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THE RESOURCES AGENCY
Department of Fish and Game

POPULATION ASSESSMENT OF THE ELF OWL IN CALIFORNIA

by

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ABSTRACT

A survey to determine the population of Elf Owls in California was conducted from mid-April to mid-May, 1987. Fifty-two sites were checked, of which 49 were along the lower Colorado River from the Nevada to the Mexican borders. A total of 17 to 24 Elf Owls were found at 10 sites along the Colorado River and may have been breeding at seven to nine of these sites. The 17 to 24 responses represent 15 to 18 pairs of Elf Owls. Almost all potential habitat was surveyed and these birds present the vast majority of Elf Owls in California. It is very unlikely that the state's population exceeds 25 pairs.

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FINAL REPORT TO THE CALIFORNIA DEPARTMENT OF FISH AND GAME
CONTRACT C-1981

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POPULATION ASSESSMENT OF THE ELF OWL IN CALIFORNIA

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RECOMMENDATIONS

The Contractors make the following recommendations:

1. Take action to protect the seven to nine sites where Elf Owls may be breeding. This may be accomplished through management agreements, conservation easements, and land purchases.
2. Enhance both those areas where Elf Owls were found and sites of good and excellent quality habitat where they were not found. This could be accomplished by removal of salt cedar and reforestation with native vegetation.
3. Conduct yearly surveys, especially of good and excellent quality sites, to determine if there are fluctuations in the occupancy of habitat and in the population of Elf Owls along the lower Colorado River.
4. Initiate studies to determine if persistent pesticides are contributing to the decline of the Elf Owl population in California. Studies could include collection of eggshell fragments (to determine thinning) and investigation of possible sources of contamination on the breeding grounds.

INTRODUCTION

The Elf Owl (*Micrathene whitneyi*) has been found in California only in riparian habitats and scattered stands of saguaro (*Carnegiea gigantea*) along the lower Colorado River and at a few southern California desert oases. While it apparently was never numerous in California, there has been a decline in numbers due in large part to human disturbances, including habitat destruction. Surveys in 1978 and 1979 located less than 25 Elf Owls at only two locations along the lower Colorado River (Cardiff 1978, 1979). Since 1979 habitat destruction has continued, resulting in the loss of much of the remaining cottonwood-willow and mesquite bosque habitat (C. Hunter and B. Anderson pers. comm.). The habitat has been lost due to the introduction of tamarisk (*Tamarix chinensis*), agricultural clearing, bank stabilization projects, and urbanization and to recent sustained flooding. This habitat loss and its possible effect on Elf Owls and the long span of time since the last major survey effort prompted this survey along the lower Colorado River during the spring of 1987.

The objectives of this study were to: 1) identify and survey areas where Elf Owls were reported during and since the 1979 survey; 2) identify and survey areas of suitable Elf Owl habitat not previously known to the California Department of Fish and Game and not surveyed in 1979; 3) determine the size and distribution of the breeding population of Elf Owls in California; 4) describe the physiographic features and vegetation of the habitats surveyed using the system adopted by Anderson and Ohmart (1976); 5) assess overall condition of habitats surveyed, including potential threats, vigor of native riparian growth, and probable longevity of that particular riparian forest stand; and 6) develop management recommendations that can be undertaken to halt and possibly reverse the decline of Elf Owls in California.

METHODS

We selected the survey sites using three sources of information: 1) sites identified by California Department of Fish and Game; 2) sites identified by cooperators; 3) sites identified by the authors during previous field work in riparian habitats along the Colorado River. The range of suitable habitats was identified as patches of cottonwoods (*Populus fremontii*), red willow (*Salix gooddingii*), honey mesquite (*Prosopis juliflora*), screwbean mesquite (*Prosopis pubescens*), palo verde (*Cercidium floridum*), and saguaros of sufficient size to contain nest cavities and of sufficient extent to provide foraging areas and which had limited human disturbance.

We conducted the field surveys between 6 April and 8 May 1987. This period was identified as the optimum survey time based on data provided by California Department of Fish and Game which showed a peak occurrence of historical records of Elf Owl detections in the latter part of April. We surveyed sites between sunset and midnight. Daytime reconnaissance of these areas was done to determine if suitable habitat still existed to support Elf Owls, to classify habitat quality, and to analyze vegetation according to the methods of Anderson and Ohmart (1976).

