Coachella Valley fringe-toed Lizard
(Uma inornata)

5-Year Review:
Summary and Evaluation

Coachella Valley fringe-toed lizard (*Uma inornata*), Photo credit Tyler Grant (USFWS 2006)

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

August 6, 2010

5-YEAR REVIEW
Coachella Valley fringe-toed lizard *(Uma inornata)*

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. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

The Coachella Valley fringe-toed lizard (CVFTL) (*Uma inornata*) is a medium-sized, highly specialized endemic lizard that inhabits windblown desert ecosystems of the Coachella Valley in Riverside County, California. This species averages 15 to 23 centimeters (6 to 9 inches) in total length with a white or sandy-colored belly and back and light eye-like patterns that form shoulder stripes. Since listing the species' distribution has decreased by more than 60 percent and only 43 percent of habitat remains (USFWS 1980, pp. 63812–63820). Declines of CVFTL populations are likely to continue, but additional monitoring efforts are needed to fully assess this trend. There are currently 59 presumed extant occurrences in the Coachella Valley with 41 occurring, or partially occurring, within six conservation area boundaries of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) (CFWO Staff, CNDDB 2010).

CVFTL was listed as endangered under the California Endangered Species Act (CESA) in 1980 and listed as threatened under the Act in 1980.

Methodology Used to Complete This Review:

This review was prepared by Jason Stayer at the Carlsbad Fish and Wildlife Office (CFWO), following the Region 8 guidance issued in July 2010. We used information from the Recovery Plan, field observations by CFWO staff, regional conservation planning documents, internal documents and files, published and white papers, and communications with various researchers and experts.

We received no information relative to the Coachella Valley fringe-toed lizard from the public in response to our Federal Register notice initiating this 5-year review. This 5-year review contains updated information on the species' biology and threats, and an assessment of information compared to that known at the time of listing or since the last 5-year review. We focus on current threats to the species pursuant to the five listing factors in the Act. This review synthesizes this information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in performing the five-factor analysis, we herein recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

Contact Information:

Lead Regional Office: Larry Rabin, Deputy Division Chief for Listing and Recovery, Region 8; (916) 414-6464.

Lead Field Office: Jason Stayer, Fish and Wildlife Biologist, and Bradd Baskerville-Bridges, Recovery Branch Chief, Carlsbad Fish and Wildlife Office; (760) 431-9440.

Federal Register (FR) Notice Citation Announcing Initiation of This Review:

A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published on February 14, 2007 (USFWS 2007, p. 7064). No new information was received in response to the Federal Register (FR) notice announcing the initiation of this review.

Listing History:

Original Listing
FR Notice: 45 FR 63812
Date of Final Listing Rule: September 25, 1980
Entity Listed: Coachella Valley fringe-toed lizard *(Uma inornata)*, a reptile species
Classification: Threatened

State Listing
CVFTL was listed by the State of California as endangered in 1980.

Associated Rulemakings:

The original listing and proposed critical habitat rule was published on September 28, 1978 (USFWS 1978, pp. 44806–44808). The rule was withdrawn on March 6, 1979 (USFWS 1979, pp. 12382–12384) and reproposed on May 28, 1980 (USFWS 1980, pp. 36038–36041). The final rule on the listing and critical habitat designation for CVFTL was published on September 25, 1980 (USFWS 1980, pp. 63812–63820).

Review History:
Two 5-year reviews of the Coachella Valley fringe-toed lizard were previously conducted. The notice initiating the first review was published on July 22, 1985 (USFWS 1985, pp. 29901–29909) and review results, recommending no change in status, were announced on July 7, 1987 (USFWS 1987, p. 25522). The notice initiating the second review was published on November 6, 1991 (USFWS 1991, pp. 56882–56900). The results of this review were not published; however our recommendation was no change in status (USFWS 1992, p. 1). No subsequent 5-year reviews were initiated since that time until this current 5-year review.

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

The recovery priority number for CVFTL is 5C according to the Service's 2009 Recovery Data Call for the CFWO, based on a 1-18 ranking system where one is the highest-ranked recovery priority and 18 is the lowest (USFWS 1993, pp. 43098–43105). This number indicates that the taxon is a species that faces a high degree of threat and has a low potential for recovery.

Recovery Plan or Outline:

> **Name of plan:** Coachella Valley Fringe-toed Lizard Recovery Plan (Recovery Plan)
> **Date:** September 11, 1985.
> **Date of previous revisions:** None

II. REVIEW ANALYSIS

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

The Act defines "species" as including any subspecies of fish, or wildlife, or plants, and any distinct population segment (DPS) of any species of vertebrate. This definition of species under the Act limits listing as DPSs to species of vertebrate fish or wildlife. The DPS policy is not applicable concerning this species and is not addressed further in this review.

Information on the Species and its Status:

Species Biology and Life History

As summarized in the Recovery Plan for this species (USFWS 1985), CVFTL is a medium-sized lizard that averages 15 to 23 centimeters (6 to 9 inches) in total length. The back and belly are whitish or sand-colored, with light eye-like markings that form shoulder stripes. The species has specific phenotypic adaptations to keep fine sand out of its eyes, mouth, nose, and ears. CVFTL is closely related to the Colorado Desert fringe-toed lizard (*Uma notata*) and the Mojave fringe-toed lizard (*Uma scoparia*). The species is restricted to windblown sand deposits (dunes) on the floor of the Coachella Valley in Riverside County, California (USFWS 1985, p. 10; Turner et al. 2007, p. 371). Home range size is approximately twice the size for male CVFTLs (845-1295 square meters), compared to female CVFTLs (269-605 square meters) (Vorchar 1992, p. 41). The breeding season for these omnivorous lizards begins in the spring (April/May) following their winter dormancy and their diet consists of plants and plant-dwelling arthropods

(Durtsche 1992, pp. 86–87). The non-breeding season begins in the summer (July/August) and their diet consists of plants and ground dwelling arthropods (Durtsche 1992, pp. 86–87), before their winter dormancy. Hatchlings begin to appear from late June to early September. This lizard hibernates during the winter and is most active during daylight hours. When CVFTL body temperatures reach elevated temperatures near 35 degrees Celsius (Pough 1970, p. 152), the lizard escapes the heat by "swimming" or burrowing beneath the sand and restricts its activities to the early morning and late afternoon hours.

Species Distribution and Abundance

CVFTLs were historically and remain endemic to the Coachella Valley. At the time the species was listed in 1980 (USFWS 1980, pp. 63812–63820), an estimated 63,000 acres (255 square kilometers) of extant blowsand habitat was recorded (USFWS 1980, p. 63812). The Recovery Plan estimated that approximately 130,000 acres (500 square kilometers) of CVFTL habitat existed in the Valley prior to human settlement of the area (USFWS 1985, p. 6) and that approximately 81,000 acres (328 square kilometers) of "occupiable habitat" was extant as of 1984 (USFWS 1985, p. 7).

The Coachella Valley Association of Governments (CVAG), created a model for the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) and estimated that as of 2000, 27,000 acres (10,932 ha, 43 percent) of habitat, of the 63,000 acres (25,506 ha) available at listing (USFWS 1980, p. 63812) remained (Table 1). Thus, according to this CVAG estimate, the distribution of suitable CVFTL habitat decreased by more than 50 percent since the species was listed. Similarly, of the 170,000 acres (688 square kilometers) of "occupiable habitat" the 1986 Fringe-toed Lizard Habitat Conservation Plan (FTLHCP) estimated was available historically (The Nature Conservancy 1985, p. S-3), CVAG estimates that about 16 percent (27,000 acres or 109 square kilometers) remain. Some of these areas are expected to become periodically suitable with the input of new aeolian sand, such as occurred in the months/years following the stormflow-generated fluvial deposits upwind during the winter of 2004/2005 (J. Avery and T. Grant, CFWO Biologist, pers. obs. 2006). Other large areas of CVAG modeled habitat are not expected to become suitable habitat in the predicted future, even following larger fluvial deposition events, as these areas are not downwind of expected/current fluvial deposition areas based on mapping of existing floodplain conditions by Griffiths et al. (2002). Based on the available historical and current data for CVFTL habitat, approximately 90-95 percent of historical habitat was lost and currently only 15,000-20,000 acres (6,000-8,100 hectares) remain available (USFWS 2010, p. 20). The Service's GIS analysis (2009) and CVAG mapping (2007) indicate that only 9,000-11,000 acres (3,600-4,500 hectares) of this area has potential to periodically become or remain suitable habitat for CVFTL (USFWS 2010, p. 20).

At listing, the California Natural Diversity Database (CNDDB 2010) indicated there were 118 known occurrences, of which 75 were extirpated and 43 were presumed extant (CFWO Staff 2010, Appendix 1) (USFWS 1980, pp. 63812–63820). Of the 75 known occurrences that were extirpated, only 4 occurred/partially occurred on conservation areas (all within the Santa Rosa & San Jacinto Mountains Conservation Area). In 1994, many researchers believed CVFTL was virtually extirpated outside of three existing conservation areas (Barrows et al. 1995, pp. 137–138). Since listing 17 occurrences have been identified; one of which has been extirpated.

Table 1. Summary of CVFTL habitat within conservation areas (CVAG 2007, p. 9-103).

Conservation Area	***Total Acres of Habitat in Conserv. Area***	***Acres of Disturbance Authorized***	***Acres of Existing Conserva-tion Lands***	***Remaining Acres to be Conserved***	***Total Acres to be conserved in MSHCP Reserve System***	***Designation***
Snow Creek / Windy Point	1,374	130	70	1,174	1,244	Core Habitat
White-water Floodplain	5,617	309	2,532	2,777	5,309	Core Habitat
Willow Hole	897 / 857	74 / 86	157 / 0	666 / 771	823 / 771	Core / Other Cons. Habitat
Edom Hill	120	6	58	56	114	Other Cons. Habitat
Thousand Palms	3,962 / 3	93 / 0	3,035 / 2	834 / 1	3,869 / 3	Core / Other Cons. Habitat
East Indio Hills	824	70	123	631	754	Other Cons. Habitat
Santa Rosa & San Jacinto Mountains	122	10	22	90	112	Other Cons. Habitat
Total - All Habitat	13,776	778	5,999	6,999	12,998	--
Total - Core Habitat	11,850	606	5,794	5,451	11,245	--
Total - Other Cons. Habitat	1,926	172	205	1,549	1,754	--

These are not likely new occurrences, but rather newly identified occurrences that were extant at listing. There are currently 59 known occurrences of CVFTL in the Coachella Valley that are presumed extant (Figure 1; Appendix 1). CNDDB data (2010) indicates 18 extant occurrences of CVFTL outside of conservation areas. Of these known occurrences, 3 are located east of the East Indio Hills Conservation Area, 6 are north of the Willow Hole Conservation Area, 5 are west of the Thousand Palms Conservation Area, and 4 appear on what is known as the Big Dune

area (Figure 1). CNDDB data (2010) and CFWO staff (2010) indicate there are currently 41 presumed extant occurrences of CVFTL that exist partially or completely within six of the seven newly formed conservation areas under the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP): Thousand Palms Conservation Area, Whitewater Floodplain Conservation Area, Willow Hole Conservation Area, Edom Hill Conservation Area, Snow Creek/Windy Point Conservation Area, East Indio Hills Conservation Area, and Santa Rosa & San Jacinto Mountains Conservation Area). The majority of occurrences (34) are located on private lands and afforded protection by the CVMSHCP of which 90 percent of the land must remain as open-space and 10 percent may be developed under the CVMSHCP (CVAG 2007, p. 4-18, Table 4-7). Of the currently presumed extant occurrences within conservation areas (41), only 7 occur or partially occur on non-private lands: 2 on lands owned by the Bureau of Land Management, 3 on lands owned by the Center for Natural Lands Management, and 2 on lands owned by the Coachella Valley Water District (Appendix 1).

The creation of the CVMSHCP resulted in the subsumation of three existing reserves (Thousand Palms, Whitewater Floodplain, and Willow Hole/Edom Hill) established by the FTLHCP and resulted in the creation four conservation areas (Thousand Palms, Whitewater Floodplain, Willow Hole, and Edom Hill) that support CVFTL habitat. The CVMSHCP also conserved habitat for the species in the creation of the Snow Creek/Windy Point Conservation Area and other areas required for maintaining crucial ecological processes in the creation of the East Indio Hills Conservation Area and Santa Rosa & San Jacinto Mountains Conservation Area. The CVMSHCP modeled 27,070 acres (10,955 hectares) as habitat for CVFTL (USFWS 2008, p. 260). Modeled habitat consists of "core habitat" and "other conserved habitat" (USFWS 2008, pp. 262). Core habitat is intended to protect large habitat blocks that support large populations of covered species, their habitat, and the natural processes on which they depend (USFWS 2008, p. 152). Other conserved habitat are lands that have conservation value and may include essential ecological processes, biological corridors, linkages, buffering from edge effects, enhanced species persistence probability in proximate core habitat, genetic diversity, recolonization potential, and flexibility in the event of long-term habitat change (USFWS 2008, p. 152). Acreage specific to these habitat designations in conservation areas are discussed in Table 1.

Thousand Palms Conservation Area:

The Thousand Palms Conservation Area is located in the north-central portion of the Valley and contains the largest amount of remaining contiguous extant habitat for CVFTL and likely the most robust population of the species. Within this conservation area, 901 acres (365 hectares) of lands are designated as critical habitat (USFWS 2010, p. 30). The FTLHCP estimated 5,201 acres (2,100 hectares) of occupiable habitat in the Preserve in 1985. With the section 10 permit approval of the CVMSHCP in 2008, the FTLHCP was subsumed and the Thousand Palms Reserve is now included within the larger Thousand Palms Conservation Area (CVAG 2007, p. 9-103). The CVMSHCP estimated 3,962 acres (1,603 hectares) of core habitat existed in this conservation area in 2007 (USFWS 2008, pp. 262–266), with approximately 620 acres (250 hectares) of high-function dune habitat (USFWS 2008, pp. 225). An additional 3 acres (1 hectare) of other conserved habitat supporting small populations of CVFTL in sand source areas

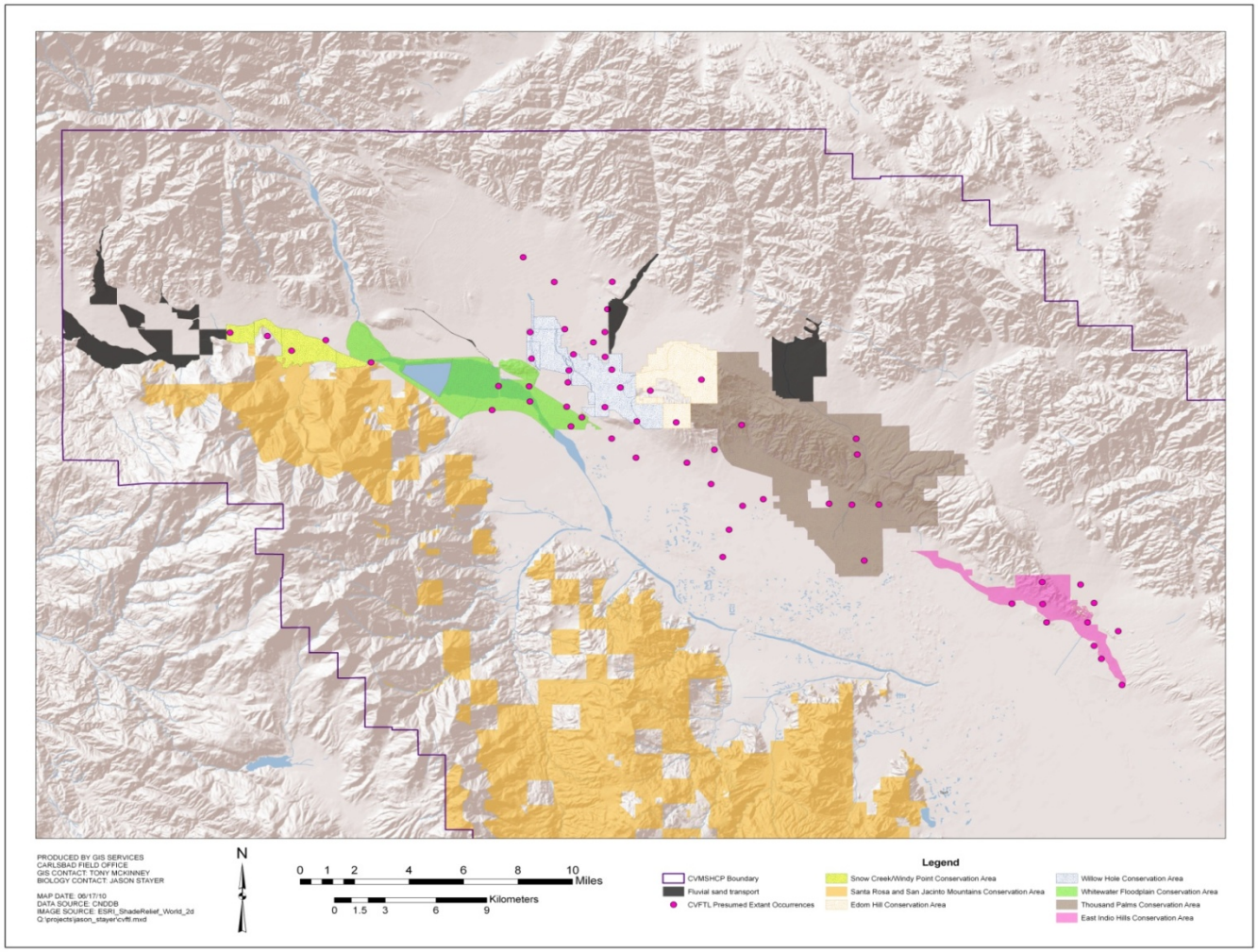

Figure 1. Distribution of Coachella Valley fringe-toed Lizards occurrences presumed extant among seven conservation areas (six of which are occupied by CVFTL) created by the CVMSHCP and their current sand transport systems (CFWO GIS 2010).

was also estimated by the CVMSHCP (USFWS 2008, pp. 262–266). The CVMSHCP model is likely an overestimate of currently occupied or suitable habitat; total CVFTL habitat in this area is approximately 1,850 acres (750 hectares) (USFWS 2008, pp. 273–274).

