

**Blunt-nosed leopard lizard
(*Gambelia sila*)**

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



T. Kuhn, U.S. Fish and Wildlife Service 2009

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5-YEAR REVIEW

Blunt-nosed leopard lizard (*Gambelia sila*)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (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. The blunt-nosed leopard lizard was listed as endangered under the Endangered Species Preservation Act in 1967, and was not subject to the current listing processes and, therefore, did not include an analysis of threats to the lizard. However, a review of Federal and State agency materials and scientific publications written at or near the time of listing indicates that listing was in fact based on the existence of threats that would be 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

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley of central California (Stejneger 1893; Smith 1946; Montanucci 1965, 1970; Tollestrup 1979a). This species typically inhabits open, sparsely vegetated areas of low relief on the San Joaquin Valley floor and in the surrounding foothills (Smith 1946; Montanucci 1965). Holland (1986) described the vegetative communities that blunt-nosed leopard lizards are most commonly found in as Nonnative Grassland and Valley Sink Scrub communities. Other suitable habitat types on the Valley floor for this species include Valley Needlegrass Grassland (Holland 1986), Alkali Playa (Holland 1986), and Atriplex Grassland (Tollestrup 1976).

The species is a relatively large lizard in the Iguanidae family with a long, regenerative tail; long, powerful hind limbs; and a short, blunt snout (Smith 1946; Stebbins 1985). Though their under surface is uniformly white, the species exhibits tremendous variation in color and pattern on the back (Tanner and Banta 1963; Montanucci 1965, 1970), ranging from yellowish or light gray-brown to dark brown. Males are typically larger and weigh more than females; adults range in size from 3.4 to 4.7 inches (Tollestrup 1982) and weigh between 0.8 and 1.5 ounces (Uptain *et al.* 1985). Blunt-nosed leopard lizards use small rodent burrows for shelter from predators and temperature extremes (Tollestrup 1979b). Burrows are usually abandoned ground squirrel

(*Spermophilus beecheyi*) tunnels, or occupied or abandoned kangaroo rat tunnels (*Dipodomys* spp.) (Montanucci 1965). Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. Montanucci (1965) found that in areas of low mammal burrow density, lizards would construct shallow, simple tunnels in earth berms or under rocks. Blunt-nosed leopard lizards feed primarily on insects (mostly grasshoppers, crickets, and moths) and other lizards, although some plant material is rarely eaten or, perhaps, unintentionally consumed with animal prey. They appear to feed opportunistically on animals, eating whatever is available in the size range they can overcome and swallow.

I.A. Methodology used to complete the review: This review was prepared by a staff biologist for the Sacramento Fish and Wildlife Office (Service). This review is based on the *Recovery Plan for the Blunt-Nosed Leopard Lizard* (Service 1980), the *Revised Blunt-Nosed Leopard Lizard Recovery Plan* (Service 1985), the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Recovery Plan) (Service 1998), as well as published literature, agency reports, biological opinions, completed and draft Habitat Conservation Plans (HCPs), unpublished data, and interviews with species experts. No previous status reviews for this species have been conducted. Due to the lack of a threats analysis within the 1967 listing (32 FR 4001), this 5-year review contains updated information on the species' biology and threats, and an assessment of that information since the time that 1980 Recovery Plan was drafted. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes this available 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.

I.B. Contacts

Lead Regional Office –Diane Elam, Deputy Division Chief for Listing, Recovery and Habitat Conservation Planning, Region 8, Pacific Southwest Regional Office, (916) 414-6464

Lead Field Office – Kirsten Tarp, Recovery Branch, Sacramento Fish and Wildlife Office, Region 8, (916) 414-6600

Cooperating Field Office: Mike McCrary, Ventura Fish and Wildlife Office, Region 8, (805) 644-1766

I.C. Background

I.C.1. FR Notice citation announcing initiation of this review: 71 FR 16584, April 3, 2006. We did not receive any information in response to our request for information.

I.C.2. Listing history

Original Listing

FR notice: 32 FR 4001

Date listed: March 11, 1967*

Entity listed: Species – Blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*)

Classification: Endangered

*Note: Listing documents at this time did not use the 5 factor analysis method, and did not provide discussion of status and threats.

I.C.3. Species’ Recovery Priority Number at start of review: 2C

The Recovery Priority Number for the blunt-nosed leopard lizard is 2C. This Number reflects a high degree of threat, a high recovery potential, and a taxonomic rank of full species (Service 1983). The “C” indicates conflict with construction or other development projects or other forms of economic activity. This determination results from continued degradation and fragmentation of its habitat, perceived and realized threats to extant populations, and the potential for recovery of the species.

I.C.4. Recovery Plan or Outline

Name of plan:	Recovery Plan for Upland Species of the San Joaquin Valley, California
Date issued:	September 30, 1998
Dates of Previous Revisions:	Recovery Plan Blunt-Nosed Leopard Lizard (Service 1980), and Revised Blunt-Nosed Leopard Lizard Recovery Plan (Service 1985)

II. REVIEW ANALYSIS

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

II.A.2. Is there relevant new information for this species regarding the application of the DPS policy?

Yes
 No

II.B. Recovery Criteria

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

Yes
 No

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
 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

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

The downlisting and delisting criteria for the blunt-nosed leopard lizard in the Recovery Plan are described below. Listing Factor B is not considered relevant to this species.

Downlisting Criteria

Reclassification to threatened status should be evaluated when the species is protected in specified recovery areas from incompatible uses, management plans have been approved and implemented for recovery areas that include survival of the species as an objective, and population monitoring indicates that the species is stable. Downlisting criteria include:

- 1) *Protection of five or more areas, each about 5,997 acres or more of contiguous, occupied habitat, including one each on (addresses Listing Factor A):*
 - A) *Valley floor in Merced or Madera Counties;*
 - B) *Valley floor in Tulare or Kern Counties;*
 - C) *Foothills of the Ciervo-Panoche Natural Area;*

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- A) Present or threatened destruction, modification or curtailment of its habitat or range;
 - B) Overutilization for commercial, recreational, scientific, or educational purposes;
 - C) Disease or predation;
 - D) Inadequacy of existing regulatory mechanisms;
 - E) Other natural or manmade factors affecting its continued existence.

- D) Foothills of western Kern County; and*
- E) Foothills of the Carrizo Plain Natural Area.*
- 2) *Management Plan approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective (addresses Listing Factor C and E).*
- 3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards 1 per acre through one precipitation cycle (addresses Listing Factor E).*

A brief discussion of each downlisting criterion for the blunt-nosed leopard lizard is presented in the text below, and further abbreviated in Table 1. Appendix A presents detailed information used for analysis of these downlisting criteria in this review, including the level of protection for each of the recovery areas, land management plan status for these areas, and the mean density and stability of blunt-nosed leopard lizard populations. Figures 1 and 2 illustrate the location of known blunt-nosed leopard lizard occurrences reported in the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDDB) (CNDDDB 2006) and the location of large preserves within the range of the blunt-nosed leopard lizard.

1. *Protection of five or more areas, each about 5,997 acres or more of contiguous, occupied habitat, as follows:*

The downlisting criteria for the blunt-nosed leopard lizard require the protection of five or more areas each of about 5,997 acres or more of contiguous, occupied habitat, including one each in the following areas: the Valley floor in Merced or Madera Counties, the Valley floor in Tulare or Kern Counties, the foothills of the Ciervo-Panoche Natural Area, the foothills of western Kern County, and the foothills of the Carrizo Plain Natural Area (Figures 1 and 2). Only in the foothills of the Carrizo Plain Natural Area is the criterion achieved with the protection of 55,000 acres of blunt-nosed leopard lizard habitat by the Carrizo Plain National Monument. There are no preserves containing significant populations of blunt-nosed leopard lizard on the Valley floor in Merced or Madera Counties. Within the Valley floor in Tulare or Kern Counties, the Semitropic Ridge Preserve approaches the criterion by protecting 5,278 acres of contiguous blunt-nosed leopard lizard habitat. Pixley NWR protects 3,000 acres of contiguous habitat in Tulare County. The Lokern Natural Area protects over 13,000 acres in Kern County but in fragmented 10 to 640-acre parcels. Within the Ciervo-Panoche Natural Area, two Areas of Critical Environmental Concern (ACEC), separated by 2 miles, protect 4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat, respectively. The ACEC designation is the highest level of protection that the BLM (under Federal Lands Policy and Management Act) can assign to an area; with this designation, the BLM is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, including fish and wildlife resources. Within the foothills of western Kern County, the Occidental Petroleum Ltd. (Oxy), conservation lands protect 2,882 acres of contiguous habitat on the North Flank of Elk Hills and 3,770 acres in Buena Vista Valley. Therefore, the recovery criterion for protection of 5,997 acres of contiguous habitat is achieved in the foothills of the Carrizo Plain Natural Area, but not in the four other specified recovery areas.

Notably, through the development of a draft HCP for Chevron USA, Inc. (Chevron), lands in the *Lokern Natural Area*, and a draft HCP for Oxy of Elk Hills lands in the *Foothills of western Kern County*, the downlisting criterion is expected to also be met for these two areas in the foreseeable future. The draft Chevron Lokern HCP (G. Scott, Chevron, pers. comm. 2006) proposes to protect an additional 11,143 acres in the Lokern area. Thus, in total, approximately 24,303 acres of contiguous blunt-nosed leopard lizard habitat would be protected when added to the other already protected lands in the Lokern area. Similarly, the Oxy Elk Hills HCP (Live Oak & Associates, Inc., *in litt.* 2009) proposes to preserve roughly 38,780 acres of the Naval Petroleum Reserve-1 (NPR-1). Nonetheless, for the purposes of this review, until these HCPs are completed and an incidental take permit for the proposed activities is issued, the habitat protection associated with the proposed HCP remains uncertain.

2. *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*

The downlisting criteria also require that for each protected area a management plan is approved and implemented that includes the survival of blunt-nosed leopard lizard as an objective. The following areas have such management plans: Kern National Wildlife Refuge (NWR); Pixley NWR; the Center for Natural Lands Management (CNLM) lands at Semitropic Ridge Preserve; the CNLM, Plains Exploration & Production Company (PXP), and Bureau of Land Management (BLM) lands in the Lokern Natural Area; the Oxy conservation lands near Elk Hills; the BLM, the Nature Conservancy, and CDFG lands of the Carrizo Plain National Monument; the Coles Levee Ecological Preserve (CLEP); and Kern Water Bank (KWB) Conservation Lands. Whereas, management plans have not been developed for the remaining specified protected areas including: Merced and/or Madera Counties; CDFG lands on the *Semitropic Ridge Preserve*; CDFG and Oxy Lands (outside of the Elk Hills Conservation Area) on the Lokern Natural area; Ciervo-Panoche Natural Area; and, NPR-2. Notably, the management plans for the Carrizo Plain National Monument and the Ciervo-Panoche Natural Area are currently being revised by the BLM. Therefore, the downlisting criterion for the approval and implementation of management plans in all protected areas is partly achieved.

3. *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*¹

Long-term population studies have monitored the population trends in blunt-nosed leopard lizard at Elkhorn Plain (Germano *et al.* 2004; Germano and Williams 2005), Semitropic Ridge (Warrick 2006), Lokern (Germano *et al.* 2005; Warrick 2006), Elk Hills (Quad Knopf 2006), Pixley National Wildlife Refuge (NWR; Williams *in litt.* 2006), Buttonwillow Ecological Reserve (ER), Allensworth ER (Selmon *in litt.* 2006), and Coles Levee Ecosystem Preserve (Quad Knopf 2005). Long-term population studies have not been conducted for blunt-nosed leopard lizards in the Cuyama Valley, the Ciervo-Panoche Natural Area, Merced County, or Madera County, the status of these populations is unknown (Stafford *in litt.* 2006).

¹ A precipitation cycle is defined in the Recovery Plan as a period when annual rainfall includes average to 35 percent above-average through greater than 35 percent below-average and back to average or greater.

Table 1. Summary display of each protected area specified in the Recovery Plan for the blunt-nosed leopard lizard and downlisting criteria.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Valley Floor	Merced or Madera		Not Achieved (0 acres protected)	Not Achieved	Not Achieved	Large preserves have been designated in western Merced County (e.g. Grasslands Ecological Area, ~179,000 acres) but are seasonally flooded and do not support blunt-nosed leopard lizard (Juarez <i>in litt.</i> 2006)
	Kern and Tulare	<i>Semitropic Ridge Preserve</i>	Not Achieved (5,278 contiguous acres protected--3,093 acres CNLM; 2,185 acres CDFG)	Achieved on CNLM lands; Not Achieved on CDFG Lands	Not Achieved	Though only slightly less than the specified 5,997 acres of contiguous habitat, only about 1,500 acres of the area support 2 or more lizards per acre (Warrick <i>in litt.</i> 2006).
	Kern	<i>Kern National Wildlife Refuge</i>	Not Achieved (2,000 contiguous acres protected)	Achieved	Not Achieved	The majority this area is seasonally flooded, allowing for only roughly 2,000 acres of potential blunt-nosed leopard lizard habitat. No confirmed sightings of lizard have been reported in this area since 1996 (Williams <i>in litt.</i> 2006).
	Kern	<i>Lokern Natural Area</i>	Not Achieved (13,160 acres of highly fragmented land protected--includes 3,858 acres BLM, 3,332 acres CNLM, 968 acres CDFG, 840 acres Plains Exploration and Production (PXP), and 4,162 acres Occidental of Elk Hills (OXY)	Achieved on BLM, CNLM and PXP lands; Not Achieved on CDFG and Oxy Lands (outside of the Elk Hills Conservation Area)	Not Achieved	The largest contiguous block of habitat is ~2,882 acres. The draft Chevron Lokern HCP (Chevron, <i>in prep.</i> 2008) would protect an additional 11,143 acres, and result in ~24,303 acres of protected contiguous habitat in the area, if finalized.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Valley Floor	Kern	<i>Buttonwillow Ecological Reserve</i>	Not Achieved (1,350 contiguous acres protected)	Achieved	Not Achieved ¹	This area contains one of the largest and most stable populations on the Valley Floor (Selmon <i>in litt.</i> 2006).
	Kern	<i>CLEP, KWB Conservation Lands, Tule Elk State Reserve</i>	Not Achieved (11,291 acres protected--6,059-acre CLEP, 4,263-acre KWB Conservation Lands, and 969-acre Tule Elk State Reserve)	Achieved	Not Achieved	Although these Preserves are sizeable, habitat contiguity is limited by the California Aqueduct, Alejandro Canal, Interstate 5, Highway 43, and Highway 119
	Tulare	<i>Pixley National Wildlife Refuge</i>	Not Achieved (6,833 fragmented acres of protected land--principally comprised of 3 large blocks: 4,445, 1,476, and 800 acres)	Achieved	Not Achieved	
	Kern and Tulare	<i>Allensworth Ecological Reserve</i>	Not Achieved (5,243 fragmented acres of protected land--principally comprised of 4 large blocks: 2,482, 1,432, 551, and 536 acres.	Achieved	Not Achieved	Blunt-nosed leopard lizard population in this area has declined over the past 15 years (Selmon <i>in litt.</i> 2006); no updated data is available.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Foothills	San Benito and Fresno	Ciervo-Panoche Natural Area	Not Achieved (16,600 fragmented acres--the largest contiguous block is roughly 4,800 acres)	Not Achieved	Not Achieved	Much of this area is not suitable habitat due to dense vegetation and high clay soils (Lowe <i>in litt.</i> 2006; L. Saslaw, pers. comm. 2006); rather the remaining portions have been noted as some of the best habitat in the Region. However, most prime habitat remains unprotected on private lands. Only 3 of the 21 reported occurrences are within BLM ACEC (CNDDDB 2006; Lowe <i>in litt.</i> 2006).
	Kern	<i>Elk Hills Conservation Area</i>	Not Achieved (7,932 fragmented acres--largest contiguous parcel is roughly 3,770 acres)	Achieved	Not Achieved	The Oxy Elk Hills HCP is in draft form; barring any substantive changes before completion, the HCP is expected to result in the preservation of roughly 38,780 acres of Elk Hills NPR-1 (Live Oak & Associates, <i>in litt.</i> 2009).
	Kern	<i>NPR-2</i>	Not Achieved (9,000 highly fragmented acres within NPR-2 and the adjacent Buena Vista Valley)	Not Achieved	Not Achieved	The Caliente Resource Management Plan is scheduled to be revised to include BLM lands within NPR-2.
	Kern	<i>Wind Wolves Preserve</i>	Not Achieved (2,000 contiguous acres protected)	Achieved	Not Achieved	Blunt-nosed leopard lizards have not been observed at the site since the early 1990s.

Table 1 continued.

Region	County	Protected Area	Downlisting Criteria 1 (Land Conservation)	Downlisting Criteria 2 (Management Plan for Species Conservation)	Downlisting Criteria 3 (Population Stability)	Comment
Foothills	San Luis Obispo	Carrizo Plain Natural Area	Achieved (~250,000 largely contiguous acres protected within the BLM National Monument and adjacent CDFG Ecological Reserve, and the Upper Cuyama Valley (Saslaw <i>in litt.</i> 2006).	Achieved	Not Achieved for Carrizo Plain Natural Area	The Resource Management Plan for these areas is currently being revised the BLM; though conserving listed species and habitat will continue to be a primary focus of the revisions.
NOTES: ¹ Quantified population density estimates are not currently available for Buttonwillow ER due to a lack of surveys.						