All areas (n=52) were surveyed once, and most areas with good or excellent habitat were surveyed a second time as were several of the marginal or poor habitat areas. In two areas of poor quality habitat we did not conduct nocturnal surveys. Repeat surveys were conducted 2 to 3 weeks after the initial surveys.

We conducted surveys by automobile, foot and boat. Nocturnal surveys consisted of stopping every 50 to 100 yards at suitable sites and listening for Elf Owls. If few or no Elf Owls were heard, we played a tape of a male Elf Owl's territorial call to stimulate a response. The taped call was played 5-10 times with one minute pauses between calls at each station. We could hear the taped call 500 feet. We mapped the responses on U.S.G.S. 7½ min. topographic maps. At many sites two researchers "leap-frogged" working 300 ft. apart with one or both playing tape recorded calls.

Information gathered for all areas surveyed for Elf Owls included: 1) name of the area; 2) location of the area; 3) habitat type (Ohmart and Anderson 1976); 4) acres of habitat; 5) where appropriate, general comments on the health and vigor of the habitat; 6) dates surveyed; 7) survey results; 8) general comments; and 9) habitat quality rating.

The habitat's ability to maintain Elf Owls at each survey site was assessed and each site was placed into one of four habitat quality categories: 1) excellent; 2) good; 3) marginal ; and 4) poor (Table 1). The sites were categorized based on a combination of habitat extent, maturity, and density, presence of potential nest sites, extent of human disturbance (a major human disturbance would be the presence of off-road-vehicles (ORV) and the removal of habitat for ORV trails), and the presence or absence of salt cedar (Tamarix spp.).

RESULTS

Cardiff's (1978) complete record of the 28 Elf Owl sightings made in California prior to 1978 identified the eight locations where Elf Owls have been found in Imperial, Riverside and San Bernardino counties. Cardiff (1978, 1980) surveyed the historical sites in 1978 and 1979 and found owls at only three sites, two north of Needles and one near Waterwheel Camp. The major center of the Elf Owl population during Cardiff's surveys was at the Soto Ranch, one of the two areas north of Needles. We have gathered 10 more records of observations made since 1979 (Table 2). All of these recent records were sightings made at Soto Ranch or near Waterwheel Camp.

A total of 52 sites was surveyed during this study (Figure 1, Appendix 1) ; 31 were checked twice. Fifteen to twenty-two Elf Owls were located at 10 sites. These sites were:

Soto Ranch (5) -- The population of 5 pairs here seems to have remained stable since the 1979 survey. This is the most extensive tract of old-growth mesquite bosque found in California along the Colorado River. The removal in 1986 of 1 acre of habitat, which included several large cottonwood snags, indicates that there is potential danger of habitat being removed as the landowner needs additional farmland.

Table 1. Parameters for determining overall condition of habitats surveyed for Elf Owls along the lower Colorado River during 1987.

