SANTA ANA NATIONAL WILDLIFE REFUGE

Alamo, Texas

ANNUAL NARRATIVE REPORT

Calendar Year 1985

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

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REVIEW AND APPROVALS

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Nita M. Fuller — 10-3-86
Nita M. Fuller, Refuge Manager — Date

Billy J. Hawthorne — 10-8-86
Billy J. Hawthorne, Refuge Supervisor — Date

W. Ellis Kuhl — 10/15/86
Regional Office Approval — Date

INTRODUCTION

1. Background Information

Refuge: Santa Ana National Wildlife Refuge

Establishing Legislation:

Date: 01 September 1943

Action: Acquired, under approval of the Migratory Bird Conservation Commission, as an addition to the National Wildlife Refuge System...Santa Ana NWR "represents the best remaining habitat of appreciable extent left on the American side of the Rio Grande for the chachalaca, white-winged dove, white-fronted and red-billed pigeon as well as several passerine species of birds" (Migratory Bird Conservation Commission Minutes of January 27, 1942). The total acreage at acquisition was 2,014 acres at $12.00 an acre.

Acreage: 2,080 acres

Location: 7 1/2 miles south of U.S. Business 83; the entrance lies 1/4 mile east and south of the junction of U.S. 281 and FM 907.

Mailing Address: Route 2, Box 202A
Alamo, Texas 78516

(512) 787-3079 or 787-7861

County: Hidalgo County, Texas

Legislative District: 15

Legislative Mandate: Registered Natural Landmark

In 1967, under provisions of the Historic Sites Act of 1935, Santa Ana NWR was designated a Registered Natural Landmark **because of its exceptional value in illustrating the natural history of the United States of America.** So designated in its entirety, Santa Ana NWR was one of the first Federal areas placed in this category. [Under the National Environmental Policy Act (NEPA), Federal Agencies must consider the existence and location of National Landmarks when assessing the impacts of their proposed actions on the environment.]

Figure A-1. Aerial photo of Santa Ana National Wildlife Refuge. Note the refuge as an island of wildlife habitat in a sea of agricultural fields.

Santa Ana National Wildlife Refuge

907

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Figure A-2. Map of Santa Ana National Wildlife Refuge.

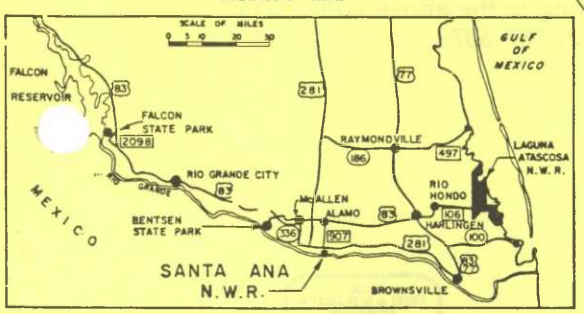
LEGEND

- REFUGE BOUNDARY
- ★ REFUGE OFFICE / VISITOR CENTER
- WILDLIFE DRIVE (ONE WAY TRAFFIC)
- SERVICE ROAD (PRIVATE VEHICLES PROHIBITED)
- WILDLIFE TRAILS (FOOT TRAFFIC ONLY)
- DESIGNATED PARKING AREA
- PHOTO BLIND
- LEVEE

DISTANCES:

	Miles	(Km)
WILDLIFE DRIVE	7.0	11.2
WILDLIFE TRAILS		
★A SANTA ANA (HANDICAPPED TRAIL)	.5	.9
★B SANTA ANA'S COMMUNITIES	1.6	2.5
★C WILDLIFE MANAGEMENT	2.0	3.2
★ BROCHURES AVAILABLE AT VISITOR CENTER		
CATTAIL LAKE	1.5	2.5
CHINABERRY	.3	.5
DICLIPTERA	.9	1.3
HIGHLAND	.6	1.0
JAGUARUNDI	1.4	2.2
MESQUITE	.3	.5
ORIOLE	1.1	1.8
OWL	1.7	2.7
PINTAIL LAKE	.5	.8
RED-BILLED PIGEON	.7	1.1
RESACA	.4	.6
ROADRUNNER	.2	.3
TERRACE	.8	1.3
VIREO	.9	1.4

VICINITY MAP



SEE REVERSE SIDE FOR REFUGE REGULATIONS

Santa Ana National Wildlife Refuge would like to encourage visitors to pursue an understanding of wildlife, natural environments and the objectives of the refuge. The refuge provides the visitor with the opportunity for wildlife observation, environmental education, scientific research and other wildlife-related activities compatible with the primary objectives of the refuge.

The refuge is open daily to the public and offers a visitor center, a 7 mile (11.2 km) wildlife drive, over 15 miles (24 km) of trails and several photography blinds. Visitor Center Hours: 8:00 a.m. to 4:30 p.m. Monday through Friday; 9:00 a.m. to 4:30 p.m. Saturday, Sunday and Holidays.

Foot access to the refuge is allowed from sunrise to sunset. The wildlife drive is open 9:00 a.m. to 4:30 p.m. and is seasonally closed to private vehicles when the refuge interpretive tram system is in operation.

REFUGE REGULATIONS

— **IT IS UNLAWFUL TO DISTURB, INJURE OR TAKE ANY WILDLIFE, PLANT OR HISTORICAL FEATURE ON THE REFUGE.** The U.S. Fish and Wildlife Service is responsible for protecting natural and historical resources on National Wildlife Refuge lands.

— **Feeding wildlife is prohibited** due to problems created for wildlife when they come in contact with non-natural food sources. **Picnicking on the refuge is prohibited** for the same reason.

— **Speed limit for all vehicles is 15 m.p.h. (25 km/h)**. Wildlife and pedestrian traffic has right-of-way.

— **All motor vehicles and bicycles are restricted to the wildlife drive. Motorcycles are restricted to the visitor center parking lot**. No unauthorized vehicles are permitted on service roads or walking trails due to wildlife disturbance and visitor safety.

— **Camping is not permitted.** Although day use activities have an impact on refuge natural resources, the effect is not as long-term as those associated with overnight use.

— **Pets must be on leash at all times**. Unrestrained domestic animals are a source of disturbance to refuge wildlife and visitors.

Consult the refuge staff for a more complete listing of regulations in force.

REFUGE SAFETY PRECAUTIONS

— Please remember the wildlife drive is limited to **one way** traffic except portions indicated on the map.

— The river bank is very unstable due to undercutting and erosion. Be extremely cautious when walking near the river.

— Many species of plants on the refuge have thorns or spines. Look closely before touching any plant.

— Mosquitoes, chiggers (red bugs), spiders, wasps, bees, and scorpions are common on the refuge. Many can be avoided by limiting walks to established trails; proper clothing and insect repellant is helpful.

Further information on Santa Ana may be obtained by writing to the above address or calling the refuge visitor center/administrative office at (512) 787-3079.

2. Refuge Perspective

Background

The Santa Ana National Wildlife Refuge is situated on the Rio Grande in the ecologically diverse lower Rio Grande Valley of South Texas. As part of the Matamoran District of the Tamaulipan Biotic Province, this small 2,080 acre refuge provides an essential island of riparian woodland or Rio Grande floodplain forest for an international diversity of wildlife. This riparian or floodplain forest is unique, being made up of plants of tropical and temperate origin. Many of the plant and wildlife species known to occur at Santa Ana are listed as peripheral, threatened, or endangered.

The lower Rio Grande Valley has undergone a drastic change since the turn of the century. At that time, Hidalgo County was mainly vegetated with dense chapparal interspersed by some grassland. The Rio Grande flood plain, approximately a mile wide, contained mainly subtropical, riparian vegetation. During the early 1900's, much of the native vegetation was eliminated except for a few areas considered uneconomical for clearing and farming along the river. Clearing near the river accelerated after World War II. Santa Ana NWR was established by farsighted individuals disturbed by the rapid disappearance of one of the most unique ecosystems found in the United States. To underscore the wildlife-related importance of this refuge, it must be realized that over 95% of the original habitat of the lower Rio Grande Valley has been cleared to make way for intensive, irrigated row crop agriculture, industrial development, and urban growth. The Rio Grande NWR wildlife corridor and land acquisition program must be completed if wildlife and wildlife habitat on Santa Ana NWR are to be guaranteed in perpetuity. (See Figure A-1.)

Soils

Prior to upriver dam construction, the Santa Ana refuge was subjected to frequent inundation from the Rio Grande. Over the years, alluvial silt built up thick soil deposits interspersed with beds of fine sand and silty clay loam. The topography of the refuge is generally flat, with an elevation of approximately 90 feet above sea level. Minor relief of less than 10 feet occurs where old river beds (dry resacas) dissect the refuge. A mosaic of habitat types parallels these dry resacas with more mesic (medium moisture requirement) woodlands in the bottoms and more xeric (drier) woodlands on higher ground.

Climate

The climate of the lower Rio Grande Valley is subtropically humid with hot Summers and cool Winters. The mean temperatures are about 60oF in Winter and approximately 82oF during the Summer. Freezing temperatures rarely occur. Precipitation, averaging 20 inches per year, is variable with maxima generally occurring in May and June and in September. Often a single thundershower will account for the entire month's rainfall. Winds from the southeast at 10 to 15 mph usually prevail. The annual evaporation rate approximates 60 inches.

Hurricanes occur infrequently during late Summer or early Autumn. However, the moisture brought by hurricanes has become the only source of essential flooding. No hurricane since Hurricane Allen in 1980 has reached the lower Rio Grande Valley.

Air

Air quality at Santa Ana NWR is highly suspect due to agricultural, industrial, and urban development (including imports from Mexico, immediately adjacent to the refuge's south boundary). Drift from aerial spraying, as well as ground application of biocides, is a major concern. Burning of refuge-surrounding sugarcane fields at harvest time results in smoke, falling ashes and occasional eye irritations. An industrial plant south and east of Santa Ana NWR results in a smoke plume over the refuge at times throughout the year depending on prevailing winds which are from the southeast.

Water

Water quantity and quality are both significant issues and concerns for Santa Ana NWR. Artificially-maintained impoundments require significant expenditures of O&M funds due to the lack of legal water rights for SANWR -- i.e., only "surplus" water rights. Additionally, water is suspected to be high in iron as well as other compounds which could potentially negatively impact wildlife population management and maintenance. Cattail, Pintail, Resaca, Willow, and Headquarters Lakes contain approximately 130 surface acres of water when full. Sources include precipitation and runoff, formerly periodic flooding from the Rio Grande, pumping from three wells, occasional donation of water from Hidalgo County Irrigation District No. 2 and purchase of irrigation water. Depths range from a few inches to about eight feet. Since the upstream construction of Falcon Dam, flooding has been greatly reduced and water levels can only be maintained by pumping.

Flora

Santa Ana NWR can be divided into five major habitat associations relative to the Mid-Valley Riparian Woods biotic community of the Tamaulipan Biotic Province (Land Protection Plan, 1985):

1. Resaca -- Wetland, intermittent to persistent, usually a former stream channel.

   Plants: Retama, Rattlebox, smartweed, Black Mimosa

2. Upland thorn forest -- Well-drained, elevated landforms, not normally flooded.

   Plants: Cenizo, Texas Ebony, Guayacán, Coyotillo, Trecul's Yucca, cacti, La Coma, Elbowbush, Blackbrush

3. Bottomland forest -- Deltaic plains, naturally intermittently flooded, but not holding waters.

Plants: Sugar Hackberry, Cedar Elm, Tepeguaje, Honey Mesquite, grasses, Rio Grande Ash, Texas Huisache, Pigeonberry, Chilipiquin, nettles

4. Riparian -- Stream-side terraces.

Plants: Giant Cane, Black Willow, Silvery-fruited Sandbar Willow, Butterflybush

5. Mudflats -- Expanses of open, flat terrain, generally lacking any plant cover, which are flooded by shallow water several times per year or receding shorelines of lakes and ponds.

Plants: None

Fauna

Santa Ana NWR has an abundant and diverse wildlife population. The Refuge provides habitat for at least 33 mammal, 358 avian, 33 reptile, 11 amphibian, 20 fish, 19 gastropod, hundreds of butterfly and skipper, and thousands of other invertebrate species. Much identification, especially of fishes and invertebrates, remains to be done.

At present, Santa Ana NWR is home or serves as a migratory stopover for four federally endangered species. Two native felines, the Ocelot and Jaguarundi, occur. The first confirmed sighting of an Ocelot since the early 1960's was substantiated by a photograph taken during March 1977. A sighting in December 1983 led to an ongoing documentation effort; see Section G-2 for 1985 documentations. Jaguarundis are also occasionally observed. Population estimates remain unavailable, but are frequently estimated as two to four for each species. Peregrine Falcons occasionally visit Santa Ana NWR. Several sightings during December 1977 represented the first on-refuge observations since 1974. Sightings continue several times per year through 1985. Wood Storks also occasionally visit Santa Ana NWR's limited aquatic habitat.

Capital Investment

The Refuge Complex received new administrative facilities in 1980. Capital investment at Santa Ana NWR includes 15 buildings, 7.5 miles of paved road and parking areas, 6.5 miles of gravel roads and parking areas, four foot bridges, one boardwalk, two miles of earthen dikes, 600 feet of open ditch, 24 water control structures, five buried water pipelines, 120 acres of water impoundments, five water wells with pumps, 30 miles of fencing, and three sewage systems.

Minerals and Energy Sources

The Rio Grande Delta has a long history of oil and gas exploration, but the several wells drilled on Santa Ana NWR were poor producers. The last well drilled on the refuge was in 1967. Mineral rights on original refuge property were forfeited to the U.S. Government after 30 years on 02 September 1973. The mineral rights to Bravo Woods and the new headquarters area remain under non-federal ownership. Region 2 has stated in a policy directive that seismic activities will not be permitted on Santa Ana NWR. Recent mineral development immediatly adjacent to Santa Ana NWR's south boundary in Mexico (thought to be petroleum) has raised the issue of addressing mineral resource development in the international sense.

Socio-Economic

The two lower Rio Grande Valley Standard Metropolitan Areas consistently rank as the most economically depressed in the nation. Today, agriculture is the main industry in the lower Rio Grande Valley. The Valley Chamber of Commerce has indicated that within five to ten years, tourism will replace farming as the greatest source of income in the area. Figures compiled by the Chamber indicate tourism has increased ten to fifteen percent a year during the last five years. Valley businessmen have responded to this potential source of income by building recreational vehicle parks, mobile home parks, and apartments throughout the region. Much of this new industry is directed at retired people, known as Winter Texans, wishing to escape the harsh winters of more northerly climes. These people comprise the majority of Santa Ana NWR's winter visitors.

Culturally, the area is primarily Mexican-American. Approximately eighty-five percent of the year-round inhabitants are of this descent and their heritage is reflected in many of the buildings and activities in the lower Rio Grande Valley.

G. WILDLIFE

H. PUBLIC USE

I. EQUIPMENT AND FACILITIES

J. OTHER ITEMS

A. HIGHLIGHTS

An Ocelot was live-trapped on Santa Ana NWR on 26 April 1985. (See Section G. 2.) Thus, the presence of the Ocelot has been documented in the proposed wildlife corridor along the lower Rio Grande.

Another Ocelot was photographed on Santa Ana NWR from September through November 1985. (See Section G.2.)

A peak at (from?) the "HIGHLIGHT OF THE YEAR." Are Ocelots present on Santa Ana NWR? Undoubtedly! (15/16SE85, SA373-07, JI)

During 1985, Santa Ana NWR lost three staff members. ORP Maxwell transferred to Aransas NWR in March. Clerk Bustos resigned in August to return to college. In September, the exodus continued as Santa Ana and Laguna Atascosa NWR's swapped ARM's. DeSantos of LANWR filled in at SANWR to replace Labuda for two months before returning to LANWR. At the end of CY 1985, Santa Ana NWR was badly understaffed with all three positions still vacant. Remaining personnel were taxed to cover the essential duties of the departed. (See Section E.1.)

Rio Grande Valley NWR, still in the acquisition process, shares a headquarters and Visitors' Center with Santa Ana NWR The Public Use program at Santa Ana NWR also serves as Rio Grande Valley NWR's interpretive program and attempts to educate visitors in regard to the land protection plan for the entire lower Rio Grande Valley. Rio Grande Valley NWR consists of over 30 isolated "islands" of native habitat scattered along the lower Rio Grande and near La Sal Vieja in four counties. With adequate funding, these habitat islands will be connected by a wildlife corridor of native or revegetated habitat along the lower Rio Grande from Boca Chica to Falcon Dam. Santa Ana and Rio Grande Valley NWR's share maintenance and clerical personnel and one project leader administers the Complex. For additional details see the Land Protection Plan inside the back

cover and the 1985 Rio Grande Valley NWR annual narrative.

Martin Suhr of the Regional Office visited the Refuge 23-25 January. His purpose was to discuss revision of the Stations' Fire Management Plan and to further organize installation of the Complex's new high frequency radio system.

Construction of a greenhouse for native plant revegetation work on Santa Ana NWR was completed in January 1985. (See Section I.1.)

Regional Director Mike Spear, Wildlife Resources ARD Ellis Klett, South Texas Refuges Supervisor Bill Hawthorne, Realty Supervisor Tom Smith, and South Texas Realty Supervisor Claude Lard visited Santa Ana and Rio Grande Valley NWR's on 11-14 February. The purpose of the visit was to review the land acquisition program in the Valley. In addition to an aerial overview of the project and on-the-ground site visits, the group met with local conservation, IBWC, and Texas Parks & Wildlife representatives. Fuller, Schumacher (RGVNWR), and Realty Specialist J. E. B. Stuart subsequently travelled to Albuquerque 2-3 April to present a 6-year land acquisition plan for the Rio Grande Valley NWR as requested by the RD and staff.

Regional Office personnel ARD-Habitat Resources Jim Young, South Texas Refuges Supervisor Bill Hawthorne, Regional Engineer Bill Stabler, Safety Officer Roger Monson, and B&F Officer Robert Casaus visited the Refuge during the second week of April. Their purpose was the implementation of the Regional field station evaluation. The Refuge was fortunate to have the benefit of their collective experience and some very useful criticism was received.

Charles McDonald, Regional SE Office, toured both Santa Ana and Rio Grande Valley Refuges on 25-26 February. He was given an orientation to the Refuges' objectives as well as on-the-ground site visits.

A National FWS Surveyors' Conference was held in the lower Rio Grande Valley the week of 25 February. The surveyors received an overview of the Rio Grande Valley land acquisition program and made site visits to several refuge units.

At April's end, the Refuge was visited by the dean of bird guide authors, Roger Tory Peterson. Dr. Peterson and a crew of hotshot birders were here as part of a "Big Day" effort. Their attempt to set a new North American record for number of bird species seen in a single day was successful; their total of 244 topped a previous California record by one species.

A Washington Office field station operations evaluation was conducted by team members Elizabeth Cummings and Ella Strader of the WO and Ronald V. Papike, Sherburne NWR Refuge Manager, on 15 May.

Phase I of the Contaminant Monitoring Program for Santa Ana/Rio Grande Valley and Laguna Atascosa NWR's was initiated in July/August with the collection of sediment samples under the direction of RCA Gerry Jackson of the Corpus Christi Ecological Services office. The program involved the collection of numerous sediment samples spread over a four-county area from Falcon Dam to the Gulf of Mexico. Results are pending.

Dave Kimbrell, WO Realty, paid a courtesy visit to the Refuge on 14 November. Dave was in the "Valley" to review LRGV acquisition/appraisal procedures with Realty Specialist J.E.B. Stuart.

Nine members of the Jiangxi and Jiangsu Provincial delegations from the People's Republic of China on a two-week tour under the sponsorship of the International Crane Foundation arrived at Santa Ana NWR on 5 December. Here, they were greeted and served a luncheon by Frontera Audubon. Fuller and DeSantos met with the delegation and discussed conversion of cleared and developed lands to wildlife habitat, "people control" of 100,000 visitors a year while preserving a 2,000-acre wildlife refuge, and plans to acquire 107,000 acres to form a Rio Grande wildlife corridor with Santa Ana NWR currently at the center of some 30 separate tracts comprising 17,000 acres. After the meeting, the delegations and FAS and SANWR hosts rode the interpretive tram.

Santa Ana/Rio Grande Valley NWR Complex was contacted and visited by staff reporters from the Sacramento Bee in 1985.

Fuller and Schumacher (RGVNWR) attended the First Regional Conference of the Rio Grande Border States on Parks and Wildlife, 5-8 November 1985, in Laredo, Texas. The conference was a forum for discussion and exchange on issues pertaining to parks, saving natural areas, and wildlife in the border states along the Rio Grande and sponsored by the states of Chihuahua, Coahuila, Nuevo León, Tamaulipas, and Texas. Both felt the conference was an excellent first effort enabling communication with other agencies and individuals pursuing similar goals. Keynote speakers included the governors of Texas and Tamaulipas and the Director of the U.S. National Park Service. Additionally, at the conference, Fuller and Schumacher were invited by the Texas Parks & Wildlife Department to discuss the International Biosphere Program with IBP representative Bill Klegg as well as brief Klegg on the lower Rio Grande Valley project. It appears the International Biosphere Program could be an excellent vehicle for increasing international networking and resource protection efforts. Interest was expressed in establishing a Biosphere Reserve which would encompass the United States and Mexican portions of the Rio Grande Valley relative to the Tamaulipan Biotic Province.

Press interest in the Refuge and Refuge Complex continues to escalate. Contacts include PBS for filming a documentary on river ecosystem preservation and private sector initiative, Texas Parks and Wildlife Department for a documentary on native plant revegetation efforts, effects of channel dams on wildlife resources and Valley refuges, and numerous activity and event articles.

Congressional briefings concerning the Rio Grande Valley NWR land acquisition program were presented to staff members of Senator Phil Gramm and Congressman Eligio (Kika) de la Garza by Fuller, Stuart, and Schumacher RGVNWR).

An Ocelot Recovery Plan was initiated by the R2 Endangered Species Office (See Section G.2.)

B. CLIMATIC CONDITIONS

A freak ice storm hit the refuge (and the entire lower Rio Grande Valley) on 12 and 13 January. A light, drizzling rain begin to freeze on plant leaf and stem surfaces on Saturday evening as the temperature dropped into the low thirties. By Sunday morning ice dropped trees were a common sight, and ice coated roads provided for hazardous driving conditions. The sound of branches breaking under the weight of so much ice was mistaken for gunshots by people and ducks alike. By mid-afternoon Sunday, however, the "Spring melt" was well underway, and most ice was gone by nightfall. Four freezes occurred during January and the first week of February.

Spring came creeping into the lower Rio Grande Valley in February; wildflowers began blooming, the first Purple Martins arrived, and a hint of Summer temperatures was in the air. Enough precipitation also fell in March to encourage an attractive bloom of wildflowers. In 1984, Santa Ana NWR went 100 days from February to May without rainfall. Pleasant temperatures and moderate to ample rainfall characterized the months of April and May. The extreme warmth of Summer arrived much later than in 1984 (107oF on 27 March 1984) with 100oF first reached on 11 June 1985. Precipitation of 5.57 inches fell on 19 June. July was another scorcher and August still a little warmer this year. Summer heat lingered on through September with over 90oF daily until about 27 September. September was dry except for the 4.5-inch deluge the last morning of the month. Then soil and vegetation dried as less than an inch of rainfall fell in each of the last three months of 1985. Freezing temperatures of 29oF and 31oF were reached the mornings of 14 and 15 December; freezing temperatures normally do not occur here before the "official" calendar start of winter (winter soltice). Table B-1 and Figures B-1 and B-2 illustrate 1985 temperature and rainfall patterns.

September wind speed averaged Force 1.47 at the morning check (Force 1 includes 1-5 km/hr winds and Force 2 6-11 km/hr) and Force 3.03 at the afternoon check (Force 3 includes 12-19 km/hr winds). Wind direction averaged 10.2 (East=10, ESE=11) in September. October wind speed averaged Force 1.35 at the morning check and Force 2.77 at the afternoon check. Wind direction averaged 8.56 (NE=8, ENE=9). Force 5 winds (29-38 km/hr) prevailed 27-30 October. Sugarcane burning and harvesting began along the east boundary on 28 October. November wind speed averaged Force 1.73 at the morning check and Force 2.67 at the afternoon check. Wind direction averaged 9.33 (ENE=9, E=10) from two checks per day in November. December wind speed averaged Force 1.58 at the morning check and Force 1.83 at the afternoon check (29 checks each). Wind direction averaged 7.3 (NNE=7, NE=8) from two checks per day (29 days) in December.

Table B-1. Temperature (OF) and precipitation (inches) data for CY 1985.

1985	HIGH	LOW	AVG. HIGH	AVG. LOW	AVG. TEMP.	PRECIPITATION
January	85	25	63.5	43.9	53.7	2.43
February	87	27	67.5	46.2	56.9	1.13
March	92	47	75.6	62.1	68.8	1.15
April	95	50	86.8	65.7	76.2	1.46
May	98	60	91.5	70.6	81.0	3.07
June	100	63	93.2	73.2	83.2	6.95
July	98	67	96.7	72.4	84.6	1.73
August	101	70	98.2	73.4	85.8	0.24
September	100	60	94.4	71.3	82.8	5.32
October	93	50	86.8	66.1	76.4	0.94
November	90	41	82.6	62.6	72.6	0.69
December	89	29	69.3	49.2	59.2	0.64

Figure B-1. Precipitation by month in CY 1985.

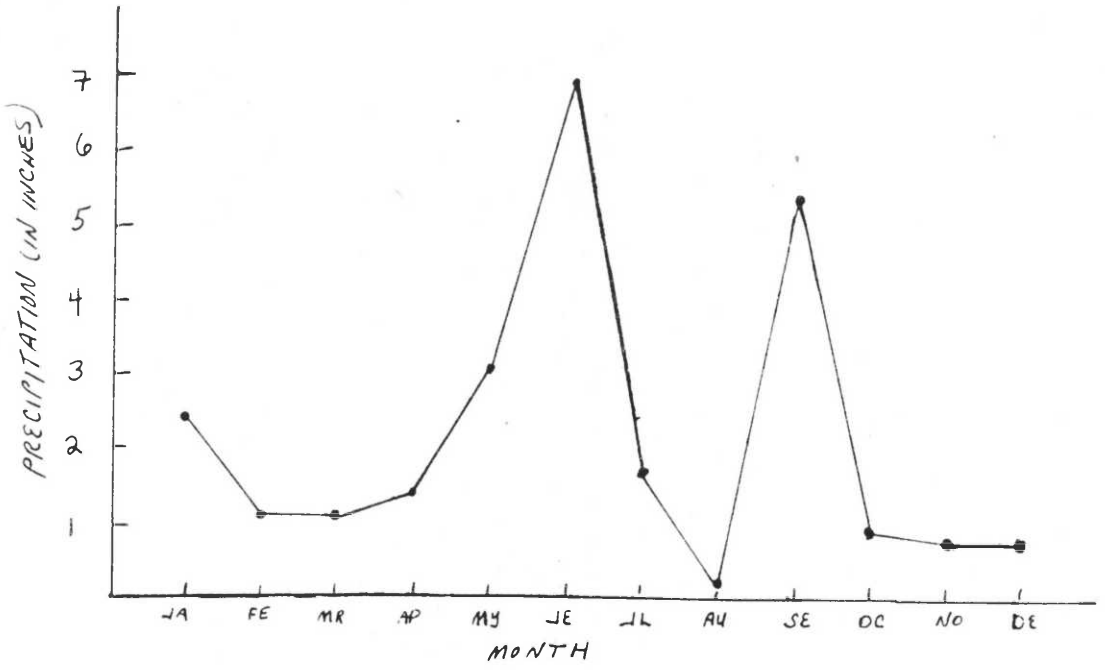
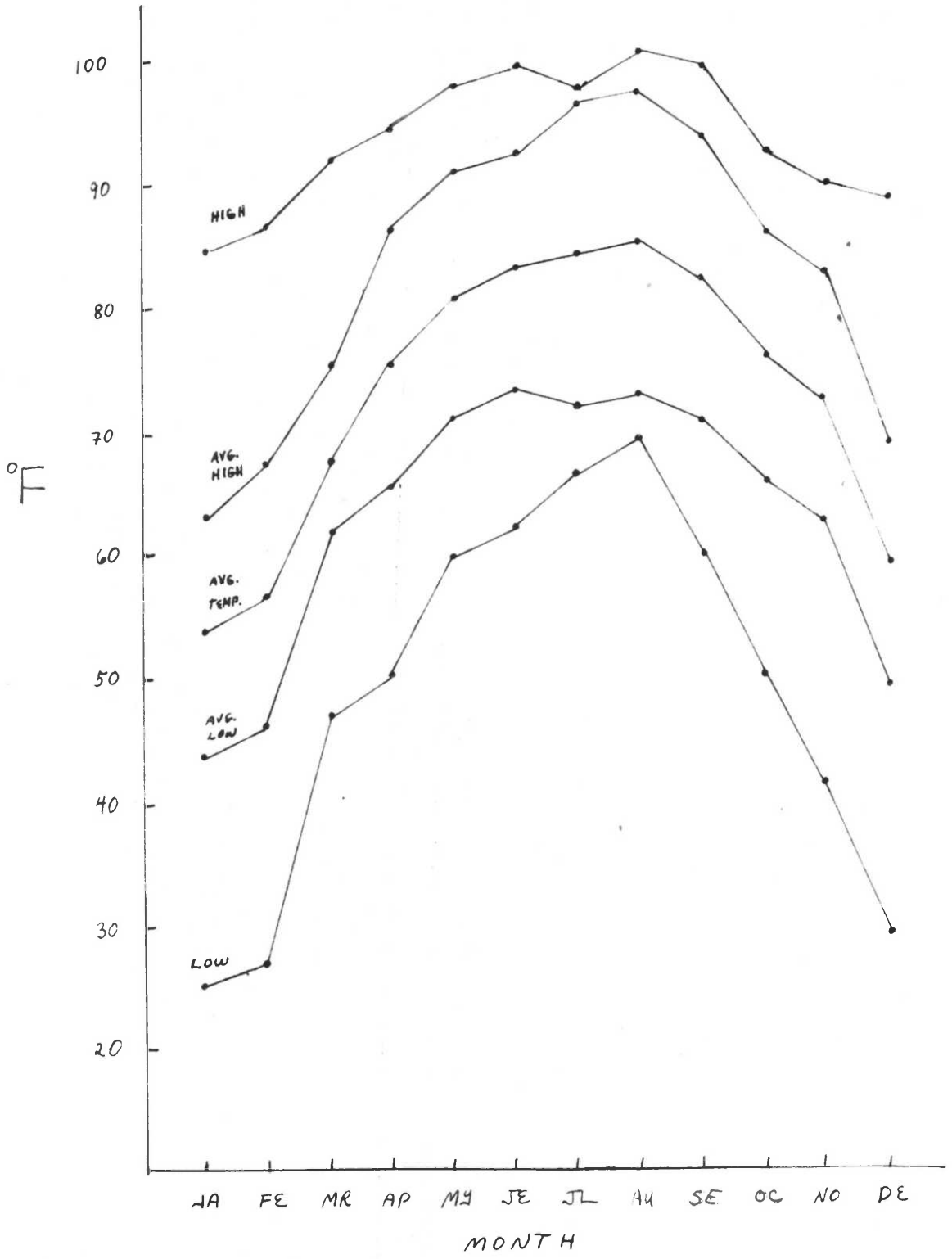


Figure B-2. Temperature patterns based on monthly extremes and averages during CY 1985. High 101o, low 25o.



C. LAND ACQUISITION

1. Fee Title

Nothing to report.

2. Easements

Nothing to report.

3. Other

Nothing to report.

D. PLANNING

1. Master Plan

The Refuge was Regionally ranked Low Priority for Master Planning as a result of the 1983 Planning Needs Assessment document and Regional Committee, evaluation. The field station recommendation had been Low Priority for Master Planning. FY 86 AWPA stipulates that a Planning Needs Assessment will be conducted for this, as for all refuges in the Region, in 1986.

2. Management Plans

Management plans in draft format and currently under review for finalization include oil and gas and interpretive. Management plans considered somewhat current and usable by the Refuge are the fire and sign plans completed in CY 84. Management plans needed inclde Water Quality Monitoring/Water Management Plan and Wildlife Inventory (consistent methodology) Plan. Perhaps most needed by this station, although not currently considered a category for management planning, is a General Policies Management Plan, i.e. one document which relates the policies, crossing category lines, which pulls together in one document the field station's policies in effect at the Refuge. By locating in one Source Document specific policies necessary for the individual station, we would be more effective in transferring essential policy information to incoming staff and volunteers, as well as better enabling management to avoid lurches in communication and determine voids.

3. Public Participation

In February, Fuller was appointed as a Public Participation Subcommittee member of the Environmental Resources Committee of the Lower Rio Grande Valley Development Council. The Subcommittee is to develop topics/plans for public participation seminars dealing with water quality in the lower Rio Grande Valley. The seminars are being funded through the EPA.

Fuller and Schumacher (RGVNWR) attended a public meeting on 27 February in Harlingen. This Army Corps of Engineers public meeting provided an overview of a flood control project planned for Cameron County by the Army Corps of Engineers and to allow for public comment.

The local press took a good deal of Refuge time in October as they prepared the annual El Tourista editions for the three major papers in the Valley. It

appears that the inclusion of the refuges of the Valley is becoming a must for these editions. To date, the Refuge has had good response from reporters as to covering effectively its mission, goals, and programs so that the public understands its uniqueness and why certain activities cannot be permitted, i.e. camping, picnic tables, etc. The potential to develop an aware and supportive public is a possibility -- the Refuge Complex needs sufficient staff to enable us to meet this essential commitment!!

A Public Participation Seminar was held in Harlingen on 30 October to discuss pros and cons of the Texas Water Plan and pending legislation. The seminars, funded by EPA and sponsored by the Lower Rio Grande Development Council (LRGVDC), are planned and scheduled through the Environmental Resources Committee (ERC) of the LRGVDC. Controversy developed over the keynote speaker who was on-record in favor of the Plan. Ultimately, Dr. Dede Armentrout, National Audubon Society, Southwest Region, was invited to speak against the Plan. Many environmental concerns were raised by members of the public attending the seminar. It appears that the plan and legislation has the potential to significantly impact wildlife resources through lack of actual environmental controls. The legislation passed on the 5 November ballot.

The Governor's Texas Rural Water Committee held a meeting in McAllen on 13 December. Ecological Services staff Brian Cain and Roy Erwin presented a program on the FWS Resource Contaminant Program. Fuller discussed the FWS program relative to the three lower Rio Grande Valley refuges.

4. Compliance with Environmental and Cultural Resource Mandates

Fuller and Schumacher (RGVNWR) met with Ecological Services personnel at Corpus Christi on 22 October. The meeting was scheduled to foster better cross programming and coordination between the two offices. The ES Office has been extremely receptive and assertive in assuring that both offices coordinate responses and share information. Plans are to schedule this type of meeting bi-annually. The meeting was extremely informative and provided the chance to discuss issues face-to-face with Roy Perez and his staff.

On 19 February, Roy Fry and Gary Waggerman of Texas Parks & Wildlife and David Curtis of Fort Worth ES met with Refuge staff concerning the proposed channel dam projects in the lower Rio Grande Valley. Texas Parks & Wildlife Department is reviewing all proposed water projects in the State of Texas and was interested in receiving Refuge comments relative to the channel dam projects and their potential impacts on fish and wildlife resources from the Refuge's perspective.

Fuller met with Bill Ruth, new Project Manager for the International Boundary and Water Commission for the lower Rio Grande Valley area, on 4 November. Bill had been Assistant Project Manager until Joe Tucker's retirement on 1 November. Fuller had requested the meeting to discuss a levee safety signage problem at Santa Ana NWR as well as the boundary gate lock system on Rio Grande Valley NWR's Cottam unit. Bill was given a set of aerial maps of FWS properties in the Valley and key to RGVNWR units for IBWC use.

Fuller, Gilbertson, and Schumacher (RGVNWR) met with Corpus Christi Ecological Services staff on 3 December to discuss the IBWC "essential elements" material presented to Regional Director Mike Spear by IBWC Commissioner Joe Friedkin. Both field stations voiced similar concerns at the meeting regarding the

"essential elements" material relative to negative impacts on FWS resource responsibilities. Written reaction and response to the materials was submitted by the Complex on 18 December. Corpus Christi ES submitted a separate written reaction and response.

Fuller and Schumacher (RGVNWR) participated in a field trip on 11 December to the proposed Playa del Rio Development Project. FWS, Texas Parks & Wildlife Department, Army Corps of Engineers, EPA, National Marine Fisheries, and developers participated. By Corps estimates, two-thirds (2/3) of the proposed project will involve wetlands. The project, as proposed, will involve lands which have been identified as a future portion of the RGVNWR and which are significant to wildlife resource management/perpetuity.

Channel dams remained a potential threat to the wildlife corridor at year's end. Construction of two dams at Retamal and Brownsville would futher reduce the insufficient inflow and flood riverbank areas critical to the wildlife corridor concept. Corpus Christi ES is currently preparing a special report on impacts of water development projects on lower Rio Grande Valley refuges, with emphasis on the proposed channel dams.

5. Research and Investigations

In March, Dr. Pauline James of Pan American University in Edinburg began studying Elf Owls on Santa Ana NWR, comparing their nest preferences for natural cavities versus nest boxes. One beneficial spin-off of the study for the refuge will be her periodic surveys of the population, which will give the refuge a more accurate account of this owl's status here. Dr. James and Dr. DeWayne Hodges also continued to monitor Least Grebe populations through the end of CY 1985.

Fuller, DeSantos, and Schumacher (RGVNWR) met with Pan American University professor, Dr. Bob Edwards, and graduate student, Matthew A. Ciomperlik, in October to discuss a graduate program proposal on fish population diversity/abundance and water quality on Santa Ana/Rio Grande Valley NWR's. The refuges are attempting to dovetail this research with their Contaminant Monitoring Program. Some fish specimens sampled are planned to become part of Phase II - Tissue Sampling for the on-going contaminant monitoring program.

Other research conducted during CY 1985 included the Wildlife Corridor Study by Patuxant, the Endangered Feline Documentation by Ideker (see Section G.2), Ocelot Habitat Requirements by Ideker, Santa Ana's portion of the Woody Plant Inventory primarily by Ideker and Dr. Russel O. Wagner, Lepidopteran research by Ed Knudson and Paul Tuskes, and the Resource Contaminants Study by Gerry Jackson of the Corpus Christi Ecological Services office.

The following investigations were authorized by special use permits in 1985:

Santa Ana NR85 - "The Social System of the Green Jay in Texas" (21551-02)
SA-85-02 Douglas C. Gayou, University of Missouri; investigate social system, ecology, and reproductive biology of the Green Jay; one visit was made in March, a banding data list was received, the doctoral dissertation was received; begun 1981.

Santa Ana NR85 - "Elf Owl Life History and Management Study" (21551-04)
SA-85-04 Pauline James, Pan American University; investigate nesting ecology

and survey populations of the Elf Owl; the study was conducted and the report received; begun 1984 (continuation of study begun at La Grulla in 1978).

Santa Ana NR85 - "Odonate Field Guide" (21551-05)
SA-85-05 Sidney W. Dunkle, University of Florida; collect dragonflies and damselflies for preparation of a field guide; collections and observations were made on 9 May and a report received by the end of May; begun 1985.

Santa Ana NR85 - "Biological Control Agents of Indianmallow" (21551-06)
SA-85-06 Neal R. Spencer, Southern Weed Science Laboratory; investigate and collect Indianmallow (Abutilon) and look at insect associations to determine possible biocontrol agents; no data on whether the permit was used or report were in the file; begun 1985.

Santa Ana NR85 - "Least Grebe Life History and Management Study" (21551-07)
SA-85-07 Pauline James, Pan American University; investigate nesting ecology and reproductive biology of the Least Grebe; the study was conducted and the report received; begun 1985.

Santa Ana NR85 - "Flea Beetles as Biological Control Agents of Indianmallow" (21551-08)
SA-85-08 Paul Parker, National Biological Control Laboratory; investigate and collect flea beetles to determine possible biocontrol agents for Indianmallow; collections were made and forwarded to Spencer and Parker's report received; begun 1985.

David Junkin (Rio Grande Valley NWR) holds the density boards which are photographed from the center of each woody inventory plot along the four cardinal directions for later comparison. Some of the various tools used in the inventory are scattered around the center stake of Santa Ana NWR Plot 5 (Summer 1984, Plot 5, JI).

Santa Ana NR85 - "Ichthyological Seasonality and Water Parameters" (21551-09)
SA-85-09 Matthew A. Ciomperlik, Pan American University; examine distribution, seasonality, and abundance of the ichthyofauna of SANWR, collect data on water parameters and seasonal food availability, and to collect and forward fish samples for USFWS pesticide analysis; monthly samples taken and reports received; begun 1985.

6. Other

Refuge personnel reviewed and provided comments to Regional Office SE on the Ocelot recovery plan draft.

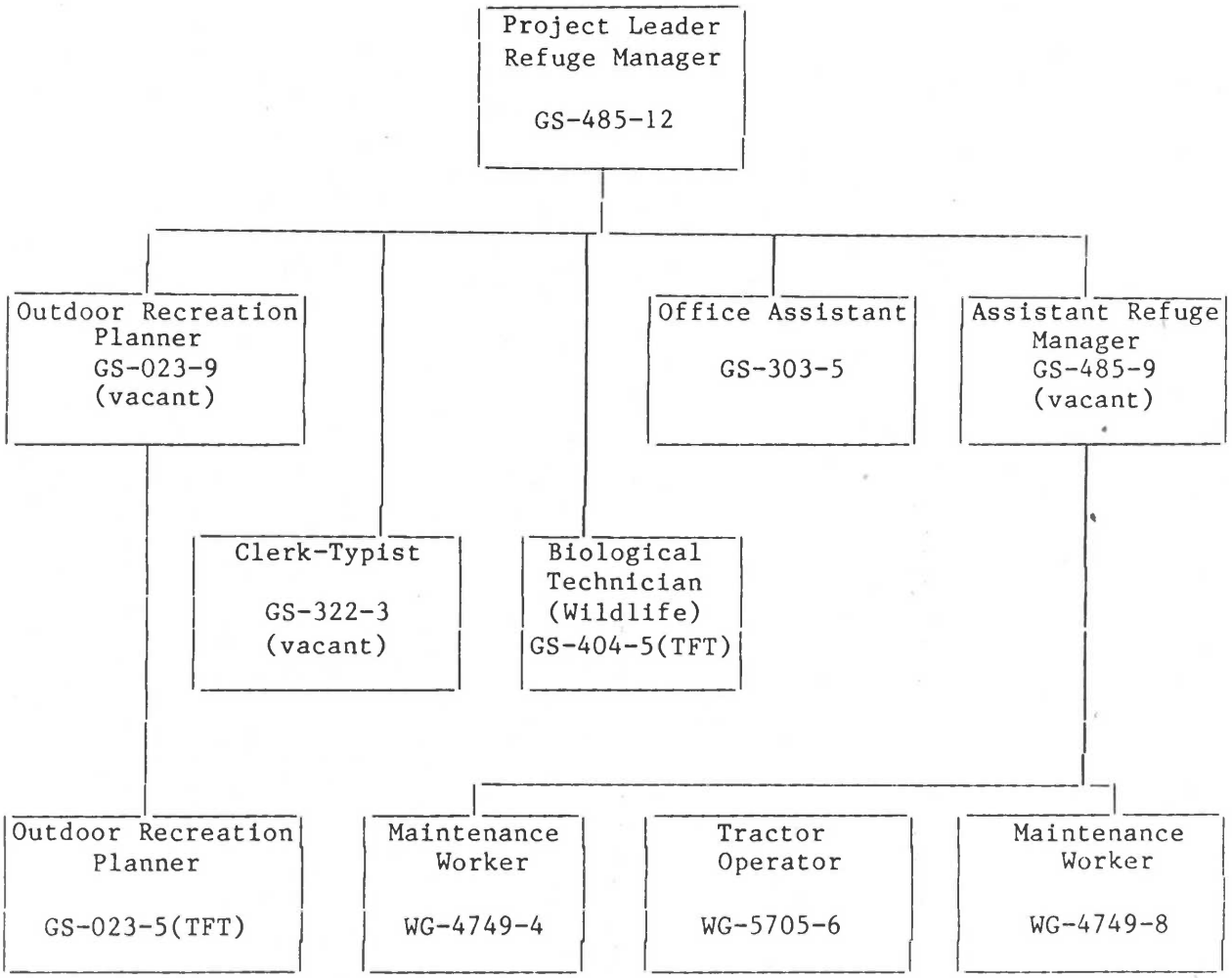
E. ADMINISTRATION

Personnel

Staff of Santa Ana NWR pose in the Spring of 1985; numbers refer to the list below. (Spring 1985, R.S. Vora)

1. Nita M. Fuller, Project Leader and Refuge Manager, GS-485-12, PFT
2. Stephen Edward Labuda, Jr., Assistant Refuge Manager, GS-485-9, PFT
3. Melvin Gerald Maxwell, Outdoor Recreation Planner, GS-023-9, PFT
4. Fermin Mancha, Jr., Maintenance Worker, WG-04749-8, PFT
5. Ruben Cavazos, Tractor Operator, WG-05705-6, PFT
6. Maria de la Luz Hernandez, Office Assistant, GS-303-5, PFT
7. Maria Ascension Bustos, Clerk-Typist, GS-322-3, PFT
8. Ricardo Alvin Flores, Maintenance Worker, WG-04749-4, PFT
9. Joe Ideker, Biological Technician, GS-404-05, TFT
10. Wayne E. McMillan, Outdoor Recreation Planner, GS-023-5, TFT
11. John Kreilick, Student Conservation Volunteer/Public Use
12. Bernice DeSantos, Assistant Refuge Manager, GS-485-07, PFT, TDY
13. Nancy Ann Morrissey, Outdoor Recreation Planner, GS-023-5, TFT

Santa Ana National Wildlife Refuge Organizational Chart
-- at end of CY 1985



1. Personnel

A list of personnel changes for Santa Ana NWR, which occurred in 1985, is presented in chronological order below.

CHANGES

NAME	FROM	TO	EFFECTIVE DATE
John Kreilick	Santa Ana NWR	Laguna Atascosa NWR YCC	10 Jun 85
Melvin Gerald Maxwell	Santa Ana NWR	Aransas NWR	17 Mar 85
Maria Ascension Bustos	Santa Ana NWR	Resigned	17 Aug 85
Joe Ideker	Extended	to 28 Sep 86	29 Sep 85
Stephen Edward Labuda, Jr.	Santa Ana NWR	Laguna Atascosa NWR	16 Sep 85
Bernice DeSantos	Laguna Atascosa NWR	Santa Ana NWR	28 Sep 85
Wayne E. McMillan	Extended	to 01 Jan 86	11 Sep 85
Nancy Ann Morrissey	Outdoor Sci. School	Santa Ana NWR	12 Nov 85
Bernice DeSantos	Santa Ana NWR	Laguna Atascosa NWR	05 Dec 85

On-board strength of the Refuge staff for the most recent five-year period is reflected in the table below.

NUMBER OF EMPLOYEES

	PERMANENT			TOTAL
	FULL TIME	PART TIME	TEMPORARY	FTE
FY-85	8	0	2	9.08
FY-84	8	0	2	9.17
FY-83	8	0	2	9.50
FY-82	7	1	2	8.46
FY-81	7	1	3	8.76

2. Youth Programs

The Youth Conservation Corps camp at the Santa Ana/Rio Grande Valley NWR Complex in 1985 was smaller by ten than in the previous year. The ten enrollees selected by random drawing included Rick Cortez, Sharon Cron, Nash Dunlap, Sergio Garcia, Lizandro Garza, Flavio Jurado, Amparo Mancha, Leticia Mancha, Melody Swofford, and Jesus Vela. McMillan had charge of the YCC program.

