

**Annual Progress Report:**  
**Implementation of the**  
**Flat-tailed Horned Lizard Rangewide Management Strategy**

**January 1, 2006- December 31, 2006**

Prepared by the  
Flat-tailed Horned Lizard Interagency Coordinating Committee  
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## EXECUTIVE SUMMARY

The flat-tailed horned lizard is a small horned lizard that inhabits a narrow range within southeastern California, southwestern Arizona, and northwestern Mexico. Much of the species' historic habitat in the United States has been lost due to agricultural and residential development. A Conservation Agreement was signed by several federal and state agencies in 1997 to implement the Flat-tailed Horned Lizard Rangelwide Management Strategy. The Strategy is a long-term plan of action among signatory agencies to ensure persistence of the species. It continues to be implemented by the signatory agencies throughout the Management Areas, the RA, and other areas of flat-tailed horned lizard habitat.

Implementation activities during 2006 included regular coordination between the participating agencies through the Management Oversight Group and Interagency Coordination Committee. Authorized surface impacts remained low in Management Areas. Outreach efforts continued to include the general public and other agencies, such as the U.S. Border Patrol and Mexican agencies, as active participants in implementing the Strategy. Educational videos were produced in 2006 to inform the public and Border Patrol on issues pertaining to flat-tailed horned lizards and their habitat. Agencies conducted population inventories, trend monitoring, and research. Research this year targeted the effectiveness of mitigation measures. This information is useful in developing future management actions and in being able to make better decisions in implementing projects. New lands were acquired within the Borrego Badlands Management Area and agencies continued coordination for the purchase of lands within the East Mesa Management Area.

The proposed rule to list the flat-tailed horned lizard as threatened was restored in 2005. On June 28, 2006, the U.S. Fish and Wildlife Service published a notice in the Federal Register withdrawing the proposed rule, based on the conclusion that the lost habitat is not a significant portion of the range of the species. A new lawsuit was filed on December 11, 2006 in the Arizona District Court challenging the 2003 and 2006 decisions to withdraw the proposed rules to list the flat-tailed horned lizard as threatened.

The participating agencies believe the Flat-tailed Horned Lizard Conservation Agreement and Strategy continue to provide an effective management focus to conserve flat-tailed horned lizard habitat throughout its range. The majority of the tasks outlined by the Strategy are being completed on schedule. Only a few of the tasks are behind schedule.

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## INTRODUCTION

On June 7, 1997, a Conservation Agreement was signed by several federal and state agencies to implement the *Flat-tailed Horned Lizard Rangewide Management Strategy* (RMS). The RMS is a plan of action to conserve the flat-tailed horned lizard (*Phrynosoma mcallii*) (FTHL) in the United States. The FTHL is a small horned lizard that inhabits creosote flats, sand dunes, and mud hills in southeastern California, southwestern Arizona, and northwestern Mexico. Much of the FTHL's historic habitat (possibly as much as 50%) in the United States has been lost due to agricultural and residential development. The RMS and the Conservation Agreement are a long-term agreement among signatory agencies to ensure persistence of the species. A revision of the RMS, with minor changes, was completed in 2003.

The following agencies are signatories to the Conservation Agreement:

- U.S. Fish and Wildlife Service (USFWS), Region 1
- USFWS, Region 2
- Bureau of Land Management (BLM), California State Office
- BLM, Arizona State Office
- Bureau of Reclamation (BR), Lower Colorado Region
- Marine Corps Air Station, Yuma (MCAS-Yuma)
- Naval Air Facility, El Centro (NAF-El Centro)
- Arizona Game and Fish Department (AGFD)
- California Department of Fish and Game (CDFG)
- California Department of Parks and Recreation (CDPR)

The U.S. Border Patrol (BP) at times participates as guests in the Management Oversight Group (MOG) and the Interagency Coordinating Committee (ICC). BP elected to not sign the Conservation Agreement but they continue to work closely with staff at BLM-El Centro.

The Conservation Agreement remains in effect today, and the RMS continues to be implemented by all Conservation Agreement signatory agencies. The RMS requires that an annual report be prepared by the Interagency Coordinating Committee to monitor plan compliance (Planning Action 9.2.4). This is the eighth annual report and covers the period from January through December 2006.

In 2005, the U.S. District Court for the District of Arizona set aside the 2003 withdrawal of the proposed rule to list the FTHL as a threatened species on the grounds that the withdrawal failed to determine whether the lost historical habitat for the FTHL is a significant portion of the range for this species and thereby violated the Endangered Species Act. On December 7, 2005, the USFWS published a Federal Register Notice vacating the 2003 withdrawal and restoring proposed status to the FTHL (70 FR 72776). The comment period was reopened on March 2, 2006, for two weeks (71 FR 10631) and on April 21, 2006, for two weeks (71 FR 20637). On June 28, 2006, the U.S. Fish and Wildlife Service published a notice in the Federal Register

withdrawing the proposed rule, based on the conclusion that the lost habitat is not a significant portion of the range of the FTHL (71 FR 36745). However, a new lawsuit was filed on December 11, 2006 in the Arizona District Court challenging the 2003 and 2006 decisions to withdraw the proposed rules to list the FTHL as threatened.

## **IMPLEMENTATION PROGRESS IN 2006**

Progress toward implementation of Planning Actions within the RMS during this period is summarized below.

### **Planning Action 1. Delineate and designate five FTHL Management Areas and one FTHL Research Area.**

Five Management Areas (MA) and one Research Area (RA) were designated in the Conservation Agreement in 1997 and their boundaries were precisely described. Maps and boundary descriptions are available in the 2003 RMS. Through the following actions prior to this reporting period, all MAs and a portion of the RA were formally adopted within agency environmental and planning documents (see also planning action 6). Prior to formal adoption, all agencies applied provisions of the RMS to these areas.

**Yuma Desert MA:** MCAS Yuma is finalizing an Integrated Natural Resource Management Plan (INRMP) that fully incorporates their portion of the Yuma Desert MA. For their portion of this MA, BR completed a Five-Mile Zone Resource Management Plan in 2004 that incorporated the RMS, including the MA.

**East Mesa, West Mesa, and Yuha Desert MAs:** An Environmental Assessment proposing an amendment to the California Desert Conservation Area Plan to officially adopt these three MAs received no public protests and was signed on February 1, 2005.

**Borrego Badlands MA:** Anza-Borrego Desert State Park's (ABDSP) General Plan was unanimously approved by the California State Parks and Recreation Commission in 2004, giving long-range guidance and planning to the 600,000 acre park and acknowledging the FTHL RMS. A Natural Resources Management Plan to be completed in the near future will more specifically address FTHL management. Boundaries for the Borrego Badlands MA within ABDSP have been delineated in the Borrego Badlands and Clark Dry Lake areas.

**Ocotillo Wells RA:** The BLM portion of the Ocotillo Wells RA was designated in 2003 in an amendment to the Western Colorado Desert Ecosystem Plan. The portion of the RA owned by California State Parks has not been incorporated into planning documents but is managed by Ocotillo Wells State Vehicle Recreation Area (OWSVRA) consistent with provisions in the RMS.

Coachella Valley: BLM-Palm Springs continues to participate in the development of the Coachella Valley Multi-Species Habitat Conservation and Natural Communities Conservation Plan (CVMSHCP) that fully incorporates measures in the FTHL RMS. The CVMSHCP uses an ecosystem/habitat approach and identifies natural communities and sensitive species known or expected to occur in the Plan area. Once finalized and implemented, this Plan is designed to ensure the long-term viability of sensitive-species populations within the Coachella Valley, including the FTHL.

**Planning Action 2. Define and implement management actions necessary to minimize loss or degradation of habitat.**

Drug smuggling, illegal immigration, and associated law enforcement activities continue to impact habitat along the international border, particularly the Yuma Desert MA. Outreach efforts to inform and educate enforcement personnel on FTHL issues continue.

The habitat impacts authorized by managing agencies within the period are shown in Table 1. Included in the remainder of this section is a narrative for each participating agency. For reference, the amount of land owned by each agency in the various MAs is shown in Table 2.

**BLM - El Centro Field Office.**

BLM-El Centro authorized a Right of Way to the Imperial Irrigation District (IID) for construction access for the All American Canal Lining project; however, BLM has not yet collected compensation for this project because these acres will be included with the compensation package for the canal lining. The canal-lining project was postponed due to litigation. Because of the large scale of this project, BLM and the MOG are working together with IID to determine the best method to handle compensation for the entire project.

**BLM - Palm Springs South Coast Field Office.**

BLM-Palm Springs didn't authorize any impacts in FTHL habitat during 2006. They continued to enforce the Windy Point vehicle closure to protect FTHL, should they still be present in this area. BLM rangers continue to patrol the 1000 Palms Preserve, Willow Hole, and Edom Hill to keep out OHVs that may damage FTHL habitat.

