# SALTON SEA/COACHELLA VALLEY NATIONAL WILDLIFE REFUGES

Calipatria, California

# ANNUAL NARRATIVE REPORT

Calendar Year 1991

U.S. Department of the Interior

Fish and Wildlife Service

NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVAL

SALTON SEA NATIONAL WILDLIFE REFUGE

CALIPATRIA, CALIFORNIA

ANNUAL NARRATIVE REPORT

CALENDAR YEAR 1991

E Clark Blower 2/1/93
Refuge Manager Date

Michael B Jamm 6/8/93
Refuge Supervisor Review Date

Assistant Regional Director Date

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CALIPATRIA. CALIFORNIA

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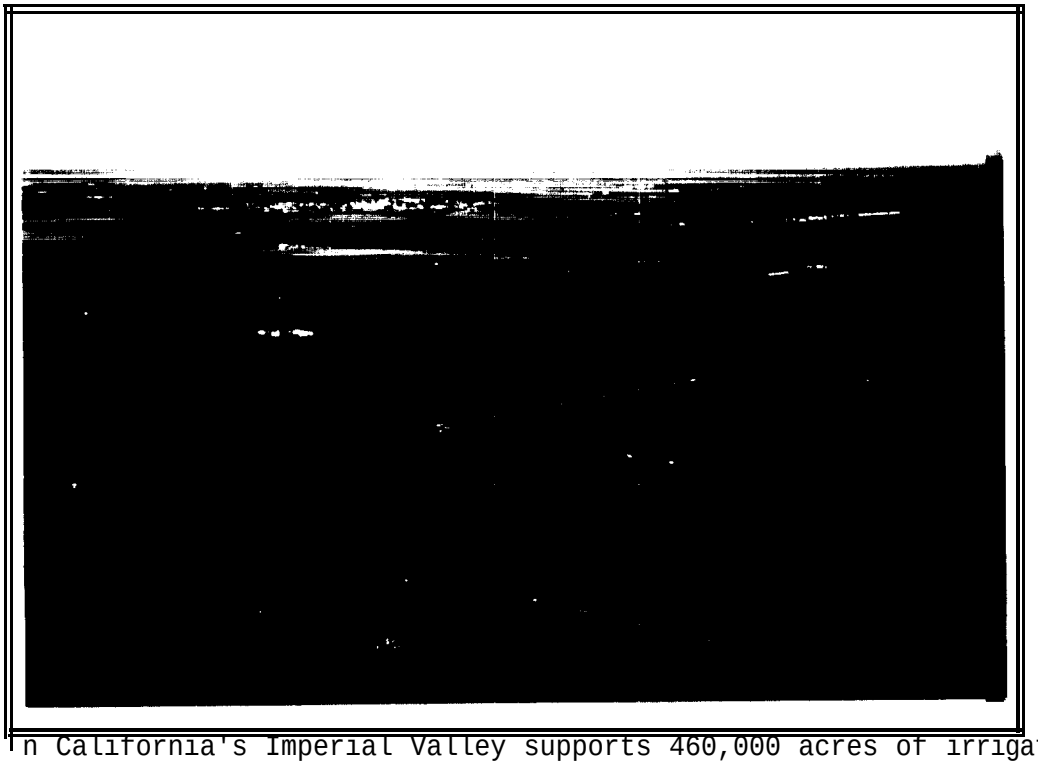
# INTRODUCTION

Salton Sea National Wildlife Refuge is located 40 miles north of the Mexican border at the southern end of the Salton Sea in California's Imperial Valley. Situated in the Pacific Flyway, Salton Sea is the only refuge located below sea level. Because of its southern latitude, -226 foot elevation, and location in the Colorado Zone of the Sonoran Desert, the Refuge experiences some of the highest temperatures in the nation. Daily temperatures from May to October generally exceed 100°F with temperatures of 116°-119°F recorded yearly.

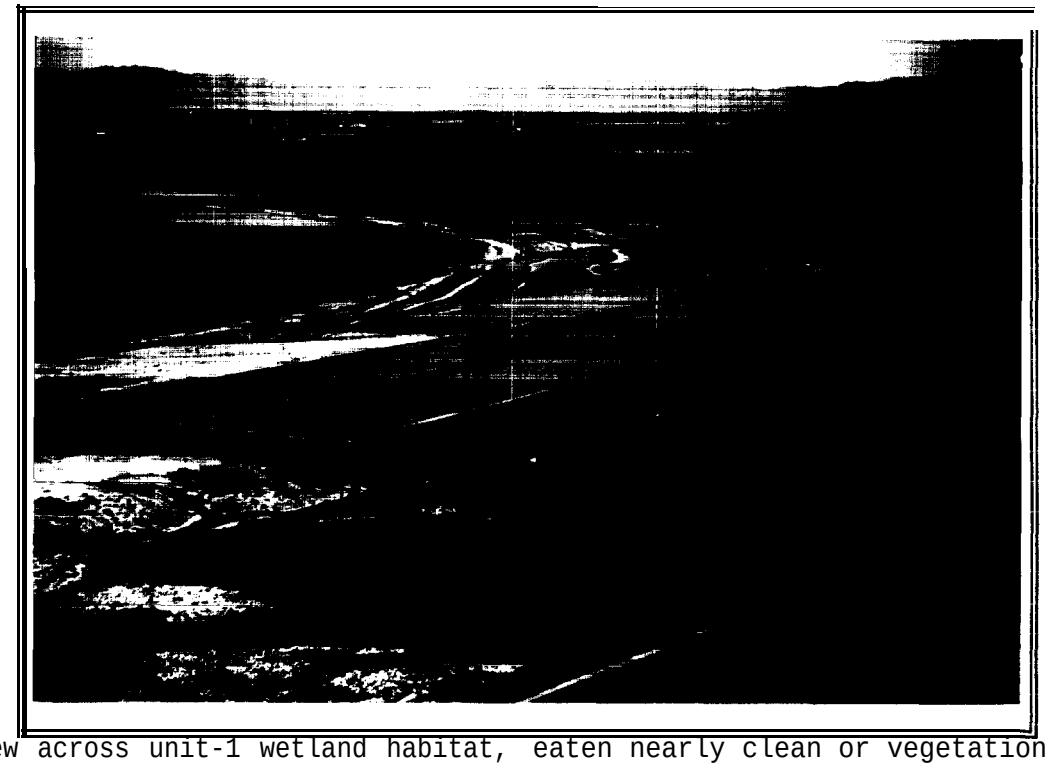
The Refuge was established "as a refuge and breeding ground for birds and wild animals" in 1930. Originally, it included approximately 35,000 acres. Nearly 60 percent of the original acreage was open saline lake with the balance comprised of shoreline alkali flats, freshwater wetlands, native desert scrub, and upland (farm fields). Due to the inflow of agricultural effluent and a subsequent rise in the level of the Salton Sea, all of the original refuge area has been inundated. In 1947, 24,000 acres were leased from the Imperial Irrigation District and divided between three agencies: California Department of Fish and Game (CDF&G), U.S. Navy, and U.S. Fish and Wildlife Service (USFWS). Most of the current Refuge acreage of 47,827 acres has been flooded by a continued rise in the level of the Sea. At present, 2,500 acres of the Refuge is dry ground, with about 2,200 acres suitable for farming and wetland development.



south In California's Imperial Valley supports 460,000 acres of irrigated agriculture, and provides habitat for tremendous numbers of resident and wintering birds.

WRR 01/06/92

Salton Sea NWR is flat with the exception of Rock Hill located near the Refuge headquarters. The refuge is bordered by the Salton Sea on the north, intensively farmed agricultural lands on the east, south and west, and is divided into two units, situated eighteen miles apart. Each unit contains managed wetland habitat, agricultural fields, alkali mudflats, and desert brushlands.



A view across unit-1 wetland habitat, eaten nearly clean or vegetation by geese. WRR 12/16/91

The courses of the New and Alamo Rivers run through the Refuge. Both provide freshwater inflow to the Sea. The New River's source is urban effluent and agricultural drainage from Baja California and the Mexican border town of Mexicali. The Alamo River's source is agricultural drainage from the Imperial Valley.

The Salton Sea basin was a prehistoric extension of the Gulf of California and is the largest saline lake in California. It forms a natural sump for the 4,500 square mile Imperial Valley and northern Baja California with its primary sources being rainwater and agricultural drainage. The salinity of the Sea has steadily increased. In 1950, it was 35 parts per thousand (ppt), equalling the Pacific Ocean. In 1989, it was 44 ppt, fully twenty-five percent saltier than the Pacific Ocean. With evaporation in the range of ten feet per year, salinity levels will continue to increase.

Habitat management emphasis is placed on the maintenance and improvement of wintering goose and duck habitat, and the reduction of waterfowl depredations to adjacent croplands. Protection and enhancement of nesting habitat for the

endangered Yuma clapper rail, and maintenance of habitat for nesting and migratory populations of sensitive species and other marsh birds and shorebirds are also major objectives.

Salton Sea NWR provides habitat for 378 bird species, 41 mammal species, and many reptiles and amphibians. The Refuge winters up to 30,000 snow, Ross', and Canada geese, and 60,000 ducks daily from November through February. Marsh birds and shorebirds account for more than six million use-days each year. Endangered species observed on the Refuge include the southern bald eagle, peregrine falcon, California brown pelican, and Yuma clapper rail. A significant Yuma clapper rail population nests on the Refuge. Sensitive species using the Refuge include the fulvous whistling duck, wood stork, long-billed curlew, mountain plover, western snowy plover, and white-faced ibis. Additionally, the status of burrowing owl populations is an issue of increasing concern.

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## A. HIGHLIGHTS

Several personnel changes occurred during 1991. (Section E.l)

Cooperative farmer quits program. (Section F.4)

Whitefly infestations become a serious threat to farming. (Section F.4)

Desert pupfish are documented in 72% of the drains flowing into the Salton Sea. (Section G.2)

A Laysan albatross was documented at the Salton Sea, establishing only the eleventh inland record for this species. (Section G.5)

Two new wildlife species, the painted redstart and hispid cotton rat, were documented on the refuge during 1991. (Sections G.7 and G.lO)

New Case 590 Turbo Backhoe/Front End Loader received. (Section 1.4)

## B. CLIMATIC CONDITIONS

Weather in the Imperial Valley can be characterized as having extremely hot summers and mild winters. The growing season lasts all year, with most farmers usually growing at least two crops per field per year, The summer of 1991 was very mild as far as normal Imperial Valley summers are concerned. From May 2.5 through October 20 (148 days from first lOO°F day to last lOO°F day of the year) 109 days had maximum temperatures of 100°F or higher. The average maximum temperature from June through September was a mere 102°F. The highest temperature for the year was 114°F on July 3.

As mild as the summer was, these high temperatures combined with noon-time relative humidity reaching 45% or higher can make outside working conditions potentially health threatening, unless proper precautions are taken.

The lowest temperature for the year was 27°F recorded on January 30, a normal low temperature on any given year.

In 1991 the Imperial Valley received a healthy 4.46 inches of rain, a full 55% increase in precipitation over the 77 year long term average of 2.87 inches. Rainfall in 1991 broke a four year streak of below average precipitation. Monthly temperatures, precipitation and average relative noon-time humidity are summarized in the following table.

The average high water elevation of the Salton Sea changed very little in 1991 compared to 1990 levels. The average elevation for the sea was -227.23 feet below sea level (based on 12 monthly readings at Fig Tree John, Imperial Irrigation District). A drop of only 0.03 feet in the Sea level was recorded during 1991. During the past seven years, the elevation of the Salton Sea has gradually dropped, (a high of -226.30 in June 1985 to -226.75 in May 1991). A possible reason for the slower rate of elevation decrease of the Salton Sea in 1991 may be a combination of two related factors: 1991 was a relatively cool year and total evaporation for the year was only 94.69 inches (down from 109 inches in 1990).

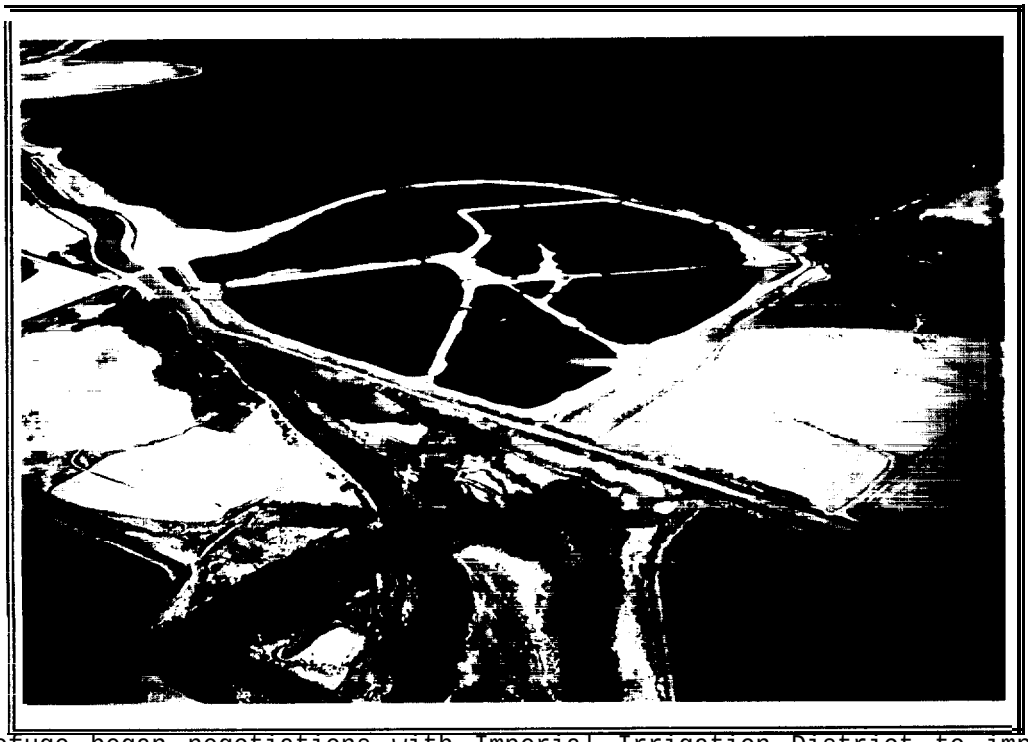
Salton Sea NWR Weather Summary 1991*

| MONTH | PRECIP. (inches) | AVE.REL.HUMIDITY (noon-time) | TEMPERATURE °F max./average | | min./average | |
|---|---|---|---|---|---|---|
| Jan. | .49 | 34% | | 69 | | 39 |
| Feb. | .86 | 29 | a7 | 80 | 34 | 45 |
| Mar. | 72 | 34 | al | 72 | 37 | 46 |
| Apr. | '0 | 26 | 96 | a5 | 41 | 52 |
| May | 0 | 22 | 101 | 91 | 43 | 57 |
| June | 0 | 26 | 106 | 98 | 55 | 63 |
| July | .47 | 32 | 114 | 105 | 66 | 72 |
| Aug. | 0 | 32 | 109 | 104 | 65 | 73 |
| Sept. | .59 | 34 | 111 | 101 | 60 | 71 |
| Oct. | .02 | 27 | 108 | 95 | 40 | 62 |
| Nov. | .05 | 50 | 94 | 79 | 33 | 46 |
| Dec. | 1.26 | 50 | 75 | 68 | 33 | 44 |

* Weather data obtained from Imperial Irrigation District

C. LAND ACQUISITION.

3. Other



The refuge began negotiations with Imperial Irrigation District to improve wildlife habitat at "Morton Bay," near the Alamo River delta. WRR 02/13/91

A solicitation package for funding consideration through the North American Wetlands Conservation Council was submitted in November for the December 9-13 Council meeting. The amount requested for funding totaled $3,000.00 for the enhancement of Morton Bay. The Imperial Irrigation District (IID) is the current title holder, although the area is within the identified Salton Sea Refuge boundary. The bay is presently used by thousands of shorebirds and waterfowl as a wintering area and during annual migrations. Morton Bay also hosts one of the few inland occurring nesting colonies of black skimmers and gull-billed terns. Threats to the area include the lowering of the Salton Sea water level as a result of water conservation measures and the subsequent dropping of water levels within the bay. Habitat enhancement activities would result in repair of the perimeter dike and redirection of freshwater inflows into the bay.

The reply from the Council dated December 20 denied the funding request based on the Technical Assessment Score (the proposal is not within a Joint Venture Area). The proposal will be considered again at the next Council meeting, however, approximately 45 proposals remain to be considered and only $1.5 · $2 million remains for allocation.

As a result of possible cooperative projects such as Morton Bay, the IID submitted a Drain Maintenance Plan for maintenance of these and other areas. Formal consultation was initiated with the Enhancement Field Station in Laguna Niguel because of endangered species occurrence (see Section D.4).

## D. PLANNING

### 2. Management Plans

Despite busy schedules, work continued on the development of a revised Habitat Management Plan (HMP). The revised edition is expected to be completed next year and focuses on management of wetland impoundments for both waterfowl and rails, and the sequential germination of cereal grains in force account managed croplands.

The updated revision of the Fire Management Plan was completed and forwarded to Portland for review/approval. While suppression of wildfires is not a major consideration at Salton Sea, a limited amount of prescribed burning is planned to enhance management of croplands and impoundments, and in salt cedar control efforts.

### 4. Compliance with Environmental and Cultural Resource Mandates

Under Section 7 of the Endangered Species Act of 1973, as amended, formal consultation was initiated for a Drain Maintenance Plan submitted in October by IID. The "Intra-Service Section 7 Evaluation Form Consultation/ Conference/Concurrence' was completed and submitted to the Enhancement Field Station in Laguna Niguel during December.

The IID's main purposes are the diversion and delivery of Colorado River water for irrigation and domestic purposes, and the operation and maintenance of facilities and approximately 1,460 miles of existing drainage canals. Drain maintenance may include dredging by hydraulic excavator or dragline, grading of drain roads and banks, herbicide applications to drain channels and banks, mechanical removal of vegetation, water level manipulations, construction

activities, and/or aquatic herbicide application or introduction of triploid grass carp for hydrilla control. Some of these activities may have the potential for negative impacts on wildlife and their habitats, including those of the federally endangered desert pupfish and Yuma clapper rail. Formal consultation was re-initiated for desert pupfish because of new information contained in "A Distribution Survey of Desert Pupfish (Cyprinodon macularius) Around the Salton Sea, California · 1991." A biological opinion has yet to be issued for Yuma clapper rails.

5. Research and Investigations

Salton Sea NR91 · "Evaluation of Contaminant Effects on Burrowine Owl Reproduction" (11630-9003)

The primary objective of this refuge-sponsored project is to determine whether contaminants are having an effect on the burrowing owl population in California's Imperial Valley, and identify these contaminants and their potential sources. Secondary objectives will include collection of baseline information on burrowing owl ecology and population dynamics such as feeding habits, pair and nest site fidelity, productivity, population recruitment, seasonal population changes, and owl longevity.

Burrowing owl populations have generally been declining throughout California and other western states. These owls are the most common small raptor in the Imperial Valley, representing the top of a rather short food chain, A number of threats currently exist which may be having an effect on the local burrowing owl population, including ditch maintenance activities, ground squirrel control programs, and pesticide use associated with agricultural production. Preliminary work was accomplished this year to document owl use on and adjacent to refuge lands (see Section G.6).

Salton Sea NR91 · "Boron Contamination in Waterfowl of the Salton Sea (11630-9101)

The large amounts of agricultural (tile drains, Alamo River), industrial and human (New River) effluent pose a very real threat of contamination to the area's waterfowl, with boron being of specific concern, The stature of the Salton Sea area, and the Refuge in particular, as wintering grounds for waterfowl magnify the importance of resolving whether a boron problem does, in fact, exist. Such concerns led to the creation of a study designed to determine the extent of boron bioaccumulation in important waterfowl species utilizing the Salton Sea; determine if waterfowl are accumulating boron in concentrations sufficient to adversely affect reproductive success; determine seasonal variability of boron concentrations in waterfowl, waterfowl food and the area's sediments; and compare the obtained data to U.S. Department of the Interior's drainwater studies data.

Four sites were selected from which three sediment, vegetation and invertebrate samples are to be taken, and the sampling periods are scheduled to coincide with the collection of waterfowl specimens. The waterfowl are to be collected as they begin to arrive in the fall, during mid-winter, and as the bird's springtime migration begins. There will also be a monthly collection of pileworms and sediment from one site in the Sea (for specific collection information, see Section G.14). This study, initiated by

Contaminant Specialist Dan Audet and funded by the California Fish and Game Commission, began early in 1991 and its field work will be concluded in March of 1992.

Drainwater flowing into the Salton Sea from the Alamo River carries various contaminants including selenium, boron, and DDE. WRR 11/15/90

Salton Sea NR91 - "Impacts of Selenium and DDE on the Endangered California Brown Pelican and other Piscivorous Birds at the Salton Sea NWR" (11630-9102)

Among the contaminants existing in the irrigation, drain, river, and sea water of the Imperial Valley, are selenium (a naturally occurring heavy metal) and DDE (a derivative of DDT). Causing special concern is the fact that endangered (brown pelican) and special concern (black skimmer, gull-billed tern) species utilize the area. The objectives of the study are to determine the impacts of selenium and DDE on the piscivorous bird species, both nesting and non-nesting, of the Salton Sea.

This study was conducted and funded in conjunction with the Service's Laguna Niguel Fish and Wildlife Enhancement office. Forage fish (mosquitofish, sailfin molly, bairdiella, corvina, and sargo) specimens were collected from various locations in agricultural drains and the sea. The sample sites were in piscivorous bird concentration/feeding areas at both ends of the sea. Specimens of various piscivorous birds and their eggs were also collected for analysis (for specific collection information, see Section G.14).

Salton Sea NR91 · "Asnects of the Reproductive Biology of the Gull-billed Tern (Sterna nilotica)" (11630-9103)

The gull-billed tern race vanrossemi breeds at the Salton Sea and locally south through west Mexico to Ecuador, and has been little studied. Ornithological researcher Kathy C. Molina of the Natural History Museum of Los Angeles County began a study this year to monitor the Saltbn Sea tern colony throughout the entire breeding season, from the arrival of the adults at the colony until the young are fledged. The study is anticipated to be a minimum of three years, with specific objectives being: 1) to form a demographic profile of the population, including population size, hatching success, fledging success, age of first breeding, and longevity; 2) document courtship behavior and vocalizations; 3) document food habits and foraging techniques; 4) record chick growth and development; 5) record philopatry for natal colony; 6) compare egg shell thickness before the advent of intensive agriculture to those of the present, utilizing discarded shell fragments; 7) determine nest site microhabitat selection and inter-nest spatial relationships.

A summary of the 1991 field season was provided by Molina for refuge files. Observations occurred between April 3 and August 12, with banding activities accomplished weekly between May 3 and July 30, and 124 young were banded. There were a total of about 70 known nesting attempts at two separate colonies during the year. A minimum of 21 birds were known to fledge, based on the maximum number of fledged individuals encountered on a single day, though undetected fledglings may have dispersed before seen by observers. The Service will gain benefits regarding management of terns and other sensitive species at the Salton Sea colony, and refuge personnel provided logistical support for the effort.

Northern Pintail DNA Study

Requests for field assistance are often received from researchers, as was the case with the Alaska Fish and Wildlife Research Center. Scientists there were attempting to determine if manageable subpopulations of pintails are genetically identifiable. Biologist Schulz and SCA Durbin collected pintail hearts from birds brought into the Wister check station. Pertinent information on the birds was recorded and the hearts were then shipped to the Center in Anchorage.

Northern Pintail Telemetry

The Refuge also cooperated with the Northern Prairie Wildlife Research Center in Dixon, California on a pintail project. Joe Fleskes of the USFWS San Joaquin Valley Pintail Project supplied the radio telemetry equipment which was used by Biologist Schulz to check duck concentration areas, both on and off the Refuge, for the presence of radio-tagged birds. During six to eight visits to each area, no transmissions were received.

## E. ADMINISTRATION

### 1. Personnel

Salton Sea Staff · (left to right) Back Row 12,8,10,7,9,13
Front Row 3,4,1,5,11,12 R. Henderson

1. Kenneth Voget · Refuge Manager GS-485-12 PFT
2. Daniel Dinkler · Primary Assistant Refuge Manager GS-485-11 PFT
3. William Radke · Wildlife Biologist GS-486-11 PFT
4. Christian Schoneman · Refuge Operations Specialist GS-485-7 PFT (Promoted from GS-485-5 ROS 8/01/91)
5. Kathleen Arnett · Administrative Support Assistant GS-303-6 PFT
6. Shelly Hunter · Office Automation Clerk GS-326-4 PFT Not pictured
7. Lee Laizure · Heavy Equipment Mechanic WG-5803-10 PFT
8. Richard Marquez · Engineering Equipment Operator WG-5716-10 PFT
9. Marcos Orozco · Engineering Equipment Operator WG-5716-9 PFT (Promoted from Maintenance Worker WG-4749-8 PFT 10/06/91)
10. Gaylord "Skeeter" Schultz · Wildlife Biologist GS-486-7 TFT (EOD 6/16/91)

11. Marcia Radke - Wildlife Biologist GS-486-7 TPT (EOD 10/20/91)

12. Mark Marquez - Maintenance Mechanic Helper WG-4749-5 TFT (EOD 11/12/91)

13. Jeffrey Walker - Laborer WG-3502-3 TFT (EOD 12/14/91)

14. Joseph Vandiver - Social Services Assistant GS-0186-4 (EOD 7/14/91, extended NTE 10/30/91) Not pictured.

During 1991, four full-time and one part-time temporary positions were filled Gaylord "Skeeter" Schultz came on board as a new Wildlife Biologist in July. Technical Assistance duties were taken over in October by new Wildlife Biologist Marcia Radke, who brings extensive experience with the Washington Department of Wildlife to her duties. Maintenance Mechanic Helper Mark Marquez was a welcome addition to the refuge maintenance crew and brings the additional bonus of both educational and practical skills in automotive mechanics. Laborer Jeffrey Walker also came on board in December. Additionally, Social Services Assistant (YCC Program Leader) Joseph Vandiver came on board in July.

The addition of temporary Wildlife Biologists Skeeter Schultz and Marcia Radke provided a much welcomed benefit to the station biological and technical assistance programs. Similarly, the addition of Maintenance Mechanic Helper Marquez and Laborer Walker gave the equipment and facilities maintenance program a much needed boost towards reducing a growing backlog of maintenance projects.

Social Services Assistant Vandiver filled in to perform the YCC Program Leader duties at the halfway point in the YCC program and stayed on to provide much needed help in the expanded force account farming program. Initially, no qualified applicants applied for the YCC Program Leader slot, a position which can "make or break" the success of the YCC Program.

2. Youth Programs

Refuge Operations Specialist Chris Schoneman had primary responsibility for the 1991 YCC program. The enrollee work force consisted of three males and two females. A crewleader (Social Services Assistant), Joseph Vandiver, joined the program at mid-season, filling the vacancy that had gone unfilled due to lack of applicants. All enrollees lasted the entire season, which must be a first! Solicitation of applicants was conducted at several Imperial Valley High Schools. Enrollees were 16-18 years of age. The five enrollee applications were randomly selected in late April. Letters of acceptance were sent to all drawn applicants as well as a brief overview of the YCC program. A meeting/orientation was held the first day of the program to introduce the enrollees to the refuge facilities and the staff.

Safety was emphasized daily by crewleader Vandiver and ROS Schoneman. No significant injuries occurred during the 1991 YCC program. Heat was not the major concern this year as it is in most years. Only one week during the eight week program did temperatures rise above 110°F. Rehydration with fluids was emphasized, as always.

An energetic YCC crew planted desert vegetation to restore neotropical bird habitat and increase aesthetics at the refuge residence. WRR 07/11/91

Work projects included: assisting with the landscaping in the front yard (including forming and pouring the concrete liner around the "island", planting vegetation, and placing rocks); vegetation and soil removal from approximately 400 yards of concrete lined irrigation ditches; repair and improvement of water control structures on ponds to reduce soil erosion; painting of preservative on wooden wildlife observation structures; preparation of all hunting blinds for fall waterfowl season; maintenance of the refuge domestic water settling reservoir; re-posting portions of the refuge boundary; painting of visitor information sign; construction of a new wire fence (2 miles) at Coachella Valley NWR; and litter collection, tree trimming, and otherwise helped keep the refuge headquarters area clean.

Environmental awareness activities included visits to: Anza-Borrego State Park, Chula Vista Nature Interpretive Center, San Diego Museum of Natural History, San Diego Zoo, The Living Desert Preserve in Palm Springs, and a geothermal power plant. Presentations by refuge personnel were also given to enhance their understanding of the local environment.

Accounting Data:

Appraised Value of Program = $12,714.00
Paid Enrollee Hours = 1600
Total Cost of Program = $12,117.00 (Including holiday pay, environmental awareness trips, and transportation costs not included in Appraised Program Value.)

$$\text{Cost/Benefit Ratio} = \frac{12.714.00}{12,117.00} = 1.05$$

Recommendations for the 1992 YCC program include increasing the level of funding to accommodate potential increases in minimum wage, and maintenance of the size and scope of the YCC program.

### 3. Other Manpower Programs

The McCain Valley Conservation Camp, a fire fighting prison camp administered by the California Department of Forestry, provided valuable manpower used to complete numerous work projects on the refuge. Crews from McCain Valley, usually consisting of about ten honor camp inmates, once again did yeoman work in supporting refuge projects, frequently those of a time-consuming, labor-intensive nature. A total of 3,600 hours were contributed by the conservation camp on projects including landscaping, concrete work, ditch cleaning, salt cedar control, and road clearing.

The refuge supplied most of the tools and materials to accomplish these projects. Diesel fuel was supplied to the Camp's truck to alleviate their transportation costs to the refuge. The program used minimal staff time and is recommended to any refuge with this type of program available to it. Without their help, the work they performed either would not have been done, due to lack of refuge staff, or would have been very costly if performed by private companies.

### 4. Volunteers

Volunteer support came from two sources in 1991: the McCain Valley Conservation Camp crews (discussed above in "Other Manpower Programs")and Student Conservation Association (SCA) member Jeffrey Durbin.

SCA volunteer Jeff Durbin provided valuable enthusiastic assistance to the public use program and other refuge operations. With Jeff's capable assistance the refuge office was open on both Saturdays and Sundays, affording weekend visitors throughout the winter the opportunity to come into the contact station, view the display, and query a staff member. Jeff lived on site and contributed forty hour work weeks totaling 320 hours in 1991.

### 5. Funding

Salton Sea Complex funds increased from FY90 to FY91 by way of new refuge funding for a new staff position at Tijuana Slough NWR. As a result, O&M in actuality did not increase. One FTE at Salton Sea could not be refilled as a result of this funding level. Temporary positions were filled with negotiated contaminants funds, which vary greatly from year to year.

The following summary illustrates funding levels and comparisons with prior FY funds:

| ACTIVITY | FY 1987 | FY 1988 | FY 1989 | FY 1990 | FY 1991 |
|---|---|---|---|---|---|
| 1260 O&M[1] | 385,900 | 424,200 | 445,600 | 562,500 | 570,000 |
| 8610 | 2,700 | 3,900 | 3,500 | ll,000 | 6,480 |
| 7201 | 10,000 | 7,000 | 22,000 | 21,600 | 13,600 |
| Total Operating Funds Available: | 398,600 | 435,100 | 471,100 | 595,100 | 590,080 |
| Fire Funds | 300 | 700 | 1,000 | 7,200 | 7,000 |
| Special one-time funds for RPRP, ARMMS, contaminant monitoring & PCS moves' | 221,100 | 139,900 | 140,000 | 50,000 | 92,600 |
| TOTAL STATION FUNDS | 620,000 | 575,700 | 612,100 | 652,300 | 689,680 |

1. A Special mitigation account funds received for Coachella Valley fringe-toed lizard, and Sweetwater Marsh NWR's (FY91 - CVFTL = $7,000, Sweetwater = $5,600 available). These funds are generally considered part of O&M.

2. Special one time funds included: $7,000 Farm Bill, $8,000 contaminants, $77,600 for MMS.

Included in the Base 1261 funds ($413 K) was $30 K for irrigation water. As farmers become more judicious in their water application, the refuge's customary use of "spill" or free water is decreasing (the refuge is on the end of ditches). This, coupled with the refuge assuming a larger responsibility for the farming program, will require this particular expenditure to significantly increase.

Contaminants funding ($8 K) was about half of what we originally negotiated for. However, due to the extreme need for this work at Salton Sea, the biological staff in particular continues to assist FWE far in excess of $8,000 worth.

6. Safety

Safety was again emphasized in 1991, highlighted with monthly safety meetings and updated Performance Plans. A wide range of safety topics were covered in weekly safety meetings, including two programs on electrical safety presented by IID Safety Officer Ed Lindsay.

The station safety program was reinforced in 1991 through changes in the Performance Plans of staff. Formerly, the "Safety" element was de-emphasized in performance plans. It was listed as the last, noncritical element and written with language that accepted "a few minor accidents" as the standard for meeting **the fully successful level of performance. For the 1991-92** performance year, the performance element for safety was rewritten, with a new, remodeled "Health and Safety" element listed as critical element number

1, and with "no accidents" as the standard for meeting the fully successful level.