These ten enrollees represented the total number for both Santa Ana and Rio Grande Valley NWR's and all were used interchangeably on both refuges in a variety of work projects. In order to provide adequate supervision for the

A YCC enrollee cleans Mescalbean seed for revegetation. Seeds were planted in the greenhouse to grow seedlings for use in revegetation efforts. (Summer 1985, YCC, LAG)

enrollees, two supervisors were hired on contract. The station was extremely fortunate to secure two supervisors with the skills of Linda Ann Gardner and Roy Arce. Linda Ann Gardner is a Biology teacher from McAllen High School and a knowledgeable environmental conservationist. Roy Arce is an industrial arts instructor for the Pharr-San Juan-Alamo Independent School District. Both supervisors proved to be excellent motivators and accomplished a tremendous amount of work with the enrollees. Their familiarity with the Refuge and dedication to preserving natural resources not only helped in carrying out their responsibilities, but was evident to the enrollees.

The 1985 YCC Program at the Santa Ana/Rio Grande Complex was immensely productive during the eight-week camp. The enrollees spent many hours collecting and cleaning native plant seeds, landscaping the central traffic island in the Visitors' Center parking lot, constructing a walkway to the greenhouse, repairing the photography/observation blinds and observation platforms, preparing herbarium specimens, building a wood rat-proof sign storage shed, trimming trails, planting a prickly pear fire break on the Vela Woods tract of the Rio Grande Valley NWR, building fence on the Palmview tract, preparing planting tubes and performing other tasks in the greenhouse, cleaning up the Nature Park of the Valley Nature Center (picking up trash thrown over the fences, removing invading exotic vegetation, trimming limbs from trails, painting the building), and cleaning chickens for Bird Rescue's rehabilitating raptors.

YCC enrollees and group leaders pose during the Summer of 1985:
1-Gardner, 2-Garza, 3-L. Mancha, 4-García, 5-A. Mancha, 6-Vela, 7-Arce, 8-Jurado, 9-Crum, 10-Dunlap, 11-Swofford, absent-Cortez. (Summer 1985, YCC, JI)

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SEED CLEANING TECHNIQUES*

Linda Ann Gardner
Native Plant Project

The following techniques for seed cleaning were developed or improved upon by the 1985 Youth Conservation Corps leaders and student workers at Santa Ana and Rio Grande Valley National Wildlife Refuges.

TEXAS HUISACHE (Acacia smallii) — Collection of large quantities of Texas Huisache seeds was especially important because the species failed to produce pods in 1984 following the freeze damage to this early floverer by the Christmas Freeze of 1983. Small quantities of pods may be opened by cutting through the center of the pod longitudinally to remove the seeds. The seeds need an acid treatment before they will germinate. Seeds and/or pods may be swept up from streets and roads and sifted in boxes with wooden sides and hardware cloth (mesh) bottoms. Pods may be collected from trees while wearing long sleeves and gloves and using pruning shears, if desired. Collected pods may be spread out to dry in the sunshine for a day or two (until crunchy) on large pieces of black plastic or canvas. Pods can be stomped with heavy boots or driven over with a heavy vehicle such as a pickup truck to crush them. Sifting through a 1/8-inch mesh sift box over a second 1/16-inch sift box will remove uncrushed pods. The seeds accumulate in the 1/16-inch sift box and can then be carefully cleaned of other debris by shaking and picking.

TEPEGUAJE (Leucaena pulverulenta) — Pods can be picked from the tree or from the ground before they open. Pods left on the ground soon open and drop their seeds. Be careful not to collect the related Popinac (Leucaena leucocephala), an introduced, weedy exotic, common in local towns and undesirable for native plant plantings and revegetation efforts. After collecting, spread the pods out to dry in the sunshine on a large piece of plastic or canvas. A day or two should dry the pods enough to curl open. Simply rub the pods between the hands in big fist-fulls until all the seeds have been released. Pour the seeds into a 1/16-inch sift box for removal of leaf litter. See winnowing below.

TEXAS EBONY (Pithecellobium flexicaule) — Texas Ebony pods may be collected under the trees as they drop or in larger quantities by removing pods from trees using pruning shears, ladders, and ground cloths to catch the picked pods. Dry the pods on black plastic or canvas in sunshine for several days or weeks. Driving over the pods may make it easier to open them by hand or with pruning shears. This method is extremely labor intensive, but no faster method has yet been evolved. It has been noted that as the pods dry some split open, but no systematic check has been made to learn whether all or most eventually will. Texas Ebony requires acid treatment before germination.

WINNOWING AND FLOATING SEPARATION TECHNIQUES — One highly useful separation technique is WINNOWING (pouring the seeds and debris from one sift box to another in a slight breeze which separates much of the lighter debris such as small leaves from the heavier seeds. Pouring is a modification of the traditional procedure where pioneer farmers threw harvested grain into the air to separate the wheat from the chaff. Winnowing by pouring loses less seed. Another separation technique is FLOATING. If the seeds and debris are poured into a dishpan nearly full of water and stirred, most insect-eaten seeds, bad seeds, and debris float at the surface. The good seeds sink. This technique is great for hard-coated seeds, but must be applied very carefully to thin-coated seeds such as Tepeguaje. Tepeguaje must be quickly removed from the water and carefully and quickly dried to avoid immediate germination.

(Continued on page 6)

REVEGETATION 1985

The Rio Grande Valley National Wildlife Refuge set its goals at one million seeds each of Texas Huisache (Acacia smallii), Tepeguaje (Leucaena pulverulenta and Texas Ebony (Pithecellobium flexicaule). Personnel, especially Youth Conservation Corps student workers and fire crews, of the Santa Ana/Rio Grande Valley Wildlife Refuge Complex collected, cleaned, and stored 621,490 Texas Huisache, 430,000 Tepeguaje, and 246,000 Texas Ebony seeds through 26 August 1985. The Texas Ebony count will grow as more already collected pods are processed. These efforts were supervised by Wayne E. McMillen and his YCC crew leaders, Linda Ann Gardner (Native Plant Project) and Roy Arce, and Nancy M. Gilbertson (Native Plant Project Director) and her assistant, Elizabeth L. Couch, a cooperative scholar from Texas A&M University.

The seemingly overwhelming numbers of seeds collected will facilitate the continuation of efforts to revegetate cleared refuge lands through the restoration of wildlife habitat with native plants. Some seeds may be directly seeded and others will be planted in the RGVNWR greenhouse and transplanted as seedlings. Seeds of other species were also collected in smaller numbers.

This revegetation effort could use additional HELP! Volunteers are urgently needed to collect additional seeds and to clean more Texas Ebony seeds. Call (512) 787-7861 to offer your services. Collected seeds must be removed from the pod or the fleshy portion removed, cleaned, and stored with an insect repellent to resist bruchid beetles which lay their eggs and rear their young naturally in seeds and find massed, stored seeds an ideal opportunity for species propagation too attractive to resist.

Seed Cleaning Techniques (Continued from page 9)

FLESHY FRUITS — Fruits such as Granjeno (Celtis pallida), Brasil (Condalia hookeri), Coyotillo (Karwinskia humboldtiana), and Chapotillo (Amyris texana) are drupes, while Anaqua (Ehretia anacua) and Ivy Treebine (Cissus incisa) are are similarly appearing berries. Drupes have a single seed or pit enclosed in a hard outer coat; berries usually have more than one seed (Anaqua two, Ivy Treebine one to four). Otherwise, these similar fruits consist of a fleshy pulp around the seed. To clean large quantities of fleshy fruits, mash the pulp and add water to fruits in a glass or plastic container. Let ferment for several days, but do not allow to dry out. Wash deteriorated flesh from seeds. Set seeds out to air dry (not in direct sunlight) in a sift box propped so air can circulate through the bottom. Small quantities of edible fleshy fruits can be cleaned by eating them like grapes and saving the seeds. This technique may not be safe for Coyotillo. Another technique has the seeds being rubbed back and forth on the mesh of a sift box until the flesh is rubbed off.

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* adapted and edited from a report submitted by the author.

YCC enrollees prepare the central parking lot island for landscaping with native plants. (Summer 1985, YCC, LAG)

After eight months, the native plant landscaping of the central parking lot island has grown quite attractive. (14MR86, R1-08, JI)

Learning experiences included earning certificates in first aid and cardiopulmonary resuscitation, visiting the Gladys Porter Zoo in Brownsville for a program on the importance of captive breeding programs to endangered species, learning about the Ocelot study at Laguna Atascosa NWR, treking to South Padre Island to learn about the function of barrier islands and to discuss human impacts on the island's fragile ecosystem, and enjoying Mardi Eggers' presentation for Bird Rescue utilizing live, non-releasable raptors.

Three of the enrollees enjoyed their Summer of work so much that they volunteered their services to continue for an additional week without pay. Jesse Vela, Amparo Mancho, and Leticia Mancha each donated a week of their scarce vacation time to continue working.

Although the drain on our limited time this program presents us with seems and is often overwhelming, the long-term resource gains we can be afforded through the program, in resource-conscious individuals, will make the potential gain worth the strain.

3. Other Manpower Programs

Probationers from the Hidalgo County Adult Probation Department volunteered many community service hours to the Refuge. These volunteers proved useful in several areas. They have been exceptionally effective in maintenance such as clearing drainage ditches, cleaning interpretive signs, and the patio and parking areas, either on weekends while the maintenance crew was off or assisting the maintenance workers during the work week. Others have helped Public Use personnel on weekends photocopying trail guides, tram schedules, wildlife lists, and other needed copying; folding brochures and maps; and cleaning restrooms, windows, exhibits, rugs, etc. -- thus, freeing the Public Use staff to meet the public, put on slide shows, and complete other interpretive efforts.

4. Volunteer Program

Volunteers play an essential role in accomplishing the Refuge's goals. With always more work to accomplish than the personnel and time permit, volunteers help tremendously by doing work or freeing staff to complete tasks which otherwise would go undone.

Although records for early 1985 remain too incomplete to properly utilize and acknowledge in this manner, the returning Fall Winter Texans were checked in as they arrived:

> Ralph Stockman, Winter Texan from Minnesota, resumed his duties as Volunteer Coordinator on 19 November. He has also filled in ably at the information counter, freeing staff for training and other duties.
>
> Alice and Bill Burger, Winter Texans from Maine, returned to their duties on 5 November. They work the information counter, initiate slide programs, and offer nature walks on Mondays and Tuesdays.
>
> Winter Texan Harold Deeth returned as a volunteer. He trims trails, plants seedlings, and generally improves the appearance of the landscaping around the Visitors' Center.

Emma and John Messerly, Winter Texans from Bartlesville, Oklahoma, returned as volunteers. Emma continues to catalog specimens and John does computer work for the Refuge Complex.

Russel and Ethel Mae Wagner checked in on 21 November from icy Wisconsin. Dr. Wagner resumed his winter occupation on 26 November as Plant Ecologist for Rio Grande Valley NWR, inventorying woody plant plots on Santa Ana NWR.

Several new people began volunteering in the Fall of 1985 and lent their welcome hands to the Environmental Education cause:

Betty Ashworth, a recently retired local teacher, has become a Refuge volunteer. Betty is especially interested in helping develop an Environmental Education resource library for teachers, as well as volunteering at the Valley Nature Center, and displaying her resource concern as an effective writer.

Dr. Ed and Doris Lowry began as volunteers on 25 November researching sources of Environmental Education materials. He is a retired fisheries biologist and educator.

Two volunteers continue to work almost exclusively, and most effectively, in the classroom:

Jane Kittleman and Mardi Eggers present Environmental Education programs in the local schools. By providing programs at the schools, Jane and Mardi promote environmental awareness while reducing public use pressure on the Refuge.

Volunteer Mardi Eggers presents her program on Bird Rescue to the 1985 YCC enrollees. The center of attraction is a Harris's Hawk; a Crested Caracara stands near Amy's hand and a White-tailed Hawk perches behind her. These raptors, unable to fend for themselves if released, are used in Environmental Education programs in the schools. (Summer 1985, YCC, LAG)

The Refuge's two nearest neighbors have worked as volunteers:

Helen Schuster helped Wednesdays at the information counter and provided Staff with much useful, historic information about the Refuge and its surrounding agriculture.

Juan Meza put in long hours on his volunteer horticultural duties. He has been busy trimming vegetation, planting trees, placing sand on the too loose gravel walkway to the greenhouse, and working in the greenhouse.

Five local residents have volunteered their services in organizing the file system and library or cleaning seeds:

Barbara Fox has been reorganizing the Refuge Complex's complex filing system. This long, thankless task will take her months.

Guadalupe and Karen Mier catalogued a large portion of the books in the Refuge library, but they still have a way to go before finishing.

Harry and Rose Miller spent many long, hot Summer hours cleaning difficult seeds such as Texas Ebony and on landscaping chores around the Visitors' Center.

Dr. Pauline James and student volunteers refurbish Black-bellied Whistling-Duck nest boxes. (file photo, anon)

Some volunteers come to the Refuge to work on their research or provide training:

Dr. Pauline James, "retired" ornithologist, continues her research on Least Grebes and Elf Owls, recruits and brings workcrews out for indispensible projects like refurbishing Black-bellied Whistling-Duck nest boxes and planting seedlings, participates in bird counts and surveys, helps train new interpreters and public use personnel, and has even filled in at the information counter when no one else was available.

Dr. DeWayne Hodges assists with Dr. James' research, participates in bird counts and surveys, trims trails, and anything else that needs doing as he hikes the trails.

Dr. Robert I. Lonard, Plant Ecologist and Professor of Biology at Pan American University, leads field trips, presents lectures, identifies plant specimens, and helps train new interpreters and public use personnel.

The services volunteered by these individuals are greatly appreciated by the Refuge Complex and the individual staffmembers. Their efforts have become indispensable in furthering the Refuge's ability to protect the resource.

Dr. Robert I. Lonard, Professor of Plant Ecology and Taxonomy at Pan American University, presents a talk in the Visitors' Center Auditorium. (file photo, anon)

The use of volunteers in Refuge Programs Implementation is not without its toll on Refuge staff time. This loss of other directed or allocated staff time does subtract from assigned staff duties. This time requirement must be recognized and accounted for in the operation of Volunteer Programs. Instead, at present, it seems the toll for implementing and conducting an effective volunteer program is that the Refuge must be able to do with less staff due to the volunteer force -- a clear incentive, if not careful, to reducing Refuge enthusiasm for volunteer outreach and utilization.

5. Funding

Santa Ana NWR's FY 1985 budget declined slightly from FY 1984. Total funds allocated for O & M were $348,900, including $8,000 for YCC from the Regional Office. Of the $340,900 left after subtracting YCC funds, $209,091 or 61.3% went to pay for staff salaries, slightly less than FY 1984. Other than fixed operating costs, high at this facility, the remainder was allocated to various non-routine O & M.

Table E-5. ANNUAL FISCAL YEAR BUDGET FIGURES (In Thousands of Dollars).

PROGRAM	1980	1981	1982	1983	1984	1985
MIGRATORY BIRDS	74	89.2	86	120	-	-
MAMMALS & NON-MIG. BIRDS	-	4	50	88	-	-
ANIMAL DAMAGE CONTROL	1	1	-	-	-	-
I & R	51	65	54.6	60	-	-
QUARTERS MAINTENANCE	-	2	3	3	4	4
ADMINISTRATIVE SERIES	-	-	-	-	0.016	-
REFUGE O & M	-	-	-	-	316.014	336.9
YOUTH PROGRAMS	-	-	-	11.162	25.266	8
LAND ACQUISITION	-	-	-	-	4.5	-
T O T A L	126	161.7	194.1	282.162	349.796	348.9
INCREASE OVER PREV. YR.		28.3%	20.0%	45.4%	24.0%	-0.3%

6. Safety

A safety hazard notice was received which pointed out an assembly defect in the chairs used at this station. To eliminate the potential for spinal damage and other injuries, Mancha welded the faulty joints during the third week of January to provide the staff with safer seating. Several safety items noted in the FY 85 Field Station Evaluation were corrected in October. These included the installation of guards on a table saw, recharging a fire extinguisher, replacement of an electrical cord on a radial saw, clean-up of an oil and paint building, installation of a steel post safety barrier around a propane tank, and the placement of accident packets in each motor vehicle.

A demonstration in the use of both pumper units was presented on 28 February by Labuda and Mancha. Topics covered were: priming, pumping, attacking a fire, re-filling with a hose, and re-filling by drafting from canals. In the latter half of February, Mancha devised and built a skid to be used in mounting one

of the two Falcon Pumper Units (for fire fighting) onto the stake bed truck. A forklift can now be used to mount the unit, and it is then bolted to the bed of the truck. The purpose of this arrangement is elimination of the trailer-mounted unit which has been on station for about a year. The truck is much more maneuverable, especially in tight, brush-bordered roads, and it can be easily backed out of an area when necessary (an impossible feat with the trailer). It is intended that the pumper unit be left in place on the stake-bed during the high fire danger seasons.

Staff members of the Refuge Complex received individualized fire pumper training in October. Mancha conducted seven one-hour personalized training sessions involving active participation in the operation of each pumper unit. Those employees who received training included Fuller, Schumacher, DeSantos, Vora, Flores, Ideker, and McMillan.

A tort claim was filed against the Refuge in April in the amount of $92.00. The claim arose when a rock, thrown by a Refuge rotary mower operated by Labuda on the tour loop roadside, hit and shattered a side window on a passing automobile. Fortunately no one was injured in the accident. The staff safety committee met and discussed ways and means to avoid similar accidents in the future.

Labuda completed his training with the American Red Cross on 8 February and became a certified Cardio-Pulmonary Resuscitation (CPR) Instructor. The Refuge staff benefited from having an "in-house" instructor for six months.

Labuda attended the monthly meeting of the Lower Rio Grande Valley Federal Safety and Health Council on 5 June in Weslaco.

Mancha built this sturdy barrier around the greenhouse's bottle gas tank to protect it from straying vehicles. (21MR86, R4-03, JI)

In June, Refuge staff visited a McAllen audiologist individually to procure their "Baseline Hearing Tests" as part of the Service's Hearing Conservation Program. Labuda offered two Red Cross courses in June. A CPR course on 11 June was attended and passed by Cavazos, Flores, Teresa R. High (SCA), Kathryn Labuda, Mancha, Ideker, Smith, and Vora. A Multimedia Standard First Aid course offered on 29 June was attended and passed by Linda Ann Gardner and all ten YCC enrollees. Labuda presented a second CPR course for Refuge staff on 15 July. This session was attended by Hernandez, Coop Student Elizabeth Couch, YCC Group Leader Roy Arce, and all ten YCC Enrollees. All students passed the 8 hour course, with final grades ranging from 72 to 100.

The YCC enrollees take a first aid class from Labuda. (Summer 1985, YCC, LAG)

Safety Committee members Labuda, Mancha, and Smith made a station safety inspection during the week of 10 June. They found only minor, easily correctable problems with the station's safety management.

Mancha and Labuda attended the monthly meeting of the Federal Safety and Health Council in Weslaco on 10 July. The subject of discussion was hazardous chemicals, their proper use and handling.

An automobile accident occurred on Thanksgiving Day afternoon at approximately 1600. Two young visitors, ages 19 (driving) and 16 entered the Refuge via Wildlife Drive. While going around the curve at the north end of Mesquite Trail, the pickup blew a tire. They lost control, went off the road, and hit a large mesquite tree. Neither occupant was injured. Both the tree and vehicle were damaged. A large limb went through the windshield and struck the seat between the occupants. Both young men admitted to DeSantos to speeding, drinking, and driving without their seatbelts buckled. Parents of the driver were called by DeSantos to the Refuge to "take custody" of the young men. The vehicle was removed by tow truck the next morning.

7. Technical Assistance

Labuda provided his "Birding in Winter at Santa Ana NWR" slide/lecture program to an Audubon Expeditions group on 21 January. This group of students traveled across the United States, learning through experience about various resource management agencies. Starting in Maine, moving toward south Florida, around the Gulf Coast to Santa Ana NWR, and then back northeast to New York, it was quite a journey.

Fuller participated in a Latin American Refuge Management Seminar planning session in Washington 21-25 January. The planning session, sponsored by the WO International Affairs Office was aimed at substantially restructuring and re-organizing the emphasis of the FWS sponsored annual NWRS tours.

Labuda and Brenda Hale Smith (RGVNWR) conducted the Raymondville area Breeding Bird Survey on 7 July. They tallied 41 species.

Labuda spent 11 July recording the narration for a slide/tape program on Texas Wetlands for the Service's Office of Ecological Services.

Leslie Rodier, University of Texas Journalism graduate student, informally interviewed Santa Ana and Rio Grande Valley NWR staff 15 November for a television program she is developing with Texas Parks & Wildlife Department on Native Brush Restoration efforts in the "Valley". Gary Waggerman, TPWD biologist, has the lead for TPWD in this project. It should prove to be a positive educational addition to state/federal/private programs in encouraging wildlife habitat restoration efforts. Leslie returned in December to film segments for production.

Fuller traveled to Washington, D.C. 17-20 December to participate on a committee updating the Environmental Impact Statement on the Operation of the National Wildlife Refuge System.

Ideker coordinated and compiled the 1985 Santa Ana NWR Christmas Bird Count of 21 December and helped with the Anzalduas-Bentsen and La Sal Vieja CBC's.

Much technical assistance was provided the newly established Valley Nature Center in Weslaco during the year. The goal of the Nature Center is to promote environmental awareness and understanding with particular emphasis on reaching young people. A series of open houses was held on weekends from February through May as a means of introducing the Valley Nature Center locally. Staff time was spent in providing programs and materials for the open houses. Several staff members also generously volunteered many hours of their own evenings and weekends preparing the Valley Nature Center and its nature park for the opening. By working closely with the Valley Nature Center, the Refuge hopes to re-direct certain environmental education activities to the Valley Nature Center, thereby reducing public use pressure on Santa Ana NWR.

8. Other Items

Fuller attended a wintering waterfowl symposium and Project Leaders' zone meeting in Galveston on 7-11 January.

Fuller presented a talk on Refuge Planning to the Basic Refuge Managers' academy at Blair, Nebraska, on 30 April.

A personnel classification audit was conducted at the station by David Yazee on 17 July. His input and advice were appreciated and will be invaluable as we move toward assimulating and making sense of a most worthwhile, but difficult, "ganglion" project, i.e. the growing pains of realizing the Land Protection Plan for RGVNWR and the associated essential staff plan shifting required to accomplish both Santa Ana and Rio Grande Valley NWRs' operational needs.

Labuda spent the week of 13 May in Boise, Idaho, attending the classroom session of S-390, Fire Behavior.

Fuller attended the Regional Programmatic Meeting in Albuquerque during the week of 9 August.

F. HABITAT MANAGEMENT

The entrance to a 2,088-acre "island" of wildlife habitat in the lower Rio Grande wildlife corridor. (14MR86, R4-03, JI)

1. General

As in recent past years, the limited natural habitat on Santa Ana NWR was managed in a "hands off" manner. This strategem is intended to promote as natural an area as possible on this small refuge. The only true habitat manipulation consisted of refilling freshwater lakes after they had been allowed to draw down naturally.. Mowing of lawn areas and roadsides and removal of invading exotic trees were other types of management used. Disking of cattails was the fourth and final type of management employed in 1985.

Santa Ana NWR can be divided into five major habitat associations relative to the Mid-Valley Riparian Woods biotic community of the Tamaulipan Biotic Province (RGV Land Protection Plan, 1985):

1. Resaca -- Wetland, intermittent to persistent, usually a former stream channel.

   Plants: Retama, Rattlebox, smartweed, Black Mimosa

2. Upland thorn forest -- Well-drained, elevated landforms, not normally flooded.

   Plants: Cenizo, Texas Ebony, Guayacán, Coyotillo, Trecul´s Yucca, cacti, La Coma, Elbowbush, Blackbrush

3. Bottomland forest -- Deltaic plains, naturally intermittently flooded, but not holding waters.

   Plants: Sugar Hackberry, Cedar Elm, Tepeguaje, Honey Mesquite, grasses, Rio Grande Ash, Texas Huisache, Pigeonberry, Chilipiquin, nettles

4. Riparian -- Stream-side terraces.

   Plants: Giant Cane, Black Willow, Silvery-fruited Sandbar Willow, Butterflybush

5. Mudflats -- Expanses of open, flat terrain, generally lacking any plant cover, which are flooded by shallow water several times per year or receding shorelines of lakes and ponds.

   Plants: None

2. Wetlands

Santa Ana NWR manages five wetlands. In an effort to recreate the historical, beneficial floods of the Rio Grande, Pintail, Cattail, Resaca, Headquarters, and Willow Lakes receive well or canal water in the late Spring when snowmelt from Mexico historically flooded the refuge and early Fall when late season hurricanes and tropical storms caused the river to swell. With the annual evaporation rate three times the annual rainfall, additional water must also be added at other times of the year to prevent the lakes from drying between the flood seasons. The 130 acres of wetlands on Santa Ana NWR include two of the five major habitat associations, Resaca and Mudflats.

Lakes or **resacas**, former channels of the Rio Grande, are managed for different species of water birds, marsh birds, waterfowl, fisheaters, and shorebirds by varying the water level in various impoundments of the several lakes. They also provide habitat for threatened species such as the Rio Grande Lesser Siren (aquatic); Giant Toad, Mexican Treefrog (breeding sites); Reddish Egret, White-faced Ibis, Wood Stork, Roseate Spoonbill, Fulvous Whistling-Duck, Masked Duck, Peregrine Falcon, Least Tern, Black Skimmer, Northern Jacana, Ringed Kingfisher (primarily feeding sites); and Resaca Rice Rat (food and nest sites). Nest boxes for Black-bellied Whistling-Ducks have been placed in all five resacas. The resacas also provide breeding sites for Least Grebes, Pied-billed Grebes, Mottled Ducks, American Coots, Common Moorhens, Purple Gallinules, and Black-necked Stilts.

Barren **mudflats**, in Santa Ana NWR's case, the receding shorelines of the resacas and Rio Grande, become exposed with fluctuations in water levels. Maintenance of minimal water levels in several impoundments simulates mudflats. These represent important feeding sites for numerous species of shorebirds and their allies.

Three of **Pintail Lake**'s five impoundments are maintained for wetland species. The three impoundments cover 27 acres. Pintail Lake receives its water from an irrigation canal. Waterfowl (including grebes and coots) usage during 1985 dropped considerably from previous years. The Refuge staff hopes the results of Matt Ciomperlik's research on the ichthyofauna and water parameters of

Refuge lakes will shed some light on this question. Shorebirds still utilized the margins in good numbers and variety.

Willow Lake receives the greatest human visitation. With preferred water levels, 400-600 waterfowl, waders, and shorebirds may be visible during the Winter months from three observation platforms on the largest of the five impoundments which total 16.6 surface acres. Willow Lake receives ground water from a well.

The eight surface acres of **Resaca Lake** intermittantly hold water received from an irrigation canal. When water is present, Resaca Lake hosts waterfowl and other water birds like the other lakes.

Levees separate **Cattail Lake's** 35 surface acres into five impoundments which receive ground water pumped from two wells. The namesake cattails choke one impoundment where they will soon need controlling. While the presence of some cattails provides good wildlife cover, little wildlife use is possible and the rate of succession towards terrestrial communities is undesirably enhanced when cattails completely clog a pond. With both cover and open water, Cattail Lake hosts the majority of the Refuge's grebes, coots, and ducks; other water birds are not infrequent. Least Grebes attempt, with varying degrees of success related to water level fluctuations, regularly to nest.

A new treatment for cattail control was tried with apparent success in June. There has been a problem with severe cattail proliferation in impoundment #5 of Cattail Lake in recent years. Dense stands of this emergent plant have precluded use by most aquatic wildlife. In 1984, a combination of drying, burning, and mowing was used in an attempt to diminish the density of these cattails. The noisome plants resprouted, however, as soon as the impoundment was re-filled with water after the treatments. Within a month, the impoundment was again choked as severely as it had been prior to the treatment.

This year, the impoundment was again dried, but disked and cross-disked instead of mowed. Next, the disturbed roots and soil were allowed to bake in the hot summer sunshine for two weeks. Then, the area was disked and cross-disked again before filling the impoundment with water. Almost six weeks after the filling (23 July), the impoundment was still open water with fewer than fifty small cattail sprouts visible in it. A variety of birds including Greater and Lesser Yellowlegs, Spotted Sandpipers, Black-necked Stilts, Least Grebes, White-faced Ibis, Mottled Ducks, and Black-bellied Whistling Ducks (and later, Winter resident ducks and coots) have been using the area since it was treated.

The **borrow ditch** along the south side of the IBWC flood levee forming the north boundary of the Refuge contains eight surface acres of water received from the irrigation canal. This long, wide ditch paralleling the portion of the wildlife drive atop the levee facilitates viewing of hydrophilic wildlife from private vehicles and the interpretive tram. Anhingas hang their wings out to dry and grebes sink and dive before vehicle passengers' eyes. Red-eared Sliders, Common Moorhens, American Coots, Least and Pied-billed Grebes, and a few ducks regularly and other, more unusual marsh birds and waders occasionally appear. A variety of raptors can often be spotted frequenting snags beyond the ditch.

Three refuge wells (Willow Lake, Cattail Lake (E), and Cattail Lake (S)), two irrigation canals (to Resaca and Pintail Lakes), and an underground irrigation

pipe (to Headquarters Lake) were used to augment lake levels on Santa Ana NWR during 1985. A summary of all water management for 1985 is included in Table F-1.

Strong warm winds produced by Hurricane Juan caused rapid evaporation of water in impoundments of Pintail, Willow, and Cattail Lakes. Water was released into these areas by October's end, resulting in moderate levels at Pintail and Willow Lakes. Cattail Lake remained low due to a disabled pump and the inability of a small, however operational, pump to deliver large amounts of water. The large pump that provides well water to Cattail Lake (E) malfunctioned in October. Apparently the pump screen corroded, allowing pebbles to penetrate the pan area. An estimate for repairs was $2,600. At October's end, refilling awaited the repairman, Mr. Reimenschneider, and parts. It was repaired in November at a cost of $2,662 and began to function well with around 90% flow. Headquarters and Cattail Lakes received some extensive rehabilitation in November; cattails in Headquarters Lake were disked. As soon as water was put into Headquarters Lake, Mottled Ducks, Blue-winged Teal, and Common Moorhens began utilizing it.

Table F-1. Water Management Summary
Santa Ana NWR
CALENDAR YEAR 1985

Month	Site	Type Water	Time Run	Amount		
February	Willow Lake	well		3.1	ac/ft.	
	Cattail Lake (E)	well		48.3	ac/ft.	
	Resaca Lake	canal		2.5	ac/ft.	
	Headquarters Lake	canal		1.2	ac/ft.	
	Pintail Lake	canal		7.4	ac/ft.	
			TOTAL:	62.5	ac/ft.	
March/April	Headquarters Lake	canal	3 days	3.3	ac/ft.	29MR-01AP
	Pintail Lake	canal	3 days	19.7	ac/ft.	29MR-01AP
			TOTAL:	23	ac/ft.	
April	Willow Lake	well	*5 days =	2.6	ac/ft.	
	Cattail Lake (E)	well	*6 days =	23.9	ac/ft.	
	Cattail Lake (S)	well	7 days =	1	ac/ft.	
	*Still running at month's end		TOTAL:	27.5	ac/ft.	
May	Willow Lake	well	*16 days =	8.5	ac/ft.	
	Cattail Lake (E)	well	40 hrs =	6.7	ac/ft.	
	Cattail Lake (S)	well	**	1.6	ac/ft.	
	Headquarters Lake	canal		7	ac/ft.	
	Pintail Lake	canal		83.16	ac/ft.	
	*including April					
	**still running at month's end		TOTAL:	106.96	ac/ft.	

June	Cattail Lake (E)	well	**14 days =	55.8 ac/ft.	
	Cattail Lake (S)	well	* 7 days =	1.0 ac/ft.	
	*180 GPM			==========	
	**800 GPM		TOTAL:	56.8 ac/ft.	
July	Willow Lake	well	16.5 days =	8.7 ac/ft.	08-24 JL
	Cattail Lake (S)	well	5 days =	0.8 ac/ft.	03-07 JL
	Headquarters Lake	canal	5 days =	10. ac/ft.	24-29 JL
				==========	
			TOTAL:	19.5 ac/ft.	
August	Willow Lake	well	* 3 days =	1.6 ac/ft.	29-31 AU
	Cattail Lake (E)	well	11 days =	39.8 ac/ft.	02-12 AU
	Cattail Lake (S)	well	4 days =	0.6 ac/ft.	10-13 AU
	Pintail Lake	canal	12 days =	53.6 ac/ft.	02-13 AU
	*still running at month's end			==========	
			TOTAL:	95.6 ac/ft.	
Sept/Oct.	Pintail Lake	canal		6.22 ac/ft.	30SE-02OC
November	Headquarters Lake	canal	1 day =	2 ac/ft.	20NO
	Pintail Lake	canal	14 days =	78.7 ac/ft.	31OC-14NO
				==========	
			TOTAL:	80.7 ac/ft.	

--RECAP--

Purchased Irrigation Water:

Resaca Lake	canal	2.5	ac/ft.
Headquarters Lake	canal	23.5	ac/ft.
Pintail Lake	canal	248.78	ac/ft.
		==========	
	TOTAL:	274.78	ac/ft.

Well Water Pumped:

Willow Lake	well	24.5	ac/ft.
Cattail Lake (E)	well	174.5	ac/ft.
Cattail Lake (S)	well	5.0	ac/ft.
		==========	
	TOTAL:	204.0	ac/ft.

==========

3. Forests

Four National Champion Trees -- Brasil, Rio Grande Ash, Guayacán, and Texas Ebony -- are now recognized in Refuge forests. A larger Honey Mesquite has been found elsewhere in Texas.

No harvests or stand improvements are made on Santa Ana NWR. Occasional trimming along roads and foot trails for visitor safety, removal of invading exotic trees, and deterring disturbance of vegetation are the forest management done.

Aside from the wetlands discussed in the previous section, Santa Ana NWR's natural habitat is comprised entirely of forest growth, including brush associations. Since the completion of Falcon Dam in 1953, the refuge has been flooded only twice as it was historically - the floods of 1958 and Hurricane Beulah in 1967. Thus, one of the principal environmental factors that created and maintained this ecosystem -- frequent flooding -- no longer occurs.

Some of the results of this drastic change are obvious while others are not clearly understood nor documented. It is known that the acreage of permanent water has been greatly reduced, from several hundred acres to 130 acres, resulting in far less waterfowl and water bird habitat and use.

Less clear is what has and is happening to the woodlands. The moist-soil plants provide the most valuable habitat to the peripheral Mexican birds Santa Ana was established to benefit. The absence of periodic saturation or inundation has caused a decrease in the number of hydrophilic plants (with high water requirements) in these associations and an encroachment of xerophyllic plants. Many valuable trees, such as Texas Ebonies, have died.

There is no quantitative data to show the changes in plant composition nor is there quantitative information to show the decreases and increases in wildlife populations. All that is known is that some peripheral birds dependent on this forest type are less abundant today and other species common to the more xerophytic associations are more abundant than formerly. Permanent vegetative plots are being inventoried on Santa Ana NWR as part of a Rio Grande Valley NWR woody plant inventory directed at collecting data on habitat composition and changes throughout the lower Rio Grande Valley.

The 1,875 acres of forest lands on Santa Ana NWR include three major forest habitat associations. The three are Upland Thorn Forest, Bottomland Forest, and Riparian Margins (both Rio Grande and resaca).

Stream-side terraces along **Riparian Margins** support a woodland association with high water requirements. Typical species include Giant Cane, Black Willow, Silvery-fruited Sandbar Willow, and Butterflybush.

Bottomlands support **Bottomland Forest**, more mesic woodlands with less thorny species and little understory. Species of importance in the bottomland forest communities include Cedar Elm, Texas Ebony, Sugar Hackberry, Rio Grande Ash, Texas Persimmon, Anaqua, Tepeguaje, Texas Huisache, Honey Mesquite, and Retama.

Upland Thorn Forest occurs on the higher and drier sites on the refuge. Various associations of varying heights and canopy covers occur on different soil types. Upland Thorn Forest typically features thick, difficult-to-penetrate, thorny shrubs, frequently with dispersed, taller Honey Mesquites or Texas Ebonies among them. The importance of this dense habitat cannot be overstated since the Ocelot documentations occurred here. Principal species include Texas Ebony, Honey Mesquite, Wright's Catclaw, Guayacán, Coyotillo, Trecul's Yucca, cacti, La Coma, Cenizo, Elbowbush, Tenaza, and Blackbrush. Many rarer shrubs also occur here.

A Texas Indigo Snake photographs the thick tangle of thorny chaparral where the Ocelot was captured. (05/060C85, SA401-07, JI)

4. Cropland

Presently, there are no croplands on Santa Ana NWR. Because of the scarceness of native brush and wetlands in the lower Rio Grande Valley, prior sunflower farming has been discontinued. As area farmers have converted hundreds of acres of fields to sunflowers near the refuge, this provision precludes the need for such efforts on Santa Ana NWR.

5. Grasslands

Other than in clearings, no natural grassland communities exist on Santa Ana NWR. Nonetheless, 75 species of grasses have been identified on the refuge. In some areas of the Refuge, grassy strips may occur between motts of chaparral resulting in a miniature savannah-like habitat. The largest natural grassland is a ravine bottom, but even there trees break up the grassland's linear stretch.

The exotic and undesirable Bufflegrass in drier areas and Guinea Grass in mesic woodlands have invaded roadsides and open areas and trails. After heavy rains, Guinea Grass grows taller than traffic and safety signs.

6. Other Habitats

The other 75 acres of the Refuge are administrative lands, including current, old, and former youth program headquarters sites, trails, roads, and parking lots.

7. Grazing

Nothing to Report.

8. Haying

Nothing to Report.

9. Fire Management

One potential wildfire was doused by Ideker in December before it could spread. Embers from a burning sugarcane field ignited a mound of dry grass on the canal bank. Mowing and disking of grassy roads provides some firebreaks.

10. Pest Control

Nothing to Report.

11. Water Rights

Water quantity is a significant issue and concern for Santa Ana NWR. Artificially-maintained impoundments require significant expenditures of O&M funds due to the lack of legal water rights for SANWR -- i.e., only "surplus" water rights currently exist.

On 27 February, a meeting was hosted at the Refuge to discuss water rights. In addition to Refuge staff, the Regional Solicitor and Rio Grande Valley Water Master and their respective staffs were present at this meeting. Santa Ana and Rio Grande Valley NWR's hope to administratively "pool" water rights next year.

12. Wilderness and Special Areas

In 1967, the entire refuge was designated as a **Registered National Landmark** due to its "exceptional value in illustrating the natural history of the United States".

One 68-acre "Texas Ebony Natural Area" has been set aside as a **Research Natural Area** for scientific and educational purposes.

Two historical Mexican cemeteries are located on the refuge. Grave sites dating back to the mid-1870's render these sites potentially significant as **Archeological and/or Historical Sites.** The Brewster/Bravo cemetery (west) currently presents a management problem based on the two families historically represented in the cemetery, Bravos and Brewsters, being at odds over burial rights.

13. W.P.A. Easement Monitoring

Nothing to report.

G. WILDLIFE

1. Wildlife Diversity

Santa Ana NWR lies at an ecological crossroads for both plants and wildlife. Many subtropical Tamaulipan Biotic Province species range no further into the United States. Mesic woodland species from East Texas, coastal species from the Gulf Coast, prairie species from the Great Plains, and desert species from the Chihuahuan Desert meet here. The plants and wildlife on Santa Ana NWR represent a mixture of species from each of the adjacent biotic provinces. Some species are abundant, while some are represented by a single individual. While some are widespread, some have never been found anywhere else in the United States. With these varied sources and the several soil types within the Refuge, Santa Ana NWR is a mosaic of habitat types utilized by varying combinations of species favoring each. Tables G-1 and G-2 present the known vertebrate fauna of the Refuge other than fishes.

Although the inclusion of numerous wildlife lists into Section G may seem excessive, this narrative will serve as a base for future additions and changes. Lists circulated previously frequently contained species not found or expected on Santa Ana NWR and the lists herein correct some of the errors. By incorporating the lists into the narrative, they become a permanent part of the record and cannot be lost as individual items or inadvertently discarded.

A Bobcat demonstrates its feline curiosity. The site was selected because a Jaguarundi was seen here, but only Bobcat and Ocelot were captured here on film. (29/30AU85, SA338-02, JI)

Table G-1. Terrestrial Vertebrates known to occur on Santa Ana National Wildlife Refuge (11 amphibians, 33 reptiles, and 33 mammals).

AMPHIBIANS
- Rio Grande Lesser Siren-T
- Black-spotted Newt -- T
- Couch's Spadefoot
- Great Plains Narrow-mouthed Frog
- Sheep Frog
- Giant Toad -- T
- Texas Toad
- Gulf Coast Toad
- Mexican Treetoad -- T
- Rio Grande Chirping Frog-T
- Rio Grande Leopard Frog

TURTLES
- Yellow Mud Turtle
- Red-eared Slider
- Texas Tortoise -- T
- Texas Spiny Softshell

LIZARDS
- Mediterranean Gecko -- I
- Green Anole -- I
- Texas Horned Lizard -- T
- Mesquite Lizard
- Texas Spiny Lizard
- Fence Lizard
- Rose-bellied Lizard
- Four-lined Skink
- Ground Skink
- Spotted Whiptail
- Six-lined Racerunner

SNAKES
- Plains Blind Snake
- Mexican Racer
- Black-striped Snake -- T
- Speckled Racer -- E
- Texas Indigo Snake -- T
- Texas Patch-nosed Snake
- Great Plains Rat Snake
- Mexican Hook-nosed Snake
- Western Coachwhip
- Schott's Whipsnake
- Rough Green Snake
- Bullsnake
- South Texas Ground Snake
- Diamond-backed Water Snake
- Texas Brown Snake
- Checkered Garter Snake
- Western Ribbon Snake
- Texas Coral Snake

MAMMALS
- Virginia Opossum
- Least Shrew
- Hog-nosed Bat
- Cave Bat
- Greater Yellow Bat
- Evening Bat
- Mexican Free-tailed Bat
- Nine-banded Armadillo
- Black-tailed Jackrabbit
- Eastern Cottontail
- Mexican Ground Squirrel
- Fox Squirrel -- I
- Mexican Spiny Pocket Mouse
- Beaver
- Fulvous Harvest Mouse
- Pygmy Mouse
- White-footed Mouse
- Resaca Rice Rat
- Hispid Cotton Rat
- Southern Plains Wood Rat
- House Mouse -- I
- Roof Rat -- I
- Norway Rat -- I
- Nutria -- I
- Raccoon
- Long-tailed Weasel
- Striped Skunk
- Badger
- Coyote
- Ocelot -- E
- Jaguarundi -- E
- Bobcat
- Javelina

E -- Endangered Species
T -- Threatened Species (Texas Protected Nongame)
I -- Introduced Species

Table G-2. The 358 species of birds known from Santa Ana National Wildlife Refuge, plus 15 hypothetical species. Species of special interest are underlined.