**Table 1. Acres of flat-tailed horned lizard habitat authorized for impact by RMS signatories from January to December 2006, and cumulative acres of impacts within the management areas.**

Agency	Within MA		Outside MA (acres)	Total Acres	Acres Impacted to Date in MAs	
	MA	Acres			Total	Percent
Palm Springs BLM	*	0	0	0	*	
El Centro BLM	East Mesa	0	0	0	93.9	0.09
	West Mesa	0	0	0	117.11	0.14
	Yuha Desert	0	0	0	87.7	0.15
Yuma BLM	*	0	0	0	*	
NAF, El Centro	East Mesa	0	0	0	1.0	0.01
	West Mesa	0	0	0	6.0	0.02
MCAS, Yuma	Yuha Desert	0	0	0	10.15	0.01
Anza-Borrego Desert State Park	Borrego Badlands	0	0	0	0	0.00
Ocotillo Wells State Vehicular Recreation Area	*	0	0	0	*	
Bureau of Reclamation	Yuha Desert	0	0	0	15.80	0.10
<b>Total Acres</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>331.66</b>	<b>0.07</b>

\* No land administered within an MA.

**Table 2. Ownership of lands within flat-tailed horned lizard management areas by signatory agencies.**

Agency	MA	Acres as of 1997	Acres acquired since 1997	Total
BLM-El Centro	East Mesa	99,900	720	100,620
	West Mesa	83,200	3,337	86,537
	Yuha Desert	57,200		57,200
NAF-El Centro	East Mesa	8,500		8,500
	West Mesa	29,800		29,800
MCAS-Yuma	Yuma	99,300	15,500	114,800
BR	Yuma	16,200		16,200
ABDSP	Borrego Badlands	36,500	600 765 (A-B Foundation)	37,865

### **BLM - Yuma Field Office.**

BLM-Yuma didn't authorize any impacts in FTHL habitat during 2006. BLM did grant a right-of-way amendment (AZA 33128) to the City of Yuma that disturbed 2 acres within the historic range of FTHL, but the area was previously disturbed. Because the disturbance was not in FTHL habitat, no compensation was collected.

### **Marine Corps Air Station - Yuma.**

No projects subject to the authority of the RMS were authorized by MCAS during 2006. Projects described in the EIS for the Yuma Training Range Complex are not subject to the RMS (Planning Action 2.2.1). The amount of habitat loss resulting from these projects remains unreported and is unknown.

### **NAF-El Centro.**

NAF-El Centro disturbed approximately 1.5 acres of FTHL habitat in the West Mesa MA and 0.5 acres of habitat in the East Mesa MA. This disturbance was the result of a range communication systems upgrade consisting of fiber optic cable installation between target scoring towers. To reduce impacts, trenching was restricted primarily to existing maintenance roadbeds. This disturbance was considered temporary and so is not reported in Table 1.

### **Anza-Borrego Desert State Park.**

No FTHL habitat was lost or degraded due to approved projects conducted or authorized by State Parks within the Borrego Badlands MA. An illegal sand and gravel mining operation on a private in-holding parcel adjacent to Clark Dry Lake began operation in 2005. The access road to this in-holding property passes through ABDSP property within the MA. There have been attempts by the mine operator to expand this dirt access road. ABDSP rangers have halted this road grading and have documented the illegal activity. Documentation has been sent to the Code Enforcement Division of the County of San Diego to have them stop the illegal mining activity until such time as a full environmental review can be conducted. In 2006, the County of San Diego put a cease and desist order into effect on the illegal sand mining operation, which the operator ignored. The County did not pursue taking the operator to court. During 2006, the operator passed away and a new owner has taken control of the property. It is uncertain if the illegal operation will continue.

### **Bureau of Reclamation - Yuma.**

Department of Homeland Security began construction of a vehicle barrier within the 90-foot wide easement that was granted by BR along their portion of the Mexico border in 2005. The easement extends from Avenue H to Avenue C and encompasses 14 acres. The easement is for the construction of the border vehicle barrier, patrol road, and fences. BR required BP to comply

with the mitigation provisions (including compensation) of the RMS for construction within the Yuma Desert MA portion of the easement (reported in 2005). BP did not seek a similar easement for the border east of Avenue C and will be staying within their existing ROW along this portion of the border. No other surface disturbance activities were authorized during 2006.

### **Ocotillo Wells State Vehicular Recreation Area.**

No FTHL habitat was affected by projects or activities this reporting period. A biological monitor trained in FTHL monitoring techniques on a previous project was contracted by a film company to monitor approximately two acres of habitat in OWSVRA in November, 2006. No FTHL, scat, or other evidence was noted. The habitat was not degraded and was restored to previous condition (high-impact OHV open area).

### **Total Habitat Disturbance from January through December 2006.**

During this reporting period, 2.00 acres were reported disturbed. These acres were within the East Mesa and West Mesa MAs and were considered to be temporary.

### **Compensation fund balances.**

As of December 31, 2006, the Yuma MA account (AZ 320 7122 5701) held \$231,369.65. No funds were spent or deposited in 2006. BLM-El Centro currently has an account balance of \$130,845.52 in compensation funds from the East account and \$59,095.63 from the West account.

### **Planning Action 3: Within the MAs, rehabilitate damaged and degraded habitat, including closed routes and other small areas of past intense activity.**

BLM-El Centro has been actively implementing the Western Colorado (WECO) route designation plan (signed on January 31, 2003). Signing for the Yuha Desert, East Mesa, and West Mesa MAs are complete. BLM rangers make routine checks on signs and replace them as necessary. BLM-El Centro continues to update 12 interpretive kiosks within the Yuha Desert and West Mesa MAs with new maps, rider, and lizard information. BLM-El Centro continues to provide regular outreach by producing and distributing maps of the WECO route of travel designations. BLM-El Centro continues law enforcement patrol of all MAs under their jurisdiction and makes regular public enforcement and education contacts.

Through a series of multiple year grants from the California OHV Motor Vehicle Commission, BLM is continuing work on an ambitious restoration program. BLM continued to work with the Student Conservation Association (SCA) to conduct restoration activities in the Yuha Desert, West Mesa, and East Mesa MAs. Archaeological surveys are necessary before implementing restoration and are ongoing concurrently with restoration.

At OWSVRA, approximately 20 acres of mesquite dune habitat and 12 acres of badland/salt-spring habitat were fenced and monitored for rehabilitation.

The SCA crew completed restoration work (closure of unauthorized roads) in the Coachella Valley Preserve and repaired the fence around the Willow Hole portion of the preserve.

**Planning Action 4: Attempt to acquire through exchange, donation, or purchase from willing sellers all private lands within MAs.**

For this annual report period, no private inholdings were acquired within MAs or the RA. All inholdings within the Yuma Desert MA were purchased previously and all land remains federally owned. The Anza-Borrego Foundation purchased six private parcels totaling approximately 745.0 acres within Borrego Badlands MA during 2006. These lands will be transferred to ABDSP in the future, but their conservation is currently assured.

As opportunities arise from willing sellers, BLM-El Centro will make land acquisitions. BLM-El Centro prioritized lands for acquisition in the East Mesa MA and plans to establish priorities in the West Mesa MA when staff and funding are available. BLM is currently working with a number of project proponents to develop agreements to facilitate land purchases.

**Seek funds for land acquisitions in MAs.**

BLM-El Centro is continuing to work with Arizona Department of Transportation to acquire compensation funds for the purchase of lands in the East Mesa MA. BLM-El Centro is continuing to work with the Resource Legacy Foundation and Wildland Conservancy to acquire lands in the West Mesa.

**Planning Action 5: Maintain or establish effective habitat corridors between naturally adjacent populations.**

The MOG and ICC continue to encourage and emphasize the maintenance of habitat connectivity throughout all MAs. USFWS consulted with Department of Homeland Security (DHS) regarding a wall that DHS proposed to construct along the border at the edge of the Yuma Desert MA. The ICC provided recommendations on how to maintain permeability for FTHL so that genetic exchange with Mexico populations could continue.

The recent acquisition of six parcels in Borrego Badlands will aid in maintaining habitat connectivity between the FTHL populations within that MA.

No activities or projects have been permitted within the California MAs or Ocotillo Wells RA this year that would prevent or obstruct FTHL movement between adjacent populations in the MAs or RA.