Three varieties of polio virus have been cultured from phosphate foam flowing into the Salton Sea via the New River, potentially impacting safety among refuge personnel conducting field work. WRR 02/13/91

No lost time accidents were reported in 1991.

7. Technical Assistance

Refuge biologists worked closely with private landowners to utilize FmHA funding to develop or rehabilitate wetlands in both Imperia1 and Riverside Counties. To help make the public aware of this program, the refuge sponsored an open house on January 5 with Vern Cunningham and Jana Nelson from the Regional Office attending to answer questions. About 50 people attended the open house. Although many of the private landowners were interested in the concept of cost sharing to fund wetland projects, very few were willing to enter into even a short-term agreement with the Service necessary to ensure wetland protection.

In addition, a news article was placed in the Brawley News to announce Partners for Wildlife and other cost-sharing programs available for the enhancement of wildlife habitat on private lands. As an immediate result, two duck clubs requested further information. An information packet was sent to River Ranch Duck Club, however, the club manager has not shown an interest in signing the habitat agreement. Another landowner was met in person and an on-site visit was made to the wetland area. This landowner also was not interested in the program because of the habitat agreement and possible additional tax assessments to the improved property.

Shady Acres Duck Club shared costs with the Service to develop and improve wetland habitat adjacent to refuge land. WRR 07/11/91

The District Conservationist at the El Centro Soil Conservation Service office was contacted by phone in order to discuss possible cost sharing avenues for the development of wildlife habitat on private lands. Follow-up letters were sent for submission at Agricultural Stabilization and Conservation Service meetings for possible funding available through ASCS WL-4, "Shallow Water Area for Waterfowl."

As a result, most assistance consists of visiting properties and making habitat management recommendations. During 1991, refuge biologists visited several properties and submitted written recommendations to the Northwind Duck Club and 21 Gun Club.

The owners of two properties, Shady Acres Duck Club and Rancho dos Palmas, entered into ten-year Wildlife Extension Agreements with the Service to share costs toward improving wetland habitat through the FmHA program. A total of $32,500 of Service funds and $32,500 of private funds were obligated to improve a total of 110 wetland acres during 1991 through this program. However, Rancho dos Palmas, which was owned by the Nature Conservancy, eventually dropped out of the program when it transferred title of its land to Bureau of Land Management (BLM). The BLM plans to continue funding of the wetland habitat project using Service plans and technical assistance, and has entered into a cost sharing agreement with Ducks Unlimited. This is an important project, with primary objectives of enhancing habitat for endangered Yuma clapper rails and desert pupfish, along with black rails, fulvous whistling ducks, and a multitude of neotropical birds.

Shady Acres Duck Club consists of 30 acres of freshwater wetland adjacent to the Salton Sea and refuge land at Bruchard Bay. This property had been seriously degraded over time, become overgrown with saltcedar, inundated with saltwater from the rising Sea, and no longer had water management capability. The resulting agreement with the Service provided tremendous revamping of the property by designing and installing water delivery ditches and water control structures to several rebuilt ponds; by constructing a system to efficiently drain the ponds; and by providing seed for wetland plant establishment. This was an important and successful project which will also benefit adjacent Service land by providing enhanced habitat for Yuma clapper rails and black rails, along with a variety of shorebird and waterfowl species.

Technical assistance to other agencies included comments prepared for the "Draft Open Space/Conservation Plan" by the Imperial County Planning Department. This plan accentuates the California legislature's promotion of the protection, maintenance, and use of the state's natural resources with special emphasis on scarce resources and those that require special control and management. However, other consumptive uses, such as mining and off-road vehicle recreation, were also given considerable attention in this plan.

8. Other Training

Refuge staff participated in the following training activities:

Equipment Certification, On-site, January;
Chris Schoneman, Ron Ryno, Dan Dinkler, Mark Marquez, Jeff Walker, Lee Laizure, Mike McGill, Henry "Mac" McEachern, Ken Voget, Marcos Orozco and Richard Marquez

Staff from Salton Sea and Tijuana Slough Refuges participated in Equipment Certification Training conducted by Dale Green and Delvan Lee. DRD 01/91

Personal Computer Tips, El Centro, CA, February 25
Kathy Arnett, Shelly Hunter

Law Enforcement Refresher, West Sacramento, CA, February
Ken Voget, Dan Dinkler, Bill Radke, Marcos Orozco

Administrative Conference, Portland, OR, May 13-17
Kathy Arnett, Shelly Hunter

Wordperfect 5.1, Portland, OR, May 17
Shelly Hunter

Applying the NEPA Process, Laguna Nigel, CA, October 28-30
Dan Dinkler, Bill Radke, Chris Schoneman

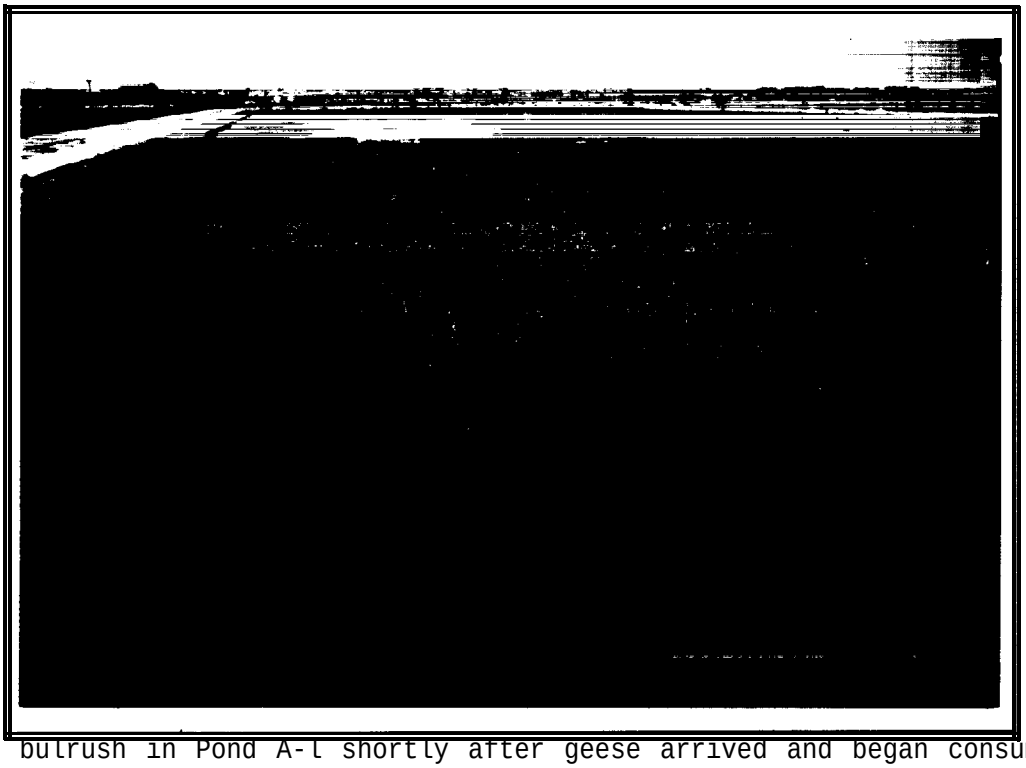
## F. HABITAT MANAGEMENT

### 1. General

In support of the goals of the National Wildlife Refuge System, Salton Sea National Wildlife Refuge was established by executive order in 1930 "as a refuge and breeding ground for birds and wild animals." Primary objectives on the refuge include endangered species production and maintenance, sensitive species production and maintenance, wintering waterfowl maintenance, and other migratory bird maintenance. Refuge habitats are intensively managed, with ponds and agricultural fields engineered, developed, and manipulated to achieve wildlife objectives.

### 2. Wetlands

Wetland habitat is managed to provide critical habitat for year-round populations of endangered Yuma clapper rails, and also to produce natural foods for wintering waterfowl and other wildlife. These objectives are sometimes mutually exclusive. All water used to flood refuge wetlands is class-l irrigation water, which is free of the soluble pesticides and toxic trace elements found in agricultural drain water. Moist soil management is geared toward production of alkali bulrush (*Scirpus robustus*), watergrass (*Echinochloa crusgalli*), sprangle-top grass (*Leptochloa* sp,), swamp timothy (*Heleochloa schoenoides*), wigeongrass (*Ruppia maritima*), and other associated species. Sesbania and saltcedar remain serious weed problems in moist soil units.



Alkali bulrush in Pond A-l shortly after geese arrived and began consuming the vegetation. WRR 11/01/91

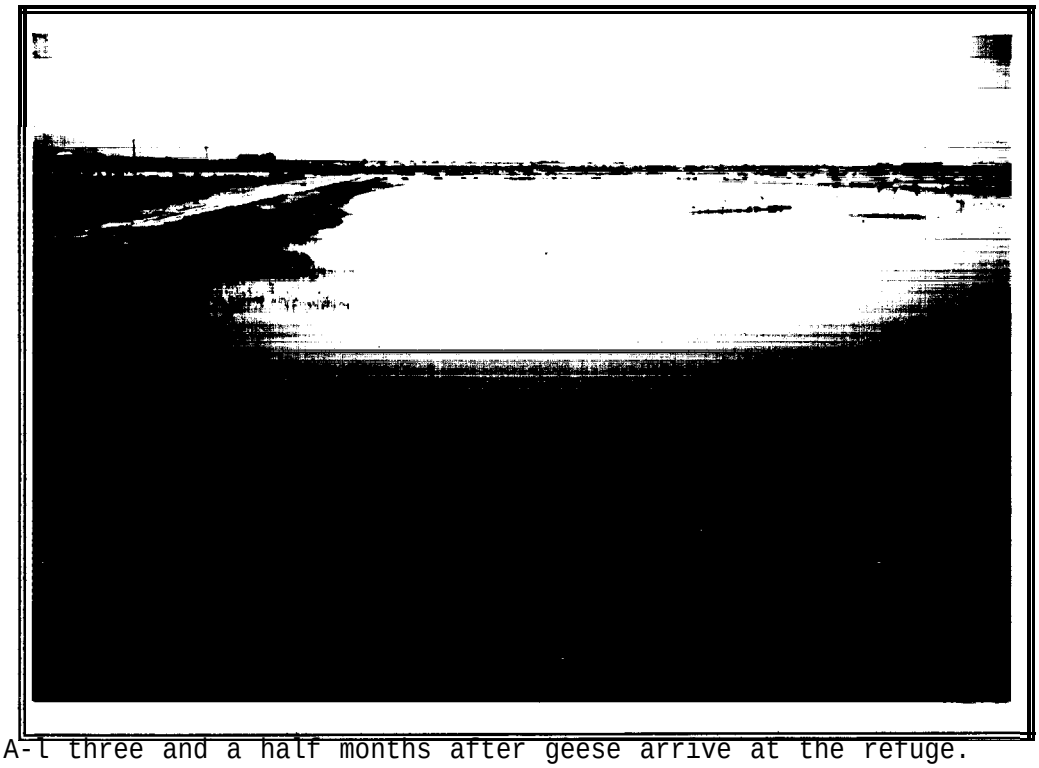
At Unit-l, Tracts A and B were drawn down the third and fourth weeks of March, allowing the existing seed and tuber source within each pond to begin sprouting. A very good rate of germination and regrowth of alkali bulrush was seen in pond A-l by April 5. Germination and regrowth in other A and B ponds took two to six weeks longer to occur. By June, a very good germination of bulrush, watergrass, and sprangletop was seen in ponds B-l and B-2; and a moderate germination of watergrass and sprangletop in ponds A-2, A-3, and B-3. Ponds B-4 and B-5 showed no signs of germination of wetland plants (possibly due to high soil salinity), so irrigation of these ponds was stopped.

Pond B-l was kept flooded all year long to encourage cattail growth and potential subsequent Yuma clapper rail use. Some small patches of cattail did grow in spotty locations but were decimated when goose feeding began in the pond in December.

Reidman ponds 3 and 4 were also kept flooded all year after bulrush germination to encourage cattail growth and subsequent clapper rail use. Cattails did get established in each pond, and by winter had occupied about one-eighth of the west end of each pond. Clapper, Virginia, and sora rails were heard and/or seen in these ponds by late summer.

The Reidman ponds were drawn down about April 1. By April 20, ponds 3 and 4 were having very good bulrush germination and in pond 2 good swamp timothy germination. Pond 1 had moderate swamp timothy germination by mid-May. Ponds 3 and 4 were left too dry for a short period at the end of May and had subsequent heavy germination of Sesbania exaltata. Reidman ponds 3 and 4 were also kept flooded all year after bulrush germination to encourage cattail growth and subsequent clapper rail use. Cattails did get established in each

pond, and by winter had occupied about one-eighth of the west end of each pond. Clapper, Virginia, and sora rails were heard and/or seen in these ponds by late summer.



Pond A-l three and a half months after geese arrive at the refuge.
WRR 02/01/92

Bruchard Bay water management was altered significantly by the Imperial Irrigation District during 1990, and continues to provide limited emergent habitat for clapper rails, black rails, night herons, shorebirds, and waterfowl. The current lack of water control does not facilitate adequate wetland management for this area, which is important habitat for endangered species along with black rails and the song sparrow subspecies saltonis. Work to correct water management of this area is currently underway.

At Unit 2, Hazard ponds 1, lA, 2A, and 3A have experienced poor drainage in the past, have alkaline soils, and do not produce vegetation. Similarly to last year, these ponds were shallowly flooded in September to enhance invertebrate populations as wildlife food. The large number of shorebirds and shovelers feeding in these ponds indicated an abundance of food. Watergrass was drilled into Hazard ponds 1, 2, and 3 during August, and provided moderate stands of food which was flooded by October 13 and fed upon by waterfowl when they arrived. As a result of water management aimed at watergrass production, alkali bulrush began to volunteer in ponds 1 and 2 from upstream ponds. This food was eagerly eaten by snow geese prior to the end of October.
Hazard Ponds 4, 5, 6, and 7 were managed primarily for swamp timothy production, and were drawn down during April, irrigated during early summer, and shallowly flooded beginning in September. Pond 4 was not flooded until December in order to extend the availability of waterfowl foods through the winter period. Each of these ponds yielded excellent crops of swamp timothy, while ponds 6 and 7 also provided extensive stands of bulrush. The availability of "free water" during the year allowed permanent shallow

flooding of Pond 6, which continued to enhance habitat in the south end of this pond for clapper rails.

Hazard Ponds 8 and 9 received extensive rehabilitation to improve drainage, remove saltcedar infested islands, and rebuild dikes. Construction largely precluded moist soil management during 1991, however, watergrass was drilled into the south end of Pond 8 in August and irrigated to provide some wetland vegetation which was utilized primarily by pintails and shovelers.

Hazard Ponds 10, and 11/12 were drained during April and re-flooded again between October 3 and 13. The availability of "free water" into Pond 10 provided tremendous amounts of dwarf spikerush, which was eagerly utilized by waterfowl and coots when flooded again in October. Hazard Pond 11/12 was not irrigated because of anticipated rehabilitation work, but still provided limited swamp timothy. If this pond could be irrigated correctly, large amounts of wetland foods could be made available on an annual basis. Until water control in these ponds is improved, moist soil management remains difficult. Overall, tremendous numbers of pintails, shovelers, green-winged teal, snow geese, Canada geese, dowitchers, egrets, sandpipers, avocets, and stilts utilized the Hazard ponds for feeding and loafing.

The Union Ponds remained shallowly flooded throughout the year to provide emergent vegetation for clapper rail habitat. Mixed stands of alkali bulrush, sprangletop, and cattail were heavily utilized by common yellowthroats, egrets, shorebirds, and waterfowl. In addition, Yuma clapper rails were again observed in these ponds throughout the year.

Headquarters Pond 1 was held fallow throughout the year. Headquarters Ponds 2, 3, and 4 were drawn down temporarily in April to accommodate germination of wigeongrass. Ponds 2 and 3 were then re-flooded and held full throughout the season. Water levels in Pond 2 were kept lower to enhance cattail production along the pond's edge in the hope of creating additional habitat for rails, yellow-headed blackbirds, and other species. Pond 4 remained largely dry, but was flooded to mudflat to provide feeding and nesting areas for stilts and avocets. This flooding also allowed germination of alkali bulrush and some cattail which were immediately eaten by snow geese upon their arrival in October. Headquarters Pond 5 is a small hypersaline pond which currently receives no active management. The Headquarters Ponds provided feeding and/or loafing habitat for large numbers of shorebirds, teal, pintails, shovelers, snow geese, Ross' geese, and Canada geese. Additionally, the ponds were used by white pelicans, gulls, black skimmers, terns, gallinules, coots, and other species throughout the year.

4. Croplands

Salton Sea Refuge manages 827 acres of cropland, primarily to provide forage for wintering geese. A combination of alfalfa, wheat, and rye grass were grown to provide green browse for snow, Ross' and Canada geese in 1991. In addition to forage for geese, a cooperator farmer grew sudan grass in the summer as an additional cash crop (which also works well in controlling weeds).

In order to meet the demands of farming several hundred acres, the farming program is, of necessity, a combination of force account and cooperative farming efforts. Farming the total acreage of upland habitat needed to meet

the needs of several thousand geese is far beyond the capabilities of the current staff, equipment, and budget. Going into the year, two cooperators were involved in the farming program, Charles "Chip" Corfman (at Unit 1), and Walt Slovak (at the Union Tract).

The cooperative farming program was dealt a serious blow with the unannounced withdrawal of cooperative farmer Corfman from the program. As we entered 1991, Mr. Corfman was farming portions of Unit 1, growing alfalfa in fields 255, 256, 257, and 304, and rye in 310. While the details of why Mr. Corfman left the program were not specifically revealed, it was understood that restrictions on pesticide use, combined with the effects of geese impacting the quality of alfalfa stands, significantly reduced his profit margin, probably to the point where his continuing with the program was no longer economically viable.

The loss of a cooperator meant that the refuge would have to substantially increase the acreage of force account farming, with significant cost and effort, if adequate amounts of goose forage were to be provided. Additionally, the two refuge tractors (John Deere models 4630 and 2940) were inadequate to meet the task. The refuge was thrust into a farming role that it was not prepared to handle.

To help meet the demands of the refuge's enlarged farming role, Kern Refuge's John Deere 8630 was borrowed in September to provide the "big tractor" needed to accomplish the disking chores. Considerable time and effort was dedicated to accomplishing the enlarged role of farming all of Unit 1, essentially tying up all of the field crew for about thirty per cent of the year.

To add to the problems, the whitefly infestation in the Imperial Valley reached epidemic proportions in 1991, costing area farmers tens of millions of dollars and impacting alfalfa and wheat grown on the refuge. In particular, the viability of the earlier plantings of wheat, germinated in September while it was still hot (and whiteflies were still in epidemic numbers), suffered significantly. Later plantings, germinated in October following cooler weather, definitely seemed to do better, which is something to keep in mind for future fall plantings when whiteflies are concerned.

The whitefly in question is known as the poinsettia strain of the sweet potato whitefly, and is thought to have arrived in the desert southwest via a shipment of poinsettias from Florida. It is now the major insect pest in the Imperial Valley, causing major problems with many crops, especially melons and "cole" crops, such as broccoli. In alfalfa, a mold grows on the "honeydew" produced by the whiteflies, significantly reducing the market value of the hay, most of which is sold to dairy farmers outside of the Imperial Valley.

Spraying whiteflies is not economically viable, largely because of the mobility of the flying stage of the insect and due to the negative effects on beneficial insects. On hot mornings, seemingly endless swarms of flight stage whiteflies drift on the wind, easily traveling from field to field throughout the valley. Current schemes for managing the whitefly include promptly disking leftover crop residues, stressing summertime host plants (such as alfalfa) to make them less attractive, and introducing beneficial insects that prey on whiteflies or their larvae.

The following table summarizes refuge croplands and uses in 1991:

| LOCATION | FIELD | GATE | ACRES | CROP:(SPRING/SUMMER,'FALL) |
|---|---|---|---|---|
| Unit I | E l/2 C | T13 257 | 70 | alfalfa* |
| | w l/2 C | T13 257 | 70 | rye/fallow/wheat+ |
| | N Johnson | T13 256 | 100 | alfalfa* |
| | S Johnson | T13 255 | 80 | alfalfa* |
| | Reidman | T16 310A | 50 | wheat/fallow/wheat+ |
| | N1/2Flamang | T16 310 | 100 | fallow/fallow/wheat** |
| | S1/2Flamang | T16 310 | 82 | rye/fallow/wheat** |
| | Flammang 20 | T16 304 | 20 | alfalfa* |
| Union | 419 | V4 419 | 60 | wheat++/wheat/fallow |
| Tract | 420 | V4 420 | 60 | rye/fallow/wheat |
| | 421 | V4 421 | 55 | alfalfa/Sudan/alfalfa |
| | 461 | V4 461 | 80 | alfalfa (all year) |

*abandoned by cooperator; dried out over summer, disked & watered in fall
**planted in alternate rows entire length of l/2 mile sandy field
+excessively weedy/problems with whitefly
++spring wheat left standing into next fall to provide carbohydrates

A conflict between the farming and hunt programs sprang up involving the standing wheat crop in field 419, which also sports the Union 3 and 4 goose blinds. The wheat crop planted by the cooperator in the fall of 1990 suffered significant damage from a hard freeze experienced just before Christmas in 1990. The wheat was in the developmental boot stage at the time of the freeze and sustained sufficient damage to render the crop unmarketable. A decision was made to retain the damaged wheat crop through summer to offer carbohydrates to arriving geese the next fall. Of course, the geese's culinary interests did not correspond with management's intent, so the field was mowed to make the wheat more available/attractive. The geese responded, moving into the field, which was now essentially "baited" (due to being mowed). Naturally, the blinds were not opened, which created more than a little hostility among our ardent, would-be goose hunters. Eventually, November rains precluded planting the field. The blinds were eventually reopened ten days after the field was disked. Future crop management schemes should consider the relationship between crop manipulation (e.g., mowing) and the hunting program to avoid scenarios involving potential conflicts with "baiting."

In summary, the farming program faces several challenges, including: maintaining a viable cooperative farming program in the face of ever-increasing restrictions on the use of pesticides; obtaining the funding and equipment to force account farm increasing portions of refuge croplands; withstanding the effects of the whitefly infestation; and maintaining a balance between conflicting interests on the inadequately small amount of habitat available at the Union Tract around headquarters.

Challenges to maintain a viable cooperative farming program were heightened in 1991, not the least of which was the continuing need to develop some sort of farming agreement with the flexibility needed to retain farmers in the program. The challenge is to develop an agreement that allows administrative flexibility, whereby the farmer could be adequately compensated to offset

losses due to impacts by geese, and the inability to use pesticides to control weeds or insects. In our current situation, the refuge would not be able to grow adequate forage to meet the habitat requirements of wintering geese without the contributions of a cooperative farmer.

6. Other Habitats

In order to create additional wildlife habitat, conserve water, and reduce the amount of grass to be mowed at the manager's residence, native landscaping was installed with a total of 65 trees, shrubs, and forbs planted in two areas. Survival of plants has been excellent, with 91% of the plants currently alive. A figure showing species composition is in the refuge files. The McCain Valley Conservation Crew was responsible for much of the construction of concrete edgings around the areas, installation of a dripline system, rearrangement of sprinklers, planting of vegetation, and placement of decorative boulders and sand. Additional work, including the construction of a shallow pond, is scheduled for the future. Following is a list of the vegetation planted.

Table F.6 Species and Number of Trees, Shrubs, and Forbs Planted at Manager's Residence, 1991.

| | #Planted | j/Volunteer | #Died |
|---|---|---|---|
| Acacia farnesiana · sweet acacia | 5 | | |
| Acacia greggi · catclaw acacia | 1 | | |
| Atriplex sp. · saltbush | 2 | | |
| Baccharis sarothroides · broom baccharis | 1 | | |
| Beloperone californica · chuparosa | 4 | | 1 |
| Caesalpinia mexicana · Mexican bird of paradise | 2 | | |
| Calliandra californica · Baja fairy duster | 1 | | |
| Calliandra eriophylla · fairy duster | 2 | | |
| Cassia sp. · senna | 6 | | |
| Cercidium floridium · blue palo verde | 4 | | |
| Cercidium microphyllum · foothill palo verde | 1 | | |
| Chilopsis linearis · desert willow | 2 | | |
| Dasylirion wheeleri · desert spoon | 2 | | |
| Encelia farinosa · brittle bush | 4 | | 1 |
| Galvezia juncea · bush snapdragon | 1 | | |
| Leucophyllum sp. · Texas ranger | 5 | | |
| Lysiloma thornberi · feather tree | 1 | | |
| Melampodium leucanthum · black-foot daisy | 1 | | |
| Oenothera soeciosa · Mexican primrose | 1 | | 1 |
| Oenothera stubbii · Baja primrose | 2 | | 2 |
| Penstemon palmeri · beardtongue | 4 | | |
| Penstemon spectabilis · beardtongue | 1 | | |
| Podranea rica-soleana · pink trumpet vine | 1 | | |
| Populus fremontii · cottonwood (cottonless) | 1 | | |
| Prosopis iuliflora · honey mesquite | 7 | | |
| Prosopis nubescens · screwbean | 1 | 11 | |
| Simmondsia chinensis · jojoba | 1 | | |
| Sophora secundiflora · Texas mountain laurel | 1 | | |
| Total number | 65 | 11 | |
| Total number of species | 28 | | |

7. Grazing,

Salton Sea Refuge does not conduct a livestock grazing program on a regular basis. However, an unusual situation involving the cooperative farmer's stand of alfalfa developed which led to the introduction of sheep for a short period of time. Please see following Section F.lO, Pest Control, for details.

9. Fire Management

Salton Sea has a relatively small, yet important, fire management program. Although there is normally some prescribed burning which needs to be accomplished each year, no prescribed burns were planned for 1991. However, wheat stubble was burned off the 419 and 420 fields when it was determined that there was too much plant residue to permit adequate tillage with a disk. Moreover, attempts to burn the stubble off of 420 field were hampered due to the fact that an aborted attempt at disking the field was made before it was burnt.

In the future, it may be prudent to include any and all wheat fields in the annual burn plan process, even though such burns are extremely "routine," with the understanding that wheat fields will likely need to be burned to remove plant residues prior to disking.

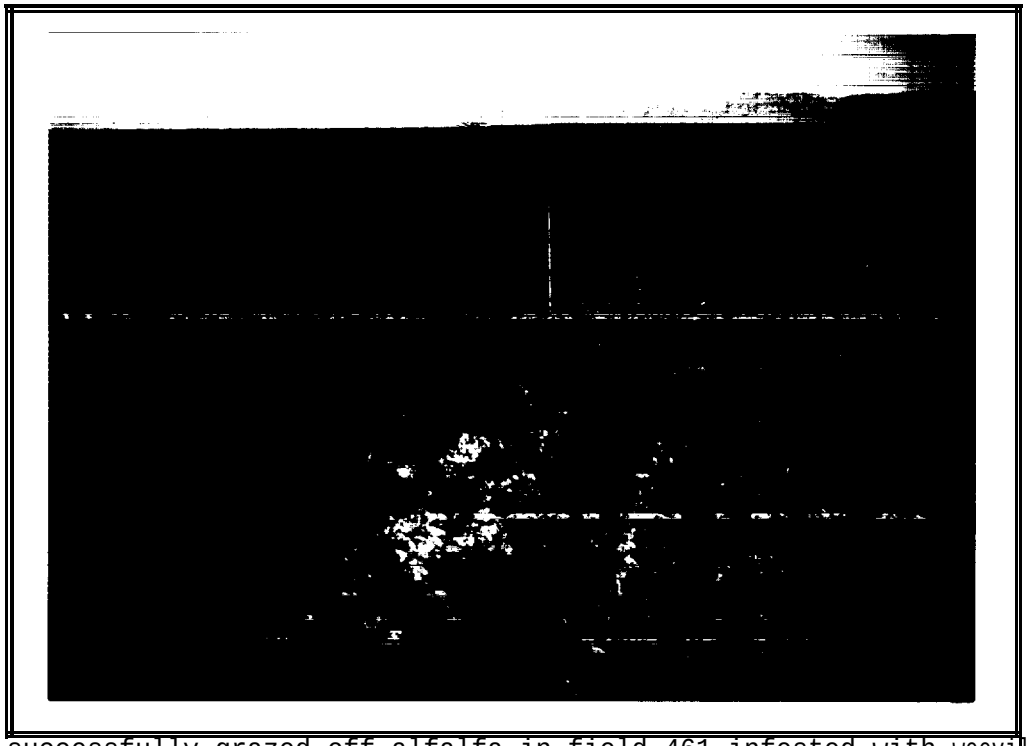
Overall, it is expected that prescribed burning needs will increase with the continued addition of permanent wetlands for Yuma clapper rail habitat.

One item of note concerning the fire program is the inadequacy of the 3/4 ton 4X4 Dodge pickup for hauling the 500 gallon tanker. When full, the tanker adds at least 5,000 pounds, which makes stopping and maneuvering safely a concern.

**10.** Pest Control

Pest control considerations on the refuge center on controlling weeds and insects in refuge field crops (alfalfa and wheat) and controlling salt cedar and phragmites in ditches and along the margins of impoundments. Pest management practices aimed at controlling weeds and insects in crops are normally conducted at the initiative of the cooperative farmer, while spraying to control salt cedar or phragmites is normally conducted by the refuge staff.

Pest management in refuge field crops is a principle area of concern to the cooperative farming program as increasing restrictions on the use of effective pesticides translates into fewer economically feasible options for the cooperative farmer. One of the two cooperators dropped out of the refuge farming program in mid 1991, partially due to his inability to use effective insecticides. The combination of pesticide use restrictions and heavy use by wintering geese can and has placed cooperators at the threshold of economic viability.



Sheep successfully grazed off alfalfa in field 461 infested with weevils and aphids and controlled a growing weed problem. Compare the grazed portion on right with ungrazed area on left. DRD 02/91

No cooperator-applied chemicals were used in 1991, although an extreme infestation by Egyptian alfalfa weevil and both blue and pea aphids developed in both the 421 alfalfa crop and the 419 wheat crop (the latter had already been extensively damaged by a hard freeze in December, 1990). The infestation was so bad that U.C. Extension Agent Eric Natwick found it to be the worst he had ever seen! Due to a combination of conditions, the infestation in 461 could not be sprayed in a timely manner to save the crop.

Restrictions against aerial application (due to the proximity of wetlands) prevented the use of aircraft. Too much rain prevented the use of ground equipment due to excessively wet field conditions. In a desperation move to save both the 461 alfalfa field and the cooperator's participation in the program, sheep were put into the 461 field to remove the host crop for the infestation (alfalfa) and a growing weed infestation (malva). The grazing treatment worked extremely well, although the removal of the alfalfa stand meant that the next cutting by the cooperator was delayed. However, thinning out the weeds meant the hay had many fewer stems and therefore was of higher quality and greater market value. About 800 sheep were grazed in field 461 between March 12 and 18, amounting'to a total of about 37 AUMs (5 sheep/30 days = 1 AUM).

Refuge staff applied five gallons of Garlon 4 (1% solution) in salt cedar control efforts throughout the summer. Additionally, two gallons of Roundup (2% solution) were used to control stands of phragmites along irrigation ditches in the late fall. Both types of applications were very successful in controlling the target plant species.

In another pest management activity, a substantial amount of effort went into researching the viability of using beneficial nematodes to manage cutworms in alfalfa. The objective was to develop a biological control for cutworms that could be used in place of restricted use pesticides in cooperatively-farmed refuge alfalfa. Cutworms are a serious problem for alfalfa in the Imperial Valley, especially in situations where the alfalfa is cultivated on raised beds for salt management purposes, as is the case with alfalfa on the refuge.

The initial idea was to develop a research study proposal whereby a graduate student would conduct field trials on the refuge to test the viability of using beneficial nematodes (Neoaplectanids) to control both the granulate (Agrostis subteranea) and veregated (Peridroma saucia) cutworms, both of which have proven to be serious pests for cooperative refuge farmers in alfalfa. Scott Stenquist (ARW/DBS) provided considerable assistance and support in developing the ideas for the proposed study.

Dr. George Poinar Jr., Professor of Entomology and Parasitology at the University of California at Berkeley, provided initial guidance in developing the proposal. Additionally, Dr. Ramon Georgis, of Biosys, Inc., provided technical assistance concerning the availability and supply of the beneficial nematodes.

In an effort to bring the proposed project on line, a meeting was held among interested parties on March 5 at refuge headquarters. Attendees included Dr. Georgis, U.C. Extension Entomologist Eric Natwick, and refuge staff. Although the project sounded good in concept, the practicality of the project fell through when it was learned that the proposed effective rate of application was in the range of 100 gallons per acre, far in excess of any means of application equipment (except for sprinklers), and at an unrealistically high cost. The application rates (gallons per minute) for aircraft and ground application equipment are incapable of meeting the 100 gallons per acre rate without making multiple applications, meaning the cost of application goes up substantially. Even with the use of sprinklers, the cost of applying the beneficial nematodes would not have been economically feasible. Therefore the experiment to use beneficial nematodes to control cutworms in alfalfa fizzled.