A = abundant (can't miss)
C = common (certain in proper habitat)
U = uncommon (present, but may not be seen)
O = occasional (seen a few times per season)
R = rare (seen every 2 to 5 years)
X = accidental (seen only once or twice)
* = exotic (feral or escaped)
H = hypothetical (never recorded but may occur, based on records nearby)
@ = has nested on refuge
S = Spring (March to May)
S = Summer (June to August)
F = Fall (September to November)
W = Winter (December to February)

SPECIES	STATUS S	S	F	W
LOONS				
Common Loon			X	X
GREBES				
@ Least Grebe	U	U	U	U
@ Pied-billed Grebe	C	O	C	C
Eared Grebe	O		O	O
PELICANS				
American White Pelican	R	R	U	O
CORMORANTS				
Double-crested Cormorant			O	O
Olivaceous Cormorant	U	U	O	O
ANHINGAS				
@ Anhinga	U	U	O	O
HERONS, EGRETS, AND ALLIES				
American Bittern	U		O	O
@ Least Bittern	U	U	O	
Great Blue Heron	U	O	U	U
Great Egret	O	R	U	O
Snowy Egret	O	O	U	O
Little Blue Heron	O	O	U	O
Tricolored Heron	O	R	U	U
Reddish Egret	R	R	O	O
Cattle Egret	O	R	O	O
@ Green-backed Heron	U	U	O	U
Black-crowned Night-Heron	O		O	U
Yellow-crowned Night-Heron	O	R	O	U
IBISES AND SPOONBILL				
White Ibis	O	O		
White-faced Ibis	O	R	O	
Roseate Spoonbill	R	R		
STORKS				
Jabiru			H	H
Wood Stork	O	O	U	
WATERFOWL				
@ Fulvous Whistling-Duck	O	R	R	R
@ Black-bellied Whistling-Duck	U	C	U	O
Tundra Swan				X
Greater White-fronted Goose	R		R	O
Snow Goose	O		O	O
Ross' Goose	H		H	H
Canada Goose	O		O	O
* Muscovy Duck			X	X
Wood Duck	R		O	R
Green-winged Teal	O		C	C
Mottled Duck	U	O	U	U
Mallard			R	R
Northern Pintail	U		U	C
Blue-winged Teal	C		C	C
Cinnamon Teal	O		O	O
Northern Shoveler	U		U	C
Gadwall	C		C	C
American Wigeon	U		C	C
Canvasback	R		R	O
Redhead	R		R	O
Ring-necked Duck	U		U	U
Lesser Scaup	O		O	U
Common Goldeneye			R	R
Bufflehead	R		R	O
Hooded Merganser	O		O	O
Ruddy Duck	O		U	U
Masked Duck	R	R	R	R
VULTURES				
Black Vulture	O	O	U	U
Turkey Vulture	U	U	A	A
HAWKS, KITES, OSPREYS, AND EAGLES				
Osprey	R		O	O
@ Hook-billed Kite	U	U	U	O
American Swallow-tailed Kite	R		R	
@ Black-shouldered Kite	U	C	U	U
Mississippi Kite	O		O	
Northern Harrier	O		O	O
Sharp-shinned Hawk	U		U	U
Cooper's Hawk	O		O	O
Northern Goshawk			X	
Common Black-Hawk	X		R	X
@ Harris' Hawk	U	U	C	C
@ Gray Hawk	O	U	U	O
Roadside Hawk			H	H
Red-shouldered Hawk	U		C	C
Broad-winged Hawk	O		O	

Swainson's Hawk	O		O	R
@ White-tailed Hawk	R	R	R	R
Zone-tailed Hawk				R
Red-tailed Hawk	O		O	O
Ferruginous Hawk	H		H	
FALCONS				
@ Crested Caracara				R
American Kestrel	O		C	C
Merlin	O		U	U
Aplomado Falcon				H
Peregrine Falcon	R		O	R
Prairie Falcon				R
CHACHALACAS				
@ Plain Chachalaca	A	A	A	A
QUAIL				
@ Northern Bobwhite	U	U	U	U
RAILS, COOTS AND ALLIES				
Yellow Rail			R	R
Clapper Rail				X
King Rail	R		O	O
Virginia Rail				R
Sora	U	O	U	U
@ Purple Gallinule	R	U	R	
@ Common Moorhen	C	C	C	C
@ American Coot	C	U	C	C
CRANES				
Sandhill Crane	R			O
THICK-KNEES				
Double-striped Thick-knee				H
PLOVERS				
Black-bellied Plover	R		R	
Lesser Golden-Plover	R		R	
Semipalmated Plover	R			
Piping Plover	R			
@ Killdeer	U	O	C	U
Mountain Plover	R			
STILTS AND AVOCETS				
@ Black-necked Stilt	C	C	U	O
American Avocet	O		O	O
JACANAS				
Northern Jacana	R		R	R
SANDPIPERS AND ALLIES				
Greater Yellowlegs	U		O	O
Lesser Yellowlegs	C		U	O
Solitary Sandpiper	O		O	R
Willet	R		R	R
Spotted Sandpiper	O	R	O	O
Upland Sandpiper	R		R	
Whimbrel	H			H
Long-billed Curlew	O		O	O
Hudsonian Godwit	X			
Marbled Godwit	R		R	
Red Knot	H	H	H	
Sanderling		R		R
Semipalmated Sandpiper	O		O	O
Western Sandpiper	O		O	O
Least Sandpiper	O		O	O
White-rumped Sandpiper	O		O	R
Baird's Sandpiper	O	R	O	R
Pectoral Sandpiper	O		O	
Dunlin	O		O	O
Stilt Sandpiper	O		O	R
Buff-breasted Sandpiper	R		R	
Short-billed Dowitcher	R		R	
Long-billed Dowitcher	O		O	C
Common Snipe	O		O	U
American Woodcock			R	R
Wilson's Phalarope	O		O	
GULLS, TERNS, AND SKIMMERS				
Laughing Gull	O	R	O	O
Franklin's Gull	O		O	
Bonaparte's Gull	R		R	R
Ring-billed Gull	O		R	O
Herring Gull				X
Gull-billed Tern	R	O	R	R
Caspian Tern	O		O	O
Royal Tern		R	R	
Sandwich Tern		O	R	
Common Tern			R	
Forster's Tern	O		O	O
Least Tern	O	O	O	O
Black Tern	O	R	O	
Black Skimmer	R	R	O	R
PIGEONS AND DOVES				
@*Rock Dove	U	U	U	U
@ Red-billed Pigeon	R	O	O	R
*Ringed Turtle-Dove		X		
@ White-winged Dove	A	A	A	R
@ Mourning Dove	C	C	C	C
@ Inca Dove	U	U	U	U
@ Common Ground-Dove	C	C	C	C
Ruddy Ground-Dove	R	R		
@ White-tipped Dove	C	C	C	C
PARAKEETS AND PARROTS				
Green Parakeet		R	R	
* Canary-winged Parakeet				X
Red-crowned Parrot		R	R	
Red-lored Parrot		R	R	
Yellow-headed Parrot		R	R	
CUCKOOS, ROADRUNNERS, AND ANIS				
Black-billed Cuckoo	U		U	
@ Yellow-billed Cuckoo	C	C	C	
Mangrove Cuckoo		X		
@ Greater Roadrunner	U	U	U	U
@ Groove-billed Ani	C	C	U	R
BARN-OWLS				
@ Common Barn-Owl	O	O	O	O
OWLS				
@ Eastern Screech-Owl	C	C	C	C
@ Great Horned Owl	O	O	O	O

@ Ferruginous Pygmy-Owl	R	R	R	
@ Elf Owl	C	C	R	
Burrowing Owl			R	R
Barred Owl			R	R
Long-eared Owl	R			R
Short-eared Owl			R	R
GOATSUCKERS				
@ Lesser Nighthawk	O	O	O	R
@ Common Nighthawk	U	C	U	O
@ Common Pauraque	C	C	C	C
Common Poorwill	O		R	R
Chuck-will's-widow	O		O	
Whip-poor-will	O		R	
SWIFTS				
Chimney Swift	C	C	U	
HUMMINGBIRDS				
Green Violet-ear	X	X		
Broad-billed Hummingbird				X
@ Buff-bellied Hummingbird	U	C	U	O
Blue-throated Hummingbird	X	X		
Ruby-throated Hummingbird	C	R	C	O
@ Black-chinned Hummingbird	O	O	U	O
Rufous Hummingbird	O		U	U
TROGONS				
Elegant Trogon		H	H	
KINGFISHERS				
@ Ringed Kingfisher	O	O	O	O
Belted Kingfisher	O		O	O
@ Green Kingfisher	O	O	O	O
WOODPECKERS				
@ Golden-fronted Woodpecker	A	A	A	A
Yellow-bellied Sapsucker	O		O	U
@ Ladder-backed Woodpecker	C	C	C	C
Northern Flicker (Yellow-shaf)	R		R	R
Northern Flicker (Red-shafted)			R	R
FLYCATCHERS				
@ Northern Beardless-Tyrannulet	R	R	R	R
Olive-sided Flycatcher	U		U	
Western Wood-Pewee	R		R	
Eastern Wood-Pewee	O		O	
Yellow-bellied Flycatcher	O		O	
Acadian Flycatcher	O		O	
Alder Flycatcher	R		R	
Willow Flycatcher	O		O	
Least Flycatcher	O		U	R
Black Phoebe			R	R
Eastern Phoebe	C		C	U
Say's Phoebe	R		R	R
@ Vermillion Flycatcher	R	R	O	R
Great Crested Flycatcher	U		U	
@ Brown-crested Flycatcher	C	C	C	R
@ Great Kiskadee	U	U	U	U
@ Couch's Kingbird	C	C	U	O
Cassin's Kingbird		X		
Western Kingbird	O		R	
Eastern Kingbird	C		C	
@ Scissor-tailed Flycatcher	A	O	C	R
Fork-tailed Flycatcher		H	H	
@ Rose-throated Becard	R	R		
LARKS				
Horned Lark	O	O	O	U
MARTINS AND SWALLOWS				
Purple Martin	O	R	O	R
Gray-breasted Martin	H			
Tree Swallow	O		O	O
Northern Rough-winged Swallow	U		U	R
Bank Swallow	O		O	
Cliff Swallow	O		O	R
Barn Swallow	U		U	R
JAYS, CROWS, AND RAVENS				
Blue Jay				R
@ Green Jay	C	U	C	A
Brown Jay	H	H	H	H
Mexican Crow	R	R	O	R
Chihuahuan Raven	O		O	O
TITMICE				
@ Tufted Titmouse(Black-crested)	U	U	U	U
VERDINS				
@ Verdin	O	O	O	U
NUTHATCHES				
Red-breasted Nuthatch				R
CREEPERS				
Brown Creeper	R		R	R
WRENS				
@ Cactus Wren	U	C	C	U
Rock Wren				R
@ Carolina Wren	U	R	U	R
@ Bewick's Wren	U	U	U	U
House Wren	U		C	C
Winter Wren			R	R
Sedge Wren	R			R
Marsh Wren	R			O
KINGLETS AND GNATCATCHERS				
Golden-crowned Kinglet			O	O
Ruby-crowned Kinglet	C		C	C
Blue-gray Gnatcatcher	C		C	C
Black-tailed Gnatcatcher				H
THRUSHES AND ALLIES				
Eastern Bluebird	R		O	O
Western Bluebird				R
Mountain Bluebird	R			R
Townsend's Solitaire				R
Veery	O		R	
Gray-cheeked Thrush	U		O	
Swainson's Thrush	U		O	
Hermit Thrush	U		O	O
Wood Thrush	U		O	
Clay-colored Robin	R	R	R	R
Rufous-backed Robin		X	X	
American Robin	U		O	O

Aztec Thrush				X
MOCKINGBIRDS, THRASHERS, AND ALLIES				
Gray Catbird	O		O	U
@ Northern Mockingbird	C	C	C	C
Sage Thrasher			R	R
Brown Thrasher				R
@ Long-billed Thrasher	C	C	C	C
@ Curve-billed Thrasher	U	U	U	U
PIPITS				
Water Pipit	U		U	U
Sprague's Pipit			O	O
WAXWINGS				
Cedar Waxwing	O		O	U
PHAINOPEPLAS				
Phainopepla				X
SHRIKES				
Loggerhead Shrike	U		C	C
STARLINGS				
* European Starling	R		R	R
VIREOS				
White-eyed Vireo	U	U	U	U
Bell's Vireo	R		R	R
Black-capped Vireo	R		R	R
Solitary Vireo	U		O	O
Yellow-throated Vireo	O		O	
Warbling Vireo	U		O	
Philadelphia Vireo	U		O	
Red-eyed Vireo	U		U	
@ Red-eyed Vireo (Yellow-green)	R	R		
WOOD-WARBLERS				
Blue-winged Warbler	O		O	
Golden-winged Warbler	O		O	
Tennessee Warbler	U		U	
Orange-crowned Warbler	C		C	C
Nashville Warbler	C		U	O
Northern Parula	U	R	O	O
@ Tropical Parula	R	R	R	R
Yellow Warbler	C		C	
Chestnut-sided Warbler	C		U	
Magnolia Warbler	O		O	
Black-throated Blue Warbler				X
Yellow-rumpedWarblr(Audubon's)	O		O	
Yellow-rumped Warbler (Myrtle)	C		C	C
Black-throated Gray Warbler	U		U	O
Townsend's Warbler				R
Black-throated Green Warbler	C		U	O
Blackburnian Warbler	C		O	R
Yellow-throated Warbler	U		U	U
Pine Warbler	R		R	R
Prairie Warbler				R
Palm Warbler	R		R	O
Bay-breasted Warbler	C		O	
Blackpoll Warbler	R		R	
Cerulean Warbler	U			
Black-and-white Warbler	C	O	C	U
American Redstart	O		O	
Prothonotary Warbler	O		O	
Worm-eating Warbler	U		U	
Ovenbird	O		O	
Northern Waterthrush	O		O	
Louisiana Waterthrush	C		C	
Kentucky Warbler	U		U	
Connecticut Warbler	R		R	
Mourning Warbler	O		O	
MacGillivray's Warbler			R	
@ Common Yellowthroat	C	U	C	C
Gray-crowned Yellowthroat	X	X	X	X
Hooded Warbler	U		U	O
Wilson's Warbler	C		C	O
Canada Warbler	C		C	
Golden-crowned Warbler				X
@ Yellow-breasted Chat	C	O	O	O
TANAGERS				
@ Summer Tanager	O		R	
Scarlet Tanager	U		O	
SPARROWS, BUNTINGS, TOWHEES, AND ALLIES				
@ Northern Cardinal	C	C	C	C
@ Pyrrhuloxia	O	O	U	U
Rose-breasted Grosbeak	O		U	
Black-headed Grosbeak	R		R	R
Blue Bunting			H	H
Blue Grosbeak	O			
Lazuli Bunting	R	R		
Indigo Bunting	O		U	U
Varied Bunting	R	R		
@ Painted Bunting	C	O	O	
@ Dickcissel	C		C	
@ Olive Sparrow	C	C	C	C
Green-tailed Towhee			U	U
Rufous-sided Towhee			U	U
@ White-collared Seedeater	R	R		
Cassin's Sparrow	C		O	O
Chipping Sparrow	O			O
Clay-colored Sparrow	O		O	O
Field Sparrow			U	U
Vesper Sparrow	C		U	U
@ Lark Sparrow	U	U	U	U
Black-throated Sparrow				U
Lark Bunting			R	R
@ Savannah Sparrow	C	C	C	C
Grasshopper Sparrow	U		O	O
Le Conte's Sparrow	R			R
Song Sparrow	U		R	R
Lincoln's Sparrow	C		C	A
Swamp Sparrow	R		R	O
White-throated Sparrow	O		O	O
White-crowned Sparrow			R	R
Dark-eyed Junco (Oregon)			R	R
Dark-eyed Junco (Slate-colord)			R	R

BLACKBIRDS,ORIOLES AND ALLIES

@ Red-winged Blackbird	C	C	A	A
@ Eastern Meadowlark	C	C	C	C
Western Meadowlark	R		R	U
Yellow-headed Blackbird	R			R
Brewer's Blackbird	R		U	U
@ Great-tailed Grackle	A	A	A	A
Common Grackle	R			R
@ Bronzed Cowbird	C	A	U	U
@ Brown-headed Cowbird	O	O	C	C
@ Orchard Oriole	C	R	C	
@ Hooded Oriole	O	O	O	O
@ Altamira Oriole	C	C	U	U
@ Audubon's Oriole	O	O	O	O
Northern Oriole (Bullock's)	R	R	R	R
Northern Oriole (Baltimore)	C		U	

FINCHES, GOLDFINCHES, AND ALLIES

Purple Finch				X
House Finch				R
Red Crossbill				X
Pine Siskin	R		R	R
Lesser Goldfinch	R			R
Lawrence's Goldfinch				H
American Goldfinch	U		O	C

WEAVERS

@*House Sparrow	C	C	C	C

A Long-billed Thrasher patrols an opening in Upland Thorn Forest. (13/14SE85, SA369-05, JI)

2. Endangered and Threatened Species

At present, Santa Ana NWR is home or serves as a migratory or transient stopover for four federally endangered species. Two native felines, the Ocelot and Jaguarundi occur. The first confirmed sighting of an Ocelot since the early 1960's was substantiated by a photograph taken during March 1977. A sighting in December 1983 led to an ongoing documentation effort; see below for 1985 documentations. Jaguarundis are also occasionally observed. Population estimates remain unavailable at the current time.

Peregrine Falcons occasionally visit Santa Ana NWR. Several sightings during December 1977 represented the first on-Refuge observations since 1974. Sightings continue several times per year through 1985. Wood Storks also occasionally visit Santa Ana NWR's limited aquatic habitat.

Table G-3 contains a list of endangered, threatened, or watch list vertebrates of actual or potential occurrence on Santa Ana National Wildlife Refuge. Potentially occuring species -- the Lesser Yellow Bat, Jaguar, Bald Eagle, Golden Eagle, and Aplomado Falcon -- have not yet been recorded from the Refuge. Watch list is a designation used by the Texas Organization for Endangered Species for species believed endangered or threatened in Texas, but not officially listed federally or by Texas.

This wily, but curious, Coyote investigates a heat/motion sensitive camera. (14/15NO85, SA434-13, JI)

Table G-3. Endangered, Threatened or Watch List Vertebrates of Actual or Potential Occurrence on Santa Ana National Wildlife Refuge.

Common Name	Scientific Name	USDI[1]	TOES2	TPWD[3]	STATUS[4]
Lesser Yellow Bat	Lasiurus ega		WL	T	P
Resaca Rice Rat	Oryzomys couesi aquaticus		T	T	P
Coati	Nasua nasua		WL	E	P
Cougar	Puma concolor		T		-
Jaguarundi	Herpailurus yagouaroundi	E	E	E	P
Ocelot	Leopardus pardalis	E	E	E	P
Jaguar	**Panthera onca	E	E	E	P
Reddish Egret	Egretta rufescens		-	T	C
White-faced Ibis	Plegadis chihi		T	T	-
Wood Stork	Mycteria americana	E	-	T	C
Roseate Spoonbill	Ajaia ajaja		WL*		C
FulvousWhistling-Duck	Dendrocygna bicolor		T		C
Masked Duck	Oxyura dominica		WL		P
Black-shouldered Kite	Elanus caeruleus		WL*		P
Am.Swallow-tailedKite	Elanoides forficatus		T	T	M
Zone-tailed Hawk	Buteo albonotatus		T	T	P
Gray Hawk	Buteo nitidus		T	T	P
White-tailed Hawk	Buteo albicaudatus		T	T	P
Common Black-hawk	Buteogallus anthracinus		T	T	P
Bald Eagle	Haliaeetus leucocephalus	E	E	E	nP
Golden Eagle	Aquila chrysaetos		T		nP
Osprey	Pandion haliaetus			T*	M
Peregrine Falcon	Falco peregrinus	E	E	E,T	M
Prairie Falcon	Falco mexicanus		T		nP
Merlin	Falco columbarius		T		WR
Aplomado Falcon	**Falco femoralis			E	P
Least Tern	Sterna antillarum		T	T*	C
Black Skimmer	Rhyncops niger		T		C
Northern Jacana	Jacana spinosa		T		C
Red-billed Pigeon	Colomba flavirostris		T		P
Ferruginous Pygmy-owl	Glaucidium brasilianum		WL	T	P
Ringed Kingfisher	Ceryle torquata		WL		P
Rose-throated Becard	Pachyramphus aglaiae		WL	T	P
N.Beardless-Tyrannulet	Camptostoma imberbe		WL	T	P
Brown Jay	Cyanocorax morio		WL		P
Yellow-green Vireo	Vireo olivaceous flavoviridis		WL*		P
Tropical Parula	Parula pitiayuma		WL	T	P
Altamira Oriole	Icterus gularis		WL		P
Giant Toad	Bufo marinus horribilis		WL	T*	P
RioGrandeChirpingFrog	Syrrhophus cystignathoides campi		WL	T*	P
Mexican Treetoad	Smilisca baudini		WL	T	P
Sheep Frog	**Hypopachus variolosus		-	T	P
Black-spotted Newt	Notophthalmus meridionalis		WL	E	P
RioGrande LesserSiren	Siren intermedia texana		T	E	P
Texas Tortoise	Gopherus berlandieri		T	T	-
Texas Horned Lizard	Phrynosoma cornutum		T	T	-
Black-striped Snake	Coniophanes imperialis		WL	T	P
Speckled Racer	Drymobius margaritiferus		WL	E	P
Texas Indigo Snake	Drymarchon corais erebennus		WL	T	-

1/ Endangered (E) or Threatened (T), according to the latest U.S.D.I. listing

2/ Endangered (E), Threatened (T), or Watch List in Texas per the 1984 Texas Organization for Endangered Species list

3/ Endangered (E) or Threatened (T) species in Texas per the Texas Parks and Wildlife Department (1986 proposed revision). **Species added

4/ Unofficial status based on examining range maps, Peripheral from south (P), Peripheral from coast (C), from north (n), Migrates through (M), Winter Resident (WR), status of previous list (*)

Olive Sparrows, the smallest avians documented, seem attracted to the infrared beam source. (31AU/1SE85, SA346-09, JI)

Whew, most prefer the photograph to an opportunity for wildlife observation this close up. Striped Skunks threatened the flashing cameras, but never perfumed them. (8/9N085, SA430-10, JI)

Endangered and Threatened Plants. Few of the hundreds of native plant species occurring in the lower Rio Grande Valley are currently formally protected as threatened or endangered. However, this lack of protective status designation should be reviewed as a high priority in the Region in the near future due to the continued and accelerated loss of habitat which has occurred in the lower Rio Grande Valley and adjacent Mexico in recent years. Many of the plant species may indeed now be physically threatened or endangered. The Native Plant Project, a local nonprofit organization devoted to the preservation of native plants and plant communities in the lower Rio Grande Valley and the utilization of nursery-grown, local native plants in landscaping, has developed a list of endangered, threatened, extinct, and watch list plant species of the lower Rio Grande Valley (Table G-4). Seventeen of these species occur at present on Santa Ana NWR (Table G-5). Santa Ana NWR attempts to aid survival of endangered species by introducing them into the headquarters and quarters area landscaping to display their natural beauty, to provide a seed source for rearing stock to reintroduce into their former habitats on revegetated Rio Grande Valley NWR tracts, and to observe their phenology to learn the environmental parameters and requirements for each species. The Native Plant Project's complete list shows the status of these plants throughout the lower Rio Grande Valley. Many of the included species are under consideration for listing by the U.S. Fish and Wildlife Service. The most serious threat to the survival of most of these species remains the ongoing habitat clearing and conversion in the lower Rio Grande Valley. Hope for their survival rests with the accomplishment of the goals of the Land Protection Plan for the RGVNWR and the development of a Valley Arboretum to study, propagate, and reintroduce them into their former, now cleared, habitat.

Endangered Species Committee
Native Plant Project

Family	Species Common Name	Range	Published Status
		ENDANGERED	
Taxodiaceae	01 Taxodium mucronatum Montezuma Baldcypress	LRGV, Mex.	G2S2; TOES (1983): Texas End.
Agavaceae	02 Polianthes runyonii Runyon's Huaco	Endemic to lower Rio Grande Valley	USFWS 1983:End.; Ayensu et al 1978: End.
Amaranthaceae	03 Achryranthes aspera Chaff-flower	Hidalgo Co. into C.Am.	
Rutaceae	04 Esenbeckia berlandieri Jopoy	Cameron Co. to Gro.	Everitt (1976); Lonard et al: Extinct in USA?; Heep and Lonard (In Press):Rediscovered(3 trees)
Euphorbiaceae	05 Euphorbia antisyphylitica Candelilla	Big Bend (Texas) to Gro. plus Webb and Starr Cos.	Everitt and Gonzalez (1976);colony in Starr Co.,bulldozed all around
Sterculiaceae	06 Ayenia limitaris Cameron Ayenia	Cameron and Hidalgo Cos., Coah.	G1S1
Frankeniaceae	07 Frankenia johnstonii Johnston's Frankenia	Endemic to Rio Grande Plains	G2S2; USFWS 1984b: ENDANGERED; Ayensu et al 1978: End.
Violaceae	08 Hybanthus verticillata v. platyphyllus Cameron Green Violet	Endemic to Cameron Co.	G1S1
Cactaceae	09 Echinocactus asterias Star Cactus	Starr Co., Tamps., N. L.	G2S1; in USA, found only in Starr Co.
Acanthaceae	10 Justicia runyonii Runyon's Water-willow	Endemic to Tamaulipan Biotic Province	Ayensu et al (1978): Thr.
Rubiaceae	11 Cephalanthus salicifolius Mexican Buttonbush	Hidalgo Co. to Hond.	
Asteraceae	12 Dyssodia tephroleuca Ashy Dogweed	Starr and Zapata Cos.	G1S1; USFWS (1984a): ENDANGERED; Ayensu et al (1978): End.
		THREATENED	
Arecaceae	13 Sabal texana Texas Sabal Palm	LRGV into SLP	G2S2; TOES (1983): IV, Texas Thr.

Family	Species Common Name	Range	Published Status
Nyctaginaceae	14 Pisonia aculeata Devil´s Claw	Cameron Co. into S.Am.	
Amaranthaceae	15 Iresine palmeri Palmer´s Bloodleaf	Cameron Co., Mex.	
Mimosaceae	16 Acacia constricta Mescat Acacia	Trans-Pecos, Starr and Zapata Cos. to C. Mex.	
Mimosaceae	17 Mimosa wherryana Wherry Mimosa	Endemic to Tamaulipan Biotic Province	G2S1; USFWS (1983), as M. biuncifera
Fabaceae	18 Coursetia axillaris Texas Baby Bonnets	Tamaulipan and SLP.	Ayensu et al 1978: Thr.
Rutaceae	19 Amyris madrensis Sierra Madre Torchwood	LRGV to Coah. and Tamps	
Rutaceae	20 Helietta parvifolia Baretta	Starr Co. to Hgo.	
Celastraceae	21 Mortonia greggii Afinador	Rio Grande Plains to ne Mexico	
Capparidaceae	22 Capparis incana Santa Ana Capparis	Hidalgo Co. south to?	Lonard et al: one at Santa Ana NWR
Crassulaceae	23 Sedum texanum Texan Stonecrop	Endemic to Tampaulipan Biotic Province	G2S2; USFWS (1983): End. (formerly Lenophyllum)
Flacourtaceae	24 Xylosma flexuosa Brush-holly	Rio Grande Plains to Guat.	
Cactaceae	25 Echinocereus reichenbachii v. fitchii Hair-covered Hedgehog Cactus	Webb Co. to LRGV	G2S2; Benson (1982): Thr.; Ayensu et al (1978): Thr.
Cactaceae	26 Thelocactus bicolor v. flavidispinus Yellow-spined Glory-of-Texas Hedgehog Cactus	Brewster and Starr Cos.	G1S1; Benson (1982): Thr.; Ayensu et al (1978): Thr.
Cactaceae	27 Coryphantha macromeris var. runyonii Runyon´s Pincushion Cactus	Endemic to Cameron & Starr Cos.	G2S2
Lythraceae	28 Heimia salicifolia Hachinal	Rio Grande Plains into S. Am.	
Asclepiadaceae	29 Asclepias prostrata Prostrate Milkweed	Endemic to Starr Co. & Tamps.	G1S1
Verbenaceae	30 Citharexylum spathulatum Mission Fiddlewood	Endemic to Starr & Hidalgo Cos.	G1S1
Verbenaceae	31 Lantana microcephala Hammock Lantana	LRGV to Guat.	

Family	Species Common Name	Range	Published Status
Acanthaceae	32 Tetramerium platystegium Torrey's Tetramerium	Endemic to Rio Grande Plains and Edwards Plateau	G2S2
Acanthaceae	33 Dicliptera vahliana Red Dicliptera	LRGV to n. S. Am.	
Rubiaceae	34 Chiococca alba David's Milkberry	LRGV into Trop. Am.	
		WATCH LIST	
Cyperaceae	35 Eleocharis austrotexana Johnston's Spikerush	Cameron Co., endemic to Rio Grande Plains and se Tex.	MacDonald 1984: candidate; species unknown to committee
Bromeliaceae	36 Tillandsia baileyi Bailey's Ballmoss	LRGV to Guat.	Populations still being removed by continued habitat clearing
Liliaceae	37 Anthericum chandleri Lila de los Llanos	LRGV, s.-coastal Texas, ne Mexico	G2S1; MacDonald 1984: candidate
Agavaceae	38 Agave lophantha Thorn-crested Agave	LRGV into Ver	Colonial, threatened by clearing
Urticaceae	39 Urtica chamaedryoides var. runyonii Ortiguillo	Endemic to lower Rio Grande Valley	USFWS 1983:End.; Ayensu et al 1978: End.
Polygonaceae	40 Eriogonum greggii Gregg Wildbuckwheat	Hidalgo Co., to N.L. & Coah.	G2S1, status uncertain
Brassicaceae	41 Lesquerella thamnophylla Shrubleaf Bladderpod	Starr & Zapata Cos.	G1S1; MacDonald 1984: candidate [Not in Correll and Johnston (1970)]; unknown to committee
Rosaceae	42 Prunus texana Peach Bush	Endemic to Rio Grande Plains and Edwards Plateau	Ayensu et al 1978: Thr.
Fabaceae	43 Erythrina herbaceae Coral Bean	SE USA to SLP.	
Euphorbiaceae	44 Adelia vaseyi Vasey Adelia	Endemic to Tamaulipan Biotic Province	
Euphorbiaceae	45 Croton soliman Solimán	Cameron Co. to Hgo.	Lonard et al: one at LANWR
Euphorbiaceae	46 Manihot walkerae Tamaulipan Manihot	Endemic to Tamaulipan Biotic Province	G1S1; USFWS 1983: End.; Ayensu et al 1978: End.; species cannot be located by committee botanists

Family		Species Common Name	Range	Published Status
Euphorbiaceae	47	Euphorbia golondrina Boquillas Spurge	Hidalgo, Brewster, Presidio Cos, n. Mx.	G2S2, status uncertain
Sapindaceae	48	Cardiospermum dissectum Rio Grande Balloon-vine	Hidalgo, Starr Cos., Chih.	G2S1, status uncertain
Cochlospermaceae	49	Amoreuxia wrightii Yellowshow	Rio Grande Plains, adj. Mex., W. Edwards Plateau	Ayensu et al (1978): Thr.; Durant (1985):Rare (photo, p.58); in highly disturbed areas
Turneraceae	50	Turnera diffusa Hierba del Veneda	Starr Co. through Trop. Am.	
Boraginaceae	51	Tournefortia volubilis Twining Tournefortia	Cameron and Hidalgo Cos. into S. Am.	Only in isolated habitat islands
Verbenaceae	52	Citharexylum berlandieri Tamaulipan Fiddlewood	LRGV to Ver.	
Asteraceae	53	Grindelia oolepis Plains Gumweed	Endemic to coastal portion of Rio Grande Plains	G2S2; status uncertain
Asteraceae	54	Ambrosia cheiranthifolila Tamaulipan Ragweed	Endemic to Tamaulian Biotic Province	Ayensu et al (1978): End.; USFWS (1983): End.
Asteraceae	55	Parthenium incanum Mariola	Starr Co., sw TX, NM, AZ, MX	
		EXTINCT		
Rhamnaceae	56	Colubrina greggii Manzanita	Cameron Co. into Guat.	Committee botanists cannot locate species in LRGV
Sterculiaceae	57	Nephropetalum pringlei Pringle's Kidneypetal	Endemic to Hidalgo Co.	Lonard et al:Extinct? (1888); Ayensu et al 1978: Extinct
Cactaceae	58	Cereus (Selenicereus) spinulosus Tropical Forest Cereus	Cameron Co. to e. Mex.	Benson (1982): Extinct in USA?; once one colony near Boca Chica?
Cactaceae	59	Echinocereus berlandieri v. angusticeps Linn Yellow Alicoche	Endemic to Hidalgo Co.	Benson (1982): Extinct? (1934); Ayensu et al (1978): Extinct

LITERATURE CITED OR USED

Ayensu, E.S., R.A. DeFilipps, et al. 1978. Endangered and threatened plants of the United States. Smithsonian Institution and World Wildlife Fund, Washington, D.C.

Benson, L. 1982. The cacti of the United States and Canada. Stanford Univ. Press, Stanford.

Correll, D.S., and M.C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner. 1881 pp.

Durant, M. 1985. The hazardous life of our rarest plants. Audubon 87(4):50-61.

Everitt, J.H. 1976. Native plant though extinct grown as an ornamental. Rio Grande Valley Hort. Soc. J. 30:113-114.

Everitt, J.H., and C.L. Gonzalez. 1976. Discovery of Candelilla (Euphorbia antisyphilitica Zucc.) in the Lower Rio Grande Valley of Texas. Rio Grande Valley Hort. Soc. J. 30:109-111.

Heep, M.R., and R. I. Lonard. In press. Esenbeckia berlandieri (Rutaceae) rediscovered in extreme southern Texas. Southwestern Nat. 31(2).

Lonard, R.I., J.H. Everitt, F.W. Judd, with N.A. Browne. In press. Woody plants of the lower Rio Grande Valley, Texas. 202 pp.

MacDonald, C. 1984. Candidate species of plants for the lower Rio Grande Valley. Unpubl. mimeo, RGVNWR files.

Texas Organization for Endangered Species. 1983. Endangered, Threatened, & Watch Lists of plants of Texas, Revision 3. TOES Publ. 3.

U.S. Fish and Wildlife Service. 1983. Department of the Interior Land Protection Plan for the Rio Grande Valley National Wildlife Refuge, Cameron, Hidalgo, Starr, and Willacy Counties, Texas. 57 pp.

U.S. Fish and Wildlife Service. 1984a. Endangered and threatened wildlife and plants. U.S. Dept. Int. 50CFR17.11 and 17.12. 24 pp.

U.S. Fish and Wildlife Service. 1984b. Endangered status for three western plants. End. Spp. Tech. Bull. 9(9):6-7.

Vines, R.A. 1960. Trees, shrubs, and woody vines of the Southwest. Univ. Texas Press, Austin. 1104 pp.

DEFINITIONS

SPECIES -- includes species, subspecies, and varieties, following FWS/End Spp precedents.

ENDANGERED -- on verge of elimination from LRGV (Two of these are listed by the FWS and another by TOES)

THREATENED -- threatened with elimination from LRGV, primarily by land conversion

WATCH LIST -- species proposed as threatened or endangered, but some are unknown or insufficiently familiar to the committee to be properly placed. Others are borderline and need monitoring to observe whether they continue to face a threat to their survival before the decision is made to list or delist. A few are peripheral, reaching the limits of their ranges in the LRGV.

NOTE: Key to Status Codes (Source citation unknown at present):
G= Global, S= State, 1= <6 known populations, 2= 6-20 known populations
Example: G1S2 = <6 known pop. on Earth, 6-20 known pop. in Texas

Table G-5. Endangered, Threatened, and watch list species of the Native Plant Project list on Santa Ana NWR. (An introduced plant on this list is one not known to be native to Santa Ana NWR, but is native within the scope of the Rio Grande Valley NWR -- the four-county lower Rio Grande Valley).

Endangered (4):	Montezuma Baldcypress, reintroduced
	Chaff-flower, rare (in USA, found only on Santa Ana NWR)
	Jopoy, rare (introduced while U.S. population believed extinct)
	Runyon's Water-willow, rare
Threatened (8):	Texas Sabal Palm, reintroduced
	Devil's Claw, rare
	Texas Baby Bonnets, rare
	Sierra Madre Torchwood, rare
	Santa Ana Capparis, represented on the Refuge by a single plant which is believed to be the only one occurring in the United States.
	Brush-holly, rare (introduced)
	Hachinal, occasional (at northern range limit on Refuge)
	Red Dicliptera, rare (in Texas, known only from Santa Ana NWR)
Watch List (5):	Bailey's Ballmoss, very rare
	Ortiguilla, common (endemic to lower Rio Grande Valley)
	Coral Bean, rare (introduced)
	Vasey Adelia, rare
	Yellowshow, rare (introduced)

On 9 July, Dr. Pauline James donated fifteen Bailey's Ballmoss, Tillandsia baileyi, to the Refuge. These native bromeliads were salvaged when trees were bulldozed for a new highway on U.S. 77 north of Raymondville. The fifteen specimens were tied to tree limbs around Trail A with hopes they would survive and reproduce on the Refuge. At least one of seven Bailey's Ballmoss (donated by William MacWhorter) attached in this fashion last year flowered and bore seeds this Spring. This project was accomplished with the use of the YCC program.

Endangered Feline Study.

CAMERAS. Remote wildlife photography for Endangered feline documentation on Santa Ana National Wildlife Refuge continued through CY 1985. Each camera consists of a Kodak disc camera inside a plastic case with either a heat/motion sensor or a infrared trip beam to activate the camera when an animal passed in front of it. Table G-6 summarizes camera-night efforts through the end of the year.

Three heat/motion sensitive (animal-activated) cameras cases have been employed on Santa Ana NWR since 4 November 1984, except while they were returned to the manufacturer for modification in August and September 1985. Six infrared trip beam cameras were received in June and employed three each on Santa Ana NWR and in palm groves of the Audubon Sabal Palm Grove Sanctuary and Boscaje de las Palmas tract of the Rio Grande Valley NWR in June and July of 1985. They all failed and were returned to the manufacturer for repair and modification. They

were returned to the Refuge, modified as described above, and set on wildlife trails on Santa Ana NWR in August. Camera 9 was loaned to Aransas NWR on 7 October. Camera-nights decreased after the disappearance of two infrared trip beam and one heat/motion sensitive cameras while set between 15 and 18 December.

Through the end of CY 1986, the heat/motion sensitive cameras spent 906 camera-nights (C-N) out on Santa Ana National Wildlife Refuge exposing 308 discs. Of these 308, at least 61 discs were animalless. Frames with animals totaled 1348 (29.4% of 4,587 total frames) while, after modification, 37.3% (155 of 414) were exposed while checking cameras. Table G-7 lists the nineteen species documented with these cameras and the number of frames taken per species.

Through the end of CY 1986, the infrared trip beam cameras spent 447 camera-nights (C-N) out on Santa Ana National Wildlife Refuge exposing 232 discs. Of these 232, 17 discs were animalless. Frames with animals totaled 863 (46.5% of 1856 total frames). Table G-8 lists the twenty species documented with these cameras and the number of frames taken per species. From 42 camera-sets with infrared trip beam cameras in palm groves, some 93 frames on 34 discs contained animals (Table G-9).

Animal-activated cameras should prove useful to many wildlife inventories. Species varying in size from White-footed Mouse and Olive Sparrow to Coyote and Harris Hawk have been documented by our cameras. Varying attractants (specific scents, bait fowl, grain, etc.) attracts a variety of wildlife (Tables G-7 and G-8). The trip beam cameras have also captured reptiles. Absolutely no harm is done to the wildlife; wildlife are neither approached nor handled.

An infrared trip beam camera case is posed for your viewing. The infrared source box appears in many of the wildlife photographs. An animal moving between the two boxes breaks the beam and takes its own photograph. (14MR86, JI)

Table G-6. Summary of camera-night (C-N) (Santa Ana NWR) and camera-set (C-S) (Palm Groves) efforts.

Month	Nights (N)	Monthly C-N/C-S	Accumulative C-N	Comments
NO 84	01-13	38 C-N	----	H/M-SANWR
DE 84	14-27	42 C-N	80 C-N	H/M-SANWR
JA 85	28-48	63 C-N	143 C-N	H/M-SANWR
FE 85	49-76	84 C-N	227 C-N	H/M-SANWR
MR 85	77-107	96 C-N	323 C-N	93 H/M, 3 IRa, SANWR
AP 85	108-137	96 C-N	419 C-N	89 H/M, 7 IR, SANWR
MY 85	138-169	96 C-N	515 C-N	H/M-SANWR
JE 85	170-190	59 C-N	574 C-N	H/M-SANWR
	-------	25 C-N	25 C-N	IR-SANWR
	-------	18 C-S	18 C-S	IR-Palm Groves
JL 85	191-222	65 C-N	639 C-N	H/M-SANWR
	-------	24 C-S	42 C-S	IR-Palm Groves
AU 85	223-235	26 C-N	665 C-N	H/M-SANWR
	-------	26 C-N	51 C-N	IR-SANWR
SE 85	-------	4 C-N	669 C-N	H/M-SANWR
	-------	155 C-N	206 C-N	IR/SANWR
OC 85	-------	87 C-N	756 C-N	H/M-SANWR
		101 C-N	307 C-N	IR/SANWR
NO 85	-------	90 C-N	846 C-N	H/M-SANWR
		90 C-N	397 C-N	IR/SANWR
DE 85	-------	70 C-N	916 C-N	H/M-SANWR
		50 C-N	447 C-N	IR/SANWR
TOTALS		906 C-Nb		H/M-SANWR
		457 C-Nb		IR-SANWR
		42 C-S		IR-Palm Groves

[a] H/M=Heat/motion sensitive camera
IR=Infrared trip beam camera
C-N=daily checked
C-S=biweekly checked

[b] Data for 10 camera-nights testing a prototype infrared trip beam camera in April and May are included in the heat/motion camera data above. The totals here are corrected.

Table G-7. Number of frames taken per species by heat/motion sensitive cameras on Santa Ana National Wildlife Refuge.

Subjects	NO 84	DE 84	JA 85	FE 85	MR 85	AP 85	MY 85	JE 85	JL 85	AU 85	SE 85	OC 85	NO 85	DE 85	TOTAL FRAMES
Opossum	8	--	17	18	19	----a	25	21	10.5	7	--	10	--	--	135.5
Eastern Cottontail	8	38	28	32	97	25	7	16	1	3	--	5	13	3	276
Mexican Ground Squirrel	--	--	--	--	--	16.5b	11	12	25	--	--	--	--	--	64.5
MexicanSpinyPocketMouse	1	--	3	1	1	--	--	--	2	--	--	--	--	--	8
White-footed Mouse	12	6	13	4	--	0.5b	7	1	6	--	--	--	1	--	50
Southern Plains Wood Rat	39	22	32	10	29	11	45	5	138.5	2	--	7	6	1	347.5
Nine-banded Armadillo	6	7	3	8	3	2	3	--	2	11	--	4	--	--	49
Coyote	--	--	6	3	4	--	--	--	--	--	--	2	1	--	16
Raccoon	24	--	2	1	8	16	17	17	9	3	--	8	3	--	108
Striped Skunk	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1
Bobcat	--	--	--	14	6	--	--	--	--	--	--	--	--	1	21
Ocelot	--	--	--	--	--	--	--	--	--	--	--	3	--	--	3
Javalina	--	--	--	--	--	--	--	--	--	6	--	--	--	--	6
Unidentifiable mammals	--	--	2	9	--	5	1	--	2	1	--	1	--	--	21
Plain Chachalaca	--	3	2	--	10	5	--	--	65	3	--	--	--	--	88
White-tipped Dove	--	--	--	1	--	20	104	14	--	3	--	--	--	--	142
Greater Roadrunner	--	--	--	--	1	1	--	--	--	--	--	--	--	--	2
Eastern Screech Owl	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1
Common Pauraque	--	--	--	--	1	--	1	--	--	--	--	--	--	--	2
Long-billed Thrasher	--	--	--	1	--	--	--	--	3	--	--	--	--	--	4
Unid Chiropterans/Avians	1	--	1	--	--	--	--	--	--	--	--	--	--	--	2
Total Frames with Ss	99	76	110	102	180	102	221	86	264	39	0	40	24	5	1348

[a] Probably included in unidentifiable mammals

b Two species were documented in one frame, each credited with one half frame to facilitate computation. Frames with more than one individual of a single species are tabulated as one.

Table G-8. Subjects documented by cameras with infrared trip beams on Santa Ana National Wildlife Refuge in 1985.

Subjects	JE 85	AU 85	SE 85	OC 85	NO 85	DE 85	TOTAL FRAME.
Opossum	--	5	31	27	29	6	98
Eastern Cottontail	2	3	102	33	62	5	207
Mexican Ground Squirrel	18	1	26	1	-	-	46
White-footed Mouse	--	--	1	--	--	--	1
Southern Plains Wood Rat	25	2	18	10	20	11	86
Nine-banded Armadillo	--	2	4	4	3	-	13
Coyote	--	--	1	--	--	--	1
Raccoon	--	--	5	6	2	2	15
Striped Skunk	--	--	2	-	8	-	10
Bobcat	--	2	--	-	1	-	3
Ocelot	--	--	16	-	2	5	23
Unidentifiable mammals	--	--	5	--	--	--	5
Plain Chachalaca	--	--	7	7	22	5	41
White-tipped Dove	11	34	106	43	47	25	266
Greater Roadrunner	--	--	4	3	1	-	8
Long-billed Thrasher	--	--	13	1	-	6	20
Olive Sparrow	--	--	4	--	--	--	4
Unidentifiable Chiropterans/Avians	--	--	1	--	--	--	1
Texas Tortoise	4	2	2	--	--	--	8
Rose-bellied Lizard	--	1	--	--	--	--	1
Texas Indigo Snake	--	--	--	1	-	-	1
Formicid	--	--	1	-	-	1	2
Unidentifiable	--	--	--	1	2	-	3
Total Frames with Subjects	60	52	349	137	199	66	863

Table G-9. Subjects documented by cameras with infrared trip beams at the Audubon Sabal Palm Grove Santuary and Boscaje de las Palmas tract of the Rio Grande Valley National Wildlife Refuge in June and July 1985.

Subjects	JE85	JL85	TOTAL FRAMES
Opossum	21	19	40
Eastern Cottontail	3	5	8
Nine-banded Armadillo	13	--	13
Raccoon	11	3	14
Plain Chachalaca	--	1	1
Long-billed Thrasher	2	9	11
Olive Sparrow	4	--	4
terrestrial gastropod (Helicina orbiculata)	1	--	1
adult lepidopteran, unidentified	1	--	1
Total Frames with Animal Subjects	56	37	93

A Greater Roadrunner pauses before streaking away. (130C85, SA405-06, JI)

PHOTODOCUMENTATIONS. During the night of 15-16 September 1985, a series of two (2) photographs taken by an infrared trip beam camera documented the presence of an Ocelot on Santa Ana National Wildlife Refuge. The following night, a series of thirteen (13) photographs of an Ocelot were taken by another camera at a second site on Santa Ana NWR.

Comparison of facial markings indicates the same individual is in both series. In addition, a feline was photographed on 5-6 September 1985 at a third site on Santa Ana NWR. The photograph shows primarily the posterior surfaces of the hind limbs below the undocumented tail. Comparison of leg stripes in this photograph to a posterior view in the series of thirteen indicates the probability of it, too, being the same individual. Thus, the three series of photographs appear to indicate three points in one Ocelot's home range. Comparison of facial markings in photographs of this Ocelot and the one trapped on 26 April 1985 indicates the two are different individuals.

During the night of 6-7 October 1985, an Ocelot walked by a heat/motion sensitive camera on Santa Ana National Wildlife Refuge. Although documented, the Ocelot was too distant from the camera for the markings to show well enough and photographed from an angle for which a comparison photograph was not available. Thus, it could not be determined whether or not the Ocelot was one which had been captured or photographed previously.

During the night of 20-21 October 1985, an Ocelot walked by a heat/motion sensitive camera on Santa Ana National Wildlife Refuge. Seen in left lateral view with its head obscured by a small trunk, the clearly visable markings could not be matched with those of the 26 April or the September Ocelots and appeared to indicate a third individual. Unfortunately the facial markings necessary for positive identification were not visible. The Ocelot appeared robust and healthy.

During the period of 25-28 November 1985, an infrared trip beam camera documented an Ocelot on Santa Ana National Wildlife Refuge. The site was the same one as the 15-16 September documentation. The first of the two frames showed the venter; the Ocelot apparently stood directly over the camera. The second showed the right lateral surface; the Ocelot apparently moved to its left or reapproached the camera. Comparison of visible spotting, although not definitive, suggested that this Ocelot was the same one previously documented at this site. It appeared hale and robust.

During the night of 28-29 November 1985, an infrared trip beam camera documented an Ocelot on Santa Ana National Wildlife Refuge. The site was the same one as the 26 April documentation. The first three of five frames showed the Ocelot head on, approaching the camera from behind the infrared beam source box. The fourth showed the chest and forelimbs. The fifth presented much of the right lateral surface from an anterior angle. The lateral striping compared well with that of the Ocelot of the 16-17 September documentation while the facial spotting matches. This Ocelot was the same one documented in the earlier photographs. However, it was not the one captured at this site.

Of the Ocelot photographs obtained by animal-activated cameras, all which could be positively identified to individual showed the same individual Ocelot. The unidentifiable (to individual Ocelot) photographs probably were this individual also; however, since the definitive forehead was not visible, they possibly could represent one or more other individuals. Thus, the known Ocelot

This Ocelot stuck around for thirteen flashes; comparison of markings indicated this one was not the captured Ocelot. (16/17SE85, SA372-12, JI)

The long hours spent in the field culminated in this capture which provided documentary proof that an Ocelot still resided on Santa Ana NWR in the wildlife corridor. (26AP85, JI)

population using Santa Ana NWR included at least the Ocelot trapped on 26 April 1986 and another individual photographed during the Autumn months.

LIVE-TRAPPING. Fifteen Tomahawk livetraps measuring 107 x 38 x 51 cm were modified by attaching bait cages to house live Chickens as attractants. Each bait cage was constructed of 2.5 x 5 cm mesh covered by 1.27 cm2 mesh to keep non-target predators from reaching through the larger mesh and killing the bait. Various scents were also employed around the trap pan and mouth as additional attractants. Permits arrived and the 15 livetraps were employed in the various habitat types on Santa Ana NWR beginning on 21 January. All trapping efforts occurred on Santa Ana NWR with one exception. Six livetraps were moved to the Santa Maria Tract of the Rio Grande Valley National Wildlife Refuge on 8 March for 16 nights totaling 96 trap-nights. Santa Maria traps took Raccoons ten times and Opossums twelve.

The presence of an Endangered Ocelot on Santa Ana NWR was documented the night of 25-26 April 1985 when one was captured, photographed, and released by Ideker. Witnesses jumping up and down with excitement included Fuller, Labuda, and Realty Surveyor James Reed. This capture confirmed the continued presence of this species in the wildlife corridor along the lower Rio Grande.

Table G-10 summarizes trap efforts by month and site, while Table G-11 lists the subjects captured. Fourteen species were captured before trapping ceased on 30 April.

Predators, probably Raccoons, reduced the problem of repeat captures of Plain Chachalacas by consuming those captured by the traps. Since the fowl were killed and removed through 2.5 x 5 cm mesh, predation likely occurred as they slept. By the end of March, Green Jays ceased frequenting the traps as predators, probably Raccoons or Opossums, were able to capture and remove them from the livetraps. However, the seasonal increase in food supply could alternatively provide an explanation. Percent gramnivores captured declined and percent carnivores increased with the employment of Bobcat scent.

Eight of the livetraps were loaned on 15 August to Linda Laack of Caesar Kleberg Wildlife Research Institute for use at Laguna Atascosa National Wildlife Refuge. With the continuing manpower shortage, trapping was not resumed in the Autumn of 1985. Gearing up for the expected resumption of trapping began with the return of five of the eight borrowed livetraps on 27 October and a sedation workshop. A radio-tracking receiver and transmitter collar were purchased. Ideker spent 2 December observing Linda Laack's field techniques at Laguna Atascosa NWR and brought back the other three traps.

Table G-10. Summary of trap-night (T-N) efforts.

Month	Nights (N)	Monthly T-N	Accumulative T-N	Refuge Trapped
JA 85	8 N	113 T-N	----	Santa Ana NWR
FE 85	28 N	417 T-N	530 T-N	Santa Ana NWR
MR 85	31 N	362 T-N	892 T-N	Santa Ana NWR
MR 85	16 N	96 T-N	96 T-N	Santa Maria tract, RGVNWR
AP 85	30 N	450 T-N	1342 T-N	Santa Ana NWR
MY 85	0 N	0 T-N	1342 T-N	
JE 85	0 N	0 T-N	1342 T-N	
JL 85	0 N	0 T-N	1342 T-N	
AU 85	0 N	0 T-N	1342 T-N	
SE 85	0 N	0 T-N	1342 T-N	
OC 85	0 N	0 T-N	1342 T-N	
NO 85	0 N	0 T-N	1342 T-N	
DE 85	0 N	0 T-N	1342 T-N	
TOTAL			1438 T-N	Combined - All Tracts

Table G-11. Subjects captured in livetraps during CY 1985.