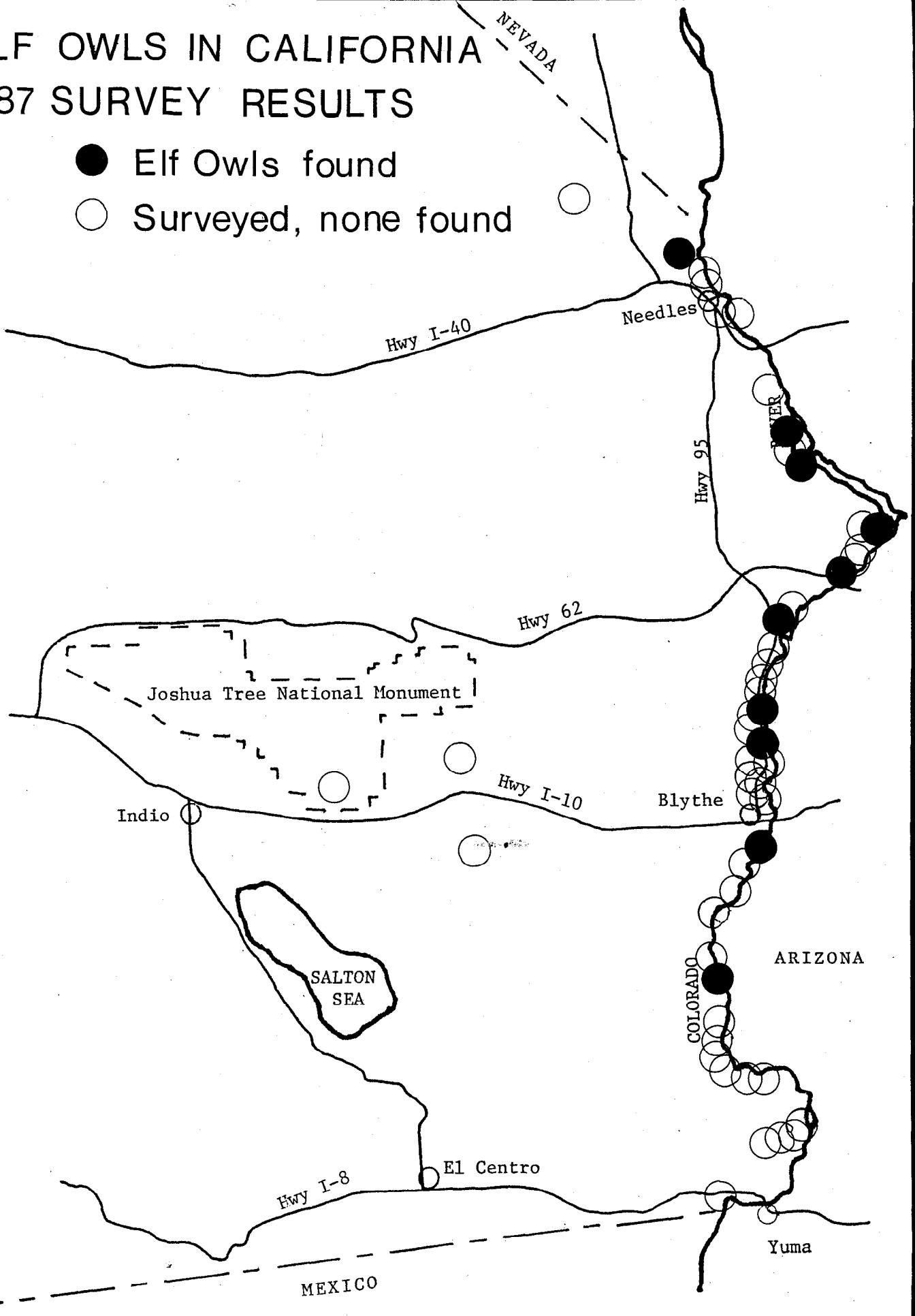
Habitat quality category	Excellent	Good	Marginal	Poor
Extent of habitat (in acres)	20 (mature cottonwood willow-mesquite)	>5 (cottonwood willow-mesquite-palo verde)	>1 (young cottonwood willow-mesquite-palo-verde)	small patches of trees
Extent of dense (closed-canopy) habitat (in acres)	5	>2	None	None
Potential for nest sites	Numerous	Numerous	Few	Few to none
Extent of human disturbance	Areas free of disturbance >5 ac in size	Some areas free of disturbance	Moderate to high	High
Presence of salt cedar	<50%	<75%	High	Almost pure stands of salt cedar

Table 2. Sightings of Elf Owls in California, 1980 to 1986.