Figure 1. Blunt-Nosed Leopard Lizard (*Gambelia sila*) Range

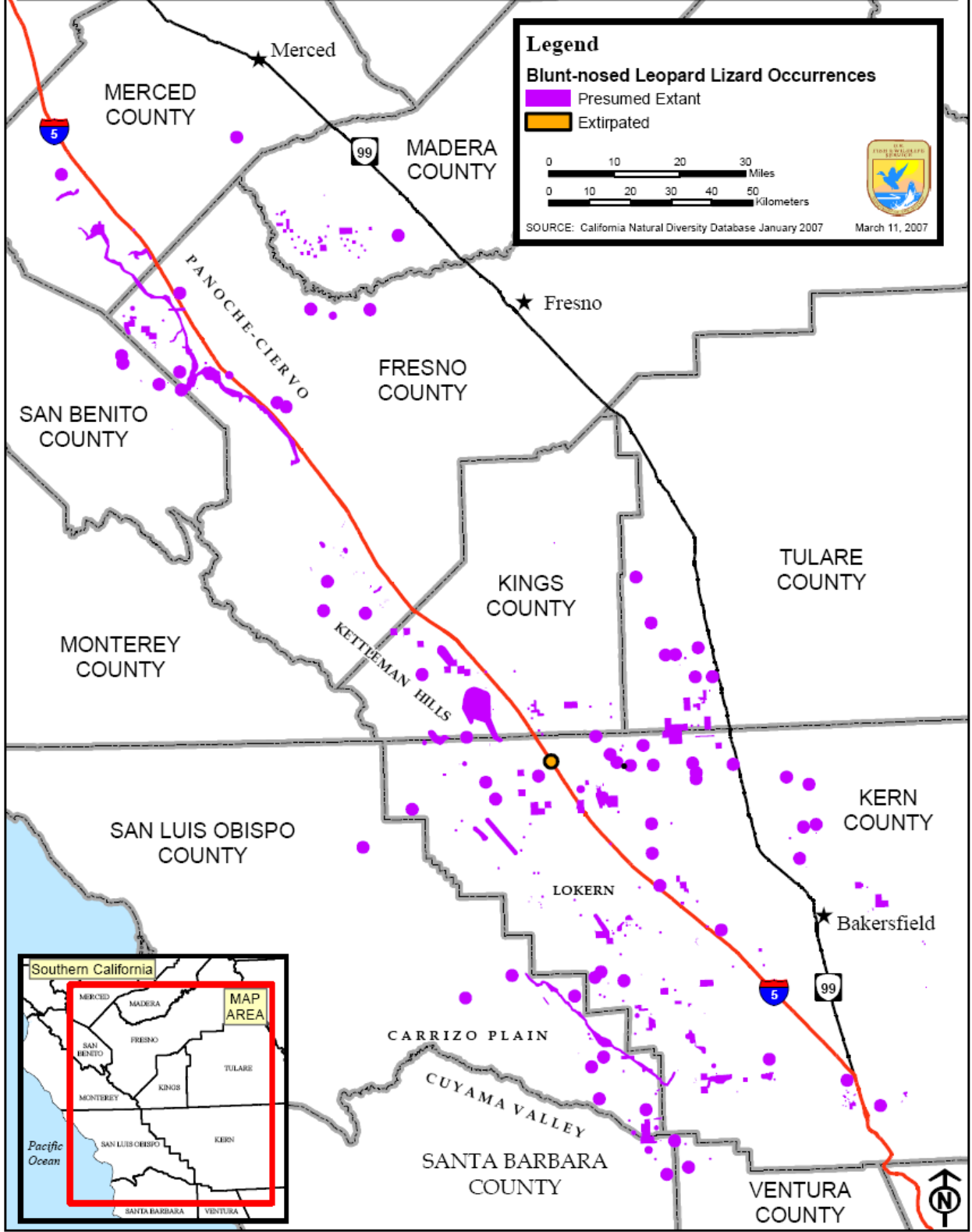
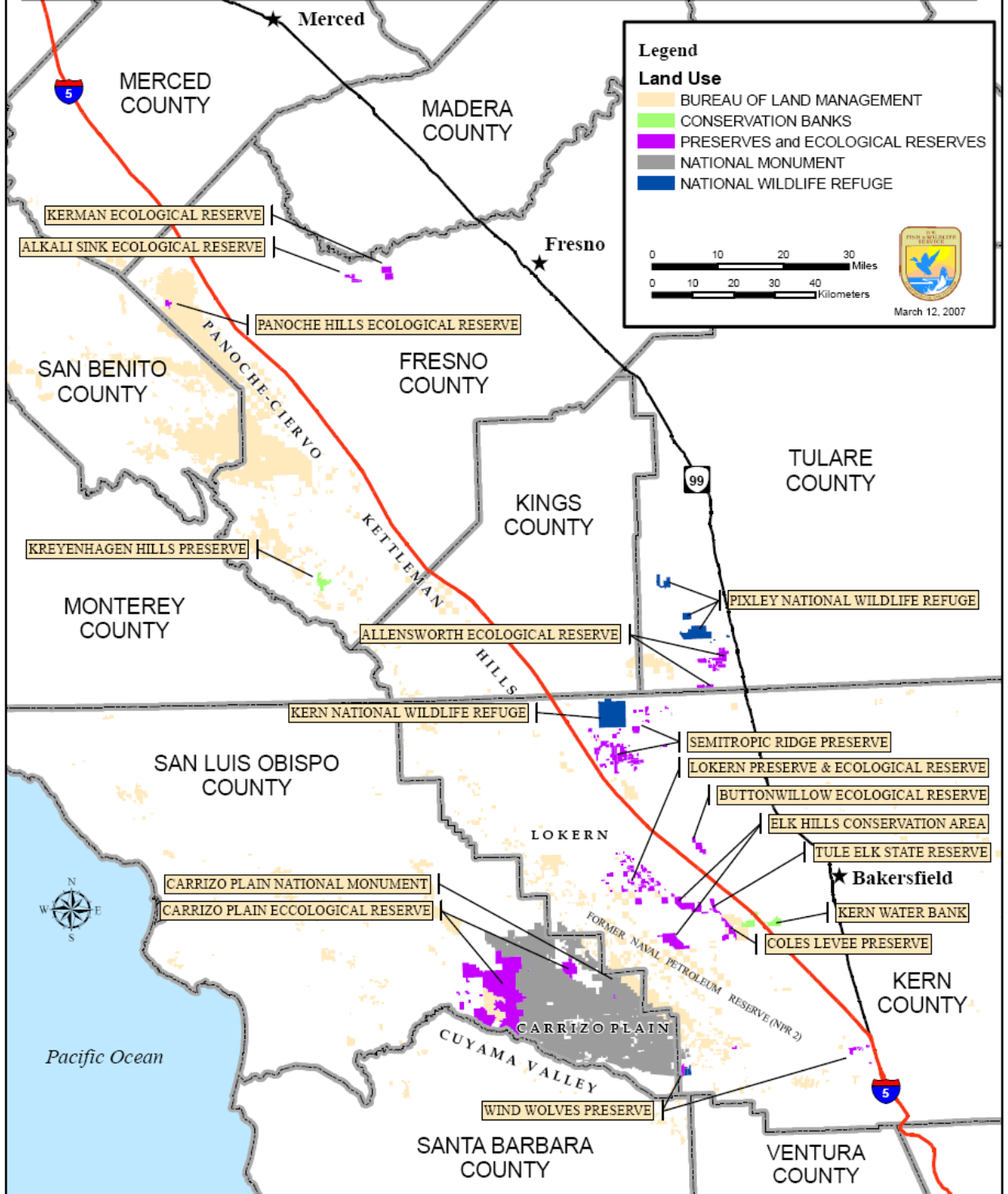


Figure 2. Protected Areas in the Blunt-Nosed Leopard Lizard Range



Annual blunt-nosed leopard lizard surveys show that the population density decreased below 2 per hectare during the wet years in the late 1990s at Pixley NWR, while the density remains below 2 per hectare in the Lokern area, the Elk Hills, Coles Levee Ecosystem Preserve, and KWB Conservation Lands. Population density estimates at Semitropic Ridge Preserve were also well below 2 per hectare during spring road surveys in 2005. Elkhorn Plain, however, has been reported to have the highest abundance and density of blunt-nosed leopard lizards recorded in any area with densities up to 16 adults per hectare and 35.6 hatchlings per hectare (Germano and Williams 2005). Therefore, the downlisting criterion for population stability has not been achieved for any of the specified protected areas in the Recovery Plan.

Delisting Criteria

Delisting will be considered when, in addition to the criteria for downlisting, all of the following conditions have been met:

- 1) *Three additional areas with about 5,997 acres or more of contiguous, occupied habitat including:
 - A) *One on the Valley floor;*
 - B) *One along the western Valley edge in Kings or Fresno Counties; and*
 - C) *One in the Upper Cuyama Valley of eastern San Luis Obispo and eastern Santa Barbara Counties.**
- 2) *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*
- 3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*

Summary of Recovery Criteria

Due to the lack of protection of sufficient habitat in specified recovery areas, the lack of approval and implementation of management plans, and the lack of population stability, the downlisting criteria for blunt-nosed leopard lizard have not been met. Therefore, the delisting criteria for blunt-nosed leopard lizard have also not been met. The acreage of contiguous blunt-nosed leopard lizard habitat protected, adequacy of management plans, and population trends are discussed below for each of the recovery areas specified in the delisting criteria. None of the delisting recovery criteria for protection of habitat, approval and implementation of management plans (except for the Kettleman Hills ACEC), and population stability have been achieved for the specified areas: western Valley edge in Fresno or Kings Counties, Upper Cuyama Valley, and other Valley floor areas. Appendix A includes detailed information used for the analysis of the delisting criteria.

II.C. Updated Information and Current Species Status

Note this section typically includes updated information on species status since the time of listing. However, given the brevity of information included within the 1967 listing rule (Service 1967), and that no previous status reviews for this species have been conducted, the following update presents new information since the issuance of the *Recovery Plan for the Blunt-Nosed Leopard Lizard* (Service 1980).

II.C.1. Biology and Habitat

II.C.1.a. Abundance, population trends, spatial distribution, and biology

Abundance and Population Trend Surveys

Long-term localized population census and plot-based research studies have been conducted in areas on the Valley Floor (Pixley NWR and Lokern Natural Area) and Foothill Regions (Elk Hills Conservation Area, and Elkhorn Plain) in the southern Valley (see Table 2). As these surveys were conducted to achieve various goals and according to different methods, and given that they represent only a small proportion of the species range, they are not directly comparable. However, they provide some insight to abundance and population trends of this species in specific locations.

Long-term studies show blunt-nosed leopard lizard population instability, especially during years of above average precipitation (Germano *et al.* 2004; Germano *et al.* 2005; Germano and Williams 2005; Germano *in litt.* 2006; Williams *in litt.* 2006). The largest and most stable population of blunt-nosed leopard lizards on the Valley Floor is thought to be at Semitropic Ridge Preserve. However, the number of all lizards at Semitropic Ridge Preserve has been decreasing since 2003 for unknown reasons. Establishing corridors between existing natural areas on the Valley floor in Tulare and Kern Counties will be important for maintaining these populations (especially at the smaller Buttonwillow ER). Relocation of blunt-nosed leopard lizards to some areas such as Allensworth ER (where numbers have plummeted in the past 15 years) will also be necessary for persistence of the population (Selmon *in litt.* 2006). Based on population instability and on-going modification and conversion of existing habitat to agriculture, residential or commercial developments, and for petroleum and mineral extraction activities, overall species abundance is considered to be decreasing across its range.

Table 2. Blunt-nosed leopard lizard survey results for Valley Floor and Foothill Protection Areas; note the surveyed areas account for only a small portion of the species range.

County	Survey Location	Duration of Study	Survey Results (interannual trends)	Comments	Source
Valley Floor					
Tulare	Pixley NWR	1993-2006	Decline	Population fluctuations seemed to be negatively correlated with annual precipitation	Williams <i>in litt.</i> 2006
Kern	Lokern Natural Area	1997-2005	Variable	Methods included ten-day census surveys of four grazed and four non-grazed plots; more individuals observed in grazed plots than ungrazed in all but one year	Germano <i>et al.</i> 2005
Foothill					
Kern	Elk Hills Conservation Area (Oxy conservation lands--North Flank of the Elk Hills, and Buena Vista Valley)	2000-2005	Increase	Combined road and foot surveys	Quad Knopf 2006
Kern	Elkhorn Plain	1988-2003	Variable	One grazed and one non-grazed plot	Williams <i>et al.</i> 1993; Germano and Williams 2005

Spatial Distribution (Current Range)

Historically, blunt-nosed leopard lizards occurred in arid lands throughout much of the San Joaquin Valley and adjacent foothills, ranging from San Joaquin County in the north, to the Tehachapi Mountains in the south, as well as in the Carrizo Plain and Cuyama Valley (Montanucci 1965; Germano and Williams 1992a; McGuire 1996). At the time of listing, the blunt-nosed leopard lizard was found in scattered locations in San Joaquin Valley, in the foothills of Tulare and Kern Counties and up the eastern portions of the Coast Range foothills; Fresno, Kern, Madera, Merced, San Luis Obispo and Tulare Counties (Stebbins 1954, and California Department of Fish and Game 1972 as reported in BLM 1972). Due to widespread agricultural development of natural habitat in the San Joaquin Valley, the current distribution of blunt-nosed leopard lizards is restricted to less than 15 percent of its historic range (Germano and Williams

1992a; Jennings 1995). In the remaining habitat that exists, blunt-nosed leopard lizards occur in alkali sink scrub, saltbush scrub, as well as native and nonnative grasslands on the Valley floor and in the surrounding foothills areas (Montanucci 1965; Germano *et al.* 2001; Stebbins 2003).

Although the blunt-nosed leopard lizard has been listed as endangered for nearly 40 years, there has never been a comprehensive survey of the species entire historical range; thus, any changes in the range of the species from the time of listing are currently unknown. It has been reported that the contemporary range of blunt-nosed leopard lizards was confined to a few areas scattered from southern Merced County to southern Kern County, between elevations of 100-2,400 feet (Tollestrup 1979a). However, as reported in the Recovery Plan (Service 1998), blunt-nosed leopard lizards have been found near Firebaugh and Madera (Williams 1990), Ciervo, Tumey, Panoche Hills, Anticline Ridge, Pleasant Valley, Lone Tree, Sandy Mush Road, Whimesbridge, Horse Pasture, and Kettleman Hills Essential Habitat Areas (CDFG 1985). Also, as recently as May 2009, the Endangered Species Recovery Program (ESRP) of California State University, Stanislaus, reported that blunt-nosed leopard lizards had been observed on the Madera Ranch in western Madera County from surveys conducted for the Madera Irrigation District (Kelly *et al.* 2009).

Biology

Microhabitat use and home range characteristics of blunt-nosed leopard lizards were compared at two sites near Elk Hills in Buena Vista Valley that differed in ground cover (Warrick *et al.* 1998). These authors reported that blunt-nosed leopard lizard microhabitat use differed significantly between the two study sites. At the more densely vegetated site, blunt-nosed leopard lizards used dry wash areas significantly more than grassland, floodplain, and road habitats. Conversely, at the more sparsely vegetated site, grassland was used more than wash habitat, and hills were used less than all other habitats.

Warrick *et al.* (1998) also compared home range size, core area size, and amount of overlap of ranges between the sites. The average male home range size was 10.48 acres, and the average female home range size was 4.99 acres. Female home ranges and core areas were overlapped extensively by male ranges at an average of 79.8 percent and 50.3 percent, respectively. Female home ranges were found to overlap the ranges of up to four other males, but were not observed to overlap with other females.

The span of seasonal activity for both adults and hatchlings described in the Recovery Plan Results was corroborated by results of a two-plot study on the Elkhorn Plain (Germano and Williams 2005). This study further postulated that activity levels can be strongly affected by environmental factors—temperature, precipitation and vegetation characteristics. These factors affect lizard behavior by effecting thermoregulation, metabolism, prey densities, and predatory success or mobility. For example, these authors reported that activity was completely absent for 21 months from July 1989 until April 1991 when individuals remained below ground due to dry conditions. In spite of this anomaly, Germano *et al.* (2004) supported the capacity of a 10-day survey to detect the blunt-nosed leopard lizard presence during typical environmental conditions compared to full-season surveys ($r^2 = 0.96$ for adults, $r^2 = 0.99$ for hatchlings/juveniles). Notably CDFG's standardized protocol survey methods (CDFG 2004) require a minimum of 12 days of

surveys to assess presence/absence for new ground disturbance during specific ambient air and ground temperature conditions.

Germano and Williams (2005) also compared data from the Elkhorn Plain study to data previously collected in Valley floor habitat and noted the following differences in behavior among the two regions. On the Elkhorn Plain, females were generally gravid by late April or early May, while some females were found with eggs in early July. Clutch size on the Elkhorn Plain ranged from 1 to 6 eggs, with a mean clutch size of 3.4 eggs (varying from 3.1 to 3.8 yearly). Many females produced multiple clutches in a year with up to four clutches observed in a single female. On Valley floor sites, clutch size ranged from 2 to 5 eggs with a mean of 2.9 to 3.3 eggs per clutch, and only a few females produced a second clutch (Montanucci 1967; Tollestrup 1982). The greater clutch size and greater frequency of multiple clutches observed on the Elkhorn Plain compared to the Valley floor was attributed to greater prey abundance with the irruptive population growth of grasshoppers in 1992 (Germano and Williams 2005).

II.C.1.b. Genetics, genetic variation, or trends in genetic variation

Gambelia sila and *G. wislizenii* from the San Joaquin Valley and Mojave Desert, respectively, hybridize in the upper Cuyama Valley near the Santa Barbara – San Luis Obispo County line (Montanucci 1978; Slack 2002). The greatest heterogeneity in color pattern and morphology is concentrated near Ballinger Canyon, with most of the *sila*-like lizards occurring to the north and *wislizenii*-like lizards to the south. The leopard lizard hybrid zone covers about 200 acres in Los Padres National Forest and is associated with an ecotone between *Stipa-Atriplex* grasslands and *Pinus-Juniperus-Artemisia* Great Basin shrub desert (Slack 2002). Most evidence shows that natural selection is opposing the production of hybrids between the two forms of leopard lizards. The intermediate phenotypes have a lower fitness than those approaching the parental species (Montanucci 1978). The hybridization likely began 20,000 years ago when the ranges of the two species overlapped in the vicinity of Ballinger Canyon. Climatic changes since then have resulted in the isolation of the hybrid population (Montanucci 1979). Thus, though not currently protected, the hybrid population is at risk of extinction due to the degradation of its habitat by heavy off-road vehicle (ORV) use, the conversion of 95 percent of its habitat into alfalfa fields, and the construction of roads and oil development activities (Montagne 1979; Slack 2002; Stafford *in litt.* 2006).

II.C.1.c. Taxonomic classification or changes in nomenclature

The blunt-nosed leopard lizard was federally listed in 1967 as *Crotaphytus wislizenii silus* (Service 1967). At the time of listing (Service 1967), this species was named *Crotaphytus silus*, according to Stejneger (1890) first description and nomenclature of the species. However, the precise taxonomic split between the collared and leopard lizard remained largely in debate until Montanucci (1970) argued for specific status based upon the study of hybrids between the long-nosed and blunt-nosed leopard lizards. The taxonomic debate was resolved when Montanucci (1970) separated the genera *Gambelia* from *Crotaphytus*, resulting in the generic epithet name *Gambelia silus* for the blunt-nosed leopard lizard. Montanucci *et al.* (1975) separated all leopard lizards from collared lizards, placing both *silus* and *wislizenii* into the genus *Gambelia* at full species status. Most recently, the specific spelling was changed to *sila* such that its gender

agreed with the genera name *Gambelia* (Frost and Collins 1988; Collins 1990; Germano and Williams 1992b).