**Planning Action 6: Coordinate activities and funding among the participating agencies and Mexican agencies.**

**Management Oversight Group.**

The MOG is comprised of managers from 12 offices from the signatory agencies. It meets several times each year to coordinate implementation of the Conservation Agreement in response to recommendations from the ICC. The MOG met on the following dates during 2006:

2 March (MOG/ICC; BLM-Yuma)  
22 August (BLM-El Centro)

Major items discussed by the MOG during 2006 included the use of compensation funds that would result from the Area Service Highway near Yuma, various projects that could impact FTHL habitat, and a need to formalize the process through which the ICC submits funding proposals for monitoring and research projects.

**Interagency Coordinating Committee.**

The ICC is comprised of biologists from 13 offices from the signatory agencies. It meets quarterly to exchange information on research results, develop proposals, and discuss technical and management issues. The ICC is responsible for compiling information for the annual ICC report, which outlines accomplishments under the RMS. The ICC met on the following dates and locations during 2006:

2 March (MOG/ICC; BLM-Yuma)  
14 June (BLM-El Centro)  
14 September (BLM-Yuma)  
2 November (monitoring/research; BLM-El Centro)  
6 December (BLM-El Centro)

Major items that the ICC discussed in 2006 included the use of compensation funds (including the purchase of inholdings within the East Mesa MA), various projects that could impact FTHL habitat, training for monitors, results of monitoring and research, future direction for monitoring and research, completion of informational videos, and the production of new brochures and signs.

## **Coordination with Mexico**

AGFD and USFWS (Arizona Ecological Services Office) continued to meet with staff from the Alto Golfo Biosphere Reserve (AGBR) to discuss issues of common concern. An item that continued to be discussed was a new highway that is being constructed between El Golfo and Puerto Peñasco, passing through FTHL habitat and providing access for tourists, including off-highway vehicle enthusiasts, to the dunes of the Gran Desierto and the beaches on the Gulf. USFWS, AGFD, and AGBR completed a proposal to address these issues to be submitted to the Trilateral Commission for funding.

Previously identified needs continue to be brochures and other interpretive materials to inform visitors of the sensitivity of the area and regulations to protect the environment, including the FTHL; special management areas, equivalent to the MAs in the U.S. need to be identified and managed as such; additional signage and interpretive materials would be needed in support of these areas; meetings of the MOG and/or ICC need to be held specifically to discuss management and research needs in Mexico and projects to support those needs; meetings should ideally be held in Sonora, but must include representatives from AGBR and Pinacate Biosphere Reserves; a Spanish version of the RMS would be useful.

## **Conservation Agreement.**

The 10 agencies that are signatories to the Conservation Agreement to implement the FTHL RMS are listed in the introduction.

## **Incorporate RMS actions in ecosystem plans**

See also Planning Action 1.

The WECO Route of Travel Plan, prepared by BLM-El Centro and signed in January 2003, incorporates the guidelines of the RMS. BLM is managing its lands under those guidelines. BLM-El Centro wrote an Environmental Assessment to Amend the California Desert Conservation Area Plan to officially designate the FTHL MAs. The EA was signed on February 1, 2005, thus formally establishing all three MAs in the El Centro area.

BR continues to implement the Five-Mile Zone Resource Management Plan, adopted March 18, 2004, for withdrawn lands along the five-mile zone that parallels the international border. This RMP incorporated the RMS and is described further in the 2004 FTHL Annual Report.

MCAS-Yuma is finalizing an INRMP which fully incorporates and implements the RMS.

BLM-Palm Springs continues to participate in the development of the CVMSHCP that fully incorporates measures in the FTHL RMS.

## **Border Patrol.**

As reported last year, the ICC coordinated the production of a video intended for training of BP agents to instill a greater respect for the desert among agents, emphasizing techniques they can use to minimize their impacts on FTHL habitat. This project is nearing completion and distribution of videos to BP offices is expected in early 2007.

BLM-El Centro holds monthly coordination meetings with three BP offices and holds regular FTHL orientation sessions with the BP to reduce impacts to FTHL habitat along the international border. In 2006, the National Guard was deployed to assist BP with border activities such as fence construction, camera monitoring, and administration. BLM conducts regular briefings for the troops to ensure that they are aware of FTHL concerns in the desert. This coordination is viewed as a model nationally because of its positive effect on BLM's and BP's ability to accomplish their missions. Because of BP's increased understanding of FTHL and its habitat needs, they are completing their mission while minimizing impacts in FTHL habitat.

BLM-El Centro implemented an ambitious education strategy with BP to reduce impacts to FTHL habitat. This includes Detailer and Post Academy Orientation. Detailed staff and new employees assigned to the El Centro Sector of the BP are given a 1-2 hour presentation on the location of MAs, desert ecology, sensitive species, archeology, and wilderness. Detrimental effects of off-route travel on FTHL habitat is discussed relating to prey, ecology, and habits of the FTHL. This information is provided to all new field agents in the El Centro and Calexico BP stations as part of their new employee orientation. BLM recommends, and will assist with, similar training for enforcement staff in other MAs (e.g. Yuma Desert).

## **Planning Action 7: Promote the purposes of the Strategy through law enforcement and public education.**

### **Law Enforcement.**

BLM-El Centro has continued to increase law enforcement patrols in the FTHL habitat in Imperial County (see description under Planning Action 3 above). Law enforcement reports that the majority of recreational users in the MAs are now following the route designation requirements of staying on approved routes and camping in appropriate areas.

OWSVRA continues to distribute the FTHL information brochure to park visitors and enforce applicable provisions of the agreement. As previously mentioned, ABDSP law enforcement personnel monitor public recreational use of FTHL lands within the park to ensure that regulations are followed. Law enforcement continued to monitor illegal grading within FTHL habitat by an illegal mining operation, and forwarded evidence to the County of San Diego for enforcement action.

MCAS conducted ORV patrols within the Yuma Desert MA and adjacent habitat. MCAS continued to provide standardized FTHL briefings for newcomers to the range.

### **Public Information.**

OWSVRA continues to distribute the FTHL information brochure to park visitors and enforce applicable provisions of the agreement. An informational video on FTHL is now available for public viewing at the reception area of the Ocotillo Wells District Office and Ranger Station.

BLM-El Centro and the National Park Service are preparing an interpretive brochure discussing important resource values in the Yuha basin, such as FTHL. BLM-El Centro continues to maintain informational kiosks and continues to distribute the WECO route of travel area map, which encompasses the Yuha Desert, West Mesa and East Mesa MAs. Furthermore, BLM-El Centro continues public contacts and information dissemination using Park Rangers and the Student Conservation Association crew. BLM-El Centro has extended these contacts into the West Mesa MA and has also partnered with the Desert Protective Council in their securing of a grant to produce and distribute an interpretive brochure of the Yuha area. Additionally, BLM-El Centro has expanded the environmental outreach program in the Imperial Sand Dunes. New interpretive panels that have information about FTHL and other wildlife in the dunes have been placed in the Cahuilla Ranger station. Five new kiosks will be placed in various locations around the dunes. These will have panels that are designed to be removed and moved from location to location so that returning visitors will get to see a variety of information. While there is not yet a panel for FTHL, one will be made available in the future.

As discussed in the previous report, the ICC administered a contract to produce educational videos for BP training and the general public. The general public video is intended to provide information about issues of concern to FTHL and its habitat. Upon completion in early 2007, it will be distributed to schools, OHV groups, conservation groups, civic groups, and will be provided to the public by the signatory agencies.

MCAS continues to give FTHL briefings for minor projects and made FTHL part of the MCAS Yuma range users briefings. MCAS transferred their captive FTHL facility to Arizona Western College (AWC). These FTHL will continue to be used for educational purposes and will now be available for special studies by AWC students.

**Planning Action 8: Encourage and support research that will promote the conservation of FTHLs or desert ecosystems and will provide information needed to effectively define and implement necessary management actions.**

**Research Permitting and Funding**

AGFD issued 12 permits for collecting or handling FTHL during 2006. CDFG issued no new scientific collecting permits during 2006; 2 that were issued in 2005 remained valid. The following studies were funded by signatory agencies or other sources during this reporting period:

OWSVRA self-funded an occupancy study to examine presence/absence. While the primary purpose was to gauge feasibility of a monitoring protocol, the collection of occupancy data was organized in a manner such that ecological questions related to habitat and off-road vehicle use could be pursued at the same time.

AGFD completed the second and final year of a research study to evaluate FTHL use of experimental culverts. A draft abstract appears in this report; the final report for this project will be completed in 2007. AGFD, with funding from MCAS and BR, completed the first year of a two-year study to evaluate the effectiveness of relocating FTHLs. An abstract is included in this report.

The report from a University of Arizona study to analyze microsatellite genetic variation in FTHL throughout its range will be finalized in 2007.

**Planning Action 9: Continue Inventory and Monitoring.**

A summary of past and current inventory and monitoring efforts is provided in Table 3.