Subjects	Santa Ana NWR JA85	FE85	MR85	AP85	Totals	Santa Maria Tract MR85
Opossum	11	23	12	9	55	12
Fox Squirrel	--	1	--	1	2	--
Southern Plains Wood Rat	--	2	4	7	13	--
Coyote	--	--	--	1	1	--
Raccoon	2	16	17	36	71	10
Bobcat	--	--	3	--	3	--
Ocelot	--	--	--	1	1	--
Harris' Hawk	--	1	--	--	1	--
Broad-winged Hawk	--	--	1	--	1	--
Plain Chachalaca	--	21a	1	2	24	--
White-tipped Dove	--	--	--	10b	10	--
Eastern Screech Owl	--	1	--	--	1	--
Golden-fronted Woodpecker	--	2	--	--	2	--
Green Jay	--	6	4c	--	10	--
Subjects captured per month	13	73	42	67	195	22

a/ 13 singles, 4 pairs (17 captures)

b/ 6 singles, 2 pairs (8 captures)

c/ 2 singles, 1 pairs (3 captures)

RECOVERY PLAN - OCELOT. Dr. Gary Harwell visited the Refuge Complex on 12 April to discuss the Ocelot Recovery Plan draft he was preparing and to obtain a first hand look at Ocelot habitat. Comments on the Ocelot Recovery Plan draft were submitted by Ideker and by Fuller and Schumacher (RGVNWR) to RO Endangered Species in November 1985.

CONFERENCE AND SEDATION WORKSHOP. A meeting convened for Ocelot researchers at Laguna Atascosa NWR on 16 July was attended by Fuller, Labuda, and Ideker. It included an update on accomplishments of, problems encountered with, and future plans for Ocelot studies in south Texas. The meeting provided an excellent opportunity for everyone involved to become acquainted and to correlate methods and data recording. Participants attended from the Region 2 Office of the USFWS (Ellis Klett, Bill Hawthorne, Dave Langowski, Curtis Carley), USFWS Ecological Services Corpus Christi Office (Gerry Jackson, Tom Mauer), Caesar Kleberg Wildlife Research Institute (John Rappole, Linda Laack, Dan Twedt, Mike Tewes -- now at the University of Idaho), Texas Parks and Wildlife Department (Gary Homerstadt), Laguna Atascosa NWR (Ray Rauch, DeSantos, Sue Rice) and Santa Ana NWR (Fuller, Labuda, and Ideker).

An endangered feline workshop was held at the Santa Ana/Rio Grande Valley NWR Complex headquarters on 27 October to provide hands-on experience in sedating endangered felines. The workshop was directed by Dr. Gary Harwell, coauthor of the "Technical Draft of the Recovery Plan for the Listed Cats of Arizona and Texas," and Dr. Mike Hughes, veterinarian from Brownsville (formerly with the Gladys Porter Zoo). The workshop was deemed very successful by participants and in addition to the training information allowed the individuals to exchange information and discuss the Project. Dr. Harwell is to be commended for his interest and involvement. Eleven others attended from Santa Ana NWR (Fuller, DeSantos, Ideker), Laguna Atascosa NWR (Labuda, Rice), ES-Corpus Christi (Tom Mauer, Pete Ramirez), Texas Parks and Wildlife Department (Gary Homerstadt), Caesar Kleberg Wildlife Research Institute (Linda Laack, Dan Tweedt), and Pan American University (Dr. Pauline James).

ENDANGERED FELINE SIGHTINGS. Thirteen Ocelot and eleven Jaguarundi sightings were reported during CY 1985. Two Ocelots and one Jaguarundi were reported during January. On 16 January, Ideker observed an Ocelot on Wildlife Drive below the Willow Lake pump. On 28 January, Ideker observed an Ocelot cross the Wildlife Drive north of Cattail Lake. Kreilick sighted a Jaguarundi near the backgate on 28 January.

Two Jaguarundis and one Ocelot were reported in February. On 5 February, Ideker observed a Jaguarundi cross Wildlife Drive between Highland Trail and the Old Cemetary and leap the Guinea Grass to leave the blacktop. Tram Interpreter Janine Lombardi reported a Jaguarundi near her rural residence southwest of Alamo on 9 February while land was being cleared nearby. On 28 February, Ideker observed an Ocelot cross the Wildlife Drive near the Roadrunner Trail intersection.

Four Ocelot and one Jaguarundi sightings were reported in March. Just before he migrated north to Aransas NWR, Maxwell found two Ocelots on 1 March resting on the Wildlife Drive near the Vireo Trail intersetion. Mancha saw an Ocelot cross the Wildlife Drive above the Old Cemetary. On 22 March, Ideker observed a Jaguarundi cross Wildlife Drive below the Willow Lake pump. On 16 March, Ideker observed an Ocelot cross Wildlife Drive west of Jaguarundi Trail. On 21 March, Ideker observed an Ocelot cross Wildife Drive near the Terrace Trail

intersection. Ideker observed an Ocelot cross Wildlife Drive near Terrace Trail on 5 May. It was the second sighting at that exact point.

Jaguarundis were reported three times during June. Labuda reported one crossing Wildlife Drive inside the entrance gate on 3 June. Cavazos reported one crossing a levee of Pintail Lake on 12 June. Ideker followed one up Jaguarundi Trail on 20 June.

Dr. Pauline James, Professor-Emeritus of Ornitology from The Pan American University at Edinburg, and her able avian research assistants, Dr. DeWayne Hodges and David Cavazos, glimpsed a reddish Jaguarundi the first week of July. August reports include two sightings each of Ocelots and Jaguarundis. An Ocelot crossed Wildlife Drive north of Cattail Lake on 1 August and one crossed north of the north end of Mesquite Trail on 4 August. Staff await the photograph taken by visitors, Steve Robinson and Robin Moore, of a Jaguarundi "sitting on a road" on 13 August. J. Jay Newton, a visitor, saw a Jaguarundi cross Wildlife Drive at Roadrunner Trail on 29 August.

Barry Jones described a Jaguarundi he and fellow tram interpreter Jill Kinney saw in the Willow Lake pump area on 7 December. Ideker saw Ocelots north of Cattail Lake on 4 and 29 December and on Highland on 6 December during camera checks. The two appeared to the observer to be of different height and build and, thus, compare well with the two individuals previously documented on Santa Ana NWR.

FUTURE OF THE OCELOT AND JAGUARUNDI IN SOUTH TEXAS. The successful documentation of the Endangered Ocelot on Santa Ana NWR should further serve to verify the importance of land protection efforts currently underway in the lower Rio Grande Valley of south Texas (U.S. Fish and Wildlife Service, 1985, Land Protection Plan for Rio Grande Valley National Wildlife Refuge in Cameron, Hidalgo, Starr, and Willacy Counties, Texas.) Over 95% of the native brushland historically occurring in the four Valley counties has already been cleared -- the habitat type in which the Ocelot has been documented at both the Laguna Atascosa and Santa Ana NWR's. Present trends indicate that the remaining native brushland habitat not currently under Federal, State, or private protection will be converted within the next five years, unless the USFWS can move quickly to implement its land acquisition plan. To protect the Endangered felines in perpetuity, it is essential that sufficient habitat "islands" be placed under protection, as well as connecting habitat travel corridors, to permit movement of the felines between the habitat "islands".

In order to further document the need for the habitat travel corridor -- the wildlife corridor described in the Land Protection Plan (reference above), the Refuge will broaden current efforts to include radio-collaring of a live-trapped Ocelot to document its movements. Refuge personnel have now completed the necessary training and acquired the needed equipment and supplies for radio-tracking.

It is indeed encouraging to have successfully documented the presence of the Endangered Ocelot on Santa Ana NWR as well as Laguna Atascosa NWR. However, much more will be be needed if the perpetuity of this species as well as the Endangered Jaguarundi and other species of management concern shall be guaranteed. Implementation of a Recovery Plan for Ocelots in Texas at the earliest possible date is essential to their survival in Texas. Acquisition efforts will remain critical to the continued survival of many wildlife species

found in the lower Rio Grande Valley of south Texas.

Other Endangered and Threatened Species Sightings.

Amphibians. Ideker observed a Rio Grande Chirping Frog on 8 March on the Santa Maria Tract. Visiting herpetologist Ken King reported hearing them on 22 March. Ideker noted their calling on the night bird census on 5 April. Two or three were noted by Ideker calling from the levee ditch area between A Trail and the entrance gate on 19 May and on 20 June. One made use of the moisture at the faucet by the old gasoline pumps behind Quarters 14 on 11 August. Three or four Rio Grande Chirping Frogs chirped around the coop in the Maintenance Compound on the evening of 16 September and one on 22 September. Another utilized the moisture from the faucet by the old gasoline pumps behind Quarters 14 on 23 September.

Ideker and six visitors observed a male Giant Toad on 10 February near the river end of the canal from the Rio Grande to Pintail Lake. Ideker observed an immature Giant Toad on 8 March on the Santa Maria Tract. On the night bird census on 5 April, Ideker noted Giant Toads chorusing in Willow and Cattail Lakes and along the Rio Grande. The Giant Toad was obvious during early April's rains. Ideker noted choruses on Willow Lake on the 8th, 11th, and 12th, Pintail Lake on the 8th and 11th, and Cattail Lake on the 8th, one hopping up the middle of Wildlife Drive before Roadrunner Trail on the 8th,, and one crossing Wildlife Drive near the lower C Trail crossing on the 8th. Anonymous visitors reported Giant toads on the 10th near Trailhead and at an anonymous site on the 13th.

Rainfall produced numerous Giant Toad records during May. Ideker noted calling on 2 May, one 50 m east of the southwest corner, one at Roadrunner Trail, a 125 mm male on the levee (these three all on Wildlife Drive on 16 May), a 163 mm female in the maintenance compound on 16 May, four calling on 16 May, a chorus at Willow Lake on 18 May, and a 123 mm female in the maintenance compound on 27 May. He rescued a 150 mm male trying unsuccessfully to climb a sawhorse leg to escape from inside a tractor tire on 13 May at the woodshed. On 16 May, he found three huge female Giant Toads just south of Alamo and a 88 mm juvenile and a 116 female in a church parking lot entrance at Alamo and Bowie in Alamo; all five were sitting in rain puddles. These records extend the known range of this peripheral species seven miles further into the United States from the Refuge and documents an unreported population in southern Alamo, McMillan also encountered a Giant Toad on Wildlife Drive near the west photography blind on 25 May.

On 28 June, Fuller's dog, Golda, had an encounter with a Giant Toad at Quarters 14. She apparently instinctively sensed the potential danger of the toad's skin venom and intelligently backed off. The toad identification was made by Fuller. At the time, articles in a local newspaper were condemning the Giant Toad and advocating the eradication of this protected species as an attacker and killer of dogs. To attack and kill an unwary dog, the toad would have to jump into the dog's open mouth! A 15.1 cm female Giant Toad was met on Wildlife Drive 0.2 miles west of the north end of Mesquite Trail on 20 June. An individual of the Alamo Giant Toad population was seen sitting in a puddle on the rainy evening of 20 June. A 14.0 cm male Giant Toad was met on the south sidewalk outside the Quarters 14 fence on 11 August. A 15.2 cm female was encountered hopping along Wildlife Drive about 50 m north of the Willow Lake pump on 25 August.

Despite the dry month, Giant Toads were reported each time humidity increased or rain sprinkled the roads and trails during September. A 14.3 cm male was under the bottle gas tank in the Maintenance Compound at 0830 on 1 September. Visitor David Arbour met one in the Old Headquarters building on 7 September. An anonymous visitor reported one on 13 September. Teresa R. High and Brenda Hale Smith of Rio Grande Valley NWR reported a "big, fat one" from near the west observation platform at Willow Lake on 16 September. Four juveniles were met on the levee that evening, snout/vent measurements were 8.9, 9.6, 9.8, and 9.9 cm. A 14.3 cm male crossed Wildlife Drive near the Old Headquarters on the evening of 20 September. Three juveniles were encountered on the levee the dry evening of 22 September, measurements were 8.9, 9.6, and 10.2 cm. Fuller saw one as she crossed the levee near the entrance on 25 September. Visitor J. Everett reported seeing a "2-pound" adult on 30 September. A 10.0 cm juvenile was on the Visitors' Center patio feeding under the phone booth lights that evening. Two juvenile Giant Toads were encountered nine times on seven evenings (4, 10, 12, 17, 20, 25, and 27 October) on the Vistors' Center patio, usually feeding under the telephone booth light. The two measured respectively 92-94 mm (N=3) and 97-103 mm (N=6). Giant Toads were on the Visitors' Center patio on 8 and 10 November.

The Mexican Treetoad was often heard but not seen. Ideker noted one calling on 16 May in the levee ditch, two calling on 16 May in the levee ditch, one calling in the levee ditch and two calling at Willow Lake on 19 May, and one calling from the nursery shade structure or greenhouse on 20 May. Several Mexican Treetoads called from the flooded levee ditch west of the backgate on 19 and 20 June. Rainfall those two days totaled 5.92 inches. Another called from Headquarters Lake and more from a flooded field on the northwest corner of US 281 and FM 907. Labuda found a Mexican Treetoad traveling along the wall of the Quarters 2 carport on 23 June. Two were observed hopping across Wildlife Drive near Terrace Trail on 16 September. One hopped along Wildlife Drive between Highland and Terrace Trails on 15 October.

Reptiles. Ideker observed a female Texas Tortoise at a trap site on 7 March along upper Jaguarundi Trail. Three Texas Tortoises were noted by Ideker, a female on upper Jaguarundi Trail on 12 April (with Labuda and Gary Harwell), a male on Highland Trail on the 22nd, and another male on upper Jaguarundi Trail on the 28th. Texas Tortoises were reported four times during May. A 190 mm male was noted by Ideker on middle Jaguarundi Trail on 6 May, a 156 mm female by Ideker on upper Jaguarundi Trail on 10 May, a 160 mm female by Ideker on Wildlife Drive just inside the entrance 13 May, and one in the same area by Fuller on 15 May. Ideker released a 156 mm male Texas Tortoise on upper Jaguarundi Trail on 13 May; it was found by a visitor on Schunior Street near Edinburg and brought to the Refuge on 11 May.

Numerous encounters with Texas Tortoises occurred on Jaguarundi Trail during June. Records include a 16.9 cm tortoise on 6 June, a 17.2 cm female on Highland Trail on 16 June, a 16.4 cm male on 21 June, a small tortoise on 21 and 28 June, a 17.2 cm male on 22 June, a 17.7 male on 24 June grazing on grass, and a reencountered male on 28 June feeding on a small Sida sp. Nine Texas Tortoise sightings were reported during July. Unattributed records are from Ideker's field notes. These include a 20.6 cm male on 6 July and a 19.5 cm male on 29 July, both on Wildlife Drive near the south end of Mesquite Trail; a 15.9 cm male on Highland Trail on 12 July; a 17.0 cm male on 12 July and 18.0 cm male on 22 July on upper Jaguarundi Trail; a 16.3 cm male on middle

Jaguarundi Trail on 12 July; a 15.7 cm male on Vireo Trail on 15 July; one on Wildlife Drive past Resaca Seca by McMillan on 20 July; and a 11.4 cm female inside the Refuge entrance on 27 July. Several of these have been observed and reported before.

Due to hot, dry conditions as well as reduced field time while the cameras were away, only three Texas Tortoise reports were noted in August. McMillan saw one on Wildlife Drive near the back gate. The male reported for 15 July on Vireo Trail was found crossing Wildlife Drive southbound 0.15 miles east of the south end of Mesquite Trail on 3 August and encountered again on 25 August crossing Wildlife Drive just below the west end of Highland Trail. Two Texas Tortoises flew in from Colorado and were released on 5 August on upper Jaguarundi Trail. The larger one was reported as 39 years old. By the way, they used an airplane.

Encounters with Texas Tortoises occurred only during the first half of September. A 17.6 cm male was being chased (or followed closely at a fast pace for tortoises) by a 17.7 cm male across Highland Trail on 1 September. On 6 September, Labuda brought in a 13.8 cm male from the Visitor's Center patio which was then released into known tortoise habitat inside the entrance, hopefully where it would be less likely to emigrate with human assistance. A 12.7 cm female crossed Wildlife Drive at that same release site on 14 September. Three Texas Tortoises were reported in October. A 17.2 cm male crossed Highland Trail on 10 October and a 17.3 cm male crossed middle Jaguarundi Trail at its junction with Highland Trail. Visitor Lida Crooks saw one on Terrace Trail on 11 October.

Ideker observed a Texas Horned Lizard along upper Jaguarundi Trail on 29 March 1985. Fuller saw one on Wildlife Drive north of Chapote Trail on 13 May.

Ideker observed a Mexican Racer on Wildife Drive below the lower C Trail intersection on 2 March. One was seen by Ideker crossing Wildlife Drive north of Cattail Lake on 27 April. Mexican Racers were noted by Ideker north of Chapote Trail on 13 May, on upper Jaguarundi Trail also on 13 May, on Wildlife Drive between Resaca Seca and Jaguarundi Trail on 19 May, and at the Old Headquarters gasoline pumps on 23 May. A Mexican Racer was observed 1.5 miles north of the floodway on Stewart Road (within San Juan) in June.

The Santa Ana National Wildlife Refuge "List of Terrestrial Vertebrates" lengthened in August when a Speckled Racer about 1/2 m long "froze" in mid-road allowing the observer walking there to circle it for a long, careful look.

Kreilick saw a Texas Indigo Snake on 2 March on the Santa Maria Tract. Texas Indigo Snakes were noted by Ideker on a wood rat trail between plots 25 and 06 on 14 April and crossing Wildlife Drive west of the north end of Mesquite Trail on the 27th. Ideker found a dead Texas Indigo Snake on 6 May on Wildlife Drive at Terrace Trail. McMillan saw one alive on Wildlife Drive just inside the entrance on 18 May. Visitor H. H. Axtell observed one crossing Wildlife Drive about 100 m before Chapote Trail on 14 May.

McMillan saw a Texas Indigo Snake on Wildlife Drive adjacent to Cattail Lake in June. A small (2/3 m) Texas Indigo Snake was observed on Vireo Trail on 13 July. An anonymous visitor reported a 1 1/3 m Texas Indigo Snake from B Trail west of the photo blind in August. Six Texas Indigo Snakes reports came in during September. Visitors Mrs. Alan, Alan, and Sandy Barnes encountered one

on 1 September. Visitor David Arbour saw one on Wildlife Drive on 7 September and another near Willow Lake on 22 September. One was reported anonymously from south of the entrance on 13 September. McMillan saw a Texas Indigo Snake on Wildlife Drive near Cemeterio Viejo on 21 September and visitor Jim Chance reported one from Wildlife Drive near Roadrunner Trail on 28 September.

A 1.3 m Texas Indigo Snake sunned itself along Highland Trail on 26 October. One was documented by an infrared trip beam camera the night of 5-6 October off middle Jaguarundi Trail. With the return of warm weather, reports of Texas Indigo Snakes followed with two on 23 November and a third a day or two later. Five Texas Indigo Snakes were reported in December: once by Sid Hamesley from A Trail on 1 December, once by Kinney and Jones from the tram in the Cattail Lake area on 7 and 16 December, and twice on 27 December by Jones and Kinney from the tram at the Chachalaca Crossing and in the Cattail Lake area.

Avians. White-faced Ibis were in residence during December: one at Willow Lake on 15 December, 3 at Willow Lake on 16 December, one at Willow Lake on 18 December, 12 from the tram at the north C Trail crossing on 20 December, one over the levee on 23 December, 16 at Willow Lake on 23 December, and 3 at Willow Lake on 31 December. On the 21 December CBC, 5 of the 13 counted on Santa Ana NWR were at Pintail Lake, 7 at Willow Lake, and one at Resaca Lake.

A Zone-tailed Hawk was first sighted on the 21 December CBC near the Rio Grande off Pintail Lake and again over Plot 1 inside A Trail on 26 December. A Common Black-Hawk was also sighted on the CBC from Wildlife Drive flying over the brush in the vicinity of the east end of Highland Trail. Adult and immature Gray Hawks were reported about twenty times throughout December. At least one White-tailed Hawk spent December on or near the Refuge with seven reports between the 4th and 26th.

Reports of Endangered Peregrine Falcons for 1985 totaled 13 reports and 15 individuals. On 9 March, Tram Interpreters Dinah Owens and Janine Lombardi reported two Peregrine Falcon sightings from the tram, the first was an adult flying north from the west end of the levee about 1400 and the second was an immature seen in a tree near the lower end of Mesquite Trail about 1715. A Peregrine Falcon was anonymously reported from Pintail Lake on 23 April. An anonymous report of a Peregrine Falcon came in on 30 September. Four Peregrine Falcon reports in October included six individuals (assuming no duplication). Jim Chance saw two over the Rio Grande near Pintail Lake on 1 October. Ideker saw an adult fly from a tree across Wildlife Drive near its southwest corner on 6 October and one over Headquarters Pond on 15 October. Schumacher (Rio Grande Valley NWR) saw two over the Visitors' Center parking lot on 16 October 1985. Morrissey and McMillan reported a Peregrine Falcon at Pintail Lake on 15 November. Four Endangered Peregrine Falcon records from Pintail Lake in December include one by Victor Emanuel and party on 12 December. an immature anonymously on 23 December, an immature by Tom and Chris Hanrahan on 26 December, and one anonymously on 30 December.

3. Waterfowl

Numbers of ducks wintering on Refuge lakes declined by a third from January to February and again a third by March. Many began leaving toward the end of March, evidently winging northward toward favored breeding sites. Wintering ducks continued their exodus toward northern breeding grounds in April and only the Mottled Duck, Fulvous Whistling-Duck and Black-bellied Whistling-Duck replacing the Winter residents showed population increases in April and May. One late record of a pair of Blue-winged Teal came in June; the pair was present on Willow Lake through June and July.

Fulvous Whistling-Duck flocks continued to pass through in September. Black-bellied Whistling-Ducks awaited flight capability of late broods of ducklings. Our "Winter Texan" waterfowl species began to appear by late September. Reports from 22 and 26 September include Green-winged Teal, Mottled Ducks, Blue-winged Teal, and Northern Shoveler. Waterfowl numbers increased in October as the Winter months drew near and Blue-winged, Green-winged, and Cinnamon Teal, Ring-necked Ducks, American Wigeon, Northern Shovelers, and Northern Pintail utilized the Refuge. Black-bellied Whistling-Ducks were present on 29 October. Two male Redheads on 17 November and one male Canvasback from 17 November on used Willow Lake. Two to 15 Black-bellied Whistling-Ducks and 3 Mottled Ducks used Pintail and Willow Lakes in November. A skein of 78 Canada Geese was counted from Terrace Trail on 18 December. Duck populations on the Refuge and in the surrounding area remained far below normal through December. As many as 37 Black-bellied Whistling-Ducks used Pintail Lake during December. Table G-12 lists average waterfowl populations.

4. Marsh and Water Birds

Migratory species such as Pied-billed Grebes, Anhingas, Soras, and Virginia Rails wintered on Refuge lakes and returned north as temperatures warmed. Flocks of as many as 800 Anhingas rested on the Refuge in March as they winged their way north from more southerly wintering sites in Mexico. January and February reports included 6 to 85 American White Pelicans. A Sandhill Crane flew over Cattail Lake on 19 March. A Yellow Rail was at Willow Lake on 26 March. A Clapper Rail present on 26 April, with previous and subsequent records, should be considered an accidental that wandered from the coast.

Residents such as Olivaceous Cormorants and the numerous heron and egret species fed in Refuge lakes throughout the year except during the nesting period when they moved to rookeries to reproduce. Least Grebes successfully reproduced again this year; the first nest was seen on 6 April and the last young reported on 27 August. Twenty White Ibis utilized Headquarters Pond on 21 August. The American Coot population of December 1985 was double that of January 1985 (Table G-12).

Marsh and waterbirds reported during September include Pied-billed Grebes, Anhingas, American Bitterns, Least Bitterns, Black-crowned Night-Herons, Common Moorhens, and American Coots. Reported October visitors also included Roseate Spoonbill and Sandhill Crane. A Roseate Spoonbill utilized Pintail Lake on 1 November. Some 50 to 100 American White Pelicans flew above the Refuge on 10 November, while December reports included 25 to 72.

Table G-12. Average populations of waterfowl on Santa Ana NWR in 1985.

CY 1985	Amer Coot	Cnada Goose	Gadwl	Nrthn Pintl	GrnWg Teal	BluWg Teal	Amer Widg	Nrthn Shvlr	Mttld Duck	Other Dbblr	Rngnk Duck	Lessr Scaup	Ruddy Duck	Other Diver	Fulv Whis	Blkbl Whis	Avg Pop	Peak Pop
Jan	70	-	30	30	80	50	40	40	20	-	40	20	5	6	-	-	431	509
Feb	70	-	25	20	50	40	30	30	20	-	20	10	5	3	-	-	323	413
Mar	--	-	10	10	50	40	10	10	6	20	20	5	5	1	15	2	204	334
Apr	50	-	5	1	5	10	2	5	10	-	10	1	-	-	20	50	169	290
May	--	-	-	-	-	10	-	-	16	-	-	-	-	-	20	70	116	135
Jun	--	-	-	-	-	2	-	-	8	-	-	-	-	-	5	30	45	71
Jul	--	-	-	-	-	2	-	-	4	-	-	-	-	-	3	30	39	87
Aug	--	-	-	-	-	10	-	-	10	-	-	-	-	-	30	40	90	180
Sep	40	-	-	-	10	50	-	4	10	-	-	-	-	-	20	25	159	278
Oct	50	-	15	5	50	150	20	15	10	-	20	5	-	-	-	15	355	525
Nov	75	-	20	10	50	200	10	25	20	-	50	10	6	1	-	10	487	698
Dec	150	2	20	50	60	125	-	50	5	-	18	-	2	1	-	10	493	717

5. Shorebirds, Gulls, Terns, and Allied Species

Two Black Skimmers used Pintail Lake on 22 March. Black-necked Stilts began breeding activities in late March at Cattail and Headquarters Lakes. Common Winter residents such as Solitary, Semipalmated, Stilt, Spotted, and Least Sandpipers, Long-billed Dowitchers, and Forester's Terns were still migrating through northbound in May. The four Hudsonian Godwits which visited Pintail Lake from 11 to 13 May required a status change from hypothetical to accidental on the in-press checklist. Eleven Wilson's Phalaropes were with them.

July brought a few southbound shorebirds. Seven or more Gull-billed Terns fished in the Lateral A canal daily from late July through August. September reports include Killdeer, American Avocets, Lesser Yellowlegs, and Long-billed Dowitchers.

An immature Northern Jacana highlighted November's birding. Father Tom Pincelli, Karen Edelson, Ann Bellamy, Cindy Simmons, and Louise and Red Gambill found it on 7 November in Willow Lake. Joe Ideker and Robert Lamb saw it last during the noon hour. The flash of yellow on the under surface of the wings is spectacular and unmistakable as even an immature lands. Despite the many birders searching, it could not be relocated. This record is the first in several years. Water was being added to Willow Lake at the time of the sightings. Water level fluctuation may have contributed to the movement of the jacana.

Common December residents included Killdeer, Black-necked Stilts, Greater and Lesser Yellowlegs, Solitary, Spotted, Western, Least, and Stilt Sandpipers, Long-billed Dowitchers, and Common Snipe. Scattered gull and tern reports showed an occasional bird, but little evidence of any Winter residents.

6. Raptors

Female Hook-billed Kite sightings occurred on 7 and 9 January. Nineteen sightings were reported from 10 March to 21 April. Later sightings included 11 July, 20 August, and 7 September. Short-eared Owl reports included 23 and 28 Janurary. Spring Broad-winged Hawk reports were dated 11 March through 17 April with the maximum numbers (3,000+) reported on 31 March. The largest kettles passed during a two-week period from 26 March to 12 April. A few Swainson's Hawks were mentioned with them. Mississippi Kite migrant reports ranged from 15 to 40 (and "numerous") between 13 and 28 April.

Fall hawk migrants began to trickle in by mid-August. Arrivals (earliest report) reported include flocks of Black-shouldered Kites and individual Swallow-tailed Kites (5 August), Red-Shouldered Hawks (17 August), Broad-winged Hawks (24 August), and Harris' Hawks (7 July). Harris' Hawks, so abundant during the Winter months, spend the Summer off the Refuge; none were reported after 26 April.

Autumn migrant raptors continued to trickle in during September. Arrivals (earliest record) reported include Osprey (25 September), Sharp-shinned Hawk (25 September), Cooper's Hawk (26 September), Black Vulture (27 September), Merlin (28 September), American Kestrel (04 October), and Red-tailed Hawk (06 October). Other raptors reported include Hook-billed Kite, Gray Hawk, Swainson's Hawk, Red-shouldered Hawk, Broad-winged Hawk, Turkey Vulture (flocks), Black-shouldered Kite, and Harris' Hawk. The 28 September Hawk Watch

found few diurnal raptors. No large flocks arrived through September.

The first large flocks of raptors for the Fall arrived with October. Some 2 to 3,000 Broad-winged Hawks were sighted on the evening of 1 October near Willow Lake and 4-5,000 hawks (probably Broadwinged and Swainson's Hawks) were spotted flying over the headquarters area on 4 October. Other sightings reported for October include American Kestrel, Merlin, and Cooper's, Red-shouldered, and Gray Hawks, Northern Harrier, Ospreys, and Short-eared Owls.

An immature Prairie Falcon perched on a snag on Pintail Lake on 17 November. A Golden Eagle flew SSE from the floodway crossing on U.S. 281 northwest of the Refuge on 6 November; all eagles are rare in the area. Numerous Hook-billed Kite and Gray Hawk records came in during November and December -- including flocks of Hook-billed Kites as large as six. Black Vultures were noted in December, with six found on the Refuge during the CBC on 21 December. Turkey Vulture counts reached several hundred roosting on the Refuge at night with most moving off the Refuge into Mexico or to recently burned sugarcane fields to feed during the day.

A mini-experiment conducted by Dr. Pauline James and Labuda on the night of 07/08 May was intended to test the effect of moonrise on calling Elf Owls. In a survey of the Refuge tour loop before moonrise (2230 to 2330) only two calling Elf Owls were detected. Following moonrise at 0010, however, a second survey of the same area revealed 21 calling Elf Owls. This experiment clearly illustrated a tendency for increased calling by Elf Owls under moonlit conditions, but Dr. James feels that barometric pressure may be as strong an influence on the Elf Owls' calling as is moonlight.

Santa Ana's second annual night bird count was conducted this year on 05 April and summary maps were appended to the May activities report. It showed a significant increase in Elf Owl numbers, from 19 to 39, between 1984 and 1985. Other species numbers (Common Barn-Owl 1, Great Horned Owl 3, Eastern Screech-Owl 36, Ferruginous Pygmy-Owl 2, Long-horned Owl 4) remained fairly consistent between the two years.

7. Other Migratory Birds

An out-of-season Groove-billed Ani was seen on the levee from the tram on 4 January. A(?) White-collared Seedeater was reported on 28 January. At least two Black Phoebes (one with, one without tail) were still present through January. Three Green Parakeets flew near the levee on 10 March. A very unusual Blue Jay rested on a nest box on 13 April.

The first Purple Martin scouts appeared during the last week of February. The question has been raised as to whether Purple Martins, Tree Swallows, and Rough-winged Swallows sighted during December and January remain all Winter or periodically move in from further south during warmer weather. Reports included Tree Swallows on 3 January. Later large movements included Chimney Swifts, Bank, Barn, Northern Rough-winged, and Tree Swallows on 7 April, Bank Swallows on 12 May, and Cliff Swallows on 27 May. Goatsuckers on the night bird count of 05 April included 84 Common Pauraques, 1 Chuck-Will's-Widow, 2 Whip-Poor-Wills, and 5 Lesser Nighhawks.

The normal passage of migratory birds was slow in coming in 1985. No sightings of migratory warblers, bunting, tanagers or orioles were reported in March.

Scissor-tailed Flycatchers passed through with reports from 21 March to 4 April. The annual passerine migration which usually highlights Spring birding failed to materialize in April. A really "Silent Spring" was had as migrants over flew the Valley and Gulf of Mexico, landing on the upper coast instead of in south Texas. The first Groove-billed Anis returned on 28 April with three sighted during the cat biologist's rounds on 28 April. The "Silent Spring" suddenly ended on 04 May. A variety of the missing northbound migrants and Summer residents was observed on this and ensuing weekends.

Things were quiet in June as migrants from the tropics slipped into the woods to raise their broods in hiding. The first fledgling Groove-billed Ani report was dated 29 June, the last juvenile 2 August. Late Belted Kingfisher records included 22 March and a pair on 19 June.

An early southbound passerine migrant record came on 19 July when Fuller and Labuda spotted an Orchard Oriole near Willow Lake. Empidonax flycatchers, orioles, vireos, and Whip-poor-wills all were seen in good numbers in August as the Fall migration began building up. Similarly, the staging of White-winged Doves also began in August although numbers were not nearly so impressive as in past years. One Red-billed Pigeon was observed at Pintail Lake on 27 August and one at Cattail Lake on 21 December.

Father Tom Pincelli, Karen Edelson, and Bernice de Santos encountered two Red-crowned Parrots on 26 September. Pauline James and DeWayne Hodges also saw them the next day. A Yellow-headed Parrot flew over Willow Lake on 3 October. Groove-billed Anis made themselves scarce after 15 September and appeared to have emigrated. Flocks of White-winged Doves utilized Santa Ana NWR for nocturnal roosts. Individual warbler reports were frequent. Notable September sightings include Mourning Warbler, Canada Warbler, Wilson's Warbler, Yellow Warbler, Northern Waterthrush, Yellow-breasted Chat, Painted Bunting, and Northern (Baltimore) Oriole. Swallows noted passing through included numerous Purple Martins, Northern Rough-winged Swallows, and Tree Swallows plus an occasional Cliff Swallow and Barn Swallow.

October sightings included Green Parakeets, Tennessee, Nashville, Mourning, Black and White, Black-throated Blue, Cape May, and Wilson's Warblers and Lesser Goldfinches. Two Green Parakeets were seen 19 October. Small groups of Scissor-tailed Flycatchers passed through throughout October. A Mexican Crow was seen at Pintail Lake on 13 November and an extremely unusual Brown Thrasher was recognized by its yellow eyes on B Trail on 7 November. Many common Winter Texans were reported during November such as Hermit Thrushes, Ruby-crowned Kinglets, White-eyed and Solitary Vireos, and Orange-crowned and Black-and-white Warblers.

A female Broad-billed Hummingbird was sighted on 11 December according to Audubon Alert. The first reports directed to the Refuge came in on the 24th with three separate reports by Mitch Heindel, Bob Plamann, and J.E. and P.J. Bartl. These were followed by an anonymous report on the 26th, a report by R.A. Behrstock and "many obs." on the 28th, and another by Serge Lafram on 30 December. The Broad-billed Hummingbird is more at home in desert canyons and low mountain woodlands in Mexico and the Big Bend area of Texas. Winter swallow numbers remain far below those of the last two years. Notes of 17 December include a Northern Rough-winged Swallow. CBC birders found one of that species, 3 Tree Swallows, and 21 Purple Martins. The new Santa Ana NWR bird checklist does not include the female Black-throated Blue Warbler reported

by Serge Lafram from the Quarters 14 yard on 30 December. An immature male Vermillion Flycatcher delighted birders who reported it throughout December.

8. Game Mammals

Eastern Cottontails become conspicuous most mornings and evenings as they frequent edges such as the wildlife drive. Most reports indicate rabbits as the most important prey component of feline food chains. Exotic Fox Squirrels provide a familiar, frequently entertaining, sight for most visitors during the cooler months amid the numerous peripheral species found in the United States only in the lower Rio Grande Valley. They are much less conspicuous during the warmest months, perhaps to avoid calling unnecessary attention to their nesting.

Although the tracks of the one resident Javalina frequently appear on trails after rainfall, sightings remain few and far apart. Two sightings include those of 9 June on Terrace Trail and 22 November on middle Jaguarundi Trail. Wildlife cameras have documented its presence several times.

9. Marine Mammals

Nothing to report.

Animal-activated cameras document both common species and the rarest species on the Refuge like this Javalina; the Refuge's known Javalina population equals one. (13/14AU85, SA333-12, JI)

10. Other Resident Wildlife

Resident Avians. Plain Chachalacas, White-tipped Doves, Ringed Kingfishers, Green Kingfishers, Golden-fronted Woodpeckers, Great Kiskadees, Green Jays, Long-billed Thrashers, Altamira Orioles, and other resident birds were reported regularly by Refuge staff and visitors alike in January and February. These avians draw thousands of birders to Santa Ana NWR to add to their life lists.

Green Jays and Plain Chachalacas began their nesting season in March. While the jays became quieter and more secretive as they sought out nest sites, the garrulous cracids continued to place themselves on conspicuous perches to raucously proclaim their amorous and territorial intentions. Plain Chachalacas crowed all through May, but no chicks were reported by either staff or visitors by month's end. White-tipped Doves, on the other hand, were fledging young as early as 10 May. Their production this year is well above average on the Refuge with an estimated six nests per acre in Cedar Elm/Sugar Hackberry associations. Plain Chachalacas and Greater Roadrunners were reported often in June; both are now nesting. However, overall numbers of chachalacas seem to be down this year. Usually estimated at 800 birds refuge-wide in June, the total population is down to an estimated 400 this year. An exotic Ringed Turtle-dove was sighted on 19 June.

A number of "firsts" occurred in July. The first Plain Chachalaca chick was reported 09 July, the first Black-bellied Whistling Duck ducklings 14 July, Common Pauraque chicks 19 July. This nesting season has been a slow one. Overall breeding seemed to be depressed. For example the State of Texas decided to close its annual White-winged Dove Hunting Season this fall due to a

Sometimes White-tipped Doves bring along friends.
(25-28NO85, SA445-14, JI)

low estimated population and reduced reproduction. Other breeders brought off young in lower numbers and later in the season than usual. Both water and food were apparently available, and the only explanation for poor nesting may lie behind the seven-inch rainfall we experienced between 19 and 22 June. This precipitation came in the form of violent thunderstorms accompanied by high winds and occasional hail. Such weather may have destroyed initial nesting attempts by many species.

Daily observations and reports of Buff-bellied and Black-chinned Hummingbirds squabbling and flitting from flower to flower, Turk's Cap to Tropical Sage (both native plants), became scarce after the first reported arrival of noisy Ruby-throated Hummingbirds on 7 September. The three expected species of kingfishers (Belted, Green, and Ringed) were seen from September through December, frequently all three by one person or group at Willow Lake on one day. Plain Chachalacas, although visible, noticeably quieted down; half-grown young, capable of flight, were frequently encountered in September.

Chachalacas still communicated in October, but more quietly than during the breeding season. They were encountered daily. Green Jays and Altamira Orioles still elude many of the birders seeking them. In November, one or more pairs of Green Kingfishers repeatedly delighted enthusiastic birders with a life species. Buff-bellied (resident) and Ruby-throated (migratory) Hummingbirds utilized Turk's Cap blossoms at Quarters 14. Tropical Parulas appeared at the Old Headquarters on 27 November and utilized the Quarters 14 yard through December. Plain Chachalacas could be seen or heard daily in December. An unusual report of a Hooded Oriole came in on 30 December from C Trail.

A Plain Chachalaca struts past the camera.
(130C85, SA405-11, JI)

The Santa Ana NWR Christmas Bird Count was held on 21 December. Despite the poor light from overcast skies and afternoon rain, the 48 participants reported 142 species from within the circle (7 1/2-mile radius). Highlights include a Zone-tailed Hawk, a Common Black-Hawk, 5 Common Snipe, and a Red-billed Pigeon as well as the many common resident avians.

Mammals. Most mammals on Santa Ana NWR are primarily nocturnal and/or crespuscular. Therefore, visitor contact with the more significant species remains minimal. Species documented during endangered species trapping and photographing can be found in Section G-2 and the two most often seen mammals in Section G-8.

Opossums gave problems during feline trapping efforts, with some individuals recapturing themselves over and over. A Least Shrew was observed under a sheet of black plastic in the maintenance compound on 29 September. Several dead specimens were brought in during Autumn. With the increased cloud cover at the end of September and through the rest of the calendar year, Nine-banded Armadillos became active on overcast days with cooler temperatures resulting in numerous sightings. The "little men in armor" have little tolerance of the south Texas's broiling, direct solar radiation.

Mexican Ground Squirrels occupied the margins of the wildlife drive during the sunny portions of the day through October when Santa Ana NWR's one hibernator disappeared from before the cameras. Feline cameras and livetraps documented Mexican Spiny Pocket Mice, White-footed Mice, and Southern Plains Wood Rats, important prey of the larger mammals and which rarely prove visable during their nocturnal activities. Staff observed exotic Nutria at Cattail and Willow Lakes in November and December.

A Mexican Ground Squirrel sits for a self-portrait.
(9-12SE85, SA370-01, JI)

Labuda holds the Ringtail for photodocumentation.
(03AP85, JI)

A surprise came on 3 April when a neighbor 3 miles east of the Refuge brought in a Ringtail. The neighbors captured it when their dog chased it through an open window into their house. A small population apparently resides on their property. This nocturnal carnivore, related to the Raccoon and Coati, is known only from the Trans-Pecos and Edwards Plateau regions of Texas, but not previously from the lower Rio Grande Valley. A paper reporting this discovery was under preparation by Labuda for the Southwestern Naturalist.

Beginning with September, attempts began to record all large mammal sightings for possible numerical comparisons with endangered felines. Numbers of reports of Coyotes and Bobcats increased with cooler weather. Bobcat reports included 4 reports (4 animals), 5 (5), 6 (7), and 12 (12) from September to December respectively. Coyote reports included 2 (3), 3 (3), 7 (11), and 11 (12) from September to December respectively. Coyotes left obvious evidence of their feeding habits along Refuge drives, sidewalks, and trails. Begining with cantaloupes, they feasted in turn upon Chapote (Texas Persimmon) fruit, Nopal Prickly Pear tunas, Honey Mesquite pods, and Texas Sabal Palm fruit in addition to the less-readily recognized animal prey. Cameras and livetraps documented the presence of Striped Skunks and Raccoons, while sightings of these primarily nocturnal carnivores became more frequent during the last minutes of daylight. A sighting of a Long-tailed Weasel occurred in the Quarters 14 yard on 10 April.

Not all species of management concern on Santa Ana NWR are listed as endangered or threatened. Table G-13 lists additional game, peripheral, waterfowl, water bird, raptor, predatory, and/or parasitic vertebrate species of concern to Refuge management.

Amphibians and Reptiles. Table G-1 lists Santa Ana NWR's amphibians and reptiles. Table G-3 includes those classified as endangered or threatened by Texas; these are discussed in Section G-2.

Couch's Spadefoot bred in Resaca Seca after a heavy June rain and the newly emerged juveniles were difficult to avoid stepping on while inventorying Plot 18.

Texas Toads, preferring grasslands and grain fields, usually frequent only Refuge edges; the several which entered the Visitors' Center entryway provided insight into their larger numbers than expected. Gulf Coast Toads and Rio Grande Leopard Frogs called during the night bird census on 5 April and were also seen and heard frequently during May. It was difficult at times to walk on the Visitors' Center patio, in the greenhouse area, and on sections of Wildlife Drive without stepping on newly emerged toads. Juvenile toads and leopard frogs have made themselves at home in the new greenhouse and any arthropod after a bite of seedling best stay well above the voracious youngsters' reaching tongues. A search of field notes would provide several more pages of records for these abundant anurans.

Gulf Coast Toads called most evenings the first half of September. On the rainy evening of 16 September, both Gulf Coast and Texas Toads could be heard from the levee calling in an adjacent flooded field. Strong Gulf Coast Toad calls were heard from the Visitors' Center patio on 22 September; others frequented the patio most evenings. Despite all the vocal efforts by the males, the females appeared to ignore them since there was insufficient moisture available for tadpole survival. Rio Grande Leopard Frogs were met on Wildlife Drive on rainy evenings.

On 22 March, visiting herpetologist Ken King reported hearing Great Plains Narrow-mouthed Frogs. Following the deluge of the morning of 30 September, they called that evening from the levee ditch west of the backgate.

Noteworthy days for Rose-bellied Lizards and Spotted Whiptails were days when they were not encountered. Mesquite and Texas Spiny Lizards spend most of their time in trees and most overlook them. An exotic (introduced) Mediterranean Gecko was found by Ideker in the coop in the Maintenance Compound on 1 September.

The great mystery of the year involves the origin of a Burmese Python found by Brenda Hale Smith of Rio Grande Valley NWR where it was stretched out along the base of the entrance doors on the Visitors' Center patio on 9 September. Labuda subdued the approximately 1 1/2-meter-long serpent which proved to be very docile and easily handled. Thus, it appears likely to be a released or less likely a lost pet. The python was transferred to the Gladys Porter Zoo in Brownsville.

Serpents are most frequently encountered in Spring and Autumn, with fewer sightings during the hotter portions of the day in Summer. Amphibians and reptiles are active through the Winter on Santa Ana NWR, with brief periods of inactivity during the coldest periods. Active snakes can be found on warm days preceding and following freezes. Western Ribbon and Diamond-backed Water Snakes were repeatedly reported from around the lakes frequented by visitors.

Table G-13. Additional species of management concern on Santa Ana NWR.

Common Name	Scientific Name	Classification
Eastern Cottontail	Sylvilagus floridanus	GS
Coyote	Canis latrans	PS
Bobcat	Lynx rufus	PS
Javalina	Tayassu tajuca	GS
Least Grebe	Tachybaptus dominicus	P,WB
Pied-billed Grebe	*Podilymbus podiceps	WB
Eared Grebe	Podiceps nigricollis	WB
American White Pelican	*Pelecanus erythrorhynchos	WB
Olivaceous Cormorant	Phalacrocorax olivaceous	P,WB
Black-bellied Whistling Duck	Dendrocygna autumnalis	W
Green-winged Teal	Anas crecca	W
Mottled Duck	Anas fulvigula	P,W
Northern Pintail	Anas acuta	W
Blue-winged Teal	Anas discors	W
Northern Shoveler	Anas clypeata	W
Gadwall	*Anas strepera	W
Ring-necked Duck	*Aythya collaris	W
Lesser Scaup	Aythya affinia	W
Redhead	Aythya americana	W
Canvasback	Aythya valisineria	W
Ruddy Duck	Oxyura jamaicensis	W
Hook-billed Kite	Chondrohierax uncinatus	P,R
Harris' Hawk	Parabuteo unicinctus	P,R
Red-shouldered Hawk	*Buteo lineatus	MR
Broad-winged Hawk	Buteo platypterus	MR
Swainson's Hawk	Buteo swainsoni	MR
Red-tailed Hawk	*Buteo jamaicensis	MR
Crested Caracara	Polyborus plancus	P,R
Plain Chachalaca	Ortalus vetula	P,GS
Northern Bobwhite	Colinus virginianus	GS
White-winged Dove	Zenaida asiatica	P,GS
Mourning Dove	Zenaida macroura	GS
White-tipped Dove	Leptotila verreauxi	P,GS
Groove-billed Ani	Crotophaga sulcirostris	P
Elf Owl	Micrathene whitneyi	P,R
Common Pauraque	Nyctidromus albicollis	P
Buff-bellied Hummingbird	Amazilia yucatanensis	P
Green Kingfisher	Chloroceryle americana	P
Brown-crested Flycatcher	Myiarchus tyrannulus	P
Great Kiskadee	Pitangus sulphuratus	P
Couch's Kingbird	Tyrannus couchi	P
Green Jay	Cyanocorax yncas	P
Rufous-backed Robin	Turdus rufopalliatus	P
Clay-colored Robin	Turdus grayi	P
Long-billed Thrasher	Toxostoma longirostris	P
Olive Sparrow	Arremonops rufivirgatus	P
Great-tailed Grackle	Quiscalus mexicanus	PS
Bronzed Cowbird	Molothrus aeneus	NP
Hooded Oriole	Icterus cucullatus	P
Audubon's Oriole	Icterus graduacauda	P

Mesquite Lizard	Sceloporus grammicus	P
Schott's Whipsnake	Masticophus taeniatus	P

GS = Game Species
MR = Migratory Raptor
NP = Nest Parasite
P = Peripheral
PS = Predatory Species
R = Raptor
W = Waterfowl
WB = Water Bird

*Species added to previous PNA list. One species was deleted from previous PNA list because it (Olive-backed Warbler) was listed twice, here and on the threatened list.