Date	Site	No. of Individuals	Reference
12 APR 80	Soto Ranch	2	Am. Birds 34:897
15 MAY 81	Soto Ranch	7	Serena, pers. comm. to DFG
12 JUN 81	Waterwheel Camp	4	Serena, pers. comm. to DFG
16 APR 83	Soto Ranch	6	Am. Birds 37:1028
21 APR 83	Waterwheel Camp	1	Am. Birds 37:1028
21 APR 83	Waterwheel Camp	1	Hunter, pers. comm. to DFG
spring 83	Soto Ranch	15	Hunter, pers. comm. to DFG
24 APR 84	Soto Ranch	1	Am. Birds 38:1062
summer 85	Soto Ranch	4-6	Am. Birds 39:962

ELF OWLS IN CALIFORNIA 1987 SURVEY RESULTS

- Elf Owls found
- Surveyed, none found



Wilson Road (20) -- This area is a patch of fairly open habitat. There appears to be little to distinguish it from many other similar areas where we did not detect Elf Owls. There appears to be minimal human disturbance at this site, but there is the possibility that some human activities such as agriculture or ORV use may threaten the area. One pair of Elf Owls was found at this site which experienced fairly heavy disturbance.

South end of **Water Wheel Camp** (26) -- Two to five Elf Owls, representing two to four pairs, were found at this site. The habitat is a large stand of predominantly salt cedar. Several roads run through it and they probably are used by off-road vehicles and dove hunters. This area is surrounded by agriculture and it could be cleared for that purpose. There are large, dense and undisturbed patches of mesquite-salt cedar habitat.

South end of **Hall Island** (29) -- Two male Elf Owls, representing one to two pairs, were found at this site. Although not very large, this is a dense and diverse patch of habitat, with willows and a few cottonwoods in a dense stand of mesquite-salt cedar. There are numerous nest sites. There is also a high level of human disturbance all along the edges and through the middle of the area. Approximately 10 acres in the middle has been cleared for an airstrip, and new off road vehicle trails are being bulldozed. The site also could be reduced by an expansion of the adjacent picnic area. This patch of habitat is badly in need of protection through either management agreement or purchase.

Head of **Clear Day** (11) -- This is a small patch of high quality habitat that is relatively undisturbed. It is too small to support more than one breeding pair of Elf Owls, and it is possible that the bird found here was a migrant. There is some use by ORVs in this area.

Chemehuevi Wash (13) -- There was possibly an Elf Owl heard here, but the great distance at which the call was heard made positive identification impossible. The area is heavily used by ORVs.

Desilt Wash (15) -- There may have been an Elf Owl heard here, although noise from the Desilt Creek made positive identification difficult. This impressive, but small, stand of cottonwoods could possibly be cleared.

Headgate Rock Dam (18) -- A pair of Elf Owls were seen and heard here. There are several potential nest trees in this area. While wholesale clearing is unlikely, high human use is inhibiting natural regeneration in the area. Much of this habitat consists of scattered clumps of palo verde and mesquite and experiences heavy human disturbance. It is possible that this was a nesting pair even though they did not respond on the second visit.

Goose Flats (36) -- There are numerous large cottonwoods in this area, but they are widely scattered, with much open habitat. Most of the trees in the area have been lost to fires and floods in the early 1980's. We feel that the habitat here was inadequate for breeding and this bird was a migrant.

Walter's Camp (41) -- This area has large tracts of mesquite interspersed with more open areas of palo verde. There is heavy off-road vehicle use on the trails which intersperse the area. More habitat could be cleared for expansion of nearby trailer parks and extension of ORV trails. There are many

large mesquite and palo verde trees which provide nest holes. We believe the Elf Owl we detected here could have been part of a breeding pair even though we did not detect any owls on our second visit.

The remaining 42 sites where Elf Owls were not detected fall into the four habitat categories discussed above. Only one site (#43) was in the excellent category. This site had a large expanse of high-quality habitat closed to ORV use. There appear to be sufficient nest sites to accommodate several pairs of Elf Owls. Unfortunately, this area was only visited once, which may explain why no Elf Owls were detected. Absence of Elf Owls at this site may also reflect the overall low population in California.

Seventeen sites fall into the good habitat quality category. Many of these sites were not extensive enough or too patchy to be considered excellent. It is possible that there are sane biotic or abiotic factors causing the absence of Elf Owls at these sites. Also this may be another indication of the overall population decline.

The marginal quality habitat areas are mostly small remnants of higher grade habitats. Many of these areas have been degraded through habitat loss from flooding, removal for agriculture, and the establishment of salt cedar.