Observations of FTHL during the course of biannual reptile surveys and any other incidental sightings in the OWSVRA were recorded in the CDFG California Natural History Database and archived with GPS equipment. FTHL observations by staff during archaeological surveys, ranger patrol, or in the course of maintenance activities were noted.

BLM-El Centro conducted occupancy estimation in the East Mesa MA during summer, 2006. This survey was similar to the study in West Mesa in 2005 with the exception of a larger plot size and more plots were surveyed. Because very few FTHL were found on the 1-ha plots on West Mesa, BLM used a 4-ha plot in East Mesa. This increased the likelihood of FTHL being on the plot. BLM also expanded the sample size from 69 (West Mesa 2005) to 156 (East Mesa 2006).

Because of deteriorated road conditions and increasing traffic, MCAS-Yuma discontinued its long-term surveys of the Auxiliary 2 road which had previously been conducted to assess the number of road kills and to monitor population trends.

USFWS, AGFD, and MCAS completed 15 disturbance transects that had been established in 2002 in the Yuma Desert MA. A report was completed and an abstract appears below.

No FTHL surveys were completed at the Dos Palmas ACEC or at NAF-El Centro in 2006.

Cameron Barrows (Center for Natural Lands Management) continued to survey FTHL at the Coachella Valley Preserve (Thousand Palms portion). The objectives were to determine if population levels can be predicted based on rainfall levels or whether harvester ant abundance proves to be a better predictor.

**Table 3. Summary of estimates of flat-tailed horned lizard populations and occupancy rates for each Management Area from 2002-2006.**

MA	2002	2003	2004	2005	2006
East Mesa	-	20,959 <sup>1</sup> 42,619 <sup>2</sup>	-	-	0.4 <sup>10</sup> (FTHL) 0.93 / 0.71 (scat)
West Mesa	-	2,946 <sup>3</sup> 10,849 <sup>2</sup>	-	0.42 <sup>11</sup>	-
Yuha Desert	17,772 <sup>4</sup> 25,514 <sup>2</sup>	-	56,993 <sup>5</sup> 73,017 <sup>2</sup>	-	-
Yuma Desert	-	16,328 <sup>6</sup> 25,855 <sup>7</sup>	-	-	-
Borrego Badlands	-	-	-	-	-
OWSVRA	-	19,222 <sup>8</sup>	-	23,345 <sup>9</sup>	1.0 <sup>12</sup>

1 using mark/recapture (95% CI. 15,924-25,995)

2 revised estimate calculated by Tyler Grant

3 using mark/recapture (too few FTHL to est. pop. with MARK program)

4 using mark/recapture (95% CI. 16,748-19,066)

5 no method data (95% C.I. 14,597-90,298)

6 using trapping webs (95% C.I. 8,378-31,794)

7 using mark/recapture (95% CI. 16,390-43,951)

8 using mark/recapture (95% C.I. 18,870-26,752)

9 using mark/recapture, adults only (95% C.I. 14,329-69,922)

10 using occupancy (95% C.I. 0.2-0.6)

11 using scat occupancy (95% C.I. 0.27 – 0.58)

12 using FTHL occupancy

The ICC evaluated the success of previous FTHL monitoring efforts and established a plan for future monitoring. Following is a summary:

Monitoring of FTHL using 4-hectare closed mark-recapture plots, as has been done at least once on all the MAs and the RA except for the Borrego Badlands, has successfully generated broad population estimates. The confidence intervals are very wide in a few cases and because we believe the populations fluctuate in size, the ICC believes that another method would be more informative to use in 2007 and beyond.

Monitoring is used to assess the status or “health” of the populations in question. Many different indicators can be informative of “health” and which indicator is used is often a function of conditions specific to the species. Such indicators include population size, density, survival rate, recruitment, population growth rate, or other such metrics. The ICC is proposing a new monitoring regime to monitor the health of FTHL populations in MAs and the RA. The monitoring will consist of occupancy estimation and “sentinel” plots.

Occupancy estimation will give inference about the distribution of FTHLs in the MAs. It will answer the question: Is the distribution of FTHLs in the MAs stable, increasing, or decreasing? This component of the monitoring is meant to detect large-scale changes that reflect large or catastrophic changes in status. The protocol for this method has generally been established in occupancy conducted during the last two years.

The sentinel plots will be a smaller number of plots where more in depth information is collected to further our understanding of the population dynamics of the species. We propose to use a statistical mark-recapture model known as “Robust Pradel”. Robust Pradel models are used to estimate abundance each summer and yearly survival and fecundity rates. These rates are critical to understanding the population dynamics of the FTHL. The Robust Pradel model is a recent extension of the simple Pradel model, which has been used to monitor northern spotted owl.

The summer of 2007 will serve as a pilot study/evaluation of the sentinel plot protocol. Afterwards, the monitoring goal is to conduct surveys every year on every MA and RA for a specified amount of time (e.g. 5 years).

## **CONCLUSIONS**

Signatory agencies continue close cooperation and execution of their respective responsibilities. The FTHL RMS is being implemented throughout the MAs and FTHL habitat by the cooperating agencies. Regular coordination between the participating agencies continues through the MOG and ICC. The participating agencies believe the FTHL Conservation Agreement and RMS continue to provide an effective management focus to conserve FTHL habitat throughout its range. During the past year, the aggressive implementation of the RMS has been a positive benefit for FTHL conservation. Outreach efforts continue to include the general public and other agencies, such as BP and Mexican agencies, as active participants in implementing the RMS. The Alto Golfo and Pinacate Biosphere Reserves are already working closely with agencies in the U.S. on research and conservation efforts to benefit the FTHL in Mexico. Authorized surface impacts have remained low in MAs.

The MOG and ICC continue to support the 2004 decision that compensation money can be shared among MAs, regardless of source state, since there is no available land for purchase in the Yuma MA. The major focus of this decision continues to be the purchase of available land

in any MA prior to private development and, secondly, to use compensation funds to restore habitat within MAs after there is no additional land available for purchase in a MA. Some signatory participants have been able to secure funding for rehabilitation efforts from non-compensation funds. This supplements the compensation funds in providing management capability in implementing the RMS.

Population inventories and monitoring of trends continue, as does research in MAs and habitat areas. This information is useful in developing future management actions and in being able to make better decisions in implementing projects.

Outreach, including providing education and information to the public, is an on-going activity. The informational videos that were produced in 2006 for the general public and the BP will help immensely in this effort. Public understanding of the FTHL, its habitat needs, and authorized activities is necessary to fully implement the RMS.

The 2003 updated version of the FTHL RMS continues to be a platform to move participating agencies into more effective management and conservation of FTHL in the upcoming years.

## RMS IMPLEMENTATION PROGRESS TO DATE

The following table displays the priority, responsible agency, estimated cost, and schedule for completing each Planning Action. The priorities indicated in the table are assigned the following definitions:

**Priority 1:** An action that must be taken in the near term to conserve the species and prevent irreversible population declines.

**Priority 2:** An action that must be taken to prevent significant declines in population or habitat quality.

**Priority 3:** All other actions necessary to meet the goals and objectives of this RMS.

The following abbreviations and symbols are used in the implementation schedule:

ABDSP.....	Anza-Borrego Desert State Park
AGFD.....	Arizona Game and Fish Department
BLM.....	Bureau of Land Management
BOR.....	Bureau of Reclamation
ICC.....	Interagency Coordinating Committee
CDFG.....	California Department of Fish and Game
OWSVRA.....	Ocotillo Wells State Vehicular Recreation Area
USFWS.....	U.S. Fish and Wildlife Service
USMC.....	U.S. Marine Corps
USN.....	U.S. Navy
<input checked="" type="checkbox"/> .....	Task completed since 1997
<input type="checkbox"/> .....	Task not completed
⇒, ∪.....	Task ongoing, on schedule
➔, ∪.....	Task ongoing, not on schedule