Most sightings of Bullsnakes occurred as they crossed or sunned themselves on trails or roads. As temperatures cooled, nocturnal Texas Coral Snakes did not always return to their hiding places at dawn. Thus, they were encountered by SCA Volunteer Cartographer Teresa R. High on 10 October crossing Wildlife Drive near the Visitors' Center and an anonymous visitor on 27 October from A Trail.

Invertebrates. Thousands of insect species occur on Santa Ana NWR. Only a few major groups have been studied and only lists of snails and butterflies approach completeness. Still, the natural history of many of the species in these two comparatively well known groups remains unknown, such as key larval food plants. New species are still being found on and described from the Refuge. As essential links in food webs on Santa Ana NWR, invertebrates represent every trophic level: herbivores, prey, predators, secondary predators, commensals, parasites, decomposers.

Invertebrates are critical as the food of many insectivorous birds, amphibians, reptiles, and mammals and as pollinators of native plants. As some plants are known to depend on single species of pollinating insects, it is possible (but not yet determined) that some of the declining plant species in the lower Rio Grande Valley may have lost or are losing host-specific pollinators. **The United States population of the rare Hook-billed Kite may be less than a dozen; over 99% of its known prey on Santa Ana NWR has been determined to be a single species of land snail.** Some species, despite searches for them, have been found only in surviving natural habitat islands; they do not survive in agricultural areas or in towns. Some invertebrates are of economic importance; some may be found to have medicinal value. It remains difficult to manage for species whose natural history, habitat requirements, value, and even identity has yet to be determined. The rarest tropical butterflies draw listers as peripheral birds draw birders seeking life species; however, if habitat continues to be lost or altered, these species may be lost entirely from the United States. Table G-14 lists some of the invertebrate species of management concern on Santa Ana NWR. The completion of the Rio Grande Valley NWR through acquisition realization of the approved Land Protection Plan is essential to the continued viability of Santa Ana NWR.

Table G-14. A partial list of invertebrates of management concern on Santa Ana NWR.

Species	Common Name	Status
Rabdotus alternatus	land snail	This species represents over 99% of known prey of the Hook-billed Kite on SANWR.
Euglandina texasiana	carnivorous snail	Feeds only on snails, endangered in RGV by brush clearing.
Helicina texasiana	land snail	Survives in LRGV only in remnant natural woodland habitats.
Siproeta stelenes	Malachite	Most of these butterflies disappeared from SANWR and the LRGV after the Christmas freeze of 1983. Some have not yet returned after being pushed south out of Texas. If connecting habitat in northern Tamaulipas continues to be lost, some of these rare species may not be able to return to Texas. Most are limited from range expansion northward by winter minima. The larval food plants (unknown for 9 of these 16) may not grow north of the LRGV. A 1972 report to SANWR states eight species "are known only from the Refuge at present."
Dryas iulia	Julia	
Heliconius erato	Crimson-patched Longwing	
Chlosyne janais	Janais Patch	
Chlosyne rosita	Rosita Patch	
Anartia jatrophae	White Peacock	
Anartia fatima	Fatima	
Adelpha fessonia	Mexican Sister	
Myscelia ethusa	Blue Wing	
Biblis hyperia	Crimson-banded Black	
Doxocopa laure	Laure	
Lycorea cleobaea	Tropical Milkweed Butterfly	
Chiodes catillus	White-striped Longtail	
Astraptes fulgerator	Flashing Blue Astraptes	
Gantra josephina	Giant White	
Priamedis anchisiades	Ruby-spotted Swallowtail	
Sphingicampa heiligbrodti	Heiligbrodt's Saturniid Moth	Studies of these huge, rare saturniid moths resulted in the discovery of a new species described from SANWR: S. blanchardi.
Sphingicampa blanchardi	Blanchard's Saturniid Moth	
Rothschildia jorulla	Rothschild Saturniid Moth	
Hetaerina titia	damselfly	Example of a riparian insect occurring on SANWR whose neares shallow, lentic breeding habita to the north is the Nueces.
species undescribed	bolas spider	This spider, belonging to a little known tropical group, was discovered on SANWR by a researcher studying chemical attractants used by bolas spiders to attract moths. Bolas spiders live in natural woodlands.

11. Fisheries Resources.

Ideker prepared a list of fishes (Table G-15) found on Santa Ana NWR from his field work and the current research collections of Matthew A. Ciomperlik, Santa Ana NWR research permittee. The list treats the entire bordering Rio Grande as part of the Refuge. A list of fishes known to occur in the segment of the Rio Grande between Brownsville and Anzalduas Dam, which includes the Refuge, was appended as a hypothetical list of additional species expected to be found on the Refuge. More of these fish could reach Refuge lakes with future irrigation (canal) water.

The species composition of the ichthyofauna changes from month to month with fluctuations in water levels and related fluctuations in temperature and water chemistry. Soon water chemistry data should be available which may explain faunal differences between the various lakes.

Small lake acreage, fluctuating water levels, and conflicts with higher priority objectives relative to maintenance of wildlife populations preclude "public use" fishing in Santa Ana NWR's lakes. Most fish do not reach harvestable size and game fish are absent. The small fish in the lakes and ditches provide food for piscivorous wildlife.

Table G-15. FISHES OF SANTA ANA NATIONAL WILDLIFE REFUGE

Part 1. Fishes documented on Santa Ana NWR by Joe Ideker and/or Matt Ciomperlik.

Gizzard Shad	Dorosoma cepedianum		Clupeidae
Threadfin Shad	Dorosoma petenense		Clupeidae
Mexican Tetra	Astyanax mexicanus		Characidae
Carp	Cyprinus carpio	*Intr	Cyprinidae
Tamaulipas Shiner	Notropis braytoni		Cyprinidae
Red Shiner	Notropis lutrensis		Cyprinidae
Bullhead Minnow	Pimephales vigilax		Cyprinidae
Channel Catfish	Ictalurus punctatus		Ictaluridae
Variegated Pupfish	Cyprinodon variegatus		Cyprinodontidae
Rainwater Killifish	Lucania parva		Cyprinodontidae
Mosquitofish	Gambusia affinis		Poeciliidae
Sailfin Molly	Poecilia latipinna		Poeciliidae
Inland Silverside	Menidia beryllina		Atherinidae
White Bass	Morone chrysops		Perchichthyidae
Green Sunfish	Lepomis cyanellus		Centrarchidae
Warmouth	Lepomis gulosus		Centrarchidae
Bluegill	Lepomis macrochirus		Centrarchidae
White Crappie	Pomoxis annularis		Centrarchidae
Rio Grande Cichlid	Cichlasoma cyanoguttatum		Cichlidae
Blue Tilapia	Sarotherodon aureus	Intr	Cichlidae

Part 2. Hypothetical list based on fishes known from the Rio Grande between Brownsville and Anzalduas Dam

Alligator Gar	Lepisosteus spatula	Lepisostidae
American Eel	Anguilla rostrata	Anguillidae

Goldfish	Carassius auratus	Intr	Cyprinidae
Rio Grande Silvery Minnow	Hybognathus nuchalis amarus		Cyprinidae
Speckled Chub	Hybopsis aestivalis		Cyprinidae
Ghost Shiner	Notropis buchanani		Cyprinidae
Rio Grande Shiner	Notropis jemezanus		Cyprinidae
River Carpsucker	Carpiodes carpio		Catostomidae
Smallmouth Buffalo	Ictiobus bubalus		Catostomidae
Blue Catfish	Ictalurus furcatus		Ictaluridae
Black Bullhead	Ictalurus melas		Ictaluridae
Yellow Bullhead	Ictalurus natalis		Ictaluridae
Flathead Catfish	Pylodictis olivaris		Ictaluridae
Atlantic Needlefish	Strongylura marina		Belonidae
Gulf Killifish	Fundulus grandis		Cyprinodontidae
Amazon Molly	Poecilia formosa		Poeciliidae
Rough Silverside	Membras martinica		Atherinidae
Tidewater Silverside	Menidia peninsulae		Atherinidae
Longear Sunfish	Lepomis megalotis		Centrarchidae
Redear Sunfish	Lepomis microlophus		Centrarchidae
Largemouth Bass	Micropterus salmoides		Centrarchidae
Black Crappie	Pomoxis nigromaculatus	Intr	Centrarchidae
Lookdown	Selene vomer		Carangidae
Freshwater Drum	Aplodinotus grunniens		Sciaenidae
Mountain Mullet	Agonostomus monticola		Mugilidae
Striped Mullet	Mugil cephalus		Mugilidae
Bigmouth Sleeper	Gobiomorus dormitor		Eleotridae
Spinycheeked Sleeper	Eleotris pisonis		Eleotridae
River Goby	Awaous tajasica		Gobiidae
Naked Goby	Gobiosoma bosci		Gobiidae

Nomenclature follows: Lee, D.S., et al. 1980. Atlas of North American Fishes. N. Car. Biol. Surv. Publ. #1980-12 and Hoese, H.D., R.H. Moore. 1977. Fishes of the Gulf of Mexico; Texas, Lousiana, and adjacent waters. Texas A&M Press, College Station. 327 pp. (Selene and Membras only).

*Intr -- Introduced Species

12. Wildlife Propagation and Stocking

Nothing to report.

13. Surplus Animal Disposal

Nothing to report.

14. Scientific Collections

Seven special use permits were issued for scientific study and collection on Santa Ana NWR in 1985. The following list lists the permittees, their affiliations, and subjects.

SA-85-02 Douglas C. Gayou, University of Missouri; investigate social system, ecology, and reproductive biology of the Green Jay.

SA-85-04 Pauline James, Pan American University; investigate nesting ecology and survey populations of the Elf Owl.

SA-85-05 Sidney W. Dunkle, University of Florida; collect dragonflies and damselflies for preparation of a field guide.

SA-85-06 Neal R. Spencer, Southern Weed Science Laboratory; investigate and collect Indianmallow (Abutilon) and look at insect associations to determine possible biocontrol agents.

SA-85-07 Pauline James, Pan American University; investigate nesting ecology and reproductive biology of the Least Grebe.

SA-85-08 Paul Parker, National Biological Control Laboratory; investigate and collect flea beetles to determine possible biocontrol agents for Indianmallow.

SA-85-09 Matthew A. Ciomperlik, Pan American University; examine distribution, seasonality, and abundance of the ichthyofauna of Santa Ana NWR, collect data on water parameters and seasonal food availability, and to collect and forward fish samples for USFWS pesticide analysis.

15. Animal Control

Nothing to report.

16. Marking and Banding

During 1985, 25 birds were banded under the Santa Ana NWR Master banding permit. Of the 25, 15 were rehabilitated by Bird Rescue (BR) and 10 were Elf Owl nestlings banded by Dr. Pauline James (PJ) at La Grulla (Rio Grande Valley NWR).

AOU No.	Species	No.	By	Comments
325.0	Turkey Vulture	1	BR	Injured, from Minnesota, received newspaper write up
335.0	Harris' Hawk	2	BR	1st-unknown, 2d-confiscated young
337.0	Red-tailed Hawk	1	BR	Poisoned
365.0	Common Barn-Owl	10	BR	Injured-5*, parasitized-1, young-4*, poisoned-1; *1 in two categories
375.0	Great Horned Owl	1	BR	Shot
381.0	Elf Owl	10	PJ	Nesting study
		25		

17. Disease Prevention and Control

The Refuge was contacted by reporter Bill Clayton of the Houston Chronicle who is developing an article on contaminants on refuges. Again, the interest and resultant article focused on selenium. The public -- through such organizations as the Environmental Resource Committee of the Lower Rio Grande Valley Development Council (a pre-requisite of Section 208 of the "Water Quality" Act for funding allocation to the States -- is becoming aware of the baseline program underway for the refuges of the Valley; the intent is to get the word out so that at a later date there will not be the perception that the Refuge system has been clandestine. The response, to date, has been most positive. Selenium is only part of the system problem; an on-going baseline monitoring program for all potential contaminants to refuge land, is grossly needed.

H. PUBLIC USE

1. General

The Public Use Program at Santa Ana NWR is an integral and critical facet of the overall Refuge Mangement function for Santa Ana and Rio Grande Valley NWR. Santa Ana NWR's habitat and wildlife, nationally and internationally reknowned, make it a well-publicized attraction for local residents, scientists, visiting wildlife enthusiasts, and tourists alike. This provides the opportunity to accomplish environmental awareness and understanding for the Santa Ana NWR as well as the entire wildlife/habitat resource of the lower Rio Grande Valley. HOWEVER, in assuming this role, the concomittant resource responsibility is "fixed" on management at Santa Ana NWR to ensure that potential and realized enviromental awareness/understanding goals are compatible with the amount of public use pressure the refuge resource can sustain. Additionally, and most importantly, the habitat and wildlife resource of the refuge must remain guaranteed in perpetuity.

With the administrative complexing of Santa Ana and Rio Grande Valley NWR's in 1980, Santa Ana NWR additionally became the focal point of the public use program for Rio Grande Valley NWR. Since both Santa Ana and Rio Grande Valley NWR's are headquartered at the same facility, public use inquiries and activities are directed toward Santa Ana and Laguna Atascosa NWR's where facilities and most importantly "control" and public use monitoring are feasible. Although visitation at Santa Ana NWR has escalated dramatically (Figure H-1) since the construction of the Wildlife Interpretive Center in 1979 and the complexing with Rio Grande Valley NWR in 1980, the institution of Santa Ana NWR's interpretive tram program in 1982 has enabled management to more effectively manage people pressures on the Refuge in a high-quality manner, developing an effective interpretive program aimed at providing opportunities for environmental awareness for Santa Ana and Rio Grande Valley NWR's and the wildlife resource in general. The contribution of Rio Grande Valley NWR to Santa Ana NWR and the entire resource of the lower Rio Grande Valley, in terms of providing secluded refuges for wildlife and in continuing to acquire necessary wildlife habitat to guarantee wildlife perpetuity for the lower Rio Grande Valley is immeasurable. Without the Rio Grande Valley NWR acquisition and current management program direction, there is no doubt that Santa Ana NWR as well as existing state parks, state wildlife management areas, and privately or non-profit protected areas could not guarantee the perpetuity of local wildlife. Santa Ana NWR, as well as other "protected" areas would eventually be reduced to a "dwindling zoo" of wildlife that previously existed throughout the lower Rio Grande Valley of south Texas, with wildlife perpetuity eventually lost for this unique resource.

In the effort to augment public awareness regarding the Land Protection Plan for the Rio Grande Valley NWR as well as facilitating a "managed" and effective public use program for Santa Ana and Rio Grande Valley NWR's, we are moving toward a public use program which is directed more toward "Public Affairs" type activities. We are finding that a program which includes press releases, televison and radio coverage, as well as effective newspaper contacts and coverage, and off-refuge resource-oriented programs, has the ability to accomplish Service and Refuge goals without inviting and encouraging "EACH AND EVERYONE" to visit the refuges. Our Public Use Program Goal is to accomplish resource protection and environmental awareness and appreciation without sacrificing the resource itself in that effort. The following describes

primary objectives for the Public Use Program for Santa Ana and Rio Grande Valley NWR's which will allow us to pursue that goal:

1) To provide high-quality wildlife-oriented interpretation and environmental awareness activities for the refuges, primarily focusing on wildlife, habitats, and the existing public use facilities at Santa Ana NWR. We hope to include exhibitry in the Visitors' Center in the short-term which will interpret the Wildlife Corridor Concept associated with the Rio Grande Valley's Land Protection Plan as well as providing limited conducted tours to Rio Grande Valley NWR units.

2) To work toward communicating the Department's, Service's, and Refuges' mission and goals through an effective Public Affairs out-reach program, stressing that the Refuges are a part of the community.

The majority of visitors -- whether they be expert birders, novice birders, or non-birders, Winter Texans or Valley residents -- expect to see a variety of birds and other animals while visiting Santa Ana NRW. It is evident from visitors' comments and their excitement and enthusiasm or disappointment that there is a correlation between the degree of satisfaction with their visit and their success in wildlife observation.

Tables H-1 and H-2 display visitation at the Wildlife Interpretive Center (foot counter in the Visitors' Center entryway) and total visitation at Santa Ana NWR for the period 1980-1985. Visitation recorded at the Visitors' Center for 1985 was 71,708. Total visitation recorded at Santa Ana NWR for 1985 was 204,579. For comparison, total visits were 67,233 in CY 1979.

Figure H-1 compares the period from 1976 to 1985 and illustrates the continuing increase in visitation. The tram system began operation in 1982. For CY 1983, total visitation decreased 14.9%, but increased 38.7% the following year.

Figure H-2 depicts monthly visitation at the Santa Ana NWR Visitors' Center from 1982 through 1985. It shows that, after 1982, the visitation pattern has become somewhat constant and predictable. For comparative purposes, Table H-1 displays Visitors' Center visitation by month from 1980 through 1985. As in previous years, the bulk of the year's use comes during the Winter and Spring months. This pattern held true in FY 1985 with 73.5% of yearly use coming in six months (November through April).

Figure H-1. Total annual visitation at Santa Ana NWR.

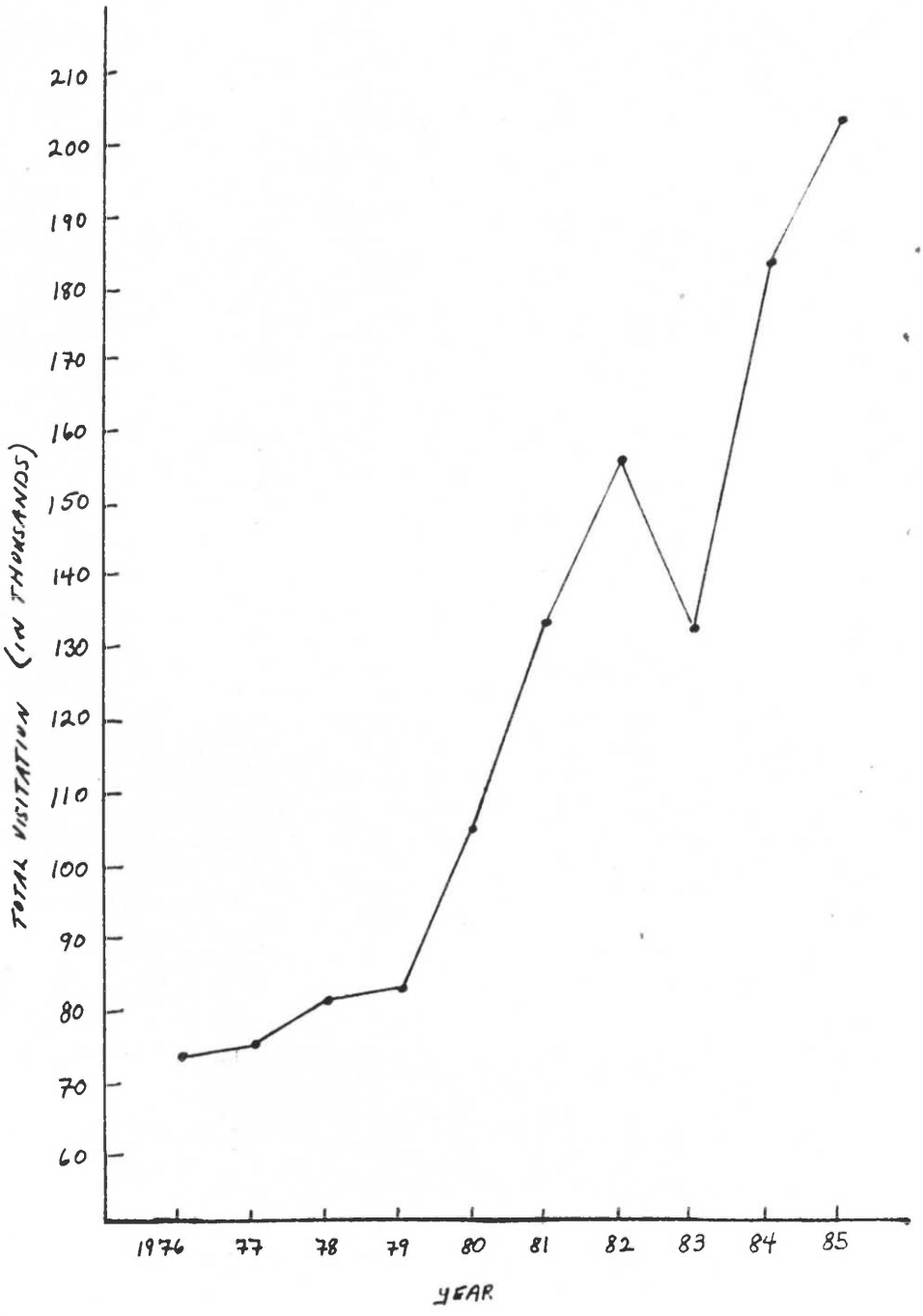


Figure H-2. Visitors' Center counts by month for CY 1982-1985.

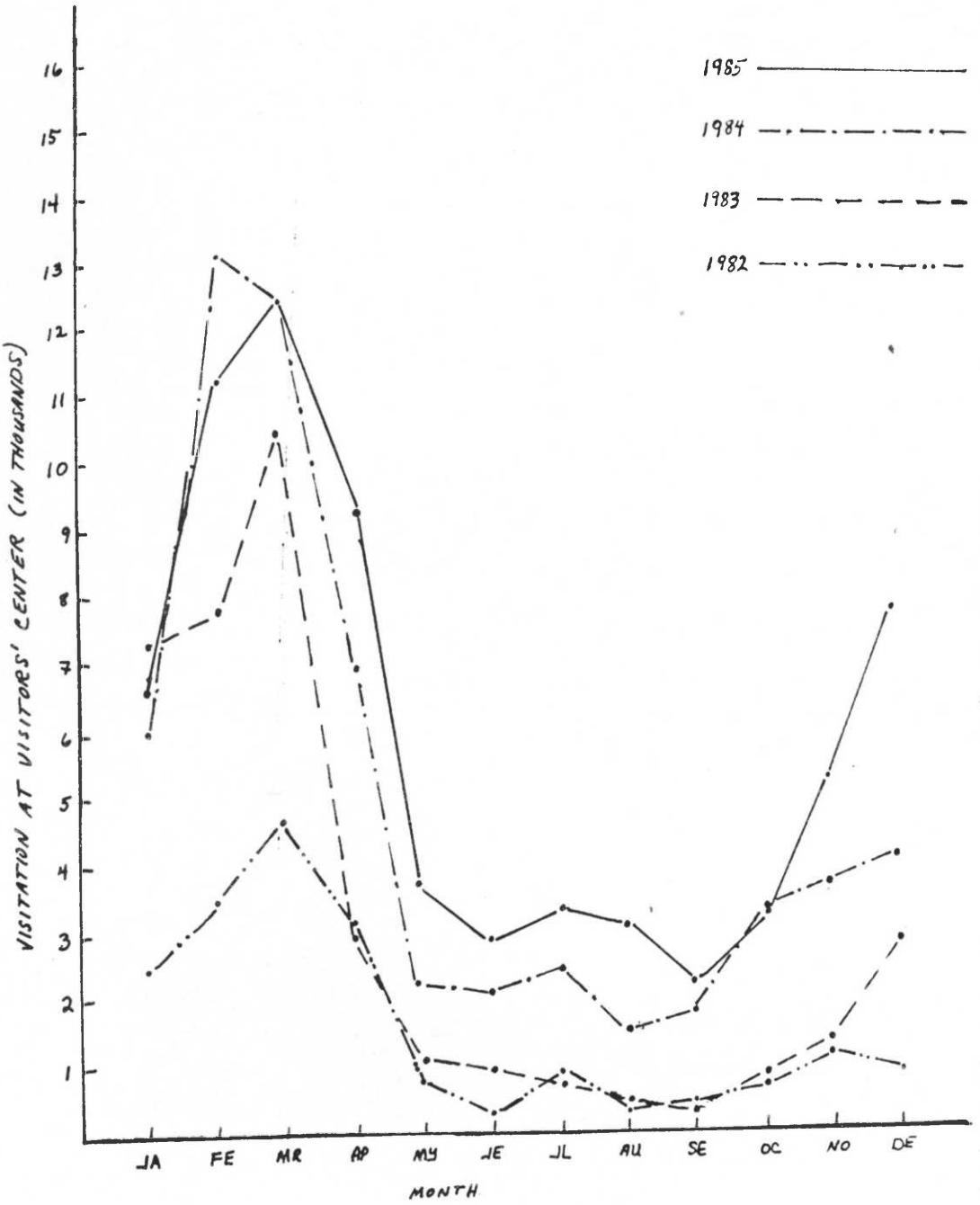


Table H-1. Visitation by month at the Santa Ana NWR Visitors' Center from 1980 through 1985. The Visitors' Center first opened in March 1980 (without exhibits).

Month	1980	1981	1982	1983	1984	1985
January	-	1,295	2,545	7,273	6,000	6,570
February	-	4,349	3,493	7,843	13,140	11,200
March	-	3,307	4,751	10,478	12,465	12,467
April	-	2,477	3,176	2,900	6,970	9,374
May	-	561	787	1,097	2,305	3,838
June	-	353	300	982	2,190	3,025
July	-	279	905	742	2,500	3,443
August	-	356	306	441	1,550	3,136
September	-	300	550	387	1,850	2,254
October	-	450	800	918	3,400	3,387
November	-	827	1,238	1,406	3,766	5,226
December	100	680	950	2,903	4,146	7,788
CY Total	100	15,234	19,801	37,370	60,282	71,708

Table H-2. Total number of visits per year to Santa Ana NWR from 1980 through 1985. (A visitor may participate in more than one activity.)

Month	1980	1981	1982	1983	1984	1985
January	22,212	17,238	22,228	16,281	18,393	19,492
February	17,338	23,344	20,691	30,852	32,215	34,297
March	12,107	14,915	20,810	27,877	38,481	38,542
April	12,349	26,135	20,036	13,760	21,501	27,478
May	8,527	6,798	7,760	9,646	8,472	10,513
June	3,425	3,720	4,008	5,012	7,142	8,337
July	7,067	5,699	11,709	4,510	6,109	8,792
August	3,979	3,758	11,935	2,866	3,141	7,884
September	3,108	7,930	17,323	3,177	5,219	5,752
October	6,129	6,353	7,062	3,681	12,178	8,514
November	4,059	10,706	8,642	6,575	15,222	13,727
December	4,738	7,593	4,265	8,983	16,688	21,251
CY Total	105,038	134,279	156,469	133,220	184,761	204,579
% Increase fr. prev. yr.	56.2	27.8	16.5	-14.9	38.7	10.7

2. Outdoor Classrooms -- Students

Santa Ana NWR's location in the lower Rio Grande Valley places it within easy commuting distance for large public school groups from the 32 public school districts and numerous private schools in the lower Rio Grande Valley. The 32

public school districts potentially could send their combined 163,980 students and 8,941 teachers to visit the Refuge. Despite a reduction in public school group usage in 1984/85 due to restrictions by the Texas Education Agency on students leaving the classroom, requests from area teachers for guided tours for their classes exceeds the Refuge staff's abililty to accomodate these groups. However, all groups making reservations in advance receive a 10 to 15 minute talk along with a slide presentation or a film to better prepare them before entering the Refuge. Presently, new films are being purchased and slide shows are being prepared to better accomodate the wide age differences in school groups. For example, the Refuge purchased Dr. Seuss' film, The Lorax, in 1985. This film can be used for all age groups and has a strong environmental message. Additionally, through the Texas Education Agency's Region I resource center which serves as an audio-visual media distribution system, the Refuge plans to have the films delivered to the schools instead of having the Refuge's available resource materials serve as a drawing card to the Refuge.

It has been a major concern of the Refuge staff that the increasing demand from school groups, unannounced appearances, poor preparation prior to the visit, and too many students per group with inadequate supervision contributes to a poorer quality experience for the students as well as a considerable disturbance to both wildlife and other visitors as well as a poor quality wildlife education experience for the students. Santa Ana NWR is too small and the resource too fragile to simply ignore this problem. There are several steps that have been implemented to lessen the impact from groups. These include an orientation by a staff member before the students enter the Refuge, emphasizing our concerns and regulations and encouraging teachers to use the interpretive tram to lessen the impact on wildlife and the educational message

Too many people impact the Refuge. This group of students awaiting instructions must be properly supervised and oriented to minimize the impact. (AP86, JI)

delivered by the naturalists. Additionally, an attempt is made to redirect the groups to other areas (such as the Valley Nature Center now open in Weslaco to provide an alternative site for structured Environmental Eduction activities) and also recruiting volunteers who go into public and private schools with a high quality wildlife-oriented education program. For example, two volunteers go into classrooms and use non-releasable raptors to illustrate aspects of bird biology to students. These programs can stand alone or be introductions to Refuge visits by school groups. One ideal direction that our Environmental Education program can take is making teachers aware of how they can use the Refuge properly and make Environmental Education materials available to them which can be used without visiting the Refuge to do so. In support of National Wildlife Week 1985, Refuge staff presented nine slide programs to some 300 students in local schools.

3. Outdoor Classrooms -- Teachers

The Refuge and Complex priority is "Teach the Teachers" as per FWS policy and philosophy. Through the orientation, the Refuge will be able to reach more students in less time. The key then is competent and successful teacher facilitation as they will determine the products futility.

Considerable progress has been made in 1985 in our efforts to work with teachers from the surrounding communities. In general, many contacts were established with teachers to inform them of what Environmental Education is, how they can take advantage of various Environmental Education materials, and how they can structure various environmental activities. More specifically, all Environmental Education materials at the Refuge have been organized and indexed by Morrissey, an Environmental Education specialist, to make these materials more readily available to teachers upon request.

An FWS sponsored teacher workshop also was prepared and given by Morrissey on "Bird Migration" in McAllen on 16 December. Approximately 20 teachers attended and were given handouts of Environmental Education materials as tools to literally help the teachers teach.

It is important that teachers have some grasp of what Environmental Education is and how they can use the concept regardless of a teacher's individual program area. One does not have to be a science or biology teacher to utilize the Environmental Education concept. Morrissey will be traveling to Austin in February 1986 to become certified as an instructor for the program, Project WILD, which will prepare her to instruct teachers through workshops in the common endeavor towards Environmental Education. The Refuge staff also continues to work toward making the Valley Nature Center a viable alternative to the Refuge.

4. Interpretive Foot Trails

In 1981, three foot trails totaling 4.1 miles and easily accessible from the Visitors' Center were completed. The trails were designed to serve as an interpretive tool and also complement the Refuge tram operation. All three trails have separate brochures with different, but complementary Environmental Education messages. These three closed-loop interpretive trails have become especially popular with visitors and many utilize these short and intermediate length trails either before or after riding the interpretive tram. Road closure at the Refuge on days of tram operation has encouraged more use of foot

trails forcing many people into a new type of recreational experience other than driving through the Refuge in a car. Visitors are exposed to different aspects of Refuge habitats and management because each trail was designed to serve slightly different purposes, but yet complement one another in interpreting the resource to the visitor. Most importantly, the trails were designed to help reduce visitation impact on other areas of the Refuge where vehicle access is normally used to reach hiking trails.

The three trails are:

1. **A Trail, or Santa Ana Trail** -- a half-mile-long trail often referred to as the handicapped trail -- is the shortest of these trails, but receives the heaviest use. The trail is resource-related in that it serves to concentrate public use in a small controllable area due to its length. Additionally, it is designed and developed for wheelchair-confined and visually-impaired visitors. The trail remains extremely popular with the young, the retired, and the handicapped alike, which is probably due to the sense of security offered by the familiar sidewalk appearance, the interpretive signs placed along the trail, the rustic observation platforms, the aesthetic quality of the area it traverses (Willow Lake), and the readily observable wildlife associated with this riparian habitat. Visitors met by staff in the vicinity repeatedly express their appreciation for the rotating tree identifier.

In 1985, another interpretive device, a tree quiz was made available for A Trail. Ten trees were marked and identified by numbers on carsonite markers along the first third of the trail. A guidesheet was also developed that lists each tree by number, describes its characteristics, and illustrates it. On the second segment of the trail, the same species of trees were similarly marked

This Sugar Hackberry Woodland draped with Spanishmoss awes first-time visitors -- a scene they expect to see only in Louisiana or Florida. A Trail's concrete sidewalk with curb permits access to wheelchairs and the visually handicapped. (14MR86, JI)

with the order scrambled so the visitor could practice identifying the trees just learned. This guidesheet gives the trail user the opportunity to identify these trees from their initial practice on the first segment of the trail and the list of identifying characteristics. The answers were available for checking at the Visitors' Center. This tree quiz has been very popular with groups and individual visitors alike.

2. **B Trail, or Communities Trail** -- designed to expose visitors to some of the different plant communities and habitats found on the Refuge -- remains popular with Winter Texans, birders, and older school groups. The popularity of this one-and-one-half-mile-long trail is related to the combination of length, the available, bilingual, self-guiding brochure, and its diverse mixture of habitat types with their associated species diversity. In addition, a photoblind can be reached from this trail. During the Winter months, grain, suet, and sugar water are provided at the blind each morning to attract birds such as the Plain Chachalaca, Green Jay, and Altamira Oriole to help make these birds more visable for viewing and wildlife photography.

B Trail winds through a variety of plant communities such as this Honey Mesquite-Nopal Prickly Pear association. (14MR86, JI)

3. **C Trail, or Management Trail** -- a two-mile trail and the longest of the closed-loop trails -- also remains quite popular with more energetic visitors as it meanders between Pintail Lake impoundments, along the Rio Grande, and through riparian woodland. Both Spanish and English brochures are also available for this trail, although the English version is now out of print. The brochure explains various management techniques applied on Santa Ana NWR, including water management, controlled burns, and former plantings of wildlife foods. The diversity of habitats this trail crosses attracts visitors primarily because of the visible wintering waterfowl, shorebirds, wading birds and peripheral species that utilize Pintail Lake and its surroundings. During the Summer of 1985, two American Swalow-tailed Kites were viewed by several staff as the kites kited and soared over Pintail Lake with 25 to 30 Black-shouldered Kites, a rare beauty to behold. Again, these three interpretive trails play an important role in the overall management plan at Santa Ana NWR by helping to concentrate visitation towards the portion of the Refuge proximal to the Visitors' Center lessening wildlife disturbance impacts on other portions of the refuge.

C Trail offers the impoundments of Pintail Lake and other habitat management examples. Black-bellied Whistling Ducks later nested in these boxes. (16MR86, JI)

5. Interpretive Tour Routes

In 1981, the hard-packed dirt tour road was altered by the application of caliche and a dust emulsion. The emulsion temporarily cured the problem of powder-fine dust fogging up around vehicles and covering roadside vegetation with a dry, white film and also gave the caliche road a paved appearance. This alteration was in preparation for the eventual paving of the wildlife drive, a seven-mile loop through the Refuge, which occurred the Summer of 1984.

On 6 February 1982, Santa Ana NWR began its interpretive tram operation under a cooperative agreement between Frontera Audubon Society and the Fish and Wildlife Service. After operating through an abbreviated season in early 1982, the interpretive tram completed its first full season in 1983 which contributed greatly to reducing vehicular traffic with its related adverse impacts. In addition to reducing negative human/wildlife impacts, it was apparent that visitors' educational experiences were being enhanced by providing the interpretive tours. Evidence indicated the Refuge took on a different character since it was much quieter and more natural appearing with the reduction in noisy and disruptive vehicles.

The 1984/85 tram season marked the fourth year the interpretive tram program has been in operation. It has become apparent that wildlife appeared less skittish along the wildlife drive during days of tram operation than on days the wildlife drive was open to private vehicles. In fact, wildlife observation from the tram became quite remarkable. The increase of wildlife observations from the tram encouraged the 1985/86 interpreters to begin collecting baseline data on species observed. As as example, some of the species observed by tram passengers during the first fifty tours of the season included: Plain Chachalacas on 49 tours, Green Jays on 16 tours, ten Harris' Hawks, seven Gray Hawks, two Hook-billed Kites, five Black-shouldered Kites, 17 Nine-banded Armadillos, eight Coyotes, and four Bobcats. The data suggest that reduced vehicular traffic during the tram season is having favorable consequences on the natural resource base of Santa Ana NWR. There is no doubt that the interpretive tram has and is accomplishing a great deal to help preserve Santa Ana NWR's unique and fragile habitat and the wildlife education experience for many visitors.

The interpretive tram offers an Environmental Education experience orienting visitors to Santa Ana NWR and the lower Rio Grande Valley. (16MR86, R3-12, JI)

1985 AMMENDMENT

COOPERATIVE AGREEMENT BETWEEN
THE U.S. FISH AND WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR
AND THE FRONTERA AUDUBON SOCIETY

COOPERATIVE AGREEMENT NUMBER
14-16-0002-83-907

The above numbered Cooperative Agreement between the U.S. Fish and Wildlife Service and the Frontera Audubon Society for the operation of the interpretive tram at Santa Ana National Wildlife Refuge is hereby ammended for the 1985/1986 public use season, as follows:

Article II: SCOPE OF WORK

Specifically, the Service will:

e) Train tram operators. (Government driver's licenses will be issued upon successfully meeting all requirements). Society employees will be available for training on November 15, 1985.

g) The Service may occasionally assist the Society in driving/interpretation duties.

Article III: PERIOD OF PERFORMANCE

a) The Period of Performance of this Cooperative Agreement will be determined by mutual agreement between both the Service and the Society, by September 15 of each year. Period of Performance for the 1985/1986 interpretive tram season shall commence on November 30, 1985, and end April 14, 1986.

b) Days of operation for the interpretive tram system will be Thursdays, Fridays, Saturdays, Sundays, and Mondays within the period of performance. Expansion to other days and/or special tours will be by mutual agreement between the Service and the Society.

c) The Society will insure that at least two personnel (filling functions of tram driver, fee collector, interpreter) are available and on time when the tram is scheduled to run.

d) A total of four trips per day will be initially scheduled as indicated below. Rescheduling, adding, or reducing tram trips will be at the discretion of the Service after discussion and agreement by the Society.

Scheduled Tram Trips

10:00 A.M.
1:00 P.M.
3:00 P.M.
4:30 P.M.

e) Unscheduled or special trips may be conducted by mutual consent between the Service and the Society.

Article V: PROJECT OFFICERS

For the Service:

Refuge Manager
Santa Ana NWR
Route 2, Box 202A
Alamo, Texas 78516
(512) 787-7861

For the Society:

President
Frontera Audubon Society
P.O. Box 1106
Mercedes, Texas 78570
(512) 565-2161

Article VI: SPECIAL PROVISIONS

An annual meeting will be held between the Service and the Society to evaluate the current year's tram operation; discuss problems and potential changes in operation. The meeting to be held in April/May of each year the Agreement is in effect, immediately following the closing of the interpretive tram season.

1985 AMMENDMENT - COOPERATIVE AGREEMENT 14-16-0002-83-907

Signature/Approval Blocks

U.S. Fish & Wildlife Service

Name Vicki M. Fulks

Title Refuge Manager

Date 9/19/85

Frontera Audubon Society

Name Dean Landin

Title President

Date 9/19/85

The interpretive tram operated through 15 April 1985 with Dinah Owens and Janine Lombardi as interpreters and drivers. It resumed on 30 November 1985 with Barry Jones and Jill Kinney working as interpreters and drivers through 14 April 1986. Their abilities and presentations were repeatedly complimented; see sample letter below. The following tables (Tables H-3 and H-4) present an overview of use data gathered during the season and compare it to data from previous years.

[Received 11 February 1986]

Dear Folks:

About a month ago we came to Santa Ana NWR. We were not pleased that we could not drive our vehicle thru the refuge -- at first. After using the tram ride and the services of Barry as driver and Jill as narrator from the Audubon Society, we are encouraging this type of service as often as possible. We are new at "birding". We saw and learned so much from Jill and other guests on the tram than we learned while driving on our own thru Atascosa and Aransas Areas. The opportunity to walk to any area is still available.

I would also like to suggest that you use pictures or photographs in the visitor centers of the bird species most common to that area that may not be seen any where else. Suggestions for identifying along side the picture would help us "new watchers" to learn just what to look for. The green jay, altamira oriole and chachalaca come to my mind as examples.

Thanks so much for the enjoyable experience. We are passing the word on to others in our area.

Sincerely,
Ken and Margaret Daleski
Reeds Spring, MO 65737

Table H-3. Comparison of Santa Ana Tram Operation 1981-1985

	1981/1982 (initial year)	1982/1983	1983/1984	1984/1985
Length of Season	10 wks	16 wks	19 wks	18 wks
Schedule	2 da/wk 4 tours/da	4 da/wk 5 tours/da	5 da/wk 4 tours/da	5 da/wk 4 tours/da
Total Passengers	2,180	6,351	8,210	6,831
% Occupancy (based on 60/tour)	42%	31%	36%	32%

Table H-4. Comparison of monthly passengers for FY's 1983 to 1985.

MONTH	PASSENGERS		
	1983	1984	1985
DECEMBER	469	276	845
JANUARY	1,635	1,188	1,270
FEBRUARY	1,965	2,509	1,545
MARCH	1,949	2,965	2,461
APRIL	304	1,271	797.
FY TOTAL	6,322	8,209	6,918

6. Interpretive Exhibits/Demonstrations

Interpretive exhibits in the 2,000 ft2 exhibit area of the Visitors' Center display a historical overview of the lower Rio Grande Valley. They present information on agricultural development from 1850 to 1980 and its impact on native habitat.

The graphics used in the exhibits are black and white photographs, color photographs, photo murals, painted murals, maps, and silk-screened text. Exhibits describe the ecological uniqueness and wildlife diversity of Santa Ana NWR. The diverse displays include a multi-level island exhibit which introduces the vistor to the concept that Santa Ana NWR is a habitat island in a sea of agricultural fields on both sides of the border and color photographs displaying several birds with a partial list of birds sighted at Santa Ana NWR.

The island exhibit displays color photographs of an Ocelot, a Jaguarundi, a Mexican Ground Squirrel, several birds, and five native wildflowers. It also presents a butterfly collection and nests of three birds, Plain Chachalaca, Altamira Oriole, and Great-tailed Grackle. A table displays pelts from Ocelot, Jaguarundi, and Bobcat for touching. Other exhibits include a 55-gallon aquarium with native fishes and a Texas Spiny Softshell, a portable FWS display on the 50th anniversary of the Duck Stamp, a Kodak viewer on which birders can examine slides of 75 birds of Santa Ana NWR, an exhibit on unique, peripheral bird species which "lifers" come to Santa Ana NWR seeking for their life lists, an exhibit explaining management practices at Santa Ana NWR, and a display case exhibiting for identification practice the common doves occurring on the Refuge.

As mentioned in the General Section, plans include the addition of an exhibit which will graphically interpret the wildlife corridor concept of the Rio Grande Valley NWR. The Refuge hopes to utilize aerial photography on-hard to accomplish this effort, attempting to educate the public as to the need for the wildlife corridor for wildlife protection, maintenance, and species perpetuity

in south Texas.

Public Use Staff or volunteers greet visitors at the Visitor Information Counter in the Visitors' Center, answer their questions, and direct them to where they wish to go. Many brochures, Refuge maps, and other information are distributed from the information counter. Refuge maps are also available from a dispenser on the patio for those arriving while the Vistors' Center is closed.

Visitors pick up maps and brochures at the information counter. Kevin C. Stephenson greets them and answers their questions. (14MR86, R2-04, JT)

The environmental book sales outlet of the Southwest Natural and Cultural Heritage Association has become very popular with many visitors. Visitors can browse and purchase field guides and other environmental books in the book sales area. (See Section H.18.)

7. Other Interpretive Programs

The auditorium in the Visitors' Center seats about 50 adults. It is used for interpretive programs and meetings. The auditorium in the Visitors' Center is equipped with a film screen that utilizes a rear screen Kodak 16-mm movie projector. The projector is located in the audiovisual room adjacent to the auditorium. The audiovisual room is also equipped with two Kodak slide projectors, a Kodak EC-K Solid State Dissolve Control, and a Kodak Carousel Synchronizer. The dissolve unit, along with the two slide projectors allows

Nancy A. Morrissey introduces a slide show to visitors in the auditorium. (21MR86, R4-11, F. D. Bryce)

for each slide change to be set at a specific fade-rate.

The Sound Synchronizer generates a slide-change signal that can be recorded on the first channel. When the tape is played, the slides will advance automatically with the recorded narration. The advantage of this system is that slide presentations can be presented mechanically. During the peak-visitation period, this feature frees personnel for other duties. The audiovisual room equipment also features a Pioneer sound system. The components include a 3-motor, 4-head reel-to-reel tape deck (RT909), A-5 stereo amplifier, CT-4 stereo cassette tape deck, and the SE-700 Pioneer headphones. These components allow for exceptional sound quality. The film projector, reel-to-reel tape deck, and cassette tape deck can all separately play through two Pioneer speakers in the auditorium.

The audiovisual system allows for flexibility. Presentations can be made by a speaker in person or automatically when taped. Both slide shows and films can be presented. Sixteen-millimeter films available for viewing at Santa Ana NWR include:

1. Two Little Owls
2. The Living Mosaic
3. America's Wetlands
4. Wildlife, Wetlands, and You -- The Duck Stamp Story
5. The National Wildlife Refuge System
6. America - 1492
7. Whispers of the Wind

8. This Time Forever
9. So Little Time
10. Age of Alaska
11. The Lorax

Slide programs available at Santa Ana NWR include:

1. Corridor of Life (Wildlife corridor along the lower Rio Grande)
2. Valley Wilderness: A Vanishing Legacy
3. Bird Identification at Santa Ana NWR
4. Representative Animals of Santa Ana NWR
5. Discover Wildlife in Your World
6. Non-game Slide Show
7. We Care About Oceans
8. Freshwater Inflows ... The Coastal Connection
9. White-winged Dove Management
10. La Sal Vieja
11. Barretal
12. On the Wichitas
13. Animals of Santa Ana

Slides and film presentations are used to serve two functions. They educate the visitor and they also occupy people while they wait for a tram tour. During the peak-visitation season, slide presentations are given at scheduled times; on busy days when the tram is operating, they are given almost every hour. During slacker seasons, slide presentations are given on request.

8. Hunting

The usual White-winged Dove hunt occurring adjacent to the Refuge in alternating years was cancelled due to low populations levels. (See Section H.17.)

9. Fishing

Sport fishing is not a public activity (human) at Santa Ana NWR due to the limited water areas available. Fishing as a public activity is restricted and reserved for wildlife visiting or resident on the Refuge.

10. Trapping

Nothing to report.

11. Wildlife Observations

Many people who visit wildlife refuges find observing wildlife a very rewarding experience. For most, viewing a Plain Chachalaca, a Green Jay, an Eastern Cottontail, or an exotic Fox Squirrel will suffice. Some enter the Visitors' Center excited about having seen a "black bird, a green bird, and a duck". But a large percentage of Santa Ana NWR's visitors are serious birders diligently seeking to add a few more species of peripheral birds found only in the United States in the lower Rio Grande Valley to their life lists. A sighting of a Northern Jacana or an Aztec Thrush will bring the most dedicated winging in from Boston or Los Angeles hoping for another life species. As one of the nation's birding hot spots, Santa Ana NWR draws birders from from every state

and from countries around the world seeking those rare avian species which Santa Ana NWR was established to protect.

A Wildlife Sightings log is maintained at the Visitor Information Counter for birders to list their sightings. This log serves as a source of information for other birders and as a record of some of the rarer or more sought after avians on the Refuge.

Tentative figures suggest that approximately 30,000 birders use Santa Ana NWR annually. These range from single visits from distant parts of the country to local residents who come back weekend after weekend. A survey needs to be conducted to help determine the economic contribution birders make to the lower Rio Grande Valley.

Finished early in March was the revision of the Santa Ana NWR bird checklist. Labuda spent many hours updating the species list and status codes. The submitted result was a list of 354 species, including 19 accidentals and 6 exotics or escaped domestics, plus 17 hypotheticals. Editing and final re-submission of the Santa Ana NWR bird checklist was accomplished in July, thanks to Fuller, Brenda H. Smith (RGVNWR), and Labuda. A measure of the new list's accuracy can be seen in the recording of four Hudsonian Godwits on the Refuge in late May. Previously unrecorded here, this species was listed as a hypothetical on the original submission, but was upgraded to an accidental based on this sighting in the interim. Clapper Rail should be relisted as an accidental and Broad-billed Hummingbird and Black-throated Blue Warbler were added later in the year as accidentals. Thus 358 avian species have been recorded from Santa Ana NWR, including 20 accidentals and 6 exotics; the 15 hypotheticals may also eventually be seen on the Refuge.