The poor quality habitat consisted largely of salt cedar or areas with only a few trees in trailer parks. As a result of the habitat analysis we did not expect to find Elf Owls at these sites and none were found on the surveys.

The proportion of sites at which Elf Owls were found declined with habitat quality. Elf Owls were found at 50% of the excellent sites, 32% of the good sites, 8% of the marginal sites, and none of the poor sites (Table 3). The proportions of sites at which Elf Owls were found in each habitat category differed significantly from what would be expected if the owls were found in the same proportion across the categories.

Table 3. Site habitat quality and Elf Owl occupancy along the lower Colorado River in 1987.

Habitat Quality	Occupied by Elf Owls	No Elf Owls Found
Excellent	1	1
Good	8	17
Marginal	1	11
Poor	0	11
Total	10	40*

*2 additional sites were not surveyed at night due to poor habitat quality and poor access.

DISCUSSION

There are a number of reasons that the areas of good to excellent quality habitat may not support Elf Owls. One of these reasons may be that our habitat model is not correct. Another possible explanation is that there are other factors limiting the population size. One such factor could be that the population of Elf Owls in California is so low and that most sites are so small that stochastic events prevent occupancy of a portion of these sites every year. This can only be tested by multi-year studies to determine occupancy of sites over a series of years. Additionally it is possible that persistent pesticides, such as DDT, may be ingested on the wintering grounds and result in eggshell thinning and reduced reproductive success, thereby keeping the population below the carrying capacity of the habitat. Collection and measurement of eggshell fragments could help answer this question.

There is a drastically low population of Elf Owls in California. This may be the result of several factors. Until these factors are understood the first step must be to stop the further decline of the species through habitat protection and restoration. All 9 sites where we believe Elf Owls might breed are in some danger of destruction. These dangers stem from flooding, clearing for agriculture or development, or disturbance by ORVs. Almost all of these sites could be protected by management agreements, conservation easements, or fee title purchase by state or federal agencies or conservation organizations.

Habitat preservation alone probably will not be enough to halt the decline of the species; ultimately there must be efforts to restore suitable habitat by removing salt cedar, excluding disturbing activities and reforesting with mesquite, or cottonwood and willow. It may be possible by these means to increase the numbers of Elf Owls in currently occupied sites and improve other sites so they could become occupied. Without this management it seems unlikely that the Elf Owl will be able to maintain its tenuous foothold in California.

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APPENDIX 1

Information for Sites Checked for Elf Owls Along the Lower Colorado River During the 1987 Breeding Season

Information for each site is given in the following order: 1) name of the area; 2) location of the area; 3) habitat type (Ohmart and Anderson 1976); 4) acres of habitat; 5) where appropriate, general comments on the health and vigor of the habitat; 6) dates surveyed; 7) survey results; 8) general comments; and 9) habitat quality rating.

Areas in which we recorded possible or definite responses from Elf Owls are noted by an asterisk (*). The listings are in approximate north to south order.

1) **Cottonwood and Cotton Spring;** Joshua Trees National Monument; approximately 10 total mature cottonwoods; 0.5 acres; 5 April and 8 May 1987; no owls heard; poor quality.

2) **Ironwood-palo verde area** 3 miles N of Desert Center; ironwood-palo verde V; 300 acres; the habitat is very scattered in most areas; 8 May 1987; no owls detected; poor quality.

3) **Corn Springs;** 7.5 miles SW of Desert Center; palm oasis with approximately 100 fan palms (Washingtonia filifera); 0.5 acres; Bureau of Land Management has placed nest boxes in several locations here; 6 April 1987; No Elf Owls, 2 pairs of Screech Owls; poor quality.

4) **Fort Piute Wash - Piute Spring; Cottonwood-willow I;** 5 acres; the habitat is a strip 50 - 150 feet wide and 1.5 miles long; 14 April 1987; No owls detected, 10 Common Poorwills; area not rechecked due to poor access; good quality.

5) **Soto Ranch;** 8 miles N of Needles; mesquite III; 160 acres; mature mesquite forest with a few cottonwood snags; 13 and 29 April 1987; 1-3 Elf Owls at 2 locations, 7 Screech Owls, and 2 Great Horned Owls on the first visit and 2-4 Elf Owls. at 3 sites on the second visit. A total of 3-7 Elf Owls at 5 sites; there has been some clearing of cottonwood snags and mesquite since the summer of 1986; excellent quality.