RMS Implementation Progress												
Status	Priority	Action number	Planned action	Duration (yrs)	Responsible agency	Total cost (\$000)	Cost estimates (\$000)					
							FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	
		<b>1.</b>	<b>Delineate and designate FTHL MAs</b>									
<input checked="" type="checkbox"/>	1		Designate Yuma Desert MA	2	BR USMC	1	0	0	0	0	0	
<input checked="" type="checkbox"/>	1		Designate East Mesa MA	2	BLM USN	1	0	0	0	0	0	
<input checked="" type="checkbox"/>	1		Designate West Mesa MA	2	BLM USN	1	0	0	0	0	0	
<input checked="" type="checkbox"/>	1		Designate Yuha Desert MA	2	BLM	1	0	0	0	0	0	
<input checked="" type="checkbox"/>	1		Designate Borrego Badlands MA	2	ABDSP	1	0	0	0	0	0	
<input checked="" type="checkbox"/>	3		Designate Ocotillo Wells RA	1	BLM OWSVRA ABDSP	1	0	0	0	0	0	
<input checked="" type="checkbox"/>	1		Designate conservation areas in Coachella Valley	2	BLM USFWS CDFG	1	0	0	0	0	0	
		<b>2.</b>	<b>Define and implement actions necessary to minimize loss or degradation of habitat</b>									
<input type="checkbox"/>	1		Apply mitigation measures	<input type="checkbox"/>	ALL	5	1	1	1	1	1	
<input type="checkbox"/>	1		Require compensation	<input type="checkbox"/>	ALL	25	5	5	5	5	5	
<input type="checkbox"/>	1		Limit discretionary land uses authorizations and rows to 10 acres and 1% total per MA	<input type="checkbox"/>	ALL	5	1	1	1	1	1	
<input type="checkbox"/>	1		Do not dispose of lands in MAs	<input type="checkbox"/>	ALL	0	0	0	0	0	0	
<input type="checkbox"/>	3		Continue maintenance in existing ROWs	<input type="checkbox"/>	ALL	0	0	0	0	0	0	
<input type="checkbox"/>	2		Require fencing along Yuma Desert MA boundary road	<input type="checkbox"/>	ALL	50	0	50	0	0	0	
<input type="checkbox"/>	2		Limit surface disturbance from mineral activities in MAs	<input type="checkbox"/>	ALL	5	1	1	1	1	1	
<input checked="" type="checkbox"/>	2		Reduce new roads to a minimum in MAs	<input type="checkbox"/>	ALL	5	1	1	1	1	1	
<input checked="" type="checkbox"/>	1		Designate routes "open," "closed, or limited." Give route signing a priority	<input type="checkbox"/>	BLM USMC BR	200	50	90	20	20	20	
<input type="checkbox"/>	1		Reduce route density in MAs		See 2.4.2							
<input type="checkbox"/>	1		Coordinate with U.S. BP	<input type="checkbox"/>	ALL	20	4	4	4	4	4	
<input type="checkbox"/>	3		Allow OHV recreation in RA	<input type="checkbox"/>	OWSVRA	0	0	0	0	0	0	
<input type="checkbox"/>	1		No competitive recreational events in MAs	<input type="checkbox"/>	ALL	0	0	0	0	0	0	
<input type="checkbox"/>	2		Allow non-motorized recreational activities in MAs, but no new recreational facilities	<input type="checkbox"/>	ALL	0	0	0	0	0	0	
<input type="checkbox"/>	2		Limit camping in MAs	<input type="checkbox"/>	BLM USMC	20	10	10	5	5	5	

RMS Implementation Progress											
Status	Priority	Action number	Planned action	Duration (yrs)	Responsible agency	Total cost (\$000)	Cost estimates (\$000)				
							FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
⇒	2		No new long-term visitor areas in MAS	∞	ALL	0	0	0	0	0	
⇒	3		Authorize limited use of flora in MAS	∞	ALL	5	1	1	1	1	
⇒	1		Allow military maneuvers and encampments only in designated sites in MAS	∞	USN USMC	5	1	1	1	1	
⇒	3		Suppress fires in MAS using limited fire suppression methods in MAS	∞	ALL	5	1	1	1	1	
⇒	1		Prohibit pesticide treatments in MAS	∞	ALL	5	1	1	1	1	
⇒	3		Limit other activities consistent with above	∞	ALL	5	1	1	1	1	
		<b>3.</b>	<b>Rehabilitate damaged and degraded habitat</b>								
⇒	2		Rehabilitate damaged and degraded habitat in MAS	∞	BLM BR ABDSP USMC USN	200	40	40	40	40	
		<b>4.</b>	<b>Bring all lands within MAS into public management</b>								
☑	3		Maintain prioritized list of parcels for acquisitions; and respect private rights	1	ALL	5	1	1	1	1	
⇒	3		Procure funds for land acquisitions in MAS (37,600 acres of private lands acres in California MAS at \$250 per acre)	∞	BLM CDFG ABDSP OWSVRA	9,400	1880	1880	1880	1880	
⇒	3		Use compensation funds to acquire key lands in MAS	∞	BLM CDFG ABDSP OWSVRA	20	4	4	4	4	
⇒	3		Exchange lands opportunistically	∞	BLM	20	4	4	4	4	
		<b>5.</b>	<b>Maintain or establish effective habitat corridors between naturally adjacent populations</b>								
⇒	2		Limit or mitigate activities in movement corridors	∞	ALL	25	5	5	5	5	
⇒	3		Coordinate with Mexico and INS	∞	ALL	10	2	2	2	2	
		<b>6.</b>	<b>Coordinate activities and funding among the participating agencies and Mexican agencies</b>								
☑	2		Establish FTHLMOG	∞	ALL	5	1	1	1	1	
⇒	2		Hold semi-annual ICC meetings	∞	ALL	5	1	1	1	1	
⇒	3		Establish forum for discussions with agencies and individuals in Mexico	∞	ALL	5	1	1	1	1	
☑	1		Develop Conservation Agreement	1	ALL	10	2	2	2	2	

RMS Implementation Progress											
Status	Priority	Action number	Planned action	Duration (yrs)	Responsible agency	Total cost (\$000)	Cost estimates (\$000)				
							FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
<input checked="" type="checkbox"/>	2		Incorporate actions in Western Colorado Desert ecosystem plan (Note: other state and local agencies will fill key roles)	3	ALL	10	2	2	2	2	2
<input checked="" type="checkbox"/>	2		Incorporate actions in CVMSHCP (Note: other state and local agencies will fill key roles)	3	BLM CDFG USFWS	60	30	20	10	0	0
<input type="checkbox"/>	2		Incorporate actions in Western Colorado Desert Route Designation	∞	BLM	10,000	4	4	4	4	4
<input type="checkbox"/>	1		Coordinate with U.S. BP and develop mutual agreements	2	BLM BR USMC	6	2	2	2	0	0
<input type="checkbox"/>	2		Encourage use of techniques to minimize BPOHV activity	∞	BLM BR USMC	5	1	1	1	1	1
<input type="checkbox"/>	2		Prepare educational briefing for BP agents	1	BLM BR	5	1	1	1	1	1
		<b>7.</b>	<b>Promote the purposes of the RMS through law enforcement and public education</b>								
<input type="checkbox"/>	1		Provide adequate law enforcement	∞	BLM CDFG AGFD USMC	750	150	150	150	150	150
<input type="checkbox"/>	3		Provide public information and education	∞	ALL	25	5	5	5	5	5
		<b>8.</b>	<b>Conduct research necessary to effectively define and implement necessary management actions</b>								
<input type="checkbox"/>	3		Require permits for research	∞	ALL	5	1	1	1	1	1
<input type="checkbox"/>	2		OWSVRA shall continue to fund research	∞	OWSVRA	200	40	40	40	40	40
<input type="checkbox"/>	2		Test trapping as a population census technique	2	ALL	200	40	40	40	40	40
<input type="checkbox"/>	2		Test direct counting methods	2	ALL		Included in 8.2 and 8.3.1				
<input type="checkbox"/>	2		Determine life history and demographic data	2	ALL		Also included in 8.2 and 8.3.1				
<input type="checkbox"/>	2		Determine effects of conflicting activities	5	ALL	300	60	60	60	60	60
<input type="checkbox"/>	3		Determine genetic variation in population	5	ALL	30	5	5	5	5	5
<input type="checkbox"/>	3		Determine effects of non-natural barriers	∞	ALL	30	5	5	5	5	5
<input type="checkbox"/>	3		Determine effects of natural barriers	5	ALL	15	3	3	3	3	3
<input type="checkbox"/>	3		Determine effectiveness of mitigation measures	5	ALL	20	4	4	4	4	4
		<b>9.</b>	<b>Continue inventory and monitoring</b>								

RMS Implementation Progress											
Status	Priority	Action number	Planned action	Duration (yrs)	Responsible agency	Total cost (\$000)	Cost estimates (\$000)				
							FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
⇒	2		Continue inventories	∞	ALL	125	25	25	25	25	25
⇒	2		Monitor implementation	∞	ICC	40	8	8	8	8	8
⇒	2		Monitor population trends	∞	ALL (USMC) [BLM]	320 (70) [350]	70 [100]	105 (35) [100]	70 [50]	105 (70) [50]	70 [50]
⇒	1		Document habitat disturbance and loss	∞	ALL	40	8	8	8	8	8
⇒	1		Conduct aerial reconnaissance and analysis of surface disturbance on the five MAs every five years	∞	ALL	50	10	10	10	10	10
⇒	2		Prepare annual monitoring/implementation report	∞	ICC	20	4	4	4	4	4
⇒	1		Use new inventory, monitoring, and research data in evaluations and proposed changes	∞	ALL	10	2	2	2	2	2

## Appendix A: Report Abstracts

**Bureau of Land Management El Centro Field Office. 2006. Flat-Tailed Horned Lizard Monitoring Report 2006.** The Bureau of Land Management El Centro Field Office continued monitoring Flat-tailed Horned Lizard (FTHL) in 2006 through occupancy estimation. The Bureau selected 156 plots in the East Mesa FTHL Management Area in a stratified random sample. Each plot was visited by 3 or 4 independent observers who recorded presence of FTHL, their scat, and measured various aspects of the habitat. The habitat types were divided into 2 categories - Sand (S) and Not Sand (NS). The data was analyzed with program Mark to determine the probability of detection ( $p$ ) and the occupancy rate ( $\Psi$ ) for both FTHL occupancy and Scat occupancy. We ran several different estimation models to determine which the best fit the data. We used model averaging to alleviate any uncertainty about model selection. .