According to CNDDB data and CFWO staff (2010), there are currently seven occurrences that are located partially or completely within the Thousand Palms Conservation Area. CVFTLs are often found in sandy inter-dune areas consisting of aeolian sand hummock habitat, although these areas likely function as connections between dunes that would otherwise be isolated (Barrows 2006b, p. 515). Approximately 1,236 acres (500 hectares) of inter-dune habitat (Barrows 2006b, p. 521) existed in the Thousand Palms Conservation Area in 2006. The apparent decline in habitat area by approximately 64 percent (estimated as 5,201 acres/2,100 hectares in 1985, to 1,856 acres/750 hectares in 2000) likely resulted from improved estimates of habitat in the conservation area and from a reduction in habitat over time due to sand depletion caused by aeolian erosion of blowsand out of the conservation area from 1985 to 2000.

Monitoring began in what is now the Thousand Palms Conservation Area in 1986 using a transect methodology (Chen et al. 2006, p. 29). Results suggest large annual fluctuations in the population index (survey numbers), primarily correlated with yearly precipitation (Barrows 2006b, p. 514). The population index in the Thousand Palms Conservation Area displayed a negative trend during droughts, but a positive trend during wetter seasons over the last two decades (Barrows 2006b, p. 514). During droughts, population (survey count) numbers within the Thousand Palms Conservation Area dropped to levels near zero, but rebounded during periods of average rainfall (Barrows 2006b, p. 520). This transect methodology did not have the sensitivity to determine densities or census population sizes.

Whitewater Floodplain Conservation Area:

The Whitewater Floodplain Conservation Area is located in the northwest portion of the valley and contains the most intensively studied population of CVFTLs (CVAG 2007, p. 9-105). The FTLHCP estimated 2,042 acres (826 hectares) of occupiable habitat in the Whitewater Floodplain Reserve in 1985. With the introduction of the CVMSHCP in 2005, the FTLHCP was subsumed and the Whitewater Floodplain Preserve is now part of the much larger Whitewater Floodplain Conservation Area. This conservation area includes 5,617 acres (2,273 hectares) of core habitat (USFWS 2008, pp. 262–266). The CVMSHCP model likely overestimated the currently occupied or suitable habitat for CVFTL in this conservation area. Based on field reviews and aerial photos, our estimates indicated that about 1,000 acres of habitat suitable for CVFTLs in the Whitewater Floodplain Conservation Area was extant in early 2005 and large areas of modeled habitat (approximately 4,500 acres) were found to be devoid of substantial blowsand deposits and were unsuitable at that time (J. Avery and T. Grant, CFWO Biologist, pers. obs. 2007). A limited portion of these areas received new ephemeral blowsand deposits following stormflow sediment deposits upwind during the winter of 2004-2005.

According to CNDDB data and CFWO staff (2010), currently eight occurrences are located partially or completely within the Whitewater Floodplain Conservation Area. CVFTLs previously occupied most of the floodplain (The Nature Conservancy 1985, p. II-33, 36). Over that last several decades, artificial modification of a large section of the Whitewater River

floodplain (effectively restricting the river to a small portion of its historical floodplain for approximately 5 to 6 kilometers (3 to 4 miles) downstream from Windy Point), to accommodate approximately 900 acres of water percolation ponds, has changed fluvial sediment deposition in the floodplain (Griffiths et al. 2002, p. 23). These changes have restricted blowsand habitat and CVFTLs to the northeast part of the floodplain (northeast of the current Whitewater River main channel (Figure 2)). Additionally, due to a reduced supply of blowsand from upwind, the habitat in this area is likely more transitory (episodic) than it was several decades ago (Grant and Groom, unpubl. data 2007). Within the Whitewater River floodplain area, the Palm Springs train station habitat area and a few small areas with substantial blowsand deposits at the eastern end of the Whitewater Floodplain Conservation Area provide essential refugia for CVFTLs during extended droughts (Avery, pers. obs. 2007). Almost all of the Whitewater River floodplain was severely depleted of blowsand during the extended drought that ended in 2005. Extensive areas south of the Whitewater River, though modeled as habitat by CVAG, are devoid of the levels of surface blowsand required by CVFTLs (Avery, pers. obs. 2007). These areas are not expected to receive substantial blowsand influx under current ecosystem conditions without restoration of the fluvial processes of the Whitewater River (Avery, pers. obs. 2007).

Mark-recapture monitoring methodology was used in what is now the Whitewater Floodplain Conservation Area, in which a 5.6-acre (2.3-hectare) plot in the center of the conservation area has been intensively sampled for CVFTLs since 1985 (Barrows et al. 1995, pp. 137–138; A. Muth and M. Fisher, consulting biologist, pers. comm. 2006, p. 1). During drought conditions from 1985 to 1990, the estimated density dropped to 11 adults on the plot. Density within the plot rebounded to 143 in 1996, although drought conditions from 1993 to 2005 resulted in a decrease in the number of lizards (Barrows et al. 1995, pp. 137–138). Only one adult CVFTL was captured within the entire 5.6 acre plot in 2005 (Fisher, pers. comm. 2006, p.1). Results indicate fluctuations in CVFTL numbers (Figure 3) from 1985 to 2005 due to a cyclical rainfall/drought-driven cycle (Barrows et al. 2006, p. 516). These fluctuations are probably greater in the Whitewater Floodplain (than those in Thousand Palms) during extended droughts because of the degradation of fluvial deposits and aeolian processes that would otherwise support blowsand habitat during extended droughts in the Whitewater Floodplain area; the blowsand deposits in the Whitewater Floodplain Conservation Area are shallower, and thus more ephemeral, than those in the Thousand Palms Conservation Area. In 2005 and 2006, habitat conditions in some portions of the Whitewater River floodplain improved due to an influx of new aeolian blowsand deposits following the flood-borne sediment deposits upwind during the winter of 2004-2005 (T. Grant and J. Avery, CFWO biologist, pers. obs. 2006).

Willow Hole and Edom Hill Conservation Areas:

The Willow Hole and Edom Hill Conservation Areas are two contiguous conserved areas located northwest of the Thousand Palms Conservation Area and east of the Whitewater Floodplain Conservation Area. The FTLHCP estimated 1,972 acres (798 hectares) of occupiable habitat in this reserve in 1985 (FTLHCP 1985, p. 47). With the permitting of the CVMSHCP in 2008, the FTLHCP was subsumed and the Willow Hole/Edom Hill Reserve is included within the boundaries of the two mentioned conservation areas. The Willow Hole Conservation Area consists of 823 acres (333 hectares) of core habitat and 857 acres (347 hectares) of other conserved habitat in sand source areas (USFWS 2008, pp. 262–266). The Edom Hill

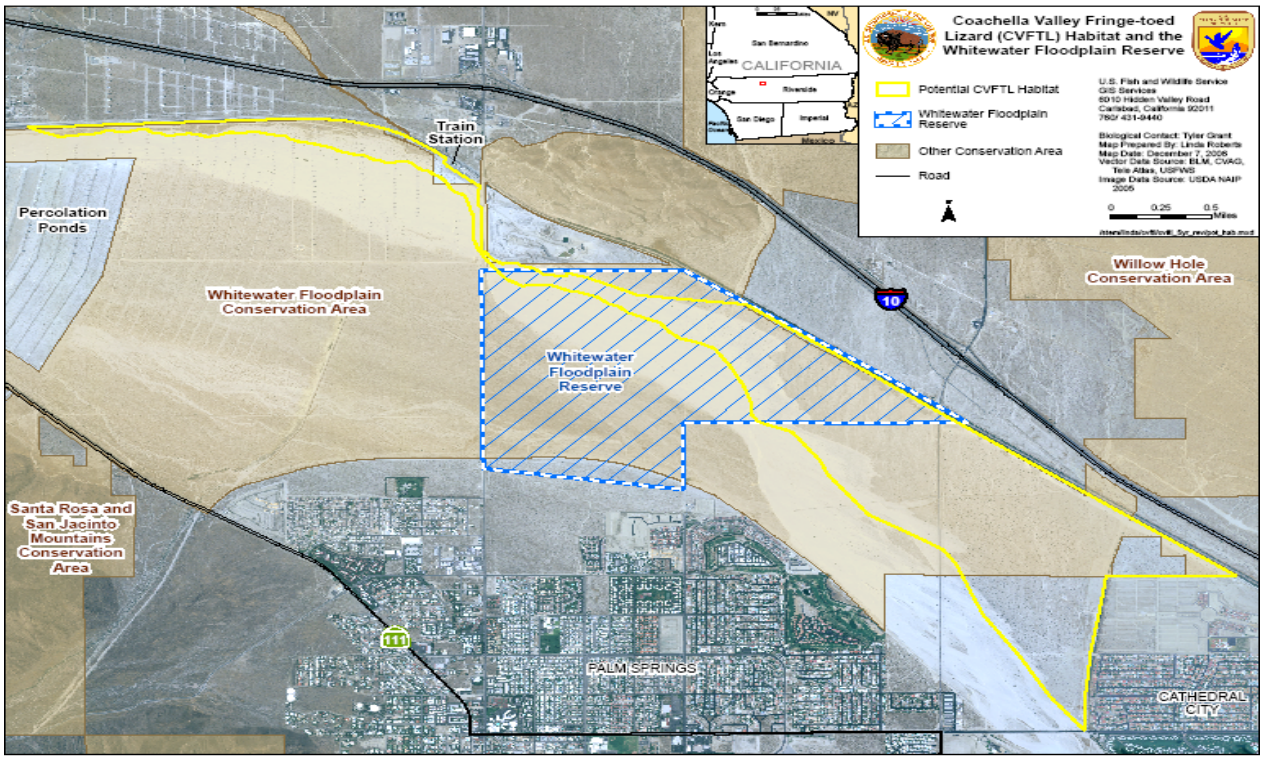

Figure 2. The Whitewater River floodplain and its corresponding land conservation measures: Whitewater Floodplain Reserve (FTLHCP) subsumed by Whitewater Floodplain Conservation Area (CVMSHCP).

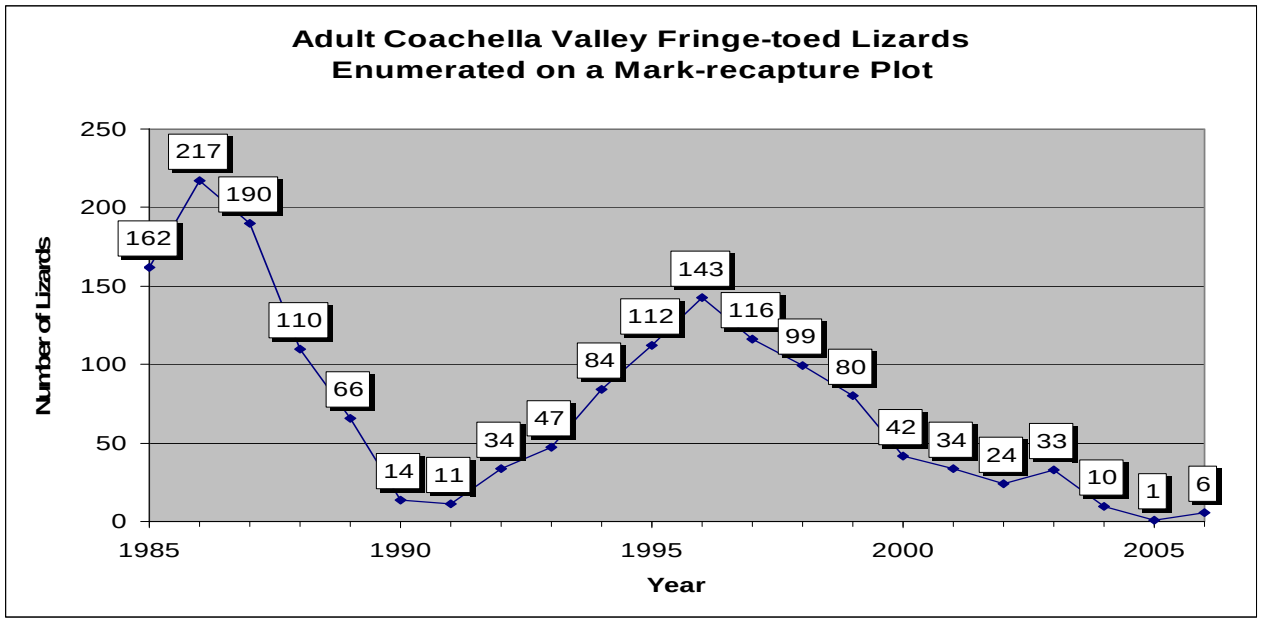

Figure 3. Number of adult Coachella Valley fringe-toed lizards found each year on a 5.6 acre mark-recapture plot in the Whitewater River Floodplain Reserve.

Conservation Area consists of 114 acres (46 hectares) of other conserved habitat (USFWS 2008, pp. 262–266).

According to CNDDB data and CFWO staff (2010), currently 10 occurrences in the Willow Hole Conservation Area and 3 occurrences in the Edom Hill Conservation Area are located partially or completely within their respected conservation area boundaries. Honey mesquite (*Prosopis glandulosa*), which forms dunes or hummocks in the Coachella Valley, occurs along a fault line in the Willow Hole Conservation Area that locally impounds groundwater near the ground surface along the fault. This high groundwater supports the growth of mesquite, resulting in a rough row of mesquite along sections of the Banning Fault, which is a portion of the larger San Andreas Fault (Avery 2005, pp. 1–30). The mesquite plants capture blowing sand over time, creating habitat for CVFTLs in the form of dunes associated with the mesquite hummocks (Griffiths et al. 2002, pp. 4–6). The specific area called Willow Hole lies within a large depression in the ground surface that traps blowsand; the Willow Hole area encompasses the eastern end of the strand of mesquite hummocks along the fault line as well as the Willow Hole depression itself. In the Edom Hill Conservation Area, east and contiguous to the Willow Hole Conservation Area, ravines and hollows in the high-relief ground surface topography capture blowsand in pockets that support what are likely small, patchily distributed CVFTL populations. The largest of these habitat pockets is nearly 35 acres (14 hectares), but most pockets are less than 5 acres (2 hectares) (C. Barrows, consulting biologist, pers. comm. 2006, p. 1).