6) **Fort Mojave Indian Reservation;** a narrow strip of habitat along the river approximately 6 miles N of Needles; salt cedar-mesquite IV; 60 acres; 13 April 1987; no owls found; area not rechecked due to unsuitability of habitat; poor quality.

7) **Mouth of Piute Wash;** 5 miles N of Needles; mesquite-salt cedar-palo verde IV with many open spaces; 60 acres; snags present; 13 and 30 April 1987; no owls detected; good quality.

8) **Needles sewage disposal site;** willow-salt cedar III with some mesquite; 40 acres of scattered patches; 15 and 30 April 1987; no owls detected; marginal quality.

9) **Beal Lake**; in Topock Marsh; salt cedar-willow-mesquite IV; 160 acres; 15 and 30 April 1987; 3 Screech Owls, 1 Great Horned Owl on the first visit and 2 Great Horned Owls on the second visit; good quality.

10) **Topock Gorge**; salt cedar-mesquite-palo verde IV; a total of 20 acres at 10 sites; 90% salt cedar; 1 May 1987; this area was checked during the day but was not surveyed due to poor habitat quality and poor access; marginal quality.

* 11) **Head of Clear Bay**; 5 miles N of Havasu Landing; salt cedar-mesquite-palo verde IV; 4 acres; 16 April and 2 May 1987; 1 possible Elf Owl on the first visit and no owls on the second visit; good quality.

12) **Catfish Bay**; 2 miles N of Havasu Landing; salt cedar-mesquite-palo Verde IV; 1.5 acres; 1 May 1987; one screech owl; marginal quality.

* 13) **Mouth of Chemehuevi Wash**; 0.5 miles S of Havasu Landing; mesquite-salt cedar-palo verde V; 20 acres; 16 April and 1 May 1987; 1 possible Elf Owls on the first visit and no awls on the second visit; there is heavy ORV use in this area; good quality.

14) **Saguars in the Whipple mountains**; 5 miles WNW of Parker Dam; approximately 20 mature saguaros along 3 miles of road, with one 'clump' of 8 saguaros in a 5 acre area; 28 April 1987; no owls heard; there has been visible disturbance of the saguaros and they are very scattered; poor quality.

* 15) **Desilt Wash**; 1 mile SW of Parker Damn; cottonwood-willow I; 5-10 acres; one of the best stands of cottonwoods along the Lower Colorado River; 12 and 28 April 1987; no owls on the first visit and one possible Elf Owl on the second visit, however, Desilt Creek was too noisy for us to be certain we heard one; good quality.

16) Copper Basin Wash; mesquite-palo Verde-salt cedar III; 7 acres; 12 and 28 April 1987; no owls detected; moderate ORV use; marginal quality.

17) **Mouth of Bennett Wash, along Parker strip**; mesquite-salt cedar V; 3 acres; 12 and 27 April 1987; no owls detected; marginal quality.

* 18) **Headgate Rock Dam**; 15 miles ENE of Earp; mesquite-salt cedar-cottonwood-willow III; 7-10 acres; numerous scattered mature cottonwoods; 12 and 28 April 1987; 2 Elf Owls and 1 Screech Owl on the first visit and no owls detected on the second visit; heavy human disturbance; good quality.

19) Vidal Wash; 8 miles S of Parker; mesquite-salt cedar V; 15 acres; there are a few cottonwoods and willows present; 11 and 26 April 1987; 2 Great Horned Owls were present on the first visit; good quality.

* 20) Wilson Road, 1 mile E of Highway 95; mesquite-palo Verde IV; 40 acres; the vegetation is clumped; 11 and 26 April 1987; one Elf Owl was heard on the first visit and 2 responded on the second visit; good quality.

21) Xesquite area N of Lost Lake Trailer Park; mesquite-salt cedar IV; 40 acres ; there are several roads through the habitat; 6 May 1987; no owls; good quality.