Observers detected a total of 64 FTHLs on plots. Only 36 out of 156 plots yielded FTHL presence. The FTHL occupancy rate was 0.42 (CI 0.25-0.60) for the S and 0.38 (CI 0.25-0.61) for NS. Our confidence intervals were wide for this measure; therefore we cannot statistically show a difference in occupancy between strata by FTHL occupancy. These wide confidence intervals are a result of the low detection rates and small number of plots with FTHLs located. The scat occupancy test showed occupancy rates of 0.94 (CI 0.84-0.98) for S and 0.71 (CI 0.59-0.80) for NS. This test shows significantly higher scat occupancy in sandy habitat than in non sand habitat. This test also shows a much higher rate of scat occupancy than lizard occupancy. This makes sense because there is more useable habitat than what lizards are actually occupying.

Occupancy estimation still proves to be much less labor intensive and this data may also be useful for future research including development of habitat models. While scat occupancy does yield some good information, it is very important that we put more emphasis on actually finding FTHLs. In the future we should spend more time in training and refine our search techniques to improve the detection probability for each observer.

**Fernandez, Erin, Jim Rorabaugh, and Lin Piest. 2006. Human Disturbance in the Flat-tailed Horned Lizard Yuma Desert Management Area.** In 2002, using methodologies developed in California, 16 randomly selected transects were sampled in the flat-tailed horned lizard (*Phrynosoma mcallii*) Yuma Desert Management Area for the purpose of quantifying forms and levels of human disturbance and establishing an environmental baseline for future trend analysis. In February 2006, we re-sampled 15 of the 16 transects. The most common form of human disturbance observed in 2006 was off-road vehicle tracks, which covered 2.9% of the ground surface in the Barry M. Goldwater Range portion, and 4.4% of the surface in the 5-Mile Zone portion of the Management Area. Signs of immigrant passage were commonly observed, as well. Mean percent absolute cover by perennial plants was 5.2 in the Goldwater Range portion and 6.7 in the 5-Mile Zone portion of the Management Area. Dominant perennial plants were creosote (*Larrea tridentata*), crinklemat (*Tiquilia palmeri*), and white bursage (*Ambrosia dumosa*). No flat-tailed horned lizards were observed during our work. This report includes recommendations to sample the 16 transects annually to detect trends in disturbance levels and

types, to determine longevity of vehicle tracks under different climatic and soil conditions, to determine who is responsible for observed off-road activity, and to study survival of perennial plants crushed by vehicles.

**Hollenbeck, Eric. 2006. Ocotillo Wells District 2006 flat-tailed horned lizard (*Phrynosoma mcallii*) occupancy survey report (draft).** OWSVRA was surveyed using the occupancy protocol authored by the BLM in 2006. Eighty-eight stratified randomly chosen four-hectare plots were searched for presence of FTHL a maximum of four person-occasions, fewer if a lizard was found after at least two occasions. 48 plots (54%) were positive for FTHL. Analysis in the program MARK for occupancy indicated 100% for combined western strata, which tended to be near sea level and alluvial or mudhill and 52% occupancy for combined eastern strata, which tended to be below sea level and badland or tabular sandstone-mud. Encounter likelihood was approximately 30% and did not vary significantly between observers.

**Painter, M.L. and M. Ingraldi. 2007. Use of simulated highway underpass crossing structures by flat-tailed horned lizards (*Phrynosoma mcallii*). Final report, Research Branch, AGFD, Flagstaff.** The flat-tailed horned lizard (*Phrynosoma mcallii*) occupies a restricted range in the Lower Sonoran Desert of southwest Arizona, southeast California, and adjacent land in Mexico. Because they exhibit behavior patterns that include basking and remaining motionless when danger approaches, flat-tailed horned lizards are particularly susceptible to mortality on roads. Therefore, roads and new road construction are recognized as threats influencing the long-term persistence of this species. The propensity for flat-tailed horned lizards to use culverts as road crossing structures to avoid vehicle-caused mortality is unknown. From 2005-2006 we studied flat-tailed horned lizard use of a variety of simulated road crossing structures. The study objectives were to 1) determine if flat-tailed horned lizards will pass through culverts of sizes commonly used in road construction, and 2) compare and describe the characteristics of culverts used by flat-tailed horned lizards to those not used. We built a testing facility with 6 culverts of 3 dimensions and 2 interior lighting options. All culverts were 40 feet long; the 3 types included 24-inch diameter steel culverts, 36-inch diameter steel culverts, and 4-foot tall by 8-foot wide box culverts. One of each type of culvert was lit with skylights, and one of each type of culvert had only natural light from the ends. Light and temperature conditions in the culverts were evaluated during the study. Out of 54 flat-tailed horned lizards placed in the testing facility, we observed 12 complete crossings. The 36-inch diameter culvert without skylights was used 5 times. The 24-inch diameter culvert with skylights was not used, and other culvert designs were each used once or twice. Results indicated that flat-tailed horned lizards can use culverts as road crossing structures, but the evidence did not reveal a strong selection for or against any culvert type. Recommendations for employing appropriate road crossing structures are discussed.

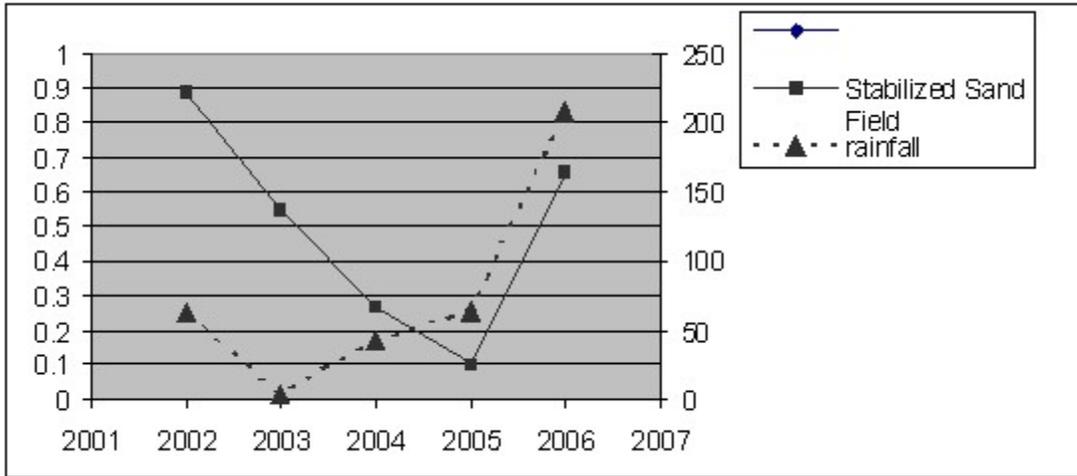
**Painter, M.L. and M. Ingraldi. 2006. Evaluation of relocation as a mitigation technique for flat-tailed horned lizards. Draft progress report, Research Branch, AGFD, Flagstaff.** This was the first year of a study to determine the effectiveness of FTHL relocation as a mitigation measure. AGFD Research Branch attached radiotransmitters to treatment FTHL in the Yuma Desert that were relocated and compared 3 measures of fitness (survival, weights,

movements) with control FTHL, which were also affixed with transmitters but not moved. Total sample size was 36 FTHL. Predation was very high and survival was only 11% for the control sample and 15% for the treatment. Weights did not vary much during the course of the experiment and treatment did not appear to differ from control. In general, treatment FTHL moved more in the first few days than their control partners, but then became more sedentary. Funding will be sought to continue this study for a second year.