A monitoring transect was established within the Whitewater Floodplain Reserve, now the Willow Hole Conservation Area, in 1988 and monitored until 2002. Results indicate fluctuations in CVFTL numbers likely due to a cyclical rainfall/drought-driven cycle as seen in the Thousand Palms Conservation Area and Whitewater Floodplain Conservation Area during the same time period. At Edom Hill, CVFTLs typically inhabited relatively small pockets of dune habitat. Minimal monitoring has occurred on this conservation area and thus, little data exists on the status of this population.

Snow Creek/Windy Point Conservation Area:

The Snow Creek/Windy Point Conservation Area is located at the northwestern portion of the Valley and includes what is likely the western end of the species' range. The Snow Creek/Windy Point Conservation Area encompasses most of the potential CVFTL habitat in the local area and contains 1,374 acres (556 hectares) of core habitat designated by the CVMSHCP (CVAG 2007, p. 9-105).

According to CNDDB data and CFWO staff (2010), currently four occurrences are located partially or completely within the Snow Creek/Windy Point Conservation Area. A CVFTL population of unknown size does exist, however this area has received few monitoring surveys since 2003 (T. Grant and J. Avery, pers. obs. 2006). Other substantial populations that existed historically are likely extirpated or now are very small, based on habitat loss from development over the last several decades.

East Indio Hills Conservation Area:

The East Indio Hills Conservation Area is located in the eastern-central portion of the Valley. This conservation area consists of 824 acres (333 hectares) of other conserved habitat designated by the CVMSHCP (USFWS 2008, pp. 262–266). In this conservation area, on the eastern side of the Valley, ravines and hollows in the high-relief surface topography capture blowsand in pockets that support small, patchily distributed CVFTL populations. According to CNDDB data and CFWO staff (2010), currently nine occurrences are located partially or completely within the East Indio Hills Conservation Area. We are unaware of any current monitoring occurring on this conservation area.

Santa Rosa & San Jacinto Mountains Conservation Area:

The Santa Rosa & San Jacinto Mountains Conservation Area is located in the western portion of the Valley. This conservation area consists of 122 acres (49 hectares) of other conserved habitat designated by the CVMSHCP (USFWS 2008, pp. 262–266). There are no known extant occurrences and we are unaware of any current monitoring efforts occurring on this conservation area.

Big Dune area:

The Big Dune consisted of a relatively vast dune area of mostly private or Tribal Reservation lands south of Interstate 10 and east of the Santa Rosa & San Jacinto Mountains Conservation Area. The Big Dune is now largely developed, though individuals were collected from the area in 2006 for genetic research (Hedtke et al. 2007, pp. 412–413) and CNDDB (2010) data indicates occurrences of CVFTL on the Big Dune are presumed to be extant. Populations likely persist on the Big Dune in the center of the Valley on remaining undeveloped sections. However, most researchers do not consider Big Dune as providing long-term habitat for the species due to existing intervening development within the essential sand transport corridor that formerly supported the area (discussed further below). As such, blowsand inputs have been cut off to remaining undeveloped portions of the Big Dune. Limited census population monitoring data available for the remaining isolated and likely small populations, combined with unstable population fluctuations, have made it difficult to determine the status of the species since listing (USFWS 1980, p. 63812).

Habitat or Ecosystem

CVFTL is specialized to occupy a specific habitat type consisting of accumulations of wind-blown (aeolian) sand. Deeper sand deposits with more topographic relief are preferred by the species over flatter sand sheets. These lizards prefer fine sand grains from 0.004 to 0.02 inches (0.1 to 0.5 millimeters) in size (Stebbins 1944, pp. 311–332; Simons, Li and Assoc. 1996, p. 20; Griffiths et al. 2002, p. 7). Barrows (1997, pp. 218–223) indicated that low sand compaction is an important preferred habitat characteristic because it is easier for CVFTLs to burrow in less compact sand. Barrows (1997, pp. 218–223) also indicates that the presence of *Atriplex canescens* (four-winged saltbush), *Salsola tragus* (Russian thistle), and *Dicoria* (Twinbugs) were confirmed as features in high use areas. Because *S. tragus* is listed as a Factor A threat in the

listing rule (USFWS 1980, p. 63818), additional research may be needed to assess its impact on CVFTL habitat.

Since the listing rule we learned there are four main sand transport systems that maintain the ecosystems this species depends upon, including the Thousand Palms system, Whitewater Floodplain system, Willow Hole system, and the Snow Creek system. These systems are composed of sand source areas, fluvial transport zones, fluvial deposition/aeolian erosion areas, wind transport corridors, and aeolian sand deposition areas. Fine sand within CVFTL habitat comes from windblown sand source areas. The Coachella Valley is very windy and prevailing winds come from the west through the San Gorgonio Pass. Winds are stronger/faster in the western part of the Coachella Valley and weaker/slower in the more open eastern portions. Sand and other sediments are eroded from canyons and hillsides surrounding the valley and deposited by flood flows onto alluvial plains and floodplains (e.g., Whitewater River floodplain downstream of Windy Point) (Lancaster et al. 2002, pp. i-51; Griffiths et al. 2002, p. 17). Sand and smaller particles on the ground surface of these plains are subsequently entrained and transported by the wind (Griffiths et al. 2002, pp. 6–8). Wind transport sorts the sediments into finer and heavier components. Finer particles are carried farther and faster, while larger sands drop out sooner (Griffiths et al. 2002, pp. 6–8).

Blowsands are moved by the wind close to the ground surface, compared to smaller particles (e.g., dust) which billow high in the air. Sharp (1964, p. 785) observed that 50 percent of the sediment grains (by weight) in the Valley traveled on the wind within 13 centimeters (5 inches) of the ground, and 90 percent moved within 64 centimeters (25 inches) of the ground. Shrubs, topographic features, and structures slow the wind near the ground surface, causing sand to drop out and accumulate, and dunes and hummocks to form near these features (Simons, Li and Assoc. 1997, p. 4; Griffiths et al. 2002, pp. 6–8). Sand accumulations increase and decrease over time depending on the amount of entrained sand (in the aeolian transport supply from upwind) and wind speeds (Griffiths et al. 2002, pp. 6–8). When upwind sand supply is substantial, temporary accumulations of blowsand build up, creating dunes often lasting for years or decades (Griffiths et al. 2002, pp. 26–40). Without the supply of additional blowsand transported from areas upwind (similar to the dwindling of fluvial sediment deposits during extended droughts/ periods without stormflows), wind erodes blowsands from these temporary aeolian accumulations faster than it is replaced. The result is depleted or eliminated dunes or hummocks, and thus degraded CVFTL habitat (Simons, Li and Assoc. 1996, p. 21; Griffiths et al. 2002, pp. 5–8). Areas without input of sand become “armored” (surface capped by larger materials) as the larger sediments that are not typically carried by the wind remain and the finer sands blow away (Griffiths et al. 2002, p. 38). These areas of depleted blowsands (finer sand particles) do not provide suitable habitat for CVFTLs. Maintenance of these ecosystem processes is therefore essential to sustaining habitat for the species. The four systems are described below: Thousand Palms Sand Transport System, Whitewater Floodplain Sand Transport System, Willow Hole and Edom Hill Sand Transport System, and Snow Creek Sand Transport System.

Thousand Palms Sand Transport System:

The dunes within the Thousand Palms Conservation Area likely formed from large storms events in the Indio Hills around 1890 and 1938 (Lancaster et al. 1993, p. 21). These storm events likely caused large sediment depositions on alluvial fans upwind of the conservation area (Lancaster et al. 1993, pp. 4–30). These sands were entrained by winds and blown to the conservation area, creating the dunes (Lancaster et al. 1993, pp. 4–30). The fluvial and aeolian processes that created the Thousand Palms dunes were likely episodic and not part of a static, continuing phenomenon. Nevertheless, continued smaller inputs of sand help maintain these dunes (Lancaster et al. 1993, pp. 4–30). The large dunes on the Thousand Palms Conservation Area appear to be the result of fluvial deposition events (large infrequent storms) in upwind areas that occurred from 1850-1940 (Lancaster et al. 1993, p. 25). Washes draining the southern flank of the Indio Hills, upwind of the conservation area, are the major source of sediment for the blowsand habitat in the conservation area (Lancaster et al. 1993, p. 21).

In the 1990s, geologists studied a time series (1939-1995) of aerial photographs of the dunes and sand transport corridor in the Thousand Palms Conservation Area (Lancaster et al. 1993, pp. i–38; Simons, Li and Assoc. 1996, pp. 1–51; Simons, Li and Assoc. 1997, pp. i–40). Large areas of mesquite hummocks have disappeared that were clearly visible within the Thousand Palms Conservation Area and environs in historical photographs (Simons, Li, and Assoc. 1996, p. 12; Figure 4). Mesquite hummocks may have historically played an important role in dune formation on the Thousand Palms Conservation Area (Barrows 1996, p. 890), as they locally slowed the wind causing blowsands to drop out and accumulate. When they were alive and foliaged, these mesquite stands helped capture blowsands for the dunes/hummocks of the Thousand Palms Conservation Area (Avery 2005, pp. 1–30; Griffiths et al. 2002, p. 5; Simons, Li, and Assoc. 1997, p. 1). Based on the rate of dune movement in the Coachella Valley, researchers predict that dunes will disappear from the conservation area within 50 years (Simons, Li and Assoc. 1997, p. 20; Lancaster et al. 1993, pp. i–38; Simons, Li, and Assoc. 1996, pp. 1–50).

Whitewater Floodplain Sand Transport System:

In the mid-1980s, fluvial processes in the Whitewater River floodplain were altered by the construction of water percolation ponds by the Coachella Valley Water District in the western Whitewater floodplain (Griffiths et al. 2002, p. 23). The facility consists of a series of retention ponds that impound water from the Colorado River for percolation into the ground to recharge the Coachella Valley aquifer. These ponds cover over 900 acres (364 hectares) of the upper Whitewater River floodplain (Figures 2 and 5) and cause the rerouting of the Whitewater River to a narrow portion of the northern side of the River's original channel and floodplain (Griffiths et al. 2002, p. 23). The reduction in available channel and floodplain during mid-to larger-size flood events has significantly altered fluvial deposition of sediments (Griffiths et al. 2002, p. 23). The fluvial depositional area upwind of the Whitewater Floodplain Conservation Area has been reduced from a historical area of 18.5 square kilometers (7.1 square miles) to 9.3 square kilometers (3.6 square miles) (Griffiths et al. 2002, p. 23). The river historically spread out over a wide portion of the floodplain in this area during larger stormflow events, and deposited sand and other sediments over a wide surface area (Griffiths et al. 2002, pp. 22–25). Sediments are

now only fluvially deposited on the northern side of the floodplain in this region (except in rather infrequent flood events, e.g., 100-year and larger flood events) and the southern portions of the floodplain, having lost their fluvial sand source, and lack sand-dwelling species diversity through aeolian erosion (Griffiths et al. 2002, pp. 4–43). Currently, CVFTLs and their habitat are only found north of the Whitewater River low-flow channel in the Whitewater River Conservation Area.

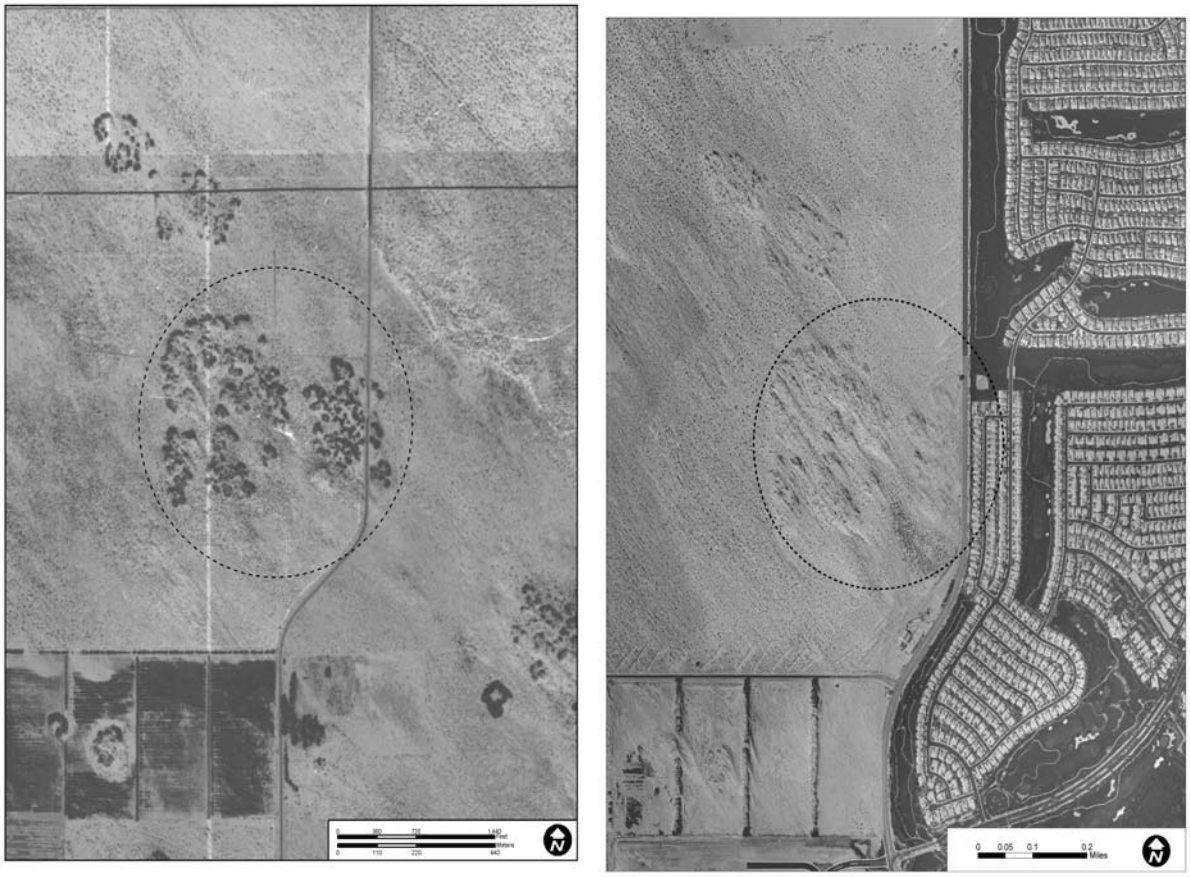

Figure 4. Portion of the Thousand Palms Conservation Area, showing the change in density of a patch of mesquite from 1955 to 2003 (Ball et al. 2005, pp. 900–901).

Willow Hole and Edom Hill Sand Transport System:

The zone between the Morongo Wash and Mission Creek fluvial depositional area (downstream of the Banning Fault) is the most important aeolian sand transport corridor that supports CVFTL habitat in the Willow Hole and Edom Hill Conservation Areas (Griffiths et al. 2002, pp. 15–23). The ecological processes in this area are mostly intact, although some development has occurred in this corridor. The mesquite plants that capture blowsands for the hummocks and dunes along the Banning Fault in the Willow Hole Conservation Area appear to be dying. While this decline in mesquite may be due to a reduction in formerly available groundwater source (Avery 2005, pp. 1–30), mesquite grows on some sites in the southwestern United States without access to adequate ground water and instead relies on shallow lateral roots to supply water (Ansley et al. 1992, p. 339).