## 11. Water Rights

The refuge does not hold any water rights. All water used on the refuge for management of croplands and impoundments is purchased from the Imperial Irrigation District (IID) on an "as needed" basis, requiring only a telephone request 24 hours in advance of delivery. Water is diverted from the lower Colorado River at Imperial Dam and is delivered to the Imperial Valley via the All American Canal. Although IID has the oldest perfected water right on the lower Colorado River, concerns are developing about the long term availability and cost of water delivered by IID to the refuge. A recent agreement between IID and the Metropolitan Water District (MWD), which services much of coastal southern California, transfers large quantities of IID water from the croplands of the Imperial Valley to the thirsty faucets of Los Angeles serviced by MWD.

The Service purchased 2,979.8 acre feet of water for the refuge in FY-91 at a total cost of $33,376.10. The fiscal year figure of 2,979.8 represents a 90% increase over the FY-90 total of 1,570 acre feet purchased. The Imperial

Irrigation District increased the price of an acre foot of water from $10.50 to $11.50 in January, representing a 9.52 per cent increase in the price.

Additional water used on the refuge came from two sources. A decreasing amount of "free water," coming from farmers up the canal who ordered more water than they could use, is available to the refuge. "Free water" has previously been estimated to account for an additional 30% over what the Service purchases, but has decreased in volume, a trend that is expected to continue with increasing water conservation efforts. For estimation purposes, a figure of 25% of the volume of water purchased by the Service was used to generate a total figure for "free water" in FY-91. That percentage is expected to continue to drop in future years.

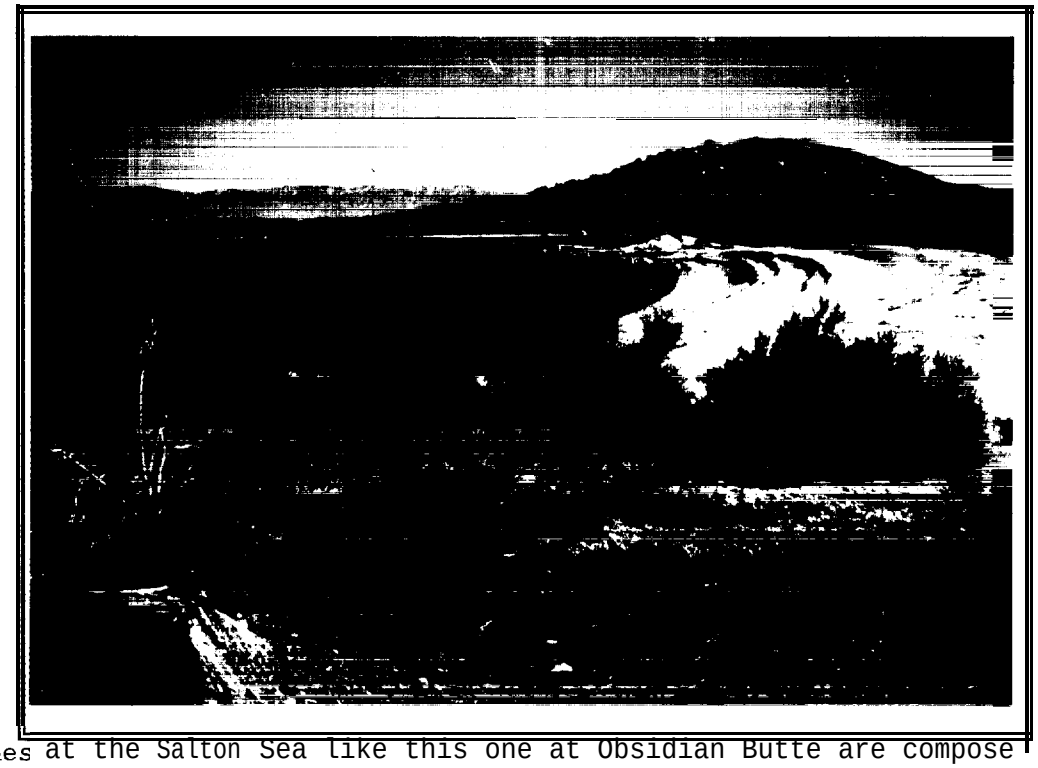
A third source of water used on the refuge is that purchased by the cooperative farmer for use on fields he is managing. In recent years, cooperative farmers have purchased more water each year than has the Service. However, with the reduced acreage cooperatively farmed in 1991, the amount of water purchased by coop farmers has also dropped. Assuming the coop farmer purchased an amount of water similar to that of the refuge translates into an additional 3,000 acre feet of water used on the refuge, although most of that amount involves commercial harvesting, rather than use of water on crops consumed directly by wildlife.

In total, a "soft," rounded estimate of 6,750 acre feet of water was used on the refuge in FY-1991, representing an estimated 38% increase over the FY-90 estimate of 4,876 acre feet used.

## G. WILDLIFE

### 1. Wildlife Diversity

Lower Colorado Desert lands on the refuge, although characterized by extremely low precipitation and very high temperatures, support a surprising diversity of wildlife species. Habitat diversity on refuge lands provides the needs of various resident wildlife, while many of the birds are seasonal residents or migrants. At least 378 bird species have been observed at Salton Sea NWR, and at least 93 species have nested on the refuge. In addition, 41 species of mammals, 18 species of reptiles, 4 species of amphibians, and 15 fish species have been identified on the area. Two new wildlife species, a painted redstart and a hispid cotton rat, were documented on the refuge for the first time during the year (see G.7 and G.lO).



Beaches at the Salton Sea like this one at Obsidian Butte are compose largely of barnacles crushed by wave action and pushed up to create nesting habitat and resting areas for numerous wildlife species. WRR 07/26/90

2. Endangered and/or Threatened Species

State and federally listed endangered species which occurred on the refuge include the desert pupfish, California brown pelican, bald eagle, peregrine falcon, and the Yuma clapper rail. Although Aleutian Canada geese have been documented at the Salton Sea in the past, none were observed during 1991.

Desert pupfish are the only fish native to Salton Sea. During the months of April, May, and June 1991, the California Department of Fish and Game conducted surveys to determine desert pupfish distribution around the Salton Sea. The Service provided an airboat for the survey, and refuge Equipment Operator Orozco assisted with the effort. Baited minnow traps were set in agricultural drains leading to the Sea, several shoreline pools along the northern and southern ends of the Sea, and in Salt Creek, a natural tributary to the Salton Sea. In addition, San Felipe Creek was visually surveyed to determine pupfish and exotic fish presence. Results showed that desert pupfish were found in 72% of the drains surveyed around the Sea. Along the northern portion, 24 out of 27 (89%) drains surveyed contained pupfish, while 17 out'of 30 (57%) drains along the southern shore contained pupfish. Both Salt Creek and San Felipe Creek also contained pupfish, as did 64% of all shoreline pools. In addition to pupfish, 12 species of other fish were trapped during the effort. During the survey, pupfish were found on refuge lands in the McKindry Pond and the Barnacle Bar Pond near Headquarters. Refuge personnel also located pupfish in the drain flowing into the Sea east of Unit-l during August. Pupfish have the ability to survive dramatic temperature and salinity extremes, and it appears that as salinity in the

Salton Sea has increased, desert pupfish may have regained a competitive advantage over exotic species. As a result of this survey, formal Section 7 consultation with the Laguna Niguel Enhancement Field Station was re-initiated (see Section D.4).

Increasing numbers of brown pelicans are utilizing the Salton Sea arc: l where they often rest and feed in freshwater channels draining agricultural fields.
WRR 09/21/91

**California brown pelicans** are normally occasional summer visitors to the Salton Sea, reaching peaks of perhaps 50 post-breeding birds from the Sea of Cortez. However, an unprecedented peak of 5,000 birds was estimated during July, 1990. During 1991, brown pelican numbers peaked on July 24 at about 950 birds. The recent increase in post-nesting pelicans at the Salton Sea indicates the availability of ample food, but also raises concerns over contaminant concentrations documented in Salton Sea fish and how this may affect endangered species utilizing the fish for food. On January 13, two wintering brown pelicans were observed at the Salton Sea. The spring arrival date was May 30, when four birds were seen near the Whitewater River delta.

**Bald eagles** are occasional fall and winter residents at the Salton Sea, where they feed on waterfowl and fish. Although no bald eagles were observed during the January 10-13 winter eagle survey, individual adults and subadult birds were observed throughout the winter in both the Coachella and Imperial Valleys near the Salton Sea shoreline. Immature bald eagles were seen at Unit-l on January 2, February 18, and October 22.

**Peregrine falcons** are occasional residents at the **Salton** Sea, and one or two are normally observed during every month of the year. Little is known about the peregrine falcons using the Salton Sea, however, population peaks of peregrines appear to coincide with major shorebird migrations. During 1991, peregrines were observed throughout January near HQ, February 6 at Unit-l, May 11 at HQ, October 23 at Morton Bay, and November 8 at HQ.

**Yuma clapper rails** are rare permanent residents in freshwater marshes associated with the Salton Sea. About 700 birds are estimated in the United States, with another 200 in Mexico. Saltwater inundation of wetlands, direct habitat destruction associated with wetland draining and agriculture, water conservation methods, and contaminants have all led to the demise of this species. Following recovery team instructions, refuge populations are surveyed each spring to document the minimum number of birds utilizing available refuge wetlands. Although pair counts occur each year, no production surveys have ever been attempted. Refuge staff members W. Radke and C. Schoneman conducted several rail surveys between April 18 and June 24. Areas covered included all suitable habitat on and adjacent to Salton Sea NWR, Rancho Dos Palmas and waters associated with Salt Creek in Riverside County, and "Barnacle Beach," an area of emergent vegetation south of Bombay Beach and about 10 miles north of the state fish hatchery at Wister.

Salton Sea NWR: 13 individuals (5 pair, 3 single)
Salton Sea NWR lands supported at least 11 clapper rails, while adjacent private land near the Hazard Unit (Walt Slovak's waterfowl hunting club) supported an additional two rails this year.

Barnacle Beach: 9 individuals (2 pair, 5 single)
No clapper rails responded at Barnacle Beach on 4/18, but one month later the habitat supported at least nine of the birds in cattail and bulrush habitat.

Salt Creek: 4 individuals (1 pair, 2 single)
The mouth of Salt Creek supported at least one rail, and upper Salt Creek at Rancho Dos Palmas supported an additional three clapper rails.

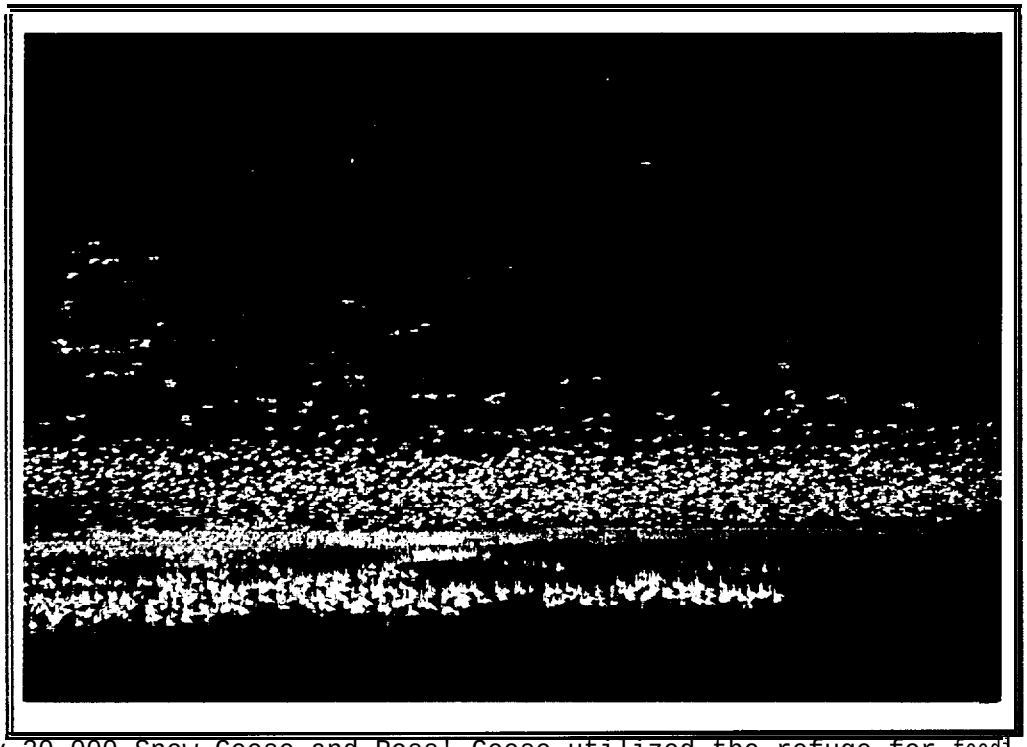
Overall rail numbers were down somewhat from 1990 surveys because cattail habitat provided by "leach ponds" adjacent to Bruchard Bay on private land have been converted back to agriculture. Refuge habitats remain favorable and a number of ponds are being managed primarily to provide rail habitat through nearly year-around shallow flooding and propagation of dense emergents. These areas include Reidman ponds 3 & 4, the two Union ponds, and Hazard ponds 6 & 7 (see Section F.2). Rail numbers at Bruchard remain depressed following habitat alterations during 1990 by the Imperial Irrigation District. No rails responded from either the Alamo or New River deltas. Both areas have become overgrown with salt cedar and phragmites, and perhaps no longer provide favorable habitat, The following table depicts Yuma clapper rail numbers at Salton Sea NWR since 1984.

Table G.2 Minimum Numbers of Yuma Clapper Rails Responding to Taped Calls on or Immediately Adjacent to Salton Sea NWR.

| YEAR | NUMBER OF PAIRS | TOTAL NUMBER OF INDIVIDUALS |
|---|---|---|
| 1984 | 3 | 10 |
| 1985 | 5 | 21 |
| 1986 | 8 | 25 |
| 1987 | 6 | 20 |
| 1988 | 4 | 18 |
| 1989 | 1 | 5 |
| 1990 | 6 | 16 |
| 1991 | 5 | 13 |

3. Waterfowl

A primary benefit of Salton Sea NWR is to provide a sanctuary area necessary to protect wintering waterfowl in the Imperial Valley. During the year, at least 26 waterfowl species utilized the refuge, with common species including snow geese, Ross' geese, northern pintail, northern shoveler, and green-winged teal, During 1991, observations of noteworthy waterfowl included an oldsquaw at Wister on February 13 and April 30; blue-winged teal observed at Unit-l during March and April, and again June 2; a red-breasted merganser at HQ on April 28 and December 17; a white-winged scoter at Unit-l on June 7; a black-bellied whistling duck at HQ on September 1; a surf scoter at HQ on December 15; and a Eurasian wigeon at Unit-l throughout December.



Nearly 20,000 Snow Geese and Ross' Geese utilized the refuge for food and sanctuary during the winter. WRR 11/01/91

Waterfowl numbers both on and off the refuge were surveyed using the same methods as in past years. Survey areas included both the Imperial and Coachella Valley wetlands most important to waterfowl. Refuge personnel conducted Salton Sea aerial surveys during January, February, November, and December. No survey was conducted during October because a contract airplane was not available. Total waterfowl numbers between November through February were estimated at 257,889 birds during 1991-92, compared to 471,766 birds during the same period last year. There were a total of 7,736,670 waterfowl use-days between November and February during the 1991-92 season, as compared to 14,152,980 use-days during 1990-91, representing a 45 percent decline. In addition to monthly surveys at the Salton Sea, a mid-winter waterfowl survey covering the south coast of California was conducted January 9th. The refuge contracted with Pacific Executive Aviation of Ramona for the January and February flights, and contracted with Sun Western Flyers, Inc. of Yuma, Arizona for November and December flights. Aircraft costs average about $450 per survey. The following table depicts estimated waterfowl peaks at Salton Sea NWR, the Imperial Valley, and the Coachella Valley during 1991-92.

Table G.3a Waterfowl Peak Populations During 1991-92.

| PEAK WINTER POPULATIONS FOR WATERFOWL: 1991 - 1992 | | | |
|---|---|---|---|
| SPECIES | SSNWR | IV | CV |
| Snow/Ross Goose | 10,670 (D) | 16,770 (D) | 0 |
| Canada Goose | 1,210 (D) | 1,263 (D) | 0 |
| Green-winged Teal | 3,000 (D) | 6,015 (D) | 275 (J,F) |
| Mallard | 65 (D) | 400 (D) | 55 (D) |
| Northern Pintail | 7,750 (D) | 15,190 (D) | 1,270 (J) |
| Cinnamon Teal | 175 (F) | 390 (F) | 25 (F) |
| Northern Shoveler | 13,160 (F) | 29,320 (F) | 4,530 (D) |
| Gadwall | 400 (D) | 1,445 (D) | 95 (F) |
| American Wigeon | 1,770 (F) | 2,315 (F) | 100 (J) |
| Canvasback | 55 (F) | 185 (F) | 15 (D,J) |
| Redhead | 150 (F) | 295 (F) | 70 (J) |
| Ring-necked Duck | 0 | 575 (F) | 75 (D) |
| Greater/Lesser Scaup | 125 (J) | 730 (F) | 105 (J) |
| Bufflehead | 160 (F) | 375 (F) | 15 (D) |
| Ruddy Duck | 800 (F) | 4,615 (F) | 1,115 (D) |

(D)=indicates peak winter population occurred in December; (J) = January; (F) = February
SSNWR = Salton Sea National Wildlife Refuge
IV = Imperial Valley
CV = Coachella Valley

a. Ducks

The common duck species at Salton Sea include the northern shoveler, northern pintail, and green-winged teal. Duck use remained below the long-term average for the Imperial Valley reflecting the continent-wide trend of declining waterfowl populations. The duck population peaked at 60,840 birds during December, compared to 103,733 birds estimated for 1990-91.

Nesting on the refuge by mallards, cinnamon teal, northern pintail, and redhead was documented during the year, but production on the area by these species is minimal. Fulvous whistling-ducks, a sensitive species, did not nest on the refuge during 1991, although nesting was documented at nearby Finney Lake.

b. Geese

Salton Sea NWR provides two of the three significant sanctuary areas within the Imperial Valley. Nearly every goose wintering in the valley utilizes refuge habitat at some point. The overall refuge goose population peaked at 16,470 birds during November, which is above the average peak goose population observed during the last five years. Most white geese departed the refuge during late February, with some lingering into early May. The first four snow geese arrived on the refuge October 12 at headquarters. The fall arrival date for white-fronted geese was October 25 at headquarters. Refuge personnel spent extensive time gathering neck collar information from snow and Ross' geese utilizing the area.

Total Imperial Valley goose populations decreased to a surveyed high of 20,100 birds during the 1991-92 winter, compared with 27,200 counted during the 1990-91 winter. Canada goose numbers in the Imperial Valley decreased, with a high of 2,300 compared to 4,980 counted last winter. White goose populations in the Imperial Valley also decreased to a high of 18,000 compared to 27,100 counted during 1990-91. White goose reproduction was apparently poor during the spring/summer of 1991, as less than five percent of the total geese on the refuge appeared to be hatch-year birds.

Twenty nine neck-collared geese (23 Ross', 6 snow) were observed on the Refuge in 1991. When the geese are banded at the breeding grounds, the collars are color-coded to their region of origin. Hence, all the collared snow geese seen at Salton Sea were banded in the western Canadian Arctic (black collars) and all the Ross' geese were banded in the central Canadian Arctic (blue collars). At least two adult and two immature blue phase snow geese were also observed.

Brant are normally rare visitors to the Salton Sea. On May 8, 25 brant were present at headquarters, and between May 30 and July 24, 20-50 brant were observed at the New River delta and the Whitewater River delta, indicating these birds summered at the Salton Sea.

Table G.3.b Snow and Ross' Goose Collar Observations

| SPECIES | COLLAR NO. | COLOR | LOCATION(S) | DATE(S) |
|---|---|---|---|---|
| ROSS' | 2T1 | blue | headquarters<br>Unit 1 | 10/28/91<br>12/03/91<br>12/31/91 |
| Ross' | V69 | blue | headquarters<br>Unit 1 | 10/28/91<br>11/27/91<br>12/31/91 |
| Ross' | 34X | blue | Unit 1<br>headquarters | 10/28/91<br>12/03/91 |
| Ross' | 2V3 | blue | Unit 1 | 10/28/91<br>12/03/91<br>12/31/91 |
| snow | 07A | black | Unit 1 | 10/28/91 |
| Ross' | 97V | blue | headquarters | 11/26/91 |
| Ross' | 9C6 | blue | headquarters | 11/26/91 |
| Ross' | 26T | blue | headquarters<br>Unit 1 | 11/26/91<br>12/31/91 |
| Ross' | 6H3 | blue | headquarters | 11/26/91 |
| Ross' | 2El | blue | headquarters | 11/26/91 |
| Ross' | 08C | blue | headquarters | 11/26/91 |
| Ross' | 9C2 | blue | Unit 1 | 11/27/91 |
| snow | 58P | black | Unit 1 | 11/27/91<br>12/31/91 |
| snow | lC3 | black | Unit 1 | 11/27/91<br>12/03/91 |
| Ross' | 7R0 | blue | Unit 1 | 11/27/91<br>12/03/91 |
| Ross' | 14C | blue | Unit 1 | 11/27/91 |
| Ross' | 8H2 | blue | Unit 1 | 11/27/91 |
| Ross' | 07C | blue | Unit 1 | 11/27/91<br>12/03/91 |
| snow | F09 | black | headquarters | 12/03/91 |
| Ross' | 3R9 | blue | headquarters | 12/03/91 |
| Ross' | 02C | blue | headquarters | 12/03/91 |
| Ross' | H28 | blue | headquarters | 12/03/91 |
| Ross' | 1HC | blue | Unit 1 | 12/03/91 |
| Ross' | 85C | blue | Unit 1 | 12/03/91 |
| Ross' | E29 | blue | Unit 1 | 12/03/91 |
| snow | 66C | black | Unit 1 | 12/03/91 |
| snow | 73K | black | Unit 1 | 12/31/91 |
| Ross' | 0X9 | blue | Unit 1 | 12/31/91 |
| Ross' | 8V8 | blue | Unit 1 | 12/31/91 |

On October 3, Biologist W. Radke observed four brant at Unit-l. Two of the brant were in Pond B-3, which was dry at the time, feeding on sprangletop grass heads. One of these birds had an aluminum leg band on its left leg, and a plastic yellow band with black lettering 1VH (read from bottom to top) on its right leg. David Ward at the Alaska Research Center reported that the brant had been banded as a juvenile in 1990 on the Yukon Delta. A total of about 7,000 brant are banded each year by the Service, which may result in increased sightings of marked birds at Salton Sea. Research objectives are to

differentiate various migration routes and wintering areas used by subpopulations of brant,

4, Marsh and Water Birds

Great blue herons nest in isolated colonies, such as this one near Bombay Beach, along the Salton Sea shoreline. WRR 05/24/91

A great number and diversity of marsh and water bird species were present on Salton Sea during the year. Nesting species included pied-billed grebes, great blue herons, great egrets, snowy egrets, cattle egrets, green-backed herons, black rails, clapper rails, common moorhens, and American coots. Least bitterns fledged young near Bombay Beach, Johnson Drain, Wister, and Rancho dos Palmas during June and July. Noteworthy species included a Pacific loon at Salton City on June 2, a little blue heron at Unit-2 on June 24, and a tricolored heron on July 27. At least seven flamingos have been observed at various points throughout the year at Salton Sea.

Sandhill cranes from the Lower Colorado River population winter in the Imperial Valley each year, with 100 first arriving on October 4 during 1991, and normally departing in February; Sandhill crane numbers peaked at 252 on November 15.

Colonial nesting bird surveys were accomplished by refuge personnel between April 2 and August 24 at traditional rookery areas along the south and southeast shores of the Salton Sea. In addition, survey areas were expanded during 1991 to cover the entire Salton Sea shoreline. This expanded survey is justified because of the dynamic nature of rookeries, and because a more thorough documentation of colonial nesters on the entire Sea is required to

better understand the Salton Sea ecosystem. Colonies at freshwater sites away from the Salton Sea were not surveyed, though a large colony of herons, night herons, and egrets occurred at newly flooded Ramer Lake during 1991.

On April 12, five pairs of great blue herons were incubating eggs at Salton Sea NWR HQ. By May 23, large numbers of great blue herons were nearly fledged at both the Johnson Drain colony and Bombay Beach colony. On May 30, herons, night herons, and egrets were incubating eggs at the Whitewater colony, with many still incubating on June 18. By June 14, great egret nests were active in a colony west of Unocal Geothermal, and herons at the south end had visible young. On July 23, a new colony of incubating night herons and egrets had established at Johnson Drain. By August 24, nearly all the active nests at the south end had fledged young.

Although overall numbers of colonial nesters rebounded from last year, there are still indications of problems involving productivity at the Salton Sea. There were large numbers of double-crested cormorants on the Sea throughout the period, yet no cormorant production was documented. Also, the number of nesting snowy egrets and cattle egrets at the south end of the Sea remained zero, although nesting birds of these species were well represented at the north end of the Sea. For the most part, productivity was not documented for colonial species, however, the number of fledged terns and skimmers was estimated. Gull-billed terns nested successfully in the south end at Morton Bay, fledging 60 young. Black skimmers fledged a total of 25 young at three separate colonies, though only the Johnson Drain colony successfully fledged large numbers of young. A pair of Forster's terns was documented nesting at Morton Bay, but nesting success remains unknown.

Contaminant research continues at the Salton Sea to ascertain the effects on colonial birds and other species. Forage fish, especially bairdiella, threadfin shad, sailfin mollies, and mosquitofish, are available in the Sea and drains, however, numbers of tilapia appear depressed except in some drains, Colonial birds at the north end of the Sea seem to be feeding heavily at local fish farming facilities, which may provide an uncontaminated food source along with a competitive advantage for the north Sea colonies. Young birds at these north colonies had stomachs full of tilapia and catfish, but had also consumed bairdiella, red shiner, and even desert pupfish. In contrast, no tilapia or catfish were documented in colonial bird stomachs at the south end, where birds instead contained mostly bairdiella, some sailfin mollies, and a few desert pupfish. Gull-billed terns were observed feeding on insects, small bairdiella, and adult zebra-tailed lizards. The following three tables depict nesting activity of the survey areas.

Table G.4a ACTIVE NESTS

| YEAR | GREAT BLUE HERON | CATTLE EGRET | SNOWY EGRET | GREAT EGRET | DOUBLE-CRESTED CORMORANT | TOTAL |
|---|---|---|---|---|---|---|
| 1987 | 246 | 1373 | 9 | 85 | 63 | 1776 |
| 1988 | 208 | 850 | 3 | 8 | 57 | 1126 |
| 1989 | 0 | 98 | 80 | 53 | 0 | 231 |
| 1990 | 15 | 0 | 0 | 4 | 0 | 19 |
| 1991 | 11 | 0 | 0 | 36 | 0 | 47 |

Table G.4b ACTIVE NESTS AT TRADITIONAL SURVEY AREAS · 1991

| LOCATION | GTBH | CAEG | SNEG | GREG | DCCO | TOTAL |
|---|---|---|---|---|---|---|
| Trifolium Drain | 0 | 0 | 0 | 0 | 0 | 0 |
| Bruchard Bay | 0 | 0 | 0 | 0 | 0 | 0 |
| New River Delta | 3 | 0 | 0 | 0 | 0 | 3 |
| Vail Ranch | 0 | 0 | 0 | 0 | 0 | 0 |
| Lindsey/Lack | 2 | 0 | 0 | 36 | 0 | 38 |
| Obsidian Butte | 1 | 0 | 0 | 0 | 0 | 1 |
| Red Hill/HQ | 5 | 0 | 0 | 0 | 0 | 5 |
| Hazard Lakes | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 11 | 0 | 0 | 36 | 0 | 47 |

Table G.4c ACTIVE NESTS AT OTHER SALTON SEA LOCATIONS · 1991

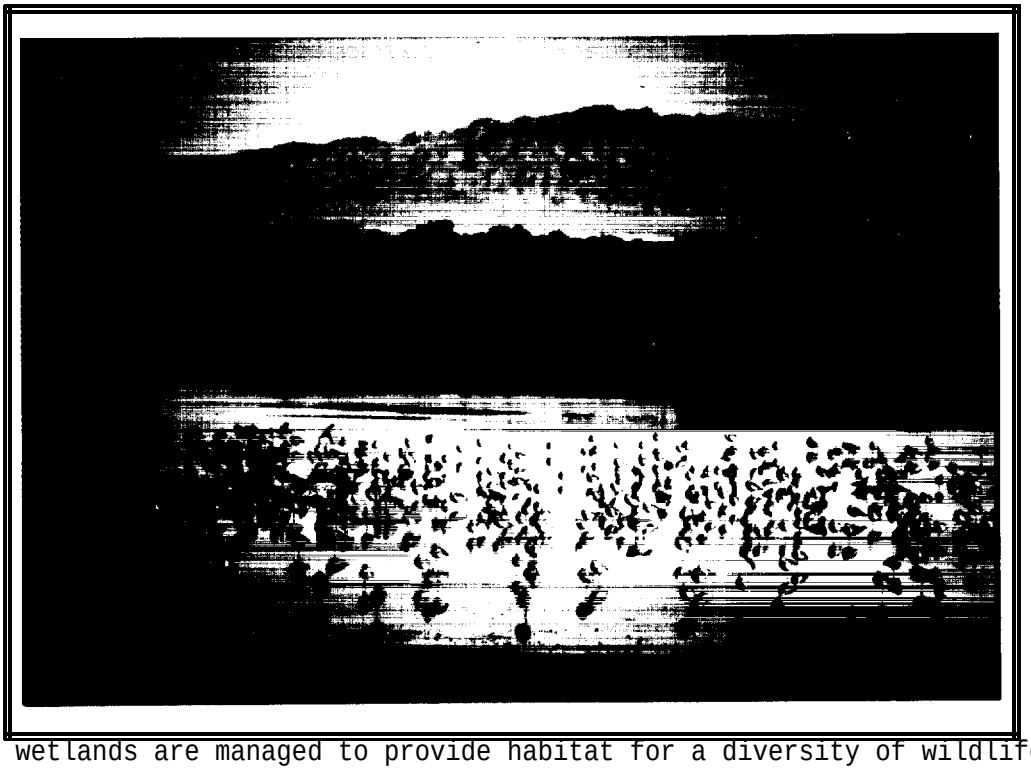
| LOCATION | GTBH | CAEG | SNEG | GREG | DCCO | BCNH | GBTE | BLSK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| Johnson Drain | 25 | 60 | 60 | 80 | 0 | 100 | 0 | 40 | 365 |
| Bombay Beach | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| W. Whitewater | 10 | 65 | 75 | 250 | 0 | 100 | 0 | 0 | 500 |
| Barth Road | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 30 | 80 |
| W. Poe Road | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Morton Bay | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 40 | 120 |
| Alamo Delta | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Wister Shoreline | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 8 |
| Traditional Areas (from preceeding table) | 11 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 47 |
| Salton Sea Total | 61 | 125 | 135 | 371 | 0 | 200 | 130 | 110 | 1132 |

GTBH: Great blue heron
CAEG: Cattle egret
SNEG: Snowy egret
GREG: Great egret
DCCO: Double-crested cormorant
BCNH: Black-crowned night heron
GBTE: Gull-billed tern
BLSK: Black skimmer

5. Shorebirds, Gulls, Terns, and Allied Species

Throughout 1991, at least 50 species in this category were observed on the refuge. Birds known to have nested successfully included the killdeer, black-necked stilt, American avocet, gull-billed tern, and black skimmer. No nest searches for snowy plovers, a sensitive species, were accomplished in 1991. Noteworthy sightings during the year included a mew gull at Unit-l on February 2; several red knots at HQ on April 27; wandering tattlers observed at various locations during June, September, November, and December; a least tern at Obsidian Butte on June 2; a peak of 100 yellow-footed gulls at the Alamo River delta on July 9; juvenile Heermann's gulls during July and August; a magnificent frigatebird near Poe Road on 7/28; a semi-palmated sandpiper on July 27; a black turnstone at Unit-l on August 24; and a glaucous-winged gull at Red Hill on December 17. The spring arrival date for black skimmers and

gull-billed terns was April 3. The skimmer population peaked at 480 birds during July, with 80-100 pair nesting at the Sea.



Refuge wetlands are managed to provide habitat for a diversity of wildlife including long-billed curlews which winter here by the thousands. WRR 12/91

Most notable was an adult Laysan albatross which Manager Voget found alive, but mortally injured, about three miles east of refuge HQ on Sinclair Road. The bird, which hit a powerline, represents only the 11th inland record for this species in the west, and is only the third record of an albatross at the Salton Sea. The bird was donated to the San Bernardino County Museum.

Clearly, the Salton Sea supports one of the largest inland concentrations of migrating shorebirds in the Pacific Flyway. Refuge personnel assisted with both the spring and fall Salton Sea shorebird census coordinated by the Point Reyes Bird Observatory. The spring survey, conducted April 27 on refuge lands, totalled 38,446 individuals of 40 species; while the fall survey, conducted August 24 on refuge lands, totalled 42,524 individuals of 44 species. Peak numbers on the refuge included 4,000 black-necked stilts, 7,000 American avocets, 500 willets, 1,300 marbled godwits, 24,000 Western sandpipers, and 6,000 dowitchers. The refuge helps provide habitat for numerous shorebird species by varying water depths in freshwater ponds, and drawing down ponds during periods which coincide with shorebird migration peaks. Wood storks arrived June 6, when four were observed at Morton Bay. Stork numbers peaked on July 9, when 70 birds were counted at the Alamo River delta.

