumed extant,” 11 occurrences have not been surveyed in over 20 years and another 44 have not been surveyed in 15 to 20 years (CNDDDB 2009). Seven occurrences have been surveyed during the last 5 years (CNDDDB 2009). Thus, reliable values for population sizes and trends do not exist for the overall distribution of this species.

When *Monolopia congdonii* was listed as endangered in 1990 (55 FR 29361), the major threats to the species included agricultural land conversion and urbanization, overgrazing, and competition with nonnative, annual grasses.

The past extirpation of *Monolopia congdonii* from most of its historic range and the current threats to the species continue to endanger the survival and recovery of *M. congdonii*. The threats today include the complete removal of grazing or uncontrolled grazing, oil and gas exploration and extraction, off road vehicle recreational use, water storage and transport infrastructure, and inadequate regulatory mechanisms. Climate change, nitrification of soil, and solar energy projects have been identified as potential new threats.

The *Monolopia congdonii* populations, which occur on public lands do not yet have management plans implemented that achieve the recovery plan’s criteria; although the BLM-Bakersfield office is expected to begin the revised management plan implementation this year. Other goals in the recovery plan have not been achieved, and in some instances, not initiated, including the development and implementation of an outreach plan, development of economic incentives on private land, land ownership research for large populations in the Kettleman Hills (Fresno and Kings Counties), and protection of two 640-acre preserves.

In summary, based on the continuing threats to *Monolopia congdonii* from habitat conversion, oil and gas exploration and conveyance, competition with nonnative grasses; the new threats from landscape nitrification, climate change, and solar energy development; and the lack of current information regarding current species trends or status we conclude that the species continues to meet the Endangered Species Act definition of endangered of extinction throughout all or a significant portion of its range. No status change is recommended at this time.

III. RESULTS

III.A. Recommended Classification:

Downlist to Threatened
 Uplist to Endangered
 Delist
 No change is needed

III.B. New Recovery Priority Number 2

The previous priority number “1” (Annual Data Call Report 2007) places the species in a monotypic genus; thus this number no longer reflects the current taxonomy of the species. Since the reclassification from *Lembertia congdonii* to *Monolopia congdonii* (Baldwin 1999), the species no longer belongs to a monotypic genus. The new priority number 2 is based on designation as full species with a high degree of threat, and high potential for recovery.

IV. RECOMMENDATIONS FOR FUTURE ACTIONS:

The following recommendations for future actions are from the recovery plan, scientific literature, and as a result of discussions with species experts.

1. Protect existing habitat in the San Joaquin Valley for *Monolopia congdonii*.
2. Conduct surveys to determine trends in the range-wide status of the species and population abundance.
3. Collect seeds from multiple populations adhering to the Center for Plant Conservation Guidelines (1991). Store seeds in facilities certified by the Center for Plant Conservation.
4. When BLM revises the ACEC management plan, address invasive species, wildlife habitat improvements, and the protection/enhancement of special status species throughout the Panoche-Coalinga ACEC. Ensure that habitat can be protected in blocks of at least 160 acres and buffer zones of 500 feet or more are protected beyond the

occurrence margins of *Monolopia congdonii* to reduce external influences and to allow for plant population expansion.

5. Conduct research to determine the degree or intensity of threat from livestock grazing to the plant and its habitat. Include the variables of cattle stocking rate, relative weight or size of animals, numbers, and cattle sheltering or shade selection behavior.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Monolopia (=Lembertia) congdonii*

Current Classification: Endangered

Recommendation resulting from the 5-Year Review

Downlist to Threatened

Uplist to Endangered


Delist

No change is needed

Review Conducted By: Sacramento Fish and Wildlife Service staff

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve  Date 6.28.10