Sighting this Nine-banded Armadillo delights visitors when it comes out during daylight on cloudy days. (15/16SE85, SA373-04, JI)

Santa Ana is recognized by most as a birding hot spot, but many are interested in other forms of wildlife. A list of the other terrestrial wildlife known from Santa Ana NWR is available at the Visitor Information Counter along with the new (1985) bird checklist. Those who are aware that they still exist in the United States would like to see the nocturnal endangered felines (Ocelot and Jaguarundi). Others just appreciate seeing whatever and as much wildlife as they can. Some come to learn about the native plants so important for the wildlife and others want to see the diverse butterfly fauna.

12. Other Wildlife Oriented Recreation

Many visitors bring their cameras and find numerous scenes to record. Photography is very popular with many visitors whether they use disc cameras or the most advanced 35-millimeters. Professional photographers come to photograph the diverse wildlife and plant communities found on the Refuge. Photographers frequently donate duplicates of their slides to the Refuge slide collection for later use in exhibits or slide shows.

13. Camping

Nothing to report.

14. Picknicking

Picnickers are referred to parks. No picnic facilities are maintained on this refuge.

15. Off-road Vehicling

Nothing to report.

16. Other Non-wildlife Oriented Recreation

Inappropriate activities such as drinking parties, joy riding, and romantic meetings have been greatly reduced by limiting vehicle access during the tram season. Joggers and bicycles are attracted to the blacktopped wildlife drive as a safer place to jog or bicycle than the highways. Few suitable sites exist in the lower Rio Grande Valley for such recreational activities. Large groups of either are being discouraged because of the disturbance factor to wildlife. Groups are encouraged to utilize instead a more appropriate park.

17. Law Enforcement

Fuller, Labuda, and Mancha travelled to Clute, Texas, during the week of 17 June to attend the annual refresher training session for FWS Law Enforcement Officers in South Texas.

A briefing with the McAllen Sector Border Patrol representatives was held at the Refuge on 15 August. The purpose of the briefing was to discuss the two agencies' individual programs and responsibilities and further increase lines of communication between the agencies.

Employees with LE authority at Rio Grande Valley and Santa Ana NWR's successfully met six-month LE weapons qualification standards on 4 December. FWS Special Agent Joe Ramos conducted the requalification for Refuge Officers

and deserves commendation for conducting the qualification in an extremely time-efficient, yet effective manner.

Fuller met with Ramos in McAllen in September to discuss current pending Refuge LE cases and to update items of shared involvement and accomplishments.

The usual major team law enforcement effort did not take place in 1985. Due to nest sites losses from the Christmas Freeze of 1983, White-winged Dove populations had declined so drastically that the 1985 special white-wing season was cancelled. White-winged Dove hunting annually draws non-resident hunters into the lower Rio Grande Valley the traditional first two weekends of September. The cancellation of the hunting season meant a loss to local businessmen estimated at $20 million.

18. Cooperating Associations

Visitors repeatedly express their pleasure at the availability of field guide and other environmental books. The Southwest Natural History & Cultural Heritage Association sales outlet at Santa Ana NWR provides an important service in making essential field guides available at the point of use. In many towns and cities, field guides and environmental books are not sold by available book outlets. Visitors frustrated by seeing birds not included in their twenty-year-old bird guides with numerous names no longer correct come in and purchase one of the latest, most complete bird guides. Then, they turn around and immediately put them to use on the Refuge. Gross sales have continued to increase over previous years. This visitation and the resulting increased number of visitors browsing through the book sales display, an increased number of popular titles and children's environmental books, a great improvement in maintaining an adequate inventory during the peak visitation season, and the availabililty of new bird guides purchased to replace dated ones. Total sales of $9,619.90 in 1985 increased 55.3% over 1984 sales. A current price list listing titles sold is appended to this section. Table H-5 summarizes the growth of cooperating association sales at Santa Ana NWR from the beginning, while Table H-6 summarizes monthly book sales in CY 1985.

PRICELST **PRICES DO NOT INCLUDE STATE SALES TAX OF 4 1/8%**

BIRDS:

A BIRDER'S GUIDE TO THE RIO GRANDE VALLEY OF TEXAS (LANE)	$ 6.95
A BIRDER'S GUIDE TO THE TEXAS COAST (LANE)	$ 7.95
AUDUBON BIRDS OF AMERICA (COLORING BOOK)	$ 2.50
AUDUBON MASTER GUIDE TO BIRDING VOL. 1, LOONS TO SANDPIPERS	$13.95
VOL. 2, GULLS TO DIPPERS	$13.95
VOL. 3, OLD WLD WARBLERS TO SPARROWS	13.95
AUDUBON - FIELD GUIDE TO NORTH AMERICAN BIRDS	$13.50
BIRD BEHAVIOR	$18.95
BIRD MIGRATION	$ 4.95
BIRDS OF TROPICAL AMERICA	$29.95
DUCKS AT A DISTANCE - A WATERFOWL IDENTIFICATION GUIDE	$ 0.50
DUCKS, GEESE, AND SWANS OF NORTH AMERICA	$29.95
GOLDEN (BLUE) - FIELD GUIDE TO NORTH AMERICAN BIRDS	$10.95(HC)
=	$ 7.95(PB)
NATIONAL GEOGRAPHIC - FIELD GUIDE TO THE BIRDS OF NORTH AMERICA	$13.95
PETERSON - BIRDS COLORING BOOK	$ 3.95
PETERSON - A FIELD GUIDE TO BIRDS EAST OF THE ROCKIES	$11.95
PETERSON - A FIELD GUIDE TO BIRDS OF TEXAS	$17.95(HC)
=	$11.95(PB)
PETERSON - A FIELD GUIDE TO MEXICAN BIRDS	$15.95(HC)
PETERSON - A FIELD GUIDE TO WESTERN BIRDS	$11.95(PB) NEW
=	$ 8.95(PB) OLD
TUCSON AUDUBON - CHECKLIST OF NORTH AMERICAN BIRDS	$ 1.50
WATCHING BIRDS - AN INTRODUCTION TO ORNITHOLOGY	$ 9.95
ZOOBOOKS - DUCKS, GEESE, AND SWANS	$ 1.95
ZOOBOOKS - HUMMINGBIRDS	$ 1.95

MAMMALS

AUDUBON - FIELD GUIDE TO NORTH AMERICAN MAMMALS	$13.50
THE MAMMALS OF TEXAS	$ 5.00
PETERSON - A FIELD GUIDE TO ANIMAL TRACKS	$15.95(HC)
=	$10.95(PB)
PETERSON - A FIELD GUIDE TO THE MAMMALS NORTH OF MEXICO	$10.95
SMALL ANIMALS OF NORTH AMERICA - COLORING BOOK	$2.50
ZOOBOOKS - ENDANGERED ANIMALS	$ 1.95
ZOOBOOKS - WHALES	$ 1.95

REPTILES AND AMPHIBIANS

AUDUBON - FIELD GUIDE TO NORTH AMERICAN REPTILES AND AMPHIBIANS	$13.50
PETERSON - A FIELD GUIDE TO REPTILES AND AMPHIBIANS OF EASTERN	$13.95(HC)
AND CENTRAL NORTH AMERICA	$11.95(PB
POISONOUS SNAKES OF TEXAS	$ 5.00
REPTILES AND AMPHIBIANS COLORING BOOK	$ 2.50

(HC) - HARD COVER
(PB) - PAPERBACK

PRICES DO NOT INCLUDE STATE SALES TAX OF 4 1/8%

INSECTS AND SPIDERS

AUDUBON - FIELD GUIDE TO NORTH AMERICAN BUTTERFLIES	$13.50
AUDUBON - FIELD GUIDE TO NORTH AMERICAN INSECTS AND SPIDERS	$13.50
PETERSON - FIELD GUIDE TO THE INSECTS OF AMERICA NORTH OF MEXICO	$11.95(HC)
=	$10.95(PB)

WILDFLOWERS

AMERICAN WILDFLOWERS **COLORING BOOK**	$2.50
GOLDEN - A GUIDE TO FIELD IDENTIFICATION - WILDFLOWERS OF N. AMERICA	$ 7.95
PETERSON - FIELD GUIDE TO SOUTHWESTERN AND TEXAS WILDFLOWERS	$12.95(PB)
ROADSIDE FLOWERS OF TEXAS	$10.95
SOUTH TEXAS WILDFLOWERS	$ 5.95
TEXAS WILDFLOWERS	$10.95
WILDFLOWERS OF TEXAS	$15.95

TREES, SHRUBS, AND GRASSES

COMMON TEXAS GRASSES - AN ILLUSTRATED GUIDE	$10.95
FOREST TREES OF TEXAS	$ 5.00
GOLDEN - A GUIDE TO FIELD IDENTIFICATION - TREES OF NORTH AMERICA	$ 7.95
PETERSON - A FIELD GUIDE TO TREES AND SHRUBS	$15.95
VINES - TREES, SHRUBS, AND WOODY VINES OF THE SOUTHWEST	$47.50

OTHER BOOKS

FAVORITE NATURE STORIES	$ 1.25
INDIANS OF TEXAS	$ 9.95
THE LORAX	$ 7.95
MOUNTAIN ISLANDS AND DESERT SEAS - A NATURAL HISTORY OF BORDERLANDS	$19.95
A SAND COUNTY ALMANAC	$ 2.95
WILDLANDS FOR WILDLIFE	$ 6.95
YOUNG NATURALIST	$15.95

(If you are unfamiliar with the sales tax chart, multiply the total times 0.04125 and add the result to the total. The calculator is in the ORP office.)

Table H-5. Growth of cooperating association sales at Santa Ana NWR from the beginning in 1980.

Year	Products Available	Items Sold	Visitors in Sales Area	Staff Hours	Gross Sales
1980	6	100	9,000	200	$939.00
1981	23	705	14,500	600	2,139.00
1982	25	1,506	27,000	1,400	4,384.63
1983	31	1,935*	50,000	2,000	5,415.67
1984	38	861	66,172	700	6,196.08
1985	56	1,388	72,650	950	$9,619.90

*postcard sales were discontinued in 1983 resulting in a much higher average price per item in ensuing years.

Table H-6. Monthly book sales at Santa Ana NWR in CY 1985.

Month	Gross Sales	Books Sold
January	$983.70	108
February	1,271.40	170
March	2,521.50	374
April	646.75	93
May	322.44	50
June	221.06	32
July	212.00	40
August	269.20	46
September	221.90	25
October	483.00	51
November	1,033.20	155
December	1,433.75	244
CY 1985	$9,619.90	1,388

19. Concessions.

Nothing to report.

I. EQUIPMENT AND FACILITIES

1. New Construction

A greenhouse was constructed at Santa Ana NWR, under contract, for use in growing native seedlings for revegetation efforts associated with Rio Grande Valley NWR units. Native plants grown in the greenhouse are additionally used in landscaping the Santa Ana/Rio Grande Valley Office/Visitors' Center area. The goal, at headquarters, is to encourage the public to "think native" for its wildlife value as well as water conservation associated with using native plant materials in landscaping efforts. A positive spin-off of the greenhouse has been the public interest generated by having the greenhouse located adjacent to the Visitors' Center. Its location provides the opportunity for public awareness relative to revegetation efforts, as well as encouraging potential volunteer work associated with greenhouse operation. After contract work was accepted, Mancha and Cavazos installed a sliding gate in the security fence between the greenhouse entrance and the maintenance compound to allow easy access for supply delivery and loading of native plant materials from the greenhouse.

2. Rehabilitation

Refuge dikes and service roads received maintenance grading during the year. Caliche was purchased and used to patch portions of Mesquite Trail.

Ricardo Flores provides tender loving care to raise these native plants in the new greenhouse for revegetation efforts. (14MR86, R1-15, JI)

Before -- In the beginning, maintenance workers prepared the pad. Mancha reaches into the cab; Maxwell supervises. (NO84, SA002-14, JI)

After -- The greenhouse is completed and in use. Its predecessor continues in use at the left, a shade structure consisting of shade cloth over a frame. (14MR86, R1-10, JI)

Fire pumper units (two, 300 gallon slip-on units, Western Fire) were mounted on Refuge vehicles (4X4 pick-up and stake bed). Both pumper units required carburetor work during the year as well as numerous miscellaneous repairs. Consistent problems with the pumper units seem to reoccur and getting replacement parts has been extremely difficult. Additionally, much time is spent in up-keep of the fire vehicles themselves due to their age and condition. The Refuges hope to replace the vehicles in the short-term with fire funding.

Cavazos performed an overdue mowing and disking job on the Refuge's east boundary fire break in August. This boundary still has some potential for wildfire outbreak during periods of drought due to the grassy levee adjacent to the boundary. The majority of Santa Ana NWR is fairly well protected from wildfire outbreak due to the overstory and lack of fuel understory.

New lighting was installed in the solar room for visibility in servicing heating and air conditioning equipment.

On recommendation of the Alamo Postmaster, the Refuge mailbox was moved from its location on Highway 281 to the headquarters parking lot. The move enables the Alamo postal carrier to deliver packages to the Refuges directly instead of personnel having to drive to Alamo to pick them up.

The pump associated with the "Old Headquarters", specifically Q14 "lawn" was replaced during the year. Due to the birding associated with this area, the Refuge continues to irrigate the area for wildlife attraction/ observation purposes. Future plans for the area include replacing the "water demanding," exotic shrimp plant in the area with native plants such as Turk's Cap which will serve the same purpose. The "lawn" is being allowed to revert to its natural state -- in fact the refuge manager is no doubt the envy of many chronic "machine pushers". How much acreage, as a System, could refuges revert to native habitat if the call of the "un-wild" didn't call?

3. Major Maintenance

Currently Santa Ana NWR has three PFT staff in the Maintenance series. With increasing responsibilities associated with Rio Grande Valley NWR, a concerted effort was made in 1985 to schedule/coordinate high priority work needed by the Complex with existing maintenance positions at Santa Ana. On the average, Mancha was scheduled for RGV tasks 3 staff days/pay period; Cavazos 4 days/pay period; and Flores 1 staff day/pay period. Maintenance accomplished for RGVNWR by Santa Ana NWR maintenance staff is reported separately in the RGVNWR Annual Narrative. The same holds true for other Santa Ana NWR staff accomplishing work associated with RGV.

Refuge wells, a major item in water management for Santa Ana NWR were maintained and serviced by Refuge staff. Additionally, major well maintenance was accomplished at Willow and Cattail Lakes (large well) during the year under purchase order to Reimenschneider Well Drilling And Maintenance Company.

Refuge trails and the tour road and service roads required, as usual, a good deal of maintenance upkeep during the year. This on-going

maintenance is a major task accomplishment for Cavazos and at times requires assistance from Mancha and Flores. (Currently, There are 15 miles of walking trails, a 7-mile-long Wildlife Drive, and several miles of service roads). Additionally, volunteers supplement Refuge staff efforts by trimming wildlife observation trails. Clearing broken branches from the wildlife drive, service roads, and trails was a major task after the January ice storm.

Maintaining Refuge facilities for the Complex, at Santa Ana, took up the majority of Flores' time. With visitation at 100,000 per year, public restroom maintenance, Visitors' Center and maintenance compound upkeep, greenhouse responsibilities, assisting Mancha and Cavazos in other duties at times, and end-of-day security responsibilities currently take up the majority of this FTE for the Complex.

Santa Ana NWR maintains its own sewage treatment facility with Mancha certified under Texas law as sewage plant operator. The effluent, after treatment is returned to Headquarters Lake and the area is well used by wildlife. Water quality is monitored and recorded by Mancha and the Complex continues to get good reports from the Texas Water Commission and Texas Department of Health regarding the facility and its operation. Mancha attended a one-week sewage plant operators' course during the year to maintain his Class C certification as an operator.

An accident with potentially serious implications occurred on the 16th of April. In the week previous to this date, a contractor had been cleaning the water delivery system in the station's solar AC/Heating System with a mild acid solution. When he tried to flush the system on the 15th, two things evidently occurred. First, the city water pressure was low - around 5 p.s.i., as is often the case here at the Refuge. Second, the pumps in the system generate 15 to 20 p.s.i., resulting in a backpressure of 10 to 15 p.s.i. from the AC/Heating System to the City water supply. The treated water backed up to Quarters 14 where two employees came in contact with it. Cavazos drank some tap water in the backyard while working there on the 15th and complained of gastro-intestinal upset in the days following. Fuller took a shower on the morning of the 16th and immediately noticed a tingling sensation. She quickly got out of her shower and drove to the maintenance shop where she used "clean" water to shower off the chemicals. Fortunately, neither employee appears to have suffered any permanent damage, and the water never backed up far enough to affect public water facilities at the Visitor Center. Still, the potential for a real disaster was seen as plans called for the addition of ethylene glycol to the solar system for antifreeze. This chemical is deadly. To avoid a repeat of the backpressure incident, lines providing automatic feed to the water system were cut; now a piece of copper tubing must be used to connect the water supply to the solar system after pressures have been checked to insure a positive pressure from the water supply to the solar system.

4. Equipment Utilization and Replacement

The Refuge tram almost made it through the entire season without major problems. The "almost" stems from failure of the engine's electronic ignition regulator module on 17 March. Fortunately, Mancha was able to scavenge one from another Refuge vehicle to keep the "green Machine"

rolling with only a brief interuption. It won't be many years before serious consideration will have to be given to budgeting for another interpretive tram as a replacement unit.

The Refuge accepted delivery of a 4X4 pick-up to be used by the Complex and the Ridley's Turtle project in Mexico. The vehicle was a much needed addition to the Complex fleet, however, due to the harsh beach conditions the truck is subjected to in Mexico, the Complex gets only a few months use out of these vehicles before they are rendered virtually unserviceable. Plans now include replacing the truck every other year so the Turtle Project will maintain usable vehicles for use. Replacement should save repair time -- Mancha usually dreads the return each year!

Vehicle maintenance has become an increasing work-load and responsibility for Mancha. As the Refuges attempt to field employees efficiently in a Complex which spans a 4-county area, encompassing a spread of 250 river miles and 35 scattered units, necessity has required the invention of a "less personally attached" vehicle situation, and probably results in more efficient vehicle utilization. However, preventive maintenance checks by Mancha are now more often required. In 1985, a vehicle sign-out chalk board was implemented which allows employees to sign-out for vehicles on a daily basis. Vehicles are <u>not</u> assigned to individuals at the Complex. Additionally, a board with vehicle keys was installed in the safe room. With the complementing systems, individual employees sign-out for vehicles on a daily basis, then pick up keys stored in the central location. There remains a way to go in refining the system, but it has brought the Complex a long way in making more efficient use of Refuge vehicles.

It took months to successfully debug the new radio system.
(14MR86, R2-02, JI)

5. Communications Systems

The Complex, along with the Laguna Atascosa NWR, were converted to high-band radios during the year. Sixteen-channel GE Phoenix radios were purchased and two repeaters, one located in Rio Grande City and another in Weslaco, were installed. As soon as it was installed, the Refuges found that someone in Mexico was operating on the FWS frequency with constant radio traffic. Although the company, evidently a trucking company located in Monterrey with a sub-station in Rio Bravo, is operating illegally on the frequency, the international aspect is taking some time to resolve. Channel guards had to be installed on all radios to keep the noise down. The Refuge Complex is very dissatisfied with the radio system and had requested not to go with the 40-watt Phoenix radios. However, Martin Suhr has since assumed responsibility as the Regional Radio Coordinator and he has been working closely with FCC and local radio repair servicemen to resolve the problems. Martin deserves a great deal of credit for helping make sense of the radio system mess ... but there remains a way to go yet.

6. Computer Systems

The Digital Rainbow computer units, two, have been heavily used by staff of both Refuges of the Complex. Competition is keen for computer access, with both staff and volunteers vying for time. The staff hopes that by next year at least one other unit can be added; two could be used.

Long hours are spent on the word processor, usually while others await their turns. (22MY86, R5-09, MDH)

7. Energy Conservation

An effort was made to repair the solar system associated with providing heating and air conditioning for the Visitors' Center. All solar panels were completely rehabilitated, the hot water tank was cleaned, and the control panel was rewired. Although numerous problems were found with the system as the result of improper initial construction, success is still lacking with the cooling assist portion of the system. It appears that with the number of panels involved and the average temperature, the system will be unable to heat the water coming off the panels to the required 180° to trigger the Arkla Chiller unit to function. However, the heating portion of the unit does function now, and for the first time the building has a heating system in winter. A final evaluation of the solar assist air conditioning will be made in FY 86 and the decision to not maintain that portion, i.e., cooling assist, will probably be made.

8. Other

Repairs to the paved tour route and paved facilities areas were accomplished in September by the contractor, Ortiz Construction Company, before the expiration of the one-year Contract Construction warranty. Although no major problems existed, numerous areas were sealed with oil and sand to prevent further deterioration.

A meeting with Hydroworld, Inc., on 27 February was aimed at resolving problems which have existed since that firm received the contract for water treatment in the Visitors' Center heating/air conditioning system a year ago. Part of their contract responsibilities included monthly visits to check and clean strainers in the system. They have not honored this commitment in the past, but representatives assured Labuda that things would change in the future - for the better. At the end of FY 1985, the problems continued.

Mancha and Cavazos spent two weeks between 05 and 17 May attending the Heavy Equipment Operators School at Aransas NWR. Both found it to be a rewarding session.

J. OTHER ITEMS

1. Cooperative Programs

Under Special Use Permit SA-85-01 and a cooperative agreement, Bird Rescue, under the leadership of Cynthia Chapman, placed injured raptors in the Refuge's rehabilitation pens. The raptors placed in Santa Ana NWR's pens frequently were waiting for a molt to replace feathers damaged by humans. Recuperating injured owls and hawks spent their last few weeks awaiting freedom here -- after treatment and convalescence at one of Bird Rescue's crowded facilities -- to isolate them from unnecessary human contact until release, to evaluate their flight and feeding capabilities in a large pen, and usually to eventually release them into a natural environment. Ideker fed them five evenings a week and cleaned the pens; Fuller and Schumacher (RGVNWR) voluntarily fed on his days off, with occasionally another staff member or interpreter filling in. Other rehabilitated individuals of avian species naturally occurring on the Refuge were released through the year. After some 18 months of care by volunteer Refuge personnel, two rehabilitated Common Barn-Owls were removed from the Refuge's raptor rehabilitation pens by Bird Rescue personnel. They were placed in an abandoned barn on private property near Weslaco. The male was found shot to death about three months later. One rehabilitating Great Horned Owl remained in the rehabilitation pens at the end of the year.

A successfully rehabilitated Great Horned Owl awaits release from this raptor rehabilitation pen. (4AU84, JI; handheld, 1/4 sec, f1.8/2.8)

Special Use Permit SA-85-03 was issued to William W. Vanderput of Magic Valley Honey to place 100 honey bee hives on Santa Ana NWR. Due to problems with the beekeeper following the Refuge Manager's specified conditions and the question of exotic honey bees competing with native pollinators, the permit will not be renewed.

The Valley Nature Center in Weslaco held its first weekend of public activities on 16-17 February. The Valley Nature Center, a non-profit organization, was formed to increase environmental awareness, with particular emphasis on providing environmental education activities for young people. The Refuge is providing technical assistance to the Valley Nature Center and Fuller serves on the Board of Directors. The Valley Nature Center held an Open House on 7 December. Santa Ana, Rio Grande Valley, and Laguna Atascosa NWR's were actively represented at the event which was a rousing success. Along with the networking which resulted from the conservation groups participating, a great number of people became acquainted and aware of the Valley wildlife resource as a result of the event. Refuge volunteers, Ed and Doris Lowery ably represented the Complex at the Open House. A benefit barbecue for the VNC was held there on 13 December.

The Frontera Audubon Society Board of Directors held its monthly meetings in the Visitors' Center Auditorium. Program topics of the general meetings usually involve Refuge and FWS concerns. Fuller and Schumacher (RGVNWR) presented a slide program on 19 September. They dealt with refuge management programs on the two refuges, emphasizing revegetation efforts, water quality and quantity requirements of wildlife, wildfire, and special projects underway such as the endangered cat documentation effort. A field trip led by Gilbertson, Fuller, and Schumacher which included tours of the greenhouse and the Santa Ana Ecological Management Unit of the Rio Grande Valley NWR followed on 21 September. On 18 October, Dr. William Sheffield of Texas A&M spoke on the effects of the Texas Water Plan on wildlife, especially on the importance of inflows to estuarine wildlife. On 21 November, Patricia Bacak-Clements showed slides documenting the extensive avifaunal use of the lower Rio Grande Valley Pothole habitats and spoke about the need for their protection from drainage and conversion to unproductive agricultural use. The role of the U.S. Fish and Wildlife Service in preserving these important wetlands for wildlife use was brought out. John Martin of FAS led a field trip to view some of the Pothole communities on 23 November. FAS sponsored CBC's in lieu of a December general meeting.

The Revegetation Group held its third annual meeting at the Santa Ana/Rio Grande Valley NWR Complex headquarters 15-16 October. The purpose of the group, composed of federal, state, university, and private individuals, is to discuss and share information relative to techniques associated with native brush revegetation. The group seems to be firmly established, with networking among individuals and information sharing growing.

The Native Plant Project held most of its Board and general meetings at Santa Ana NWR. Program topics frequently intricately concern Refuge and FWS concerns. Dr. Robert I. Lonard, Professor of Plant Ecology and Taxonomy at Pan American University, Ideker, and Mike Heep, PAU Botany student, presented a slide show on backyard wildlife habitat at a joint meeting with Frontera Audubon on 17 January. Dr. Russel O. Wagner, "retired" University of Wisconsin plant ecologist and RGVNWR volunteer, talked about "Phenology -- What Is It?" on 15 February. Dr. Gary Bernon of the USDA's National Biological Control Laborary discussed "Some Interesting Aspects of Insects Associated with Native Plants" on 15 March. On 10 May, the NPP visited Mike Heep's greenhouse and viewed his native plants. Gary Waggerman, Texas Parks and Wildlife Department dove biologist, spoke on "Large Scale Plantings on State and Federal Refuges" on 12 July. On 13 September, Dr. Norman A. Browne spoke on native plant

illustration and held a workshop here the next morning. On 15 November, Robin S. Vora, Forester for Rio Grande Valley NWR, gave a slide presentation on germination of native plants of the lower Rio Grande Valley from seeds and cuttings. He then conducted the audience through the RGVNWR greenhouse. On 13 December, Mark Q. Smith, Hidalgo County Extension Agent - Horticulture, spoke on Xeriscaping. Xeriscaping involves conserving water through landscaping with low-water-using, native plants.

Approximately 25 individuals of Bexar Audubon and Central Texas Region of the Native Plant Society of Texas, led by Texas Nature Conservancy staff member Susan Rust, toured Santa Ana and Rio Grande Valley NWR's on 9 and 10 November. The group was extremely interested in and supportive of efforts underway by federal, state, and private entities to preserve the unique wildlife of the lower Rio Grande Valley.

2. Other Economic Uses

Nothing to report.

3. Items of Interest

Labuda represented the Refuge at the annual meeting of the Texas Chapter of the Wildlife Society in San Angelo in March. His report to the staff afterwards indicated a varied menu of technical papers with subjects ranging from aspen forest management to Whooping Crane mangement and liberally saturated with the inescapable White-tailed Deer lore.

Peter Argentine of WQED in Pittsburgh visited the Refuge on 10 December to interview Complex staff relative to a PBS documentary on rivers. The lower Rio Grande wildlife resource and river is to be the topic of a segment of the documentary. Peter, the producer, and staff plant to return in January for filming.

4. Credits

Sections D.1-4, F.11, H.1-5, I.5, I.7, and K were written by Nita M. Fuller who also inserted paragraphs into other sections.

Sections A, B, C, D.5-6, E, F, G, H.6-19, I.1-4, I.6, I.8 , and J were written by Joe Ideker.

Mancha was an appreciated source for maintenance and habitat management answers. Hernandez provided the fiscal data on request.

Typist for the report was Joe Ideker.

Previous narratives fell largely on the shoulders of the Assistant Refuge Manager, Outdoor Recreation Planner, and Clerk. With these three positions vacant, narrative preparation duties were reassigned to existing staff. (That is why this narrative is so late. No apology is offered.)

K. FEEDBACK

MAKING DECISIONS DESPITE UNCERTAINTIES

by Jay D. Hair
Executive Vice President, National Wildlife Federation

No one, least of all a scientist or federal agency administrator, likes to reach a conclusion based on incomplete information. But there are times when decisions must be made according to what information is available at the time. The federal Environmental Protection Agency's (EPA) responsibility for setting acceptable levels of contaminants in drinking water has been put off for over a decade because of such scientific uncertainties.

Thanks to Congress and the President, that is about to change. The newly reauthorized Safe Drinking Water Act establishes a deadline for EPA to begin attacking a growing threat -- groundwater contamination.

The Safe Drinking Water Act of 1974 reduced many traditional contamination problems. As a result, fatal water-borne diseases are no longer the major public health problem in the United States they once were. The drinking water problems we face now are far more complex, yet we believe the revised drinking water act will begin to solve them.

Today, we are most concerned about the chemical contamination of drinking water by toxic waste dumps, agricultural use of chemical pesticides, leaking underground storage tanks and ineffectively treated industrial wastes. Our concerns are well founded.

In 1983, the Office of Technology Assessment reported 29 percent of the groundwater supplying 954 cities of 10,000 or more residents was contaminated. Studies indicate that contaminated water primarily causes infectious diseases, but scientists believe it also can contribute to chronic poisoning and even cancer. While there are strong indications that significant health risks exist, there can be no absolute scientific certainty about such health effects. This is just the problem addressed by the reauthorized Safe Drinking Water Act.

The act gives EPA three years to assess available research studies and set maximum permissible levels for 83 hazardous contaminants found in drinking water. That is faster action than EPA has taken in the 12 years that the act has been on the books. During that period, EPA set permissible levels for less than two dozen of the more than 700 potential pollutants found in the nation's 200,000 public water systems.

Part of the problem has been EPA's unwillingness to make decisions that regulate pollutants until the agency knows everything there is to know about the pollutants' impacts. In many cases, such inaction totally disregards substantial research accumulated over many years. "Scientific certainty" is an admirable goal, but perhaps not an attainable one.

Scientists have worked diligently to develop new tools to evaluate the potential effects of environmental contaminants. Yet, even the standard practice of testing for effects of toxic substances on laboratory mice or rats

is not universally accepted as providing "scientific certainty." Responsible for the health of America's citizens, **government administrators must begin to use science-based judgments rather than waiting for scientific certainty.**

In the case of water contaminants, the use of "science-based judgments" will allow officials to make decisions by using the best available data at hand. **In light of the public's widespread -- and justifiable -- fear of toxic contamination, science-based judgments are a far better alternative than** no judgment or **action at all.** Reauthorization of Safe Drinking Water Act is the first significant piece of environmental legislation to clear Capitol Hill this year. We hail the act's progressive provisions, and now look to EPA to translate those provisions into standards that safeguard our drinking water supplies.

RIGHTS WITH NO RESPONSIBILITIES

The count was 950,000. Within a few hours, the million-pound quota of redfish was to be met, and the fishing would end.

But the closure came too late for as many as 100,000 pounds of bull reds off the Louisiana coast. They were killed, no one will pay the price.

On the last day of fishing during the 90-day period of emergency, Pascal Townsend, a fishing guide out of Cocodrie, came across a sickening sight: a purse seine operation was dipping fish from a recent set -- and the entire fleet was surrounded by miles of dead bull redfish.

"As far as you could see, their white bellies were shining in the sun," Pascal said. "It was something you'll never want to see."

Pascal alerted authorities. Within an hour, the National Marine Fisheries Service confirmed the kill.

"Our observers in spotter planes monitoring the fishing has confirmed two separate groups of dead fish," said Andy Kemmerer, head of the NMFS Pascagoula labs, and the man in charge of monitoring the fishing.

"They estimated the number to be between 50,000 and 100,000.

"At this time we can't be sure who is responsible. But we have so many people (on-board observers) out there, they shouldn't have too much trouble finding out."

But it really didn't matter.

"As far as I know, there are no specific penalties for dumping the fish," Kemmerer admitted.

And the final injury: the fish did not count against the quota.

A few hours later another boat made a set, took in another 50,000 pounds of the breeders, and the fishery was closed.

The incident created another howl of protest among conservationists. If big purse seines are going to be given the privilege to fish, what responsibilities are they expected to shoulder.

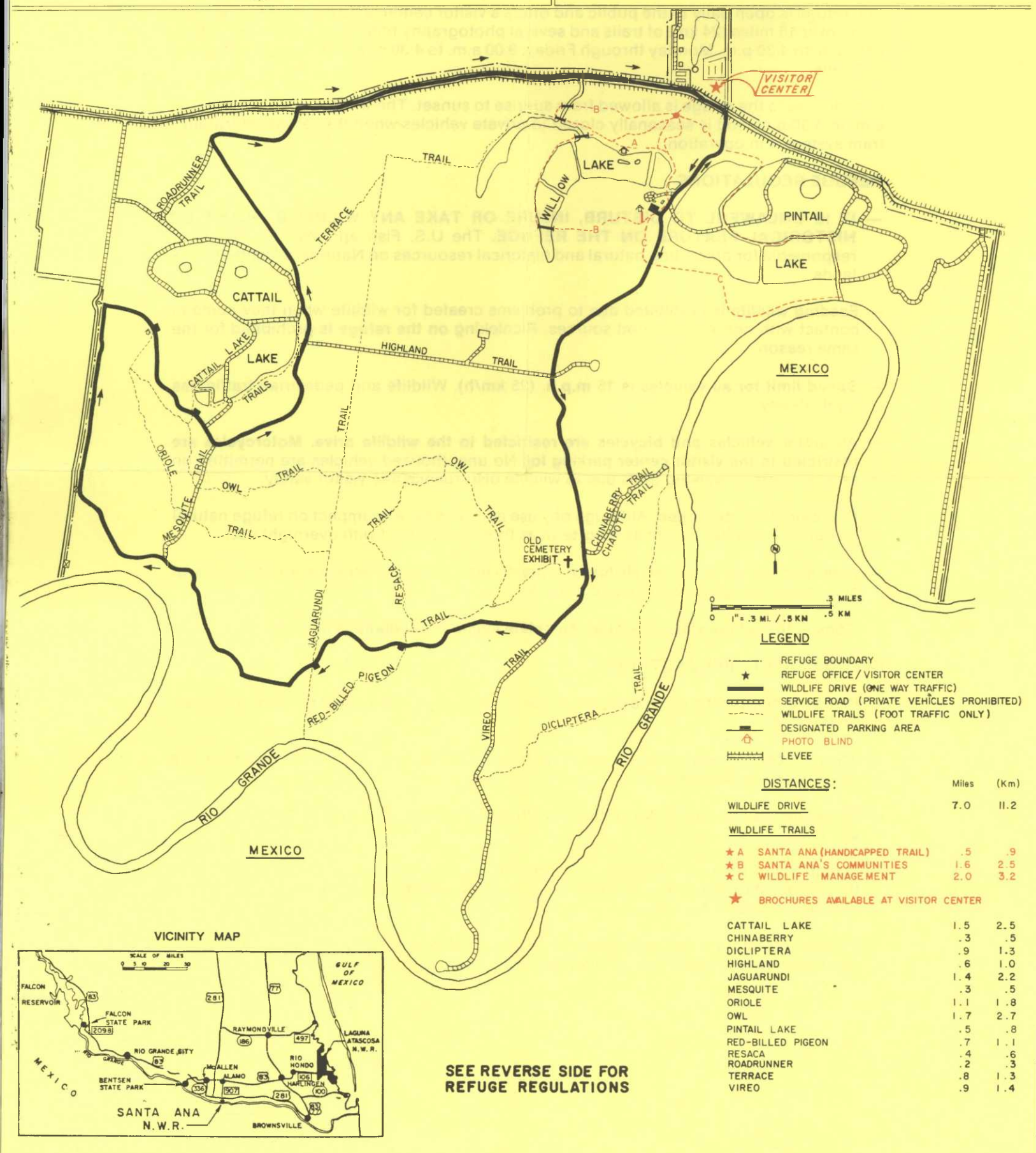
If a duck hunter knowingly leaves a dead bird in the pond, he can be cited for wanton waste.

But a fisherman can kill 100,000 pounds of redfish. And walk away.

"We have no proof that the purse seining is doing any damage to the resource.

But it didn't take a sharp mind to ask the question: Do you have any proof that it isn't doing damage?

Santa Ana National Wildlife Refuge



LEGEND

- REFUGE BOUNDARY
- ★ REFUGE OFFICE / VISITOR CENTER
- WILDLIFE DRIVE (ONE WAY TRAFFIC)
- SERVICE ROAD (PRIVATE VEHICLES PROHIBITED)
- WILDLIFE TRAILS (FOOT TRAFFIC ONLY)
- DESIGNATED PARKING AREA
- PHOTO BLIND
- LEVEE

DISTANCES:	Miles	(Km)
WILDLIFE DRIVE	7.0	11.2
WILDLIFE TRAILS		
★ A SANTA ANA (HANDICAPPED TRAIL)	.5	.9
★ B SANTA ANA'S COMMUNITIES	1.6	2.5
★ C WILDLIFE MANAGEMENT	2.0	3.2
★ BROCHURES AVAILABLE AT VISITOR CENTER		
CATTAIL LAKE	1.5	2.5
CHINABERRY	.3	.5
DICLIPTERA	.9	1.3
HIGHLAND	.6	1.0
JAGUARUNDI	1.4	2.2
MESQUITE	.3	.5
ORIOLE	1.1	1.8
OWL	1.7	2.7
PINTAIL LAKE	.5	.8
RED-BILLED PIGEON	.7	1.1
RESACA	.4	.6
ROADRUNNER	.2	.3
TERRACE	.8	1.3
VIREO	.9	1.4

VICINITY MAP

SEE REVERSE SIDE FOR REFUGE REGULATIONS

U.S. Fish and Wildlife Service
Santa Ana National Wildlife Refuge
Route 2, Box 202A
Alamo, Texas 78516

Santa Ana National Wildlife Refuge would like to encourage visitors to pursue an understanding of wildlife, natural environments and the objectives of the refuge. The refuge provides the visitor with the opportunity for wildlife observation, environmental education, scientific research and other wildlife-related activities compatible with the primary objectives of the refuge.

The refuge is open daily to the public and offers a visitor center, a 7 mile (11.2 km) wildlife drive, over 15 miles (24 km) of trails and several photography blinds. Visitor Center Hours: 8:00 a.m. to 4:30 p.m. Monday through Friday; 9:00 a.m. to 4:30 p.m. Saturday, Sunday and Holidays.

Foot access to the refuge is allowed from sunrise to sunset. The wildlife drive is open 9:00 a.m. to 4:30 p.m. and is seasonally closed to private vehicles when the refuge interpretive tram system is in operation.

REFUGE REGULATIONS

— **IT IS UNLAWFUL TO DISTURB, INJURE OR TAKE ANY WILDLIFE, PLANT OR HISTORICAL FEATURE ON THE REFUGE.** The U.S. Fish and Wildlife Service is responsible for protecting natural and historical resources on National Wildlife Refuge lands.

— **Feeding wildlife is prohibited** due to problems created for wildlife when they come in contact with non-natural food sources. **Picnicking on the refuge is prohibited** for the same reason.

— **Speed limit for ail vehicles is 15 m.p.h. (25 km/h)**. Wildlife and pedestrian traffic has right-of-way.

— **All motor vehicles and bicycles are restricted to the wildlife drive. Motorcycles are restricted to the visitor center parking lot**. No unauthorized vehicles are permitted on service roads or walking trails due to wildlife disturbance and visitor safety.

— **Camping is not permitted**. Although day use activities have an impact on refuge natural resources, the effect is not as long-term as those associated with overnight use.

— **Pets must be on leash at all times**. Unrestrained domestic animals are a source of disturbance to refuge wildlife and visitors.

Consult the refuge staff for a more complete listing of regulations in force.

REFUGE SAFETY PRECAUTIONS

— Please remember the wildlife drive is limited to **one way** traffic except portions indicated on the map.

— The river bank is very unstable due to undercutting and erosion. Be extremely cautious when walking near the river.

— Many species of plants on the refuge have thorns or spines. Look closely before touching any plant.

— Mosquitoes, chiggers (red bugs), spiders, wasps, bees, and scorpions are common on the refuge. Many can be avoided by limiting walks to established trails; proper clothing and insect repellant is helpful.

Further information on Santa Ana may be obtained by writing to the above address or calling the refuge visitor center/administrative office at (512) 787-3079.

RF-21551-1A
NOVEMBER 1985

SANTA ANA NATIONAL WILDLIFE REFUGE

List of Terrestrial Vertebrates

This list includes 11 Amphibians, 33 Reptiles, and 33 mammals found at Santa Ana National Wildlife Refuge. A separate bird checklist is available.

E -- Endangered Species
T -- Threatened Species (Texas Protected Nongame)
I -- Introduced Species

AMPHIBIANS

Rio Grande Lesser Siren-T
Black-spotted Newt -- T
Couch's Spadefoot
Great Plains Narrow-
mouthed Frog
Sheep Frog
Giant Toad -- T
Texas Toad
Gulf Coast Toad
Mexican Treetoad -- T
Rio Grande Chirping Frog-T
Rio Grande Leopard Frog

TURTLES
- Yellow Mud Turtle
- Red-eared Slider
- Texas Tortoise -- T
- Texas Spiny Softshell

LIZARDS
- Mediterranean Gecko -- I
- Green Anole -- I
- Texas Horned Lizard -- T
- Mesquite Lizard
- Texas Spiny Lizard
- Fence Lizard
- Rose-bellied Lizard
- Four-lined Skink
- Ground Skink
- Spotted Whiptail
- Six-lined Racerunner

SNAKES

Plains Blind Snake
Mexican Racer
Black-striped Snake -- T
Speckled Racer -- E
Texas Indigo Snake -- T
Texas Patch-nosed Snake
Great Plains Rat Snake
Mexican Hook-nosed Snake
Western Coachwhip
Schott's Whipsnake
Rough Green Snake
Bullsnake
South Texas Ground Snake
Diamond-backed Water Snake
Texas Brown Snake
Checkered Garter Snake
Western Ribbon Snake
Texas Coral Snake

MAMMALS

- Virginia Opossum
- Least Shrew
- Hog-nosed Bat
- Cave Bat
- Greater Yellow Bat
- Evening Bat
- Mexican Free-tailed Bat
- Raccoon
- Long-tailed Weasel
- Striped Skunk
- Badger
- Coyote
- Ocelot -- E
- Jaguarundi -- E
- Bobcat
- Javelina
- Nine-banded Armadillo

Mexican Ground Squirrel
Fox Squirrel -- I
Mexican Spiny Pocket Mouse
Beaver
Fulvous Harvest Mouse
Pygmy Mouse
White-footed Mouse
Resaca Rice Rat
Hispid Cotton Rat
Southern Plains Wood Rat
House Mouse -- I
Roof Rat -- I
Norway Rat -- I
Nutria -- I
Black-tailed Jackrabbit
Eastern Cottontail

SANTA ANA NATIONAL WILDLIFE REFUGE
1986-1987 TRAM SCHEDULE

BEGINS: NOVEMBER 28, 1986
ENDS: APRIL 27, 1987
DAYS: THURSDAY THRU MONDAY
RIDES DEPART AT: 10:00 AM
1:00 PM
3:00 PM
4:30 PM
ADMISSION: $2.00 ADULTS
$1.00 CHILDREN UNDER 12

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SANTA ANA TRAIL-TREE QUIZ

The abundant vegetation which grows on Santa Ana National Wildlife Refuge is different from what most people are used to seeing. The semi-arid climate (18" rainfall annually) and river delta topography have combined to form a unique jungle-like forest. This riparian thorn woodland contains several trees indigenous only to the Rio Grande valley.

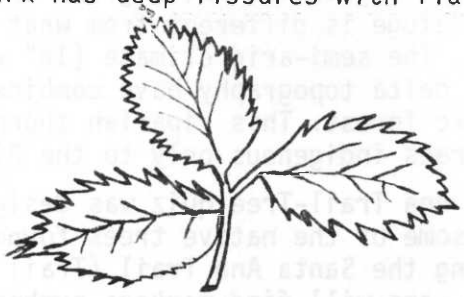
The Santa Ana Trail-Tree quiz was designed to help visitors identify some of the native trees found on the refuge. Located along the Santa Ana Trail (Trail A), taking the right hand loop, one will find markers numbered 1-10. Each number is in front of a tree and corresponds to the numerical listing below. Read the following information to learn distinctive clues necessary for identifying these trees. Please don't remove leaves or other plant parts. Enjoy but don't take!

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

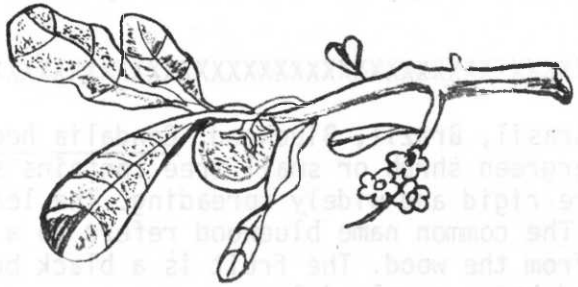
____1. Brasil, Brazil, Bluewood. Condalia hookeri.
This evergreen shrub or small tree contains spiny branches which are rigid and widely spreading. The leaves are spoon-shaped. The common name bluewood refers to a blue dye obtained from the wood. The fruit is a black berry that is sweet and has a purple juice.

____2. Spiny Hackberry, Granjeno. Celtis pallida.
The spiny hackberry is a spreading, densely branched evergreen shrub or small tree. The bark is mottled gray to reddish brown and is smooth and tight. The leaves are coarse and are toothed on the margin. The fruit are orange-colored berries which attract many birds such as the green jay.

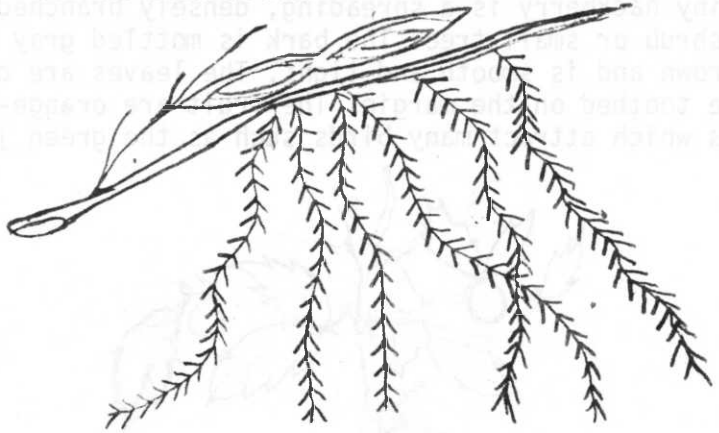
___3. Cedar Elm. Ulmus crassifolia. This is a tall deciduous tree that reaches heights of up to 75 feet. The rough saw-toothed leaves are the smallest of any native elm. The bark has deep fissures with flattened, scaly ridges.



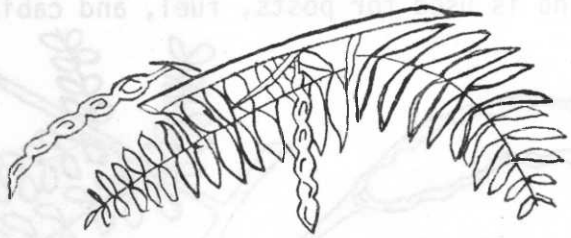
___4. Texas Persimmon. Diospyros texana. The Texas persimmon is a deciduous tree with smooth brownish outer bark, that flakes off in thin layers exposing inner gray bark. White flowers, small black fruit, and oblong, leathery leaves are other good characterstics.



___5. Retama, Jerusalem Thorn. Parkinsonia aculeata. This is a small rapid growing tree which is thorny and green-barked. The branches are slender and the leaflets are tiny and regimented. Yellow, pea-like flowers are another distinguishing feature. The fruit is contained in a long seed pod which the Indians formerly pounded into flour to make bread.