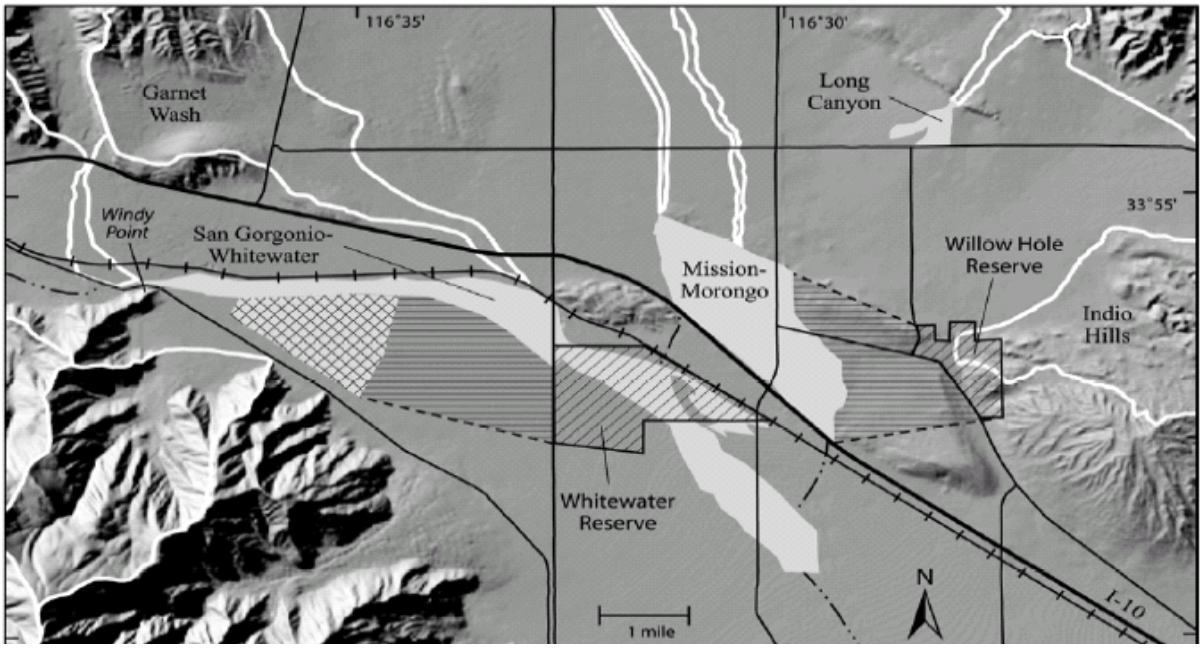

Figure 5. Shaded relief map showing the location of historical predevelopment (black lined) and current (solid white) areas of fluvial deposition for the San Gorgonio-Whitewater River, Mission Creek- Morongo Wash, and Long Canyon drainages. The current (1993) areas of fluvial deposition and the CVWD percolation ponds (hatched lines) in the Whitewater River (Griffiths et al. 2002).

Snow Creek Sand Transport System:

The ecosystem processes that maintain CVFTL habitat in the Snow Creek/Windy Point Conservation Area appear to be intact. However, sand and gravel mining does occur upstream on the San Gorgonio River floodplain, which may reduce sediment loads that reach the Snow Creek/Windy Point Conservation Area during large flood events (Griffiths 2002, p. 21).

Changes in Taxonomic Classification or Nomenclature

No changes in the taxonomic classification or nomenclature of *Uma inornata* has been made since the species was listed in 1980 (USFWS 1980, pp. 63812–63820). This conclusion was supported by Trepanier and Murphy (2001, pp. 327–334) who evaluated the phylogenetics of the three northern species of *Uma*: CVFTL (*U. inornata*), the Mojave fringe-toed lizard (*U. scoparia*), and the Colorado Desert fringe-toed lizard (*U. notata*). The Colorado Desert fringe-toed lizard consists of two subspecies, *U. notata notata* (in California) and *U. notata rufopunctata* (in Arizona), which are geographically separated by the Colorado River. Trepanier and Murphy (2001, pp. 327–334) found, of the four taxa examined, *U. inornata* to be a distinct species that is most closely related to *U. notata*. *Uma inornata* "…is morphologically and genetically distinct" and "…is isolated geographically from other populations, has genetic and morphological traits that are specific to it, and is on a diverging evolutionary trajectory" (Trepanier and Murphy 2001, p. 333).

Genetics

Trépanier and Murphy (2001, pp. 327–334) analyzed nine individuals, from nine locations throughout the CVFTLs range using mitochondrial DNA and found them nearly identical. They found genetic variation among the nine CVFTL individuals to be considerably less than that observed within a single population of *U. scoparia* or *U. notata* (Trépanier and Murphy 2001, p. 331) indicating a recent genetic isolation of CVFTL population. Trépanier and Murphy (2001, p. 331) attribute the genetic homogeneity of CVFTLs to a likely genetic bottleneck and expect continued loss of variability. Hedtke et al. (2007, p. 417) did not confirm evidence of a severe species wide bottleneck, but do confirm that genetic variability within CVFTLs appears low. Trépanier and Murphy (2001, p. 331) and Hedtke et al. (2007, p. 417) both attributed this likely trend of loss of genetic variability to ongoing destruction and degradation of CVFTL sand dune habitats. As noted previously, decreased genetic variation can reduce the ability of the species to adapt to new threats potentially increasing the likelihood of inbreeding.

Species-specific Research and/or Grant-supported Activities

We are aware of no current research or grant-supported activities related to CVFTL.

Five-Factor Analysis

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

The final listing rule (USFWS 1980, p. 63818) identified the following Factor A threats for CVFTL: urbanization, agricultural growth, nonnative invasive plants, off highway vehicle (OHV) activity; Factor B threats: over collection (specifically in the spring of 1978); and Factor D threats: inadequacy of existing regulatory mechanisms. Factor threats C (disease/predation) and E (natural or manmade) were not identified at the time of listing.

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

At listing, urban and agricultural growth, nonnative invasive plant species, construction of windbreaks, and OHV use were identified as threats impacting habitat occupied by CVFTLs (USFWS 1980, pp. 63817–63818). Since listing 72 CVFTL occurrences were extirpated from Factor A threats. Impacts from these threats continue to be rangewide occurrences, except for agricultural growth and new hydrological concerns which are focused threats in portions of CVFTLs range; impacts to the habitat are discussed below.

Urbanization

Urbanization was the predominant threat at listing and continues to impact CVFTL habitat rangewide (USFWS 1980, p. 63818). Impacts from urbanization resulted in direct loss of habitat, fragmentation of habitat, and modification of habitat within the existing conservation

areas, which affect essential ecosystem processes outside the conservation areas. Ecological processes needed to generate blowsand habitat are affected by continued development throughout the Coachella Valley, through alteration of hydrological systems and blocking of winds that move sands along the ground, due to fencing and housing development (Griffiths et al. 2002, pp. 4–8). Since listing (USFWS 1980, pp. 63812–63820), 52 occurrences were extirpated by urban development. Development contributed to rangewide habitat loss, and fragmentation has resulted in the isolation of CVFTL into several likely small remnant or peripheral populations (USFWS 1980, p. 63818; England 1983, p. 151; CVAG 2007, p. 9-103; Hedtke et al. 2007, p. 411). The permitting and implementation of the CVMSHCP in 2008 created seven conservation areas that support modeled habitat for the species (Thousand Palms Conservation Area, Whitewater Floodplain Conservation Area, Willow Hole Conservation Area, Edom Hill Conservation Area, Snow Creek/Windy Point Conservation Area, East Indio Hills Conservation Area, and Santa Rosa & San Jacinto Mountains Conservation Area); these conservation areas assist in the preservation of CVFTL habitat and substantially reduce impacts of habitat loss and fragmentation on numerous species including populations of isolated CVFTL. Of the 59 CVFTL extant occurrences, 41 occur or partially occur on six of the conservation areas (no extant occurrences likely occur on the Santa Rosa & San Jacinto Mountains Conservation Area). Seven of these occurrences are on non-private lands: two on lands owned by the Bureau of Land Management, three on lands owned by the Center for Natural Lands Management, and two on lands owned by the Coachella Valley Water District (Appendix 1). However, three of these occurrences are located in the City of Desert Hot Springs, which is not a permittee under the CVMSHCP (the two on lands owned by the Coachella Valley Water District, which is a CVMSHCP permittee and one occurrence on lands owned by the Center for Natural Lands Management, a land management/conservation organization). The remaining known occurrences (35) are located on private lands within conservation areas; most of these are afforded protection by the CVMSHCP, because 90 percent of the modeled habitat for the species on private lands within conservation areas must be conserved under the plan (USFWS 2008, p. 261). Conversely, the remaining 10 percent of these private lands within conservation areas will subject to take under the CVMSHCP (USFWS 2008, p. 261). Outside of conservation areas and outside of Tribal Reservation lands, most of the CVFTL modeled habitat on private lands is expected to be lost to development (USFWS 2008, p. 275).

The CVMSHCP consists of 27,070 acres of habitat within the plan area (USFWS 2008, p. 260). The CVMSHCP will manage and protect 12,998 acres (5,260 hectares) of CVFTL habitat (5999 acres (2,428 hectares) of habitat occur within existing conservation lands, and 6999 acres (2,832 hectares) remained to be conserved during the term of the permit) in exchange for the maximum potential loss of 13,681 acres (5,585 hectares) of CVFTL habitat within the CVMSHCP plan area (USFWS 2010, p. 54). Within the CVMSHP conservation areas, 778 acres (315 hectares) of CVFTL habitat are authorized for loss; outside of these conservation areas 12,903 acres (5,222 hectares) of modeled CVFTL habitat are authorized for impact on nonfederal lands (CVAG 2007, p. 4-185). Historical data indicates the distribution of CVFTL declined by 80 to 95 percent (CFWO staff estimate; Barrows 2006b, p. 514) throughout the valley. As of 2009 (USFWS GIS staff analysis and aerial photos), approximately 1,741 acres (705 hectares) of CVFTL critical habitat has been disturbed or developed, with 99 percent of this area occurring on private lands (USFWS 2010, p. 55).

All CVAG modeled CVFTL habitat in proposed conservation areas totals about 13,776 acres. Of these 13,776 acres approximately 12,998 acres (approximately 94 percent) would remain conserved after plan implementation (USFWS 2008, p. 262). Under the CVMSHCP, 95 percent of land designated as core habitat (11,850 acres/4,796 hectares) will be conserved in four core habitat areas distributed among four conservation areas (Thousand Palms Conservation Area, Whitewater Floodplain Conservation Area, Willow Hole Conservation Area, and Snow Creek/Windy Point Conservation Area). The CVMSHCP also provides protection for 1,754 acres (710 hectares) of other conserved habitat supporting smaller populations in sand source areas located in five conservation areas (Thousand Palms Conservation Area, Willow Hole Conservation Area, Edom Hill Conservation Area, East Indio Hills Conservation Area, and Santa Rosa & San Jacinto Mountains Conservation Area) to accommodate population fluctuations, provide for genetic diversity, and conservation of the range of environmental conditions that CVFTL are extant (Table 1). Approximately 48 percent (12,998 acres/5,260 hectares) of modeled habitat will be conserved under the CVMSHCP. Within the conservation areas lands exist in sand source areas authorized for disturbance as follows: Thousand Palms Conservation Area (93 acres (38 hectares) of the core habitat), Whitewater Floodplain Conservation Area (309 acres (125 hectares) of core habitat), Willow Hole Conservation Area (74 acres (30 hectares) of core habitat and 86 acres (35 hectares) of other conserved habitat), Edom Hill Conservation Area (6 acres (2 hectares) of core habitat), Snow Creek/Windy Point Conservation Area (130 acres (53 hectares) of core habitat, East Indio Hills Conservation Area (70 acres (28 hectares) of other conserved habitat, and Santa Rosa & San Jacinto Mountains (10 acres (4 hectares) of other conserved habitat (USFWS 2008, pp. 262–267, Table 1). Planning efforts described in the CVMSHCP address the conservation needs of the species, as described in Factor D below.

Agricultural growth

At listing, agricultural growth in the Coachella Valley was a factor of growing concern contributing to habitat loss for CVFTL in what is now known as the Thousand Palms Conservation Area and the East Indio Hills Conservation Area (USFWS 1980, p. 63818). Loss of habitat occurred through replacement of CVFTL dune habitat by agricultural lands. Agricultural growth in this portion of the Coachella Valley has slowed and the acreage of cultivated lands has decreased from 68,200 acres at listing to 56,453 acres in 2007 (Marra 2008, p. 1). Development of agricultural lands no longer appears to be a substantial threat affecting this species, although existing agricultural lands may inevitably be converted for urban development (Marra 2008, p. 1).

Nonnative invasive plants

At listing, *Salsola tragus* (Russian thistle) was discussed as having a detrimental impact on the blowsand ecosystem through the southern and eastern parts of the valley (Thousand Palms Conservation Area), causing stabilization of dune systems and allowing other plant species to invade the area (USFWS 1980, p. 63818). Recent research indicates that *S. tragus* is a confirmed feature in areas of high use by CVFTL and may not be as big a detriment to CVFTL habitat as originally suspected (Barrows 1997, p. 222). CVFTL may benefit by gleaning arthropods from foliage, excavating insect larvae from the base of the plants, and utilizing the plant for shade opportunities during the hottest portion of the day (Barrows 1997, p. 222). However, more

research is needed to assess current impact of *S. tragus* on CVFTL populations. *Salsola tragus* is also known to occur within the East Indio Hills Conservation Area, though no current information exists. The CVMSHCP provides protection to CVFTL in conservation areas from nonnative invasive plants species through land use guidelines restricting the use of specified nonnative invasive plants as landscape treatments within or adjacent to a conservation area (CVAG 2007, p. 4-179).

Brassica tournefortii (Saharan mustard), an invasive plant not discussed in the Recovery Plan, has relatively recently covered large areas of CVFTL habitat and sand source areas in high rainfall years (CALIPC 2006, pp. 1–2; Barrows 2006a, pp. 1–36; Arizona Sonoran Desert Museum 2006, pp. 1–4). In the winter of 2004-2005, above-average precipitation resulted in a rapid expansion/re-occupation of Saharan mustard in most blowsand habitat areas of the valley. CVFTLs will not occupy areas under a thick canopy, as the strong sunlight they require for thermoregulation cannot penetrate and the open spaces they prefer become compromised by thick vegetation (T. Grant, CFWO biologist, pers. obs. 2006). The portions of the Thousand Palms Conservation Area dunes where blowsands were most active (greater aeolian sand movement, less perennial vegetation) had substantially less *B. tournefortii* cover and were the areas where the highest densities of CVFTLs were predictably found (Grant, pers. obs. 2006). Saharan mustard dominated the habitat areas with less active blowsands, thereby restricting useable habitat for CVFTLs during the period of invasion/expansion. Saharan mustard may be a significant threat to CVFTL and its ecosystem, though additional research is needed (CNLM 2007, p. 1; CVAG 2007, p. 228).

Obstruction of Sand Transport Systems

CVFTL occurs in a dynamic system that is dependent on sandy (blowsand) habitat for its continued existence. The sand transport systems that maintain the existing Thousand Palms Conservation Area has been substantially modified or disrupted by development and the construction/planting of windbreaks (Turner et al. 1984, p. 371). The sand transport systems for the Willow Hole Conservation Area, Edom Hill Conservation Area, and Snow Creek/Windy Point Conservation Area are largely intact. Future development in the sand transport corridors that supports these blowsand systems would incrementally block the wind and essential sand needed to feed these systems. At listing, the planting of *Tamarix aphylla* (tamarisk) to relieve areas of urban development and agriculture of blowsand, was considered a threat to this species by acting as a windbreak for blowsand throughout the valley (USFWS 1980, p. 63818). To date, little action has been taken to reduce the amount of *T. aphylla* that occur throughout the valley. We still consider this a secondary threat to the remaining CVFTL occurrences in the Thousand Palms Conservation Area.