22) **Lost Lake Resort**; 12 miles S of Parker; trailer park with many planted cottonwoods; 20 acres; 11 and 26 April 1987; no awls were detected; marginal quality.

23) **Burned area 1 mile S of Lost Lake Resort, E of Highway 95**; salt cedar VI with mesquite and salt cedar snags; 300 acres; very bare with lots of snags; 11 and 26 April 1987; 1 Screech Owl, 1 Great Horned Owl, and 50 - 100 Poorwills on the first visit; area burned in 1985 in preparation to agricultural clearing; poor quality.

24) **North end of Water Wheel Camp**; 16 miles N of Blythe; 4 small clumps of mature cottonwoods surrounded by agricultural fields; minimal understory; 11 and 25 April 1987; no owls found; poor quality.

25) **Cottonwoods at south end of Water Wheel Camp**; 10 large cottonwoods; 6 May 1987; no owls; marginal quality.

* 26) **South end of Water Wheel Camp**; 15 miles N of Blythe; salt cedar-mesquite V; 320 acres; 60% salt cedar; 11 and 25 April 1987; 2-5 Elf Owls on the first visit and none on the second visit; this area could be cleared for agriculture; good quality.

27) **Shaggy Tree trailer park**; 13 miles N of Blythe; several large cottonwoods and mesquite; 11 April 1987; 1 Screech Owl heard; poor quality.

28) **Red Rooster trailer park**; 13 miles N of Blythe; 20 mature cottonwoods; unsuitable for owls; 11 April 1987; not rechecked due to unsuitability of habitat; poor quality.

* 29) **Aha Quin trailer park**, S end of Ball Island; 12 miles N of Blythe; scattered patches of cottonwood-willow III with salt cedar-willow-mesquite understory; mature, dense vegetation; 20 acres; 10 and 24 April 1987; no owls detected on first visit, and 2 Elf Owls responded to the tape on the second visit; we saw one Elf Owl on 26 April during a daytime check; some of the habitat is being cleared for an airstrip and ORV trails; good quality.

30) **Twin Palms Camp**; 10 miles N of Blythe; 20 mature cottonwoods, 5 mature willows; very poor habitat; 10 April 1987; no awls detected; area not rechecked due to unsuitability of habitat; poor quality.

31) **Above Blythe Boat Club**; 2 miles N of the boat club; cottonwood-willow I; 20 acres; and salt cedar-mesquite-willow IV; 65 acres; the habitat is in scattered patches; 10 and 24 April 1987; no owls were detected; the habitat could be cleared by the residents; good quality.

32) **Mayflower County Park**; 6 miles N. of Blythe; honey mesquite II; 15 acres; no understory (campground), all dead branches have been removed; 11 and 23 April 1987; One Screech Owl on first visit; marginal quality.

33) **600 feet S of 6th Avenue Trailer Park**; salt cedar-mesquite mix III, 75% mesquite; 10 acres; Few very large mesquite and palo verde; 7 and 23 April 1987; No owls; marginal quality.

34) **1 mile W of 6th Avenue Trailer Park**; honey mesquite and baccharis IV, 15 feet tall; 40 acres; several patches with very large mesquite; 7 and 23 April 1987; no owls; good quality.

35) **Big Hole, approximately 3 miles NE of Blythe**; cottonwood-willow-mesquite I, cottonwoods in narrow strips; 100 acres; cottonwood-mesquite III; 100 acres; widely scattered cottonwoods and very marshy; 7 and 23 April 1987; 2 Screech Owls, 1 Great Horned Owl, 1 Barn Owl, and 1 Poorwill; marginal quality.

* 36) **Goose Flats**; backwater 2 miles downstream from I-10 freeway bridge; cottonwood-willow IV; 240 acres; 70% salt cedar, 3% cottonwood, 2% willow in scattered clumps; 8 and 22 April 1987; 1 Elf Owl on first visit was probably a migrant; marginal quality.

37) **North of McIntire County Park 0.4 miles**; cottonwood-willow I; 60 mature cottonwoods in a narrow 0.4 mile strip; 8 and 22 April 1987; 2 Screech Owls, 1 Great Horned Owl, 1 Barn Owl, and 1 Poorwill; marginal quality.