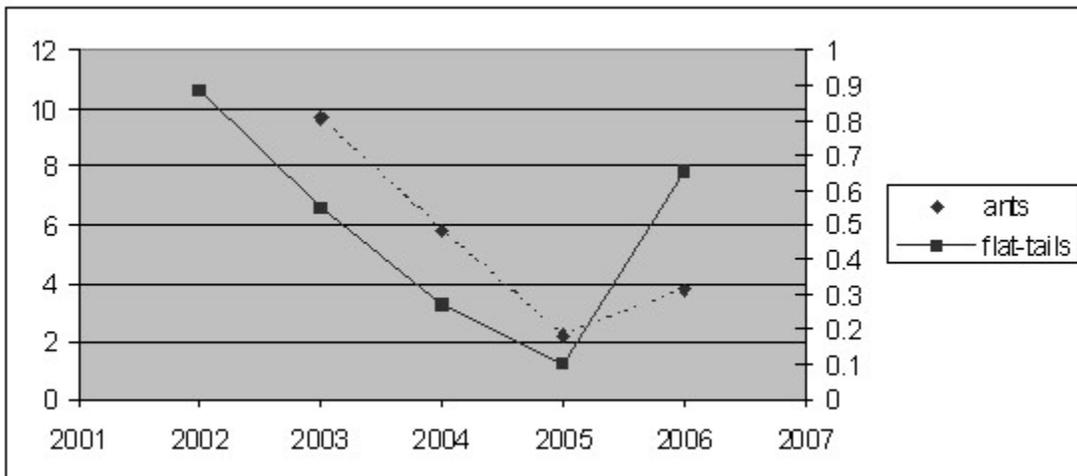
**Young, K.V., and J.A. Royle. 2006. Abundance and site occupancy of flat-tailed horned lizard (*Phrynosoma mcallii*) populations in Arizona and California. Report to U.S. Navy and U.S. Bureau of Reclamation. 21 pp.** In May-July 2005 we conducted mark-recapture surveys on small and large plots in the Yuma Desert Management Area and scat-based occupancy surveys at NAF El Centro target areas. We caught 334 different flat-tailed horned lizards and had 120 recaptures while sampling 47 small (1-hectare) plots and 2 large (12 hectare) plots on the Yuma Desert MA. Small plots were chosen in areas with 70% or greater probability of occurrence (based on a 2003 model of distribution). Large plots were placed in areas with high lizard density and favorable tracking conditions. Emigration and immigration on the small plots posed serious difficulties, resulting in very low detection rates and a wide confidence interval around the density estimate of 1.9 lizards per hectare. Data were adjusted to represent a series of occupancy surveys instead of mark-recapture on the small plots. With this adjustment we estimated that 80% of the small plots were occupied. The occupancy data were further used to estimate a density of 2.1 lizards per hectare on the small plots. Detection rates were much higher on the large plots than on the small plots, due to such factors as better sand for tracking and less movement off the plot, but still we estimated only 25-30% of lizards were available for detection on any given day. After adding a boundary strip based on mean maximum distance moved between recaptures, we estimated density of 4.1 lizards per hectare on the large plots. If other areas that have 90% probability of detection (based on the 2003 model) have similarly high lizard densities, then about 20,000 flat-tailed horned lizards may occur on less than 10% of the MA, indicating the importance of identifying and protecting high-density areas. At NAF El Centro 300 small (50 X 50 m) plots were sampled for presence of scat and analyzed using a removal sampling protocol. The probability of correctly detecting an occupied site within one hour was extremely high (> 99%), so the estimate of 74.6% occupancy appears very accurate. We estimated 11.2 scat per hectare. Based on the ease of scat occupancy surveys and the high detection rates, we recommend broad-scale surveys that combine scat-based occupancy surveys with lizard mark-recapture surveys.

**Summary of research findings for the Coachella Valley, California in 2006, Cameron Barrows, Center for Natural lands Management, Center for Conservation Biology, U.C. Riverside.** Flat-tailed horned lizard studies and surveys were continued at the Coachella Valley Preserve (Thousand Palms portion of the preserve) by Cameron Barrows (Center for Natural Lands Management). The objectives for the current studies are to determine if population levels for these lizards can be predicted based on rainfall levels or whether harvester ant abundance proves to be a better predictor. Flat-tailed horned lizard populations significantly increased in

2006. This increase only roughly corresponded to rainfall, however the dynamics of harvester ant populations appeared to closely match the dynamics of the horned lizard populations.



**Relationship between FTHL populations and rain.**



**Relationship between FTHL populations and ant numbers.**

## **Appendix B: 2007 Annual Work Plan for the Flat-tailed Horned Lizard Interagency Coordinating Committee**

### **1. Delineate and designate flat-tailed horned lizard MAs and a RA.**

**1.1-1.6.** All MAs and the RA have been delineated and officially designated. ABDSP will work to strengthen their official commitment in their new Natural Resources Management Plan.

**1.7. Encourage development of a MA in the Coachella Valley.** Signatories decided to support creation and management of the CVMSHCP instead. BLM-Palm Springs will continue to participate in the development of the CVMSHCP.

### **2. Define and implement management actions necessary to minimize loss or degradation of habitat.**

**2.1. Mitigate and compensate project impacts through humane and cost-effective measures.**

**2.1.1. Apply mitigation measures.** Appropriate mitigation measures will be enforced for all authorized projects that impact FTHLs or their habitat.

**2.1.2. Require compensation for residual impacts.** Agencies will continue to require compensation for projects that have residual impacts to FTHL habitat.

**2.2. Limit authorizations that would cause surface disturbance in MAs.**

**2.2.1. Attempt to locate projects outside MAs; limit discretionary land use authorizations and ROWs to 10 acres and 1% total per MA.** These limits will be observed.

**2.2.2. Federally owned lands in the MAs shall be retained in federal ownership.** No disposal of federal lands within MAs will occur.

**2.2.3. Maintenance in existing ROWs may continue.** No action required.

**2.2.4. Require fencing along Yuma Desert MA boundary road.** Agencies in Arizona will continue to coordinate with ADOT to ensure that they are committed to provide and maintain lizard barrier fencing along the Area Service Highway, when and if it is constructed.

**2.3. Limit surface disturbance in MAs from minerals actions.**

**2.3.1. Allow approved minerals actions while applying applicable mitigation and compensation.** Applicable mitigation and compensation will continue to be applied.

**2.4. Limit vehicle access and route proliferation in MAs.** BLM-El Centro will continue to rehabilitate illegal routes and sign designated routes.

- 2.4.1. Reduce new roads to a minimum in MAs.** BLM-El Centro will sign all designated routes within the MA's. MCAS-Yuma is finalizing their INRMP, which will restrict new road development.
- 2.4.2. Designate routes "open", "closed", or "limited". Give route signing a priority.** BLM-El Centro completed route designation for the Western Colorado Desert. All vehicle routes on BLM managed lands in Imperial County were designated as open, closed, or limited. BLM has completed initial signing of all of these routes and is routinely patrolling the area and replacing signs as necessary. BLM is also in the process of restoring closed routes to a natural condition. MCAS-Yuma's INRMP includes a comprehensive effort to sign routes.
- 2.4.3. Reduce route density in MAs.** BLM-El Centro completed route designation for the Western Colorado Desert. All vehicle routes on BLM managed lands in Imperial County were designated as open, closed, or limited. BLM has successfully secured hundreds of thousands of grant dollars to restore closed routes throughout the Western Colorado Desert area particularly in the FTHL Management Areas. The MCAS-Yuma INRMP includes most of the Yuma Desert MA and calls for closure of redundant routes; routes will be identified for closure within the MA.
- 2.4.4. Coordinate with USBP to ensure cooperation and enforcement of vehicle regulations.** ICC members will continue to hold FTHL orientation sessions with BP agents in the El Centro sector to reduce impacts to FTHL habitat along the International Border.
- 2.5. Limit impacts of recreational activities in MAs.** Recreational camping is limited in the Yuha Desert MA to designated camping areas. The MCAS-Yuma INRMP closes the portion of the Yuma Desert MA on the Barry M. Goldwater Range to all forms of recreation.
- 2.5.1. Allow vehicle-oriented recreation in RA.** No action required.
- 2.5.2. Permit no competitive recreation events in MAs.** Competitive races will not be permitted in MAs.
- 2.5.3. Allow non-motorized recreational activities in MAs, but limit new recreational facilities.**
- 2.5.4. Limit camping in MAs.** Recreational camping is limited in the Yuha Desert MA to designated camping areas. The MCAS-Yuma INRMP closes the portion of the Yuma Desert MA on the Barry M. Goldwater Range to camping.
- 2.5.5. No long-term camping areas shall be developed in MAs.** None will be developed.
- 2.6. Allow limited use of plants in MAs.** No plant sales, commercial collecting, or grazing will be allowed.