Thousand Palms Sand Transport System:

In approximately 50 years, the sand dunes (and most of CVFTL habitat) are predicted to move off the Thousand Palms Conservation Area, because the rate of aeolian erosion off the conservation area exceeds current sand transport onto the conservation area (Simons, Li and Assoc. 1997, pp. 37–40). If the current rate of dune migration continues, the existing dunes will continue migrating downwind an average of 20 to 30 feet (6-9 meters) per year. The sand supply

provided to the conservation area is expected to be extirpated in by 2060 based on current conditions (Simons, Li and Assoc. 1997, p. i).

Creation of new dunes (and habitat) on the Thousand Palms Conservation Area would require a large pulse of blowsand from upwind areas; a pulse of this magnitude is only expected following disturbance associated with very large stormflows (from infrequent storm events) in upwind areas of the Indio Hills and the washes of the Thousand Palms alluvial plain (Simons, Li and Assoc. 1997, pp. i–4). Future large sand inputs that would create new sand dunes would be dependent on the Thousand Palms alluvial plain upwind of the conservation area remaining relatively open. Existing development has stabilized a substantial portion of the Thousand Palms alluvial plain, reducing aeolian sand transport to the conservation area (Simons, Li and Assoc. 1997, pp. 37–40) and further increasing the rate of dune degradation (Simons, Li and Assoc. 1997, p. ii). Parcels within the Thousand Palms sand transport corridor have been acquired under the FTLHCP, which was subsumed by the CVMSHCP (discussed in Factor D below), though escalating land prices have slowed acquisition in recent years. Despite these acquisitions, future development on remaining private parcels in the sand transport corridor would be a significant threat to CVFTL in its habitat. Expected future development would stabilize additional portions of the alluvial plain and further impede essential aeolian sand movement. Thus, future development in this sand transport corridor would likely cut-off an essential portion of the large blowsand pulse input needed to create new "replacement" dunes, as well as the smaller supplemental blowsand inputs needed to slow the degradation of existing dunes in the Thousand Palms Conservation Area.

Whitewater River Floodplain Sand Transport System:

The primary threat to habitat (under Factor A) for CVFTL occurrences on the Whitewater Floodplain Conservation Area is blowsand depletion (Griffiths et al. 2002, p. 41). This conservation area and surrounding areas are subject to stronger winds than the other conservation areas, and blowsand accumulations (aeolian depositions) in habitat areas are shallower in depth and less protected by vegetation; thus, blowsand habitat is eroded away more readily in this high energy wind field when the upwind sand supply is curtailed. The Bureau of Land Management (BLM) is currently considering dust control measures, through the use of chemical suppressants to stabilize soil, on dirt roads that occur on BLM lands in this sand transport system (USFWS 2010, pp. 83–84). These measures could adversely affect CVFTL habitat downwind of this system, by reducing the amount of aeolian sand that could reach the habitat (USFWS 2010, pp. 83–84), the Whitewater Floodplain Conservation Area and Snow Creek/Windy Point Conservation Area would be the most affected by this action.

Big Dune Sand Transport System:

Dense development has occurred since listing (USFWS 1980, pp. 63812–63820) within the aeolian sand supply corridor feeding the Big Dune area, cutting off the blowsand supply (from the Whitewater River floodplain) to the area. Thus, the ecological processes that maintain CVFTL habitat in the long-term have been artificially cut off in the Big Dune area (important quantities of blowsand do not travel over the structural obstructions of development).

Changes in Hydrology

At listing (USFWS 1980, pp. 63812–63820), hydrological changes were not identified as a threat concerning CVFTL populations or its habitat. However, changes in hydrology, specifically due to groundwater pumping and creation of percolation ponds, have affected the habitat of CVFTL and constitute new threats under Factor A (Avery, pers. obs. 2007). Impacts from this threat are more likely to affect the following areas: Thousand Palms Conservation Area, Whitewater Floodplain Conservation Area, Willow Hole Conservation Area, and the Edom Hill Conservation Area.

Thousand Palms Sand Transport System:

Within the Thousand Palms Conservation Area, large areas of mesquite hummocks have disappeared that were clearly visible within historical photographs (Ball et al. 2005, pp. 894–904; Simons, Li, and Assoc. 1996, p. 12; Figure 4). Mesquite hummocks, present historically in the conservation area, likely played an important role in dune formation on the Thousand Palms Conservation Area (Ball et al. 2005, pp. 894–904; Barrows 1996, p. 890; Avery 2005, pp. 1–30; Griffiths et al. 2002, p. 5; Simons, Li, and Assoc. 1997, p. 1). Groundwater well data for the region indicate that water levels have dropped considerably in the aquifer under the conservation area over the last couple decades (CVWD 2005, p. 3-13). Groundwater pumping of the aquifer has likely caused substantial drops in the groundwater level under the conservation area (CVWD 2005, pp. 3-13). Current groundwater levels are likely beyond the reach of mesquite resulting in the potential loss of the mesquite stands that formerly helped the dunes/hummocks of the Thousand Palms Conservation Area (Avery 2005, pp. 1–30; Griffiths et al. 2002, p. 5; Simons, Li, and Assoc. 1997, p. 1). Because of the falling water table, mesquite hummocks may never be restored naturally to the conservation area (Barrows 1996, p. 890), though recent revegetation efforts have demonstrated that mesquite can be established in the Sonoran Desert of California (Bainbridge et al. 2001, pp. 25-29). The lack of mesquite would expedite the loss of blowsand and CVFTL habitat from this conservation area.

Whitewater Floodplain Sand Transport System:

Construction of dikes for the percolation ponds in the Whitewater Floodplain Conservation Area in 1984 caused a reduction in the available floodplain during flood events (Avery, CFWO, pers. obs. 2007). This construction downstream from Windy Point has trapped fluvial sediments upstream from the Whitewater River depositional area and blocked westerly aeolian sand transport from crossing much of the depositional area. Based on Griffiths et al. (2002), the percolation ponds affect the Whitewater River depositional area by depositing aeolian sand downstream out of the desired depositional areas, resulting in less sand being deposited into the Whitewater Floodplain Conservation Area (Figure 6). Sediment delivery in the Whitewater River floodplain sand transport system is highly episodic and long periods of no delivery must be anticipated during drought conditions (Griffiths et al. 2002, p. 41), as compared to the Thousand Palms sand transport system. Depletion of the Whitewater River floodplain sand supply over 12 years (1993-2005) exhausted the available material in the supply area. At the end of the 12-year drought period, degradation of CVFTL habitat caused a fully functioning system to fall to about 1,000 acres of low- to moderate-function by 2005. The mid-size (smaller than 50-year) flood

flows of the Whitewater River have been forced to flow in a narrower northern zone due to construction of the percolation ponds, thus, prohibiting the river from spreading sediment over larger areas so more sediment can be entrained by the wind (Griffiths et al. 2002, pp. 23–42). This change cut the fluvial depositional area upwind of the Whitewater Floodplain Conservation Area in half (Griffiths et al. 2002, p. 23). CVFTL habitat and lizards in this system are only found north and east of the Whitewater River current low-flow channel. Under current conditions for the floodplain, substantial flood sediment-depositing flows are needed more often than once every 12 years to keep sufficient blowsand (and blowsand habitat) in the Whitewater River floodplain sand transport system. Since droughts lasting longer than 12 years have occurred and will occur, current conditions within the floodplain threaten this population (e.g., see Piechota et al. 2004, pp.301–308; Stahle et al. 2000, pp. 121–125; Tarboton 1995, pp. 803–813; Goodrich 2007, pp. 713–738; McKelvey and Johnston 1992, p. 242; Cook et al. 2004, pp. 1015–1018).

Willow Hole/Edom Hill Sand Transport System:

The most important remaining fluvial sand transport system for the Willow Hole Conservation Area and Edom Hill Conservation Area is the Morongo Wash and Mission Creek system. Most of the blowsands for these areas come from the area where Mission Creek and Morongo Wash fluvially deposit sediment south of the Banning Fault line and north of Interstate 10 (Griffiths et al. 2002, pp. 39–40). Mission Creek is currently channelized for several miles upstream of the Fault (where the mesquite strand lies). Because the channelization ends at the fault, sediments continue to be fluvially deposited on the floodplain south of the fault where they are entrained and transported by the wind to the Willow Hole and Edom Hill Conservation Areas (Griffiths et al. 2002, pp. 39–42). Fluvial deposition of sediments from Mission Creek and Morongo Wash are essential for sand influx and the maintenance of habitat in these areas. The Willow Hole and Edom Hill Conservation Area also receive sands from Long Canyon, which emerges from the Little San Bernardino Mountains. A small drainage from the Indio Hills also has supplied sediment to the system, although this drainage has recently become naturally incised and now deposits its sediment load outside the Willow Hole Conservation Area (Griffiths et al. 2002, pp. 17–43). Sand deposits in the Edom Hill Conservation Area appear to have been slowly deposited over the prehistoric past and are apparently not subject to serious depletion like other areas (Griffiths et al. 2002, pp. 17–43).

The mesquite plants that capture the blowsand along the fault in this area rely on groundwater (Sosebee and Wan 1989, pp. 103–118; CVAG 2007, pp. 4–73) and are increasingly threatened by the loss of groundwater from extensive groundwater pumping of the subbasin aquifer (Avery 2005, pp. 1–30). Mesquite in the Willow Hole Conservation Area has been dying back over the last decade or more (CVAG 2007, pp. 10–39; Avery 2005, pp. 1–30; Avery, CFWO, pers. obs. 2007). Water levels have been declining in the Mission Creek Groundwater Subbasin under the Willow Hole Conservation Area since the early 1950s due to naturally scarce annual precipitation and groundwater extractions (DWR 2004, p. 2). Groundwater level data indicate that since 1952, water levels have declined at a rate of 0.5 foot to 1.5 feet per year (DWR 2004, p. 2). The vegetative dieback in the Willow Hole Conservation Area over the last decade is likely caused by a dropping water table in the groundwater subbasin that underlies and provides essential support to mesquite hummocks (Avery 2005, pp. 1–30).

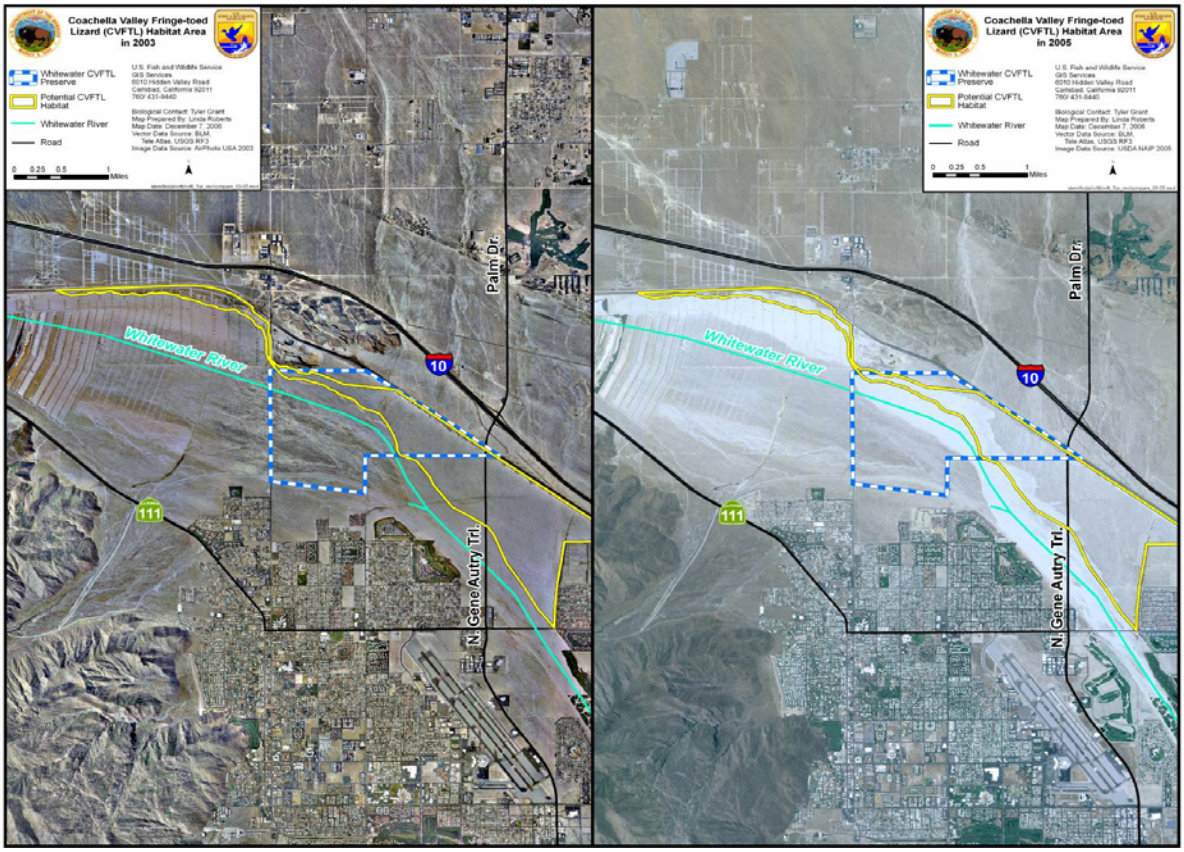

Figure 6. Before (2003) and after (2005) photos showing the influx of blowsand across the northern portion of the Whitewater River floodplain.

Off-Highway Vehicle (OHV) Activity

OHV activity has shown to impact dune habitats by altering vegetation communities, increasing levels of water and wind erosion, and increasing soil compaction (Luckenbach and Bury 1983, pp. 265–286; Lovich and Bainbridge 1999, pp. 309–326). Illegal OHV recreation regularly occurs on most of the remaining habitat areas for the species, primarily in the Whitewater Floodplain Conservation Area and surrounding areas, Willow Hole Conservation Area, Edom Hill Conservation Area, and the Snow Creek/Windy Point Conservation Area. The County of Riverside has recently increased enforcement related to OHV use and BLM has fenced large portions of their lands with CVFTL habitat and will conduct inspections at least every two weeks to determine compliance/effectiveness and document OHV management measures (USFWS 2010, p. 129). OHV use in Coachella Valley remains a current threat impacting CVFTL habitat; additional research is needed to assess this threat.

Summary of Factor A Analysis

In summary, the following threats identified in the listing rule under Factor A are still relevant: urbanization, nonnative invasive plants, construction/planting of windbreaks, and OHV activity. Urbanization is a rangewide threat affecting CVFTL populations by loss, modification, and

fragmentation of habitat. Nonnative invasive plants are a threat to CVFTL populations occurring in the Thousand Palms Conservation Area by causing the stabilization of dune systems, allowing the encroachment of other plant species, and creating thick canopies that restrict penetration of sunlight that is vital for CVFTL thermoregulation. The construction/planting of windbreaks impacts CVFTL habitat in the Thousand Palms Conservation Area, Willow Hole Conservation Area, Edom Hill Conservation Area, and Whitewater Floodplain Conservation Area by obstructing essential blowsand deposits from reaching these areas. Changes in hydrology (groundwater pumping) is a new threat effecting CVFTL habitat in the Thousand Palms Conservation Area, Willow Hole Conservation Area, and the Edom Hill Conservation Area. This lowers the water table and effectively destroys mesquite hummocks that help to accumulate blowsand, which creates the dune systems. The Whitewater Floodplain Conservation Area is also affected by hydrological changes by the construction of percolation ponds on the Conservation Area and causing a reduction in fluvial deposition of sediments, essential for dune rejuvenation. OHV activity continues to be a threat to the Whitewater Floodplain Conservation Area, Willow Hole Conservation Area, Edom Hill Conservation Area, and the Snow Creek/Windy Point Conservation Area through alteration of vegetative communities, increased water and wind erosion, and increased soil compaction. Conservation measures are implemented and planned by the CVMSHCP to minimize the effects of urbanization through the creation of seven conservation areas to assist in the preservation of CVFTL habitat and minimize impacts of habitat loss and fragmentation. Protection is also afforded to CVFTL habitat within the conservation areas through minimizing impact of nonnative invasive plant species by restricting use of these plants into landscapes on or adjacent to the conservation areas. Impacts from Factor A threats continue to be a primary issue facing CVFTL and its habitat.