On April 25, 1991, refuge personnel observed a Western sandpiper at Unit-l which was wearing a red over white marker on its left leg and a FWS band on

its right leg. This bird was banded at Parita Bay, Panama during January-February 1989. As part of a cooperative program between the Canadian Wildlife Service and Panamanian biologists, over 500 Western sandpipers were banded with these leg flags, with the Salton Sea sighting only the third from this group to be discovered in California.

Ring-billed gulls are the most common gull species in the Imperial Valley, with numbers estimated at 400,000. Although abundant, gulls do not nest at the Salton Sea. On January 15, a color-marked ring-billed gull was found dead near Red Hill Marina. This bird was banded prior to fledging in 1989 about eight miles east of Silver Springs, Nevada by University of Nevada researchers.

Mountain plovers are uncommon winter visitors in the Imperial Valley, and are of special interest to the public visiting Salton Sea NWR. On a sign-in sheet of noteworthy bird observations, the public annually lists mountain plovers about five to ten times between September through March. The number of birds reported varies from three to 1500, with most groups averaging about 40-50 birds. Peak numbers of mountain plovers were observed on October 2 (500 birds), October 20 (700 birds), and December 17 (200 birds). Mountain plovers were reported in the Imperial Valley as late as March 13 during 1991.

The Service is currently reviewing the status of mountain plovers, whose total population is estimated at 5,000, in preparation of a listing package. There are concerns that plovers may be picking up contaminants on their wintering areas, including the Imperial Valley. In 1991, the Imperial Valley (on the U.S. side) contained 560,790 acres of agriculture, including 4,725 acres in asparagus and 11,954 acres in bermuda grass (for seed). Both of these perennial crops provide important feeding areas for mountain plovers near the Salton Sea. Asparagus is ferned out during the summer and is chopped at ground level and burned off during fall and winter to allow harvest of the sprouting shoots. Burning of the earliest fields begins in October, while late fields are burned in December. The bare, blackened earth apparently provides localized invertebrate activity and food for mountain plovers. Bermuda grass is burned or mowed primarily during late January through March to promote spring growth and seems to provide much the same conditions for plovers. However, mountain plovers also will use any bare agricultural field (or short-grass field) in the valley, and their population size is difficult to determine. Bermuda grass has declined as a crop in the area, however, asparagus is the same or increasing. Refuge agricultural lands are managed to provide green browse for wintering geese, and do little to provide good plover habitat. Mountain plovers are generally seen on refuge lands in late winter after geese have partially denuded alfalfa fields.

6. Raptors

The Imperial Valley hosts a large breeding population of burrowing owls, with the many ditch banks furnishing a plentitude of nesting habitat and the agricultural fields providing an abundance of prey species, primarily insects, As part of a study which was begun in 1990 (see Section D.5), some preliminary field work was conducted involving the location of active burrowing owl burrows. A total of 39 burrows were located and mapped.

Raptorial species are rather common at Salton Sea, especially during the fall and winter months. Burrowing owls, northern harriers, American kestrels, red-

tailed hawks, and common barn owls are the most abundant of the area's raptors. Heading the list of noteworthy sightings was an immature zone-tailed hawk, which was seen several times throughout the winter (the area's second record ever for a zone-tailed hawk), and an immature broad-winged hawk in December (the third record for this species). January's noteworthy observations included a rough-legged hawk and an osprey. An osprey was also seen in February, as was a prairie falcon. Other unusual sightings for the year were a black-shouldered kite in early March; an unsubstantiated report of a caracara late in April; an osprey in June; a sharp-shinned hawk in September; a prairie falcon, great horned owl, sharp-shinned hawk, merlin, osprey, and Cooper's hawk in October; a ferruginous hawk and an osprey in November; and a black-shouldered kite, Cooper's hawk, sharp-shinned hawk, rough-legged hawk, and prairie falcon in December. Sightings in surrounding areas were topped by a light phase Swainson's hawk at Coachella Valley NWR in mid-May, a Harris' hawk northeast of Niland in August, and a ferruginous hawk near Interstate 8 in mid-December.

7. Other Migratory Birds

The 92nd annual Christmas Bird Count was conducted on December 17 by 13 individuals (including Voget, M. Radke, W. Radke, Schoneman, Schulz, and Durbin) covering seven areas with a total of 62,952 individual birds observed representing 131 species. This was down considerably from last year's count of 142 species and 116,587 individuals. This year's noteworthy species included one brant, one whimbrel, three laughing gulls, and one winter wren. Additional unusual species observed during the count week but not on the count day included a Eurasian wigeon at Unit 1 and a hooded merganser. The following table lists the species and numbers observed on the count area, centered 2.2 miles east-southeast of the Salton Sea NWR headquarters.

Noteworthy observations of passerines on or near the refuge during the year included vermilion flycatchers at headquarters on January 3, a sage thrasher at Unit 1 on February 3, a white-throated sparrow at headquarters on March 10, a common poorwill at Obsidian Butte on April 27, an olive-sided flycatcher at Unit 1 on April 30, a Crissal thrasher at headquarters on April 4, yellow-breasted chats at headquarters on May 5 and on September 29, a green-tailed towhee at headquarters on May 5, chipping sparrows at headquarters on May 28, and an indigo bunting was observed at headquarters on June 2. A painted redstart was observed and photographed at headquarters on September 26 by Henry Detwiler of Yuma (slides are located in the refuge files). This represents the first observation and a new species for the refuge.

Other noteworthy observations of passerines in the Imperial Valley included sage sparrows north of Wister Wildlife Area on February 7, a bobolink at the Sunbeam rest stop along Interstate 8 a few miles west of El Centro on August 10, and a Lewis' woodpecker at the intersection of Brandt and Eddins Roads on December 12.

Table G.7 Species Observed During December 1991 Christmas Bird Count

| | |
|---|---|
| Pied-billed Grebe | 12 |
| Eared Grebe | 696 |
| W. Grebe | 10 |
| Clark's Grebe | 1 |
| Am. White Pelican | 7 |
| Double-crested Cormorant | 277 |
| Am. Bittern | 3 |
| Great Blue Heron | 29 |
| Great Egret | 232 |
| Snowy Egret | 54 |
| Cattle Egret | 2824 |
| Green-backed Heron | 2 |
| Black-crowned Night-Heron | 33 |
| White-faced Ibis | 256 |
| Snow Goose | 5849 |
| Ross' Goose | 2731 |
| Brant | 1 |
| Canada Goose | 281 |
| Green-winged Teal | 2422 |
| Mallard | 22 |
| N. Pintail | 477 |
| Cinnamon Teal | 21 |
| N. Shoveler | 5737 |
| Gadwall | 121 |
| Am. Wigeon | 180 |
| Canvasback | 2 |
| Redhead | 4 |
| Greater Scaup | 2 |
| Lesser Scaup | 65 |
| Com. Goldeneye | 4 |
| Bufflehead | 63 |
| Red-breasted Merganser | 1 |
| Ruddy Duck | 1383 |
| Black-shouldered Kite | 1 |
| N. Harrier | 54 |
| Sharp-shinned Hawk | 4 |
| Cooper's Hawk | 3 |
| Red-tailed Hawk | 36 |
| Rough-legged Hawk | 1 |
| Am. Kestrel | 128 |
| Peregrine Falcon | 1 |
| Prairie Falcon | 1 |
| Ring-necked Pheasant | 2 |
| Gambel's Quail | 91 |
| Clapper Rail | 2 |
| Virginia Rail | 4 |
| Sora | 13 |
| Corn. Moorhen | 25 |
| Am. coot | 2481 |
| Black-bellied Plover | 253 |
| Snowy Plover | 9 |
| Semipalmated Plover | 6 |
| Killdeer | 363 |
| Mountain Plover | 163 |
| Black-necked Stilt | 381 |
| fun. Avocet | 938 |
| Greater Yellowlegs | 12 |
| Lesser Yellowlegs | 2 |
| Willet | 96 |
| Spotted Sandpiper | 6 |
| Whimbrel | 1 |
| Long-billed Curlew | 1289 |
| Marbled Godwit | 157 |
| W. Sandpiper | 1023 |
| Least Sandpiper | 733 |
| Dunlin | 30 |
| Stilt Sandpiper | 2 |
| Long-billed Dowitcher | 842 |
| Corn. Snipe | 2 |
| Laughing Gull | 3 |
| Bonaparte's Gull | 20 |
| Ring-billed Gull | 12592 |
| California Gull | 8 |
| Herring Gull | 310 |
| Yellow-footed Gull | 22 |
| Glaucous-winged Gull | 1 |
| Forstar's Tern | 55 |
| Rock Dove | 182 |
| Mourning Dove | 225 |
| Corn. Ground-Dove | 20 |
| Greater Roadrunner | 2 |
| Burrowing Owl | 4 |
| Anna's Hummingbird | 1 |
| Belted Kingfisher | 8 |
| Ladder-backed Woodpecker | 1 |
| N. (Red-sh.) Flicker | 20 |
| Black Phoebe | 85 |
| Say's Phoebe | 57 |
| Vermilion Flycatcher | 1 |
| Horned Lark | 803 |
| Tree Swallow | 250 |
| Corn. Raven | 1 |
| Verdin | 73 |
| Cactus Wren | 3 |
| House Wren | 4 |
| Winter Wren | 1 |
| Marsh Wren | 93 |
| Ruby-crowned Kinglet | 50 |
| Blue-gray Gnatcatcher | 10 |
| Black-tailed Gnatcatcher | 13 |
| Am. Robin | 118 |
| N. Mockingbird | 22 |
| Am. Pipit | 170 |
| Cedar Waxwing | 2 |
| Phainopepla | 21 |
| Loggerhead Shrike | 40 |
| Eur. Starling | 362 |
| Orange-crowned Warbler | 153 |
| Yellow-rumped (Myrtle) Warbler | 12 |
| Yellow-rumped (Audubon's) Warbler | 682 |
| Am. Redstart | 2 |
| Corn. Yellowthroat | 37 |
| Abert's Towhee | 110 |
| Brewer's Sparrow | 1 |
| Vesper Sparrow | 4 |
| Lark Sparrow | 55 |
| Sage Sparrow | 1 |
| Savannah Sparrow | 455 |
| Song Sparrow | 47 |
| Lincoln's Sparrow | 35 |
| Golden-crowned Sparrow | 1 |
| White-crowned Sparrow | 392 |
| Dark-eyed (Oregon) Junco | 6 |
| Red-winged Blackbird | 10875 |
| W. Meadowlark | 345 |
| Yellow-headed Blackbird | 5 |
| Brewer's Blackbird | 106 |
| Great-tailed Grackle | 222 |
| Brown-headed Cowbird | 40 |
| House Finch | 232 |
| Lesser Goldfinch | 4 |
| House Sparrow | 496 |

10. Other Resident Wildlife

At least 41 mammal species are present at Salton Sea NWR. Common species include the desert cottontail, raccoon, striped skunk, valley pocket gopher, deer mouse, pocket mouse, muskrat, and house mouse. Most of the rodent species exist in terrestrial habitats, where they provide important foods for raptors and other predators. During winter months, rodents become an important food for herons and egrets. Muskrats are present in freshwater tributaries where their feeding and burrowing activities help maintain marsh habitats for various other species.

Hispid Cotton rats (Sigmodon hispidus) were identified on the refuge for the first time in 1991 when individuals were captured at Hazard pond-5 on September 11, Unit-l on September 16, and in the Union wheat field on October 25. These medium sized rodents are probably present throughout the Imperial Valley, having taken advantage of habitat altered by agriculture to increase their geographic range from the Colorado River.

The desert shrew (Notiosorex crawfordi) is a rarely encountered resident on the refuge. Between May and October, seven shrews were found in pit hunting blinds at Hazard ponds 5 and 6. The blinds also trap abundant insects and other hapless animals which topple into the pits. Installing blinds so that they are not flush with the ground surface would help prevent most wildlife from encountering these death traps.

Amphibians and reptiles actually observed on the refuge during 1991 include the bullfrog, red-spotted toad, Woodhouse's toad, spiny softshell turtle, side-blotched lizard, desert spiny lizard, western whiptail lizard, gopher snake, common kingsnake, checkered garter snake, western diamondback rattlesnake, coachwhip, western shovel-nosed snake, and western ground snake.

During 1991 the Imperial Valley, including refuge lands, were besieged by billions of whiteflies (Bemisia tabaci). The minute insects suck plant juices, transmit viruses lethal to plants, create "honeydew" which promotes fungus growth, and are not susceptible to insecticides. Considerable damage was done to agricultural crops county wide, including refuge lands. Researchers are working to evaluate the use of biological control as a means to combat the whitefly population.

Painted lady butterflies (Vanessa cardui) reached a peak of billions during April and May throughout southern California, including refuge lands. These adult butterflies are relatively long-lived, and during favorable years, population buildups occur which culminate in extensive northerly migrations, with population peaks occurring on the average of once each twenty years.

11. Fisheries Resources

Because it is within a closed basin having low rainfall and high evaporation, the Salton Sea has tended to become increasingly saline. Presently the Sea has a salinity ranging up to 44 parts per thousand, which is about 25 percent saltier than the Pacific Ocean. A major ecological influence comes from solar radiation, which creates extremes between surface and bottom temperatures, and in turn affects the dissolved oxygen content of the water. During the eventual mixing which follows oxygen depletion at the Sea bottom, the dissolved oxygen concentration at the water's surface can temporarily be

lowered below the minimum level necessary to maintain many forms of life in the Sea. In addition, high concentrations of sulfide and ammonia present at the bottom during the summer are mixed into surface waters. The result is annual fish kills, such as one occurring on October 23, providing sudden meals for thousands of gulls, herons, raccoons, and other wildlife. Oxygen becomes increasingly less soluble in higher salinities, which influences both present and future life in the Sea.

Although the desert pupfish is the only fish native to the Salton Sea (see Section G.2), there are currently at least 15 introduced fish species which inhabit the Sea and its associated drains. The chief game fish of the Sea is the orangemouth corvina, Cynoscion xanthulus, which has supported a substantial sport fishery in the past. This species occupies the top of the aquatic food chain, and feeds upon tilapia, longjaw mudsuckers, gulf croakers, sargo, and threadfin shad, which are all important forage species. The forage fish, in turn, feed upon fish eggs, copepods, barnacle larvae, amphipods, and especially pileworms. Pileworms are the staple food item for all but very young fish, and the most important limiting factor for some fish species in the Sea may be the scarcity of pileworms during summer and early fall. The Salton Sea is currently too salty to allow successful spawning by many of the present fish species, and recruitment probably comes from fish entering the Sea from freshwater inlets. Freshwater drains contain large numbers of tilapia, carp, mosquitofish, sailfin mollies, longjaw mudsuckers, and red shiners, which are important forage for larger fish, predatory birds, and numerous other wildlife.

While corvina, sargo, and gulf croaker eggs and fry can currently tolerate the salinity levels in the Sea, there is some indication that production of these species is declining. Tilapia were not captured in the Sea during 1991 refuge research efforts, but were present in several freshwater drains. Threadfin shad, which may no longer reproduce in the Sea, were captured in gill nets set near the Whitewater River delta during June. The reproductive potential of the Salton Sea fishery is extraordinary, however, numbers are traditionally held in check through the fish mortalities which occur each year during summer or early fall as a result of food depletion, lack of oxygen, or a combination of factors.

14. Scientific Collections

Specimens for the boron study (see Section D.5) were collected throughout the year. Biologist W. Radke spent the equivalent of two work days doing field work for this study. Biologist Schulz was involved with the field work for 18.5 days and was assisted by Wildlife Technician LeCaptain (3 days), SCA volunteer Durbin (2 days), Contaminant Specialist Audet (1.5 days), and Biologist Tims (1 day). Collected specimens included Corixids (9 samples, weighing from 10 to 43 g.), pileworms (3 samples, 10-38 g.), lesser snow geese (5), Northern pintails (20), Northern shovelers (20), and ruddy ducks (25), as well as sediment (12) and vegetation (6) samples. Nine of the pintail and eight of the shoveler specimens were obtained by removing the livers from birds brought to the Wister hunter check station. All the specimens were catalogued, processed and frozen, and will be sent in for analysis when all samples have been collected.

From mid-May to mid-September, considerable time was spent collecting specimens for the selenium/DDE study (see Section D.5). W. Radke spent the

equivalent of 10.5 work days in this endeavor, with assistance from Schulz (6 days), Audet (4 days), and Contaminant Specialist Steve Goodbred (1 day). Schulz spent an additional 16 days collecting specimens for the study. At various times he was assisted by YCC Mike Higgins (3.5 days), LeCaptain (2.5 days), YCC Crew Leader Joe Vandiver (2 days), Biologist McGill (1 day), and YCC Miguel Estrada (1 day). Specimens collected included mosquitofish (10 samples, weighing from 24 to 38 g. each), sailfin mollies (10 samples, 20-46 g.), bairdiella (10 fish), sargo (4), black-crowned night herons (4), double-crested cormorants (6), white pelicans (6), and great blue herons (10), as well as eggs from cattle egrets (3), great egrets (9), snowy egrets (3), black skimmers (12), gull-billed terns (6), black-crowned night herons (3), and great blue herons (4). All specimens were cataloged, processed, frozen and sent to a lab for analysis. Additional tissue from some of the birds was retained at the Refuge for possible use in a future study.

Wildlife specimens which are in good condition are often picked up for use by researchers, museums, universities, etc. Below is a list of specimens which were collected and stored in Refuge freezers in 1991.

Table G.14 Salvage Specimens Collected

| COMMON NAME | NUMBER COLLECTED | COMMON NAME | NUMBER COLLECTED | COMMON NAME | NUMBER COLLECTED |
|---|---|---|---|---|---|
| Western grebe | 1 | Northern pintail | 11 | common barn owl | 1 |
| eared grebe | 1 | blue-winged teal | 1 | Anna's hummingbird | 2 |
| Laysan albatross | 1 | ruddy duck | 1 | Northern (red-shafted) flicker | 1 |
| black-crowned night heron | 1 | sora | 1 | Empidonax, sp. | 1 |
| snowy egret | 1 | common moorhen | 1 | European starling | 2 |
| great blue heron | 1 | American avocet | 1 | Wilson's warbler | 1 |
| sandhill crane | 2 | killdeer | 1 | common yellowthroat | 1 |
| lesser snow goose | 6 | red-necked phalarope | 2 | Abert's towhee | 1 |
| Ross' goose | 4 | sanderling | 1 | savannah sparrow | 1 |
| Canada goose | 1 | Western sandpiper | 5 | Northern (Bullock's) oriole | 1 |
| brant | 4 | mourning dove | 3 | hooded oriole | 1 |
| mallard | 3 | white-winged dove | 1 | house sparrow | 15 |
| American wigeon | 2 | greater roadrunner | 1 | | |

16. Marking and Banding

In association with contaminant or other appropriate studies on the refuge, a total of six species and 45 individuals were banded in 1991, summarized in the following table. No duck banding was attempted during 1991.

Biologist Mike McGill collecting addled eggs and banding Black-crowned Night Heron chicks at the west Whitewater River colony. WRR 06/18/91

Table G.16a Species and Number Banded During 1991

| Species | Number Banded |
|---|---|
| Black Brant | 1 |
| Great Blue Heron | 6 |
| Great Egret | 23 |
| Snowy Egret | 4 |
| Cattle Egret | 4 |
| Black-Crowned Night Heron | 7 |

Recovery locations of banded waterfowl included one each from Mexico and Canada, with the majority from three Pacific flyway states. Interesting band returns during 1990 included a 16 year old snow goose recovered at Wister Wildlife Area, and a pintail recovered in Mexico which was banded in 1975. A total of 31 band returns from previous year's banding efforts were received during 1990 - 1991, summarized in the following table.

Table G.16b Band Return Summary, 1990 - 1991

| Species | Date Banded | Date Recovered | Recovery Locations |
|---|---|---|---|
| Mallard | 02-14-88 | 10-20-90 | Antimony, UT |
| Green-winged teal | 02-04-88 | 09-13-91 | Bear River Refuge, UT |
| Northern pintail | 02-28-87 | 12-08-90 | Niland, CA |
| Northern pintail | 02-07-90 | 12-10-90 | Niland, CA |
| Northern pintail | 02-05-88 | 12-08-90 | Niland, CA |
| Northern pintail | 02-07-90 | 12-18-90 | Niland, CA |
| Northern pintail | 02-09-87 | 01-06-90 | Niland, CA |
| Northern pintail | 02-07-90 | 12-01-90 | Niland, CA |
| Northern pintail | 02-23-87 | 01-05-91 | Wister WA, CA |
| Northern pintail | 02-22-90 | 12-01-91 | Wister WA, CA |
| Northern pintail | 02-07-90 | 01-05-91 | Wister WA, CA |
| Northern pintail | 02-03-87 | 12-09-90 | Imperial WA, CA |
| Northern pintail | 02-17-88 | 02-08-90 | Calipatria, CA |
| Northern pintail | 02-20-90 | 10-28-90 | Colusa NWR, CA |
| Northern pintail | 02-17-88 | 12-06-90 | Colusa NWR, CA |
| Northern pintail | 02-19-88 | 12-21-91 | Mecca, CA |
| Northern pintail | 02-18-88 | 12-16-90 | Mecca, CA |
| Northern pintail | 02-07-90 | --- | El Centro, CA |
| Northern pintail | 02-08-75 | --- | Milpas Viejas, Mexico |
| Northern pintail | 02-09-88 | 04-21-90 | Cessford, Alberta, Canada |
| Northern pintail | 02-18-88 | 12-29-90 | Grizzly Island WA, CA |
| Northern pintail | 02-17-88 | 12-08-90 | Salton Sea NWR, CA |
| Northern pintail | 02-08-90 | 10-07-90 | Bear River Refuge, UT |
| Northern pintail | 02-17-88 | 10-13-90 | Harrison Duck Club, UT |
| Northern pintail | 02-17-88 | 12-02-90 | Corrine, UT |
| Northern pintail | 02-19-88 | 12-02-89 | Greenhead Duck Club, NV |
| Northern pintail | 02-08-88 | 10-20-91 | Stillwater, NV |
| Canvasback | 02-27-87 | 12-26-91 | Niland, CA |
| Lesser scaup | 02-21-87 | 01-06-90 | Imperial WA, CA |
| Lesser scaup | 02-18-87 | 12-15-90 | San Pablo Bay, CA |
| Snow goose | 02-14-74 | 10-31-90 | Wister WA, CA |

17. Disease Prevention and Control

A disease outbreak occurred at the southeast end of Salton Sea beginning in mid-January and ending around February 20. A total of 229 birds representing 20 species were picked up by Service personnel on Salton Sea NWR lands, however, the total estimated number of birds killed on the Sea during the die-off was about 2000. Field necropsies conducted by Refuge staff suggested avian cholera. A representative sample of fresh dead birds was collected and sent to the National Wildlife Health Research Center (NWHR) for analyses which were positive for cholera in some of the samples.

Table G.17 Carcasses Picked Up During Mid-January to Late February Cholera Outbreak

| SPECIES | # COLLECTED | SPECIES | # COLLECTED |
|---|---|---|---|
| Canada goose | 9 | ring-billed gull | 81 |
| snow goose | 16 | great egret | 3 |
| Ross' goose | 2 | snowy egret | 1 |
| Northern pintail | 4 | eared grebe | 3 |
| American wigeon | 24 | American coot | 4 |
| Northern shoveler | 53 | American avocet | 1 |
| green-winged teal | 13 | black-necked stilt | 2 |
| canvasback | 1 | killdeer | 1 |
| ring-necked duck | 2 | short-billed dowitcher | 3 |
| herring gull | 5 | long-billed dowitcher | 1 |

During 1991, an estimated 60 gull-billed tern and 20 black skimmer nests were active on an island in Morton Bay. During routine monitoring in June and July, five dead tern and seven dead skimmer chicks were collected. The chicks were sent to NWHR, but their tissues were too decomposed for analysis.

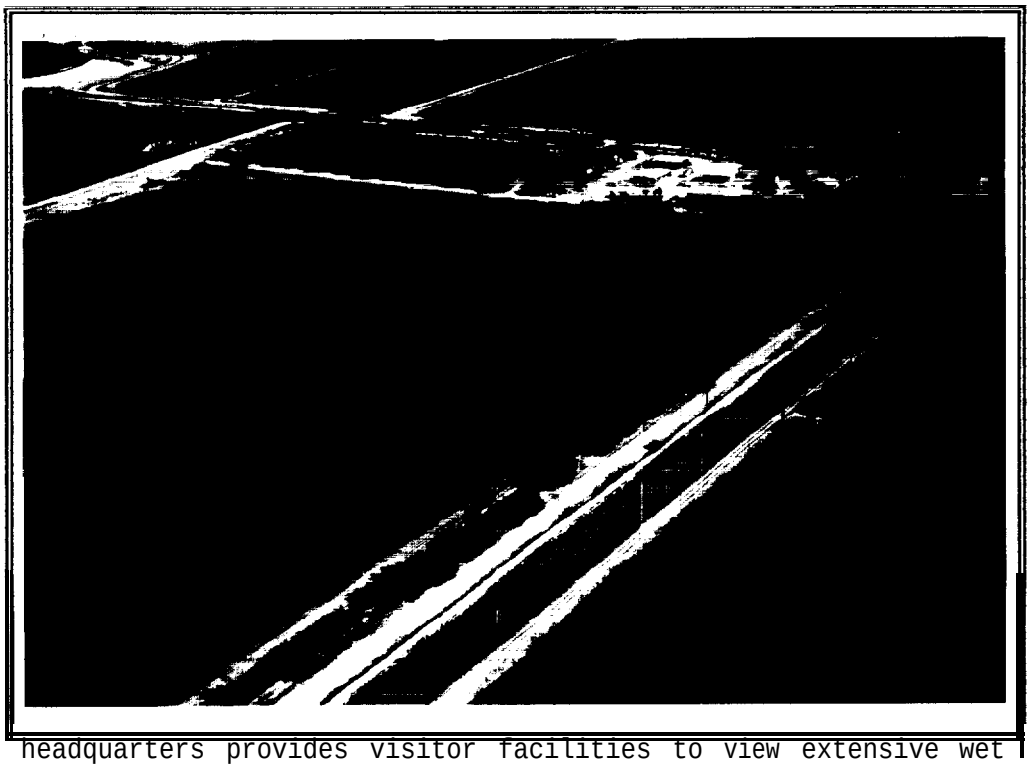
In July, the Refuge was contacted by NWHR concerning a supposed die-off among the nesting cattle egrets at the rookery along Dogwood Road, which CDF&G personnel had indicated was probably due to salmonella. Biologist Schulz visited the rookery and found the number of dead birds to be within the realm one would expect, given the size of the rookery and its proximity to vehicular traffic. Three birds were captured, euthanized, and sent NWHR for analysis. Lab results revealed that no salmonella bacteria were found in the tissues of any of the birds. No other tests were performed.

An avian botulism outbreak occurred in Riverside County in August, with one of the hardest hit areas being the 21 Gun Club. Schulz met with club members to discuss the die-off and to outline measures for the control and future prevention of botulism epidemics. The club members estimated the outbreak had killed in excess of 200 birds, and two fresh carcasses were taken to the Refuge and shipped to NWHR. Lab results confirmed the presence of type C botulism. During June, members of the 21 Gun Club, concerned about another disease outbreak, brought three mallards to the Refuge, Analyses by NWHR indicated all three birds were injured or crippled by hunters and subsequently developed fatal secondary bacterial infections.

A snow goose which was found by a hunter at one of the Hazard ponds was sent to NWHR and found to have succumbed to lead poisoning.

In mid-December, Equipment Operator Orozco noticed several dead eared grebes in the area north of the end of Garst Road. On December 27, a total of six Herring gulls, five American coots, three eared grebes, two ruddy ducks, and three snow geese were picked up in Morton Bay and Units 1 and 2 by M. Radke. Two grebes were later collected for analysis. Lab tests performed by NWHR showed that one bird had died from a meningeal hemorrhage, but results for the other bird were inconclusive.

## H. PUBLIC USE



Refug headquarters provides visitor facilities to view extensive wet land and upland habitats managed for resident and migratory wildlife. WRR 02/24/92

### 1. General

An estimated 40,000 visitors ventured to the refuge in 1991. The vast majority of refuge visitors are wildlife oriented, and are primarily bird watchers ranging from casual to fanatical in their interest levels. The relatively large numbers of waterfowl and shorebirds, combined with the tremendous overall variety of avian species, has made the Salton Sea a birding "destination" for wildlife enthusiasts from far and wide.

Visitor facilities at refuge headquarters include a twenty-five space parking area (plus overflow), entrance and orientation signs, rest rooms, a contact station featuring a popular habitat diorama with thirty-five mounted specimens, shaded picnic area with three tables and an adjacent observation platform, self-service brochure box, and the self-guided interpretive Rock Hill Trail. Additional facilities at Unit 1 include a small parking area, observation platform, entrance and orientation signs, and self-service brochure box.

The challenge with managing public use at Salton Sea is allowing a level of public access that balances with wildlife objectives, where only a limited amount of manageable habitat exists. Restricting access to limit disturbance is essential but not always well understood, or popular. In particular, the closure of the former trail that led from the observation tower to the Sea at Unit 1 (which is still shown on the general refuge leaflet and in a popular birding guide book), frequently causes consternation among birders who want to

walk through the impoundments and down to the Sea. "But I'm not hurting anything" is the standard response among trespassing birders who view their activities as non-consumptive and, therefore, not harmful.

2. Outdoor Classrooms - Students

A total of 15 class groups totaling about 450 students took part in outdoor classroom sessions on the refuge in 1991. Almost all school groups visit the refuge in the cool season when waterfowl viewing opportunities are best. Scheduling visits by class groups on hunt days (Wednesdays) is avoided in order to reduce conflicts among interest groups.

Challenges to the outdoor classroom program include finding the collateral duty staff time to host activities, infusing a variety of activities aimed at specific grade levels, and developing more "hands on" activities that reinforce the curriculum for a given grade level. Currently, almost all groups, regardless of grade level, take a walking "tour" of the Rock Hill Trail.

4. Interpretive Foot Trails

The Rock Hill Trail provides visitors with a self-guided interpretive opportunity. The trail leads from headquarters out to Rock Hill, where it dead ends. The 1 mile (each way) trail has several interpretive panels that inform visitors about habitat, migration and other natural history subjects. About half of the public visits to headquarters include a stroll down the trail, which is also used for outdoor classroom sessions.

6. Interpretive Exhibits/Demonstrations

Assistant Manager Dinkler was recruited to staff the "Enjoy Outdoors America" booth in San Diego on December 11 and 12. The Interior Department's display booth was set up at the National Campground Owner's Association conference at the Town and Country Motel in San Diego. A high percentage of the conference attendees visited the booth, which represented all Interior Department land management agencies.

7. Other Interpretive Programs

Assistant Manager Dinkler presented a slide/talk program to the Holtville Optimist Club on January 18. The presentation focused on wildlife objectives and habitat management operations on the refuge.

8. Hunting

The refuge waterfowl hunting program is conducted under cooperative agreement with the California Department of Fish and Game. Hunts are administered through the neighboring state-operated Wister Unit of the Imperial Wildlife Management Area on Wednesdays, Saturdays, and Sundays on a reservation/permit basis. Hunting parties of not more than four individuals (including minors and non-shooters) are assigned to specific pit blinds or shooting points on impoundment dikes and must hunt from only those points.

Hunters encountered some changes in the refuge hunt program at the Hazard Unit. These included the installation of new pit blinds and relocation of

shooting points on dikes in place of island blinds, the improvement of the physically challenged blind, and the development of a new parking area, all accomplished by equipment operator Marcos Orozco.

New two-person pit blinds were purchased from Fiber-Tech Engineering, Inc., located in Santee, California and placed at blinds 8 and 9 (2 each), and at the physically challenged blind 7 to accompany the existing two-person wood platform shooting point there. Several hunting parties used the physically challenged site and gave it rave reviews.

Four shoreline shooting points (10, llA, llB, and 12) were established in replacement of island blinds 10, 11, and 12, increasing the number of shooting points by one. While most of the new blinds were generally productive and well received, the location of blind 12 needs further evaluation. Due to its location along the eastern boundary, blind 12 proved to be marginal in both opportunity and productivity. Blind 12 also placed hunters in the situation of hunting very close to the refuge boundary and, therefore, the neighboring fish farm's property.

A primary concern when considering improvements to Hazard Unit ponds east of the Alamo River (including existing blind sites 10, llA, llB, and 12) is the fact that the area is leased from the State and subsurface rights may be leased for geothermal power development. If geothermal rights are leased, mitigation funds would likely become available for improvements, including reshaping dikes and impoundments, rehabilitating the ineffective water delivery and drainage system, and buying and installing fiberglass pit blinds.

The 1991/92 hunting season was a banner year for hunter complaints. Although most of the perceived problems focused on the state's management of neighboring Wister Wildlife Management Area, the refuge received more than the normal amount of complaints. Among other things, hunters voiced discontent over the delayed opening of the four Union goose blinds, even though blinds were available at the Hazard Unit. The loss of a cooperative farmer meant that some fields, including the 421 field next to headquarters, were planted later than usual. However, fields that were planted earlier seem to have major problems with white fly infestations. As it turned out, a delayed germination date may well have been a positive from a farm management and wildlife habitat (i.e., goose forage) perspective. However, changes in the farming program did cause unpopular delays in opening the Union blinds (see Section F.4).