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

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. The final ruling to list the blunt-nosed leopard lizard as endangered did not include a discussion of the threats to the lizard. The Service is using reports from the California Department of Fish and Game (Laughrin 1970; Morrell 1972, 1975), and the 1980 *Recovery plan for the blunt-nosed leopard lizard* to address threats that affected the lizard at the time of its listing.

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

This section summarizes the threats included under Factor A, and also covers the conservation efforts implemented to reduce threats over the known range of the blunt-nosed leopard lizard. At the time that the blunt-nosed leopard lizard was listed, the conversion of native habitat to agriculture was considered to be the primary threat to species. Additional threats to the blunt-nosed leopard lizard included habitat fragmentation, mineral development (primarily for oil and gas extraction), inappropriate grazing levels, and agricultural pest control, primarily spraying for the beet leafhopper (Montanucci 1965).

Past research on this species reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizards (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993). Since listing, the Service has identified additional potential threats to the blunt-nosed leopard lizard including: landscape leveling and cultivation which caused habitat disturbance, destruction and fragmentation; grazing (under- or over-grazing); mineral development, primarily oil and gas extraction; and, agricultural pest control, primarily spraying for the beet leafhopper (Montanucci 1965). The 1998 Recovery Plan added mortality from vehicle-strikes with roadway traffic and/or ORV (discussed in Factor E) to the threat list.

The loss and modification of habitat due to agricultural conversion and urban development remain the largest threat to the blunt-nosed leopard lizard. Mineral exploration and extraction, and water banking activities also affect a significant portion of the blunt-nosed leopard lizards range. More recently the proposed siting of solar facilities in blunt-nosed leopard lizard habitat is an emerging threat that has the potential to substantially affect blunt-nosed leopard lizard. Specific information of these on-going and recent threats and habitat conservation activities are described in detail below.

Collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993). Land conversions contribute to declines in blunt-nosed leopard lizard abundance directly and indirectly by increasing mortalities from sources including: displacement

and habitat fragmentation, reducing feeding, breeding, and sheltering sites, and by reducing the carrying capacity and prey populations for occupied sites.

Dramatic loss of blunt-nosed leopard lizard habitat has continued to occur since the drafting of the 1980 Recovery Plan. According to Service files and a preliminary assessment of issued biological opinions from 1987 to 2006, roughly 120 projects permitted incidental take of blunt-nosed leopard lizard. In total, these projects allowed for the incidental take of approximately 220 individuals and roughly 21,200 acres of impacts to blunt-nosed leopard lizard habitat. Of these activities, the habitat disturbance was authorized for oil exploration and power generation (2,433 acres permanent and 1,215 acres temporary), road construction and repair (1,387 acres permanent and 469 acres temporary), general operation and maintenance activities (15 acres permanent and 5,120 acres temporary), pipeline construction and repair (264 acres permanent and 853 acres temporary), transmission line and fiber optic cables construction (410 acres permanent and 418 acres temporary), hazardous waste facilities construction (844 acres permanent and 16 acres temporary), prison facilities construction (283 acres permanent and 74 acres temporary), water banking (KWB operations 6,000 acres permanent), and other agricultural, residential, and commercial development activities (covered under the Metropolitan Bakersfield HCP 15,200 acres permanent).

Note, these figures account for only those projects that were reviewed under the Act; the estimations do not include any loss of habitat or adverse effects from habitat conversion that was not reported to the Service. Presently, additional habitat loss can be expected due to on-going modification and conversion of existing habitat for agriculture, residential or commercial developments, oil and gas exploration activities, the construction of water banking facilities, and solar power developments.

Habitat Threats from Agriculture and Urban Development

Conversion of land for agricultural purposes continues to be the most critical threat to the blunt-nosed leopard lizard. Although the increment of habitat loss attributable to urban development appears to be increasing, this activity remains less significant than agriculture for this species. Agricultural conversion is generally not subject to any environmental review and is not directly monitored or regulated. Conversion of privately owned habitat without use of federally supplied water typically does not result in section 7 consultation with the Service, nor is it common for there to be an application for a section 10 incidental take permit (which would include a habitat conservation plan to reduce the effects of the take on the species). In addition, CVP water is used for groundwater recharge by some districts in the San Joaquin Valley. Such recharge may allow nearby landowners to pump groundwater for uses that may affect listed and proposed species.

Conversion of natural lands to agriculture has continued since the listing of the blunt-nosed leopard lizard. The 1980 Recovery Plan reported that between 1976 and 1979, habitat loss for the blunt-nosed leopard lizard was occurring at a rate of approximately 19,200 acres per year (Service 1980). By 1979, roughly 95 percent (approximately 8.1 million acres out of a total 8.5 million acres) of habitat on the San Joaquin Valley floor had been converted or otherwise destroyed (Service 1980; Williams 1985). The California Department of Water Resources has

predicted continued loss of wildland habitat to agricultural conversion at a rate of 10,000 to 30,000 acres per year. The California Department of Forestry (1988) predicted wildland habitat losses totaling 465,000 acres in the San Joaquin Valley region between 1980 and 2010 as a result of agricultural conversion and urbanization. Much of the projected loss is likely to occur in the remaining blocks of habitat for listed and proposed species, where conversion also isolates populations by increasing habitat fragmentation, and limits availability of suitable habitat for future recovery of the species

The conversion of blunt-nosed leopard lizard habitat into agricultural fields continues to be a threat to blunt-nosed leopard lizard on private lands on the Valley floor. For example, in August 2006, about 1,300 acres of saltbush scrub and sink scrub habitat were illegally disced for cultivation of melons on the Valley floor along Interstate 5 north of the Kings – Kern County line. Blunt-nosed leopard lizards occur in several locations a few miles from the site (Vance *in litt.* 2006). Another similar instance of illegal discing of saltbush habitat was reported on the Valley floor in Kern County (Krise *in litt.* 2006).

The Panoche Valley was identified an important area for blunt-nosed leopard lizard within the Ciervo-Panoche Natural Area (Service 1998). However, the majority of the Panoche Valley remains unprotected on private lands. In September 2006, the real estate company Schuil and Associates sold a 1,200-acre parcel of rangeland in the Panoche Valley to private interests, and another 9,000 acres of Panoche Valley rangeland are on sale for potential home sites zoned for agricultural rangeland 40-acre minimum site size. The Panoche Creek and Silver Creek were identified as important dispersal corridors within the Ciervo-Panoche Natural Area (Service 1998; Lowe *et al.* 2005; L. Saslaw, BLM, pers. comm. 2006), but the majority of these areas remain unprotected and subject to residential and agricultural development.

Between 1970 and 2000, the human population of the San Joaquin Valley doubled in size; it is expected to more than double again by 2040 (Field *et al.* 1999; Teitz *et al.* 2005). The increasing population combined with the concurrent high demand for limited supplies of land, water, and other resources, has been identified as a principal underlying cause of habitat loss and degradation (Bunn *et al.* 2007).

Numerous large residential housing developments have been proposed in blunt-nosed leopard lizard habitat within the Metropolitan Bakersfield HCP (MBHCP) service area, including the 4,000 acre Gateway Specific Plan, and the 890 acre Canyons residential housing development. Impacts from these large-scale developments would likely extend beyond their physical footprint, considering potential effects upon dispersal corridors and habitat connectivity across the Valley floor. Additionally, the City of Taft recently proposed to expand its sphere of influence to cover roughly 157,570 acres of land (246.2 square miles), including approximately 9,622 acres of land within existing City limits and 147,948 acres of land within the proposed Expansion Area (City of Taft 2009). The recent economic recession in combination with other factors have delayed planning and construction of proposed development in Bakersfield and throughout the Valley; in some cases the applicants have withdrawn their proposals entirely. Nonetheless, blunt-nosed leopard lizard habitat degradation in, and around, Bakersfield, Taft and other urban areas remains a threat on unprotected private lands.

Habitat Threats from Oil and Gas Exploration

Oil and natural gas exploration activities continue to degrade blunt-nosed leopard lizard habitat in western Kern, Kings, and Fresno Counties. The construction of facilities related to oil and natural gas production, such as well pads, wells, storage tanks, sumps, pipelines, and their associated service roads degrade habitat and cause direct mortality to blunt-nosed leopard lizards. Leakage of oil from pumps and transport pipes, and storage facilities, surface mining, and ORV use also degrade blunt-nosed leopard lizard habitat (Madrone Associates 1979; Chesemore 1980; Mullen 1981; Service 1985; Kato and O'Farrell 1986; Service 1998).

From 2001 to present, 38 projects have been permitted through the Oil and Gas Programmatic biological opinion (BLM 2008) with potential to affect blunt-nosed leopard lizards. These 38 projects have impacted approximately 19 acres of occupied or potential habitat. Additionally, under this programmatic opinion the incidental take of four individual blunt-nosed leopard lizards has been reported: one presumed vehicle strike at the Carneros Devils Den area, and one at Kettleman Hills Middle Dome area; and, two assumed predation mortalities. Under the Oil and Gas Programmatic biological opinion, impacts to blunt-nosed leopard lizard habitat are generally minimized by applying a ratio of 3:1 for the purchase and protection of other existing habitat for each acre of suitable habitat impacted (Service 2001, 2003). However, this only results in the protection of existing habitat and not the creation of new blunt-nosed leopard lizard habitat; thus, each project effectively represents a net loss in total habitat.

Formal consultation between the BLM and the Service was initiated on April 10, 2008, for the development of a programmatic biological opinion for seismic exploration projects for which the BLM is the Federal nexus. Thus far, this programmatic opinion is expected to cover four specific projects, and others that may arise in the future. The four seismic exploration projects that have submitted formal requests include: the Buena Vista Seismic Exploration Project near Taft (roughly 128,000 acres) (Occidental of Elk Hills, Inc., *in litt.* 2008); the Chevron's Kettleman Hills Seismic Exploration Project (roughly 131,500 acres) (BioEnvironmental Associates, *in litt.* 2008a); the Aera Energy LLC Seismic Exploration Project near McKittrick (roughly 73,600 acres) (BioEnvironmental Associates, *in litt.* 2008b); and, the Belgian Anticline Seismic Exploration Project (roughly 33,270 acres) (E&B Natural Resource Management, *in litt.* 2008). Disturbances associated with these projects are predominantly temporary and are dispersed across large land areas but, nonetheless, have potential to impact blunt-nosed leopard lizards, or adversely affect their habitat. At the time of this review, impacts of these projects on the blunt-nosed leopard lizard are not known. Nonetheless, it is anticipated that blunt-nosed leopard lizards are likely to be adversely affected by vehicle strikes, entombment in burrows, temporary loss or degradation of their habitat, and harassment from noise and vibration. Some blunt-nosed leopard lizards may escape direct injury if burrows are destroyed, but become displaced into adjacent areas. They may be vulnerable to increased predation, exposure, or stress through disorientation, loss of foraging and food base, or loss of shelter. Furthermore, it is expected that any positive results from seismic testing will subsequently result in proposals for oil and gas extraction projects; if these proposals are within listed species habitat, a separate consultation with the Service would be required.

Habitat Threats from the Construction of Water Banking Facilities

The on-going need to provide and secure water supplies for continued urban and rural use throughout California has increased the demand for new construction of water banking facilities. This need was formalized by Executive Order S-06-08 (signed on June 4, 2008 by Governor Arnold Schwarzenegger), which officially declared a statewide drought, and a state of emergency in nine Central Valley Counties with exceptionally urgent water needs: Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern. Currently, the Service is engaged in informal consultation with two proposed water banks that have potential to impact blunt-nosed leopard lizards—Madera Irrigation District’s Madera Water Supply Enhancement Project, and Semitropic’s Stored Water Recovery Unit. These projects potentially threaten the blunt-nosed leopard lizard by: directly removing habitat (through flooding, or the establishment of infra-structure); changing habitat quality (vegetation structure, higher predation, reduced prey, etc.); and, increasing the incidence of take through vehicle strikes.

The proposed 10,000-acre Madera Water Supply Enhancement Project is proposed as a groundwater recharge bank in western Madera County. The presence of blunt-nosed leopard lizards throughout the proposed site was verified by May 2009 surveys. At this time specific impacts of the project to the blunt-nosed leopard lizards have not yet been determined. However impacts associated with the project are likely given that the project entails the flooding of roughly 700 acres of swale habitat, and the construction of roughly 3,000 acres of percolation ponds. Additional effects to this species, beyond the flooding of suitable habitat, would be attributable to the permanent conversion of habitat to water bank infrastructure including the construction of access roads, powerlines, pipeline and canal conveyance systems, and numerous water extraction well pads. Requirements under the California Environmental Quality Act (CEQA) were completed in September 2005, and the applicant has initiated informal consultation with the Service for this project.

Currently, the Semitropic Water District is proposing the development of a large groundwater extraction project—the Stored Groundwater Recovery Unit—southeast of the Kern NWR, near Semitropic, California (Entrix, GEI Consultants, Inc., and Live Oak & Associates *in litt.* 2008). This project includes the following activities that have potential to affect the blunt-nosed leopard lizard: construction of a well extraction field across five sections of land (roughly 3,000 acres), ancillary well connection pipes, roughly 4 miles of open canal, and 7 miles of large diameter (120-inch) pipeline. The proposed project is located on blunt-nosed leopard lizard habitat near the Semitropic Ridge Preserve and the Kern NWR. At this time, however, potential impacts of the project to the blunt-nosed leopard lizard have not been assessed, but impacts are likely through the permanent conversion of habitat to water bank infrastructure including construction of access roads, powerlines, pipeline and canal conveyance systems, and roughly 65 water extraction well pads. Moreover, the proposed water bank will likely augment the conversion of native lands to agriculture by increasing water supply availability in the southern San Joaquin Valley.

Habitat Threats from Solar Power Developments

Solar power development projects pose potential threats to blunt-nosed leopard lizards and may

impact vast amounts of habitat. These projects can destroy, fragment, or impact blunt-nosed leopard lizard habitat by: altering landscape topography, vegetation, and drainage patterns; increasing vehicle-strike mortality; 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). Moreover, recently proposed solar projects tend to be large contiguous blocks of disturbance in undeveloped habitat lands, ranging from hundreds to several thousand acres. Currently, eight solar power farms have been proposed (see Table 3).

Table 3. Solar power projects that have been proposed within blunt-nosed leopard lizard habitat.

Project Name (Applicant)	Location (Region/County/Protected Area)	Proposed Habitat Disturbance (acres)¹	Status
SunGen (Complete Energy Holdings, Inc., and La Paloma Generating Company LLC)	Valley Floor/Kern	270-290 (P)	Informal consultation has been initiated.
Cymric	Valley Floor/Kern	Unknown	Informal consultation has been initiated.
California Valley Solar Ranch (High Plains Ranch II, LLC, Sun Power Corporation, Systems)	San Luis Obispo/Carrizo Plain	4,365 (P)	Informal consultation has been initiated.
Topaz Solar Farm (First Solar, Inc.)	San Luis Obispo/Carrizo Plain	6,200 (P)	Informal consultation has been initiated.
Carrizo Thermal Solar Farm (Ausra, Inc.)	San Luis Obispo/Carrizo Plain	640 (P); 380 (T)	Formal consultation has been initiated; Ausra, Inc. was purchased by First Solar, Inc. in 2009.
San Joaquin Solar 1 & 2 (San Joaquin Solar, LLC)	Foothills/Fresno/Coalinga	640 (P)	Informal consultation has been initiated.
Sun City and Sun Drag	Foothills/Kings/Avenal	Approximately 1000 (P)	Informal consultation has Not been initiated
Solargen Solargen Energy, Inc.	Foothills/Fresno/Panoche Valley	Total amount not determined but will be between 7,000 and 29,000 (P)	Informal consultation has been initiated.
Notes: ¹ Permanent Impacts denoted as (P), Temporary Disturbance denoted as (T).			

Conservation Efforts and Habitat Protection

A total of 14 HCPs have been prepared (13 completed and one HCP currently in draft) for which the permits include take of blunt-nosed leopard lizard and/or impacts to its habitat. These HCPs are summarized in Table 4 below, and described in further detail in Appendix B. Effectively, through section 10 consultations and the HCP process, 89,288 acres of habitat land have been conserved, while a total 30052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft).

The Central Valley Project (CVP) was constructed to protect the Central Valley from water shortages and floods. Irrigation water provided through the CVP subsequently facilitated the conversion of native habitats to agricultural lands (Bureau of Reclamation 2006). The effect of this large-scale loss of native habitat reduced populations of several species, which resulted in the listing of over twenty species in the San Joaquin Valley under the Act.

Subsequently, Congress passed the Central Valley Project Improvement Act (CVPIA) in 1992, mandating changes in the management of the CVP particularly for the protection, restoration, and enhancement of fish and wildlife. The CVPIA is comprised of several programs, including the CVPIA Habitat Restoration Program (HRP; §3406(b)(1) of the CVPIA). The Central Valley Project Conservation Program (CVPCP) was the result of a section 7 consultation with the Bureau of Reclamation (BOR) for Friant Dam water contracts.

Under the CVPCP, the blunt-nosed leopard lizard was designated as a very high priority for recovery due its imminent threat of extinction, and the fact that CVP actions significantly contributed to the species decline, either directly or indirectly and given that the species is considered to have an imminent threat of extinction. The CVPCP program is funded at approximately 2.3 million dollars annually, and has thus far funded 84 total projects since its commencement; 11 of the 84 are within alkali scrub or annual grassland habitat and specifically include the blunt-nosed leopard lizard as a focal species. Principally these projects have included habitat protection and restoration through the establishment of conservation easements and land acquisition in fee title (see Table 5). Other CVPCP goals for the recovery of the blunt-nosed leopard lizard include: determine habitat management and compatible land uses; conduct surveys for species presence and absence; and, protect key habitat areas within the known range of the species.