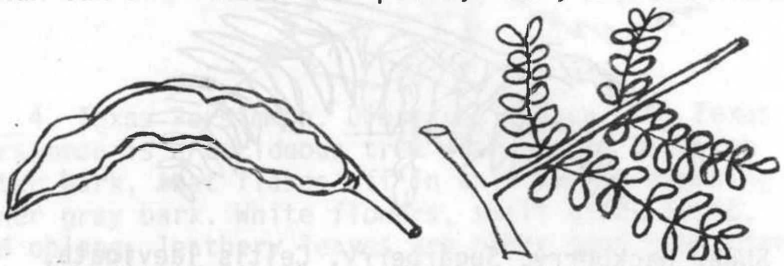
___6. Honey Mesquite. Prosopis glandulosa. This is a thorny shrub or small deciduous tree reaching a height of 30 feet. The leaves are long-petioled with 12-20 feather-like leaflets on both sides of the stem. The fruit is a long bean pod about 4 to 9 inches long that ends in a narrow point. It is the dominant tree in drier areas due to its deep and spreading root system. Another good indicator is the rough, reddish brown, thick-scaled bark.



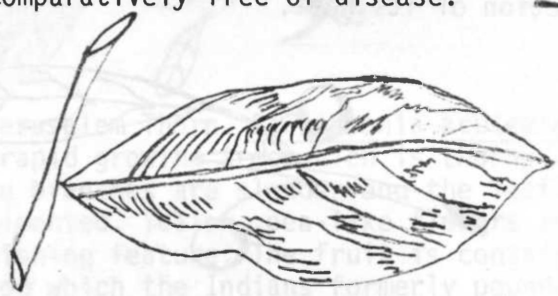
___7. Sugar Hackberry, Sugarberry. Celtis laevigata. Tall deciduous tree with pale gray bark covered with prominent warty bumps. The leaves are oblong and 2 to 5 inches long. The fruit is orange-colored, small, and frequently eaten by the chachalacas. The Altamira oriole also uses this tree by tearing off strips of bark for construction of its nest.

___8. Tepeguaje, Great Leadtree, Mexican Leadtree. Leucaena pulverulenta. Grows to a length of 50 to 60 feet. It has finely divided leaves that gives the appearance of a huge fern. The smooth gray to brown branches have white flowers and a long flat thin seed pod. Often was used as an ornamental because it grows rapidly and matures in 10 to 15 years.

9. Texas Ebony, Ebony Blackbead. Pithecellobium flexicaule. The Texas ebony is an evergreen tree with feather like leaves and light yellow flowers that bloom between June and August. The fruit is a 4 to 6 inch long heavy walled seed pod. This tree provides valuable nesting cover for several bird species. The wood is 50% denser than oak and is used for posts, fuel, and cabinetmaking.



10. Anaqua, Sandpaper Tree, Knackaway. Ehretia anacua. The anaqua is characterized by slender branches and leathery, very rough, large green leaves. It has white flowers and during the fall contains a golden fruit which a number of birds and mammals feed upon. It is drought-resistant and comparatively free of disease.



XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

The second part of the trail will test your knowledge and reinforce it. This section begins immediately after one reaches Willow Lake. Find the posts numbered 1-10. Identify the tree and write its marker number in the space before the number of the same tree listed above. Check your answers at the visitor center. Good Luck!

EL RIO GRANDE — UN CORREDOR DE VIDA SILVESTRE

Folleto Informativo para
El Valle Bajo del Río Grande de Tejas
Programa de Adquisición de Habitaciones
para la Vida Silvestre

EL RIO GRANDE — UN CORREDOR DE VIDA SILVESTRE

La gente de los Estados Unidos empieza a preocuparse por la necesidad de proteger las tierras de la vida silvestre. Como resultado de la expansión de la urbanización, las habitaciones naturales de la vida silvestre y los animales que viven en ellas se ponen más escasos cada día. El Servicio de Pesca y Vida Silvestre de los EE. UU. (The U.S. Fish and Wildlife Service) en colaboración con el Departmento de Parques y Vida Silvestre del Estado de Tejas (Texas Parks and Wildlife Department), está identificando y tratando de preservar algunas de las habitaciones de vida silvestre que quedan.

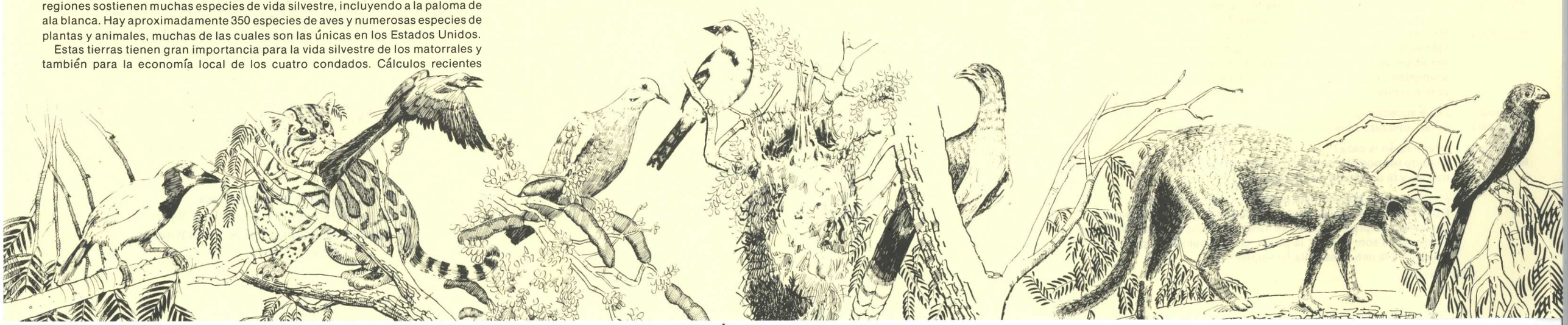
El Valle Bajo del Río Grande de Tejas, incluyendo los Condados de Cameron, Hidalgo, Starr y Willacy, ha sido identificado por el Servicio de Pesca y Vida Silvestre de los EE. UU. y el Departamento de Parques y Vida Silvestre del Estado de Tejas como una región en donde la habitación de la vida silvestre está desapareciendo y necesita protección. Para poder preservar estas tierras, los gobiernos estatal y federal están comprando una porción de los matorrales y montes bajos (brushlands) que todavía quedan en el Valle Bajo del Río Grande. Estas regiones sostienen muchas especies de vida silvestre, incluyendo a la paloma de ala blanca. Hay aproximadamente 350 especies de aves y numerosas especies de plantas y animales, muchas de las cuales son las únicas en los Estados Unidos.

Estas tierras tienen gran importancia para la vida silvestre de los matorrales y también para la economía local de los cuatro condados. Cálculos recientes indican que la caza de la paloma de ala blanca provee más de viente millones de dólares anuales a la economía local. Además, la región con su vida silvestre atrae un gran número de gente. Por ejemplo, los Refugios Nacionales para la Vida Silvestre Santa Ana y Laguna Atascosa y el Parque Estatal Bentsen reciben unos 300,000 visitantes cada año, quienes, junto con otros turistas a los cuatro condados proveen casi tresientos cincuenta millones de dólares anualmente a la economía local.

Bajo este programa, las tierras se adquiriran por medio de compras o disposicion legal (easement) segun la autoridad de la ley de la Pesca y Vida Silvestre de 1956, el Acta de Recreo y otras leyes apropriadas. Los fondos para comprar las tierras provienen de la venta de arriendos (leases) de explotación petrolera y gas en los límites de la capa continental submarina, impuestos de combustible para lanchas motorizadas y la venta de ciertas tierras federales sobrantes. Todos estos ingresos se depositan en el Fondo para la Preservación de Tierras y Aguas. El Servicio de Pesca y Vida Silvestre de los EE. UU. puede emplear estos fondos en el Valle Bajo del Río Grande para comprar tierras para adiciones recreativas a los Refugios establecidos (Santa Ana y Laguna Atascosa) y para tierras que sostienen especies de vida silvestre únicas o en peligro de extinción. Los fondos para adquisiciones de parte del Departamento de Parques y Vida Silvestre de Tejas provienen de la venta de permisos (stamps) de caza de la paloma de ala blanca autorizada por la Legislatura de Tejas en 1971.

Tierras compradas o protegidas por este programa llegarán a formar parte del Sistema Nacional de Refugios para la Vida Silvestre administrado por el Servicio de Pesca y Vida Silvestre de los EE. UU. o la Región Administrativa de Vida Silvestre "Las Palomas" del Departamento de Parques y Vida Silvestre de Tejas. Los usos recreativos, educativos y científicos serán fomentados en lugares apropriados.

El esfuerzo para proteger estas tierras del Bajo Río Grande, un "corredor de vida silvestre," comienza.



Las siguientes preguntas y respuestas ayudarán a explicar el programa de adquisición de tierras en el Valle Bajo del Río Grande de Tejas:

Pregunta: Si alguien quiere vender su tierra, ¿hay ventajas o desventajas al comunicarse con una agencia federal en vez de una agencia estatal?
Respuesta: No hay, las dos agencias coordinan sus actividades de adquisición y no están en competencia alguna entre sí. Las dos agencias funcionan bajo reglas parecidas.

Pregunta: ¿Cuántos acres de matorral se comprarán?
Respuesta: Tantos como sean posible de los que quedan — limitado por el dinero disponible y la disposición de vender de parte de los dueños.

Pregunta: ¿Serán comprados los derechos del agua junto con la tierra?
Respuesta: Sí, siempre cuando sea posible.

Pregunta: Si el dueño no quiere vender, ¿tomarán la tierra por acción legal?
Respuesta: No hay planes de adquirir tierra sino por medio de compras de los que quieren vender.

Pregunta: ¿Pueden los propietarios privados arrendar su propiedad al Gobierno Federal si no quieren vender?
Respuesta: No. Las tierras serán adquiridas o por la compra o por una disposición legal (easement) perpetua. La disposición aseguraría la continuación de los usos actuales de la tierra pero permitirá que la propiedad privada quede en posesión del dueño. No hay planes para arrendar las propiedades.

Pregunta: ¿Qué sucederá con las tierras compradas?
Respuesta: Serán administradas principalmente para la vida silvestre.

Pregunta: ¿Permiterán la caza?
Respuesta: Cuando sea posible, pero esto dependerá del tamaño, las características y la ubicación de los terrenos.

¿Habrá acceso público para propósitos ajenos a la caza?
Esto será permitido si no hay conflicto con los propósitos para los cuales se compraron las tierras. Unos ejemplos de usos públicos apropiados son: la caza, la pesca, la observación de pájaros, el estudio de la naturaleza y la fotografía.

pnotograpny.

Pregunta: ¿Cómo serán determinadas las ofertas?
Respuesta: Las ofertas se basarán en la valuación de la propriedad tomando en consideración las ventas de los terrenos comparable en la región. La Ley Federal prohibe que los precios ofrecidos sean menos que la valuación corriente.

Pregunta: ¿Se quitarán estos terrenos de las listas de impuestos?
Respuesta: Sí. Sin embargo el Acta Federal de Compartir Rentas Púlicas provee pagos anuales a los condados. En muchos casos estos pagos son iguales o superiores a los impuestos previos.

El Estado de Tejas por medio de su Legislatura puede proveer pagos a los condados y distritos escolares en vez de los impuestos de la propriedad en las regiones de manejo de vida silvestre.

Si usted desea más información, favor de comunicarse con el

Regional Director (LA-A)
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuquerque, New Mexico 87103

Teléfono: (505) 766-2174

o con el

Director, Wildlife Division
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

Teléfono: (512) 475-4879

Birds

Santa Ana National Wildlife Refuge

TEXAS

BIRDS of Santa Ana National Wildlife Refuge

Santa Ana National Wildlife Refuge was established in 1943 to protect and preserve a 2,000 acre remnant of a rapidly vanishing native subtropical woodland. The refuge provides habitat for an amazing diversity of bird species, many of which are not found elsewhere in the United States. Convergence of two major flyways, Central and Mississippi, in the lower Rio Grande Valley further contributes to the large number of bird species which may be seen in the area.

This check list of 371 species follows the phylogenetic order of the A.O.U. and includes 16 hypothetical, 20 accidental, and 6 exotic species. Accepted new names are used and species of special interest are *underlined*.

A-Abundant	(can't miss)
C-Common	(certain in proper habitat)
U-Uncommon	(present, but may not be seen)
O-Occasional	(seen a few times per season)
R-Rare	(seen every 2 to 5 years)
X-Accidental	(seen only once or twice)
H-Hypothetical	(never recorded but may occur, based on records nearby)
*-Exotic	(feral or escaped)
•-has nested on refuge	
S-Spring	March - May
S-Summer	June - August
F-Fall	September - November
W-Winter	December - February

SPECIES	STATUS S	S	F	W
LOONS				
_____ Common Loon			X	X
GREBES				
_____ •Least Grebe	U	U	U	U
_____ •Pied-billed Grebe	C	O	C	C
_____ Eared Grebe	O		O	O
PELICANS				
_____ American White Pelican	R	R	U	O
CORMORANTS				
_____ Double-crested Cormorant			O	O
_____ Olivaceous Cormorant	U	U	O	O
ANHINGAS				
_____ •Anhinga	U	U	O	O
HERONS, EGRETS, AND ALLIES				
_____ American Bittern	U		O	O
_____ •Least Bittern	U	U	O	
_____ Great Blue Heron	U	O	U	U
_____ Great Egret	O	R	U	O
_____ Snowy Egret	O	O	U	O
_____ Little Blue Heron	O	O	U	O
_____ Tricolored Heron	O	R	U	U
_____ Reddish Egret	R	R	O	O
_____ Cattle Egret	O	R	O	O
_____ •Green-backed Heron	U	U	O	U
_____ Black-crowned Night-Heron	O		O	U
_____ Yellow-crowned Night-Heron	O	R	O	U
IBISES AND SPOONBILL				
_____ White Ibis	O	O		
_____ White-faced Ibis	O	R	O	
_____ Roseate Spoonbill	R	R		
STORKS				
_____ Jabiru			H	H
_____ Wood Stork	O	O	U	
WATERFOWL				
_____ •Fulvous Whistling-Duck	O	R	R	R
_____ •Black-bellied Whistling-Duck	U	C	U	O
_____ Tundra Swan				X
_____ Greater White-fronted Goose	R		R	O
_____ Snow Goose	O		O	O
_____ Ross' Goose	H		H	H
_____ Canada Goose	O		O	O
_____ *Muscovy Duck			X	X
_____ Wood Duck	R		O	R
_____ Green-winged Teal	O		C	C
_____ Mottled Duck	U	O	U	U
_____ Mallard			R	R
_____ Northern Pintail	U		U	C
_____ Blue-winged Teal	C		C	C
_____ Cinnamon Teal	O		O	O
_____ Northern Shoveler	U		U	C
_____ Gadwall	C		C	C
_____ American Wigeon	U		C	C
_____ Canvasback	R		R	O
_____ Redhead	R		R	O
_____ Ring-necked Duck	U		U	U
_____ Lesser Scaup	O		O	U
_____ Common Goldeneye			R	R
_____ Bufflehead	R		R	O
_____ Hooded Merganser	O		O	O
_____ Ruddy Duck	O		U	U
_____ Masked Duck	R	R	R	R
VULTURES				
_____ Black Vulture	O	O	U	U
_____ Turkey Vulture	U	U	A	A
RAPTORS				
_____ Osprey	R		O	O
_____ •Hook-billed Kite	U	U	U	O
_____ American Swallow-tailed Kite	R		R	
_____ •Black-shouldered Kite	U	C	U	U
_____ Mississippi Kite	O		O	
_____ Northern Harrier	O		O	O
_____ Sharp-shinned Hawk	U		U	U
_____ Cooper's Hawk	O		O	O
_____ Northern Goshawk			X	
_____ Common Black-Hawk	X		R	X
_____ •Harris' Hawk	U	U	C	C
_____ •Gray Hawk	O	U	U	O
_____ Roadside Hawk			H	H
_____ Red-shouldered Hawk	U		C	C
_____ Broad-winged Hawk	O		O	
_____ Swainson's Hawk	O		O	R
_____ •White-tailed Hawk	R	R	R	R
_____ Zone-tailed Hawk				X
_____ Red-tailed Hawk	O		O	O
_____ Ferruginous Hawk	H		H	
FALCONS				
_____ •Crested Caracara				R
_____ American Kestrel	O		C	C
_____ Merlin	O		U	U
_____ Aplomado Falcon				H
_____ Peregrine Falcon	R		O	R
_____ Prairie Falcon				R
CHACHALACAS				
_____ •Plain Chachalaca	A	A	A	A
QUAIL				
_____ •Northern Bobwhite	U	U	U	U
RAILS, COOTS AND ALLIES				
_____ Yellow Rail			R	R
_____ Clapper Rail				H
_____ King Rail	R		O	O
_____ Virginia Rail				R
_____ Sora	U	O	U	U
_____ •Purple Gallinule	R	U	R	
_____ •Common Moorhen	C	C	C	C
_____ •American Coot	C	U	C	*C
CRANES				
_____ Sandhill Crane	R			O
THICK-KNEES				
_____ Double-striped Thick-knee				H
PLOVERS				
_____ Black-bellied Plover	R		R	
_____ Lesser Golden-Plover	R		R	
_____ Semipalmated Plover	R	X		
_____ Piping Plover	R			
_____ •Killdeer	U	O	C	U
_____ Mountain Plover	R			
STILTS AND AVOCETS				
_____ •Black-necked Stilt	C	C	U	O
_____ American Avocet	O		O	O
JACANAS				
_____ Northern Jacana	R		R	R
SANDPIPERS AND ALLIES				
_____ Greater Yellowlegs	U		O	O
_____ Lesser Yellowlegs	C		U	O
_____ Solitary Sandpiper	O		O	R
_____ Willet	R		R	R
_____ Spotted Sandpiper	O	R	O	O
_____ Upland Sandpiper	R		R	
_____ Whimbrel	H			H
_____ Long-billed Curlew	O		O	O
_____ Hudsonian Godwit				
_____ Marbled Godwit	R		R	
_____ Red Knot	H	H	H	
_____ Sanderling		R		R
_____ Semipalmated Sandpiper	O		O	O
_____ Western Sandpiper	O		O	O
_____ Least Sandpiper	O		O	O
_____ White-rumped Sandpiper	O		O	R
_____ Baird's Sandpiper	O	R	O	R
_____ Pectoral Sandpiper	O		O	
_____ Dunlin	O		O	O
_____ Stilt Sandpiper	O		O	R
_____ Buff-breasted Sandpiper	R		R	
_____ Short-billed Dowitcher	R		R	
_____ Long-billed Dowitcher	O		O	O
_____ Common Snipe	O		O	U
_____ American Woodcock			R	R
_____ Wilson's Phalarope	O		O	
GULLS, TERNS, AND SKIMMERS				
_____ Laughing Gull	O	R	O	O
_____ Franklin's Gull	O		O	
_____ Bonaparte's Gull	R		R	R
_____ Ring-billed Gull	O		R	O
_____ Herring Gull	H			X
_____ Gull-billed Tern	R	O	R	R
_____ Caspian Tern	O		O	O
_____ Royal Tern		R	R	
_____ Sandwich Tern		O	R	
_____ Common Tern			R	
_____ Forster's Tern	O		O	O
_____ Least Tern	O	O	O	O
_____ Black Tern	O	R	O	
_____ Black Skimmer	R	R	O	R
PIGEONS AND DOVES				
_____ •*Rock Dove	U	U	U	U
_____ •Red-billed Pigeon	R	O	O	R
_____ *Ringed Turtle-Dove		X		
_____ •White-winged Dove	A	A	A	R
_____ •Mourning Dove	C	C	C	C
_____ •Inca Dove	U	U	U	U
_____ •Common Ground-Dove	C	C	C	C
_____ Ruddy Ground-Dove	R	R		
_____ •White-tipped Dove	C	C	C	C
PARAKEETS AND PARROTS				
_____ Green Parakeet		R	R	
_____ *Canary-winged Parakeet				X
_____ Red-crowned Parrot		R	R	
_____ Red-lored Parrot		R	R	
_____ Yellow-headed Parrot		R	R	
CUCKOOS, ROADRUNNERS, AND ANIS				
_____ Black-billed Cuckoo	U		U	
_____ •Yellow-billed Cuckoo	C	C	C	
_____ Mangrove Cuckoo		X		
_____ •Greater Roadrunner	U	U	U	U
_____ •Groove-billed Ani	C	C	U	R
BARN-OWLS				
_____ •Common Barn-Owl	O	O	O	O
OWLS				
_____ •Eastern Screech-Owl	C	C	C	C
_____ •Great Horned Owl	O	O	O	O
_____ •Ferruginous Pygmy-Owl	R	R	R	
_____ •Elf Owl	C	C	R	
_____ Burrowing Owl			R	R
_____ Barred Owl			R	R
_____ Long-eared Owl	R			R
_____ Short-eared Owl			R	R
GOATSUCKERS				
_____ •Lesser Nighthawk	O	O	O	R
_____ •Common Nighthawk	U	C	U	O
_____ •Common Pauraque	C	C	C	C
_____ Common Poorwill	O		R	R
_____ Chuck-will's-widow	O		O	
_____ Whip-poor-will	O		R	
SWIFTS				
_____ Chimney Swift	C	C	U	
HUMMINGBIRDS				
_____ Green Violet-ear	X	X		
_____ •Buff-bellied Hummingbird	U	C	U	O
_____ Blue-throated Hummingbird	X	X		
_____ Ruby-throated Hummingbird	C	R	C	O
_____ •Black-chinned Hummingbird	O	O	U	O
_____ Rufous Hummingbird	O		U	U
TROGONS				
_____ Elegant Trogon		H	H	
KINGFISHERS				
_____ •Ringed Kingfisher	O	O	O	O
_____ Belted Kingfisher	O		O	O
_____ •Green Kingfisher	O	O	O	O
WOODPECKERS				
_____ •Golden-fronted Woodpecker	A	A	A	A
_____ Yellow-bellied Sapsucker	O		O	U
_____ •Ladder-backed Woodpecker	C	C	C	C
_____ Northern Flicker (Yellow-shafted)	R		R	R
_____ Northern Flicker (Red-shafted)			R	R
FLYCATCHERS				
_____ •Northern Beardless-Tyrannulet	R	R	R	R
_____ Olive-sided Flycatcher	U		U	
_____ Western Wood-Pewee	R		R	
_____ Eastern Wood-Pewee	O		O	
_____ Yellow-bellied Flycatcher	O		O	
_____ Acadian Flycatcher	O		O	
_____ Alder Flycatcher	R		R	
_____ Willow Flycatcher	O		O	
_____ Least Flycatcher	O		U	R
_____ Black Phoebe			R	R
_____ Eastern Phoebe	C		C	U
_____ Say's Phoebe	R		C	R
_____ •Vermilion Flycatcher	R	R	O	R
_____ Great Crested Flycatcher	U		U	
_____ • Brown-crested Flycatcher	C	C	C	R
_____ •Great Kiskadee	U	C	U	U
_____ •Couch's Kingbird	C	C	U	O
_____ Cassin's Kingbird		X		
_____ Western Kingbird	O		R	
_____ Eastern Kingbird	C		C	
_____ •Scissor-tailed Flycatcher	A	O	C	R
_____ Fork-tailed Flycatcher		H	H	
_____ •Rose-throated Becard	R	R		
LARKS				
_____ Horned Lark	O	O	O	U
MARTINS AND SWALLOWS				
_____ Purple Martin	O	R	O	R
_____ Gray-breasted Martin	H			
_____ Tree Swallow	O		O	O
_____ Northern Rough-winged Swallow	U		U	R
_____ Bank Swallow	O		O	H
_____ Cliff Swallow	O		O	R
_____ Barn Swallow	U		U	R
JAYS, CROWS, AND RAVENS				
_____ Blue Jay				R
_____ •Green Jay	C	U	C	A

	S	S	F	W
_____ Brown Jay	H	H	H	H
_____ Mexican Crow	R	R	O	R
_____ Chihuahuan Raven	O		O	O
TITMICE				
_____ •Tufted Titmouse (Black-crested)	U	U	U	U
VERDINS				
_____ •Verdin	O	O	O	U
NUTHATCHES				
_____ Red-breasted Nuthatch				R
CREEPERS				
_____ Brown Creeper	R		R	R
WRENS				
_____ •Cactus Wren	U	C	C	U
_____ Rock Wren				R
_____ •Carolina Wren	U	R	U	R
_____ •Bewick's Wren	U	U	U	U
_____ House Wren	U		C	C
_____ Winter Wren			R	R
_____ Sedge Wren	R			R
_____ Marsh Wren	R			O
KINGLETS AND GNATCATCHERS				
_____ Golden-crowned Kinglet			O	O
_____ Ruby-crowned Kinglet	C		C	C
_____ Blue-gray Gnatcatcher	C		C	C
_____ Black-tailed Gnatcatcher				H
THRUSHES AND ALLIES				
_____ Eastern Bluebird	R		O	O
_____ Western Bluebird				R
_____ Mountain Bluebird	R			R
_____ Townsend's Solitaire				R
_____ Veery	O		R	
_____ Gray-cheeked Thrush	U		O	
_____ Swainson's Thrush	U		O	
_____ Hermit Thrush	U		O	O
_____ Wood Thrush	U		O	
_____ Clay-colored Robin	R	R	R	R
_____ Rufous-backed Robin		X	X	
_____ American Robin	U		O	O
_____ Aztec Thrush	X			
MOCKINGBIRDS, THRASHERS, AND ALLIES				
_____ Gray Catbird	O		O	U
_____ •Northern Mockingbird	C	C	C	C
_____ Sage Thrasher			R	R
_____ Brown Thrasher				R
_____ •Long-billed Thrasher	C	C	C	C
_____ •Curve-billed Thrasher	U	U	U	U
PIPITS				
_____ Water Pipit	U		U	U
_____ Sprague's Pipit			O	O
WAXWINGS				
_____ Cedar Waxwing	O		O	U
PHAINOPEPLAS				
_____ Phainopepla				X
SHRIKES				
_____ Loggerhead Shrike	U		C	C
STARLINGS				
_____ *European Starling	R		R	R
VIREOS				
_____ White-eyed Vireo	U	U	U	U
_____ Bell's Vireo	R		R	R
_____ Black-capped Vireo	R		R	R
_____ Solitary Vireo	U		O	O
_____ Yellow-throated Vireo	O		O	
_____ Warbling Vireo	U		O	
_____ Philadelphia Vireo	U		O	
_____ Red-eyed Vireo	U		U	
_____ •Red-eyed Vireo (Yellow-green)	R	R		
WOOD-WARBLERS				
_____ Blue-winged Warbler	O		O	
_____ Golden-winged Warbler	O		O	
_____ Tennessee Warbler	U		U	
_____ Orange-crowned Warbler	C		C	C
_____ Nashville Warbler	C		U	O
_____ Northern Parula	U	R	O	O
_____ •Tropical Parula	R	R	R	R
_____ Yellow Warbler	C		C	
_____ Chestnut-sided Warbler	C		U	
_____ Magnolia Warbler	O		O	

	S	S	F	W
_____ Yellow-rumped Warbler (Audubon's)	O		O	
_____ Yellow-rumped Warbler (Myrtle)	C		C	C
_____ Black-throated Gray Warbler	U		U	O
_____ Townsend's Warbler				R
_____ Black-throated Green Warbler	C		U	O
_____ Blackburnian Warbler	C		O	R
_____ Yellow-throated Warbler	U		U	U
_____ Pine Warbler	R		R	R
_____ Prairie Warbler				R
_____ Palm Warbler	R		R	O
_____ Bay-breasted Warbler	C		O	
_____ Blackpoll Warbler	R		R	
_____ Cerulean Warbler	U			
_____ Black-and-white Warbler	C	O	C	U
_____ American Redstart	O		O	
_____ Prothonotary Warbler	O		O	
_____ Worm-eating Warbler	U		U	
_____ Ovenbird	O		O	
_____ Northern Waterthrush	O		O	
_____ Louisiana Waterthrush	C		C	
_____ Kentucky Warbler	U		U	
_____ Connecticut Warbler	R		R	
_____ Mourning Warbler	O		O	
_____ MacGillivray's Warbler			R	
_____ •Common Yellowthroat	C	U	C	C
_____ Gray-crowned Yellowthroat	X	X	X	X
_____ Hooded Warbler	U		U	O
_____ Wilson's Warbler	C		C	O
_____ Canada Warbler	C		C	
_____ Golden-crowned Warbler				X
_____ •Yellow-breasted Chat	C	O	O	O
TANAGERS				
_____ •Summer Tanager	O		R	
_____ Scarlet Tanager	U		O	
SPARROWS, BUNTINGS, TOWHEES, AND ALLIES				
_____ •Northern Cardinal	C	C	C	C
_____ •Pyrrhuloxia	O	O	U	U
_____ Rose-breasted Grosbeak	O		U	
_____ Black-headed Grosbeak	R		R	R
_____ Blue Bunting			H	H
_____ Blue Grosbeak	O			
_____ Lazuli Bunting	R	R		
_____ Indigo Bunting	O		U	U
_____ Varied Bunting	R	R		
_____ •Painted Bunting	C	O	O	
_____ •Dickcissel	C		C	
_____ •Olive Sparrow	C	C	C	C
_____ Green-tailed Towhee			U	U
_____ Rufous-sided Towhee			U	U
_____ •White-collored Seedeater	R	R	H	H
_____ Cassin's Sparrow	C		O	O
_____ Chipping Sparrow	O			O
_____ Clay-colored Sparrow	O		O	O
_____ Field Sparrow			U	U
_____ Vesper Sparrow	C		U	U
_____ •Lark Sparrow	U	U	U	U
_____ Black-throated Sparrow				U
_____ Lark Bunting			R	R
_____ •Savannah Sparrow	C	C	C	C
_____ Grasshopper Sparrow	U		O	O
_____ Le Conte's Sparrow	R			R
_____ Song Sparrow	U		R	R
_____ Lincoln's Sparrow	C		C	A
_____ Swamp Sparrow	R		R	O
_____ White-throated Sparrow	O		O	O
_____ White-crowned Sparrow			R	R
_____ Dark-eyed Junco (Oregon)			R	R
_____ Dark-eyed Junco (Slate-colored)			R	R
BLACKBIRDS, ORIOLES, AND ALLIES				
_____ •Red-winged Blackbird	C	C	A	A
_____ •Eastern Meadowlark	C	C	C	C
_____ Western Meadowlark	R		R	U
_____ Yellow-headed Blackbird	R			R
_____ Brewer's Blackbird	R		U	U
_____ •Great-tailed Grackle	A	A	A	A
_____ Common Grackle	R			R
_____ •Bronzed Cowbird	C	A	U	U
_____ •Brown-headed Cowbird	O	O	C	C

	S	S	F	W
_____ •Orchard Oriole	C	R	C	
_____ •Hooded Oriole	O	O	O	O
_____ •Altamira Oriole	C	C	U	O
_____ •Audubon's Oriole	O	O	O	O
_____ Northern Oriole (Bullock's)	R	R	R	R
_____ Northern Oriole (Baltimore)	C		U	
FINCHES, GOLDFINCHES, AND ALLIES				
_____ Purple Finch				X
_____ House Finch				R
_____ Red Crossbill				X
_____ Pine Siskin	R		R	R
_____ Lesser Goldfinch	R			R
_____ Lawrence's Goldfinch				H
_____ American Goldfinch	U		O	C
OLD WORLD SPARROWS				
_____ •*House Sparrow	C	C	C	C

FIELD NOTES

Date:_____ Species:_____

Time: _____

Observers: _____

_____

Weather: _____

_____

Remarks: _____

_____

_____

_____

_____

_____

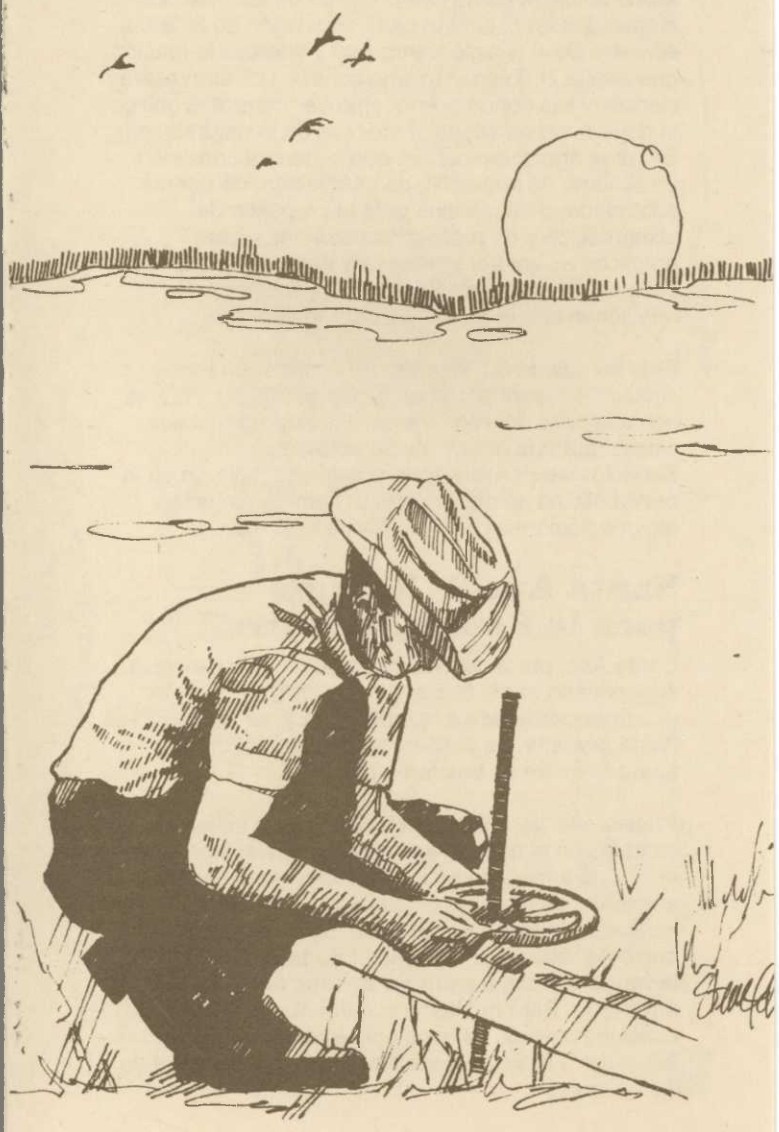
For additional information contact: Refuge Manager

Santa Ana NWR
Route 2, Box 202A
Alamo, TX 78516

RF21551

April 1985

Control de la Protección de Fauna Silvestre en el Rió Grande



Esta vereda que termina en la orilla del Río Grande le facilitará cierta comprensión de los métodos empleados en el control de la protección de la fauna silvestre en el refugio Santa Ana y además la función que presta el río en el mismo control. Ud. atravesará ciertas áreas donde el concepto de "control" significa el dejar a rienda suelta el proceso de la naturaleza. En otras áreas, descubrirá que el control consiste en un sistema de irrigación, de inundación, de quema controlada, o de plantíos para el propósito de alimentación y de protección naturales. Estas prácticas de control forman una parte significativa del sistema de control de Santa Ana, y todas se relacionan con la presencia del Río Grande.

Esta vereda de 3.2 kilometros (2 millas) en forma circular le llevará por unas zonas selváticas y claras hasta la orilla del Río Grande. Luego, regresa acá. Necesitará una hora y media aproximadamente. Servicios sanitarios y agua potable se hallarán en la previa oficina administrativa. El caminante hallará bancas sombreadas a la orilla de la vereda.

Santa Ana — Refugio para la Fauna Silvestre

Santa Ana, parte del Sistema Nacional de Refugios supervisado por U.S. Fish and Wildlife Service, es una área designada a la protección y conservación de fauna silvestre. La conservación y control de las fauna silvestre es una tarea compleja.

Puesto que ciertas circunstancias, tales como los cambios en el uso de las tierras circunvecinas tienen un efecto inmediato en los animales y su medio ambiente, se requiere un control activo para conservar la fauna nativa de la región. Desde un punto de vista ideal, **el control de la protección de la fauna silvestre equivale al control de su medio ambiente.** Para mantener o aumentar el número de especies nativos, se hace esfuerzo por conservar, estimular o mejorar el medio ambiente tradicional de los animales.

El Hábitat — Su Control

Santa Ana, geográficamente hablando, pertenece al delta del Río Grande. En el pasado, a medida que en canal principal del río cambiaba su curso periódicamente, dejaba canales viejos llamados resacas. Inundaciones frecuentes llenaban esas resacas las cuales mantenían una selva y proporcionaban un ambiente ideal para las aves durante varios meses.

Cuando en 1.953 se terminó la construcción de la represa Falcón, 160 kilometros (100 millas) río arriba, se eliminaron, practicamente, las inundaciones naturales periódicas en Santa Ana. Sin el agua proveniente de dichas inundaciones, gran parte del medio ambiente de Santa Ana comenzó a cambiar. Las aves no podían contar siempre con la presencia de resacas, y en las selvas se inició el proceso de sequía gradual que continúa hasta hoy, interrumpido sólo por inundaciones infrecuentes.

A medida que el medio ambiente tradicional cambiaba, el número y tipos de fauna nativa de esta área y su manera de existir empezo a modificarse. Si no hubiera sido por el establecimiento de medidas activos para mantener áreas de hábitat húmedo, algunas de las especies nativas hubieran desaparecido totalmente. Por lo anterior, se puede ver que el Río Grande, alterado por una presa con el fin de proteger de inundaciones a la población humana, se tornó en un medio menos hospitalario para la fauna silvestre.

El Río Grande todavía tiene el poder de cambiar el medio ambiente de el refugio. Las orillas de las curvas sufren una erosión constante que elimina las tierras de el refugio y a la vez reduce los límites del medio ambiente. Enrajonamiento (creación de barreras resistentes a las corrientes) y el restablecimiento de la vegetación ayudan a conservar las orillas y a evitar la erosión de gran parte del hábitat natural de Santa Ana.

Aunque una porción grande del refugio es mantenida en su condición natural a beneficio de la fauna silvestre, se requieren a veces ciertos esfuerzos para asegurar el bienestar de dicha condición. Hay que controlar el número de ciertos animales que no son nativos del hábitat y que compiten con las especies nativas para cantidades limitados de alimentos y espácio para vivir. Cerdos salvajes y nutria son ejemplos de animales no nativos que se encuentran el el refugio.

El control de quemazones sin refreno es necesario para evitar la pérdida de áreas grandes se selva y substancias nutritivas en la tierra. Y, por estraño que pueda parecer, se utilizan hasta quemazones controladas como medio para evitar el crecimiento peligroso de maleza y hojarasca que puede servir de combustible en un posible incendio grande. El quemazón también hace que las sustancias nutritivas presentes en la vegetación seca entren en la tierra.

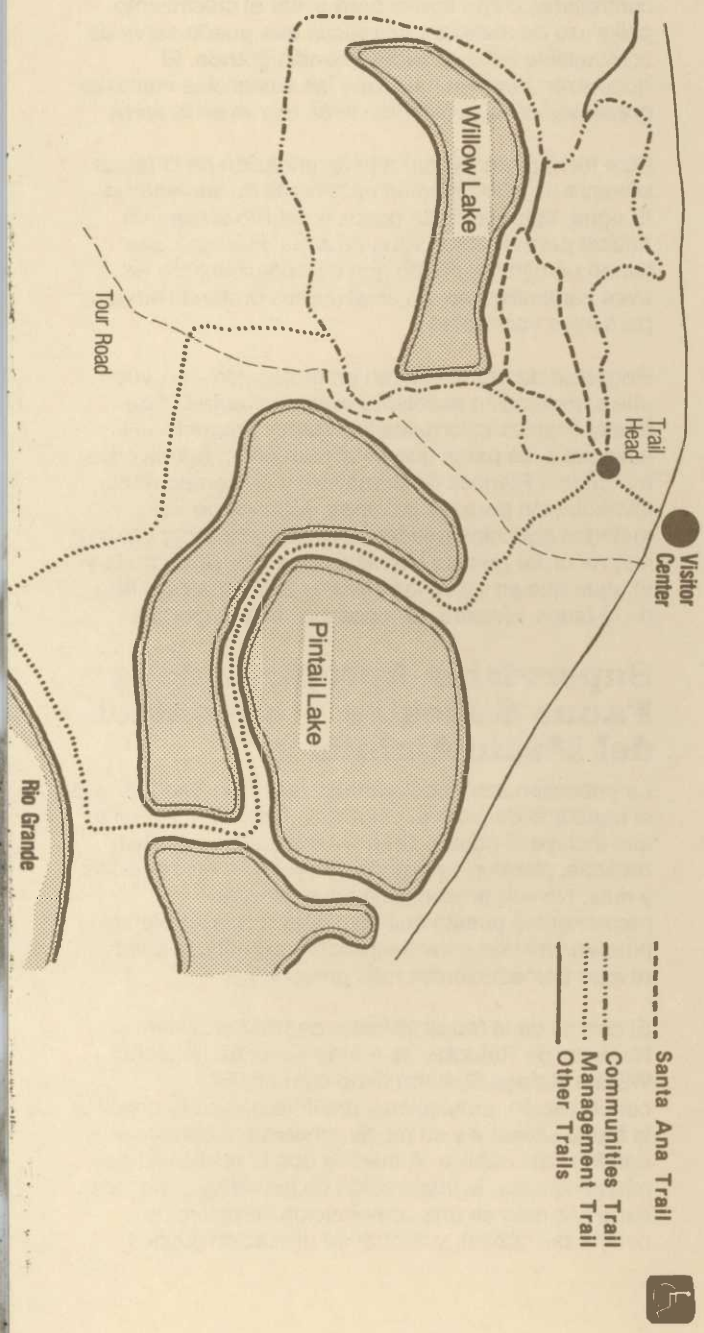
Otra manera de ayudar a la fecundación de la fauna silvestre es la inúndación controlada de las resacas. El agua, bombeada de pozos o del Río provee un hábitat para distintos tipos de aves. Resacas que tienen un nivel profundo son de beneficio para las aves zambullidoras; un nivel menos profundo sirve para aves vadeantes.

Regadíos de granos sirven de protección y proveen una alimentación excelente para una variedad de fauna. Plantas invernales inundadas proveen de lo esencial a los patos que se alimentan en aguas poco profundas. Plantíos de primavera y de verano rinden alimentación para las palomas. Algunos de los métodos agrícolas pueden parecer extraños, pero hay que recordar que las hileras torcidas, la yerba mala y el agua que se ve en los plantios existen a beneficio de la fauna silvestre, la "cosecha" más importante.

Supervisión Apropiada de la Fauna Silvestre — el Control del Medio Ambiente

La población actual de fauna silvestre en Santa Ana is el resultado del control del medio ambiente, esfuerzo que incluye el control del nivel del agua en ciertas resacas, plantíos de granos, prevención de incendios, y más. No son prácticas necesariamente permanentes puesto que las condiciones ambientales pueden cambiar o investigaciones científicos pueden revelar procedimientos más apropiados.

El control de la fauna silvestre dentro del Sistema Nacional de Refugios de Fauna Silvestre (National Wildlife Refuge System) tiene como fin la conservación, protección y proliferación de la pesca y la fauna silvestre y su medio ambiente a beneficio contínuo del público. A medida que la presencia del público crezca, la supervisión de los refugios se torna cada vez más en una combinación compleja de control del hábitat, y control de utilización pública.



Lecturas Adicionales

Cuando Ud. ya esté de vuelta a su casa, los siguientes libros le ayudarán a comprender mejor el control de la fauna silvestre. Con ellas, podrá seguir viviento su experiencia en Santa Ana.

Allen, D.L. 1954. *Our Wildlife Legacy.* Funk and Wagnalls: New York. 422 pp.

Butcher, D. 1963. *Exploring our National Wildlife Refuges.* Houghton Mifflin Co.: Boston. 340 pp.

Giles, R.H., Jr. (ed.) 1971. *Wildlife Management Techniques.* The Wildlife Society: Washington, D.C. 633 pp.

Hylander, C.J. 1966. *Wildlife Communities.* Houghton Mifflin Co.: Boston. 342 pp.

Leopold, A. 1933. *Game Management.* Charles Scribner's Sons: New York. 481 pp.

Leopold, A. 1966. *A Sand County Almanac with other Essays on Conservation from Round River.* Oxford University Press: New York. 269 pp.

Schoenfeld, C.A. and J.C. Hendee. 1978. *Wildlife Management in Wilderness.* The Wildlife Management Institute. The Boxwood Press: Pacific Grove, CA 93950. 172 pp.

Singleton, J.R. 1965. Waterfowl Habitat Management in Texas. Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX 78701. 65 pp.

_____. 1978. Final Environmental Statement: Operation of the National Wildlife Refuge System. U.S. Department of the Interior, Fish and Wildlife Service: Washington, D.C.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

CHANGE in Santa Ana's Communities

CAMBIOS en Las Zonas de Santa Ana

Not long ago the Rio Grande often flooded this river **delta***, but things change. The environment is constantly changing—these changes sometimes occur naturally, and are sometimes caused by the actions of man. It is difficult to place a value on change. If a field becomes a lake there may be more ducks, but what happens to the wood rat?

Change is a part of Santa Ana National Wildlife Refuge, and taking a look at change is what this booklet is about. **Communities*** are complex environments. As communities interact, change occurs. This booklet describes four communities briefly and suggests EXPLORATION ACTIVITIES associated with each area. However in the natural world you may discover that certain overlaps occur, and one activity may be appropriate for several communities. In addition, the idea that when communities interact, change occurs, is as true in your garden or yard at home as it is here. It just might be a little easier to see in a wildlife refuge. Perhaps after seeing and thinking about community changes here, you will find it easier to recognize them in an environment near your home.

This is your trail and your booklet. Write in it. Ask questions. If looking around doesn't provide the answer you want, come and ask us.

The trail is about 2.5 **kilometers*** (1.6 miles) long and will take you about one and one half hours if you do the Explorations. We are glad you are here. Enjoy your walk.

*See **KEY WORDS** on last page

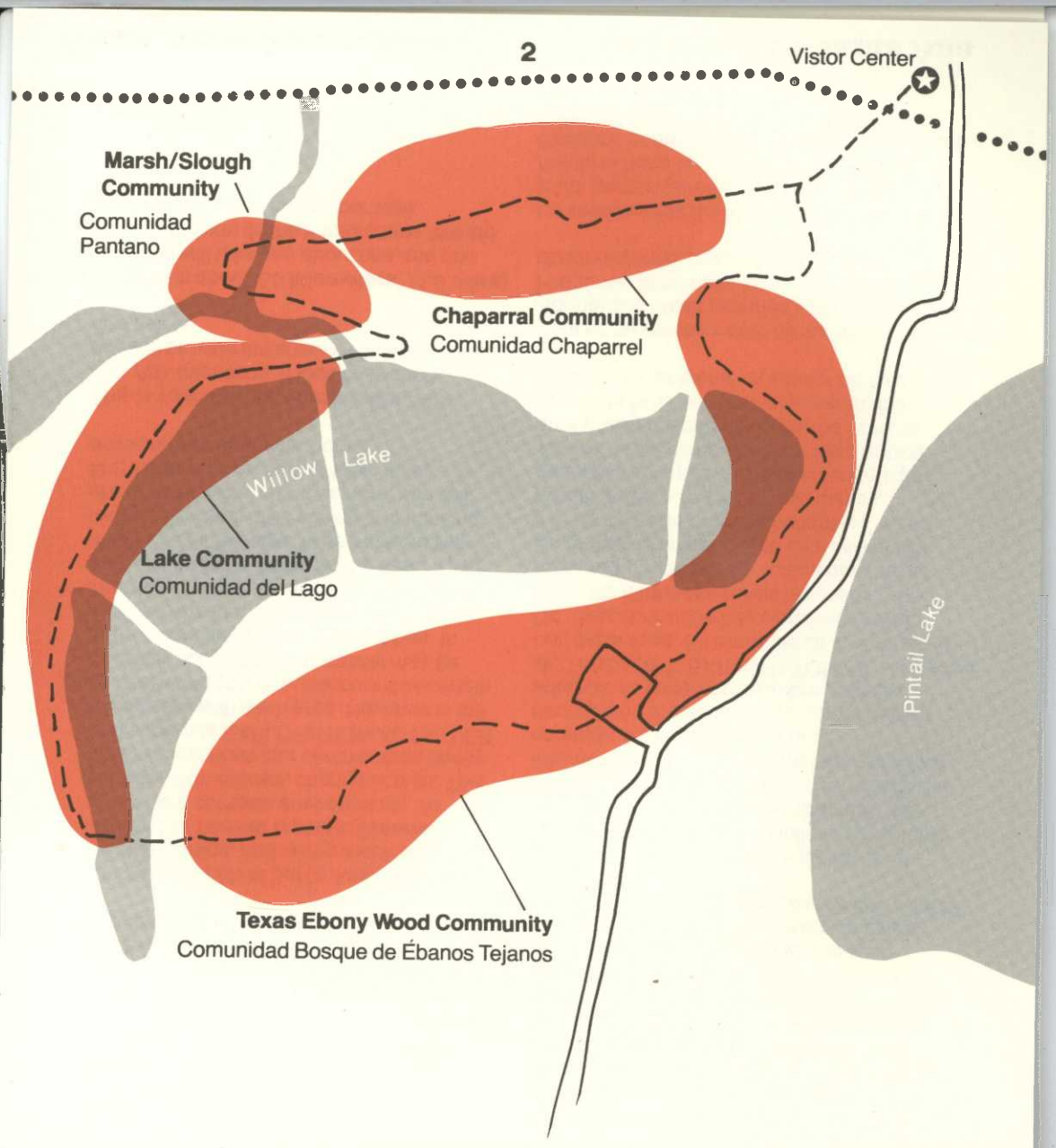
Hasta hace relativamente poco tiempo, el Río Grande inundaba este **delta***...pero las cosas cambian. El medio ambiente cambia constantemente. Los cambios ambientales ocurren a vecas por procesos naturales y a veces son causados por el hombre. Es difícil de asignar un valor al cambio. Si una tierra de labranza se convierte en un lago, aparecen los patos, pero entonces,¿cuál es el destino del roedor?