A major problem with most of the hunter's concerns was that they were not based on good information. It seemed that many hunters adopted the philosophy that "if you hear something often enough, it must be true." Many of the hunters concerns could have been relieved if they would have bothered to call or stop by the office and ask questions. It also turned out that many waterfowl hunters held the misconception that their license and stamp fees pay for the operation of the refuge, and, therefore, hunters and hunting should receive top priority.

Other complaints included the following: numerous hunters were irate about lost hunting opportunities at Unit 1 along the New River (due to our posting the correct boundary); concern over the refuge "holding" geese away from hunters, including our dumping grain at Unit 1 (the wheat in the sacks of grain involved was planted, not dumped); one hunter, whose wife sits on the

Imperial County Fish and Game Commission, generated a congressional inquiry over concerns about declining hunter opportunity, expansion of the refuge at Unit 1, and habitat management practices that he felt provided inadequate forage.

In summary, hunter visits increased slightly over 1990 totals, likely due to the availability of three additional blinds. A total of 635 hunters gunned from the seventeen refuge blinds (excluding refills, which are largely just hunters changing locations and therefore do not represent different hunters). The following table summarizes hunter use and success for the last three seasons:

Table H.8 HUNTER/HARVEST DATA*

| | DUCKS | GEESE | TOTAL BIRDS | HUNTERS | BIRDS/HUNTER |
|---|---|---|---|---|---|
| 1989-90 Season | | | | | |
| Hazard | 953 | 34 | 987 | 943 | 1.047 |
| Union | 6 | 142 | 148 | 279 | 0.530 |
| Overall | 959 | 176 | 1135 | 1222 | 0.929 |
| 1990-91 Season | | | | | |
| Hazard | 453 | 74 | 527 | 305 | 1.728 |
| Union | 2 | 181 | 183 | 259 | 0.707 |
| Overall | 455 | 255 | 710 | 564 | 1.259 |
| 1991-92 Season | | | | | |
| Hazard | 653 | 87 | 740 | 492 | 1.504 |
| Union | 0 | 134 | 134 | 143 | 0.937 |
| Overall | 653 | 221 | 874 | 635 | 1.376 |

*Hunter Data Does Not Include Refill Hunters

9. Fishing

Portions on the refuge flooded by the waters of Salton Sea provide sport fishing opportunities, primarily for corvina. The number of visitors in this category is thought to be in the range of 10,000 anglers, and declining. The decline of the fishery due to increasing salinity (and possibly contaminants), combined with health warnings against eating more than eight ounces of fish a

month, have lead to a substantial decrease in fishing activity, which is a trend expected to continue.

11. Wildlife Observation

Most refuge visitors recorded are in this category, with birding being the primary activity of choice. While the majority of visits occur during the wintering season for waterfowl, birders venture to the area throughout the year in search of new species to add to their life lists.

The Salton Sea area has developed a world-wide reputation as a birding "hot spot." The large variety and seasonal concentrations of birds, combined with a sprinkling of rare migrant and vagrant species, make the Salton Sea a popular destination for birders in search of new species.

14. Picnicking

The visitor area at headquarters provides a shaded picnic area with three tables that is a favored spot for eating, resting, and getting out of the sun. A good percentage of wildlife-oriented visitors take advantage of the picnic area in the course of their activities. Additionally, several hundred non-wildlife oriented individuals and groups use the facilities at headquarters.

17. Law Enforcement

Law enforcement activities at Salton Sea are highly seasonal and center on enforcement of the Migratory Bird Treaty Act (MBTA) off the refuge during dove season in September, and enforcement of the MBTA and special refuge hunting regulations during the fall/winter waterfowl season.

In addition to the usual routine patrols on and around Salton Sea Refuge, a special effort to maintain a presence at the coastal satellite refuges was made during the nesting season of endangered species. The lack of adequate staff, combined with the large amount of public use and the sensitivity and vulnerability of clapper rails and least terns, raised the need for maintaining a law enforcement presence. Refuge officers rotated weekend duty on the coast and issued nineteen violation notices at Tijuana Slough and four at Sweetwater Marsh, all on trespass cases.

The total number of citations issued in the vicinity of the refuge (17) dropped sharply from the total in 1990 (50 cases; 35 Federal and 15 State). Two likely reasons for the decline in the number of citations are the large increase in patrol hours in 1990 (compared to previous years) and, as a result, the realization among hunters that if you hunt the refuge you can expect to get checked.

The grizzly discovery of human remains was made in the course of a waterfowl survey flight in February. Refuge Officers discovered a human body at the mouth of the Alamo River, just outside the refuge boundary. The case was turned over to the Imperial County Sheriff's Department for investigation. The identity of the young, female victim, who was bound with rope, weighted down with rocks and shot in the head, has never been determined.

The following table summarizes the number and kind of violations notices issued on and around the Salton Sea Refuge in calendar 1991:

Table H.17 Law enforcement Case Summary

| VIOLATION | FEDERAL VIOLATION NOTICES | STATE COURT CASES |
|---|---|---|
| Vehicle Trespass | 2 | |
| Disturbing Wildlife W/ Aircraft | 2 | |
| Unplugged Gun | 2 | 2 |
| Non-Steel Shot | 2 | 1 |
| Taking Non-game migratory bird | | 1 |
| Hunting in Closed Area | 1 | |
| Special Refuge Hunt Regulations | 2 | |
| Exceeding 25 Shell Limit | | |
| TOTALS | 17 | 5 |

## I. EQUIPMFNT AND FACILITIES

### 1. New Construction

Projects in this category include installation of a new outlet structure and bridge at the Hazard Tract, the construction of a new parking lot for hunters at the Hazard Tract, continued work on the construction of the Bruchard Bay impoundment at Unit 1, and the placement of a new flag pole at "HQ."

In October, the Imperial Irrigation District (IID) installed a new concrete outlet structure (N35) and a new bridge on the N lateral. The new structure delivers water to the 11/12 impoundments on the back side of the Hazard Tract. Previously, the impoundment had been watered uphill from gate N37, which severely limited moist soil management capability and flood-up efficiency. IID also removed two wooden bridges and installed one new concrete bridge on N lateral, changing public access to the hunting blinds 10, 11 A and B, and 12 the day before the duck season opener, Extra effort and planning by the refuge staff in re-signing the affected hunt area prevented a fiasco on opening weekend,

Originally, IID's plans were to cement line the N lateral during the same week in October as the bridge and outlet structure installation project. As it turned out, the lateral was not lined, but the plan meant that water to the impoundments was shut off to dewater the lateral at the critical fall floodup period. Once again, preemptive action by the staff in flooding ponds 10 and 11/12 ahead of schedule meant that the impoundments had water for the opener.

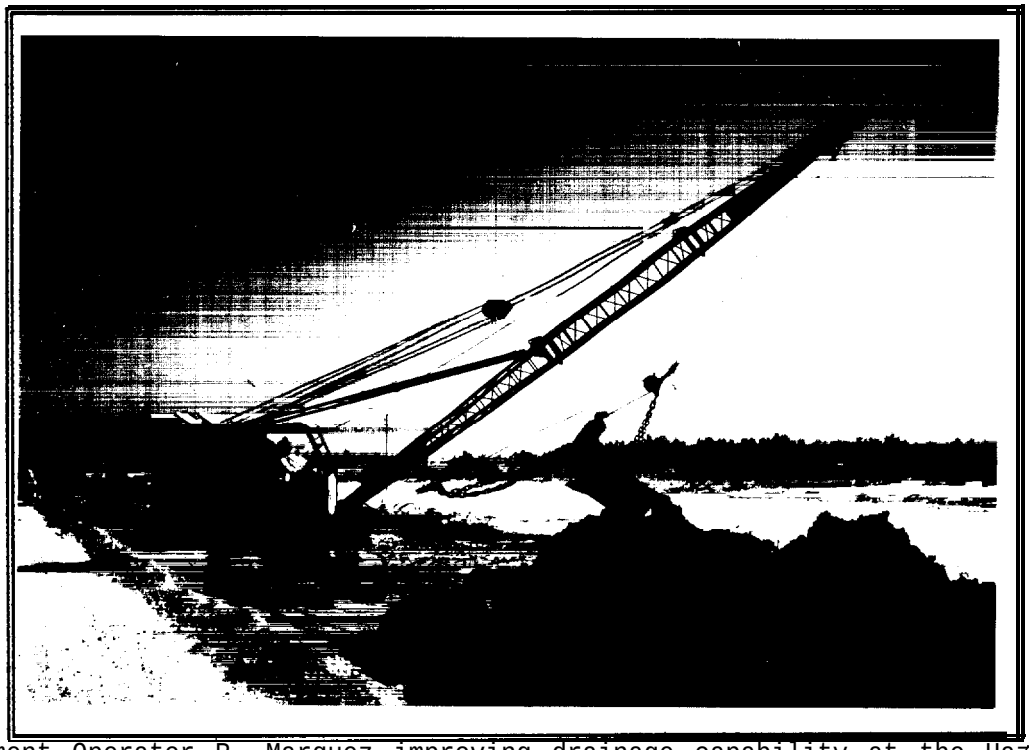
The $9,000 tab for installing the outlet structure and bridge was originally picked up by the Imperial County Fish and Game Commission. The commission was subsequently reimbursed by the Fish and Wildlife Foundation through the Salton Sea Segregated Account.

The relocation of the bridge across N lateral and elimination of the two old crossings meant that the hunter parking area also needed to be relocated. Engineering Equipment Operator Marcos Orozco did an excellent job of building a new parking lot. The new lot provides parking for four blinds; Hazard 10, llA, llB, and 12, with enough room to accommodate parking for one or two additional blinds (in the likely event that more habitat is created in conjunction with the state leasing geothermal rights to the area). The refuge leases surface management rights for the Hazard Tract from the California Department of Fish and Game.

In another project, Engineering Equipment Operator Richard Marquez put in several days on the dragline and dozer working on the new Bruchard Bay impoundment at Unit 1. The impoundment will support wetland habitat for Yuma clapper rails and a variety of migratory birds when completed next year.

One additional new construction project was the installation of a new flag pole at refuge headquarters. The pole was donated by Unocal Geothermal and was installed with their assistance. "Thanks" to our good neighbors at Unocal!

2. Rehabilitation



Equipment Operator R. Marquez improving drainage capability at the Hazard Unit. The channel will allow efficient moist soil management in the unit.

WRR 05/01/91

A major dirt hauling project in support of improving dike/roads at the Hazard Tract was continued in 1991. Dirt fill material from the Calipatria State Prison construction site was hauled to Hazard Unit impoundments to improve the size and shape of dikes at several units. Dike/roads were improved along ponds 1A, 2A, 3A, 4, 7, 8, and 9. The prison also had some sandy material that was hauled in to improve vehicle access to the parking areas and the handicapped blind at the Hazard Unit. Additionally, precast cubic yards of cement were hauled to the refuge from the prison for future placement as riprap along the refuge sea wall.

Another project at the Hazard Unit was the installation of pit blinds at hunting sites 7, 8 and 9. At the H7 handicapped blind site, a single two-person pit blind was placed adjacent to, and at the same elevation as, the existing ramped blind, providing room for two more hunters in addition to the two-person ramped (wheelchair accessible) blind. Additionally, two pit blinds were placed at both sites 8 and 9. The fiberglass pit blinds were purchased from Fiber-Tech Engineering, Inc., at a cost of $673.00 each. By the time you add in transportation and installation costs, each blind costs somewhere in the neighborhood of $750.00, meaning a $1,500 investment for each hunting site where two pit blinds are installed. More than $4,500 was invested in pit blinds for the hunting program in 1991.

In another project, the drainage ditch along Garst Road was enlarged with the dragline. The improved drain, which terminates at two lift pumps at the Alamo River, enhances management capability to dewater Hazard ponds 1A through 6. The dozer was also used in the project to build an access corridor for the dragline to work from. Since the project area included the county right-of-way along Garst Road, it was necessary to obtain a permit for the project from Imperial County.

Another significant project was the landscaping of the front yard of the manager's residence next to headquarters. The landscaping project consumed several hundred hours of combined effort from refuge staff, YCC crew, and the McCain Valley Conservation Camp crews. The primary aspects of the project included forming and pouring concrete edging to landscaped areas, rearrangement of sprinklers and related plumbing, installation of drip lines, planting native plant species, and placement of sand and rocks (see Table F.6 for plant list). The project will be completed as the availability of staff time permits.

3. Major Maintenance

A major boundary signing effort was initiated in 1991 to post the correct refuge boundary at Unit 1. Most of the area involved was flooded by the rising waters of the Salton Sea several years ago, and is situated in the vicinity of the New River west of Bruchard Road. In 1976, the description of lands involved in the lease agreement with the Imperial Irrigation District (IID) was modified to use sections rather than the shoreline in delineating the legal description of the refuge boundary. As a result, the boundary changed, but the revised boundary was never posted.

With the assistance of a survey crew from IID, the northeast and northwest corners of section 23 of Unit 1 were established, on either east and west sides of the New River, respectively. The remainder of the signing project,

working south from the northwest corner and then west from the corner within Bruchard Bay, remains to be completed.

Equipment Operator Orozco pushing concrete rip-rap along face of HQ Pond 3 to help reduce wave erosion. This dike separates the unit from the Salton Sea in background. WRR 04/12/91

The posting project involves a crew of four working out of the Lowe workboat, sometimes with a person on shore with a radio lining up the crew. Two crew members steady the boat while the other two use a post pounder to drive in a metal "C post" and bolt on additional segments of post to achieve the appropriate height. The posting process ranges from being a little difficult in shallow water to being extremely difficult in deep water; some areas exceed 8 feet in depth. Additionally, several hunt blinds located within the current boundary were posted with informational bulletins concerning the correct refuge boundary and have been left in place to provide roosting and nesting habitat for migratory birds.

In another maintenance project, a minor flood event caused significant damage and quite a stink when the Refuge Manager's residence was flooded by a backed-up septic system in May. Sometime over the Memorial Day weekend, while no one was home, a faucet was left on in the public restrooms at headquarters, adjacent to the residence. The excess water caused the system to back up, flooding the residence, ruining the carpet and several personal items. The carpet was replaced with 8610 funds in the amount of $2,738. Automatic shut-off faucets were installed in the restrooms and a valve was installed in the drain system to prevent any future backups from inundating the residence.

A variety of ditch repairs were made to the cement irrigation ditch system at Unit 1. In addition to problems resulting from age, the Unit 1 ditches seem to be susceptible to ground movement, likely from seismic activity. Repairs included an expenditure of $1,750 for Merrill Corporation to replace or repair several sections of cracked concrete. Many more repairs, or wholesale replacement, will be needed to remedy the problems of the aging ditch system.

In addition to numerous "routine" service jobs, the aging fleet of refuge vehicles and equipment received the following repairs: the 1985 Jeep Cherokee received a new carburetor, rear hatch cylinder, 4-wheel drive lever and tuneup, totaling $550.40; the 1979 Dodge 4X4 pickup experienced electrical problems and received a variety of related repairs, totaling $527.90; the 1974 GMC Dump Truck received a new air brake pot and release valve, maxie brake unit, stop light valve, and exhaust manifold, totaling $838.31; the 1978 service truck received a tuneup and had a new two-speed axle unit installed, totaling $839.00; the 1986 dodge pickup had its transmission rebuilt for $650.00; the 1979 Unimog received a new hydraulic pump for $600.00; the D-7 caterpillar received a new air conditioning compressor and belt for $550.00; the 1989 Chevy Blazer had a front end alignment and two new windshields installed, totaling $764.88; the John Deere 4630 farm tractor received new radiator belts, batteries, side screens, a pan gasket, an air conditioning compressor and A/C system recharge, rear main seal, and starter solenoid, totaling $2,306.51; and, the International backhoe (a.k.a."grandpa") had its generator replaced with an alternator for $350.00. All together, these maintenance repairs come to $7,977, and that total does not include costs for "routine" maintenance items such as oil and filter changes, lubes, etc. Yes, new equipment costs money, but so does maintaining an ageing equipment fleet.

4. Equipment Utilization and Replacement

The premier event in this category was the delivery of our new Case Model 580 turbo backhoe/front end loader. This new unit provides a quantum leap improvement to refuge maintenance operations requiring a backhoe. Features include a closed cab with air conditioning, which really improves the creature comfort level for the operator during our long, hot summers.

Several additional pieces of surplus military equipment were acquired from Navy and Marine Corps bases on the coast. Acquisitions in this category include a 32 foot flat bed trailer, two 10 ton diesel truck tractors, and a flat bed dump truck. One of the truck tractors was transferred to Bear Lake NWR, and work has begun to convert the flat bed dump truck into a service truck to fuel and service equipment in the field. While the acquisition of surplus military equipment remains a viable means of acquiring equipment, the process can be a double-edged sword if the surplus equipment requires a good deal of staff time and expenditures in parts to make it operational. It is always a challenge to find good surplus equipment that can assist in meeting equipment needs!

6. Computer Systems

The refuge computer system was upgraded with the acquisition of a new microcomputer and two new printers. A Unitron 386/25C microcomputer with graphics board and color monitor was acquired at a cost of $1,776. Two printers, a Brother dot matrix 19246 and a Hewlett Packard Deskjet 500, were acquired at a total cost of $1,198.

Previously, the station had two microcomputers, but only one printer, a situation where demand for the printer frequently exceeded availability. The updated system provides two complete stations, whereby the Administrative Support Assistant can work on the budget while other staff members vie for time on the other station. With our busy workloads, this station needs one more microcomputer station to meet our computer needs adequately.

When the new additions to our system were received, one microcomputer and our old printer were transferred to Tijuana Slough NWR over on the coast. In return, a laptop system was transferred from "TJ" to Salton Sea, primarily for applications in support of the biological program.

8. Other

Equipment certification training was conducted January 29-31 at Salton Sea NWR. Refuge staff, combined with staff from Tijuana Slough NWR, California State Parks and the Cooperative Farmer's equipment operator all went through certification training on the farm tractor and backhoe/loader. Additionally, some staff also were certified on the large Hough loader and the forklift. Our appreciation to Dale Green from Klamath Basin and Delvan Lee from Stillwater for conducting a good training session.

## J. OTHER ITEMS

1. Cooperative Programs

Several cooperative habitat enhancement projects with the Imperial Irrigation District (IID) were initiated, including Morton Bay, Bruchard Bay, and Trifolium 1. All properties are currently owned in title by the IID, however, the properties are within the identified Salton Sea Refuge boundary. The benefits derived from these proposals include habitat development for endangered species including the Yuma clapper rail and desert pupfish, and for California species of special concern such as gull-billed terns and black skimmers. The proposals requested assistance from the IID in construction of these projects, with the U.S. Fish and Wildlife Service obtaining these properties within their long-term lease with the IID (see Section C.3). Several coordination meetings with the IID have occurred in order to insure that goals and concerns of both agencies were addressed. The proposals were well-received and habitat enhancement activities are scheduled to occur sometime in the next year. As a result of these possible cooperative projects, the IID submitted a Drain Maintenance Plan for these and other areas, and formal consultation was initiated with the Enhancement Field Station in Laguna Niguel because of endangered species occurrence (see Section D.4).

3. Credits

This Narrative Report was written as a combined effort by the refuge staff. The following staff members took the lead in developing the segments listed: Ken Voget (segments E5, E8, J2, K and portions of F); Bill Radke (segments D5, D7, Fl, F2, Gl, G2, G3, G4, G5, GlO, G11, and E7); Dan Dinkler (segments El, D2, D3, E4, E5, F4, F7, F9, FlO, Fll, H, I and J3); Chris Schoneman (segments E2, E3, and F2); Skeeter Schultz (segments D5, G3, G6, G14, and G17); Marcia Radke (segments C, D4, D5, E7, F6, G7, G16, G17 and Jl). This report was edited through a combined staff effort. Individual staff members

drafted their segments on the word processor. Dan Dinkler and Sandi Harris organized and compiled the report. Photographs are credited in the text of the report.

## K. FEEDBACK

This report is dedicated to the memory of Cynthia Voget, who was tragically killed near the refuge in an automobile accident on December 19, 1991.

REVIEW AND APPROVAL

COACHELLA VALLEY NATIONAL WILDLIFE REFUGE

THOUSAND PALMS, CALIFORNIA

ANNUAL NARRATIVE REPORT

CALENDAR YEAR 1991

E Clark Bloom
Refuge Manager

2/1/93
Date

Refuge Supervisok Review

6/8/93
Date

Regional Office Approval

Date

# COACHELLA VALLEY NATIONAL WILDLIFE REFUGE

## THOUSAND PALMS, CALIFORNIA

## ANNUAL NARRATIVE REPORT

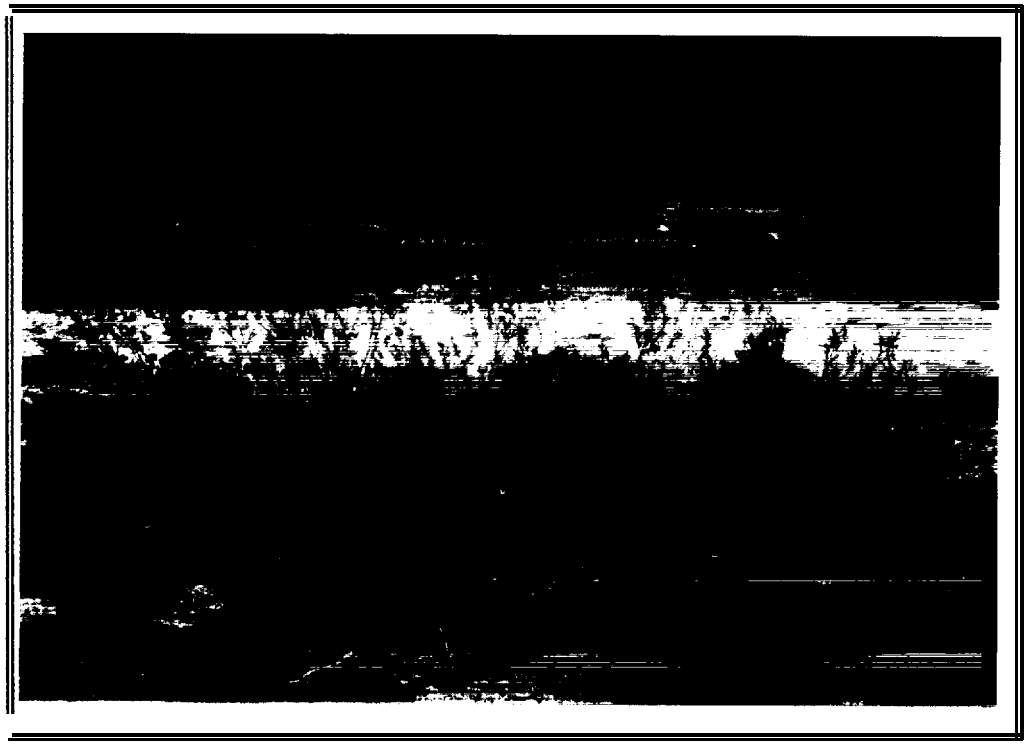
## CALENDAR YEAR 1991

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

## INTRODUCTION

The 3,074-acre Coachella Valley National Wildlife Refuge is located about ten miles east of Palm Springs in the heart of southern California's rapidly developing Coachella Valley. In passing the Endangered Species Act of 1973, Congress recognized that threatened and endangered plants and wildlife have educational, scientific, recreational, historical, and aesthetic values and should be preserved as part of the nation's natural heritage. Established in 1985 as part of the 19,000-acre Coachella Valley Preserve, the refuge protects critical habitat vital to the survival of the federally threatened Coachella Valley fringe-toed lizard (Uma inornata), an animal having an extremely restricted geographic range.

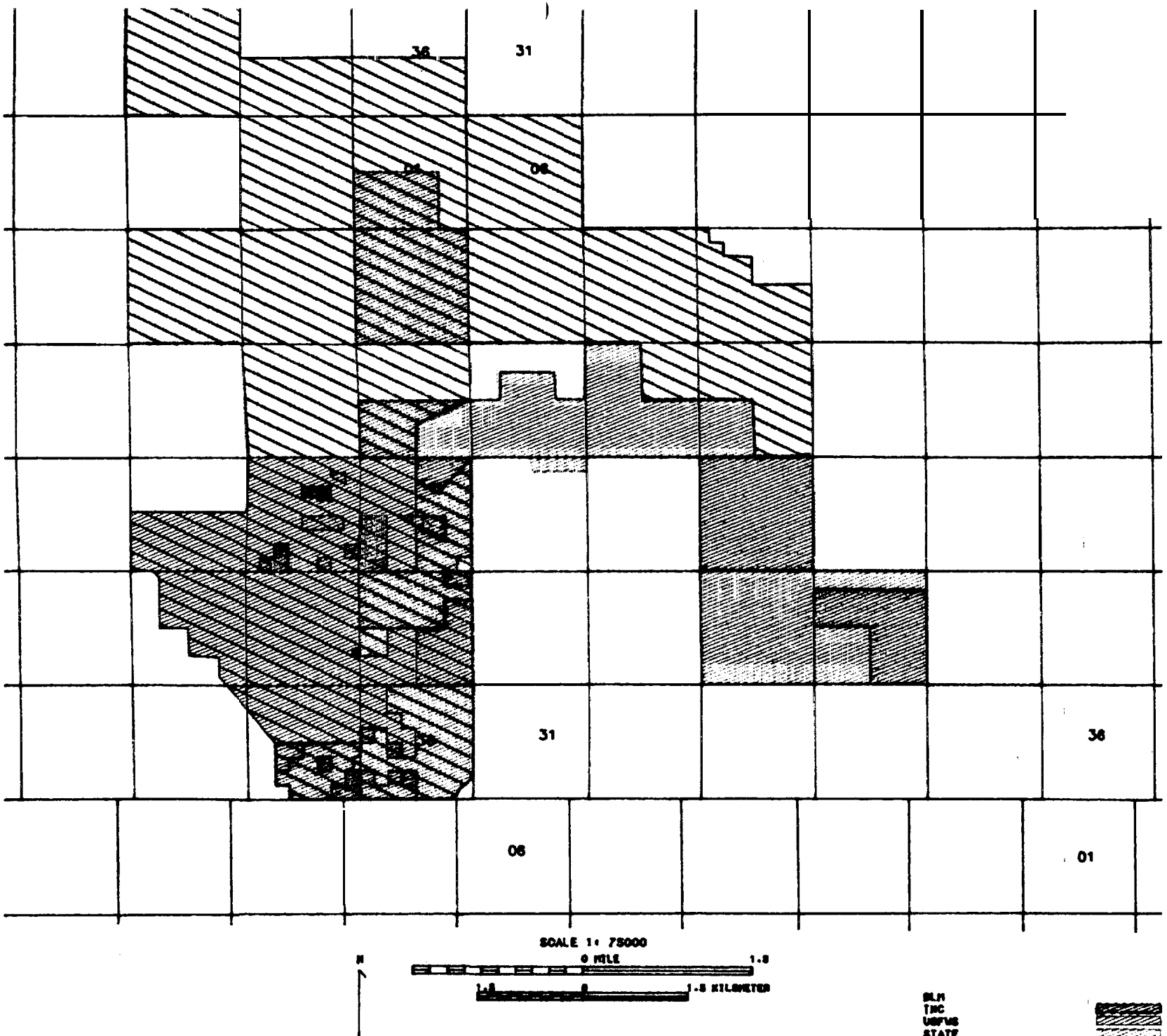
The Preserve is jointly managed by the U.S. Fish and Wildlife Service, Bureau of Land Management, California Department of Fish and Game, California Department of Parks and Recreation, and The Nature Conservancy (TNC), with each of these organizations owning various parts of the Preserve, The day-to-day management of the area is performed by a Preserve Director funded by TNC, with management directions provided by a Management Committee made up of representatives from each of the agencies mentioned. Policies governing a given part of the Preserve are ultimately the responsibility of the agency or association owning that parcel of land.



The Indio Hills provide a backdrop to the recently acquired Brick property and Coachella Valley NWR's aeolian sand ecosystem inhabited by fringe-toed lizards and other desert wildlife. 1/23/91 WRR

Because of the expanding human population in the valley, the Preserve is essential in protecting an array of desert ecosystems threatened by human development. The Preserve's ecosystems include native palm oasis woodlands, perennial desert pools and streams, and wind-blown sand dunes. The numerous palm oases are sustained by water made available through fractures in the bedrock along the San Andreas Fault, which bisects the Preserve. Impervious clay layers hold some of this water on the desert surface, providing habitat for federally endangered desert pupfish (Cyprinodon macularius) and numerous other species. Periodic flash floods from the Little San Bernardino Mountains provide waterborne sediments which are then sorted by the wind to create an extensive system of sand dunes. It is these isolated dunes which are necessary for the survival of the fringe-toed lizard. In addition to the Coachella Valley fringe-toed lizard and the desert pupfish, the Preserve provides habitat for several federal candidate species and a wide array of plant and wildlife species.

Although legally protected, Preserve lands remain threatened by flood control issues and illegal activities such as off-road vehicle use, equestrian use, indiscriminate shooting, and dumping. As one of the few desert "open areas" remaining in the Coachella Valley, the Preserve attracts significant visitor use, some of which is not compatible with refuge objectives. There are many recreational opportunities in the Preserve, however, because the Preserve encompasses lands under the jurisdiction of several agencies, rules and regulations concerning recreational and other activities vary from one area to the next. Therefore, activities allowed in other parts of the Preserve may not be allowed on refuge lands.




COACHELLA VALLEY PRESERVE – LAND STATUS

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## I. INFORMATION PACKET · · · (inside back cover)

## A. HIGHLIGHTS

Imperial Irrigation District upgrades a powerline on the refuge closely following guidelines to prevent take of fringe-toed lizards, then blatantly breaks the law by constructing a road across another area of the refuge. (Section C.4 and Section H.17)

The Coachella Valley fringe-toed lizard Habitat Conservation Plan begins to receive Service evaluation and scrutinization. (Section C.6)

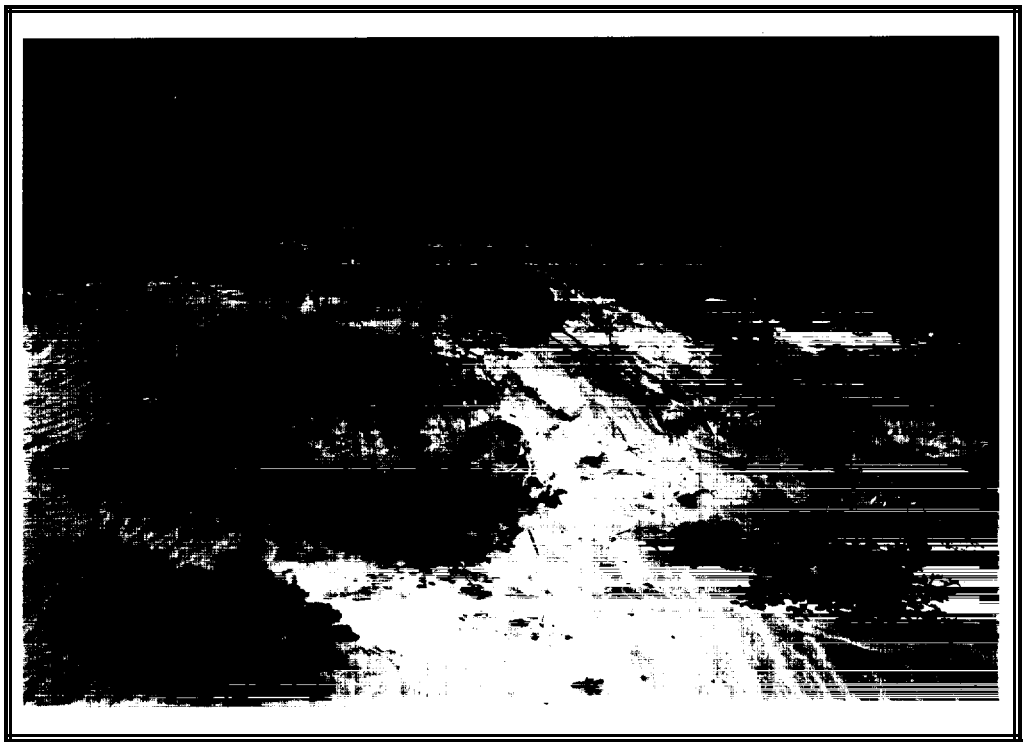
Linear regression analysis shows fringe-toed lizard populations declining sharply on every Preserve transect since 1986. (Section G.2)

A public hiking and equestrian trail is completed on refuge land. (Section H.16)

The Service enters into a complicated settlement agreement with Ivey Ranch Country Club over an alleged trespass and Endangered Species Act violation. (Section H.17)

Jerold Segall is successful in having his property withdrawn from the Preserve boundary and in having it rezoned. (Section H.17)

## B. CLIMATIC CONDITIONS



Increased winter and spring precipitation helped produce an abundance of desert wildflowers during 1991, including these sand verbenas.
4-16-91 WRR

Weather conditions in the Coachella Valley are typical of the southern interior desert with mild winters and extremely hot summer temperatures normally exceeding 110°F. The summer of 1991 was relatively mild with average maximum temperatures in July and August of 105°F and 104°F respectively. Between 7 April and 19 October (first and last days of lOO°F or greater for the year: total 196 days) 110 days had maximum temperatures of lOO°F or greater. The hottest temperature of the year was 116°F on 2 July and the coldest temperature was 32°F on 1 January.