A principal program under the CVPIA HRP is the Land Retirement Program (Law 102-575 Title 34, Section 3408(h)), which is designed to reduce irrigated agricultural drainage problems. It comprises an interagency Department of Interior Land Retirement Team and includes representatives from BOR, the Service, and the BLM. It was estimated that by 2040 approximately 400,000 to 554,000 acres of land would become unsuitable for irrigated agriculture if no actions were taken to remedy drainage problems. Under this program, those irrigated agricultural lands that are characterized by low productivity, poor drainage, shallow water tables, and high groundwater selenium concentrations would be retired from irrigated

Table 4. Since the time of listing, 14 HCPs have been developed and implemented (note the California Aqueduct San Joaquin Field Division HCP is currently in draft form); additional information is provided in Appendix B.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)¹	Comments
Coles Levee	Valley Floor/Kern	990	Coles Levee Ecosystem Preserve	270 (P)	HCP is not currently valid
Coalinga Cogeneration	Foothills/Fresno	179	On-site	49.6 (P); 27.6 (T)	June 23, 2006, the project used up all of its compensation credits and completed the mitigation requirements.
California Department of Corrections Delano Prison	Valley Floor/Kern	348/514	On-site /Allensworth ER	287 (P); 348 (T)	Compensation includes habitat enhancement and revegetation
California Department of Corrections Statewide Electrified Fence Project	Valley Floor/Kern	282/800 ²	Allensworth ER	Take of 2 Individuals	A restoration plan for the mitigation lands was finalized and approved in February 2003 (EDAW 2003)
Chevron Pipeline	Valley Floor/Kern/Lokern	28	Lokern Area	25.5 (T)	
Granite Construction Phase I	Foothills/Fresno/Coalinga	162	Semitropic Ridge ER	54 (P)	

Table 4 continued.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)¹	Comments
Kern County Waste Facilities	Valley Floor/Kern	755 ³	Coles Levee Ecosystem Preserve	251 (P) ³	Project impacts are limited to 2 acres of blunt-nosed leopard lizard habitat near Lost Hills and 47 acres near Taft in Kern County
KWB Authority	Valley Floor/Kern	4,263	On-site	12,081 (P); 291 (T)	
Metropolitan Bakersfield	Valley Floor/Kern	3:1 compensation for Natural Lands	Off-site	15,200 (P)	Acquired throughout the duration of the HCP as impacts are incurred; the HCP is valid until 2014.
Nuevo Torch	Valley Floor/Kern	840	Lokern Area	850 (P)	Now called PXP
California Aqueduct San Joaquin Field Division	Valley Floor/Kern	567/3,474 ⁴	On-site	340 (P); 835 (T)	HCP is currently in draft form. Total impacts are limited to 1,295 acres: 1,185 acres of impact will be compensated at time of issuance, 110 acres of impacts will be compensated as they occur

Table 4 continued.

HCP	Location (Region/County/Protected Area)	Habitat Protection (acres)	Compensation Area Location	Authorized Impacts to Blunt-Nosed Leopard Lizard Habitat (acres)¹	Comments
Seneca and Enron Oil and Gas	Valley Floor/Kern			650 (P)	
Enviro Cycle	Valley Floor/Kern			20 (P)	
Pacific Gas and Electric	Valley Floor and Foothill Regions/ Nine Counties of the San Joaquin Valley/All Protected Areas except Carrizo Plain	360	Areas of occupied and/or suitable habitat to be conserved in perpetuity via future conservation easement	9 (P); 690 (T)	An additional 3, 930 acres of covered activities may occur in suitable habitat
Total		89,288⁵		29,382.6 (P); 1,527.1 (T)	
<p>Notes: ¹Permanent Impacts denoted as (P), Temporary Disturbance denoted as (T); ²Compensation included acquisition and enhancement of 282 acres of high quality alkali sink/scrub habitat and an additional 800 acres of low quality laser-leveled farmland, both at Allensworth ER; ³These figures are comprehensive for compensation and impacts associated with the HCP, and not specific to blunt-nosed leopard lizard impacts specifically; ⁴567 acres will be compensated through traditional Service procedures, while the 3,474 acres will be managed to conserve habitat to the maximum extent possible (i.e., habitat may be disturbed or impacted during emergency maintenance and operational procedures); and, ⁵This total does not include habitat conservation lands acquired by CDFG through the Metropolitan Bakersfield HCP, and also does not include the 3,474 acres that DWR will manage under the proposed draft California Aqueduct San Joaquin Field Division HCP.</p>					

agriculture through a willing seller program. The original goal under the Land Retirement Program was set at 15,000 acres (see Table 5). However, the actual acreage retired thus far for restoration is limited to 9,306 acres: 7,216 acres at Atwell Island in southwestern Tulare County and 2,090 acres at the Tranquility in western Fresno County. The restoration of former irrigated agricultural lands to arid upland and alkali sink habitat are expected to benefit the blunt-nosed leopard lizard. As noted in Table 5, goals for Atwell Island are set at 70 percent restored uplands (alkali scrub), 20 percent flood management, 5 percent riparian, and 5 percent farming. Thus, only 70 percent of the 7,216 acres, or 5,051 acres at Atwell Island would be restored to alkali sink habitat suitable to support blunt-nosed leopard lizards; 2,090 acres at the Tranquility site would be restored to uplands or alkali sink.

Under the CVPCP, HRP or Land Retirement Program there was no obligation for BOR to purchase and conserve a specific amount of land. Conversely however, the California State Water Resources Control Board (SWRCB) in Decision-1641 imposed a mitigation requirement on the Bureau of Reclamation for agricultural land conversions that occurred prior to December 29, 1999 outside the CVP contract supply Consolidated Place of Use. The requirement is referred to as the Encroachment Mitigation. This Decision, which included specific requirements for alkali scrub habitat and grassland habitat, is significant for the recovery of blunt-nosed leopard lizard. The SWRCB identified 45,390 acres of habitat including 23,165 acres of alkali scrub habitat (primarily in the Westlands Water District of western Fresno County) that was converted without authorization under the Act to plowed and irrigated agriculture land, and that needs to be mitigated with in-kind habitat acquired by 2010 (SWRCB 2000). As of May 2009 roughly 9,397 acres (or 40.6 percent of the required 23,165 acres) of alkali scrub habitat had been acquired by BOR (D. Kleinsmith, BOR, *in litt.* 2009). Furthermore, in total only 25,706 acres of habitat for any species had been acquired by May 2009 (as noted in Table 5, 4,960 acres of grassland habitat is speculated to be suitable for blunt-nosed leopard lizards (D. Kleinsmith, *in litt.* 2009).

Although these land acquisition and retirement programs may protect habitat suitable for blunt-nosed leopard lizards, it should be qualified that the suitability of these lands to support blunt-nosed leopard lizard has been only coarsely determined by BOR at this time; the suitability in terms of habitat quality and landscape connectivity has not yet been evaluated by the Service. The biological opinion for the Land Retirement Program (Service 1999) recommended a 5-year Habitat Restoration Study (HRS) to determine the responses of wildlife to land retirement and restoration efforts. HRS objectives were to determine the efficacy of revegetation with native plants and microtopographic contouring for upland habitat restoration and to examine the responses of plants and wildlife at the 800-acre Tranquility study site. Beginning in 1999, vegetation, invertebrates, amphibians, reptiles, birds, and small mammals were all monitored throughout the duration of the project. The California king snake (*Lampropeltis getulus californiae*), gopher snake (*Pituophis melanoleucus*), and western whiptail (*Cnemidophorus tigris multiscutatus*) were the only reptile species observed at the Tranquility site. It is anticipated that species in the vicinity of the Tranquility Site will re-inhabit the area; however due to the distance to the nearest known population, blunt-nosed leopard lizards would most likely have to be reintroduced to the retired lands. To date, there is no available research on

Table 5. Summarized status of BOR acquired mitigation, from the 2007 Consolidated Place of Use Encroachment, which espouses habitat compensation from existing programs, including: CVPCP, HRP, Land Retirement Program projects, as well as BOR’s wetlands program (D. Kleinsmith, *in litt.* 2009).

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated¹	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
ALKALI SCRUB:								
Allensworth Ecological Reserve Addition	Alkali scrub	San Joaquin kit fox, Tipton kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard.	360	Protection	Tulare and Kern	1998	100%	360
Carrizo Plains National Monument Inholdings	Alkali scrub	San Joaquin kit fox, San Joaquin antelope squirrel, giant kangaroo rat, Blunt-nosed leopard lizard, San Joaquin wooly-threads, California jewel flower, Hoover’s wooly star.	665	Protection	Kern	2007	100%	665
Elgorriago Ranch	Alkali scrub	Giant kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard, San Joaquin wooly-threads.	1,231	Protection	Fresno and San Benito	2007	100%	1,231

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated ¹	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Goose Lake Land Acquisition	Alkali scrub	Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin kit fox.	Parcel not yet selected.	Protection	Kern	Parcel not yet selected.	100%	Parcel not yet selected.
Land Retirement Demonstration Project (Atwell Island and Tranquility)	Alkali scrub	Potential for all San Joaquin Valley species.	7,141 (5,051 and 2,090, respectively) ²	Restoration	Fresno, Kings, and Tulare	Unknown	100%	7,141
TOTAL ACRES FOR ALKALI SCRUB		23,165 acres owed	9,397 acres acquired					9397
ANNUAL GRASSLAND: 17,573 acres owed								
Bayou Vista Property	Annual grassland	Swainson's hawk, Tipton kangaroo rat, San Joaquin kit fox, blunt-nosed leopard lizard.	515	Protection	Tulare	2004	46%	236.9

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated¹	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Carrizo Plains National Monument Inholdings	Annual grassland	San Joaquin kit fox, San Joaquin antelope squirrel, giant kangaroo rat, Blunt-nosed leopard lizard, San Joaquin wooly-threads, California jewel flower, Hoover's wooly star.	800	Protection	Kern	2007	100%	800
Elgorriago Ranch	Annual grassland	Giant kangaroo rat, San Joaquin antelope squirrel, Blunt-nosed leopard lizard, San Joaquin wooly-threads.	1,400	Protection	Fresno and San Benito	2007	100%	1,400
Goose Lake Land Acquisition	Annual grassland	Blunt-nosed leopard lizard, Tipton kangaroo rat, San Joaquin kit fox.	Parcel not yet selected.	Protection	Kern	Parcel not yet selected.	100%	Parcel not yet selected.
Pixley NWR Acquisition	Annual grassland	San Joaquin kit fox, blunt-nosed leopard lizard, Tipton kangaroo rat.	345	Protection	Tulare	2006	100%	345

Table 5 continued.

Project Name	Habitat Type	Special Status Species from CPOU FEIR Being Compensated ¹	Project Size (Acres)	Purpose of Project	Location (County)	Estimated Completion Date	Reclamation Percent of Total Funding	Pro-rated Acreage Based on Percent funding
Romero and Simon-Neuman Ranches	Annual grassland	San Joaquin kit fox, blunt-nosed leopard lizard.	24,589	Protection	Stanislaus, Santa Clara, Merced	1988 to 1999	9.40%	2,311.4
TOTAL ACRES FOR ANNUAL GRASSLAND		17,573 acres owed	4.960 acquired					4,960

Note: ¹The suitability of these lands to support blunt-nosed leopard lizard has been determined by BOR, and has not been reviewed by the Service. ²Thus far, BOR has acquired 9,306 acres—7,216 acres at Atwell Island and 2,090 acres at Tranquility; however unlike the Tranquility site, restoration goals for Atwell Island are 70 percent restored uplands (alkali scrub), 20 percent flood management, 5 percent riparian, and 5 percent farming. Thus, only 70 percent of the 7,216 acres (5,051.2 acres) at Atwell Island would be alkali sink habitat suitable for the blunt-nosed leopard lizard; whereas, all 2,090 acres at the Tranquility site would be restored to uplands or alkali sink. The total upland habitat or alkali sink habitat for land retirement is $5,051.2 + 2,090 = 7,141.2$.

the ability of blunt-nosed leopard lizard to recolonize fallow fields and whether the Land Retirement Program will be successful in providing habitat for the species.

Additionally, the future ownership and status of these lands—whether they would be restored to habitat, or utilized for other purposes (i.e., dry-farmed)—remains unknown. The Land Retirement Program, however, while preventing the application of CVP water to agricultural fields, does not prevent the application of irrigation water from other sources or require the restoration of the lands to native habitat. Often an alternative irrigation supply is provided to the land, which in turn prevents the return of most agricultural fields back to natural habitat.

Furthermore, at present, Reclamation does not plan to pursue any further land acquisitions under the land retirement program authorization (D. Kleinsmith, pers. comm. 2009). Thus it is unlikely that BOR will acquire the additional 16,141 acres by the court ordered deadline.

In conclusion, it is currently unknown whether these programs will offset the blunt-nosed leopard lizard habitat losses that have occurred. Further assessment on the effects of these programs, combined with supplemental research, will be required to determine their contribution on blunt-nosed leopard lizard recovery.

Summary of Factor A Threats

In summary, broad-scale land conversion of natural habitat has resulted in substantial reduction of available blunt-nosed leopard lizard habitat. Service databases report that roughly 35,000 acres of permanent impacts and 10,000 acres of temporary disturbance have been authorized within blunt-nosed leopard lizard habitat (note: these values do not include those acres of additional impacts to scrub and grassland from those programs described above, under the CVP).

Fragmentation of residual habitat, which further isolates remaining blunt-nosed leopard lizard populations, continues due to on-going agricultural conversion of natural habitat, residential development, oil and gas exploration and extraction activities. Though several HCPs and biological opinions, as well as the CVPCP, CVPIA, and Decision-1641 have resulted in the conservation of substantial amounts of land acreage, the use and recolonization of these conserved lands by blunt-nosed leopard lizards is limited by the fragmentation and isolation of the parcels, the distribution of remaining populations, and dispersal abilities of the species.

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

At the time of listing, overutilization for commercial, recreational, scientific, or educational purposes was not considered to be a threat, and is not discussed as a threat in the 1998 Recovery Plan. There are no updates relevant to this factor, nor has the potential of this threat increased noticeably since the 1998 Recovery Plan.

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

At the time of listing predation was not considered a potential threat to survival of the species and its recovery. Montanucci (1965) reported that the list of predators in Madera and Fresno

Counties of the blunt-nosed leopard lizard included the following species: spotted skunk (*Spilogale putorius*), ground squirrel (*Citellus beecheyi*), shrike (*Lanius ludovicianus gambeli*), American kestrel (*Falco sparverius*), burrowing owl (*Speotyto cunicularia hypugaea*), roadrunner (*Geococcyx californianus*), whipsnake (*Masticophis flagellum ruddocki*), gopher snake (*Pituophis catenifer*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), and badger (*Taxidea taxus*).

The following animals are currently known to prey on blunt-nosed leopard lizards: whip snakes, gopher snakes, glossy snakes (*Arizona elegans*), western long-nosed snakes (*Rhinocheilus lecontei*), northern Pacific rattlesnakes (*Crotalus viridis oregonus*), common king snakes, western rattlesnakes, loggerhead shrikes (*Lanius ludovicianus*), American kestrels (*Falco sparverius*), prairie falcons (*Falco mexicanus*), burrowing owls (*Athene cunicularia*), greater roadrunners (*Geococcyx californianus*), golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), California ground squirrels, spotted skunks (*Spilogale putorius*), striped skunks (*Mephitis mephitis*), American badgers (*Taxidea taxus*), coyotes (*Canis latrans*), and San Joaquin kit foxes (Montanucci 1965; Tollestrup 1979b; Hansen *et al.* 1994; Germano and Carter 1995; Germano and Brown 2003). This list is likely not exhaustive for all incidences of predation that occur across the range of the blunt-nosed leopard lizard, nor has the magnitude of effects derived by predation on population trend and stability been researched at this time. Thus it remains unknown as to whether predation is a major threat to the survival and recovery of this species.

Without mammal burrows, blunt-nosed leopard lizards are more susceptible to predation (Hansen *et al.* 1994). The construction of artificial perches (i.e., fence posts) for burrowing owls, and other predators increases the risk of predation on blunt-nosed leopard lizards (L. Saslaw, BLM, pers. comm. 2006). Additionally, the territorial behavior of blunt-nosed leopard lizard males may expose them to higher rates of predation than if they were secretive (Tollestrup 1982, 1983; Germano and Carter 1995; Lappin and Swinney 1999).

There are no known diseases in blunt-nosed leopard lizards, but endoparasites (nematodes) and ectoparasites (mites and harvest mites) have been reported (Montanucci 1965). The overall effect of the parasites on the blunt-nosed leopard lizard is not currently known.

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

The blunt-nosed leopard lizard was listed as endangered under the Act in 1967, and subsequently listed as an endangered species by the State of California in 1971. At the time of Federal listing, many of the current environmental laws did not yet exist.

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 and Regulations in California

The State's authority to conserve rare wildlife and plants is comprised of four major pieces of legislation: the California Endangered Species Act, the Native Plant Protection Act, the California Environmental Quality Act, and the Natural Community Conservation Planning Act.

California Endangered Species Act (CESA): The CESA (California Fish and Game Code, section 2080 *et seq.*) prohibits the unauthorized take of State-listed threatened or endangered species. The blunt-nosed leopard lizard was listed as endangered by the State of California in 1971. The CESA requires State agencies to consult with the California Department of Fish and Game on activities that may affect a State-listed species and mitigate for any adverse impacts to the species or its habitat. Pursuant to CESA, it is unlawful to import or export, take, possess, purchase, or sell any species or part or product of any species listed as endangered or threatened. The State may authorize permits for scientific, educational, or management purposes, and to allow take that is incidental to otherwise lawful activities. The blunt-nosed leopard lizard was listed as State endangered species under CESA on June 27, 1971.

California Department of Fish and Game Code §5050--Fully Protected Reptiles and Amphibians Species: The blunt-nosed leopard lizard is a fully-protected animal under the California Fish and Game Code §5050; fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research. Therefore salvage and relocation for this species is not currently an option under State law.

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 of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

Natural Community Conservation Planning Act: The Natural Community Conservation Program is a cooperative effort to protect regional habitats and species. The program helps identify and provide for area wide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity. Many Natural Community Conservation Plans (NCCPs) are developed in conjunction with Habitat Conservation Plans (HCPs) prepared pursuant to the Federal Endangered Species Act.