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

The listing rule reported several instances where CVFTL was subject to over collection, specifically in the spring of 1978, several violations were issued for the over-collection of the species without a license (USFWS 1980, p. 63818). The extent of the problem was not known at the time. We do not have any new information indicating that over-collection violations have occurred. Thus, we do not have any indication that overutilization for commercial, recreational, or educational purpose is a current threat to the species.

FACTOR C: Disease or Predation

Disease or predation was not indicated as threats at the time of listing (USFWS 1980, p. 63818). Currently, there is no evidence of appreciable disease or predation-related threats for this species at this time.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At listing, Riverside County ordinance #529 restricting OHV use on private lands without written permission from the landowner was the only regulatory mechanism that provided some protection for CVFTL (USFWS 1980, P. 63818). The status of regulatory mechanisms with an

impact on CVFTL has changed since listing. Several State, Federal, and local mechanisms provide a conservation benefit to CVFTL, as follows:

State Protections in California

The State's authority to conserve rare wildlife and plants is comprised of three major statutes: CESA, CEQA, and the Natural Community Conservation Planning Act.

California Endangered Species Act (CESA):

Under provisions of CESA (Division 3, chapter 1.5, section 2050 *et seq*. of CFG), the CDFG Commission listed CVFTL as endangered in 1980. CESA includes prohibition forbidding the "take" of CVFTL (Chapter 1.5, Section 2080, CFG code). However, sections 2081(b) and (c) of CESA allow the CDFG to issue incidental take permits for state-listed threatened and endangered species if:

1. authorized take is incidental to an otherwise lawful activity;
2. impacts of the authorized take are minimized and fully mitigated;
3. measures required to minimize and fully mitigate the impacts of the authorized take are roughly proportional in extent to the impact of the taking on the species, maintain the applicant's objectives to the greatest extent possible, and are capable of successful implementation;
4. adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and
5. issuance of the permit will not jeopardize the continued existence of a State-listed species.

California Environmental Quality Act (CEQA):

CEQA is the principal statute mandating environmental assessment of projects in California. The purpose of CEQA is to evaluate whether a proposed project may have an adverse affect on the environment and, if so, to determine whether that effect can be reduced or eliminated by pursuing an alternative course of action or through mitigation. CEQA applies to projects proposed to be undertaken or requiring approval by State and local public agencies (*http://www.ceres.ca.gov/topic/env_law/ceqa/summary.html*). CEQA requires disclosure of potential environmental impacts and a determination of "significant" if a project has the potential to reduce the number or restrict the range of a rare or endangered plant or animal; however, projects may move forward if there is a statement of overriding consideration. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

Natural Community Conservation Plans (NCCP):

In 1991, the State of California passed the Natural Community Conservation Planning Act to address the conservation needs of natural ecosystems throughout the State (CFG 28002835). The NCCP program is a cooperative effort involving the State of California and numerous private and public partners to protect regional habitats and species. The primary objective of NCCPs is to conserve natural communities at the ecosystem scale while accommodating compatible land uses. NCCPs help identify, and provide for, the regional or area-wide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity. Many NCCPs are developed in conjunction with HCPs prepared pursuant to the Act. In August, 2008, NCCP Approval and Take Authorization were issued by CDFG for the CVMSHCP. CVFTL is a "Covered Species" under the CVMSHCP. The specific measures under the CVMSHCP that afford protection to CVFTL are discussed below under the Act.

Federal Protections

Endangered Species Act of 1973, as amended (Act):

Since listing, the Act is the primary Federal law that may provide protection for this species. The Service's responsibilities include administering the Act, including sections 7, 9, and 10. Section 7(a)(2) of the Act requires Federal agencies, including the Service to ensure that actions they fund, authorize, or carry out do not "jeopardize" a listed species or result in the "destruction or adverse modification" of habitat in areas designated by the Service to be "critical." Critical habitat has been designated for this taxon (USFWS 1980, p. 63818). 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 (50 CFR 17.3) 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). Under Section 10(a)(1)(A) of the Act there are provisions for collection of plants or plant parts for scientific purposes or to enhance the propagation and survival of the species. Under section 10(a)(1)(B) the Service may issue "incidental take" (take is defined in section 3(18) of the Act) permits for listed animal species to non-Federal applicants. Take and therefore incidental take protections are not extended to plants. "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). To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved HCP that details measures to [avoid] minimize and mitigate the project's adverse impacts to listed species including listed plants. Issuance of an incidental take permit by the Service is subject to section 7 of the Act; thus, the Service is required to ensure that the actions proposed in an HCP are not likely to jeopardize the animal or plant species or result in the destruction or adverse modification of critical habitat. Therefore, HCPs may provide an additional layer of regulatory protection to animals as well as plants. Section 10(a)(1)(B) of the Act allows for exemptions to take prohibitions under section 9 for animals, it does not allow for similar exemptions for plants. Many NCCPs are developed in conjunction with HCPs prepared pursuant to the Act. The Coachella Valley Fringe Toed-Lizard Habitat Conservation Plan (FTLHCP) and Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) are discussed below.

Coachella Valley Fringe-Toed Lizard Habitat Conservation Plan (FTLHCP):

The FTLHCP covers 17,000 acres (6,880 ha) in Riverside County, California. This plan was prepared by The Nature Conservancy in 1985 and permitted by the USFWS in 1986, which provided incidental take coverage for the species over most of the remaining CVFTL habitat that was available in the Coachella Valley at that time. Smaller designated conservation lands under the FTLHCP were referred to as "reserves" until the plan's subsumation by the CVMSHCP (discussed below), in which larger designated conservation lands are referred to as "conservation areas". The FTLHCP's conservation strategy added afforded protection to CVFTL habitat through the addition of two new reserves to the existing Whitewater Floodplain Reserve, Thousand Palms and Willow Hole/Edom Hill, as part of implementation of the FTLHCP and agreements with BLM to preserve the sand transport systems that rejuvenate core habitat (dunes) essential to CVFTL survival (Figures 7 and 8). However, it was later realized that sand transport areas outside the reserves also needed to be conserved to maintain the ability of the reserves to support CVFTLs.

The conservation goal of the FTLHCP was to preserve the remaining habitat where the sand transport system was known to be still intact. The FTLHCP identified sand transport systems in the Coachella Valley that were still intact and not blocked by development. The Thousand Palms and Willow Hole/Edom Hill Reserves were chosen because their sand transport systems and habitat were still considered functional. Areas such as Big Dune and Snow Creek were not included in the FTLHCP reserve system, because the sand transport systems for these areas were obstructed by existing development. Most sand that supports the Thousand Palms Reserve comes from some relatively small canyons in the Indio Hills and the associated alluvial fans to the northwest (upwind) of the reserve (Lancaster et al. 1993, pp. 21–29). However, much of the essential sand transport corridor between the Indio Hills and the Reserve consists of small parcels owned by many parties. To date, acquisition of a substantial portion of the numerous small parcels that are essential to maintaining the Reserve has been difficult (Grant and Avery, CFWO, pers. obs. 2007).

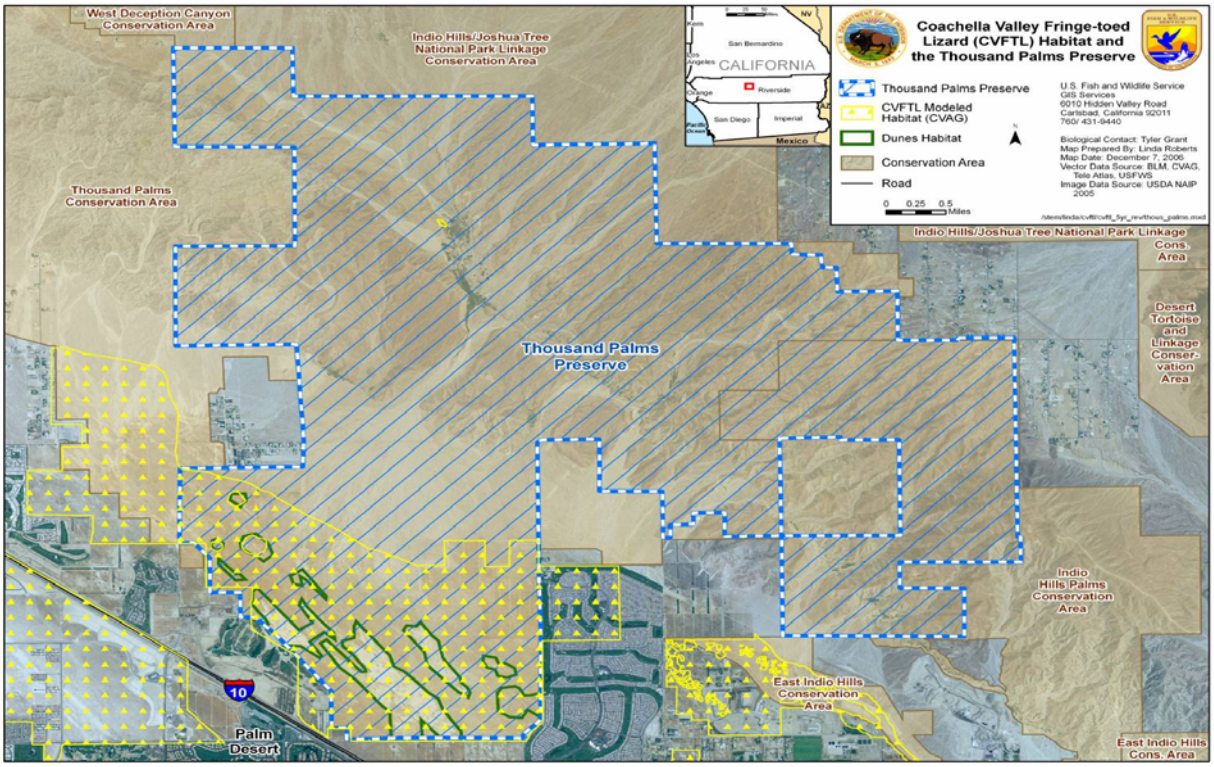

Figure 7. Thousand Palms Reserve as created by the FTLHCP (Griffiths et al. 2002).

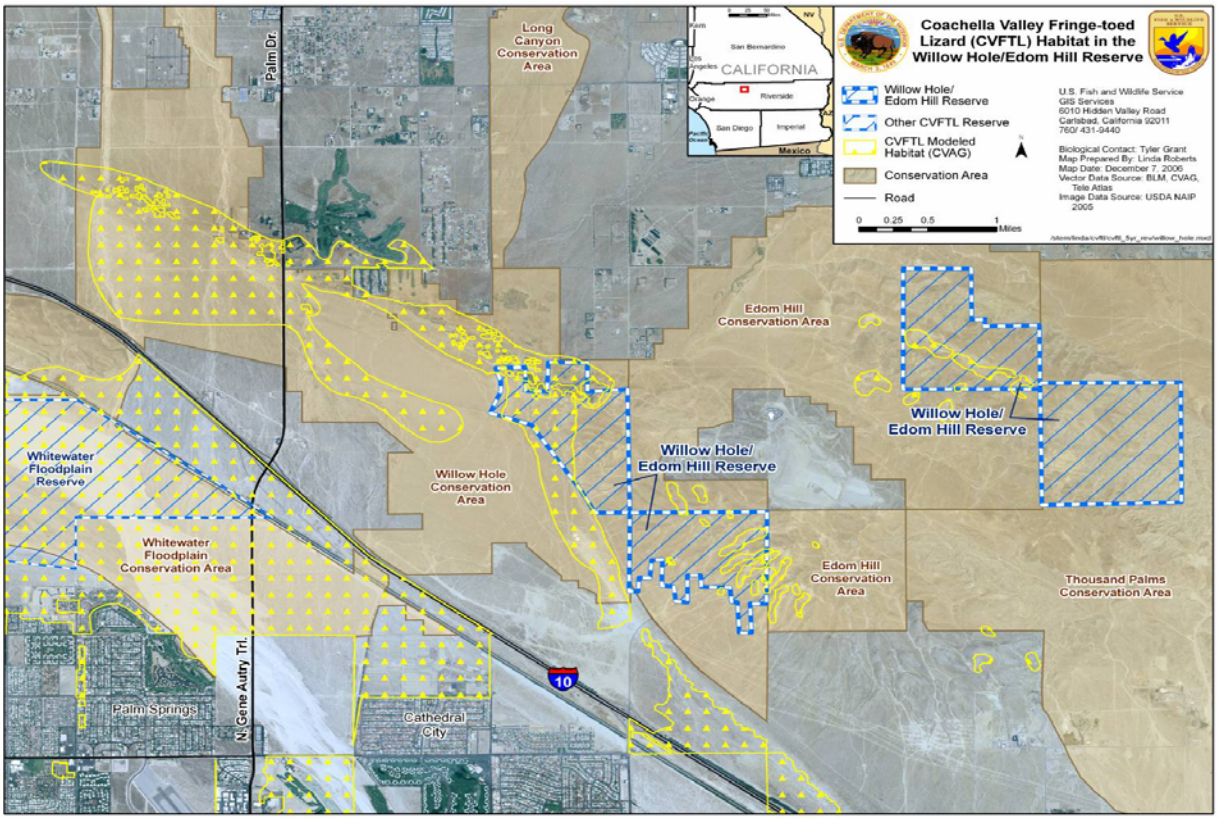

Figure 8. Willow Hole/Edom Hill Reserve as created by the FTLHCP (Griffiths et al. 2002).

In the 1990s, the Service realized that zoning was inadequate to protect most of the essential sand transport areas. In 2001, an addendum to the FTLHCP conserved the sand transport systems for the Thousand Palms Reserve and Willow Hole/Edom Hill Reserve. Development within the essential sand transport corridor continues, while acquisitions have been slow to occur. As a result, the sand transport corridor has become increasingly congested with development over the last two decades, compromising fundamental ecosystem processes related to CVFTL habitat.

As of October 1, 2008 (USFWS 1980, pp. 1-1020) the FTLHCP, including protections warranted to CVFTL, was subsumed by the CVMSHCP.

Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP):

The purpose of this plan is to protect natural communities and various habitats for 27 species found throughout the Coachella Valley, maintain the essential ecological processes to keep these habitats viable and link habitats to maximize the conservation value of the land (CVAG 2007, p. 1-2). This is a multispecies plan and provides coverage for the CVFTL. The biological opinion analyzed the incidental take permit associated into this HCP and concluded it would not likely jeopardize CVFTL. CVMSHCP permitees are required to manage and protect 12,998 acres (5,260 hectares) of CVFTL habitat in exchange for the maximum potential loss of 13,801 acres (5,585 hectares) of CVFTL habitat that existed in 1996 (USFWS 2010, p. 54). The plan creates 125,000 acres (50,586 ha) of new conservation lands throughout the preserve system, which now encompasses 680,000 acres (275,186 ha) of conservation lands. The planning area covers 1.1 million acres of the Coachella Valley. The primary goals of the CVMSHCP are as follows:

1. Protect Core Habitat for 27 species and their natural communities.
2. Maintain the Essential Ecological Processes to keep the Core Habitat viable and link Core Habitat to maximize the Conservation value of the land.
3. Improve the future economic development in the Coachella Valley by providing an efficient, streamlined regulatory process through which development can proceed in an efficient way.
4. Provide a means to standardize mitigation/compensation measures for the Covered Species so that, with respect to public and private development actions, mitigation/compensation measures established by the Plan will concurrently satisfy applicable provisions of Federal and State laws pertaining to Endangered Species protection.
5. Provide for permanent open space, community edges, and recreational opportunities, which contribute to maintaining the community character of the Coachella Valley.