Rainfall for the year was 5.5 inches, a full 140% greater than the 33 year long term average of 3.94 inches per year. December through March are usually the wettest months in the Coachella Valley. The table below summarizes weather data for the year.

Table 1. Coachella Valley NWR Weather Summary 1991*

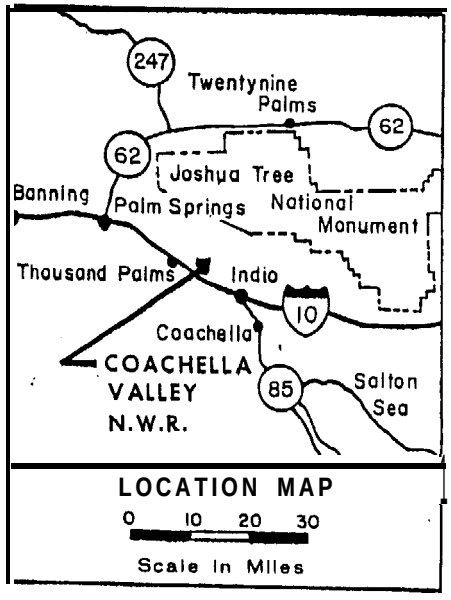
| MONTH | PRECIPITATION (inches) | TEMPERATURE °F maximum | /average | minimum | /average |
|---|---|---|---|---|---|
| January | .50 | 72 | 65 | 32 | 43 |
| February | 1.16 | 84 | 77 | 40 | 50 |
| March | 2.73 | 80 | 69 | 42 | 50 |
| April | 0 | 102 | 85 | 54 | 59 |
| May | 0 | 105 | 89 | 50 | 63 |
| June | 0 | 105 | 99 | 60 | 72 |
| July | 0 | 116 | 105 | 70 | 79 |
| August | 0 | 112 | 104 | 70 | 80 |
| September | .32 | 106 | 99 | 66 | 75 |
| October | .05 | 106 | 92 | 46 | 69 |
| November | 0 | 90 | 74 | 38 | 49 |
| December | .74 | 68 | 62 | 38 | 45 |

* Weather data gathered at Thousand Palms by Riverside Co. Flood Control and Water Conservation District.

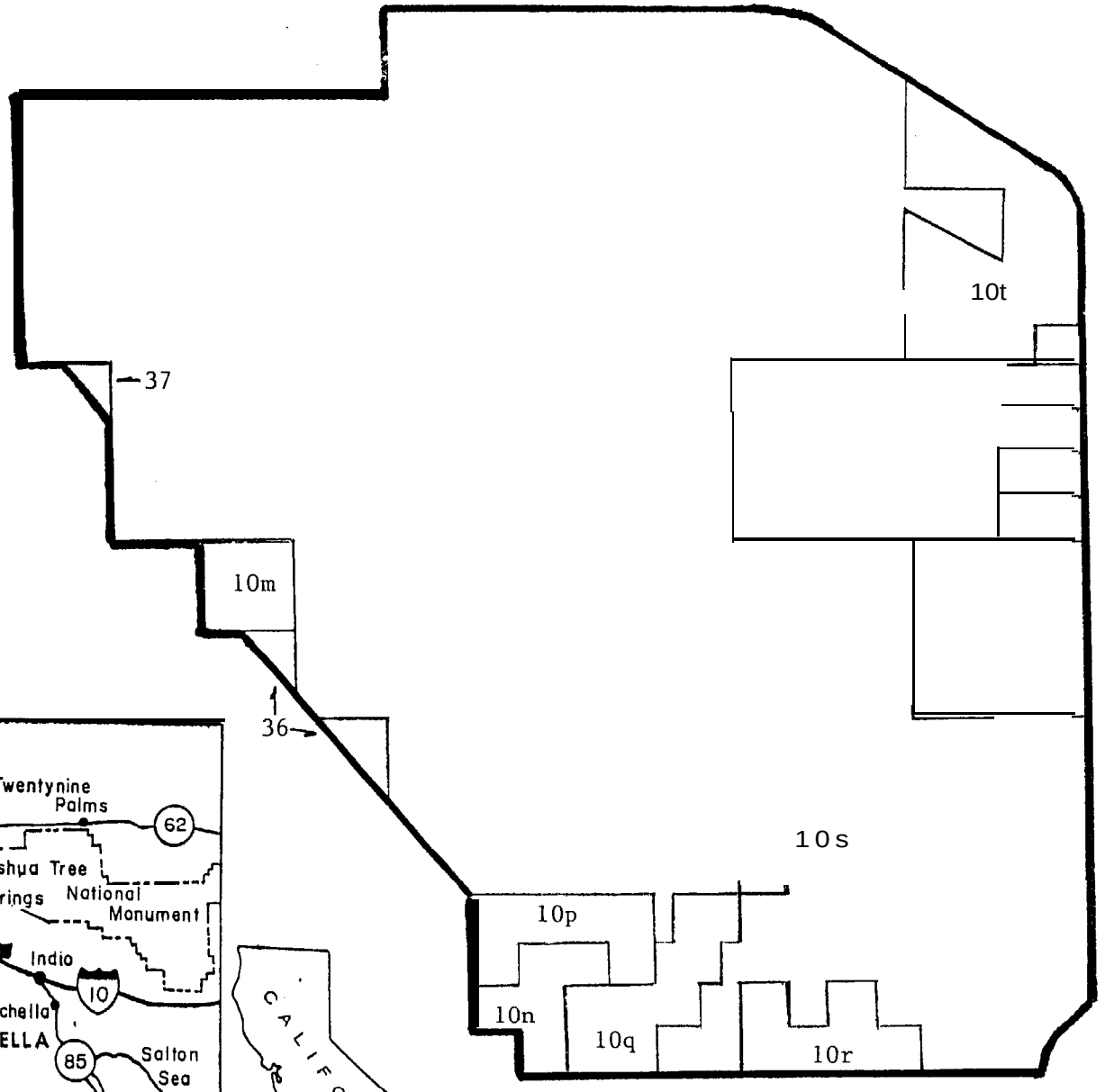
## C. LAND ACOUISITION

### 1. Fee Title

Refuge fee title lands increased to 3,074 acres by the end of 1991, through the transfer of a large number'of lands held by The Nature Conservancy. In addition, a complicated land trade with an adjacent developer was finally resolved in November after having been before Congress since 1988. This trade eliminated the stair step effect of the southwest Preserve boundary and aligned the boundary with prevailing winds to secure wind-blown sand transport. The action will help restore fringe-toed lizard habitat to about 160 acres of refuge land. (see attached map of 1991 acquisitions).







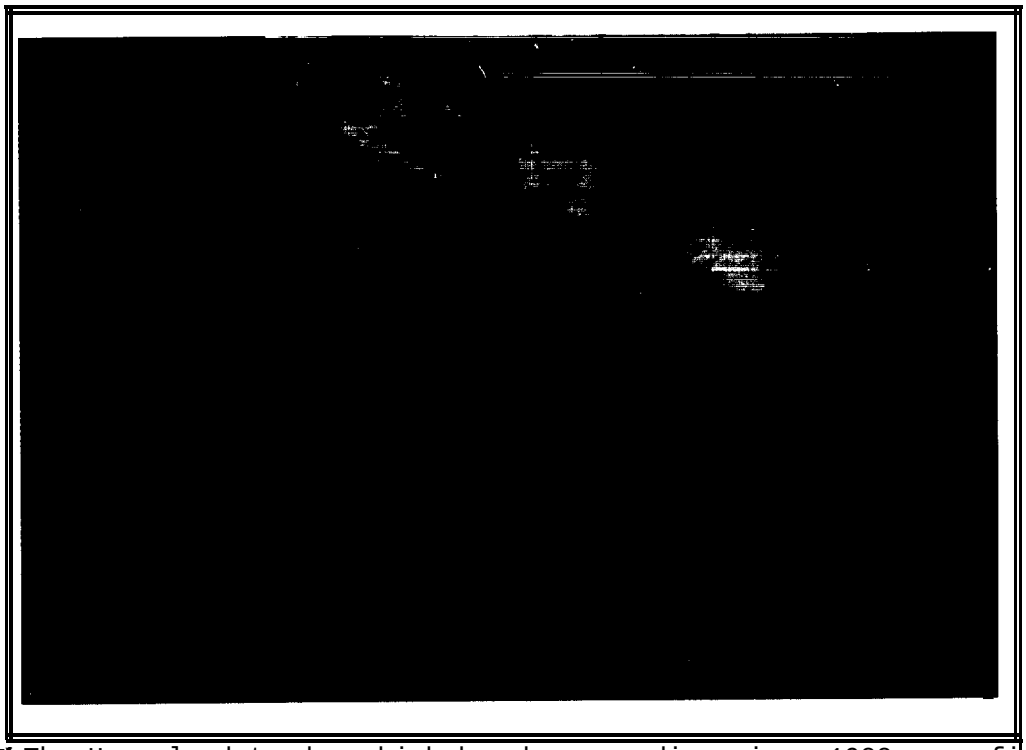

1991 Acquisitions

| Tract # | Owner | Acres |
|---|---|---|
| 37 | Ivey Ranch | 6.5 |
| 36 | Hawn | 15 |
| 10m | Brick | 40 |
| 10n | Safari Dunes | 50 |
| 10P | Applegate/Draper/ King | 50 |
| 10q | Diaz/Giesler/ Pacific Tractor/ Rumwell/Schwartz | 80 |
| 10r | Cathton IV/Yoon | 60 |
| 10s | Goodwin | 10 |
| 10t | Cathton IV | 172 |

TOTAL: 483.5

# COACHELLA VALLEY NATIONAL WILDLIFE REFUGE

**RIVERSIDE** COUNTY, CALlFORNIA



The Hawn land trade, which has been pending since 1988, was finally resolved to acquire this 9-acre corner and another 6-acre parcel.

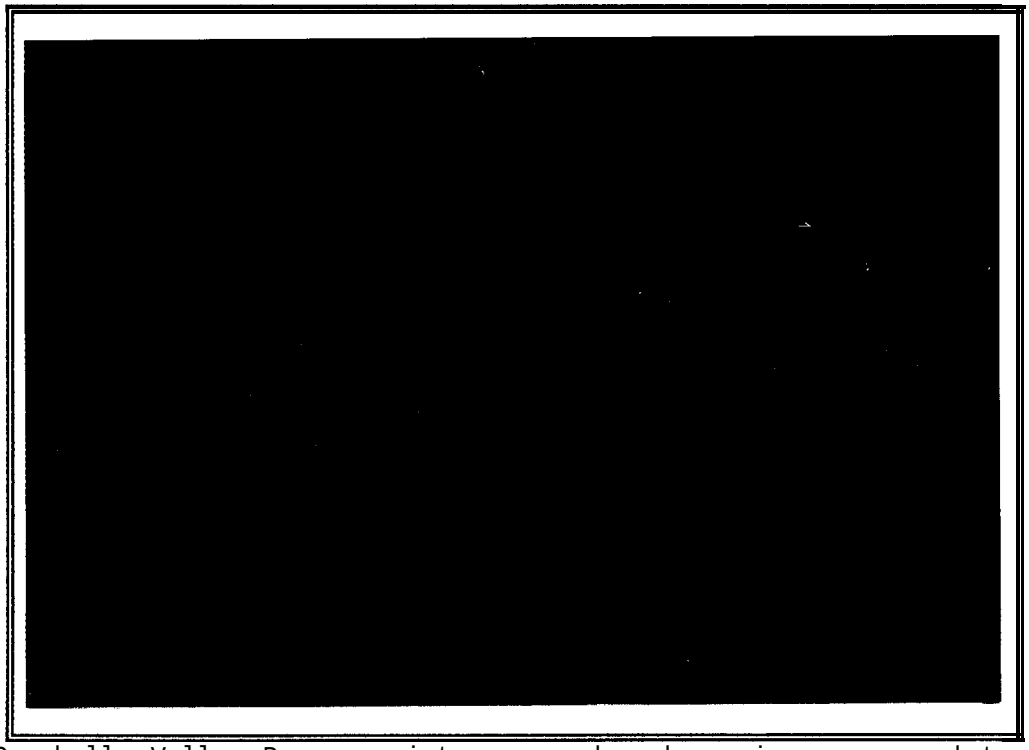
11-15-91 WRR

D. PLANNING

2. Management Plan

All management activities on the refuge are guided by a number of documents including the Coachella Valley National Wildlife Refuge Environmental Assessment (April 1985), the Coachella Valley Fringe-toed Lizard Habitat Conservation Plan and Implementing Agreement (June 1985), the Coachella Valley Fringe-toed Lizard Recovery Plan (1984), and the Coachella Valley Preserve System Management Plan (July 1986).

The **Coachella Valley Fringe-toed Lizard Recovery Plan** was published by the Service in 1984. The primary objective of the plan is to minimize further decline of the species and habitat degradation by securing areas that maintain viable, self-sustaining populations. The recovery plan identifies the following actions needed to preserve the Coachella Valley fringe-toed lizard and its habitat: 1) Secure habitat for preservation of the species. 2) Study the biological requirements of the animal. 3) Monitor the fringe-toed lizard population to determine trends. 4) Study the effects of habitat modifications on fringe-toed lizards. 5) Study the feasibility of restoration of the animal's habitat through rehabilitation. 6) Develop and provide public information and education programs to further awareness and support for preserving fringe-toed lizards. 7) Enforce existing laws and regulations protecting these animals and their habitat.



Coachella Valley Preserve interagency boundary signs are used to post refuge land instead of the traditional "blue goose sign" to keep Preserve signing consistent among the five agencies. 4-23-91 WRR

The **Coachella Valley Preserve Management Plan** establishes guidelines for management actions to "insure protection of resources contained within the Preserve." The ten long-term goals identified in the plan are as follows:

1) Maintain and enhance the natural condition of all lands within the Coachella Valley Preserve System.

2) Restrict vehicle access within the Coachella Valley Preserve System to the minimum number of routes needed to service authorized right-of-ways and private land.

3) Remove all exotic plant and animal species where and when feasible to the benefit of native species.

4) Restrict the use of firearms on all lands within the Coachella Valley Preserve System.

5) Remove abandoned buildings; vehicles, and debris.

6) Establish hiking and equestrian trail systems through the major habitats of the Coachella Valley Preserve system, and locate equestrian trails outside sensitive habitats such as palm oases and sand dunes.

7) Provide the public with information on the resources, origin, and cooperative nature of the Coachella Valley Preserve System.

8) Monitor the sensitive biological components contained within the Coachella Valley Preserve System.

9) Make the Coachella Valley Preserve System available for use by researchers.

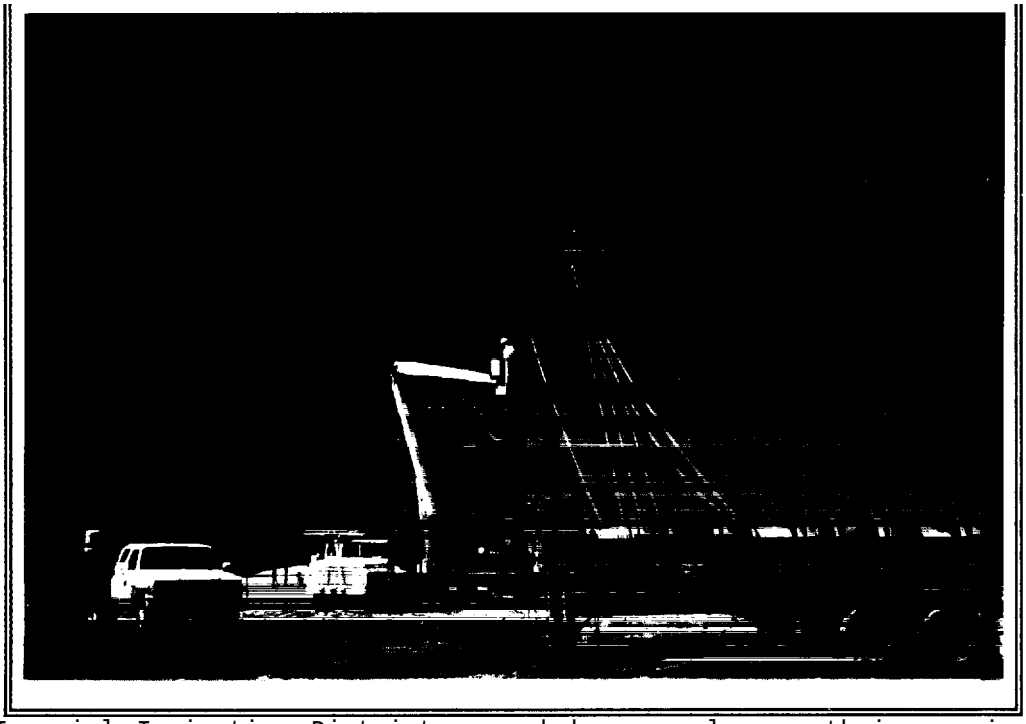
10) Provide refugia for endangered species of native plants and animals which occur in similar habitats.

Management meetings with representatives from each agency were held five times during the year to coordinate activities on the Preserve. The chairmanship of the Management Committee rotates among all the agencies, with the Bureau of Land Management representative acting as chairman during 1991. Following discussions with Riverside County Supervisor Patricia Larson, a decision was made in December to have a representative from the Supervisor's office begin attending management committee meetings in 1992 to provide increased communication and allow a better dialog for mutual problem analysis.

4. Compliance with Environmental and Cultural Resource Mandates

A meeting was held 10/17/90 between the Imperial Irrigation District (IID) Power Division Distribution Superintendent and a Service Enhancement Biologist concerning existing and proposed IID powerline facilities within a portion of the refuge. A subsequent meeting was held between IID representatives and the Coachella Valley Preserve Management Committee on 01/15/91 to discuss this same subject. On 8/22/91, because of inaction on the part of Enhancement, refuge personnel issued a Special Use Permit (SUP) which authorized IID to upgrade an existing powerline located on an IID right-of-way within the refuge. The SUP specifically did not exempt IID or its contractors from applicable laws, rather, special conditions were identified in the permit which set forth a procedure for allowing completion of the powerline upgrading project while at the same time minimizing habitat alterations, establishing mitigation, and preventing "take" of Coachella Valley fringe-toed lizards. The upgrading project authorized by the SUP included extensive monitoring by refuge biologists, with a final inspection conducted 10/09/91 following completion of the project across the refuge. Subsequent activity by IID and its contractors across a portion of the refuge not covered by the SUP led to law enforcement actions (see H.17).

Work began in 1989 on a Section-7 Consultation to allow public hiking and equestrian access through the southern part of the Preserve. A draft Biological Opinion was completed in February 1990 which would restrict trails to the western perimeter of refuge lands. A final Biological Opinion was issued in June 1990, and trail construction was completed in November 1991, though not without conflict (see H.16).



Imperial Irrigation District upgraded powerpoles on their previously existing right-of-way across refuge land after securing the necessary SUP and accompanying restrictions to prohibit "take" of fringe-toed lizards. 9-16-91 WRR

During November, refuge personnel initiated a Section-7 Consultation with Laguna Niguel Field Station biologists to allow construction of a block wall on the common boundary between refuge lands and Ivey Ranch Country Club lands. The Consultation resulted from a request by Ivey Ranch to straddle the boundary with equipment in order to dig a footing for the wall. Ivey Ranch has since experienced financial difficulties and has dropped plans for construction while at the same time trying to sell their undeveloped property (see H.17).

Although cultural resource mandates were met during 1991 on Preserve lands owned by other agencies, cultural resource concerns are not likely to occur on refuge lands. Intermittent seasonal gathering of mesquite beans by Cahuilla Indians is likely to have occurred in the refuge area, but because the area is subjected to intermittent flooding and heavy wind-blown sand transport, it is unlikely that Native Americans using the area for gathering would have erected any permanent shelter there. No indication that such settlement would have occurred has been found to date on refuge lands.

5. Research and Investigations

Coachella Valley NR90 - "Survival and Ponulation Recruitment of Hatchline; Coachella Valley Fringe-toed Lizards on Coachella Valley NWR" (11632-9001)

The Coachella Valley Preserve System Management Plan identifies a need to determine fringe-toed lizard habitat needs, reproductive needs, reproductive success, causes for population fluctuations, and population status. To help investigate these questions, Wildlife Biologist Radke and TNC Southern California Area Manager Cameron Barrows initiated a research project in 1990 to further identify the population dynamics of the Coachella Valley fringe-toed lizard. Objectives are to: 1) evaluate fringe-toed lizard population dynamics and viability, 2) determine survival and recruitment of hatchling fringe-toed lizards and identify predation pressures or other mortality causes, and 3) determine population dynamics in various habitat types.

Methods involved counting lizards on two refuge transects and one transect at the Willow Hole Preserve, each surveyed six times between 9/17 - 10/2. The ratio of adults/hatchlings during autumn will be compared with next year's springtime ratio to determine hatchling recruitment. A better knowledge of fringe-toed lizard population densities and appropriate carrying capacities of various habitats will be useful in managing refuge lands for this species. Recruitment cannot be documented until transects are surveyed during spring 1992, but recruitment from 1990 to 91 appeared extremely poor.

Table 2. Number of CVFTL Adults/Hatchlings During October 1991.

| TRANSECT | ADULTS | HATCHLINGS |
|---|---|---|
| Willow Hole | 27 | 43 |
| CVP #2 | 29 | 143 |
| CVP #4 | 19 | 61 |
| TOTALS | 75 | 247 |

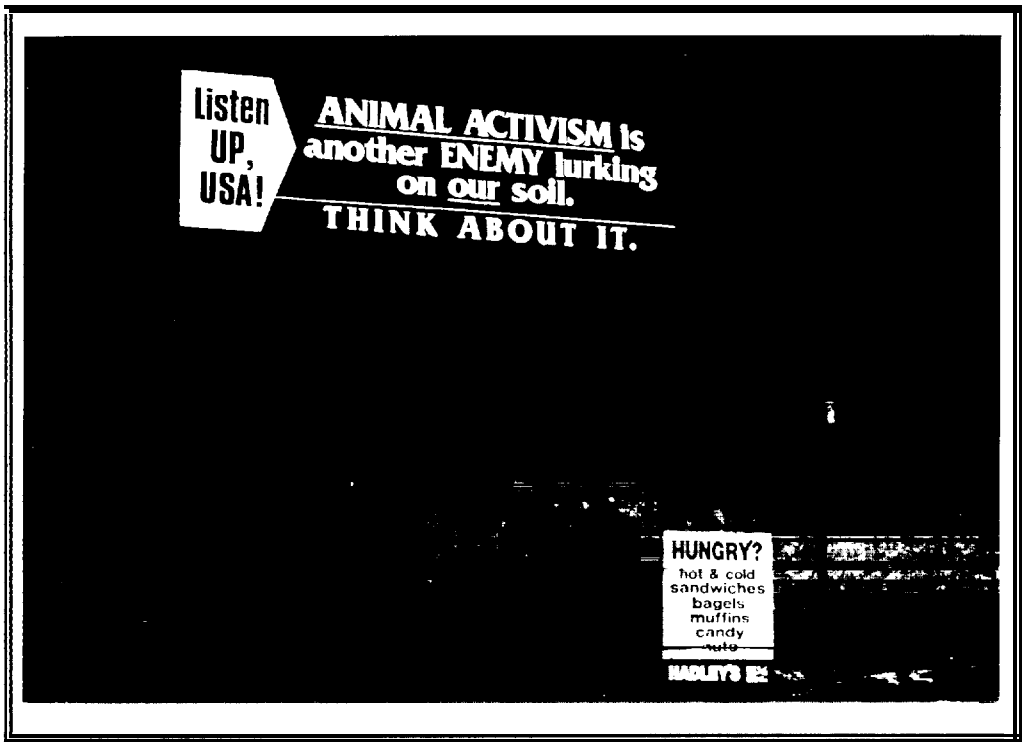
6. Other

**Coachella Valley Fringe-toed Lizard Habitat Conservation Plan**

On September 25 1980 (Federal Register 45:188), the Service listed the lizard as threatened under the Endangered Species Act. In a similar action, the California Department of Fish and Game (CDFG) listed the lizard as endangered in June of 1980 but has since proposed downlisting the species to threatened - perhaps prematurely. The federal Endangered Species Act prohibits "taking" of threatened and endangered species. "Take" means to pursue, hunt, shoot, wound, kill, trap, capture, collect, harass, or harm; or attempt any of these activities. Because the lizard is

intimately associated with its habitat, virtually any activity which disturbs or destroys habitat will almost certainly destroy individual lizards. Such protection resulted in a conflict between Endangered Species Act objectives and local land use controls.

In 1983, a joint committee of federal, state, and local agencies was formed to work with developers and environmental groups to develop a strategy for addressing the problem. The Nature Conservancy (TNC) took the lead in bringing together all interested parties and developing a Coachella Valley Habitat Conservation Plan (HCP). The purpose of the HCP was to provide a comprehensive plan for the conservation of the fringe-toed lizard and establish conditions under which the local governments in the Coachella Valley could exercise traditional land use controls, yet remain in compliance with the Endangered Species Act. In essence, the Plan divided the Coachella Valley into areas to be preserved for the fringe-toed lizard and remaining areas which can be developed. Acreage for three preserves was identified, of which an estimated 7,838-acres is occupiable habitat.




Lack of local support for wildlife protection endeavors in Riverside County are exemplified by this huge billboard along I-10 west of Palm Springs. 09/28/91 WRR

As directed by the HCP, the main goal of the preserve system is to provide a "permanently reserved habitat" for the preservation of the Coachella Valley fringe-toed lizard to assure that this species does not become extinct. Acquisitions of preserve lands were made through a combination of

federal land exchanges and land purchases using the Federal Land and Water Conservation Fund, private donations, and a mitigation fee paid by developers in the Coachella Valley. The total proposed funding required for establishing the preserves is $25 million. Fifteen million dollars are projected to come from the federal government, $2.4 million from the state, $2 million from The Nature Conservancy, and $5 to 7 million from local mitigation fees.

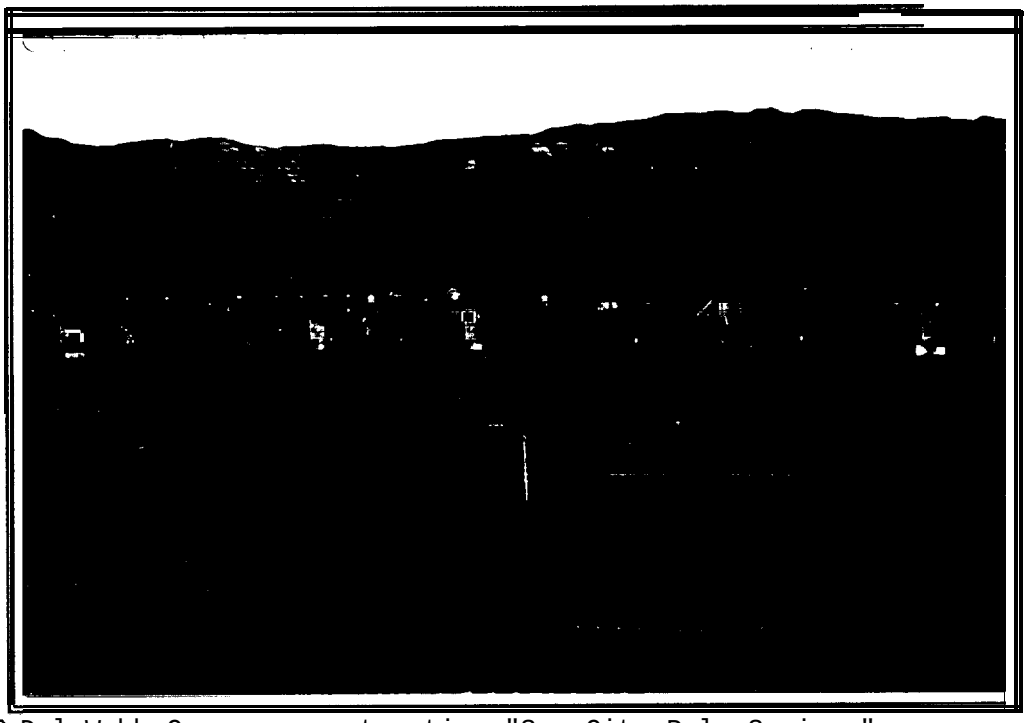
HCP goals also involved protection of the blowsand source and establishment of critical habitat, including a national wildlife refuge. The HCP protected wind corridors and sand sources outside preserve boundaries through county and city zoning actions. The HCP was signed by the Service, Bureau of Land Management, California Department of Fish and Game, TNC, Riverside County, and the cities of Desert Hot Springs, Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella. The conflict was seemingly resolved when local governments adopted the HCP and the Secretary of the Interior granted an Endangered Species Act Section 10(a) permit to allow the incidental taking of fringe-toed lizards conditioned on the implementation of the HCP. Through this permit, which was issued for a 30-year period, local government was allowed to continue their traditional regulatory authority over land use by approving development where incidental take of lizards would occur, yet still remain in compliance with the Endangered Species Act.

The Coachella Valley fringe-toed lizard HCP is often touted as a blueprint providing plans for a win:win solution serving as a model for similar confrontations throughout California and the west. However, it appears there have been a number of problems with interpretation and enforcement of the HCP and implementing agreement. Six years following implementation of the HCP and the Section 10(a) permit, it appears that the intent of these agreements has not been adequately fulfilled.

As a stipulation of the Section 10(a) permit, developers are required to pay a $600/acre mitigation fee into an endowment fund for preserve acquisition prior to receiving a grading or building permit. The fee is required for any project or activity which will disturb land, however, parcels within the fee area which were already disturbed by urbanization or agriculture prior to August 1982 are not subject to the assessment. Also, parcels may be developed for agriculture without a fee being assessed, however, fees must be paid when these lands are converted from agriculture to another use. Because of the difficulty in setting an appropriate inflator and because the bulk of the acquisition program was expected to occur within the first few years, no inflator was proposed. Not only is there no inflator, in fact, the opposite is true. After a total of $7 million is received, the mitigation fee drops from $600/acre to $lOO/acre.

Perhaps most serious is the lack of an adequate audit system to ensure payment of mitigation fees. Local land use authorities were supposed to demonstrate compliance with the terms of the permit by confirming that appropriate fees are paid, and in regulated areas, that actual land uses are in accordance with zoning. This information was to be provided through an annual report to the Service, however, it was recently determined that

about half of these reports were apparently never done. This raises the question whether mitigation fees were ever actually paid for much of the recent development in the Coachella Valley. Another technique apparently used by some developers which may not have been adequately enforced by local governments was to pay a fee only for portions of a project which received structures. For example, mitigation fees may not have been paid for acreage formed into golf fairways, parks, or other "open" areas even though these areas removed lizard habitat from the valley. Lands have also been cleared and graded for supposedly agricultural purposes which are really nothing more than mitigation-free land speculation. All these activities have resulted in inadequate funding being made available soon enough to purchase lands within the three preserve boundaries. Coachella Valley land prices have continued to rise, and because there was no mitigation fee inflator, lands become too expensive to purchase as part of the intended preserve. It is now abundantly clear that mitigation fees will not cover the purchase of remaining preserve lands, and unless other funding sources become available, total acquisition must be pursued through an HCP amendment process or some lands initially identified for preserve acquisition will need to be sacrificed to development.



Del Webb Company constructing "Sun City Palm Springs" on property immediately adjacent to the Preserve as authorized by the Section 10(a) permit which allowed the "incidental take" of many thousands of fringe-toed lizards in this instance. 01/29/92 WRR

Because fringe-toed lizards are restricted to aeolian sand deposits, environmental changes to this ecosystem could be extremely damaging to the species. It was recognized by the HCP authors that a less than adequate area was being established through direct land acquisition to perpetuate the blowsand ecosystem on the preserves, and that the integrity of preserve lands must be protected through zoning. Zoning sets forth permitted uses, restricting the range of activities that can be lawfully conducted. Local cities established zoning categories which were to regulate land use to achieve the goals of the HCP, and Riverside County General Plan designations were also to regulate land use in ways that coincidentally achieved the goals of the plan. Zoning was to provide interim control of habitat which was within the designated preserve boundaries, but remained to be acquired. The General Plan was also to regulate portions of the blowsand ecosystem which are necessary to sustain the natural function of a reserve by assuring an open corridor for wind and sand movement. However, county zoning and land use designation inconsistencies in reality do little to protect wind corridors, and it appears that the county has not acted in good faith to achieve the goals stated in the HCP. Very low density residential development was promised in areas to prevent shielding of sand source, however, zone classifications have been changed both outside and inside preserve boundaries, some of which allow extensive development even within designated critical habitat, The continuing reception of new sand is an indispensable ecological process as far as survival of fringe-toed lizards is concerned. It is clear that an unobstructed sand source upwind from preserve lands has been jeopardized through both city and county zoning failures.

Perhaps the easiest way for the Service to regain control over the HCP is through the 1986 Implementing Agreement. This agreement acts as a contract between the government agencies, other parties, and the Service to make provisions of the HCP explicit and enforceable. This agreement 1) establishes mitigation fees as a funding source to acquire, maintain, and manage preserve lands, 2) sets the amount and term of the mitigation fees stipulated in the HCP, 3) sets forth obligations and responsibilities of the local agencies, the Service, and TNC, and 4) sets forth the remedies available to all of the parties in the event of breach of the Section 10(a) permit, including the rights of the Service to suspend or revoke the overall permit.