Federal Laws and Regulations

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq.*) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigation alternatives that would offset those effects

(40 **CFR** 1502.16). These mitigations usually provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

Clean Water Act: Under section 404, the U.S. Army Corps of Engineers (Corps or USACE) regulates the discharge of fill material into waters of the United States, which include navigable and isolated waters, headwaters, and adjacent wetlands (33 U.S.C. 1344). In general, the term “wetland” refers to areas meeting the Corps’s criteria of hydric soils, hydrology (either sufficient annual flooding or water on the soil surface), and hydrophytic vegetation (plants specifically adapted for growing in wetlands). Any action with the potential to impact waters of the United States must be reviewed under the Clean Water Act, National Environmental Policy Act, and Endangered Species Act. These reviews require consideration of impacts to listed species and their habitats, and recommendations for mitigation of significant impacts.

Although the blunt-nosed leopard lizard is an upland species typically found in landscapes with limited jurisdictional waters under the Clean Water Act, the Corps has frequently assumed the role of the Federal nexus for both large and small projects in their entirety, even though these projects may only impact a minor amount of jurisdictional water. This approach by the Corps has facilitated numerous consultations under section 7 of the Act that would have otherwise likely required a section 10 permit.

Historically, the Corps interpreted “the waters of the United States” expansively to include not only traditional navigable waters and wetlands, but also other defined waters that are adjacent or hydrologically connected to traditional navigable waters. However, recent Supreme Court rulings have called into question this definition. On June 19, 2006, the U.S. Supreme Court vacated two district court judgments that upheld this interpretation as it applied to two cases involving “isolated” wetlands. Currently, Corps regulatory oversight of such wetlands (e.g., vernal pools) is in doubt because of their “isolated” nature. In response to the Supreme Court decision, the Corps and the U.S. Environmental Protection Agency (USEPA) have recently released a memorandum providing guidelines for determining jurisdiction under the Clean Water Act. The guidelines provide for a case-by-case determination of a “significant nexus” standard that may protect some, but not all, isolated wetland habitat (USEPA and USACE 2007). The overall effect of the new permit guidelines on loss of isolated wetlands, such as vernal pool habitat, is not known at this time.

Endangered Species Act of 1973, as amended (Act): The Act is the primary Federal law providing protection for this species. 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 **CFR** 402.02). A non-jeopardy opinion may include reasonable and prudent measures that minimize the amount or extent of incidental take of listed species associated with a project.

Section 9 prohibits the taking of any federally listed endangered or threatened species. Section 3(18) defines “take” to mean “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Service regulations (Service 2003) define “harm” to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The Act provides for civil and criminal penalties for the unlawful taking of listed species. Incidental take refers to taking of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity by a Federal agency or applicant (50 **CFR** 402.02). For projects without a Federal nexus that would likely result in incidental take of listed species, the Service may issue incidental take permits to non-Federal applicants pursuant to section 10(a)(1)(B). To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved Habitat Conservation Plan (HCP) that details measures to minimize and mitigate the project’s adverse impacts to listed species. Regional HCPs in some areas now provide an additional layer of regulatory protection for covered species, and many of these HCPs are coordinated with California’s related Natural Community Conservation Planning program.

Conversion of land for agricultural purposes continues to be the most critical threat to listed species. Although the increment of habitat loss attributable to urban development appears to be increasing, these activities remain less significant than agriculture for most species. Agricultural conversion is generally not subject to any environmental review and is not directly monitored or regulated. Conversion of privately owned habitat without use of federally supplied water typically does not result in section 7 consultation with the Service, nor is it usual for there to be an application for a section 10 incidental take permit (which would include a habitat conservation plan to reduce the effects of the take on the species). In addition, CVP water is used for groundwater recharge by some districts in the San Joaquin Valley. Such recharge may allow nearby landowners to pump groundwater for uses that may affect listed and proposed species.

Sikes Act: The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans with the Secretaries of Agriculture and the Interior for 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. The 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.

Federal Land Policy and Management Act of 1976 (FLPMA): The Bureau of Land Management 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 Bureau of Land Management 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 Bureau of Land Management has a multiple-use mandate under the FLPMA which allows for grazing, mining, and off-road vehicle use, the Bureau of Land Management 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).

National Wildlife Refuge System Improvement Act of 1997: This act establishes the protection of biodiversity as the primary purpose of the National Wildlife Refuge system. This has led to various management actions to benefit federally listed species.

Summary of Factor D

In summary, the Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1967. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Endangered Species Act.

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

Although the final rule listing for the blunt-nosed leopard lizard did not include a discussion of threats to the species, agricultural pesticides especially for control of beet leafhopper was identified as a threat near the time of listing (Montanucci 1965). Since the time of listing we have identified the following additional threats: altered vegetation; climate change; broad-scale pesticide use and application; and, vehicle (roadway traffic and ORV) induced mortality. In addition, altered vegetation communities (grazing, exotic grasses, and wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, and climate change continue to impact blunt-nosed leopard lizard populations. Furthermore, research has reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993).

Altered vegetation communities (grazing, exotic grasses, wildfire regime)

The southern San Joaquin Valley of California, as with much of western North America, has been invaded by non-native plant species, since European cattle were brought to the region in the 1500s. Research has reported that the exponential increase in exotic plants has paralleled the increase in human population growth in California (Randall *et al.* 1998). The following exotic species are frequently observed within blunt-nosed leopard lizard habitat, and have adversely affected the species: *Bromus rubens madritensis* (red brome), *Vulpia myuros* (mouse tail fescue), *Schismus arabicus* (Arabian grass), *Hordium murinum glaucum* (foxtail), *Bromus diandrus* (ripgut brome), and *Bromus bordeaceus* (soft chess) (Biswell 1956; Heady 1977; Germano *et al.* 2001). The timing of germination for these introduced grasses is often earlier than most native species, which effectively gives the non-native species a competitive advantage over native plant species for water, nutrients, and sun light. Additionally, an overabundance of residual thatch from the previous year's non-native grass production can have similar adverse effects by shading out or obstructing native seedlings.

Vegetation changes include levels of biomass, cover, density, community structure, or soil characteristics. Changes have generally been attributed to the negative affects of off-highway vehicle use, overgrazing by domestic livestock, agriculture, urbanization, construction of roads and utility corridors, air pollution, military training exercises, and other activities (Lovich and Bainbridge 1999). These authors also reported that secondary contributions to degradation include the proliferation of exotic plant species, higher frequency of anthropogenic fire events, and increased nitrogen deposition. Effects of these impacts include alteration or destruction of macro- and micro-vegetation elements, establishment of annual plant communities dominated by exotic species, destruction of soil stabilizers, soil compaction, and increased erosion.

Introduced grasses and herbs often create an impenetrable thicket for small ground-dwelling vertebrates. Blunt-nosed leopard lizard movement is restricted in dense herbaceous cover, as observed with the ease of catching them by hand in dense grass compared to more open habitats (Germano *et al.* 2001; Germano *et al.* 2004). Radiotelemetry studies near the Elk Hills have documented that blunt-nosed leopard lizards are generally restricted to more open habitats (e.g. washes, roads, grazed pastures) when grass cover is thick, but they may utilize grassland areas if the herbaceous cover is sparse (Warrick *et al.* 1998).

The detrimental ecological effects of livestock grazing have been documented on western lands (Fleischner 1994; Noss 1994). Overgrazing may negatively affect blunt-nosed leopard lizards by soil compaction, damaging rodent burrows that the lizards depend on for cover, and stripping away vegetative cover used by both the lizard and its prey (Hansen *et al.* 1994). However, the cessation of grazing is likely to be even more detrimental to blunt-nosed leopard lizard due to the dense growth of exotic grasses as discussed below (Germano *et al.* 2001; Germano *et al.* 2005).

Long-term studies of blunt-nosed leopard lizard population trends on the Elkhorn Plain and Pixley NWR have shown dramatic declines in numbers following consecutive wet years (Germano *et al.* 2004; Germano and Williams 2005; Williams *in litt.* 2006). On Elkhorn Plain, the decline in blunt-nosed leopard lizard numbers was shown to occur with consecutive years of dense herbaceous cover above 0.65 ounces/ft² in the 1990s (Germano *et al.* 2004). Annual grazing studies in the Lokern area from 1997 to 2005 have demonstrated the benefits of livestock

grazing in reducing exotic grasses and increasing blunt-nosed leopard lizard numbers (Germano *et al.* 2005). Therefore, recent decisions to severely restrict or eliminate livestock grazing from conservation lands may negatively affect blunt-nosed leopard lizards, especially during wet years (Germano *et al.* 2001). The BLM offices in Hollister and Bakersfield, California, are currently updating their Resource Management Plans (RMP) with respect to grazing in the Ciervo-Panoche areas and the Carrizo Plain National Monument, respectively. Grazing on the Carrizo Plain National Monument is particularly controversial.

Prescribed fire has been analyzed as an alternative habitat management tool, but in an unpublished study, it was less effective than grazing at controlling exotic grasses, and the positive effects lasted for less than one year (L. Saslaw *in litt.* 2006). Additionally, a prescribed burn had the unintended negative consequence of permanently removing native saltbush (Germano *et al.* 2001; Warrick 2006).

The preponderance of exotic grasses in blunt-nosed leopard lizard 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 exotic annual grasses into native grasslands on nutrient-poor, serpentine soils resulting in the loss of habitat for the federally threatened bay checkerspot butterfly (*Euphydryas editha bayensis*). Other researchers found that increased levels of soil N from elevated atmospheric N deposition in the Mojave Desert could increase the dominance of exotic annual grasses and thereby raise the frequency of fire (Brooks 1999, 2003; Brooks and Pyke 2001).

Of the protected areas with management plans (see Table 1), grazing is employed as a management technique to reduce exotic weed infestations in the following areas:

- All of Pixley NWR, except about 1,000 acres, is managed for blunt-nosed leopard lizard by grazing from November through April each year (Williams *in litt.* 2006);
- The entire Wind Wolves Preserve site is currently grazed by livestock (D. Clendenen, Wildlands Conservancy, pers. comm. 2006);
- The portion of the Semitropic Ridge Preserve administered by the CNLM is grazed by sheep (Warrick *in litt.* 2006), while none of the CDFG administered lands currently have any grazing leases;
- The 1,369 acre Research Natural Area of Kern NWR is managed by winter grazing for blunt-nosed leopard lizard and Tipton kangaroo rat;
- Less than one-fourth of the KWB Conservation Lands are currently grazed by sheep to control exotic grasses that threaten blunt-nosed leopard lizard habitat (KWB Authority 2006).

Vehicle strikes

Blunt-nosed leopard lizard mortality is known to occur as a result of regular automobile traffic and ORV use (Tollestrup 1979b; Uptain *et al.* 1985; Williams and Tordoff 1988). Roads typically surround and often bisect remaining fragments of habitat, increasing the risk of mortality by vehicles and further isolating populations (Service 1998). The blunt-nosed leopard lizard's preference for open areas, such as roads (Warrick *et al.* 1998), makes them especially vulnerable to mortality from vehicle strikes. On May 22, 2005, a blunt-nosed leopard lizard was

reported killed by a vehicle strike on an access road in the Devils Den Oilfield of northwestern Kern County; the road is used by oilfield personnel and ranchers (Booher *in litt.* 2005). On July 19, 2006, a blunt-nosed leopard lizard was reported killed by a vehicle strike on an access road at the Carneros Devils Den area in Kern County, and also at the Kettleman Hills Middle Dome site in Kings County (Garcia *in litt.* 2006; BLM 2008).

During habitat conversion activities, individuals could be killed or injured by operation of heavy equipment (crushing, burial by earthmoving equipment, discing, grading, mowing) or flooding of habitat. Individuals could be harassed during construction by noise, ground vibrations and compaction of burrows, construction lighting, and disruption of foraging and breeding behavior. Individuals not killed directly by operation of equipment would probably find themselves in suboptimal habitat with a decreased carrying capacity due to lower availability of foraging and breeding habitat and greater vulnerability to predation. If individuals were displaced from converted lands into nearby native habitat population densities, intraspecific competition, and predation pressure would be likely to increase. Animals which lost their fear of humans could become more vulnerable to shooting, poisoning, and roadkill.

Waterfowl blinds

Waterfowl blinds are large drums dug part way into the ground and placed at the edges of playas to conceal hunters. When left uncovered, these structures are pitfall traps for blunt-nosed leopard lizards and other reptiles and small mammals resulting in their mortality. In 1991, six blunt-nosed leopard lizards were retrieved from waterfowl blinds around two playas at the Semitropic Ridge Preserve. In 1994, 10 blunt-nosed leopard lizards and 17 Tipton kangaroo rats were found dead in waterfowl blinds (Germano 1995). This author also recommended that hunting clubs should be informed of this problem and active waterfowl blinds should be covered when not in use; abandoned blinds should be removed or filled in. At this time, however, waterfowl blinds are only being retrofitted with covers, or removed on a case by case basis.

Pesticides Use

Pesticide use may directly and indirectly affect blunt-nosed leopard lizards (Jones and Stokes 1977; California Department of Food and Agriculture (CDFA) 1984; Service 1985; Williams and Tordoff 1988; Germano and Williams 1992b). The use of pesticides reduces food available for reproducing blunt-nosed leopard lizards in the spring, and later for hatchlings when they should be storing fat to sustain themselves during their first winter (Kato and O'Farrell 1986). The most expansive pesticide program within the range of the blunt-nosed leopard lizard is the broad-scale use of malathion. Malathion is a pesticide regulated by the California Department of Food and Agriculture, and is typically aerially distributed across much of the blunt-nosed leopard lizard range to reduce impacts of the curly top virus on sugar beet production. The most important effect of malathion upon blunt-nosed leopard lizard survival and recovery is the associated reduction in insect prey populations which can last between 2 to 5 days (CDFA 1984).

In a 2000 biological opinion, the Service authorized the renewal of a five-year pesticide use permit to CDFA for use of malathion which included measures to protect the blunt-nosed leopard lizard (Service 2000). These measures allow the aerial application of malathion in some blunt-nosed leopard lizard conservation areas prior to April 15 and after October 15; thus, avoiding the primary blunt-nosed leopard lizard activity period. Notably, in 2006 CDFA treated 53,965 acres

with malathion in Kern, Kings, and Fresno Counties (CDFA 2006). The CDFA pesticide use permit for malathion is currently being revised through formal consultation with the Service. Other unregulated pesticides (e.g., common household pyrethroids [California Department of Pesticide Regulation 2006; Keith 2006]) likely pose additional threats to blunt-nosed leopard lizards by reducing insect prey populations. One recent study on the effects of malathion on insect abundance showed a significant decline in the number of ants in malathion-treated plots relative to control plots (Redak 2006); ants are a likely food source for blunt-nosed leopard lizards. Germano *et al.* (2007) reported that the effects of spraying malathion within blunt-nosed leopard lizard habitat remained largely speculative, but warrant expeditious research.

Fumigating rodents in burrows may also harm blunt-nosed leopard lizards that shelter in those burrows (Hansen *et al.* 1994). The U.S. Environmental Protection Agency (USEPA) bulletins governing use of rodenticides have greatly reduced the risk of significant mortality to blunt-nosed leopard lizard populations. The California EPA, CDFA, county agricultural departments, CDFG, and the USEPA collaborated with the Service in the development of County Bulletins that both are efficacious and acceptable to land owners (Service 1998). However, the use of rodenticides in blunt-nosed leopard lizard habitat continues to be a potential threat to the species as this effectively reduces the number of rodents available to dig burrows for secondary use by blunt-nosed leopard lizards.

Climate change

Long-term monitoring studies (Germano *et al.* 1994; Germano *et al.* 2004; Germano and Williams 2005; Williams *in litt.* 2006) show that blunt-nosed leopard lizard populations drastically decline during consecutive years of drought or above average precipitation. Also, blunt-nosed leopard lizard aboveground activity is highly dependent upon temperature. Optimal activity occurs when air temperatures are 74 to 104 degrees Fahrenheit and ground temperatures are 72 to 97 degrees Fahrenheit (Service 1985, 1998). Therefore, blunt-nosed leopard lizard population stability and behavior is very sensitive to any changes in precipitation or temperature. Climate models predict for California an overall warming of 3.0 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. Any significant changes in temperature or precipitation could have drastic effects on blunt-nosed leopard lizard populations. Climate change will likely result in changes in the vegetative communities of blunt-nosed leopard lizard habitat and potentially increase exotic species. However, there is insufficient data available at this time to predict the effects of climate change on the blunt-nosed leopard lizard.

Summary of Factor E

In summary the following threats, since the time of listing the following additional threats to the blunt-nosed leopard lizard have been identified: altered vegetation; climate change; broad-scale pesticide use and application; and, vehicle (roadway traffic and ORV) induced mortality. In addition, altered vegetation communities (grazing, exotic grasses, and wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, and climate change continue to impact blunt-nosed leopard lizard populations. These on-going threats pose additional challenges to successful blunt-nosed leopard lizard recovery.

II.D. Synthesis

At the time the species was listed, conversion of natural habitat into agricultural lands in the San Joaquin Valley resulted in the reduction of blunt-nosed leopard lizard habitat to less than 15 percent of its historic range (Service 1985; Germano and Williams 1992a; Jennings 1995). Remaining habitat is highly fragmented and confined to a few scattered areas from southern Merced County to western Kern County (Hansen *et al.* 1994). The blunt-nosed leopard lizard continues to be threatened by degradation to its habitat from the on-going modification and conversion of existing habitat to agriculture, petroleum and mineral extraction, residential and commercial development. In addition, altered vegetation communities (due to grazing, nonnative grasses, and altered wildfire regime), vehicle strikes, waterfowl blinds, broad-scale pesticide application, rodenticide application, and climate change continue to impact blunt-nosed leopard lizard populations. Research has reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizard (Stebbins 1954; Montanucci 1965; Service 1980, 1985; Germano and Williams 1993).

Although some progress in recovery of the species has been made within the southern range of blunt-nosed leopard lizard, the majority of the recovery criteria outlined in the Recovery Plan have not been achieved (see Table 1). The downlisting criteria for the blunt-nosed leopard lizard require the protection of at least 5,997 acres of contiguous habitat in five specified recovery areas representing the geographic range of the species (three in the foothills and two on the Valley floor). Also required for each protected area is the stability of the population (greater than 2 blunt-nosed leopard lizards per hectare through a precipitation cycle) and the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective. Only in the Carrizo Plain Natural Area is the acreage requirement surpassed with the establishment of the Carrizo Plain National Monument; however, long-term population surveys show significant declines in the population during wet years. The 5,278 acre Semitropic Ridge Preserve approaches the acreage requirement for Valley floor habitat in Kern County, but blunt-nosed leopard lizard population densities there are too low. Blunt-nosed leopard lizard habitat is protected in smaller fragments in the foothills of western Kern County and the Ciervo-Panoche area; however, there are no preserves protecting blunt-nosed leopard lizard populations on the Valley floor in Merced or Madera Counties. Therefore, the downlisting criteria have not been met.