38) **H. Miller County Park 12 miles S of Blythe**; salt cedar-cottonwood-willow V; very small area, overgrown with salt cedar; 9 April 1987; no owls found; area not resurveyed due to unsuitable habitat; poor quality.

39) **Arizona State Revegetation site**; 7.5 miles S of Palo Verde; planted in 1979, cottonwood-willow II; 40 acres; 9 and 21 April 1987; 2 Screech Owls and 3 Poorwills on first visit and 3 Screech Owls on second visit; good quality.

40) **1.5 miles W of Walter's Camp**; palo Verde-mesquite-smoke tree V; 480 acres; 21 April 1987; 3 Screech Owls and 1 Great Horned Owl; the area is a National Wildlife Refuge; good quality.

* 41) **Walter's Camp**; 0.25 miles S of Three-finger Lake; mesquite-salt cedar-palo verde IV and V; 160 acres; numerous large mesquite and palo Verde trees; 9 and 21 April 1987; 3 Elf Owls were heard on the first visit and 3 Screech Owls, 1 Great Horned Owl and 1 Poorwill were heard on the second visit; this area receives moderate ORV use; good quality.

42) **Across from Lighthouse Rock**; salt cedar-mesquite-palo verde; 10 acres; 5 May 1987; the area was checked during the day and due to poor quality habitat and poor access, it was not surveyed at night; poor quality.

43) **Mouth of Julian Wash**; ironwood-palo verde II; 160 acres mesquite-salt cedar IV; scattered large clumps of mature vegetation; 160 acres; 5 May 1987; no owls, 4 poorwills; this area is closed to ORV use; excellent quality.

44) **Unnamed washes between Julian and Para Wash**; mesquite-salt cedar-palo Verde IV; 20 acres; palo verde-ironwood V; 20 acres; 5 May 1981; no owls, 2 poor-wills; good quality.

45) **Mouth of Para Wash**; 3 miles N of Picacho State Recreation Area; mesquite-salt cedar-palo verde IV; 20 acres; ironwood-palo Verde V; 20 acres; 5 May 1987; no owls, 2 poor-wills; good quality.

46) **Taylor Lake and White Wash at Picacho State Recreation Area;** salt cedar-palo verde-mesquite IV; 10 acres; 19 April and 3 May 1987; one Screech Owl heard in White Wash; good quality.

47) **Main campground, Picacho State Recreation Area;** palo verde-mesquite-salt cedar V; 10 acres; 19 April and 3 May 1987; one screech owl nest found in the campground; good quality.

48) **Between Imperial and Laguna dams;** salt cedar-mesquite-palo Verde IV; 570 acres; Mostly salt cedar, there is also one 5 acre patch of willow-cottonwood-salt cedar I; 18 April and 2 May 1987; No owls detected; good quality.

49) **Along the All-American Canal;** 6.5 miles NE of Yuma; salt cedar-mesquite-palo Verde IV with quail brush understory; 60 acres; Some areas have been cleared for roads and small agricultural patches; 17 April and 4 May 1987; 2 Screech Owls on the first visit and no owls on the second visit; good quality.

50) **Along the All-American canal;** stand of cottonwoods and willows approximately 8 miles NE of Yuma, Arizona; cottonwood-willow-salt cedar I; approximately 5 acres; 17 April, 2 and 4 May 1987; No owls on first or second visit, 2 Great Horned Owls on third visit, second visit covered northern half of area and the third visit covered the southern half; good quality.

51) **Area along the All-American Canal, approximately 1 mile N of Picacho State Recreation Area turnoff;** palo verde-mesquite-salt cedar V; 160 acres; salt cedar-palo verde-mesquite IV; 160 acres; 20 April 1987; 2 Great Horned Owls, 1 Screech Owl; Area not revisited due to human disturbance; good quality.

52) **Araz Wash;** approximately 3 miles W of Winterhaven; palo verde-mesquite-salt cedar V, young habitat with few snags; 5 acres; mesquite-palo verde IV; 3 acres; 20 April 1987; two Great Horned Owls in the area; Area not revisited due to unsuitability of habitat; marginal quality.