- 2.7. Allow military maneuvers and encampments only in designated sites in MAs.**  
Military training areas in the Yuma Desert MA are fenced or marked to identify their locations and limits so that adjacent areas will not be impacted.
- 2.8. Suppress fires in MAs and BLM lands in the RA using allowable methods.**
- 2.9. No pesticide treatments shall be applied within MAs.** No pesticide treatments will occur in MAs, except for specifically targeted herbicides. Herbicides are used on tamarisk removal projects, which improve FTHL habitat.
- 2.10. Within MAs, other activities not consistent with the RMS shall not be approved.** None will be approved.
- 3. Rehabilitate damaged and degraded habitat in MAs.** Several years of extensive habitat rehabilitation is planned and has begun for the Yuha Desert, West Mesa, and East Mesa MAs
- 4. Attempt to acquire all private lands within MAs.**
  - 4.1 Maintain prioritized list of parcels for acquisitions.** Lists identifying parcels for acquisition will be maintained by the California OHV Division office headquarters in Sacramento and by BLM-El Centro. Ocotillo Wells District, through OHMVRD, will continue to acquire private inholdings. ABDSP will continue to acquire private inholdings within the park.
  - 4.2. Seek funding to acquire key parcels in MAs.** Compensation funds will be banked for habitat acquisition.
  - 4.3. Using compensation and other funds, acquire key lands in MAs.** Key lands in MAs will be acquired as opportunities arise. Compensation funds collected in Arizona may be used for habitat acquisition in the East Mesa MA in California. The ICC and MOG will continue to develop a more comprehensive approach regarding the use of funds.
  - 4.4. Participate in exchanges to acquire key parcels in MAs.** This will occur as opportunities arise. At the moment, the primary tool for land acquisition is through purchases rather than land exchanges.
- 5. Maintain or establish effective habitat corridors between naturally adjacent populations.**
  - 5.6. Limit or mitigate activities in movement corridors.**
  - 5.7. Coordinate with Mexico and INS to ensure movement across the border.**  
Agencies will continue to consult with Department of Homeland Security on border fencing issues.

**6. Coordinate activities and funding among the participating agencies and Mexican agencies.**

**6.1.1. Maintain a FTHL MOG.** The MOG will continue to meet as needed to coordinate implementation of the conservation agreement in response to recommendations from the ICC. Meeting minutes will be provided to all MOG and ICC members to facilitate effective coordination.

**6.1.2. Hold semi-annual meetings of the ICC.** The ICC has met quarterly since the inception of the RMS and will continue to do so to discuss implementation of Planning Actions under the RMS and issues and challenges regarding this implementation. In addition to ICC meetings, subgroups of the ICC may meet on occasion to discuss specific issues.

**6.1.3. Develop a forum for discussions with agencies and individuals in Mexico.** USFWS and AGFD will continue to use their periodic coordination meetings with the AGRB to promote the involvement of Reserve staff in the ICC and MOG.

**6.2 Develop a conservation agreement.** The 2003 revision of the RMS has been finalized, printed, and distributed to all involved agencies and interested parties. The RMS may be revised as necessary to reflect new information.

**6.3.1. Incorporate actions into the Western Colorado Desert Coordinated Management Plan.** In 2005, the California Desert Conservation Area Plan was amended to formally adopt the Strategy and the FTHL MAs. This plan will continue to be implemented in 2007.

**6.3.2. Incorporate actions into the CVMSHCP.** BLM-Palm Springs will continue to participate in the development of the CVMSHCP.

**6.3.3. Incorporate actions into the Western Colorado Desert Route Designation.** See 2.4.2.

**6.4. Coordinate with U.S. BP to develop mutual agreements.** BP will continue to be invited to MOG meetings. ICC agencies will finalize the production of the BP training and education video and distribute it to BP offices for use in their training programs.

**7. Promote the purposes of the RMS through law enforcement and public education.**

**7.1. Provide sufficient law enforcement.** MCAS and AGFD will continue to conduct ORV patrols within the Yuma Desert MA and adjacent habitat. BLM-El Centro has aggressively moved ahead to fill vacant law enforcement positions and apply for grants to add additional rangers.

**7.2. Provide public information and education about the MAs and RA.** All users of BMGR will receive a briefing that includes information on the FTHL, slides, pictures and/or descriptions. BLM-El Centro will continue to distribute FTHL

brochures and maps to land users. Agencies on both sides of the border will continue to distribute the FTHL brochure that was developed by the Centro Intercultural de Estudios de Desiertos y Océanos. ICC agencies will finalize the production of the general public information video and distribute it to appropriate groups.

**8. Encourage and support research to promote conservation of FTHL and desert ecosystems.**

**8.1. Require permits for research.** AGFD and CDFG will continue to require scientific collecting permits for people who collect or handle FTHL. New CDFG regulations enable monitors who move FTHL as mitigation for projects in California to do so with a letter of authorization from CDFG and not a collecting permit.

**8.2. OWSVRA shall continue to budget for research.** Ocotillo Wells District will self-fund the hiring of crews for an occupancy survey and test the hybrid “sentinel plot” protocol for the 2007 season.

**8.3. Continue to refine cost-effective techniques for assessing FTHL abundance.**

**8.3.1. Test trapping and other techniques to enumerate FTHLs directly.**

**8.3.2. Determine effectiveness of relative enumeration techniques and scat counts as an index of relative abundance.**

**8.4. Determine life history and demographic data.** The sentinel plots proposed for each of the MAs will provide these data.

**8.5. Determine effects of conflicting activities.**

**8.6. Determine genetic variation among populations and effects of barriers.** The study to evaluate genetic variation across the range of FTHL will be completed.

**8.6.1. Determine genetic variation in MAs.**

**8.6.2. Determine effects of human-created barriers.**

**8.6.3. Determine effects of natural barriers.**

**8.7. Determine effectiveness of mitigation measures.** AGFD will complete the final report of the research study to test the effectiveness of culvert designs intended to allow crossing by FTHL. AGFD will continue the study to evaluate the success of FTHL relocation.

**9. Continue Inventory and Monitoring.**

**9.1. Continue inventories.** BLM-Yuma will determine the presence/absence of FTHL within some of BLM-managed land. BLM-El Centro will continue to monitor lizard populations in the MAs using the methods defined by the ICC. BLM-Palm Springs anticipates funding through OHV grants to conduct surveys in Dos Palmas

in 2008. In the Coachella Valley Preserve, FTHL will continue to be surveyed by the Center for Natural Lands Management, with a focus on lizard-ant-small mammal interactions. The objective is to use a correlational approach as well as an experimental approach (small mammal exclosures with varying resource levels) to determine whether the small mammals restrict the growth of the ant populations and therefore impact FTHL. Sentinel plots will be established and surveyed at OWSVRA and are proposed for the Yuma Desert, West Mesa, and Yuha Desert MAs. ABDSP proposes to conduct occupancy surveys during 2007 in the Borrego Badlands MA. Occupancy surveys are also proposed for the Yuha Desert MA and OWSVRA.

**9.2. Monitor habitat quality and population trends in the MAs.** OWSVRA will continue to monitor habitat. BLM-El Centro conducts disturbance and vehicle track surveys as time and funding allow. The Student Conservation Crew conducting restoration in the Yuha Desert MA is evaluating the level of disturbance within the MA before, during, and after the restoration.

**9.2.1. Monitor implementation of the RMS.** The 2007 work plan describes how the 2003 RMS will be implemented. At the end of the year, the ICC will report accomplishments and significant deviations.

**9.2.2. Monitor population trends.** Observations of FTHL during the course of biannual reptile surveys at OWSVRA will be recorded as part of regular monitoring. FTHL observations by staff during archeology surveys, ranger patrol, or in the course of maintenance duties will be noted. BLM-El Centro will gather population data using occupancy and sentinel plots. AGFD has developed a scope of work for monitoring in the Yuma Desert MA in 2007; implementation will be dependent on funding.

**9.2.3. Document habitat disturbance and loss.** All authorized habitat impacts will be reported in the 2007 ICC annual report. BLM-El Centro, AGFD, and USFWS will continue to quantify the level of vehicular impacts to FTHL habitat using a step-point method.

**9.2.4. Prepare an annual report of monitoring results and implementation progress.** An annual report will be produced that summarizes monitoring and RMS implementation during 2007. The report will include a schedule of activities to be accomplished in 2008, budget needs for 2008, and outyear budget needs for major projects. The report shall also include a summary of monitoring results and a discussion of the likely causes of any noted declines.

**9.2.4. New data shall be used in evaluations of the RMS and in assessing proposed changes.** New information resulting from ongoing research will be used to revise the RMS.