In summary, based on the lack of protection of sufficient habitat representing the geographic range of the species, the low density and instability of the populations, and the continuation of threats to the species, we conclude that the blunt-nosed leopard lizard continues to meet the definition of endangered, and is in danger of extinction throughout its known range.

III. RESULTS

III.A. Recommended Classification:

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

III.B. New Recovery Priority Number N/A

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

The five most important actions that should be taken within the next five years to facilitate the recovery of the blunt-nosed leopard lizard include:

1. Facilitate research on the effects of solar projects on blunt-nosed leopard lizard behavior and compatibility.
2. Establish corridors between existing natural areas in Kern and Tulare Counties (i.e., Buena Vista Valley, Elk Hills, Lokern Natural Area, Buttonwillow ER, Semitropic Ridge Preserve, Kern NWR, Allensworth ER, Pixley NWR) (Service 1998; Selmon *in litt.* 2006) to enhance the metapopulation recovery strategy.
3. Establish a preserve or conservation easement on the natural lands of Madera Ranch in western Madera County (Service 1998). Protect blunt-nosed leopard lizard habitat in the Panoche Valley and in dispersal corridors in western Fresno County—Panoche Creek and Silver Creek (Service 1998; Lowe *et al.* 2005), Anticline Ridge, the western rim of Pleasant Valley, Gujarral Hills, and the north end of the Kettleman Hills (Service 1998).
4. Include the flexibility to alter the dates and stocking rates of livestock within all RMP where blunt-nosed leopard lizards have potential to occur, including the Carrizo Plain National Monument RMP, Bakersfield RMP, Caliente RMP and Hollister RMP to adaptively manage annual plant production and prevent the dominance of exotic grasses in blunt-nosed leopard lizard habitat (Germano *et al.* 2001); grazing prescriptions should be tailored to suit the ecological needs specific to the area.
5. Coordinate with hunting clubs for blunt-nosed leopard lizard protection: active waterfowl blinds should be covered when not in use, and abandoned blinds should be removed or filled in to prevent entrapment of blunt-nosed leopard lizard and other wildlife (Germano 1995).

Other important actions that are important to facilitate blunt-nosed leopard lizard recovery include the following items.

Kern County--completion of HCPs and issuance of incidental take permits

- Complete the Kern County Valley Floor HCP
- Complete the Chevron Lokern HCP
- Complete the Oxy of Elk Hills HCP
- Encourage Crimson Resource Management to start an HCP or section 7 formal consultation to protect lands in Buena Vista Valley, NPR-2, and Buena Vista Hills

Habitat management

- Assist the Lokern Coordination Team in the development of the 44,000-acre Lokern Natural Area in western Kern County

Future research and monitoring

- Continue long-term monitoring of population trends on the Valley floor (e.g., Pixley NWR, Lokern Natural Area, Semitropic Ridge Preserve, Buttonwillow ER) and in the foothills (e.g., Carrizo Plain Natural Area, Elk Hills) (Germano and Williams 1992b; Service 1998)
- Census and monitor blunt-nosed leopard lizard populations in western Madera County, central Merced County, and the Ciervo-Panoche Natural Area (Service 1998)
- Study the effects of grazing on blunt-nosed leopard lizard along precipitation gradients in the Elkhorn and Carrizo Plains to determine appropriate grazing prescriptions specific for each area
- Facilitate research on the effects of CVPCP and CVPIA programs on blunt-nosed leopard lizard recovery. Study the effects of translocation (e.g., Allensworth ER) and agricultural land retirement (e.g., Tranquility and Atwell Island sites) on blunt-nosed leopard lizard (Service 1998; Germano and Williams 1992b; Selmon *in litt.* 2006)
- Assess potential effects of malathion upon the prey base of the blunt-nosed leopard lizard (Germano *et al.* 2007) and apply findings to the CDFA Curly Top Virus Control Program.

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Appendix A—Analysis of downlisting Criteria for Blunt-nosed Leopard Lizard 5-Year Review

Summary

The downlisting criteria for the blunt-nosed leopard lizard require the protection of five or more areas each about 5,997 acres or more of contiguous, occupied habitat, including one each in the following areas: the Valley floor in Merced or Madera Counties, the Valley floor in Tulare or Kern Counties, the foothills of the Ciervo-Panoche Natural Area, the foothills of western Kern County, and the foothills of the Carrizo Plain Natural Area (Figures 1 and 2). Only in the foothills of the Carrizo Plain Natural Area is the criterion achieved with the protection of 55,000 acres of blunt-nosed leopard lizard habitat by the Carrizo Plain National Monument. There are no preserves containing significant populations of blunt-nosed leopard lizard on the Valley floor in Merced or Madera Counties. Within the Valley floor in Tulare or Kern Counties, the Semitropic Ridge Preserve approaches the criterion by protecting 5,278 acres of contiguous blunt-nosed leopard lizard habitat. Pixley NWR protects 3,000 acres of contiguous habitat in Tulare County. The Lokern Natural Area protects over 13,000 acres in Kern County but in fragmented 10 – 640-acre parcels. Within the Ciervo-Panoche Natural Area, two ACECs separated by 2 miles protect 4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat, respectively. Within the foothills of western Kern County, the Oxy conservation lands protect 2,882 acres of contiguous habitat on the North Flank of Elk Hills and 3,770 acres in Buena Vista Valley. Therefore, the recovery criterion for protection of 5,997 acres of contiguous habitat is achieved in the foothills of the Carrizo Plain Natural Area, but not in the four other specified recovery areas.

The downlisting criteria also require that for each protected area a management plan is approved and implemented that includes the survival of blunt-nosed leopard lizard as an objective. The following areas have such management plans: Kern NWR; Pixley NWR; the CNLM lands at Semitropic Ridge Preserve; the CNLM, PXP, and BLM lands in the Lokern Natural Area; the Oxy conservation lands near Elk Hills; the BLM lands of the Carrizo Plain National Monument; the Coles Levee Ecosystem Preserve; and KWB Conservation Lands. Therefore, the downlisting criterion for the approval and implementation of a management plan in all protected areas is partly achieved.

Lastly, the downlisting criteria require population stability in the protected areas with the mean population density remaining above 2 per hectare through one precipitation cycle. Annual blunt-nosed leopard lizard surveys show that the population density decreased below 2 per hectare during the wet years in the late 1990s at Pixley NWR (Figure 3) while the density remains below 2 per hectare in the Lokern area, the Elk Hills, Coles Levee Ecosystem Preserve, and KWB Conservation Lands. Population density estimates at Semitropic Ridge Preserve were also well below 2 per hectare during spring road surveys in 2005. There is not sufficient data available at this time to determine whether the Ciervo-Panoche Natural Area or any of the other protected areas achieve the population stability criteria. Therefore, the downlisting criterion for population stability has not been achieved for any of the specified recovery areas.

Analysis of Recovery Criteria

1. Protection of five or more areas, each about 2,428 hectares (5,997 acres) or more of contiguous, occupied habitat, as follows:

Summary

The downlisting criterion for the protection of contiguous blunt-nosed leopard lizard habitat has been achieved in the following areas:

- Foothills of the Carrizo Plain Natural Area

Whereas currently the downlisting criterion for blunt-nosed leopard lizard habitat protection has yet to be met for the following areas:

- Valley floor in Merced or Madera Counties
- Valley floor in Tulare or Kern Counties
 - *Semitropic Ridge Preserve*
 - *Kern National Wildlife Refuge*
 - *Lokern Natural Area*
 - *Buttonwillow Ecological Reserve*
 - *Coles Levee Ecological Preserve (CLEP), Kern Water Bank (KWB) Conservation Lands, and the Tule Elk State Reserve*
 - *Pixley National Wildlife Refuge*
 - *Allensworth Ecological Reserve*
- Foothills of the Ciervo-Panoche Natural Area
- Foothills of western Kern County
 - *Elk Hills Conservation Area*
 - *Naval Petroleum Reserve #2*
 - *Wind Wolves Preserve*

Assessment

Valley floor in Merced or Madera Counties

There are no large preserves in Merced or Madera Counties containing significant populations of blunt-nosed leopard lizard. The preserves in western Merced County (e.g. Grasslands Ecological Area, roughly 179,000 acres) are seasonally flooded and do not support blunt-nosed leopard lizard (Juarez *in litt.* 2006). Therefore, the downlisting criterion for the protection of contiguous blunt-nosed leopard lizard habitat on the Valley floor in Merced or Madera Counties has not been met.

Valley floor in Tulare or Kern Counties

Several large preserves have been established on the Valley floor in Tulare and Kern Counties containing populations of blunt-nosed leopard lizard (Figure 2). These preserves include Semitropic Ridge Preserve, Kern National Wildlife Refuge (NWR), Lokern Natural Area, Buttonwillow Ecological Reserve (ER), Coles Levee Ecosystem Preserve, Kern Water Bank (KWB), Tule Elk State Reserve, Pixley NWR, and Allensworth ER.

Semitropic Ridge Preserve

The Semitropic Ridge Preserve currently protects about 5,278 acres—comprised of 3,093 acres administered by the Center for Natural Lands Management (CNLM), and 2,185 acres administered by CDFG—of contiguous blunt-nosed leopard lizard habitat on the Valley floor of northwestern Kern County (Cypher *in litt.* 2006, Kern County Recorder 2006, Warrick *in litt.* 2006). About 570 acres of CDFG land west of Goose Lake Canal was excluded from the calculation of contiguous lands at Semitropic Ridge because the canal acts as a barrier to blunt-nosed leopard lizard movement (Warrick *in litt.* 2006). Another 120-acre parcel is currently in escrow for the CDFG (Peterson-Diaz *in litt.* 2006), which when protected would bring the total acres of contiguous lands to 5,398 acres. Therefore, the Semitropic Ridge Preserve comes close to the 5,997-acre downlisting criterion; however, only about 1,500 acres of the preserve meet the criterion of maintaining a blunt-nosed leopard lizard population density of greater than 2 per hectare (Warrick *in litt.* 2006). Therefore, the downlisting criteria for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor of Kern or Tulare Counties and population stability has not been met.

Kern National Wildlife Refuge

The Kern NWR is located in northwestern Kern County about 4 km (2.5 miles) north of the Semitropic Ridge Preserve. The majority of the Kern NWR is seasonally flooded and does not provide habitat for blunt-nosed leopard lizard. About 2,000 acres of Kern NWR are considered to be potential blunt-nosed leopard lizard habitat; however, there have been no confirmed sightings of blunt-nosed leopard lizard there since 1996 (Williams *in litt.* 2006). Surveys for blunt-nosed leopard lizard were conducted in the 1,369-acre Research Natural Area (Units 11 and 12) in 2001 and 2004, but none were found. In the summer of 2006, surveys were conducted in the recently acquired 631-acre Unit 15, which contains better quality blunt-nosed leopard lizard habitat than Units 11 and 12, but no blunt-nosed leopard lizard were observed there either. More intensive surveys are planned for 2007 (Williams *in litt.* 2006), though at the time of this review, results had not been obtained. Therefore, the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor of Kern or Tulare Counties has not been met.

Lokern Natural Area

The Lokern Natural Area is located in western Kern County about 23 km (14.5 miles) south of the Semitropic Ridge Preserve. Currently, 13,160 acres of the Lokern area are protected on Federal or State lands or under conservation easements. The protected Lokern lands include Bureau of Land Management (BLM) lands (3,858 acres), Center for Natural Lands Management (CNLM) lands (3,332 acres), CDFG lands (968 acres), and Plains Exploration & Production Company (PXP; 840 acres) and Occidental of Elk Hills, Inc. (Oxy; 4,162 acres) conservation lands (Service 1995; Nuevo Energy Company and Torch Operating Company 1999; Kern County Recorder 2006; Quad Knopf 2006; G. Warrick, CNLM, pers. comm. 2006). The protected lands, however, are highly fragmented into parcels ranging in size from 10 to 640 acres creating a checkerboard pattern of protected lands. The largest block of contiguous protected lands in the Lokern

area is 2,882 acres of Oxy conservation lands (Elk Hills Conservation Area) at the southern end of the Lokern area on the North Flank of the Elk Hills. Therefore, the downlisting criterion for contiguous land protection the Valley floor of Kern or Tulare Counties has not been met.

Chevron USA, Inc. (Chevron), the largest landowner in the Lokern area (17,329 acres), owns the intervening 640-acre sections of the checkerboard pattern of protected lands in the Lokern Natural Area. The draft Chevron Lokern Habitat Conservation Plan (Chevron, *in prep.*, 2008) proposes to protect 11,143 acres in the Lokern area and limit permanent disturbance of its undeveloped Lokern lands to 10 percent per 640-acre section, and temporary disturbance to an additional 5 percent. In total approximately 24,303 acres of contiguous blunt-nosed leopard lizard habitat would be protected when added to the other already protected lands in the Lokern area. On August 17, 2006, Chevron reasserted its commitment to complete the proposed HCP and proceed with acquiring and/or protecting the proposed habitat lands (G. Scott, Chevron, pers. comm. 2006). Still, until the HCP is finalized the habitat loss and protection associated with the proposed HCP remains speculative.

Buttonwillow Ecological Reserve

The Buttonwillow ER is located in western Kern County about 21 km (13 miles) southeast of the Semitropic Ridge Preserve and 16 km (10 miles) east-northeast of the Lokern Natural Area. The Buttonwillow ER protects about 1,350 acres of contiguous blunt-nosed leopard lizard habitat. Buttonwillow ER contains one of the largest and most stable blunt-nosed leopard lizard populations (Selmon *in litt.* 2006). Due to the small size of the preserve, however, the Buttonwillow ER does not meet the downlisting criterion for contiguous land protection.

Coles Levee Ecological Preserve, Kern Water Bank Conservation Lands, and the Tule Elk State Reserve

The 6,059-acre Coles Levee Ecosystem Preserve (CLEP), 4,263-acre Kern Water Bank (KWB) Conservation Lands, and 969-acre Tule Elk State Reserve are contiguous protected areas in western Kern County located east of the Elk Hills. However, blunt-nosed leopard lizard movement among and within the three preserves is limited by the California Aqueduct, Alejandro Canal, Interstate 5, Highway 43, and Highway 119.

The California Aqueduct bisects the CLEP creating a barrier to blunt-nosed leopard lizard movement and partitioning the preserve into about 1,280 acres to the west and 4,779 acres to the east. Additionally, portions of the CLEP are highly disturbed by high-density oil and gas drilling activities. Although the permit for CLEP HCP (ARCO Western Energy 1995) is not currently valid—as the current land owner, Aera Energy LLC, failed to initially comply with the terms of the HCP—the area is still managed according to its initial conservatory intent. Notably, no blunt-nosed leopard lizards have been observed at CLEP in recent years (Quad Knopf 2005; J. Jones, Quad Knopf, pers. comm. 2006).

Interstate 5 acts as a barrier to blunt-nosed leopard lizard movement and divides the KWB Conservation Lands into 2,589-acre and 1,674-acre parcels (Jones *in litt.* 2006).

The KWB Conservation Lands are protected under the KWB Authority HCP (KWB Authority 1996) and associated biological opinion (Service 1997). However, there are no records of blunt-nosed leopard lizard on the KWB Conservation Lands except for blunt-nosed leopard lizard introductions (Jones *in litt.* 2006, KWB Authority 2006). Although protocol-level blunt-nosed leopard lizard surveys have not been conducted on the KWB lands, these lands have had numerous other reconnaissance and meandering surveys over the years. Given the repetitive negative results from all of these surveys, the blunt-nosed leopard lizard is considered absent from the area (Jones *in litt.* 2006).

Therefore, due to the lack of blunt-nosed leopard lizard sightings and the barriers to blunt-nosed leopard lizard movement among and within the three preserves—Coles Levee Ecological Reserve, Kern Water Bank Conservation Lands, and Tule Elk State Reserve—the downlisting criterion for the Valley floor of Kern or Tulare Counties.

Pixley National Wildlife Refuge

The 6,833-acre Pixley NWR in southwestern Tulare County is divided into three large sections and several smaller sections; all parcels, with one exception, are separated by at least 1.6 km (1 mile). The largest section (Pixley-Main) covers 4,445 acres, but less than 3,000 acres are considered suitable habitat for blunt-nosed leopard lizard due to seasonal flooding of the wetlands and dense vegetative growth. The second largest section (Los Feliz) is roughly 1,476 acres. Very little reconnaissance has been done in this area, however given that the entire area is grazed it is speculatively considered potential blunt-nosed leopard lizard habitat as suitable vegetation conditions may be present. The third largest section (Horse Pasture) contains 800 acres of potential blunt-nosed leopard lizard habitat although the presence of blunt-nosed leopard lizard has not been documented (Williams *in litt.* 2006). In summary, the largest contiguous block of blunt-nosed leopard lizard habitat at Pixley NWR is 3,000 acres; thus, this downlisting criterion has not been met.

Allensworth Ecological Reserve

The Allensworth ER is owned by CDFG and located in southwestern Tulare County. This ER contains four large blocks of land containing suitable habitat for the species. However, the blocks are separated from each other and do not form contiguous habitat as required by this downlisting criterion. The largest block totals 2,482 acres and is not large enough by itself to meet the recovery goal of 5,997 acres of contiguous blunt-nosed leopard lizard habitat. In addition, the blunt-nosed leopard lizard population at Allensworth Ecological Reserve has been declining over the past 15 years (Selmon, pers. comm. 2006). Therefore, this recovery criterion has not been met for the Valley floor of Kern or Tulare Counties.

The sizes of the blocks are 2,482 acres, 1,432 acres, 551 acres, and 536 acres. The largest block is located about 3 km (1.9 miles) southeast of the Pixley-Main section of the Pixley NWR. The second largest and southernmost block is located about 5 km (3.1 miles) southwest of the largest block and about 18 km (11.2 miles) northeast of Kern NWR. Habitat planning goals include connecting the blocks of natural lands at Allensworth ER with Pixley NWR through land acquisition and retirement of agricultural

fields; however, Deer Creek acts a barrier to blunt-nosed leopard lizard movement along the southern boundary of Pixley-Main (P. Williams, Kern NWR Complex, pers. comm. 2006). The number of blunt-nosed leopard lizards at Allensworth ER has also declined over the past 15 years (Selmon *in litt.* 2006). In summary, the largest block at Allensworth ER is 2,482 acres and is not sufficient to meet this downlisting criterion for the Valley floor of Kern or Tulare Counties.