Actual implementation of the HCP should include a process of management, compliance, enforcement, evaluation, and amendment to remain a viable procedure. Management of the HCP, although hampered by lack of funding, is progressive and ongoing. Preserve lands have been established and largely protected, wildlife populations are being monitored, and efforts continue to remove sand shielding barriers on preserve land. However, perhaps more attention needs to focus on research needs, public information, and active habitat enhancement and restoration.

Compliance of the HCP and implementing agreement has generally received poor followup from both local agencies and the Service, but is necessary to monitor zoning changes, record mitigation fee assessments, and supervise land use decisions. Although various entities worked together to complete

the plan, there has been little attempt since that time to monitor compliance or establish an adequate tracking system. The Service is charged with evaluating the permit by conducting a periodic review to determine whether the HCP is functioning as it was intended to function, and whether the necessary protection for the lizard is being realized. Violations in compliance with the HCP need to be identified and addressed in a timely manner before the process worsens.

Enforcement of the HCP has been limited to Service enforcement of the provisions of the Endangered Species Act, including the Section 10(a) permit. Unauthorized damage to habitat, interference with sand transport to conserved areas, or failure to pay or require fees are all violations of the Section 10(a) permit. These violations must be corrected, or the Service must at the very least implement the option to suspend or to revoke that portion of the permit which applies to the unlawful activities. Even though the Endangered Species Act should provide adequate protection for the Coachella Valley fringe-toed lizard, it is not without problems. Habitat may be destroyed, but unless the Service can prove that lizards were taken with the habitat, it is difficult to impose penalties. While legally, enforcement actions could be brought against all parties involved in an unlawful taking; the bulldozer operator, the land developer, and the city or county that permitted the action on land known to be occupied by Coachella Valley fringe-toed lizards, in reality, law enforcement has been slow or lacking.

Evaluation of the HCP has also been slow, but is now underway. Faced with the evidence of continuing fringe-toed lizard population decline, and evidence that the implementing agreement is not being adequately fulfilled, the Service has now initiated the process of reviewing the Coachella Valley HCP. Options are currently being explored to identify additional audit or monitoring measures appropriate to assure the fiscal and biological integrity of this and any future HCPs.

In the absence of complete scientific data, the cautious approach is to adopt a conservative strategy, and because of this there was a process built into the HCP to amend the document as new information becomes available. However, there has been a reluctance to re-open "a can of worms" on the part of both local agencies and the Service. Amending the HCP to get it back on track may be an arduous process but one which may be necessary. Working in concert with the amendment process is perhaps the need to suspend or revoke the Section 10(a) permit until protection of the Coachella Valley fringe-toed lizard is again guaranteed (See Section K.).

## E. ADMINISTRATION

### 1. Personnel

As a satellite to Salton Sea NWR, Coachella Valley Refuge is operated as a collateral responsibility by personnel working in Calipatria. During 1991, Salton Sea Refuge personnel visited Coachella Valley NWR on 68 days,

primarily for biological surveys, research activities, maintenance, and law enforcement.

2. Youth Programs

The Salton Sea Youth Conservation Corps crew spent four days at Coachella Valley NWR constructing fence braces and erecting 3-strand barbed wire fence along previously unfenced refuge boundary along the southwest side of the Preserve. About one mile of fence was constructed with YCC assistance.

4. Volunteer Program

TNC employees Cameron Barrows, Carol Jacobsen, David Mathews, and others assisted Service personnel in constructing about 1.5-miles of boundary fence along the newly aquired Ivey Ranch parcel, Hawn property, Safari Dunes property, and Brick property. Bureau of Land Management provided most of the fence materials.

5. Funding

Salton Sea NWR receives funds for management of the Coachella Valley NWR from a management endowment fund managed by The Nature Conservancy for the Preserve (See Section D.4). Once the full endowment fund is established at about 2.5 million, the annual budget of the Preserve will be limited to interest yields from the endowment. By the end of 1990, mitigation fees remained below anticipated projections with most of the collected fees going toward land acquisition.

The refuge received $7,000 during FY90 for saltcedar removal and maintenance activities, law enforcement and research activities, biological monitoring and contaminant surveys, and to off-set administrative costs. Obviously, the funding does not meet overall refuge funds needed to meet Service commitments on the Preserve. Increasing operational, maintenance needs, and refuge committments at Coachella Valley NWR really require staffing a position specifically for the refuge.

## F. HABITAT MANAGEMENT

1. General

The Coachella Valley Preserve contains two major biological features: the large native fan palm (Washingtonia filifera) oasis and a large portion of the major blowsand ecosystem. Portions have been disturbed by human activities, but both of these communities are viable and biologically productive. Some of the disturbed areas may be gradually restored through management actions. The southern portion of the Preserve contains about 4,120 acres of occupiable habitat for the fringe-toed lizard, which are currently readily observed on about 2,600 Preserve acres.

A combination of natural features including tall, steep mountains, meager precipitation supporting relatively little vegetation, and rainfall occurring in sudden bursts to create flooding, combine to wash sand and

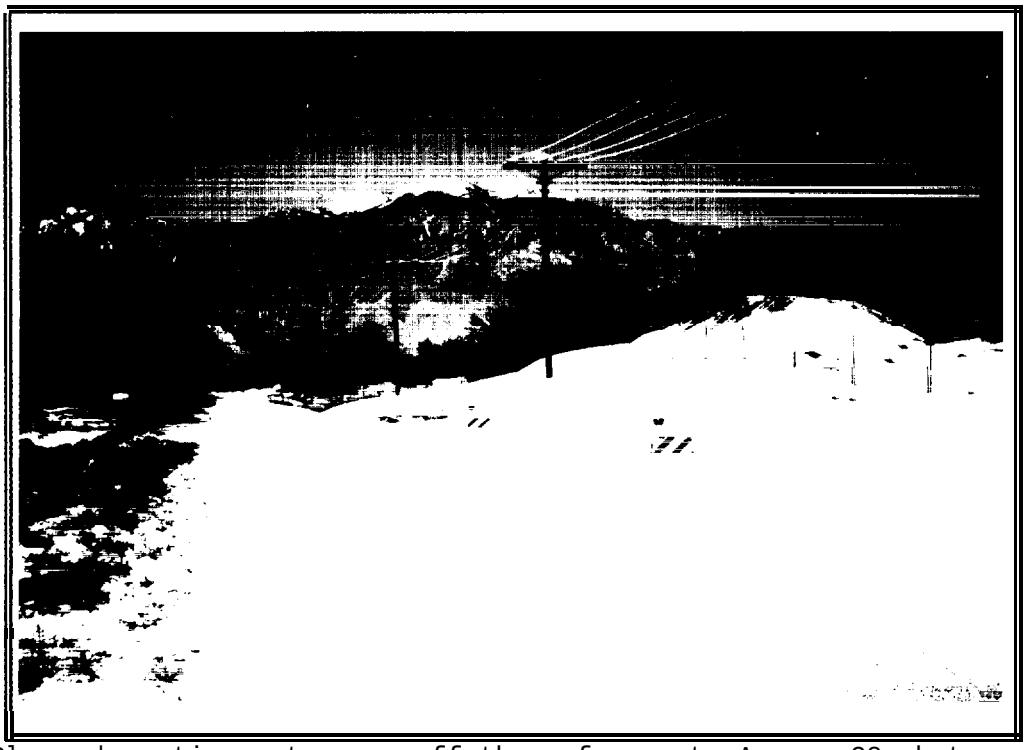
gravel from the surrounding hills into the valley. Periodic flash floods from the Little San Bernardino Mountains provide waterborne sediments which are then picked up by the valley's strong winds and sorted to create an extensive and dynamic system of sand dunes in the Coachella Valley. It is these isolated dunes upon which the Coachella Valley fringe-toed lizard and numerous other plants and animals depend. About 518 sq.km.(200 square miles) of suitable habitat once covered the Coachella Valley, however, this has been drastically reduced.

Native fan palms at McCallum Oasis provide habitat for a large number of migratory and resident birds. Ponds harbor endangered desert pupfish. 4-13-90 WRR

Within the Preserve, national wildlife refuge lands provide approximately 90% of the designated critical habitat for the lizard. Nearly all public use is precluded from refuge lands, with permitted activities restricted to research and investigation. Three major soil types with associated vegetative cover have been identified on refuge lands, these include sand dunes, sand hummocks, and sandy plains. These aeolian habitat types are present on the refuge in roughly the same proportion as they once occurred in the Coachella Valley.

Sand texture of sand dunes is fine, and wind transport is active, resulting in a very dynamic system of sand dunes shifting position over time depending on wind direction. Dune heights reach 30 feet, and have sparse vegetative cover (5-15%). Common vegetation includes honey mesquite (Prosopis elandulosa), creosote (Larrea divaricata), burrobush (Ambrosia

dumosa), sandmat (Euphorbia polycarpa), wingscale (Atriplex canescens), dune primrose (Oenothera deltoides), and others. The sand dune soil/habitat type covers about 10% of the refuge.



Blowsand continues to move off the refuge onto Avenue 38, but replenishment of this important habitat component on the Preserve has not been measured. 4-23-91 WRR

Sand texture in sand hummocks is varied, and wind transport is less active, with sand deposition and stabilization occurring in oblong "hummocks" associated with shrubs. These hummocks are usually from 2 to 5 feet high, 5 to 10 feet wide, and 10 to 20 feet long. Dominant plants include creosote, saltbush (Atriplex polycarpa), burrobush, cheesebush (Hymenoclea salsola), coldenia (Tequilia canescens), wingscale, and others. This soil/habitat type covers about 40% of the refuge.

Sand texture of sandy plains is coarse and wind transport is minor. Relief is small and plant cover is high. Common plants of sandy plains include coldenia, creosote, croton (Croton californicus), dalea (Dalea mollis), sand verbena (Abronia villosa), Coachella milkvetch (Astragalus lentieinosus coachellae), and others. This soil/habitat type covers roughly 50% of the refuge.

Plant species of special concern which may occur on refuge lands include Wiggin's croton (Croton wigginsii), flat-seeded spurge (Euphorbia platysperma) and Coachella milkvetch.

Potential lizard predators like this fledgling loggerhead shrike receive a nesting advantage in exotic saltcedar trees originally planted prior to acquisition as windbreaks. These trees are being systematically removed by refuge and TNC employees. 4-16-91 WRR

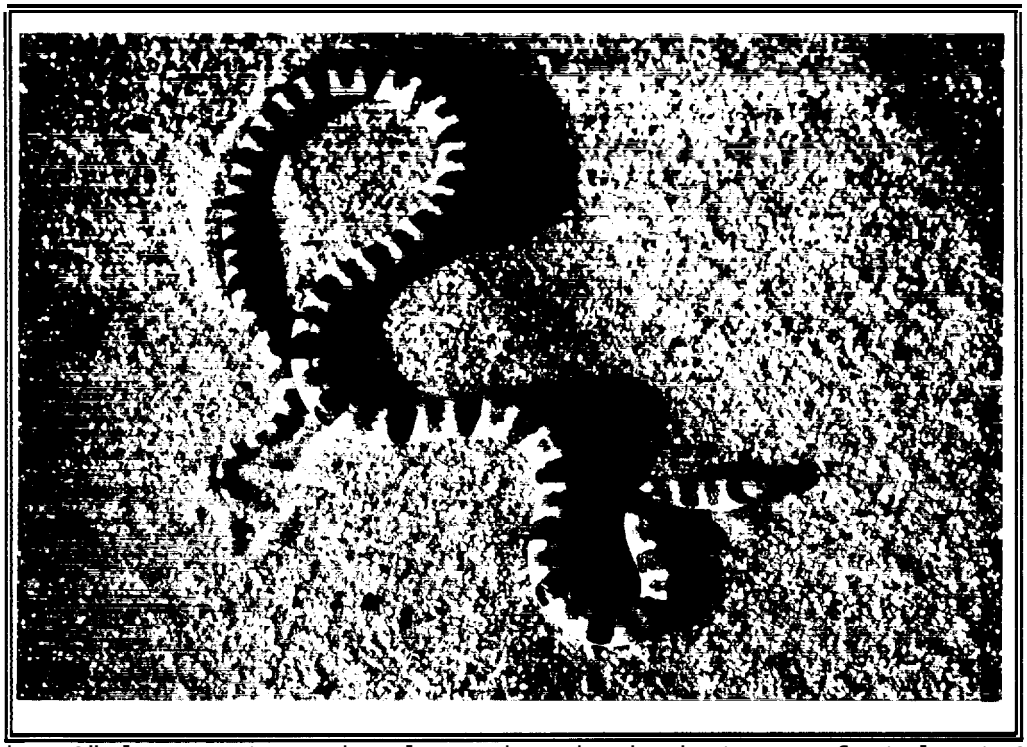
Perpetuation of the fringe-toed lizard is dependent upon the continuing renewal of windblown sand. Invasive exotic vegetation, especially saltcedar, (Tamarix aphylla), abumashi, (Schismus barbatus), and Russian thistle, (Salsola australis) are serious habitat threats. Wind shielding, by establishment of tree rows or upwind development, acts to stabilize sand dunes and eventually prevents habitat renewal, eliminating the fringe-toed lizard population.

## G. WILDLIFE

### 1. Wildlife Diversitv

Desert lands protected by the Coachella Valley Preserve support a surprising diversity of wildlife species. Many of the wildlife species are closely associated with unique habitats on the Preserve, while others are migrants taking temporary advantage of shade and perennial water associated

with native palm oases. At least 180 bird species have been documented on the area, with at least 30 of these nesting here. In addition, at least 25 species of mammals, 23 species of reptiles, 4 species of amphibians, and 2 species of fish utilize the Preserve. A number of unique invertebrates also occur on Preserve lands.



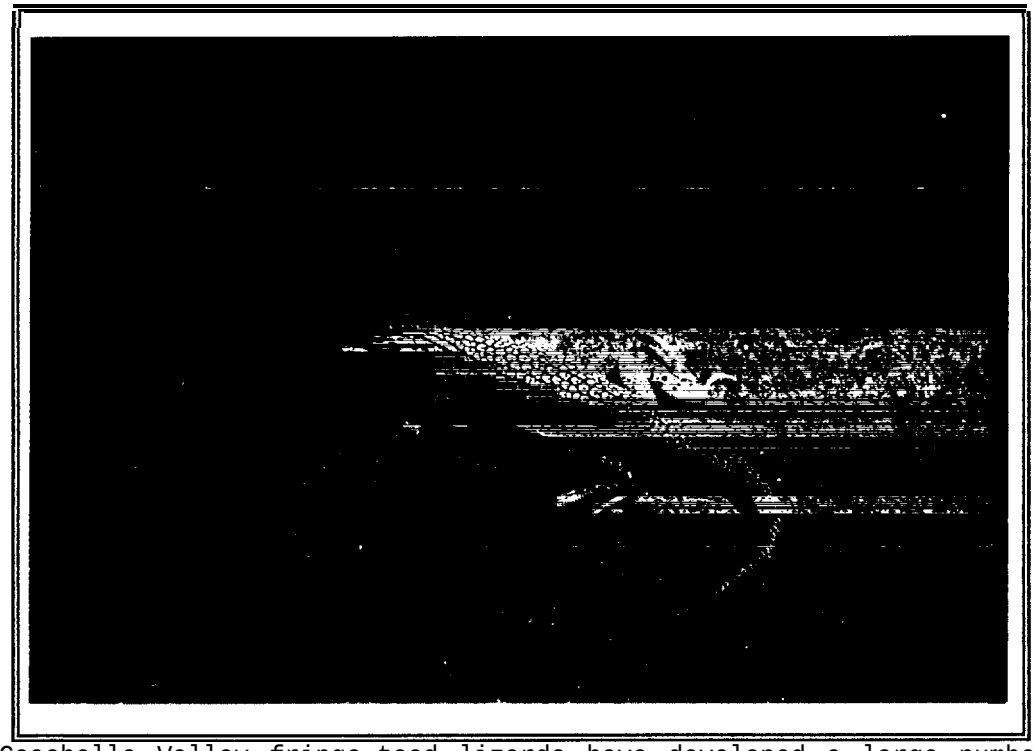
The 12" long Western shovel-nosed snake is just one of at least 25 reptile species whose habitat is protected by the Coachella Valley NWR. 4-23-91 WRR

2. Endangered and/or Threatened Species

State and federally endangered and/or threatened wildlife which occur on the Preserve include the Coachella Valley fringe-toed lizard (Uma inornata), the desert tortoise (Gopherus aeassizi), and the desert pupfish (Cyprinodon macularius). Federal candidate species include the flat-tailed horned lizard (Phrynosoma mcallii). Species of special concern include the Palm Springs round-tailed ground squirrel (Spermophilus tereticaudus chlorus), giant red velvet mite (Dinothrombium pandorae), and desert cockroach (Arenivaga investigata), all of which are sand dwelling species restricted to the Coachella Valley and found on refuge lands. The giant palm-boring beetle (Dinapate wrightii) occurs only in palm groves.

Historically, the range of the Coachella Valley fringe-toed lizard was nearly all of the valley floor from San Gorgonio Pass to the Salton Sea and extended northeast to include a portion of the Indio Hills. Some 270

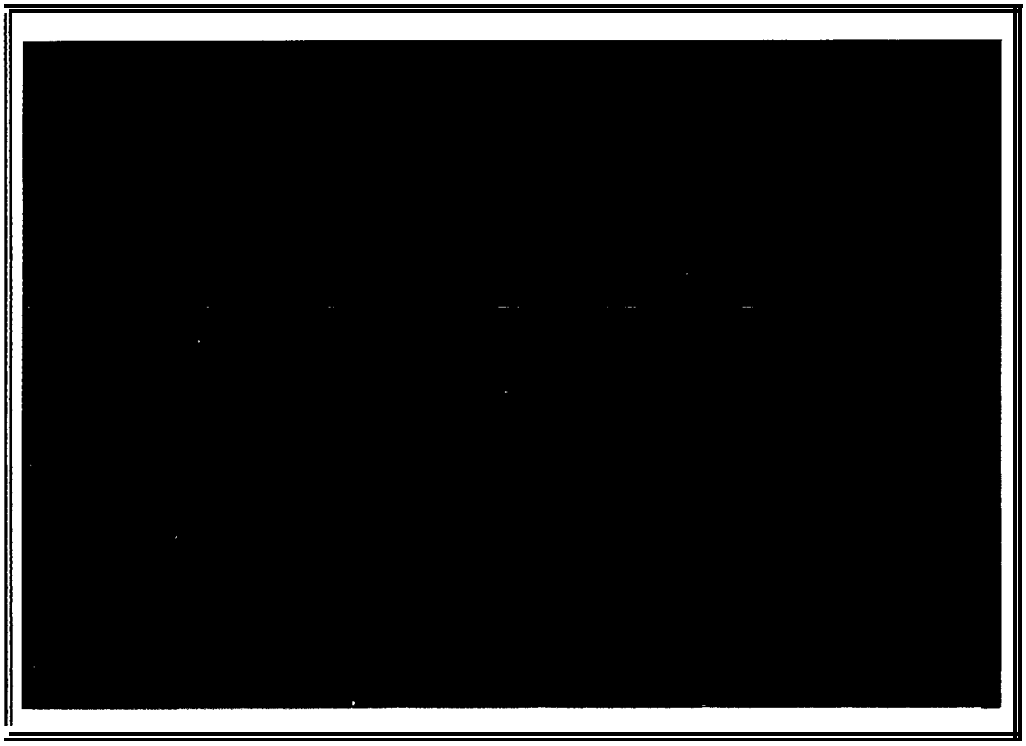
square miles once served as fringe-toed lizard habitat, but increasing development has drastically reduced the range of this species. Without immediate protection, it was reasoned that this species would become extinct within 50 years. As a result, the Coachella Valley fringe-toed lizard was federally listed as threatened on September 25, 1980 (Federal Register 45:188). In a parallel action, the state of California initially designated this lizard as endangered (but downlisted the species to "threatened" during 1990). Currently, only about 4% of the original. habitat suitable for the species occurrence exists in the Coacheila Valley in the form of three preserves. The perpetuation of this highly specialized animal is dependent upon the continuing renewal of windblown sand. Wind shielding by development or tree rows stabilizes dunes and eventually prevents renewal of habitat, eventually eliminating the fringe-toed lizard population. Other threats to habitat include off-road vehicles, flood control projects, and invasive exotic vegetation.



Coachella Valley fringe-toed lizards have developed a large number of adaptations which allow them to inhabit the dynamic and severe environment of blowsand ecosystems. Habitat destruction continues to threaten them with extinction. 4-23-91 WRR

The Coachella Valley fringe-toed lizard is one of five species of fringe-toed lizards in the world, three of which are found in the United States. The species are distinguished from one another based primarily on morphological and behavioral traits. The Coachella Valley fringe-toed lizard averages about 150 mm to 240 mm (6 to 9 inches) in total length,

with the tail normally making up over half this length. Males are slightly larger than females. This fringe-toed lizard is whitish or sand-colored on both its back and belly surfaces with a pattern of darker eye-like markings forming longitudinal stripes over the shoulders and back. Small black dots may be present along the sides and diffuse black lines are present beneath the lower jaw. There is a lack of side markings beneath the shoulder. The area surrounding the eye is bright orange, and during the breeding season, adults may have an orangish wash to the sides. Coachella Valley fringe-toed lizards usually have three internasal scales and fewer than 29 femoral pores.



Two characteristic sets of tracks on the dunes; one Delng left by a young Colorado Desert sidewinder, the other representing the bipedal tracks left previously by a running fringe-toed lizard.
04/23/91 WRR

Several investigators have long recognized the number of adaptations which the lizard has developed to survive in a dynamic and harsh environment. Adaptations to living among the dunes include the ability to run across the sand surface at high speed, dive into the sand, and move short distances below the sand surface. This activity is aided by the small, rounded scales on the lizard's skin which reduce the friction of its body against the sand and protect the body from abrasion. The lizard receives its name from its toes, which have a row of enlarged comb-like scales to increase the foot's surface area and improve traction when pushing against the sand. The fringe-toed lizard is able to partially close its nostrils and to blow

sand out of its U-shaped nasal passages, allowing a completely buried lizard to breath the air between sand grains. The nose is wedge-shaped to facilitate rapid burying, and the lower jaw is shorter than the upper, preventing sand from entering the lizard's mouth when it dives. There is a flap of skin covering the ears, preventing sand grains from entering the ears during burrowing. The species has fringed eyelids, with two sets of membranes covering the eye in opposite directions. Any sand entering the eye accumulates at the front corner where it is encased in mucus and expelled.

Although they are capable of digging, fringe-toed lizards often use the burrows of other animals for escape and thermoregulation. The lizard is active when its body temperature is between 26" and 45°C, with a mean of 38°C (100°F). It attains these temperatures by basking both on the sand surface or just below the surface. When external temperatures become too hot, the lizards spend most of the day below the surface and become active only in the early morning and late afternoon. Coachella Valley fringe-toed lizards normally enter winter dormancy from November through February when temperatures fall below the species activity range, however, they can become active for short periods during any month of the year if temperatures are favorable.

Leopard lizards, like this colorful female are one of the natural predators which occassionally take fringe-toed lizards on Preserve lands. 5/2/91 WRR

Individual fringe-toed lizards live for about five years. They seem to attain sexual maturity based on size rather than age, but are normally capable of breeding after two years. One clutch of eggs is normally laid during spring, but multiple clutches of eggs may be laid during a favorable season, with hatchlings appearing from late June to early September. It is probable that the amount of winter rainfall influences reproduction of this species. In years of low rainfall, annual plants may fail to germinate, in turn reducing the normal insect population on which fringe-toed lizards feed. In response to the short food supply, reproduction of lizards may be depressed. Coachella Valley fringe-toed lizards are insectivorous, but will also eat plant material. Perhaps in response to drought conditions during the 1990 field season, fringe-toed lizards were observed feeding almost exclusively on harvester ants. Natural predators of fringe-toed lizards include leopard lizards (Gambelia wislizenii), whiptail lizards (Cnemidophorus tigris), coachwhips (Masticophis flagellum), sidewinders (Crotalus cerastes), kestrels (Falco sparverius), roadrunners (Geococcyx californianus), ravens (Corvus corax), loggerhead shrikes (Lanius ludovicianus), and coyotes (Canis latrans). Fringe-toed lizards themselves are also at times cannibalistic.

While the taxonomy, adaptations, behavior, and physiology of the fringe-toed lizard are relatively well known, the population and ecology of the species has been little studied. Information pertaining to the population density throughout the valley, population size and reproduction from year to year, movement of individuals, barriers to movement, and contiguity of subpopulations throughout the valley remain largely undocumented.

In order to determine existing populations of fringe-toed lizards on the refuge, a monitoring program was initiated in May 1986. The methods for conducting the monitoring program are established in the Coachella Valley Preserve System Management Plan. Currently, four transects are each censused six times to establish trend information. Refuge transects were operated between May 16 and June 04 during the spring of 1991. Also, since 1990, two transects were operated during autumn between September 17 and October 02 to help determine survival and recruitment of hatchling fringe-toed lizards (See Section D.5). Results of the spring monitoring efforts are depicted in the following three tables.

Table 3. CVFTL Cummulative Totals Observed on Transects During 1991

| TRANSECT | ADULTS | JUVENILES |
|---|---|---|
| CVP #1 | 0 | 0 |
| CVP #2 | 1 | 3 |
| CVP #3 | 4 | 0 |
| CVP #4 | 11 | 2 |
| TOTALS | 16 | 5 |

Table 4. Average Number of CVFTL Per Census 1986 - 1991.

| TRANSECT | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| CVP #l | 3.7 | 2.0 | 1.0 | 1.3 | 1.2 | 0 |
| CVP #2 | 2.8 | 4.3 | 2.0 | 5.2 | 4.0 | 0.7 |
| CVP #3 | 2.0 | 1.7 | 0.5 | 3.2 | 0.5 | 0.7 |
| CVP #4 | -- | — | -- | — | 3.3 | 2.1 |

Table 5. CVFTL Adult/Juvenile Ratio 1986 - 1991.

| TRANSECT | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| CVP #1 | 0 | 1.4/l | 0 | 1.0/l | 0 | 0 |
| CVP #2 | 1.8/l | 0.6/l | 0 | 1.4/l | 3.8/l | 0.4/l |
| CVP #3 | 11.0/l | 0.4/l | 0 | 0.9/l | 0 | 0 |
| CVP #4 | -- | -- | — | -- | 9.0/1 | 6.0/l |

Dismal numbers of lizards observed during the spring surveys may have resulted from variables such as behavioral shifts in the animals due to abundant food or to the amount of vegetative cover during 1991. Substantial herbaceous vegetation grew on the transects this spring which may have impacted the survey results (this also probably happened in 1988). However, the fall surveys revealed good numbers of adults and hatchlings which support the idea that lizards were not observed in relation to their actual abundance during spring surveys. Because there are potential problems with conducting spring surveys during years having abundant annual vegetation, fall surveys may give more consistant and comparable data. Herbaceous vegetation drys up during the summer, and is usually absent by late September. The abundance of hatchlings observed during late 1991 suggests the potential of these lizards to rebound in numbers if habitat conditions are appropriate.

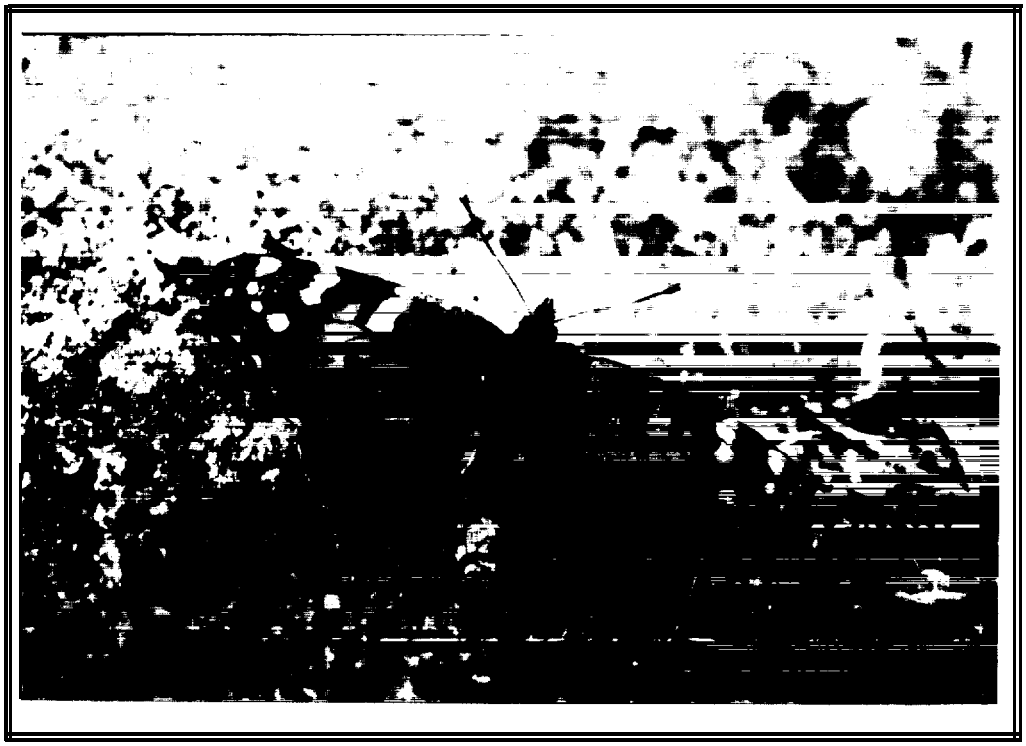
The results of this population monitoring so far have been analyzed and show a steady decline of fringe-toed lizards on all transects at each preserve except Edom Hill, where the population is steady or increasing. Recruitment by hatchling lizards into the population appears poor. Although there are a number of variables involved in measuring the decline, including a five-year drought, and the exact causes of decline may not be known with certainty, the fact is that all evidence points to an overall decline in the population, evidence that the HCP is not working as was hoped.

10. Other Resident Wildlife

The flat-tailed horned lizard is a level-2 candidate species for federal listing. Already having the smallest geographic range of any species of United States horned lizard, this animal has experienced rapid population declines in recent years. Presumably it has become another victim to habitat destruction or alteration through both urban and agricultural

development, off-road vehicle uses, and sand or gravel mining activities. The continued expansion of human activities in Imperial and Riverside County deserts will unavoidably continue to destroy or degrade the habitat for this species.

Flat-tailed horned lizards are present in unknown numbers on the Coachella Valley Preserve. This species is generally considered difficult to find because of its cryptic coloration and behavior of remaining perfectly still or suddenly darting into a rodent burrow. During 1991 monitoring efforts, one subadult horned lizard was observed on transect 2. Another horned lizard was observed in the mouth of a roadrunner which had just captured the animal near Ivey Ranch along the refuge's west boundary.



Painted Lady butterflys occurred on the refuge by the billions during 1991 when climatic conditions promoted abundant annual vegetation which helped support their massive northward migration across the Southwest. 4-23-91 WRR

Many species of moths and butterflies had a banner year on the refuge in 1991, and were able to exponentially increase their populations in response to annual vegetation made available by winter and spring rains. Painted lady butterflys (Vanessa cardui) and white-lined sphinx moths (Hyles

lineata) were present by the billions. During wet years, these species breed in Mexico and migrate northward, laying eggs as they go. Their larvae fed heavily on refuge vegetation, but seemed to provide food to very few larger animals.

The 4" caterpillars of the white-lined sphinx moth were extremely abundant on the Preserve in 1991 to take advantage of the profusion of spring vegetation. 4/21/91 WRR

## H. PUBLIC USE

### 1. General

The Coachella Valley Preserve receives about 10,000 visitors each year, Most visitation occurs between November through April, with a high proportion of visitors wintering here from out of state. The Nature Conservancy owns and operates a rustic visitor center/office at the Thousand Palms Oasis which is open to the public sporadically and operated primarily by volunteers. Popular activities on the Preserve include hiking, birding, and photography. Because the Preserve encompasses lands under the jurisdiction of five different agencies, rules regulating public use vary dramatically from one area to another. This can be extremely confusing to the public, and also to agency law enforcement officers.

Photography is an increasing activity on the refuge as all other dune systems in the Coachella Valley are becomming golf courses and housing developments. 3-22-91 WRR

16. Other Non-Wildlife Oriented Recreation

The Coachella Valley National Wildlife Refuge protects designated critical habitat vital to the survival of the Coachella Valley fringe-toed lizard. Service regulations on the refuge are standard regulations governing all National Wildlife Refuges, with main objectives aimed at conservation of wildlife and habitat, therefore, public access and/or recreation is prohibited on the refuge. Hiking and equestrian use on Coachella Valley National Wildlife Refuge was not expressly approved on Service lands when the refuge was established. As a result, two associations, the Ivey Ranch Equestrian Center and the Coachella Valley Association of Governments, filed a joint application with the Coachella Valley Preserve Management Committee to allow the creation and maintenance of public horseback riding and hiking access trails to link Service lands with Preserve lands managed by other agencies.