The CVMSHCP also identifies five species specific conservation goals/objectives pertaining to CVFTL as follows:

1. Protection of four core habitat areas comprising 11,245 acres (4,551 ha) that include occupied habitat, and associated essential ecological processes, allowing evolutionary processes and natural population fluctuations to occur. Minimize fragmentation, human-caused disturbance, and edge effects to core habitat by conserving contiguous habitat patches and effective linkages between them:

i. Snow Creek/Windy Point Conservation Area
ii. Whitewater Floodplain Conservation Area (formerly the Whitewater River Floodplain Reserve under the FTLHCP)
iii. Thousand Palms Conservation Area (formerly the Thousand Palms Reserve under the FTLHCP)
iv. Willow Hole Conservation Area (formerly part of the Willow Hole/Edom Hill Reserve under the FTLHCP)

2. Protection of other conserved habitat to provide sufficient area and variety of habitat types to accommodate population fluctuations, allow for genetic diversity, and conserve the range of environmental conditions within which CVFTL is known to occur.
3. The CVMSHCP specifies improved conservation actions to protect the essential ecological processes (sand transport/source systems) that the species depends upon to maintain core habitat and other conserved habitat through the creation of 3 conservation areas.
    i. Edom Hill Conservation Area (formerly part of the Willow Hole/Edom Hill Reserve in the FTLHCP)
    ii. East Indio Hills Conservation Area
    iii. Rosa & San Jacinto Mountains Conservation Area
4. Maintain biological corridors and linkages among all conserved populations.
5. Ensure conservation of CVFTL by maintaining the long-term persistence of self-sustaining populations and conserving habitat quality through biological monitoring and adaptive management actions in the plan area.

Agua Caliente Tribal Habitat Conservation Plan (ACTHCP):

Development is planned on the Agua Caliente Tribal Reservation, outside of USGS section 6 (T4S, R5E, Palm Springs and Cathedral City Quadrangle), which would affect the remaining blowsand habitat. For the benefit of CVFTL the ACTHCP proposes to protect almost the entire floodplain/blowsand portion of USGS section 6 on the Reservation, as well as provide mitigation funds for conservation of additional CVFTL habitat and sand transport areas within the proposed CVMSHCP Conservation Areas.

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 C.F.R. 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.

Summary of Factor D Analysis

At listing, the restriction of OHV use on private lands without written permission was the only regulatory mechanism that provided some protection for CVFTL. Presently, several Federal and State regulatory mechanisms provide discretionary protections, but the Act is the primary law affording protection for CVFTL. The CVFTL is covered under the CVMSHCP, which provides long-term protection of natural communities and maintains the essential ecological processes to keep these habitats viable. The CVMSHCP affords protection to 42 CVFTL occurrences and the sand transport systems through adaptive management of CVFTL habitat. Protections afforded by the plan have helped to preserve CVFTL habitat and minimize further impacts of habitat loss and fragmentation. Protection is also afforded to CVFTL habitat by restricting use of nonnative plant species into landscapes on or adjacent to the conservation areas. Though impacts from development and other threats have been reduced, existing regulatory mechanisms remain inadequate to ameliorate impacts from current threats to CVFTL and their habitat throughout their range.

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

The listing rule (USFWS 1980, 63812–63820) did not identify any threats under Factor E. However, new data indicates that Factor E is an issue for CVFTL. Current threats to the species under Factor E now include: small population size and climate change.

Small Population Size

CVFTL population sizes are unknown within conservation areas, though average census population numbers, based on variable density data and the amount of potential habitat, were estimated for the Whitewater Floodplain Conservation Area and Thousand Palms Conservation Area (CVAG 2007, pp. 9-105, 9-108). Since 1985, studies revealed that this species is subject to large fluctuations in population size (Barrows 2006b, pp. 514–523). A population that fluctuates widely is more likely to decline to a level from which it cannot recover versus a population that remains relatively stable (e.g., Vucetich et al. 1997, pp. 2017–2021). These fluctuations are a threat to the CVFTL due to extremely low numbers reached during declining fluctuation periods. Barrows (2006b, pp. 514–523) suggested that managing for specific population targets for CVFTLs may be inappropriate because it is difficult to "distinguish natural population fluctuations from a downward trajectory of a species at risk of extinction." Barrows (2006b, p. 514) found that during extended droughts, CVFTL population numbers were often near zero, but the populations quickly rebounded during periods of average rainfall, indicating that these extreme population dips were acceptable for considering these isolated populations viable.

The degree of homogeneity within CVFTLs likely reflects a genetic bottleneck and continued loss of gene variability is expected due to ongoing destruction and degradation of CVFTL dune habitat (Trepanier and Murphy 2001, p. 331). The loss of genetic variability in CVFTLs decreases the likelihood that genetic variations, that would likely aid the species' persistence in the future, remain in the population. Frankham (1999, p. 240) indicated that the evolutionary potential (potential for a species to adapt to change over time) of a species is reduced by genetic drift and inbreeding in small populations. This makes a population more prone to extinction or

extirpation from new diseases or other environmental changes (Soulé and Mills 1998, pp. 1658–59; Frankham et al. 2002, pp. 336–358).

The probable extinction of one population of CVFTL in the, formerly designated Thousand Palms Reserve (currently the Thousand Palms Conservation Area) is described in Chen et al. (2006, pp. 28–34) and Barrows (2006b, pp. 514–523). Chen et al. (2006, pp. 28–34) developed a model to predict the time to extinction based on habitat patch size and estimate the propensity of extinction of CVFTLs in habitat patches isolated from other occupied habitat patches. The model predicted that the population on the Thousand Palms Reserve (currently the Thousand Palms Conservation Area) would go extinct in 78 years. This prediction is important because the Thousand Palms CVFTL population is the largest and most robust population for the species. This model is important when considered with the unrelated prediction that the dunes (most of CVFTL habitat) within the Thousand Palms Reserve (currently the Thousand Palms Conservation Area) are expected to disappear in 50 years, as described previously (Simons, Li and Assoc. 1997, p. i). The Chen et al. (2006, pp. 28–34) model illustrates that random events can cause extinction of more moderate-sized populations over several decades.

Data collected at the Whitewater Floodplain Conservation Area suggests this population declined to levels of a low effective population size in 2005 (Frankham et al. 2002, pp. 227–253) and this decline may have negative consequences for the demographic and genetic viability of a population in the long term (Frankham et al. 2002, pp. 227–358, Thomas 1990, pp. 324–325, Lande 1993, pp. 911–927). Genetically bottlenecked populations typically experience substantially lowered reproductive fitness and are more susceptible to extirpation (Reed et al. 2003, pp. 23–34; Briskie and MacIntosh 2004, p. 558).

Little census population data is available for the Willow Hole, Edom Hill, East Indio Hills, Santa Rosa & San Jacinto Mountains, or Snow Creek/Windy Point Conservation Areas due to lack of focused monitoring. Based on available habitat in each of these areas, all populations are likely much smaller than the Thousand Palms population, thus they are subjected to the threats for small populations noted herein. Reed et al. (2003, pp. 28–29) and Vucetich et al. (1997, pp. 2017–2021) demonstrated that minimum viable population sizes should be larger for more variable (fluctuating) populations. Large fluctuations of isolated remaining populations of CVFTLs make the species susceptible to local extirpations in all existing conservation areas, particularly during the expected low population ebbs. Low population ebbs also lead themselves to susceptibility of demographic and environmental stochastic events, as well as random catastrophes and warrant even higher minimum threshold numbers for management actions (Lande 1993, pp. 911–927; Lande 1995, p. 789; Franklin and Frankham 1998, p. 70; Lynch and Lande 1998, p. 70; Thomas 1990, p. 327; Reed et al. 2003, pp. 23–34). These fluctuations also threaten the species with overall extinction, when such threats are considered across the remaining fragmented populations in the conservation areas. Large fluctuations were likely a normal part of the fringe-toed lizard's natural history, however low ebbs (fluctuations) of the populations pose a major threat to the species because of the small population sizes and fragmented configurations of remaining habitat within these conservation areas.

Climate Change

Since listing (USFWS 1980, pp. 63812–63820), potential threats exist to flora and fauna of the United States from ongoing, accelerated climate change (IPCC 2007). Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate intense precipitation events, warmer air temperatures, and increased summer continental winds (Field et al. 1999, pp. 5–10; Cayan et al. 2005, pp. 6–28). Climate modeling for California indicates similar outcomes in temperature and precipitation. Results from a 2007 International Panel on Climate Change assessment indicates a 1-3 degrees Celsius (1.8 to 5.4 degrees Fahrenheit) increase in average temperature by the year 2050 (Cayan et al. 2009, p. 16). Over the same time span, a 12 to 35 percent decrease in precipitation is indicated (Cayan et al. 2009, p. 17). The Desert Research Institute of the Western Regional Climate Center (WRCC) documented in Palm Springs, located in the northern portion of the Coachella Valley, a 4 degree Fahrenheit increase in average temperature since 1950 (WRCC 2010, Figure 9).

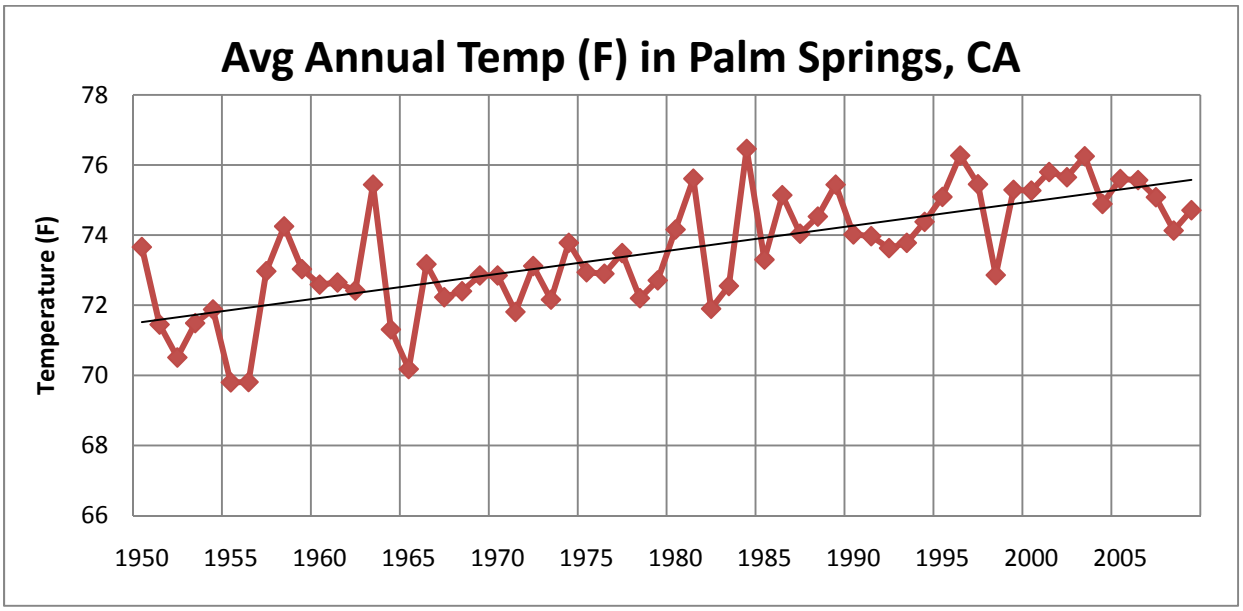

Figure 9. Displays the average annual temperature (degrees Fahrenheit) in the City of Palm Springs, CA from 1950–2006 (WRCC 2010).

Since 1950, the WRCC has shown a steady increase in temperatures throughout the Coachella Valley (Brown et al. 2010). Sinervo et al. (2010, p. 894) utilized a biological model, validated with observed extirpations of 12 local spiny (*Sceloporus)* lizard populations in Mexico, in predicting the extinction of nearly forty percent of all lizard species worldwide by 2080 due to global warming processes. These extinctions were correlated with the warming of sites in spring when reproductive energy demands are highest (Sinervo et al. 2010, p. 894). As daily temperatures become greater, lizard species spend greater amounts of time burrowing or in refuges and less time foraging (Sinervo et al. 2010, p. 894). Significant temperature increases create a stressor for endemic species, which may enhance pressures from competitors, nonnative

species, habitat change, low water supply, and disease. Species must adapt to these pressures *in situ* (in place) or shift their geographic range (Cayan et al 2009, p. 45). Such a shift in range for narrow endemic species such as CVFTL could exceed the tolerance of the species. Additionally, very little available habitat in the Coachella Valley exists to assist this species with a range shift. Though we know little of the adaptive ability of CVFTL, climate change could potentially pose a significant rangewide threat to the species.

Climate change is likely to extend drought conditions in the Coachella Valley that could additionally impact CVFTL by effecting fluvial sand deposits and food abundance. During periods of drought, fluvial sediment delivery to the Coachella Valley floor declines, impacting the rejuvenation of decreasing dune systems (Griffiths et al. 2002, p. 26). Drought conditions also reduce the amount of arthropod populations in the spring, a primary CVFTL food source, compounding the effects of climate change (Durtsche 1995, p. 915; Bolger et al. 2000, p. 1242).

Although more intense precipitation events are expected (Field et al. 1999, pp. 5–10; Cayan et al. 2005, pp. 6–28; IPCC 2007), periodic extended droughts are predicted in the Valley in the foreseeable future based on past climate history gathered from tree ring data (e.g., see Piechota et al. 2004, pp. 301–308; Stahle et al. 2000, pp. 121–125; Tarboton 1995, pp. 803–813; Goodrich 2007, pp. 713–738; McKelvey and Johnston 1992, p. 242). Tree ring data for southern California indicates that during the past 600 years, "dry" periods have averaged more than twelve years in length and intervening "wet" periods were about 10 years in duration (Tevis 1958, p. 701; Cook et al. 2004, pp. 1015–1018). This regional tree ring data is relevant to the Coachella Valley, as Lancaster and others (1993, pp. 22–27) noted that the major variations in precipitation in the Coachella Valley region generally parallel those observed in many areas throughout the southwestern U.S. Some observers have forecasted periods of 20-30 years of protracted drought for the Coachella Valley region in the foreseeable future, partially in response to expected future climate patterns (Griffiths et al. 2002, p. 28; Schmidt and Webb, 2001, pp. 475–478). Should such protracted drought periods occur, the delivery of fluvial sand to the northern Coachella Valley deposition areas (most notably the Whitewater River floodplain system), essential to blowsand transport processes, will be substantially reduced because of the decrease in flood occurrence (Griffiths et al. 2002, pp. 19–28). These predicted droughts may impact the species and its habitat.

Summary of Factor E Analysis

Small population size and climate change are newly recognized Factor E threats facing CVFTLs since listing. More data is needed to fully assess population numbers, however, impacts from population fluctuations, genetic bottlenecks, and population isolation could pose a significant threat for this species rangewide especially when compounded with threats associated in the Factor A analysis. Though currently difficult to quantify, changes in climate including higher temperatures, drought, and longer periods of time between heavy rainfall events pose a significant threat to this species rangewide. Higher temperatures will affect foraging and burrowing behavior of this species and extended periods of drought and stochastic climatic events will affect the seasonal deposition of fluvial sediments needed to rejuvenate decreasing CVFTL habitat.

III. RECOVERY CRITERIA

The Service published a final Recovery Plan in 1985 (USFWS 1985). In general, recovery plans provide guidance to the USFWS, States, and other partners and interested parties on ways to minimize threats to listed species, and on criteria that may be used to determine when recovery goals are achieved. Many paths are available to accomplish the recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded, while other criteria may not have been accomplished. In that instance, we may determine that, over all, the threats have been minimized sufficiently, and the species is robust enough, to downlist or delist the species. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on progress that has been made toward recovery since the species was listed by eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated. The CVFTL Recovery Plan (USFWS 1985) does not have threat-based recovery criteria; however it does contain a step-down outline for actions/objectives that need to be addressed to minimize further decline of the species and degradation of its habitat.

Recovery Criteria

The Recovery Plan (USFWS 1985, pp. 19–28) indicates the primary objective is to minimize further decline of CVFTL and degradation of its habitat by securing and protecting suitable habitat in two or more large-scale protected areas (one consisting of designated critical habitat) within historical habitats that maintain viable, self-sustaining populations, thus, permitting consideration for delisting. The size of the areas to be preserved and the size of CVFTL populations essential to recovery need to be determined. The criterions to accomplish this objective are listed below.