Foothills of the Ciervo-Panoche Natural Area

The BLM owns about 34,000 acres in the Ciervo-Panoche Natural Area that are considered to be blunt-nosed leopard lizard habitat (Lowe 2006). However, only the Areas of Critical Environmental Concern (ACECs) have regulatory protection under the Federal Land Policy and Management Act of 1976. The BLM allows oil and gas leasing with limited surface use stipulations for threatened and endangered species on the four ACECs (BLM 1984, 1997) and thus confer some protection to approximately 16,600 acres of blunt-nosed leopard lizard habitat (Terry 2006).

Some of the best blunt-nosed leopard lizard habitat in the region, however, remains unprotected on private lands in the Panoche Valley and near Silver Creek. Only 3 of the 21 (14 percent) reported occurrences of blunt-nosed leopard lizard are within an ACEC (CNDDDB 2006; Lowe *in litt.* 2006). Much of the rest of the Ciervo-Panoche Natural Area is not suitable habitat for blunt-nosed leopard lizard due to dense vegetative cover and clay soils (Lowe *in litt.* 2006; L. Saslaw, pers. comm. 2006). Since the largest protected block of blunt-nosed leopard lizard habitat is 4,800 acres, it does not meet this downlisting criterion for the foothills of the Ciervo-Panoche Natural Area.

Foothills of western Kern County

The foothills of western Kern County contain blunt-nosed leopard lizard habitat on both public and private lands. Protected areas and other public lands containing blunt-nosed leopard lizard habitat occur in the Elk Hills, Naval Petroleum Reserve #2 (NPR-2), and the Wind Wolves Preserve.

Elk Hills Conservation Area

The Oxy conservation lands (Elk Hills Conservation Area) consist of 4,162 acres on the North Flank of the Elk Hills near Lokern and another 3,770 acres in the Buena Vista Valley (Buena Vista Valley) along the southern edge of the Elk Hills. Within the North Flank, only 2,882 acres (mentioned above in the Lokern Natural Area) are contiguous. All 3,770 acres of the Oxy conservation lands in the Buena Vista Valley area are contiguous (Quad Knopf 2006) but are not sufficient to meet this downlisting requirement.

Currently, Oxy has proposed an Oxy Elk Hills HCP (Live Oak & Associates, Inc., *in litt.* 2009) that would permit an additional permanent disturbance of up to 4,000 acres and temporary disturbance of up to 3,000 acres within Elk Hills for oil and gas development. The HCP proposes to preserve 81.8 percent (roughly 38,780 acres) of the 47,409-acre Elk Hills NPR-1 (Live Oak & Associates, Inc., *in litt.* 2009). Until the HCP is finalized and

the Service issues the incidental take permit, habitat loss and protection associated with the proposed HCP is speculative.

Naval Petroleum Reserve #2

The BLM owns approximately 9,000 acres in NPR-2 and Buena Vista Valley, mostly in a checkerboard of 640-acre parcels. In 2003 the Service programmatic biological opinion (#1-1-01-F-0063) which covered oil and gas extraction activities on BLM lands was amended to include NPR-2 (Service 2003). However, even though the limits disturbance of high quality habitat (Red Zone Lands) to less than 10 percent per 640-acre section and lower quality habitat (Green Zone Lands) to less than 25 percent (Service 2001), residual habitat on BLM lands has been degraded by past oil and gas exploration activities. Unfortunately, several sections within NPR-2 had already exceeded the disturbance thresholds when the BLM acquired the properties. The biological opinion also limits total permanent disturbance of blunt-nosed leopard lizard habitat on BLM lands throughout Kings and Kern Counties to 180 acres (Service 2001, 2003). Since the BLM lands at NPR-2 are highly fragmented they do not meet the downlisting criterion for the foothills of western Kern County.

Wind Wolves Preserve

About 2,000 acres of potential blunt-nosed leopard lizard habitat is protected on the edge of the large Wind Wolves Preserve. Wildlands Conservancy, a non-profit group, purchased this southwestern Kern County site in 2001. In the early 1990s a blunt-nosed leopard lizard sighting was reported in the Preserve at Rincon Flat near Interstate 5 (CNDDDB 2006). However, no blunt-nosed leopard lizards have been observed on the Preserve since that initial report. The 2,000 acres of potential blunt-nosed leopard lizard habitat do not meet the downlisting criterion for the foothills of western Kern County.

Foothills of the Carrizo Plain Natural Area

The 250,000-acre BLM Carrizo Plain National Monument and adjacent CDFG Ecological Reserve protect blunt-nosed leopard lizard populations on the Carrizo Plain Natural Area (about 55,000 acres) and roughly 1,000 acres of the Upper Cuyama Valley (Saslaw *in litt.* 2006). These lands meet the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat in the foothills of the Carrizo Plain Natural Area.

2. *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*

Summary

The downlisting criterion for an approved and implemented management plan that includes the continued survival of blunt-nosed leopard lizard as an objective has been met for the following protected areas:

- CNLM lands of the Semitropic Ridge Preserve

- CNLM, PXP, and BLM lands of the Lokern Natural Area
- Oxy lands of the Elk Hills Conservation Area
- Kern and Pixley NWRs
- BLM Hollister RMP
- BLM, TNC, and CDFG lands of the Carrizo Plain National Monument

All other protected areas, including CDFG lands of the Semitropic Ridge, California State Parks Tule Elk State Reserve, Buttonwillow Ecological Reserve Allensworth Ecological Reserve, and Wind Wolves Preserve have not currently been drafted, or do not include the continued survival of the blunt-nosed leopard lizard as an objective. A joint-management plan for the Carrizo Plain Natural Area—Carrizo Plain National Monument (BLM), the Carrizo Plain ER (CDFG), and lands administered by the Nature Conservancy (TNC)—and, the Caliente RMP are also currently being revised. Therefore, the downlisting criterion is only partly met.

Assessment

The CNLM lands of the Semitropic Ridge Preserve and Lokern Natural Area have an approved management plan with a management goal to “prevent the extinction of threatened and endangered species through maintenance of high quality native habitat which supports viable, self-sustaining populations” (Warrick *in litt.* 2006). The Semitropic Ridge Preserve is grazed by sheep to control exotic grasses but the grazing is not very effective during unusually wet years (Warrick *in litt.* 2006). None of the CDFG lands currently have an approved management plan (E. Cypher, pers. comm. 2006; S. Juarez, CDFG, pers. comm. 2006). CDFG does not have any grazing leases for its lands at Semitropic Ridge but would like to at some point (Warrick *in litt.* 2006). Therefore, the criterion has been met for the CNLM lands at Semitropic Ridge and Lokern but not for the CDFG lands.

The Kern NWR and Pixley NWR both have management plans that include the survival of blunt-nosed leopard lizard as an objective. The 1,369-acre Research Natural Area of Kern NWR is managed by winter grazing for blunt-nosed leopard lizard and Tipton kangaroo rat (*Dipodomys nitratooides nitratooides*). Approximately 2,890 acres of Pixley-Main has been designated as endangered species habitat. All of Pixley NWR, except about 1,000 acres, is managed for blunt-nosed leopard lizard by grazing from November through April each year (Williams *in litt.* 2006). Therefore, this criterion has been met for the Kern and Pixley NWRs.

The Caliente Resource Management Plan (RMP) (BLM 1997) covers all BLM lands under the jurisdiction of the Bakersfield field office, but not the more recently acquired NPR-2 lands. The management plan includes the survival of listed species including blunt-nosed leopard lizard as an objective. The BLM is currently revising its Caliente RMP. The new RMP will include NPR-2 and will also provide measures for the protection of the blunt-nosed leopard lizard (L. Saslaw, BLM, pers. comm. 2006). Therefore, the downlisting criterion has been met for the BLM lands under the jurisdiction of the Bakersfield office, except for NPR-2.

The Carrizo Plain Natural Area Management Plan (BLM 1996) established the cooperative management of the 250,000 acres within the Carrizo Plain Natural Area, comprised of: the Carrizo Plain National Monument (BLM), the Carrizo Plain ER (CDFG), and lands administered

TNC. This joint-management plan includes measures for the protection of blunt-nosed leopard lizard. The BLM is currently preparing the Carrizo Plain National Monument RMP that will specifically address management of the Carrizo Plain National Monument (L. Saslaw, pers. comm. 2006). The draft RMP and Environmental Impact Statement (EIS) are currently in preparation, and are expected to be available for public review in fall 2009. Concurrently CDFG is revising its management plan for the protection of blunt-nosed leopard lizard within the Carrizo Plain ER (Stafford *in litt.* 2007). Based on the approval and implementation of the pending revision for the joint-management plans of the Carrizo Plain Natural Area, the downlisting criterion has been met for the BLM, CDFG, and TNC lands of the Carrizo Plain National Monument.

Service biological opinion (file number 1-8-07-F-19) for the revised Hollister RMP was issued in June 2007 (Service 2007), and the RMP was finalized on September 7, 2007. This plan established resource management goals for areas where blunt-nosed lizard habitat was known or had potential to occur, including: the Panoche Hills management unit has approximately 7,800 acres of habitat for sensitive species in the plateau area; and, the Griswold/Tumey Hills management unit includes 2,500 acres of habitat areas for sensitive species in the plateau area in the northern Tumey Hills. Blunt-nosed leopard lizards have been observed on private lands adjacent to the Tumey Hills management unit in the eastern Panoche valley. Lastly, the Coalinga management unit has 14,660 acres designated for sensitive species, including the blunt-nosed leopard lizard. Given BLM's commitment to implement the resource management goals, the biological opinion permitted BLM to take blunt-nosed leopard lizards or impact its habitat by conducting its grazing management, energy and minerals program, vegetation management program, and transportation program. The Hollister RMP therefore achieves this downlisting criterion.

Oxy is currently managing its 7,801 acres of conservation lands (Elk Hills Conservation Area) in Lokern and the Buena Vista Valley for the survival of blunt-nosed leopard lizard and other listed species in accordance with the Elk Hills biological opinion (Service 1995) and the 1998 Conservation Management Agreement. Also within the Elk Hills area, Berry Petroleum was authorized under the North Midway Sunset biological opinion (Service 2006) to develop a management plan that includes the survival of blunt-nosed leopard lizard as an objective for its 1,725 acres of conservation lands in Lokern, Buena Vista Valley, and Midway Valley. Therefore, the downlisting criterion has been met for the Elk Hills Conservation Area, but not yet for the Berry Petroleum lands.

The PXP, Coles Levee, and KWB Authority HCPs contain management plans which include the survival of blunt-nosed leopard lizard as an objective in the Lokern Natural Area, Coles Levee Ecosystem Preserve, and KWB Conservation Lands, respectively (ARCO Western Energy 1995; KWB Authority 1996; Nuevo Energy Company and Torch Operating Company 1999). Less than one-fourth of the KWB Conservation Lands, however, are currently grazed by sheep to control exotic grasses that threaten blunt-nosed leopard lizard habitat (KWB Authority 2006). Chevron and Oxy are currently preparing HCPs for their lands in the Lokern area and Elk Hills, respectively; however, it is unknown when the HCPs will be finalized and approved. Additionally, no management plans have been implemented for blunt-nosed leopard lizard habitat on private lands in the Ciervo-Panoche Natural Area and in western Kern County.

Therefore, the criterion for the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective has been met for the PXP conservation lands in Lokern but not for the Chevron or Oxy lands (outside of the Elk Hills Conservation Area).

In the Lokern area, an interagency cooperative acquisition and management plan for the conservation of the 44,000-acre Lokern Natural Area is in draft form. Participants include Federal agencies (BLM, Service), State agencies (CDFG, California Energy Commission, California State University Bakersfield), private environmental groups and biological consulting firms (The Nature Conservancy [TNC], CNLM, ESRP, McCormick Biological, Inc.), and private oil companies (Chevron; Oxy; Aera Energy, LLC [Aera]; PXP) (Service 1998). The parties periodically meet to coordinate their efforts, but there is no estimate for when the Lokern Natural Area management plan will be approved and implemented. Therefore outside of the CNLM and PXP conservation lands, the recovery criterion has not been met for the Lokern Natural Area.

In summary, only the CNLM lands of the Semitropic Ridge Preserve, the CNLM, PXP, and BLM lands of the Lokern Natural Area, the Oxy lands of the Elk Hills Conservation Area, the Kern and Pixley NWRs, and the BLM, TNC, and CDFG lands of the Carrizo Plain National Monument have a management plan for blunt-nosed leopard lizard that has been approved and implemented. The management plans for the Carrizo Plain National Monument and the Ciervo-Panoche Natural Area are currently being revised by the BLM. Therefore, the downlisting criterion is only partly met.

3. *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*

Long-term population studies have monitored the population trends in blunt-nosed leopard lizard at Elkhorn Plain (Germano *et al.* 2004, Germano and Williams 2005), Semitropic Ridge (Warrick 2006), Lokern (Germano *et al.* 2005, Warrick 2006), Elk Hills (Quad Knopf 2006), Pixley NWR (ESRP, Williams *in litt.* 2006), Buttonwillow ER, and Allensworth ER (Selmon *in litt.* 2006), and Coles Levee Ecosystem Preserve (Quad Knopf 2005). However, long-term population studies have not been conducted for blunt-nosed leopard lizard in the Cuyama Valley, the Ciervo-Panoche area, Merced County, or Madera County, the status of these populations is unknown (Stafford *in litt.* 2006).

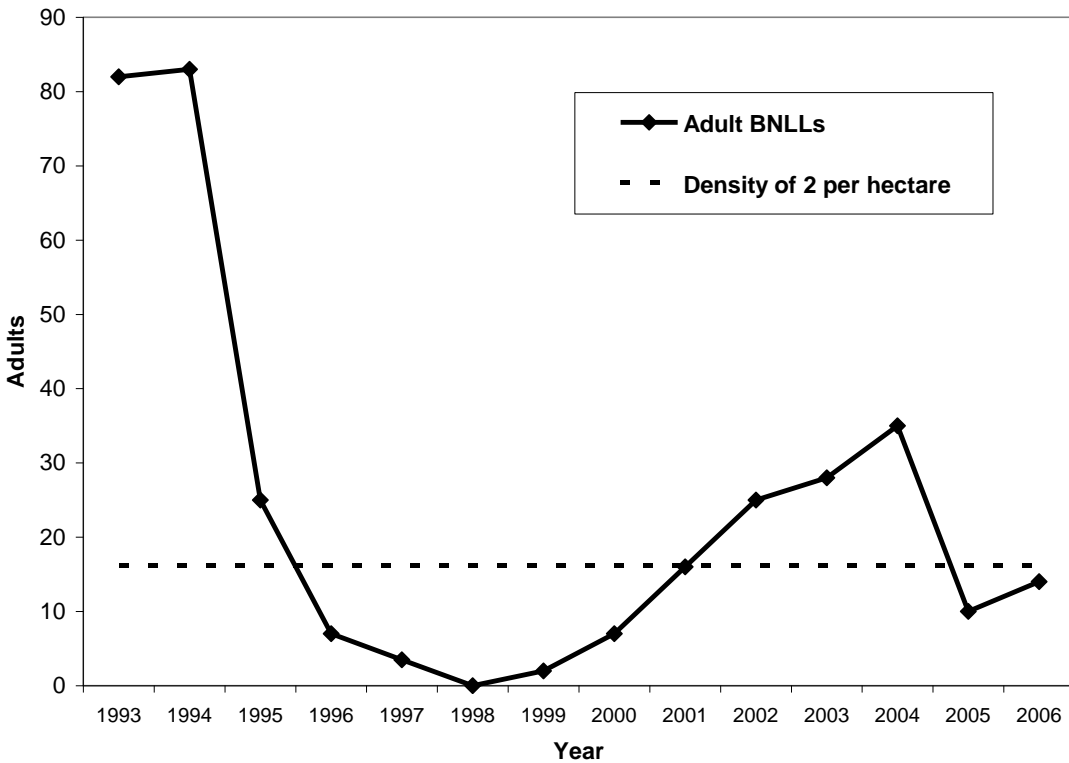
Pixley NWR

Figure 3 illustrates the population instability of blunt-nosed leopard lizard at Pixley NWR. Spring surveys of adult blunt-nosed leopard lizards from 1993 to 2006 show that the density was below 2 per hectare from 1996 to 2000 during years of above average precipitation. No blunt-nosed leopard lizards were found during surveys in 1998 due to flooding. Blunt-nosed leopard lizard numbers increased from 2001 to 2004 during years of below average precipitation but declined again below 2 per hectare during the wet years 2005 to 2006. Previous short-term studies observed blunt-nosed leopard lizard population densities at Pixley NWR of 0.3 to 10.8 per hectare (Uptain *et al.* 1985), 3.3 per hectare (Tollestrup 1979), and 6.7 to 7.0 per hectare (Williams and Germano 1991). In summary, due to the decline in blunt-nosed leopard lizard numbers during wet years, this downlisting criterion has not been met at Pixley NWR.

Elkhorn Plain

ESRP has monitored population trends of blunt-nosed leopard lizards on the Elkhorn Plain biannually since 1989 (Williams *et al.* 1993; Germano *et al.* 2004; Germano and Williams 2005). From 1989 to 1994, the population density ranged from 4.9 to 20.2 adults per hectare, except for 1990 when the density decreased to 1.7 adults per hectare following two years of severe drought. Then, after several years of above average precipitation, the population density of blunt-nosed leopard lizard decreased in 1995 and remained between 1.7 to 4.9 adults per hectare through 2003. The density remained below 1.8 adults per hectare during the wettest years from 1998 to 2000. Therefore, due to the decline in blunt-nosed leopard lizard numbers during consecutive wet years or years of severe drought, this downlisting criterion has not been met on the Elkhorn Plain.