A public meeting with representatives from the two associations, the Service, The Nature Conservancy, the Bureau of Land Management, local governments, and equestrian groups was held on April 1, 1988 to discuss the proposed access trail system and to identify issues raised by the trail proposal. The application documents were received by the BLM from the Ivey Ranch Equestrian Center on March 31, 1988, and from the Coachella Valley Association of Governments on May 20, 1988. An on-site inspection of

possible trail alternatives was conducted on September 21, 1988 with representatives from the equestrian user groups.

A Draft Environmental Assessment was prepared by the BLM analyzing the potential environmental impacts of the proposed action along with four alternatives to that proposal. This draft was distributed November 14, 1988 for 30-day public review and to the FWS Laguna Niguel office for an informal consultation to request the Service's opinion and comments. At a meeting on October 18, 1988, a representative from the Coachella Valley Association of Governments recommended that the implemented access trail system be that of alternative 3 or 4, or some intermediate alternative. The Laguna Niguel Field Office provided written comments and recommendations to the BLM concerning their Draft Environmental Assessment on January 23, 1989.

A public "open house" was held at the Coachella Valley Visitor Center on February 23, 1989, with representatives from the Service, the California Department of Fish & Game, the BLM, and the management of the Preserve. Public comments ranged from total opposition to any equestrian access trail system to support for an extensive system of trails throughout refuge lands. Enhancement personnel from the FWS Laguna Niguel Field Office recommended that some version of alternative 1 be submitted for formal Section 7 consultation since any alternative trail routed inside sensitive blowsand portions of the fringe-toed lizard habitat would greatly increase the potential "taking" of lizards. Following receipt of comments from the public and the Service, and after further public input at the "open house" the Management Committee met on March 3, 1989 to draft a "preferred alternative." This preferred alternative was the proposed decision that the Management Committee submitted to the Service on July 10, 1989 for a formal Section 7 Consultation. Although the BLM prepared the Final Environmental Assessment dated May 15, 1989 as mandated by the National Environmental Policy Act, final decision on the proposed action was made by the Management Committee following formal Section 7 Consultation with the Service.

The Service responded to the Final Environmental Assessment by providing a Draft Biological Opinion to the BLM on February 26, 1990. The Final Biological Opinion for the Public Equestrian and Hiking Trail System within the Coachella Valley Preserve, Riverside County, California, was provided to BLM on June 29, 1990, It was the belief of the Service that a trail system, **as specified in the Biological Opinion,** was not likely to jeopardize the continued existence of the Coachella Valley fringe-toed lizard. The proposed action allowed establishment of 4.5-miles of trails on refuge land, analyzed the impacts, cumulative effects, and incidental take associated with the trail, established reasonable and prudent measures to be taken, and required specific terms and conditions which must be complied with. The Biological Opinion also set forth Conservation Recommendations relating to the issue of trail use. It is important to note that trail use may be suspended should monitoring efforts reveal that incidental take of fringe-toed lizards has exceeded the levels authorized by the Biological Opinion.

At a June 11, 1991 Preserve Management Committee meeting, refuge personnel accepted the lead in establishing trails on refuge land and implementing the trail system as outlined in the Biological Opinion. Personnel from the refuge and The Nature Conservancy met with owners of the three major equestrian stables adjacent to refuge land on June 17, 1991, with the purpose of contacting equestrian users and providing information and discussion over implementation of the trail system. During these meetings, Jack and John Ivey, Eileen Davis, and Robert Soderburg were each provided with copies of the Final Biological Opinion along with a map identifying the trail location. Hiking and equestrian trail designation involves a process of boundary posting, fence construction, and trail identification on refuge land, and refuge-personnel began the project on July 25, 1991 with completion accomplished by November 29, 1991.

Demonstrating an inability for self-compliance with refuge regulations, equestrian users and their accompanying free-ranging dogs ride across an unfenced portion of the refuge. 2-15-91 WRR

An Indio newspaper article, "Feud Erupts over Desert Preserve Access," in the August 26, 1991 Desert Sun outlined the issue that equestrian users were unhappy with access limitations on refuge land. On August 27, 1991, both Service and TNC personnel received telephone calls from persons concerned with what they perceived as a shutdown of public lands. At least two individuals threatened to involve local government and/or Congressional intervention to assist in providing increased refuge access for equestrian use. In one more attempt to provide the public with information concerning

equestrian use on the preserve, personnel from The Nature Conservancy hosted another public meeting on September 11, 1991, in which only two members of the public attended.

Fencing the west preserve boundary was completed on August 26, 1991, and horses were excluded from sand dune habitat for the first time. During the week of September 23, a portion of this fence was temporarily removed to accommodate saltcedar removal. During this week, equestrian trespass immediately increased, demonstrating the inability of equestrian self-compliance with refuge regulations. Numerous examples of blatant equestrian trespass have occurred since fencing and posting were completed. An aerial survey conducted November 8, 1991 disclosed the extent to which equestrian users are continuing to trespass onto preserve land, with 95% of all illegal equestrian access emanating from the Robert Soderburg property, where many thousands of horse tracks were evident radiating into the preserve. Only two days prior to the survey, Soderburg stated that none of his tenants are interested in using the designated trail system, and that the trespass issue would "have to be forced by citing individuals, which would help escalate the situation because there are some pretty high powered people riding out there." During the same conversation with Soderburg, refuge personnel for the third time requested an opportunity to speak at the monthly Horseman's Association meeting, and were told that we were not invited, that "nobody is interested in hearing about the preserve regulations." A Refuge Officer and BLM Ranger contacted Cynthia Fry trespassing with her horse on preserve land from Soderburg's property November 17, 1991. Ms. Fry was not issued a citation, but was provided information concerning both refuge regulations and Endangered Species Act regulations. Soderburg was contacted the following morning, when he was asked again to inform his tenants of preserve regulations, and to repair the gap in his fence. During this conversation, Soderburg made the following statements: 1) He has no intention of repairing his fence, but will post signs telling people the preserve is closed to horses. 2) He has contacted Riverside County Supervisor Corky Larson, who agrees with him that the preserve should be open to horses. 3) He has contacted several BLM employees, who do not agree with FWS policy and have no intention of enforcing equestrian trespass regulations. 4) When people ask him about the preserve trail system, he responds that "there is no trail system." 5) He will not cooperate with the Service on any issue until we open up the preserve to horses. 6) He feels the Service conspired to exclude equestrian use without public input. Soderburg ended the conversation by stating that he would escalate the issue to include the media and local governments, which he did, with short spots on local radio and television but will little local support.

The public hiking and equestrian trail as described in the Biological Opinion was officially opened on November 29, 1991. Letters were sent to Ivey and Soderburg informing them of final implementation of the trail system and explaining our intent to begin enforcing trespass regulations. By the end of 1991, no citations have been issued, though equestrian trespass continues to occur on a smaller scale.

**17.** Law Enforcement

Although legally protected, refuge lands continue to remain threatened by a number of issues including flood control proposals and illegal activities such as off-road vehicle use, equestrian use, indiscriminate shooting, dumping, public hiking, general trespass, habitat destruction, photography, and collecting. While each of these issues is important, their collective impact is especially significant.

The Bureau of Land Management receives Preserve endowment funds totalling $16,000, which help fund a law enforcement position for the area. As a result, BLM ranger Edward Patrovsky had the primary responsibility of patrolling the Preserve, including refuge lands, until his transfer in July. With BLM shorthanded, the Preserve has gone without adequate patrol for five months by year's end. Most violation notices are issued by BLM rangers because of their broader authority under CFR 43 to enforce laws on all public lands, and because the rangers have state authority granted them by the California Department of Fish and Game. Refuge officers enforce laws incidental to other duties on the refuge, and have taken the lead on enforcing Endangered Species Act violations. Additional patrol was conducted by refuge officers during dove hunting season, and due to BLM's personnel shortage, refuge officers conducted periodic weekend patrol related to trespass enforcement. Currently, BLM is apparently having a horse trained which will be used by Rangers to help educate and change current attitudes concerning equestrian use on Preserve lands. BLM rangers continue to report an overall decline in violations, perhaps due to improved signing and fencing of the Preserve boundary, which in itself has contributed greatly to public awareness of the Preserve.

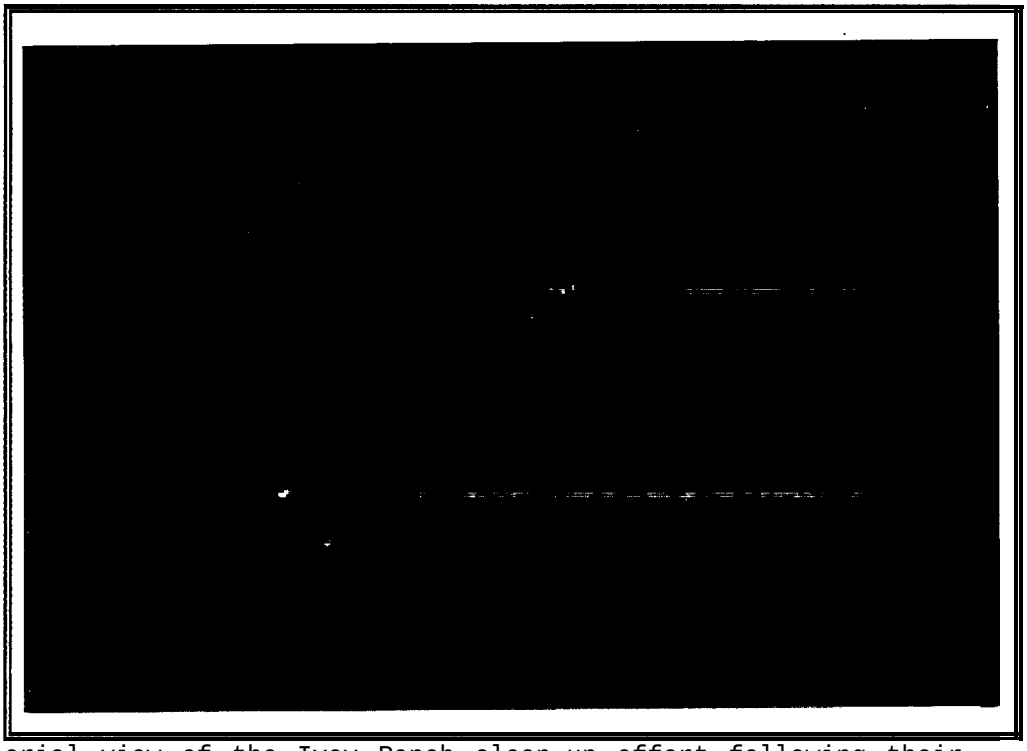
Two major cases involving Ivey Ranch and Jerold Segall, initiated during 1990, continued into 1991, with one other major case involving the Imperial Irrigation District initiated this year.

**Ivey Ranch Issue**

During June 1990, two horseback riders discovered an area of the Preserve which had been severely impacted by heavy equipment. They reported the situation, which was immediately investigated by officials from the Service and the Riverside County Department of Building and Safety. The Service investigation was jointly conducted by Special Agents and Refuge Officers. The Service determined that contractors of Ivey Ranch Country Club in Thousand Palms had carelessly and flagrantly trespassed onto National Wildlife Refuge lands and bulldozed piles of debris onto the area, impacting about 1.5-acres of Critical Habitat. This debris was composed of logs, wood, wire, rubber tires, concrete, metal drums, and other assorted trash piled up to six feet high.. The debris had clearly been pushed onto the refuge by bulldozer to dispose of material accumulated when clearing additional land for development at Ivey Ranch.

Potential federal laws/regulations involved in the action included violations of the Endangered Species Act and five violations of the National Wildlife Refuge Administration Act, including trespass, vehicle

**provisions, damage to plants and animals, destruction of property, and** disposal of waste. Under the Endangered Species Act alone, criminal penalties can amount to jail time plus $100,000 per count.



Aerial view of the Ivey Ranch clean-up effort following their trespass and destruction of critical habitat on refuge land. Debris is being trucked off of the refuge and redeposited on adjoining Ivey Ranch property cleared for development. 2-13-91 WRR

The dune system which included the impacted area was perhaps the healthiest and most extensive fringe-toed lizard habitat on the Preserve, containing some of the area's highest density of protected lizards. It appeared to Service investigators that fringe-toed lizards had been destroyed by the dozer work, which passed within 55-feet of a Preserve boundary sign. Additionally, Research Biologists from the University of California's Boyd Deep Canyon Desert Research Center in Palm Desert inspected the site and determined that the dozer activity probably "took" Coachella Valley fringe-toed lizards. "Take" of a threatened species is specifically defined by the Endangered Species Act, and means to pursue, hunt, shoot, wound, kill, trap, collect, harass, or harm; or attempt any of these activities.

Rather than pursue litigation, the Service began negotiations with Ivey Ranch Project Coordinator James Montgomery, and ultimately entered into a settlement agreement which resolved the dispute without Ivey Ranch admitting liability. The agreement, drafted by Service Biologists and

Assistant U.S. Attorney Peter Hsiao, involved both restoration of the impacted site and mitigation for damages to fringe-toed lizard habitat. Ivey Ranch agreed to remove all debris bulldozed onto the Preserve, truck 200 cubic yards of sand to the impacted site, revegetate the area, and remove a l/8-mile saltcedar treerow northwest of the site. The removal of the treerow will allow sand to migrate over the area and further enhance recovery, facilitating the eventual return of productive fringe-toed lizard habitat. Additionally, Ivey Ranch agreed to transfer title of 6.5-acres of desert land to the Service, provide an educational sign about the Preserve, and remove another treerow to enhance habitat. In consideration for the agreement, the Service released legal claims against Ivey Ranch, including tort claims, injunctive relief, damages, and criminal or civil penalties. The current management of Ivey Ranch Country Club (now Champagne Partners and Associates) have inherited the settlement agreement and have done a remarkable job in working with the Service toward implementation of the requirements. Little of the agreement currently remains unfulfilled.

**Jexrv Senall Issue**

A potential Endangered Species Act violation occurred October 5, 1990 when Mr. Jerold Segall cleared and leveled his private property immediately adjacent to the Coachella Valley National Wildlife Refuge. An investigation revealed that confusion existed in Riverside County records as to whether or not this property was part of the Coachella Valley Preserve, designated by a 1986 Habitat Conservation Plan. The HCP precludes clearing and development within the Preserve boundary, while establishing mitigation requirements for lands disturbed outside the Preserve.

On May 31, 1991, a meeting was organized by U.S. Congressman Al McCandless at the request of Segall. In attendance were the Congressman and two of his staff aids, Segall, SRA Farrington, Voget, Radke, and Regional Director Plenert. The purpose of the meeting was to try and resolve whether or not the property owned by Segall is inside the preserve and therefore subject to restrictions resulting from implementation of the HCP.

Segall had been an active participant in the HCP process, and requested exclusion from the preserve in a letter to Richard Myshak dated 10/16/85. A response to his letter directed Segall to the proper mechanisms to seek modification of the Preserve boundary, however, there is no indication that Segall ever took this action further. As a landowner and realtor in the Palm Springs area, Segall should have been aware of the need to acquire agricultural registration permits from Riverside County before clearing or leveling his land. No such permit was ever applied for by Segall. Segall did not adequately survey his property when it was developed, and a portion of the jojoba farm is actually on Service land. He cleared the additional 1.4-acres based on a corrected survey, but made no effort to adjust the original error.

The Riverside County Assessor's Map Book 653-44-006 in the Bermuda Dunes office clearly shows the Segall property within the Preserve and zoned as Natural Assets (NA), which would legally have precluded the clearing of undisturbed desert. In direct conflict with the Bermuda Dunes office, the

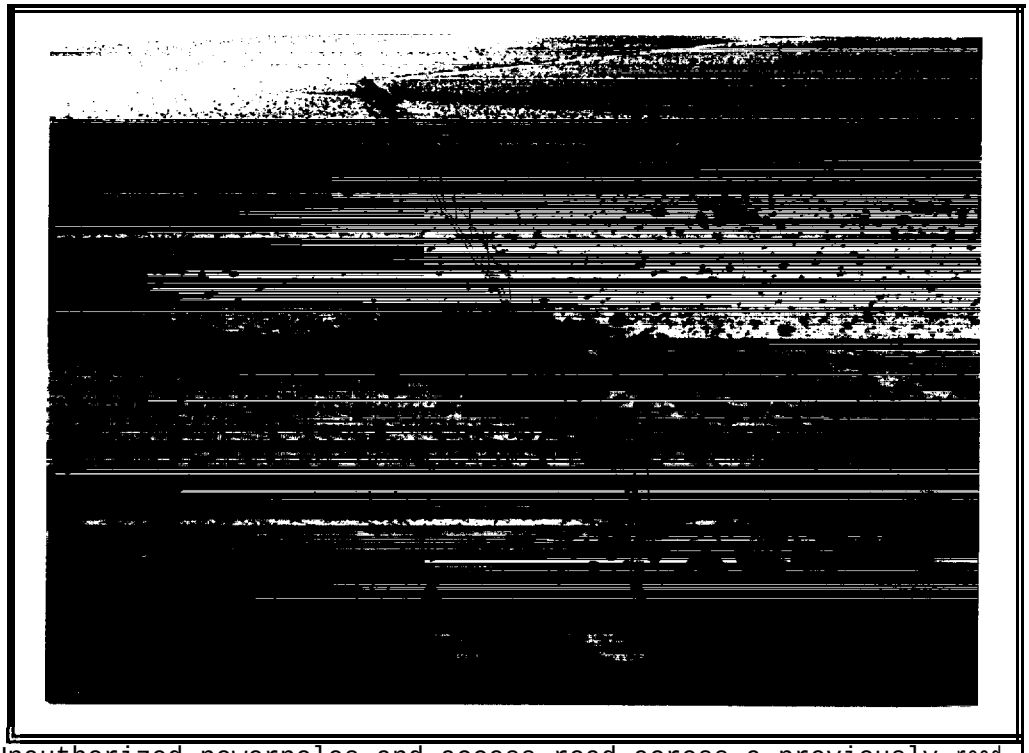
**County Assessor's Map Book 653-44-006 at the Riverside County Planning** Department office in Riverside showed the Segall property as being outside the Preserve boundary and zoned for agriculture and industry (W-2). Michelle Denne of the Riverside County Planning office reported that during late 1989, letters were sent to over 1000 landowners, including Mr. Segall, informing them of Riverside County's intent to re-zone a number of land parcels to bring them into consistency with the County's General Plan. The letter also served as notification of the public comment process. This consistency zoning affected the Segall property by re-zoning it from W-2 to Natural Assets, which apparently was not to Segall's liking because it affected the potential value of the land.

A review of records, statements, and recollections from individuals involved in the early HCP process determined that many people agreed at the time that the Segall property could be excluded from the Preserve boundary primarily because of its relatively small size. There is a tape recording from a 1985 Board of Supervisor's public hearing, and a letter from the Riverside County Supervisor which support Segall's statement that his property was intended to be excluded from the Preserve. Based on this information, Refuges and Law Enforcement were reluctant to pursue a "take" violation, because ample confusion exists to defend the opinion that Segall's property lies outside the Preserve. Instead, the Service proposed a land exchange, as suggested by Congressman McCandless, which would have enabled Segall's continued use of jojoba plants being cultivated on refuge land. At an October 21 meeting with Refuge personnel and Realty Specialist Judee Jacoby, Segall stated that he did not wish to trade lands, and resolved to remove his existing fenceline, jojoba plants, and drip line from the refuge. In turn, the correct property boundary was fenced by the Service beginning December 24. The Service issued a letter to Segall recognizing his property as being outside the Preserve, and Segall paid a 600/acre mitigation fee for clearing his 1.4-acres.

Things seemed to be resolved, however, in July 1991, Segall began actively seeking and obtaining County support to change his land's zoning back to W-2, which would again allow both agricultural and industrial uses. The Service actively opposed this zoning change, and believed that allowing the change would have several potential negative effects on Preserve management. First, the zoning change would open the door to potential uses which are not consistent with maintaining a buffer adjacent to the Preserve. Second, the zoning change would create a precedent whereby other landowners could perhaps justifiably request zoning changes which are not in the best interest of the Preserve. And third, the zoning change would undermine the very integrity of the HCP in that zoning would no longer be a viable means of maintaining blowsand corridors or habitat quality. Ignoring Service opposition, Riverside County Planning Department granted Segall a change in zoning back to W-2 on October 21. Segall stated that he intends to develop his land some day, and rezoning the property along with having it removed from "Preserve" status will greatly improve its value. In the interim, he is content with growing (but never yet harvesting) his jojoba bushes.

**Imperial Irrigation District Issue**

On 11/5/91, Refuge Officers discovered that IID and its contractor had constructed an unauthorized roadway 30-feet inside the entire west Sectionline of T4S, R6E, Section 22. This roadway runs across 3/4 mile of the preserve, and was used to place a total of twenty-one 70-foot powerpoles on land owned by the Service and by DFG. An investigation showed that the roadway was constructed on about 10/4/91 by Irby Construction Company. This roadway averages 15-feet in width and, together with the pole locations, impacts an estimated total of 1.5 acres of critical habitat, including 1 acre of refuge land and .5 acre of state land. Numerous plants were crushed, buried, or removed during this process. Poles were delivered to Preserve land beginning 10/7/91, and subsequently erected into nine-foot deep cavities augered into the ground 29-feet within the Preserve boundary. Space surrounding each of the poles was backfilled with gravel which Irby stockpiled on the Preserve in at least two locations. No wires were yet strung on the poles when they were discovered by refuge personnel.



Unauthorized powerpoles and access road across a previously road less area of the preserve, impacting about 1.5-acres of designated critical habitat. 11-08-91 WRR

Federal violations involved in this issue include:

16 USC 1538 The Endangered Species Act of 1973
16 USC 668 dd National Wildlife Refuge Systems Act
50 CFR 26.21 Trespass of personnel
27.31 Vehicle provisions
27.51 Damaging plants and animals
27.61 Destruction of property
27.92 Construct private structures (powerpoles)
27.94 Disposal of waste (waste gravel piles)

Refuge personnel immediately notified IID of the trespass and ESA violation by telephone on 11/5/91. IID personnel responded that they had built the road and erected poles within a 30-foot county road easement, and therefore were not at fault. The Service pointed out that there is no recorded road easement at the impacted site, but even if one had existed, IID had a responsibility to consult with the Service concerning any activity within designated critical habitat, in addition to impacting National Wildlife Refuge and state Ecological Reserve Lands.

The following day, Refuge Officers met with IID representatives to conduct an initial investigation into the issue, set forth a procedure to remove any immediate threats to protected wildlife and habitat, and notify IID of impending legal action. During the meeting IID representatives stated that they thought they were within an easement, but now believed they were in error and accepted fault. Refuge officers requested the immediate removal of poles from preserve land based on the assumption that all wildlife and vegetation had been unlawfully removed from the unauthorized work site as a result of road construction, watering, and equipment use, and that if the same exact corridor was utilized immediately to remove poles, no additional take would occur. IID complied by removing the poles within three days of the order.

Although no corpses of these small animals were located, it is likely that there was a take of fringe-toed lizards by direct mortality from crushing, through the cummulative actions of bulldozing the road, passage of vehicles and equipment, stockpiling gravel and other building materials, augering cavities for pole installation, framing poles with braces and groundwires, unloading powerpoles onto the ground, and backfilling holes with preserve soils. It is also likely that lizards were taken indirectly through harassment as lizards moved away from disturbances caused by many of the same unauthorized activities, including watering the roadway. Such harassment would give predators such as kestrels, shrikes, ravens, and coyotes an advantage in capturing lizards. In addition, construction of the roadway in a previously roadless area of the preserve will continue to impact fringe-toed lizards from this point forward through increased harassment by illegal vehicles, ORVs, and increased unlawful debris disposal. Already, increased vandalism, fence destruction, and illegal entry by ORVs has become evident as a direct result of roadway construction. This case was handed over to Division of Law Enforcement personnel, with no results as of year's end.

More routine violations on Preserve lands include off-road vehicle use, dumping, vandalism, and use of firearms. Law enforcement on the area has

been largely a hit-or-miss situation, and most violators are never apprehended. The following table depicts incidents investigated by BLM rangers during 1990 and 1991.

Table 6. Incidents Investigated on Preserve Lands During 1990 & 1991.

| VIOLATION | NUMBER OF CASES: | 1990 | 1991 |
|---|---|---|---|
| Trespass | | 14 | 3 |
| Littering | | 2 | 0 |
| Resource Collection | | 1 | 0 |
| Removing Vegetation | | 2 | 2 |
| Possession of Narcotics | | 1 | 1 |
| Dumping | | 2 | 0 |
| Vehicle Code Violations | | 1 | 4 |
| Discharge of Firearms | | 1 | 1 |
| Hunt with Unplugged Shotgun | | 0 | 1 |
| | TOTAL: | 24 | 12 |

## I. EQUIPMENT AND FACILITIES

### 2. New Construction

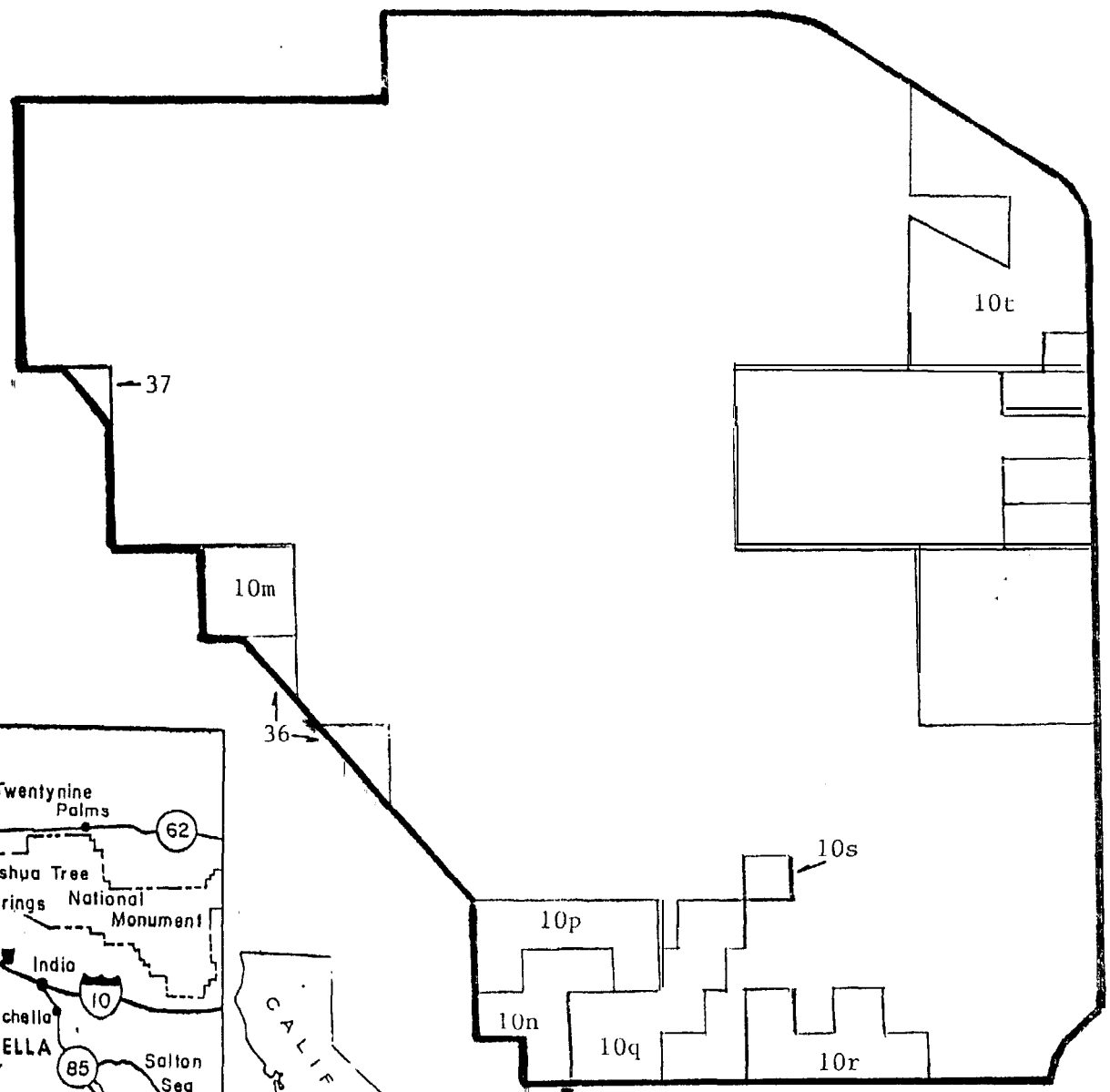
About 2.5-miles of 3-strand barbed wire boundary fence were installed along portions of the south and southwest refuge boundary during 1991. These areas were previously unfenced but were posted with boundary signs which were largely ignored by trespassers. Fence materials were provided by BLM with boundary surveying and labor provided by the Service with help from TNC volunteers. The map on the following page depicts those areas fenced during the year. Approximately two miles of exterior refuge boundary still remain unfenced, though efforts to complete this project are planned for 1992.

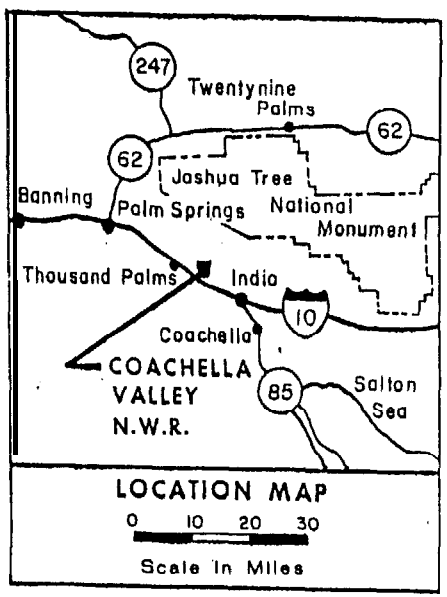
## J. OTHER ITEMS

### 1. Cooperative Programs

Coachella Valley NWR is part of the Coachella Valley Preserve which is managed cooperatively between the U.S. Fish and Wildlife Service, the Bureau of Land Management, California Department of Fish and Game, California Department of Parks and Recreation, and The Nature Conservancy. Although managed following the general guidelines of the Preserve's Management Plan, Service lands remain a part of the National Wildlife Refuge System and must often be managed independently to meet Service objectives. However, the check-and-balance system of cooperative

BOUNDARY FENCING ACCOMPLISHMENTS
DURING 1991





# COACHELLA VALLEY NATIONAL WILDLIFE REFUGE

RIVERSIDE COUNTY, CALIFORNIA

management toward attaining a common goal has generally been positive for all agencies involved.

2. Other Economic Uses

Because of its close proximity to glitzy, publicity-prone Palm Springs and because it is one of the last open desert areas in the Coachella Valley, the refuge is receiving increasing demand for what has traditionally been perceived as "nonconsumptive uses" such as photography and nature observation. Demands range from Hollywood film producers shooting movie or television footage, to photo agencies which "simply want to use the dunes as a backdrop" for their main subject, to commercial wildlife photographers who will stop at nothing to add fringe-toed lizards to their stock of endangered species photos, to a local family wishing to look at and photograph wildflowers.

Each request is carefully considered in regard to its potential impact on plants and wildlife, particularly fringe-toed lizards. Some requests are denied, many others are allowed only through the issuing of a Special Use Permit stating specific restrictions to prevent "take" of Coachella Valley fringe-toed lizards. The following table depicts SUPs issued durring 1991:

Table 7. Special Use Permits Issued at Coachella Valley NWR During: 1991.

| Permit | Permittee | Purpose of Permit | Fee |
|---|---|---|---|
| 52147 | Richard Kann | Study diptera and other insects | N/A |
| 52149 | Imp. Irr. Dist. | Upgrade powerline on ROW | 100.00 |
| 55052 | BFB Studios | Commercial photography | 50.00 |
| 55053 | Imp. Irr. Dist. | Remove illegal poles | 100.00 |
| 55054 | BFB Studios | Commercial photography | 50.00 |

4. Credits

Chris Schoneman wrote Section C., William Radke wrote the remainder, Marcia Radke and Ken Voget edited the report. Photographs are credited by initials.

## K. FEEDBACK

Wildlife managers must learn from the Coachella Valley fringe-toed lizard Habitat Conservation Plan and improve upon it to design future plans which adequately protect wildlife (see D.6). The HCP process can work, and should not be prematurely dismissed. At the same time, however, equal effort must be put into assuring the continued workability of an HCP as goes into the original design of the plan. Initially, responsible parties failed to assess whether the Coachella Valley HCP was working as it was designed, and it becomes obvious that the Service needs to renew its involvement and conduct periodic reviews to evaluate whether this, or any, HCP is functioning as it was intended. Managers need to assess, on a regular basis, whether the necessary protection envisioned for a particular species is actually being realized. In the case of the fringe-toed lizard, recovery of a threatened species is in question, and the Service must evaluate the status of the lizard, the status of land acquisition and other conservation programs, the results of scientific investigations, and the status of plan implementation by local jurisdictions. Based on this evaluation, the Service must decide whether or not the plan is working. If the process appears to be effective, then leave it alone. If problems are apparent, then the decision becomes one of either amending the existing HCP, or suspending/revoking the Section 10(a) permit. Some action is imperative, as the HCP process cannot continue to be effective under a policy of benign neglect.