1) To protect, manage, and enhance existing habitat for CVFTL in the Coachella Valley by determining appropriate method(s) to protect habitat; protect critical habitat; protect other areas as needed; monitor existing habitat conditions and distribution of habitat and modify management actions accordingly (habitat surveys); and develop and implement habitat management plan(s) for protected areas (restoration of habitat, evaluation of CVFTL success in restored habitat).

This recovery criterion is still applicable, but not completely up to date. These criterions relate to Factor A threats as they pertain to the protection of CVFTL habitat and essential ecosystem processes, which are imperiled by urban development, nonnative invasive plants, windbreaks, and alterations in hydrology. In 1986 the establishment of the FTLHCP attempted to address the need of two large-scale reserves to protect the remaining critical habitat and sand transport systems essential to CVFTL and its dune habitat through the creation of three reserves in CVFTL

core habitat areas. In 2007 the creation of the CVMSHCP attempted to address these issues even further through the establishment of seven conservation areas (four to protect core habitat, three to protect other areas essential to dune creation processes), which subsumed the FTLHCP reserves and added 125,000 acres of conservation lands. The CVMSHCP assisted in the protection of essential sand-transport systems, but urban development, windbreaks, and alterations in hydrology, as discussed above, continue to act as shields to the blowsands needed for dune creation. Sand fences to trap blowsand deposits have been erected in the Whitewater Floodplain Conservation Area and the Thousand Palms Conservation Area, but are almost completely covered. The Recovery Plan (USFWS 1985, p. 20) called for in its objectives the creation of two or more reserves large enough to sustain a viable CVFTL population so that no natural catastrophe could extirpate it. Though a single large-scale reserve is preferable, it is "unfeasible", because sufficient contiguous habitat does not exist to constitute the creation of a single large-scale reserve. We are not aware of any ongoing monitoring of existing habitat conditions or restoration of habitat within protected areas through the removal of nonnative invasive plant species, removal of windbreaks, or the rehabilitation of abandoned agricultural areas as discussed as objectives of the Recovery Plan.

Alterations in hydrology are a new threat leading to the elimination of dune habitat, as discussed above, that are not mentioned in the Recovery Plan (USFWS 1985). Therefore, new objectives to reduce this threat are needed to allow for the growth of mesquite hummocks that act as anchors for dune systems.

These criterions help reduce loss and modification of CVFTL habitat by eliminating the threat of urban development and help the essential ecosystem processes needed to sustain this habitat through the removal of windbreaks and nonnative invasive plant species.

2) Maintain and enhance CVFTL populations by determining biological requirements (population densities in various habitats, population dynamics, minimum sustainable population size, predator-prey and competitive relationships, key variables of high, medium, and low quality habitats) and utilizing results in management decisions; determine population status regularly (experimental design for sampling plots, establishment of permanent study plots, regular survey of selected plots) and utilize data in management decisions; develop and implement recommendations to maintain CVFTL genetic diversity; determining effects of human-related modifications on CVFTL populations (windbreaks, OHV use, pesticides, and nonnative invasive plants) and utilize data in management decisions; and implement programs to reestablish and evaluate CVFTL in rehabilitated areas under management control (probability of success, site selection, development of habitat management plans, restore sites for testing, reintroduction of CVFTL into restored areas as necessary, monitoring of CVFTL population numbers within restored areas).

This recovery criterion is still applicable, but not completely up to date. These criterions relate to numerous threats as follows: Factor C threats pertaining to effects of predation on CVFTL; Factor E threats pertaining to effects of small population size of CVFTL and its habitat; and Factor A threats, as discussed previously in Recovery Criteria 1, except for OHV usage and effects of pesticides in CVFTL habitat.

Analyses of predator-prey and competitive relationships concerning CVFTL have not been accomplished and are not considered a current threat effecting CVFTL. However, continued encroachment of urban development into or surrounding CVFTL habitat could lead to increasing interactions with domestic predators (i.e., cats) and research should be conducted to examine this possibility. The creation of the CVMSHCP called for the monitoring and establishment of survey protocols for CVFTL and transects line surveys were conducted on the Thousand Palms Conservation Area, Whitewater Floodplain Conservation Area, and Willow Hole Conservation Area. These studies indicate population fluctuations of CVFTL in conjunction with drought/rainfall cycles. Mark-recapture research was also conducted on plots within the Whitewater Floodplain Conservation Area to estimate population size, although this data has not been analyzed. Blood samples have also been acquired from CVFTL in the Coachella Valley to determine a minimum effective population size that would maintain the genetic integrity of CVFTLs throughout its range; however the blood analysis has not been completed. OHV use in CVFTL habitat still occurs in the Snow Creek/Windy Point Conservation Area, Whitewater Floodplain Conservation Area, and the Thousand Palms Conservation Area, which leads to degradation of CVFTL habitat through destruction of plants needed to support CVFTL prey and sand compaction reducing CVFTLs ability to burrow. Pesticide use is not considered a current threat affecting CVFTL and its habitat, though further research is needed to assess its impacts. Other concerns of human-related activities effecting CVFTL occur through climate change, not mentioned in the Recovery Plan (USFWS 1985). Research on climate change currently indicates effects on lizard populations through longer periods of drought and temperatures increases could be detrimental and lead to the extinction of numerous lizard species. No program has been implemented to reestablish and evaluate CVFTL rehabilitated areas.

3) Foster public awareness and support for the conservation of CVFTL and its ecosystem through an education and public awareness program by establishing an interpretive kiosk with self-guided nature trail at reserve sites; prepare periodic press releases on the ecology and status of CVFTL; prepare programs on CVFTL recovery and management and present to schools, clubs, and other organizations; developing and distributing posters on CVFTL for local businesses; and develop and distribute short films on conservation of CVFTL.

These criterions do not pertain to any factor threats concerning CVFTL. Currently two kiosks are located on the Thousand Palms Conservation Area that discuss CVFTL, of which one is now being updated (G. Short, Coachella Valley Preserve Manager, pers. comm. 2010, p. 1). Posters and information packets were developed for CVFTL and can be found at the Thousand Palms Conservation Area Visitor's Center and Sonny Bono Salton Sea National Wildlife Refuge (Short, pers. comm. 2010, p. 1).

4) Utilize existing laws and regulations protecting CVFTL and its habitat by enforcing State and Federal laws; evaluating success of law enforcement; and proposing appropriate new regulations or revisions.

These recovery criterions are still applicable and up to date. These criterions relate to Factor D threats as they pertain to the effectiveness of regulatory mechanisms on CVFTL and its habitat. As stated previously the Act continues to be the most prominent form of protection afforded to CVFTL as a threatened species. The state also currently affords protection to CVFTL as an

endangered species through CESA. The establishment of a reserve system through the creation of the FTLHCP provided a take permit and protection of CVFTL habitat on three reserves until its subsumation by the CVMSHCP. Currently, the CVMSHCP is authorized a take permit and affords protection of habitat and essential ecosystem processes through the creation of seven conservation areas. However, the creation of these conservation areas does not afford protection to certain areas where urban development is increasing and depleting the ability of blowsand deposits to reach the conservation areas and rejuvenate the declining dune systems.

Summary of Recovery Criteria

A portion of each recovery goal has been accomplished, though none of the criteria above were successfully achieved in their entirety. The primary objective of the Recovery Plan is to minimize further decline of CVFTL and degradation of its habitat by securing and protecting suitable habitat in two or more large-scale protected areas (one consisting of designated critical habitat) within historical habitats that maintain viable, self-sustaining populations, thus, permitting consideration for delisting. The creation of the reserve system (FTLHCP) and its subsumation into conservation areas (CVMSHCP) was accomplished, though CVFTL populations are still susceptible to impacts from natural catastrophes. Fostering of public awareness and utilization of regulatory mechanisms through recovery plan goals have been partially accomplished. CVFTL requires continued monitoring and conservation efforts to help restore and protect habitat. Further work is needed to promote conservation of CVFTL and its habitat in the foreseeable future.

IV. SYNTHESIS

The Coachella Valley fringe-toed lizard continues to be impacted by threats from urban development, nonnative invasive plant species, obstructions to sand transport systems, and OHVs and newly identified threats of small population size, alteration of hydrology, and climate change. Since listing the species' distribution has decreased by more than 60 percent and only 43 percent of habitat remains. Declines of CVFTL populations likely will continue, especially in areas authorized for incidental take under the CVMSHCP. However, additional monitoring efforts are needed to fully assess this trend. Regional conservation planning efforts are in place and being implemented to assess these needs, but these efforts will take time to enact due to the limited resources to protect and restore necessary ecosystem processes needed to maintain sustainable population levels in the long-term. Nonetheless, the permitted FTLHCP (1986) and its subsumation into the CVMSHCP (2007) provides needed protection for CVFTL and its habitat. As the Service concluded in our findings on the effect of issuing the incidental take permit for CVFTL and other species addressed in the CVMSHCP, the CVMSHCP will conserve "Core Habitat for the Coachella Valley fringe-toed lizard within the Plan Area and [provide] essential research, monitoring, and management efforts [that] will help sustain the Coachella Valley fringe-toed lizard and support the long-term conservation of this species. Specifically, seven conservation areas were created through the implementation of the CVMSHCP to enhance or support CVFTL populations, essential ecosystem processes, and their habitat. Within six of the newly formed conservation area boundaries 41 known extant occurrences now exist. Seven of the occurrences occur, or partially occur, on conserved lands that are afforded complete

habitat protection by the CVMSHCP. Occurrences that occur on private lands within conservation areas (34) are afforded partial protection where 90 percent of the land is to remain open-space and 10 percent is subject to development.

Long-term impacts from development and the associated changing hydrology outside conservation areas will continue to alter natural sediment deposition in floodplains and likely continue falling groundwater levels potentially threatening mesquite plants and their ability to assist in capturing blowsands anchoring CVFTL dune habitat. Substantial development approved by the CVMSHCP are proposed within aeolian sand transport corridors that support these conservation areas, while restoration activities are needed to address natural infrequent drought cycles affecting fluvial sediment deposits in areas that threaten CVFTL habitat and their populations. This species faces the long-term threat of localized extirpation from natural stochastic events due to small fluctuating populations and climate change factors. Conservation and other regulatory mechanisms are in place to ameliorate the threat of habitat loss, but these mechanisms will take time to reach recovery goals and be fully effective. Little data exists concerning population size for this species throughout its range and additional monitoring is needed to assess current population trends of the lizard. Given the conservation associated with the CVMSHCP and the general long-term nature of the remaining threats facing the species both within and outside the conservation areas, the CVFTL continues to be best described as a species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. As a result, we recommend no change be made to the status of CVFTL, as threatened, at this time.

V. RESULTS

Recommended Listing Action:

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

New Recovery Priority Number and Brief Rationale:

We do not recommend a change in the recovery priority number of 5C at this time. The taxon is a species that faces a high degree of threat and a low recovery potential.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

1. Permanently protect CVFTL dune habitat and the essential fluvial and aeolian ecological processes that sustain this habitat within the six conservation areas (Snow Creek/Windy Point Conservation Area, Whitewater Floodplain Conservation Area, Willow Hole Conservation Area, Edom Hill Conservation Area, Thousand Palms Conservation Area, East Indio Hills Conservation Area) where presumed extant occurrences of CVFTL currently exist. Acquire/protect from development the parcels of suitable habitat throughout CVFTLs range that occur within essential sand transport corridors.

2. Restore mesquite hummocks in the Willow Hole Conservation Area and Thousand Palms Conservation Area, through planting and irrigation, to allow for the rejuvenation of CVFTL dune habitat.

3. Establish a minimum effective population size to ensure the genetic diversity of this species and create additional research opportunities and modeling to determine the necessary habitat required to maintain genetic diversity.

4. Conduct annual monitoring surveys for CVFTL on each of the six conservation areas where presumed extant occurrences are located.

5. Revise the recovery plan to include newly found threats (alterations in hydrology, climate change, and small population size) as they pertain to CVFTL and its habitat.

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Appendix 1: Presumed extant occurrences (CNDDB) of Coachella Valley fringe-toed lizard (*Uma inornata*); prepared for 5-year review, 2010.					
Location	**Element Occurrence Number**	**Year Documented**	**Threat at Listing**	**Current Threats**	**Owner**
Within Conservation Areas Boundaries					
Thousand Palms Conservation Area	EO 25	2005	N/A	Factor A: Development; OHV activity; Nonnative invasive plant species Factor E: Population size; Climate change	Center for Natural Lands Management, Private
	EO 96	1984			Center for Natural Lands Management
	EO 107	1994			Private
	EO 163	1975	Factor A: Development Factor D		
	EO 164				
	EO 235				
	EO 236				
Whitewater Floodplain Conservation Area	EO 94	2001	N/A	Factor A: Development; Nonnative invasive plant species; Factor E: Population size; Climate change	Center for Natural Lands Management
	EO 98	2004			Private-Union Pacific RR
	EO 116	1975	Factor A: Development Factor D		Coachella Valley Water District
	EO 123				Coachella Valley Water District, Private
	EO 119				Private
	EO 138				
	EO 80	1994	N/A		Private-SPRR
	EO 230	2008			BLM, Private
	EO 237	2000			Private
Willow Hole Conservation Area	EO 106	1994	N/A	Factor A: Development; OHV activity; Hydrology Factor E: Population size; Climate change	BLM, Private
	EO 139	2009			Private-SCE
	EO 118	1975	Factor A: Development Factor D		Private
	EO 122				
	EO 129				
	EO 131				
	EO 134				
	EO 135				
	EO 136				
	EO 231				

Edom Hill Conservation Area	EO 97	1994	N/A	Factor A: Development; Hydrology Factor E: Population size; Climate change	Private
	EO 100	1984			Private, Agua Caliente Reservation
	EO 137	1975	Factor A: Development Factor D		Private
Snow Creek/Windy Point Conservation Area	EO 110	1975	Factor A: Development Factor D	Factor A: Development; OHV activity; Nonnative invasive plant species Factor E: Population size; Climate change	Private
	EO 113				
	EO 72	2004	N/A		Private-Union Pacific RR
East Indio Hills Conservation Area	EO 103	1994	N/A	Factor A: Development; Nonnative Invasive Plant Species; Hydrology Factor E: Population size; Climate change	Private
	EO 55	1975	Factor A: Development Factor D		
	EO 176				
	EO 192				
	EO 194				
	EO 195				
	EO 196				
	EO 198				
	EO 199				
Outside Conservation Area Boundaries					
Big Dune Area	EO 141	2000	N/A	Factor A: Development; Hydrology Factor E: Population size; Climate change	Agua Caliente Reservation, Private
	EO 68	1994			Private
	EO 146	1980	Factor A: Development Factor D		
	EO 161	1975			
West of Thousand Palms Conservation Area	EO 140	1975	Factor A: Development Factor D	Factor A: Development; OHV activity; Nonnative invasive plant species Factor E: Population size; Climate change	Private
	EO 144				
	EO 159				
	EO 160				
	EO 148				Private, Agua Caliente Reservation

North of Willow Hole Conservation Area	EO 117	2001	N/A	Factor A: Development; OHV activity; Hydrology Factor E: Population size; Climate change	Private
	EO 125	1994			Center for Natural Lands Management
	EO 29	1968	Factor A: Development Factor D		BLM, Private
	EO 127	1975			Private
	EO 132				
	EO 130				Agua Caliente Reservation
East of E. Indio Hills Conservation Area	EO 193	1975	Factor A: Development, Agriculture Factor D	Factor A: Development; Nonnative Invasive Plant Species; Hydrology Factor E: Population size; Climate change	Coachella Valley Water District
	EO 195				Private
	EO 197				

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

Coachella Valley fringe-toed Lizard
(Uma inornata)

Current Classification: Threatened

Recommendation Resulting from the 5–Year Review:

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

Review Conducted By: Carlsbad Fish and Wildlife Office

FIELD OFFICE APPROVAL:

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

ACTING

Approve _____ Date AUG 0 6 2010

Scott A. Sobiech