Figure 3, The number of adult blunt-nosed leopard lizards observed during spring surveys on the Deer Creek West 20-acre plot, Pixley National Wildlife Refuge, Tulare County (Source: ESRP, Williams *in litt.* 2006)



Kern County Valley floor

The largest and most stable population of blunt-nosed leopard lizard is thought to be at Semitropic Ridge Preserve. However, the number of all lizards at Semitropic Ridge Preserve has been decreasing since 2003 (Selmon *in litt.* 2006). At Semitropic Ridge Preserve, road surveys during May and June, 2005, found an average of 6 blunt-nosed leopard lizards per 32-km (20-mile) survey (Warrick 2006), which is far below the criterion for 2 blunt-nosed leopard lizards per hectare. Road surveys, however, are likely overestimates of blunt-nosed leopard lizard population density in an area because of the preference of the species for roads (Warrick *et al.* 1998; Warrick *in litt.* 2006). Additionally, the land manager at Semitropic Ridge Preserve stated that only about 1,500 acres of the preserve comes close to supporting a population density of 2 blunt-nosed leopard lizards per hectare (Warrick *in litt.* 2006). Therefore, the downlisting criterion has not been met at the Semitropic Ridge Preserve. No population density estimates are available at this time for Buttonwillow ER. Blunt-nosed leopard lizard numbers at Allensworth ER are reported to have declined over the past 15 years (Selmon *in litt.* 2006), but no data are available at this time.

At Lokern, road surveys in May and June, 2005, observed an average of 32.7 blunt-nosed leopard lizards per 82-km (51-mile) survey (Warrick 2006). Therefore, the population density estimate—ranging from 0.40 to 1.33 blunt-nosed leopard lizards per hectare—is well below the recovery criterion (Warrick *in litt.* 2006). Additionally, grazed and ungrazed plots on the Lokern were surveyed annually between 1997 to 2005, using a 10-day census survey method. These results indicated that the density of blunt-nosed leopard lizards on ungrazed plots remained less than 0.5 per hectare (notably according to Germano *et al.* (2005) no blunt-nosed leopard lizards were observed during 2000 – 2003); and, densities on grazed plots ranged from 0.06 – 0.25 per hectare during 1997 to 2001, and increased to 0.46 – 1.50 per hectare during 2002 to 2005 (Germano *et al.* 2005). Nonetheless, the downlisting criterion has not been met at Lokern.

At Coles Levee Ecosystem Preserve, blunt-nosed leopard lizard surveys have been conducted annually from 1996 to 2004 (Quad Knopf 2005). Only 10 blunt-nosed leopard lizards were observed during the surveys and no blunt-nosed leopard lizards have been observed in the last three years (Quad Knopf 2005). However, incidental observations of blunt-nosed leopard lizards are occasionally made during other monitoring activities (Quad Knopf 2005). Therefore, the downlisting criterion has not been met at Coles Levee Ecosystem Preserve.

At the KWB Conservation Lands, no protocol-level surveys for blunt-nosed leopard lizards have been conducted and the species has not been observed on numerous reconnaissance and meandering surveys over the years. Thus, the population density is most likely well below 2 blunt-nosed leopard lizards per hectare (Jones *in litt.* 2006; Warrick *in litt.* 2006). Therefore, the downlisting criterion has not been met at the KWB Conservation Lands.

Elk Hills Conservation Area

At a site near the Elk Hills Conservation Area, blunt-nosed leopard lizard population density was previously estimated at 0.40 adults per hectare (Kato *et al.* 1987). More recently, blunt-nosed leopard lizard population trends have been monitored in spring and early fall by means of road and foot surveys from 2001 to 2005 in the North Flank and Buena Vista Valley lands of the Elk Hills Conservation Area (Quad Knopf 2006). Population density estimates from 2000 - 2005—

calculated from the average sightings per mile of road survey (with a width of 50 meters)—remained below 0.02 blunt-nosed leopard lizards per hectare in both the North Flank and Buena Vista Valley (J. Jones, Quad Knopf, Inc., pers. comm. 2006). Foot surveys conducted during the same time periods, supported these low observation numbers, and reported 0.01 blunt-nosed leopard lizards per hectare in the North Flank and from 0.01 – 0.07 blunt-nosed leopard lizards per hectare in Buena Vista Valley. Therefore, due to the continually low densities observed in the North Flank and in Buena Vista Valley, the downlisting criterion has not been met at the Elk Hills Conservation Area.

Delisting Criteria

Delisting will be considered when, in addition to the criteria for downlisting, all of the following conditions have been met:

- 1) *Three additional areas with about 2,428 hectares (5,997 acres) or more of contiguous, occupied habitat including:
 - A) *One on the Valley floor;*
 - B) *One along the western Valley edge in Kings or Fresno Counties; and*
 - C) *One in the Upper Cuyama Valley of eastern San Luis Obispo and eastern Santa Barbara Counties.**
- 2) *A management plan has been approved and implemented for all protected areas identified as important to the continued survival of blunt-nosed leopard lizard that includes survival of the species as an objective.*
- 3) *Each protected area has a mean density of 2 or more blunt-nosed leopard lizards per hectare (1 per acre) through one precipitation cycle.*

Other Valley Floor

The protection of blunt-nosed leopard lizard habitat on the Valley floor in Kern and Tulare Counties and in Merced and Madera Counties is discussed above in the above section on the Downlisting Criteria. None of the protected areas meet the downlisting criterion for the protection of 5,997 acres of contiguous blunt-nosed leopard lizard habitat on the Valley floor in these areas. Therefore, the delisting criterion has also not been met.

Western Valley edge in Kings or Fresno Counties

Alkali Sink Ecological Reserve

The Alkali Sink ER protects 933 acres of alkali sink scrub and Valley annual grasslands blunt-nosed leopard lizard habitat in northwestern Fresno County (Figure 2). The purpose of the Alkali Sink ER Interim Management Plan (Ashford 1990a) is to preserve the remaining Alkali Sink Scrub habitat type, protect habitat for the Fresno kangaroo rat and blunt-nosed leopard lizard from agricultural conversion. There are no population data available at Alkali Sink ER at this time. The 12,000-acre Mendota Wildlife Area is located immediately to the south of the Alkali Sink ER. However, over two-thirds of the Wildlife Area are seasonally flooded and do not support blunt-nosed leopard lizard habitat. No blunt-nosed leopard lizards have been observed at the Mendota Wildlife Area (S. Juarez, CDFG, pers. comm. 2006). Therefore, the Alkali Sink ER and Mendota

Wildlife Area do not meet the delisting criterion for the western Valley edge in Kings or Fresno Counties.

Kerman Ecological Reserve

The Kerman ER is located about 5 miles east of the Mendota Wildlife Area and protects 1,718 acres of Valley Annual Grasslands in northwestern Fresno County (Figure 2). In the Kerman ER Interim Management Plan (Ashford 1990b), protection of Fresno kangaroo rat and blunt-nosed leopard lizard habitat is the principal management focus. Livestock grazing is occasionally permitted to control exotic grasses. Hunting is allowed but vehicles are restricted to roads. There is no population data available for Kerman ER. Therefore, due to its small size, the Kerman ER does not meet the delisting criterion for the western Valley edge in Kings or Fresno Counties.

Kreyenhagen Hills Conservation Bank

The 1,295-acre Kreyenhagen Hills Conservation Bank is located in the foothills of southwestern Fresno County. The conservation bank was established by Wildlands, Inc. for providing mitigation credits for impacts to San Joaquin kit fox (*Vulpes macrotis mutica*) habitat in portions of Fresno and Kings Counties. No blunt-nosed leopard lizards have been observed there (Lopez *in litt.* 2006; Warrick *in litt.* 2006); however, the site has numerous washes that could provide suitable habitat for the species (Lopez *in litt.* 2006). There is one reported occurrence of blunt-nosed leopard lizard approximately one mile off-site within the Jacalitos Creek Watershed (CNDDDB 2006, Lopez *in litt.* 2006). In summary, due to the small size of the preserve and lack of sightings of blunt-nosed leopard lizard, the Kreyenhagen Hills Conservation Bank does not meet the delisting criteria for the western Valley edge in Kings or Fresno Counties.

Kettleman Hills Area of Critical Environmental Concern

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 blunt-nosed leopard lizard. The Caliente RMP (BLM 1997) covers the ACEC and meets the criterion for the approval and implementation of a management plan that includes the survival of blunt-nosed leopard lizard as an objective. However, due to the highly fragmented nature of the protected lands, the Kettleman Hills ACEC does not meet the delisting criteria for the western Valley edge in Kings or Fresno Counties.

Upper Cuyama Valley

About 1,000 acres of blunt-nosed leopard lizard habitat is protected on the southern edge of the Carrizo Plain National Monument and Ecological Reserve (Saslaw *in litt.* 2006). Most of the rest of the Cuyama Valley, however, is unprotected on private lands and has been degraded by farming activities. There is no population data for blunt-nosed leopard lizard in Cuyama Valley but the populations are likely decreasing there due to an increasing amount of habitat conversion to intensive irrigated agriculture (Stafford *in litt.* 2006). Therefore, due to the lack of population monitoring data and the lack of protection of sufficient habitat, the delisting criteria for the upper Cuyama Valley have not been met.

Appendix B: Habitat Conservation Plans related to the Blunt-Nosed Leopard Lizard and Biological Opinions

A total of 14 HCPs have been prepared (13 completed and one HCP currently in draft) for which the permit included take of blunt-nosed leopard lizard and/or impacts to its habitat. These HCPs are summarized in Table 4 in the review. Effectively through the HCP process 89,288 acres of habitat land has been conserved, while a total 30,052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft). Also, according to a preliminary assessment of issued biological opinions from 1992 to 2006, roughly 120 projects—take of approximately 220 individuals, and roughly 21,200 acres of impacts—were permitted incidental take of blunt-nosed leopard lizard. Of these activities, the greatest amount of habitat disturbance authorized were for oil exploration and power generation (2,433 acres permanent and 1,215 acres temporary), road construction and repair (1,387 acres permanent and 469 acres temporary), general operation and maintenance activities (15 acres permanent and 5,120 acres temporary), pipeline construction and repair (264 acres permanent and 853 acres temporary), transmission line and fiber optic cables construction (410 acres permanent and 418 acres temporary), hazardous waste facilities construction (844 acres permanent and 16 acres temporary), prison facilities construction (283 acres permanent and 74 acres temporary), water banking (KWB 6,000 acres permanent), and other agricultural, residential, and commercial development activities (MBHCP 15,200 acres permanent).

Details of 11 of the HCPs affecting the blunt-nosed leopard lizard are discussed below.

1. The ARCO Western Energy Coles Levee HCP (currently managed by Aera) authorizes the permanent disturbance of 330 acres of natural lands including 270 acres of blunt-nosed leopard lizard habitat (ARCO Western Energy 1995). Mitigation for the disturbance is the preservation of 990 acres through the 6,059-acre Coles Levee Ecological Reserve conservation bank.
2. The Coalinga Cogeneration HCP (Aera Energy and Chervon 1991) authorizes the permanent disturbance of 49.6 acres and temporary disturbance of 27.6 acres of blunt-nosed leopard lizard habitat in the oilfield near Coalinga in southwestern Fresno County. Mitigation for the project is the protection of 179 acres of blunt-nosed leopard lizard habitat near the site. On June 23, 2006, the project used up all of its compensation credits and completed the mitigation requirements.
3. The California Department of Corrections Delano Prison HCP (California Department of Corrections 1991) authorizes the permanent disturbance of 287 acres and temporary disturbance of 348 acres of blunt-nosed leopard lizard habitat near Delano in northern Kern County. Mitigation for the project is the enhancement and revegetation of 348 acres of blunt-nosed leopard lizard habitat on-site and the acquisition of 514 acres of blunt-nosed leopard lizard habitat for protection within the Allensworth ER.
4. The California Department of Corrections Statewide Electrified Fence Project HCP authorizes the incidental take of up to 2 blunt-nosed leopard lizards by electrocution at eight

state prisons in a 5-year period during the 50-year duration of the permit (EDAW 1999). Mitigation for impacts to blunt-nosed leopard lizard includes acquisition and enhancement of 282 acres of high quality alkali sink/scrub habitat and the acquisition and enhancement of an additional 800 acres of low quality laser-leveled farmland at Allensworth ER. However, at this time it is not known whether the restoration of farmland to native habitat will benefit the blunt-nosed leopard lizard. A restoration plan for the mitigation lands was finalized and approved in February 2003 (EDAW 2003). The major components of the plan include: acquisition of 200 acres of privately-owned land next to the existing reserve boundary; installation of protective fencing and seasonal grazing to reduce non-native annual grass cover (as needed) on the newly acquired land; and patrol and maintenance of fences, monitoring of sensitive population trends, trash removal, and management of grazing leases on the existing reserve lands. As of June 11, 2006, the Wildlife Conservation Board (WCB) had identified two potential parcels for acquisition and was pursuing state-required appraisals prior to escrow. However, due to hesitation on the part of the sellers, CDFG and WCB have identified potential alternative acquisitions to satisfy the mitigation requirement (EDAW 2006).

5. The Chevron Pipeline HCP authorizes the temporary disturbance of 25.5 acres of blunt-nosed leopard lizard habitat in the 27G Pipeline Replacement Project (Chevron Pipeline Company 1995). Mitigation for impacts to blunt-nosed leopard lizard is the protection of 28 acres of blunt-nosed leopard lizard habitat within Chevron's Lokern lands.
6. The Granite Construction Phase I HCP authorizes the permanent disturbance of 54 acres of blunt-nosed leopard lizard habitat for quarrying activities near Coalinga in Fresno County (Granite Construction, Inc. 1993). Mitigation for impacts to blunt-nosed leopard lizard is the protection of 162 acres of blunt-nosed leopard lizard habitat within the Northern Semitropic Ridge ER.
7. The Kern County Waste Facilities HCP authorizes the permanent disturbance of 251 acres of natural lands including 2 acres of blunt-nosed leopard lizard habitat near Lost Hills and 47 acres of blunt-nosed leopard lizard habitat near Taft in Kern County (Kern County Waste Management Department 1997). Mitigation for impacts to blunt-nosed leopard lizard and other listed species is the protection of 755 acres of habitat at Coles Levee Ecosystem Preserve.
8. The KWB Authority HCP authorized the permanent disturbance of 12,081 acres and temporary disturbance of 291 acres of blunt-nosed leopard lizard habitat in Kern County for up to 75 years. Within the 19,900 acre-KWB, 5,900 acres are for routine recharge activities, 481 acres are for permanent water banking facilities, 960 acres are for plant preserves, 5,592 acres between the water basins will be allowed to revert to habitat, 530 acres are mitigation for the Department of Water Resources projects, 3,170 acres are for farming, and 3,267 acres are for conservation banking for third parties (490 acres of which KWB Authority may use for commercial development). Therefore, 4,263 acres of potential blunt-nosed leopard lizard habitat are protected by the KWB Authority HCP.

9. The Metropolitan Bakersfield HCP (MBHCP) and associated biological opinion (Service 1994) covers an area of 408 square miles around Bakersfield, California. The MBHCP allows the permanent disturbance of 15,200 acres of natural lands but does not estimate how much blunt-nosed leopard lizard habitat would be disturbed. The MBHCP states that mitigation for impacts to natural lands is 3:1 and for impacts to open lands (i.e. agricultural lands) is 1:1. However, the MBHCP does not explicitly state that impacts to a listed species must be mitigated for by the acquisition of lands that support the species. About 1,176 acres of blunt-nosed leopard lizard habitat disturbance has been authorized thus far through the MBHCP (Strait *in litt.* 2006); it is not known at this time how much of the habitat acquired as mitigation through the MBHCP supports blunt-nosed leopard lizard.
10. The Nuevo Torch HCP (currently managed by PXP) authorizes the permanent disturbance of 850 acres of blunt-nosed leopard lizard habitat (Nuevo Energy Company and Torch Operating Company 1999). Thus far, an 840-acre conservation easement in the Lokern area is currently being established as mitigation (R. Garcia, PXP, pers. comm. 2006).
11. The California Aqueduct HCP is currently in draft form. The area covered by the HCP includes seven pumping plants, two maintenance centers, and roughly 121 miles of Aqueduct and ROW within 11,816 acres of Kings and Kern Counties. Impacts from project related activities permitted under the HCP could total up to 1,295 acres—895 acres of impact by DWR, 290 acres of impact by third party water contractors, and an additional 110 acres of impact by other third party activities. Notably, the HCP only provides compensation for impacts by DWR and third party water contractors. Compensation for impacts associated with other third parties entering into a Compliance Agreement under the HCP will be provided via off-site compensation land consistent with Wildlife Agency requirements and subject to their approval prior to the initiation of the impacts. Compensation will be achieved through a combination of two approaches: 1) adaptive management of ROW lands to provide suitable habitat for listed species, and; 2) the conservation of three large blocks of habitat near the Buena Vista Pumping Plant, Teerink Pumping Plant, and Chrisman Pumping Plant. Thus, terms and conditions described within the HCP require DWR to manage 3,474 acres of on-site ROW land to minimize impacts to covered species to the maximum extent practicable. While total compensation acreage provided shall be 817 acres, which can be partitioned into: 242 acres of compensation for past completed emergency consultations; and, 567 acres as compensation for HCP covered activities and impacts

In addition to HCPs, numerous biological opinions have authorized disturbance of blunt-nosed leopard lizard habitat. In some earlier cases no compensation was required. For example, the biological opinion for the Laidlaw Environmental Services, Inc. hazardous waste disposal facility (Service 1988) authorized the permanent disturbance of 320 acres of blunt-nosed leopard lizard habitat in the Lokern area without requiring any compensation. In most cases, however, compensation was set at a ratio of 3:1 for permanent disturbance of natural lands.

In summary, the HCP process has facilitated the conservation of 89,288 acres of habitat land has been conserved, while a total 30052.6 acres of permanent impacts and 1,527.1 acres of temporary disturbance have been authorized (note, these figures include the California Aqueduct San Joaquin Field Division HCP that is currently in draft). Also, according to a preliminary

assessment of issued biological opinions under section 7 of the Act from 1992 to 2006, roughly 120 projects—take of approximately 220 individuals, and roughly 21,200 acres of impacts—were permitted incidental take of blunt-nosed leopard lizard.

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

Blunt-Nosed Leopard Lizard (*Gambelia sila*)

Current Classification Endangered

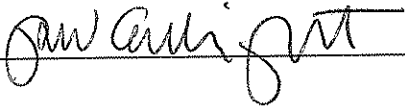
Recommendation resulting from the 5-Year Review

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change is needed

Review Conducted By Sacramento Fish and Wildlife Office Staff

FIELD OFFICE APPROVAL FOR REGION 8:

Lead Field Supervisor, Fish and Wildlife Service

Approve  Date 2.16.10

Lead Field Supervisor, Cooperating Field Office, Fish and Wildlife Service

Concur  Date 2/12/10