El cambio constante está presente en el Refugio Santa Ana y este folletín tiene como tema el cambio. Las **comunidades*** (del refugio) son medio ambientes complejos. La interacción entre las comunidades produce cambios. Este folletín dará una descripción breve de cuatro comunidades además de sugerencias sobre posibles ACTIVIDADES EXPLORATORIAS asociadas con cada área. En el mundo de la naturaleza Ud. descubrirá que hay cierta interacción entre las diferentes zonas naturales, y una actividad puede ser apropiada para varias. En efecto, la presencia de esta interacción y el cambio que produce hallará Ud. en su propio jardín o huerta. Puede que se descubra con más facilidad en un refugio. Tal vez después de observar los cambios aquí y luego pensar en lo que ha visto, le será más fácil descubrir algo semejante en el medio ambiente alrededor de su casa.

Esta es su vereda y este es su folletín. Apunte sus observaciones y pensamientos. Pregunte. Si no halla la respuesta en sus observaciones, pregúntenos a nosotros.

La vereda mide 2.5 **kilómetros*** (1.6 millas) y Ud. gastará alrededor de una hora y media si hace las EXPLORACIÓNES. Estamos contentos de verle aquí. ¡Que goce!

*Verse **PALABRAS CLAVES**, última pagina



Frequent flooding, one of the principle factors that created and maintained Santa Ana, no longer occurs here. Since the completion of Falcon Dam upstream in 1953, the Refuge does not flood as frequently as before. With infrequent flooding, the Refuge habitat is slowly changing to a drier environment. Some of the results of this change are apparent, but others are not yet understood and possibly many will never be known.

The first section of this trail takes you through the **Chaparral*** Community, which is easily recognized because of the density of the thorny brush. The Chaparral Community is composed of two minor communities. The first that you encounter uses honey mesquite as an **indicator species*** and thrives in a dry environment. Further down the trail you will begin to notice smaller, thinner trees. The two indicator species for this second minor community are huisache and retama which do well in slightly wetter environments. They did very well when they were flooded often, but now rely on rain (22 inches average per year) or water pumped from the River or underground. What do you think will happen to the ratio of mesquite to huisache and retama now that flooding no longer occurs?

Inundacciones naturales frecuentes, uno de los factores principales en la creación y mantenimiento de Santa Ana casi no ocurren aquí ya. Desde la terminación de la construcción de la represa Falcón río arriba en 1.953, el refugio ya no se inunde con tanta frecuencia. Dada la falta de inundaciones, el hábitat del refugio está cambiando lentamente a un medio ambiente más seco. Algunos de los resultados de este cambio son evidentes, pero no se ha llegado todavía a una comprensión de otros, y puede que nunca se entiendan.

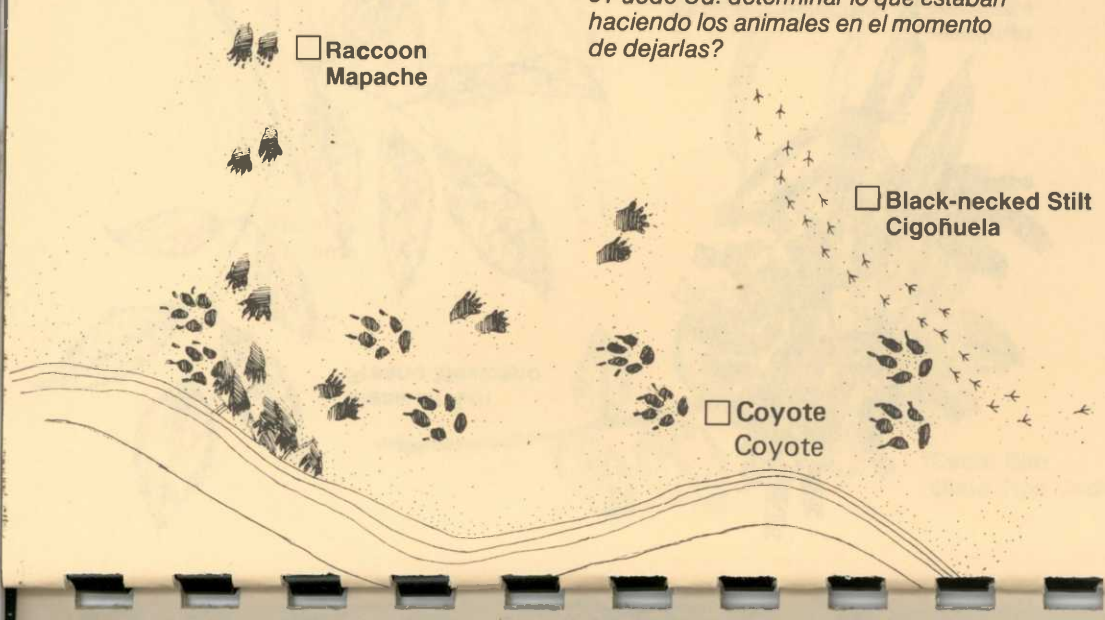
La primera parte de esta vereda le llevará por la comunidad **Chaparral*** cuyo distintivo es la gran cantidad de matorral espinoso. Hay dos zonas menores dentro de Chaparral. La especie indicadora de la primera es el mezquite (honey mesquite), un árbol que crece muy bien en un medio ambiente seco. Más allá por la vereda, empezará a ver árboles mas pequeños con troncos más delgados. Las dos **especies indicadoras*** de esta segunda zona menor son el huisache y la retama, árboles que se desarrollan mejor en un medio ambiente húmedo. Antes, en las épocas de inundaciones, crecían muy bien en todas partes, pero ahora dependen de lluvias infrecuentes (22 pulgadas/año) o del agua bombeada del río o del subsuelo. ¿Cuáles cree Ud. que sean las consecuencias de la falta de inundaciones con relación a la proporción de mezquites, huisaches y retamas?

The **Marsh/Slough** * Community is an area of shallow water or mud flats. These areas have water in them seasonally—during some times of the year they may be completely dry.

The first slough you crossed when walking over the elevated walkway was created when people dug out dirt to build the large levee between the Observation Deck and the Visitor Center. This large slough and levee were built for flood control, but since the slough retains water, it is a wildlife habitat.

Exploration 2: Tricky Tracks

Animal tracks are often the only way to discover the presence of certain creatures. Look for these tracks. Can you figure out what the animals were doing when they made them?



After an area of chaparral you come to the second slough, a straight, shallow ditch you cross by bridge. The slough is man-made and was built to move water into the **borrow ditch** * and into the lakes. This area does not retain water as often as the other sloughs, yet it is usually moist. What clues show that this slough is usually moist?

The changing water levels in these areas attract different types of wildlife. For example, full ditches provide deep water for diving birds, while shallow water provides habitat for wading birds.

The second bridge across the straight slough provides an excellent opportunity to observe bird life. As you cross the bridge, take a minute and look to your right and then to your left. Notice any differences? The marsh on the right, a **resaca** *, was formed when the Rio Grande changed course a long time ago. One main difference between the slough and the marsh is the amount and type of plant growth resulting, in part, from a difference you can't see—minerals and organic materials in the soft, wet soil. Resacas have large amounts of these rich nutrient materials, deposited partly by the floods that used to occur, and partly from the decay of plants over many years. The man-made sloughs are young and lack this nutrient base. Do you think it will gradually build up in these sloughs? Might the same types of vegetation evolve?

La **comunidad pantano** * es una área de aguas poco profundas y lodazales. Estas áreas a veces tienen agua en ciertas estaciones—al algunas épocas están secas.

El primer pantano que vio al cruzar el camino elevado fue creado por personas que cavaron con el propósito de obtener materiales para la construcción del dique que está entre el puesto de observación y el centro público. El propósito de la construcción del pantano y el dique fue el control de inundaciones, pero puesto que el pantano retiene agua, es un hábitat para la fauna silvestre.

Exploración 2: Huellas Engañosas

Muchas veces la busqueda de huellas es la única manera de verificar la presencia de ciertas criaturas. Busque Ud. estas huellas. ¿ Puede Ud. determinar lo que estaban haciendo los animales en el momento de dejarlas?

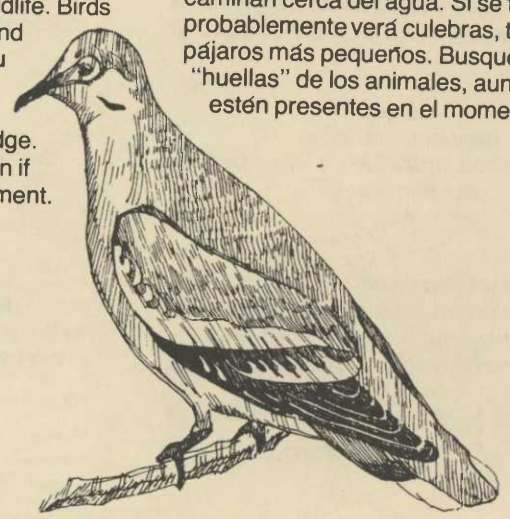
Después de pasar otro tipo de zona chaparral, llegará Ud. al segundo pantano, una **zanja prestada** * recta y no muy profunda que se cruza por medio del puente. También es producto del hombre y fue cavado con el propósito de trasladar el agua a los lagos. Esta zona no retiene el agua tanto como los otros pantanos, pero está húmeda casi siempre. ¿Cuáles son los indicios de la presencia de humedad en este pantano?

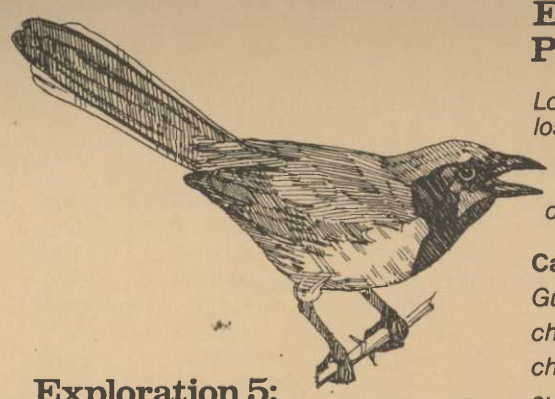
El nivel variante del agua en estas zonas atrae diferentes tipos de fauna. Por ejemplo, las zanjas llenas de agua proporcionan agua de nivel profundo adecuado para las aves zambullidoras. Las menos profundas sirven a las aves vadeadoras.

El segundo puente que cruza el pantano proporciona una oportunidad excelente de ver los pájaros. Cuando cruce el puente, deténgase un momento para mirar a la derecha y a la izquierda. ¿Nota Ud. algunas diferencias? El pantano a mano derecha, una **resaca** *, se formó cuando el Río Grande cambió su curso hace mucho tiempo. Una de las diferencias principales entre los pantanos es la cantidad y tipo de flora, cosa que resulta de algo que no se puede ver: minerales y materiales orgánicos en la tierra blanda y húmeda. Las resacas tienen un nivel de estas substancias nutritivas bastante alto. Estas substancias están presentes en parte por las inundaciones del pasado, y en parte por la descomposición de la flora durante largo tiempo. Los pantanos formados por el hombre son de construcción reciente y carecen de esa base nutritiva. ¿Cree Ud. que después de mucho tiempo tengan estos últimos la misma base nutritiva? ¿Evolucionarán los mismos tipos de flora?

A quick glance over the lake should reveal many types of wildlife. Birds should be roosting, feeding and moving along the water. If you look more closely, you will probably seę snakes, turtles and smaller birds along the edge. Look for signs of animals, even if they aren't present at the moment.

Una mirada rápida en dirección del lago le revelará varios tipos de fauna. Los pájaros descansan en sus perchas, se alimentan o simplemente caminan cerca del agua. Si se fija bien, probablemente verá culebras, tortugas y pájaros más pequeños. Busque las "huellas" de los animales, aunque no estén presentes en el momento.





Exploración 5: Paradero de los Silbidos

Los cantos o sonidos de los pajaros y de los animales son una manera de detectar la presencia de fauna escondida.

Escuche a ver si puede oir los siguientes cantos comunes:

Canto	Ave
Guip	*Kiskadee*
cha cha lac	*Chachalaca*
che che che	*Arrendajo verde*
cu cu cuc'-uu	*Paloma de ala blanca*

Si Ud. trata de remedar los cantos, puede que se acerquen aún más.

Puede que algunos de los pájaros se acerquen si Ud. produce un sonido al besar el dorso de la mano. Póngase los labios contra el dorso o el dedo. Inhale produciendo así un beso algo ruidoso.

Exploration 5: Whistle Stop

Bird and animal calls are one way you can detect the presence of hard-to-spot wildlife.

Listen for these common bird calls...

Call	Name
wheep	*Kiskadee*
cha cha lac	*Chachalaca*
cheh cheh chen	*Green Jay*
coo-uh-cuck'-oo	*White-winged Dove*

Imitating calls may draw some animals closer...

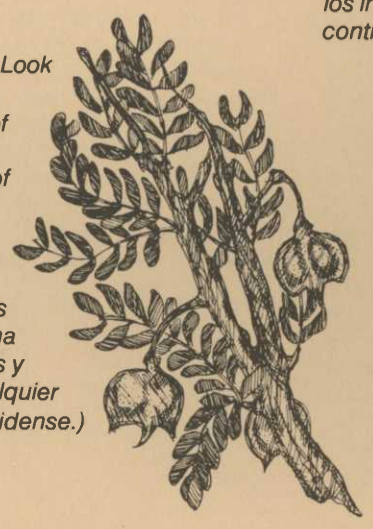
Some birds may come closer when they hear the squeaking produced by kissing the back of your hand.Purse your lips and place them against the back of your hand or finger. Then draw in your breath in a long squeaky kiss.

When the mesquite is replaced with Texas Ebony and the understory becomes more dense, you will be entering the Texas Ebony Woods Community. This community, which requires wet conditions to survive, was widespread on the Refuge when flooding was frequent. Now with several years between floods, fewer young ebony seedlings survive. However, the mature ebonys are among the oldest trees on the Refuge. In fact, Santa Ana has the National Champion Texas Ebony. This Ebony is recorded as being the largest tree of its kind in the U.S. (You can see it on the tram or the wildlife drive.)

En el momento en que Ud. observa que el mezquite se reemplaza con el ébano tejano y la maleza se vuelve más densa, se dará cuenta que está entrando en la Communidad Bosque de Ebanos Tejanos. Ésta, una comunidad que requiere alta humedad para sobrevivir, fue mucho más grande cuando había inundaciones frecuentes. Ahora, pese a las condiciones tan cambiadas, pocos de los ébanos pequeños sobreviven. Sin embargo, los ébanos maduros se encuentran entre los árboles más antiguos del refugio. En efecto, el Ébano Tejano "Campeón Nacional" se encuentra en Santa Ana. Este Ébano esta registrado como ser el más grande árbol de su especie en los Estados Unidos. (Ud. puede llegar a verlo por el carrito o por la vereda protección de fauna silvestre.)

Exploration 7: Observer

Many trees are easy to identify from a single clue. See if you can find these trees from the clue given.



☐ **Guayacan**—*Look for thick, stubby branches (one of the hardest and heaviest wood of all U.S. plants.)*

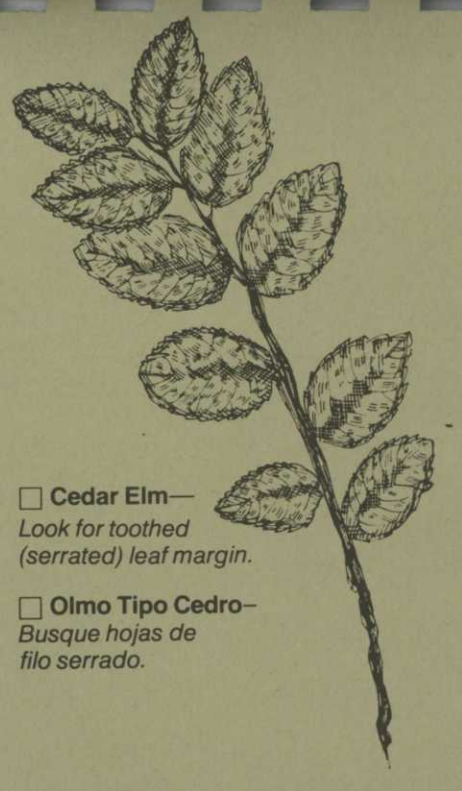
☐ **Guayacán**–*Busque ramas gruesas y cortas (la madera es una de las más duras y pesadas de cualquier planta estadounidense.)*

Exploración 7: Observador

Es fácil identificar muchos árboles con un sólo indicio. Fíjese si puede encontrar los siguientes árboles con los indicios que están a continuación.

☐ **Anaqua**—*It is sometimes called sandpaper leaf.*

☐ **Anaqua**—*A veces lo llaman hoja de liga.*



☐ **Cedar Elm**—*Look for toothed (serrated) leaf margin.*

☐ **Olmo Tipo Cedro**–*Busque hojas de filo serrado.*

☐ **Texas Ebony**—*Look for large, hard, black pods on the tree branches and/or on the ground.*

☐ **Ébano Tejano**—*Busque vainas grandes, duras y negras colgando de las ramas y/o en el suelo.*

Try sketching the trees when you find them. When drawing a tree, think of the way it grows: trunk first, then major branches, smaller branches, and leaf masses. Remember the clues that helped you find these trees are the key to their individuality—try to catch that individuality in your sketches.

Trate de dibujar los árboles que encuentre. Al dibujar un árbol, piense en la manera en que crece: primero el tronco, luego las ramas grandes, ramas pequeñas, y agrupaciones de hojas. Acuérdese de los indicios que le ayudaron a hallar estos árboles y que son la clave de sus características individuales—trate de captar esa individualidad en sus dibujos.

These trees and thick understory are part of a community that provides excellent habitat for birds. As you walk to the old refuge headquarters you may see some of them. The large brown birds scurrying through the forest are chachalacas, a non-migratory species.

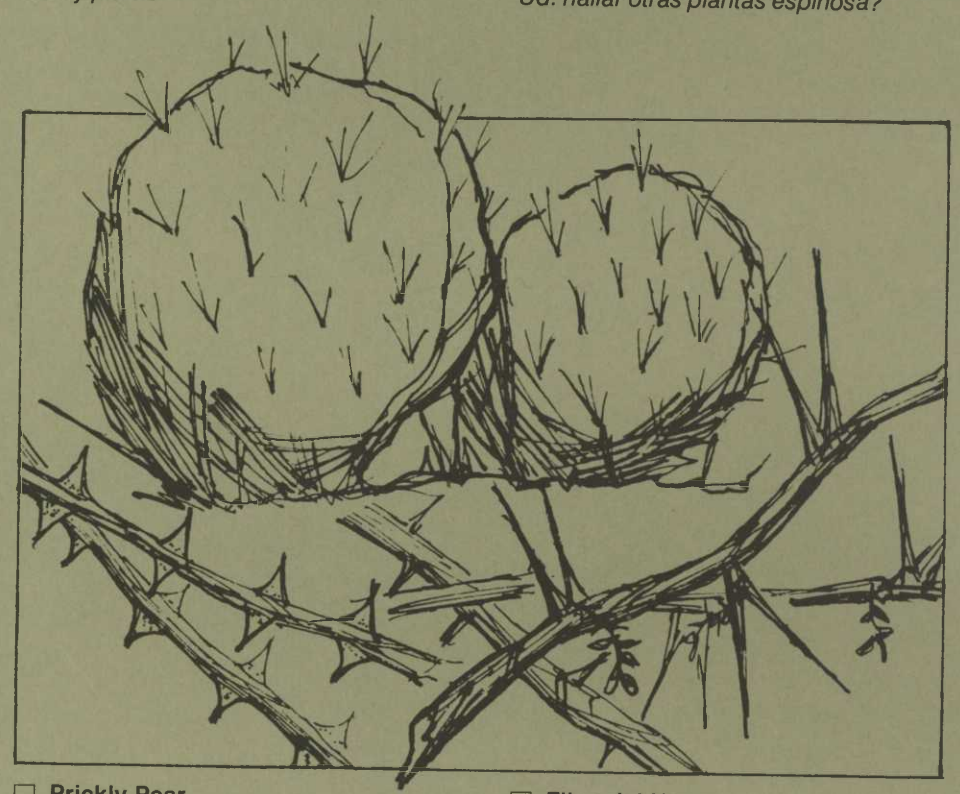
Estos árboles y la vegetación densa debajo de ellos son parte de una comunidad que constituye un hábitat ideal para los pájaros. Mientras camina hacia el antiguo centro administrativo del refugio, puede que observe algunos. Las aves grandes de color café que corren por el bosque son chachalacas, una especie que no es migratoria.

Exploration 8: Spines, Prickles & Thorns

Spines, prickles, and thorns provide a way for some plants to protect themselves from animals. Why are thorns found more often in dry climates than wet ones? Thorns were on some of the trees you identified. What are their names? Can you find other thorny plants?

Exploración 8: Espinas

Por medio de espinas, algunas plantas se protegen de los animales. ¿ Por qué se encuentran espinas con más frecuencia en los climas secos que en los húmedos? Ud. identificó algunos árboles espinosos. ¿ Cómo se llaman? ¿ Puede Ud. hallar otras plantas espinosa?

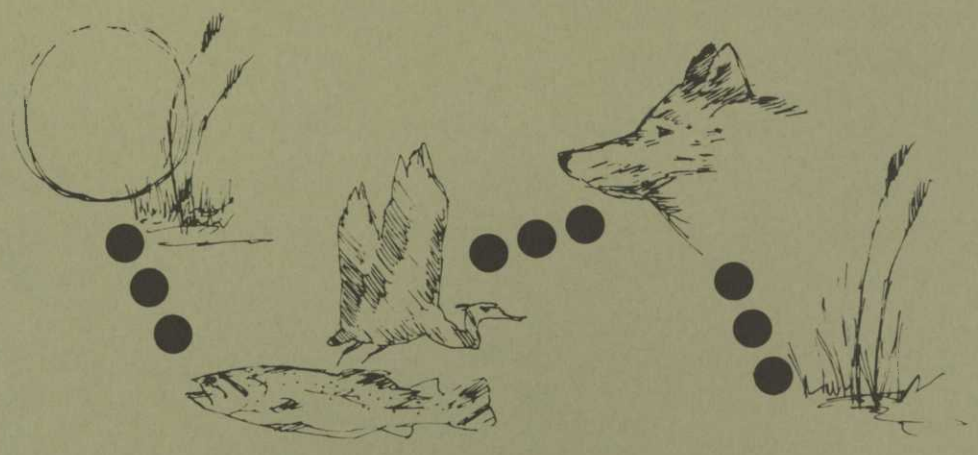


- ☐ **Prickly Pear**
- ☐ **Mesquite**
- ☐ **Black Mimosa**

- ☐ **Filos del Nopal**
- ☐ **Mezquite**
- ☐ **Mimosa Negro**

For years, here and elsewhere, man has been making some changes and preventing others. Take a minute to read the plaque dedicating Santa Ana as a Registered Natural Landmark. Registered Natural Landmarks are sites which possess exceptional value in illustrating the natural history of the United States. Without the Refuge, what would have been the effects of change? How would this area look? - Where would you be standing now?

Hace años que el hombre, aquí y en otros lugares, ha producido cambios y ha evitado otros. Deténgase un momento para leer la lamina que nombra Santa Ana por ser un sitio reconocido por el govierno federal por la importancia de su naturaleza. Estos lugares se consideran excepcionales por el valor que tienen de demostrar la historia natural de los Estados Unidos. Sin el refugio, ¿cuáles hubieran sido los resultados del cambio producido por el hombre aquí? ¿Cómo se vería este lugar? ¿Que vería Ud. alrededor de donde está parado?



Exploration 9: Web of Life

Food webs transfer the sun's energy from plants through a series of animals which eat, and in turn, are eaten. What evidence can you find of these food webs? What are the types of food webs operating near your home?

Food webs do not work independently of one another. The same plants and animals are a part of many webs.

Exploración 9: Tela de Araña Vital

Las telas de alimentos transfieren la energía del sol de las plantas a una serie de animales que se alimentan y, a su vez, sirven de alimento. ¿ Qué evidencia de esas telas de alimentación puede Ud. hallar? ¿ Cuáles son las telas de alimentos que se evidencian cerca de su casa?

Cada tela de alimentos no existe independientemente de los otros. Determinadas plantas y animales pueden formar parte de varias telas.

Key Words

Borrow Ditch
A depression in the earth made by taking (borrowing) dirt from one area to build up another.

Chaparral
A dense thicket of shrubs and thorny brush.

Community
A group of plant and animal species interacting. Major communities are relatively independent of neighboring communities. Minor communities are more dependent on adjoining communities.

Delta
A deposit of soil formed at the mouth of a river. This is soil that the river has eroded far upstream, carried along, and finally dropped near the river's mouth. The Rio Grande delta extends about 137 kilometers (85 miles) inland to Penitas and fans out about 64 kilometers (40 miles) on both sides of the River.

Indicator Species
A plant that is used to predict a certain area, soil, water or environmental quality condition. Used to identify plant communities.

Kilometer
1 mile = 1.6 kilometers.

Marsh/Slough
A swampy area, often with shallow water over deep mud.

Resaca
An old river channel which is usually wide and relatively flat; it may or may not contain water.

Palabras Claves

Zanja Prestada
Una zanja producida por el hombre quien llevó ("pidió prestado") tierra para depositarla en otro lugar.

Chaparral
Área de vegetación densa compuesta de arbustos y maleza espinosos.

Comunidad
Grupo de especies de flora y fauna que se afectan mutualmente. Las comunidades principales existen relativamente independientes. Las zonas menores dependen de las principales.

Delta
Depósito de material orgánico (tierra) en la desembocadura de un río. Es tierra desgastada río arriba por el mismo río y depositada en la boca. El delta del Río Grande se extiende por 137 kilómetros (85 millas) tierra adentro hasta Peñitas. Se extiende hasta 64 kilometros (40 millas) por lado y lado del río.

Especie Indicadora
Planta cuya presencia indica la localización de una área, tipo de tierra o cualidad de agua o medio ambiente. Figura en la identificación de zonas de vegetación.

Kilómetro
1 millas = 1.6 kilómetros

Pantano Natural/Pantano Sintético
Zona húmeda de agua poca profunda sobre barro.

Resaca
Canal fluvial ancha y plana generalmente; con o sin agua.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

U.S. Department of the Interior
January 1985

Prepared by:
Southwest Region of
U.S. Fish & Wildlife Service
Albuquerque, New Mexico

LAND PROTECTION PLAN
FOR
LOWER RIO GRANDE VALLEY NATIONAL WILDLIFE REFUGE
IN
CAMERON, HIDALGO, STARR, AND WILLACY COUNTIES
TEXAS

TABLE OF CONTENTS

Purpose

PURPOSE:

This land protection plan (LPP) presents a combination of alternative actions to protect and maintain 10 distinct wildlife communities totaling 107,500 acres which represent the best remaining habitat for certain threatened species on the U.S. side of the Lower Rio Grande Valley (LRGV). More than 115 species of wildlife will benefit, including the white-wing dove, chachalaca; numerous endangered species such as the jaguarundi, ocelot, bald eagle, brown pelican, and peregrine falcon. Permanent protection of these communities will provide an area for the natural occurrence and distribution of those wildlife species and will eliminate the present threat of habitat destruction.

Present trends suggest that the remaining LRGV brushland in private ownership will be developed (destroyed as wildlife habitat) within five years. Some 90 percent has already been lost. Similar habitat on the Mexico side of the river is also being developed rapidly, particularly for agriculture. The Santa Ana National Wildlife Refuge (NWR) established 1942 and Lower Rio Grande Valley National Wildlife Refuge (NWR) established 1979 are considered in this LPP as a single unit.

Ownership Status

OWNERSHIP STATUS:

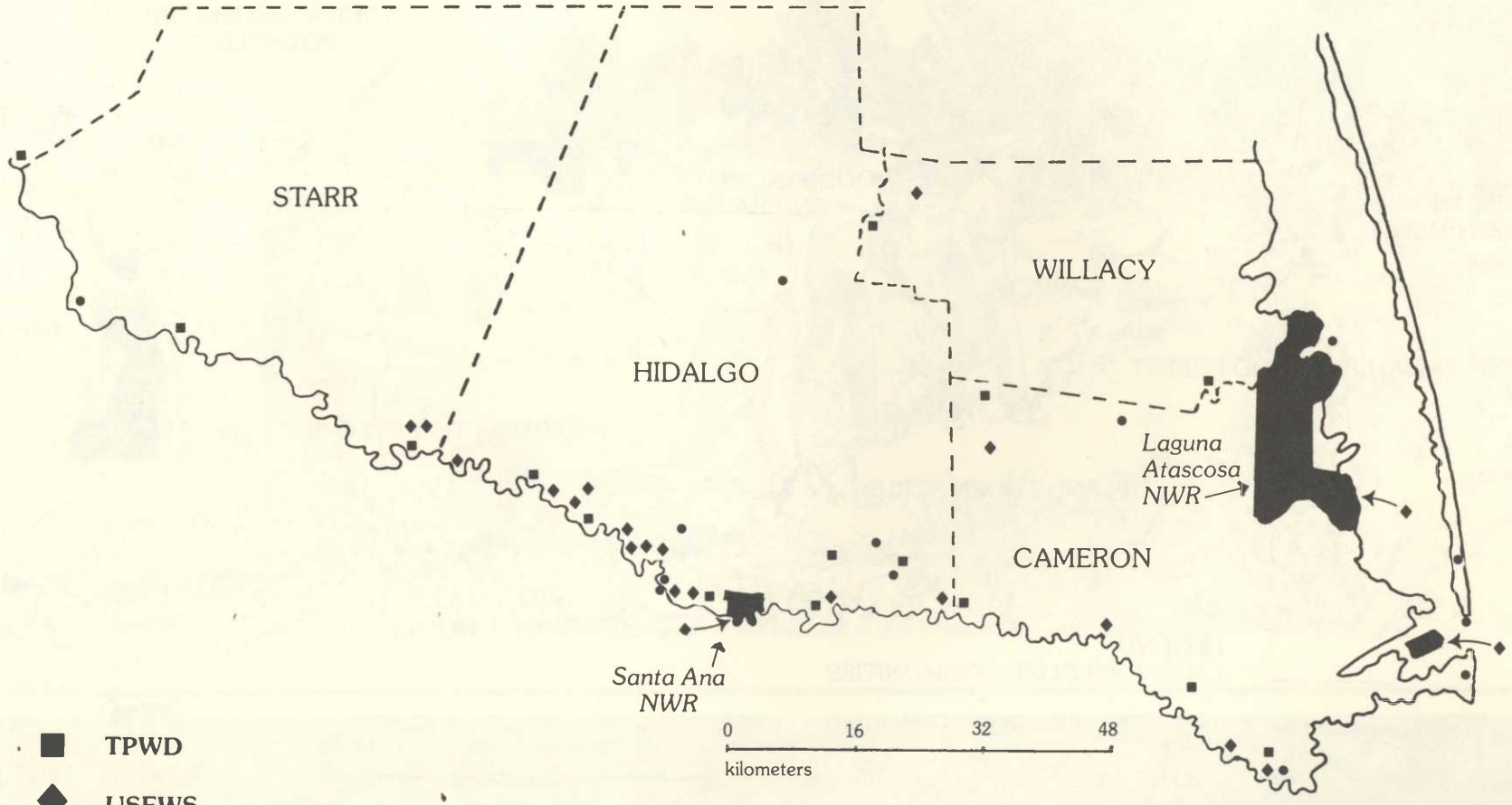
15,742 acres —	Total lands now administered by United States Fish and Wildlife Service (FWS) in the two refuges
10,000 acres —	Lands owned by other public/private conservation agencies
81,758 acres —	Lands held by about 1,000 private landowners, now considered unprotected under some form of permanent basis. The actual ownership of approximately 24,000 acres or 30 percent of the total wildlife community covered in this plan requires quiet title actions by local courts to clear long standing land claims, especially in the Falcon Woodlands area.
107,500 acres —	Total

MAPS:

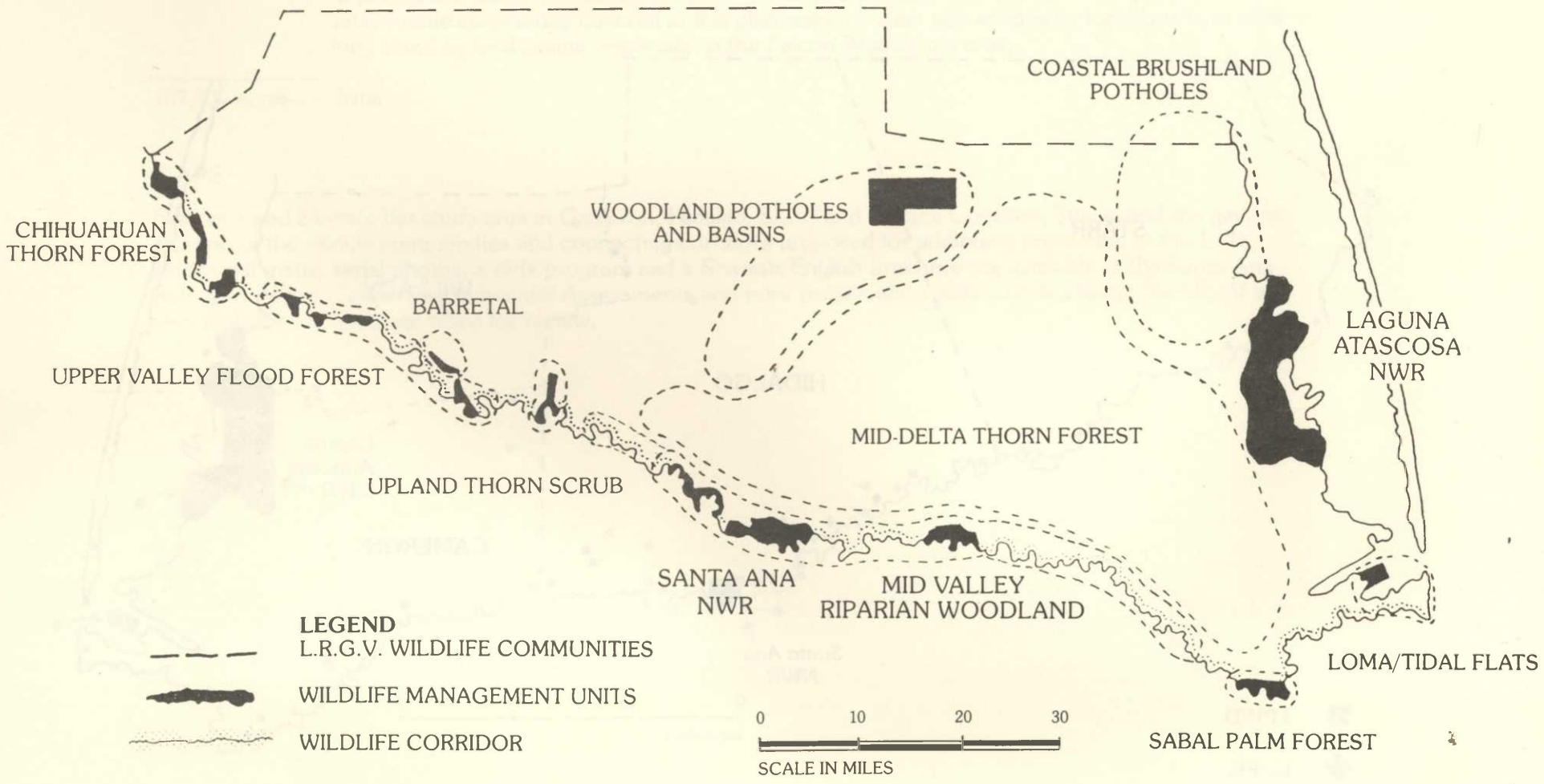
Figures 1 and 2 locate the study area in Cameron, Hidalgo, Starr, and Willacy Counties, Texas, and the general location of the wildlife communities and connecting corridors proposed for additional protection in this LPP. Additional maps, aerial photos, a slide program and a Spanish/English brochure are available at the Santa Ana Refuge in Alamo, Texas. Environmental Assessments and prior preservation plans and studies of the LRGV are also available at the refuge office for review.

RIO GRANDE VALLEY

EXISTING PARKS, REFUGES, SANCTUARIES, AND WILDLIFE MANAGEMENT AREAS



RIO GRANDE VALLEY NATIONAL WILDLIFE REFUGE
LAND PROTECTION PLAN



Socio-Cultural

SOCIO-CULTURAL:

There are no known immediate plans for commercial or industrial development of these areas especially the wildlife communities within the flood plain along the Rio Grande. Future oil, gas, and mineral exploration would be permitted under existing laws and regulations. One impact would be the loss of future agricultural production as lands that could be cleared will remain as brush. There would be a reduction of county tax revenues if fee title is purchased but this would be offset by payments to counties by FWS which usually exceed the tax revenues lost. Such payments would be subject, of course, to the continued availability of funds under the FWS Revenue Sharing Program. The few landowners residing on the properties would be assisted in relocating. It is believed that most of these would relocate in the local area. Owners of many of the remaining brush tracts (management units) such as Falcon Woodlands have historically charged the public for access to their lands for hunting and bird watching. Records of the early Spanish explorers to the LRGV in the 1500's refer to the abundant and unusual wildlife game species such as the Mexican turkey (chachalaca) and native Sabal Palm groves along the river. Each year, thousands still come to the area to hunt white-winged doves and typically pour $20 million into the local economy.

Summary of Proposed Action

SUMMARY OF PROPOSED ACTION:

PROPOSED ACTION:

It is proposed to establish corridors connecting the wildlife communities which would be permanently protected by the FWS in fee, although less-than-fee status is desirable on some tracts (see table in summary of proposed action). Due to the rapid development of these areas, it is proposed to accomplish the proposal as quickly as possible depending on landowners acceptance and availability of funds. It is estimated that some 107,500 acres of land, in addition to the 46,000 currently protected at the Laguna Atascosa National Wildlife Refuge will be required. The lands protected through this project initiative would become part of the Lower Rio Grande Valley National Wildlife Refuge, a unit of the National Wildlife Refuge System, managed by FWS.
Data on the 10 areas follows:

Wildlife Communities	Currently Protected by FWS	Objective	Deficit*
Sabal palm forest	367 ac.	3,500 ac.	- 3,133 ac.
Lomal/tidal flats	4,600 ac.	10,000 ac.	- 5,400 ac.
Chihuahuan Thorn forest	-0- ac.	24,000 ac.	-24,000 ac.
Upper Valley Flood forest	111 ac.	10,000 ac.	- 9,889 ac.
Barretal	240 ac.	5,000 ac.	- 4,760 ac.
Upland Thorn scrub	-0- ac.	2,000 ac.	- 2,000 ac.
Mid-valley riparian woodland	5,718 ac.	13,000 ac.	- 7,287 ac.
Woodland potholes and basins	4,483 ac.	20,000 ac.	-15,517 ac.
Mid-delta thorn forest	223 ac.	10,000 ac.	- 9,777 ac.
Coastal brushland potholes	-0- ac.	10,000 ac.	-10,000 ac.
TOTAL	15,742 ac.	107,500 ac.	-91,758 ac.

* includes 10,000 acres in public/private conservation ownerships on which lease or management agreements would be negotiated to protect wildlife habitat and approximately 24,000 acres of land with unknown ownership at Falcon Woodlands which will be permanently protected when title has been cleared.

PROGRAM OBJECTIVES

The objective is to extend protection to the 96,900 acres of habitat identified in the 10 target wildlife communities and to the species dependent on that habitat; and to enhance conditions on the 10,600 acres already under FWS administration by application of additional management techniques. These would include such actions as (1) impounding water to restore water-based habitats formerly maintained by natural flooding, (2) controlled burning on some areas if research indicates that this would improve wildlife conditions, (3) controlled grazing as a habitat management tool in certain areas, (4) selected reforestation, (5) timber stand management to create and adjust habitats, and (6) accelerated inventories of plant and wildlife using current computerized methods.

RESOURCE PROTECTION ALTERNATIVES:

A. *No Action:* Under this alternative, the brush habitats could be destroyed, probably within 5 years, because landowners can substantially increase their income by conversion to citrus, truck crop production or other types of agricultural uses. There is no financial incentive to permanently preserve the habitat, and there are no laws, regulations, or zoning which could prevent their conversion to other land uses. FWS would rely on management of its presently scattered wildlife units plus those in public or private ownership. A program of public awareness and education on the wildlife values of these communities will continue, but this would not likely preserve more than a remnant of the remaining habitat.

B. *Acquisition or Management By Others:* There are approximately 10,000 acres of brush lands now owned by State, County, local governments or environmental organizations as well as the International Boundary and Water Commission (IBWC). These areas can be adequately protected by various forms of cooperative agreements or no cost mutually advantages leases. This approach will be pursued to the greatest extent possible however, census figures show cities in LRGV have the lowest per capital income in the country and most property owners do not have sufficient resources necessary to protect the wildlife populations identified in this plan, without financial assistance.

C. *Less-Than-Fee Acquisition:* The less-than-fee acquisition alternative has merit and will be utilized to the maximum extent possible, especially connecting the fee management units along the river and the La Sal Vieja area, but adverse wildlife impacts will continue to occur since: (1) some property owners may not accept easements on their land, especially in perpetuity, and for a variety of reasons prefer to sell in fee (2) Government overhead and purchase costs associated with acquiring easements on some of the existing privately owned wildlife units will be higher and less cost effective than direct fee purchase. The easement rights essential for protection of the wildlife communities utilizing the corridors between the fee management units include: (1) Development rights, (2) farming, especially to the river bank and shoreline of lakes or ponds, (3) grazing that diminishes brush regeneration, (4) fencing and posting, and (5) hunting rights if adversely effecting wildlife populations.

D. *Fee Acquisition:* The fee acquisition alternative offers the optimum to assure future protection or preservation of brushland habitat, but adverse wildlife impacts will likely occur since: (1) based on past budget levels, it is highly unlikely FWS will receive sufficient acquisition funding in time to preserve all of the wildlife habitat identified in this plan; and (2) some landowners will never willingly sell their brushland property to anyone and elect to clear the land for agricultural or other economic purposes.

E. *Combination:* The use of a combination of all alternatives to the maximum extent possible offers the best opportunity to assure future protection of the wildlife communities identified in this plan. The key will depend on public acceptance and future funding available for protection of this land use by wildlife.

Coordination

COORDINATION:

FWS activities have been closely coordinated with the Texas Parks and Wildlife Department (TPWD), and IBWC, plus local public agencies and chapters of conservation groups. Some 500 landowners have been contacted over the past 10 years on protection of wildlife in LRGV. The TPWD and other private conservation agencies also have contacted many landowners. The overall attitude has been strongly supportive. There have been preferences expressed for reserving mineral rights in private ownership and for freedom of choice in decisions to sell (or not to sell land). The public is also aware of the substantial inflow of hunters' expenditures to the local economy. Copies of this LPP will be distributed to landowners, local and State government agencies and other interested parties.

Summary of Proposed Action by Protection Alternative

SUMMARY OF PROPOSED ACTION BY PROTECTION ALTERNATIVE

Resource Protection Alternative	Proposed Action
A. No Action (Land Acquisition)	Update joint FWS-TPWD Spanish-English brochure and accelerate use of short 8-10 minute slide-tape program to educate the public about the need to protect wildlife resources on private land. Increase wildlife technical and Realty assistance to landowners throughout the LRGV by establishing a Realty Specialist and Forester position at the refuge.
B. Acquisition/Management by Others	Continue to close cooperative joint preservation effort with TPWD. Increase Realty technical assitance to State through Federal aid and other program. Develop cooperative agreement and implement joint plan with IBWC covering purchase of restrictive development easements along wildlife river corridor that complement IBWC and FWS agencies' program needs (if possible utilize a single U.S. easement document that may be used by both agencies). Encourage environmental organizations to accelerate protection of private lands, through donations, deed restrictions, or purchase of additional brushlands. Accelerate work with local, public agencies in developing agreements, licenses, leases, and other cooperative arrangements to protect wildlife habitat on their lands.
C. Less-Than-Fee Acquisition	Initiate major effort to acquire conservation easements with minimum management rights needed to establish wildlife corridor along river (at least 100 meters back from Rio Grande) and connect existing FWS, State and private preserves.
D. Fee Acquisition	Accelerate effort to round out or complete purchase of current public and private management units from list of willing sellers along river and in Tres Corrales-La Sal Vieja area. Strengthen future budget submittals to Central Office as appropriate to clarify need for stable increased funding source during next 5-year critical period.

E. Summary of Proposed Action by Combination Approach for each Wildlife Community

Priority	10 Wildlife Communities*	Tracts	Permanently Unprotected Acres	Method of Protection	Remarks
Group I	Riparian woodlands (river corridor)				
	Chihuahuan thorn forest	600	24,000	No land acquisition until ownership determined	Work with county officials to clear title problems. Contact residents claiming land to encourage protection of brushlands until land title can be cleared through courts and ownership determined.
	Sabal Palm Forest	5	3,133	Fee title	Complete fee acquisition between Federal management unit and Audubon Sanctuary. Protect Saba Palm forest from further destruc tion by burning of young palms that is now being done.
	Upper Valley flood forest	95	889 3,000 6,000 9,889	Lease or agreement easement fee	Complete acquisition of 8 FWS scattered management units. Post and protect brush from further clearing and connect fee areas along river by 100 meter ease ments. Negotiate agreement with IBW to protect river bank.
	Mid-valley riparian woodland	90	847 2,000 5,000 7,847	Lease or agreement easement fee	Complete acquisition of 5 FWS scattered management units. Post and protect brush from further clearing and connect fee areas along river by 100 meter ease ments. Negotiate agreement with IBWC to protect river bank.
'Group II	Interior thorn woodlands				
	Barretal (forest)	50	3,000 1,760 4,760	Fee easement	Complete acquisition of 5 FWS scattered management units. Post and protect brush from further clearing and connect fee areas with river corridor or other State park or brush areas by easement.

E. Summary of Proposed Action by Combination Approach for each Wildlife Community *(continued)*

Priority	10 Wildlife Communities*	Tracts	Permanently Unprotected Acres	Method of Protection	Remarks
	Upland thorn scrub	20	1,000 1,000 2,000	Fee easement	
	Mid-delta thorn forest	70	3,000 6,871 9,871	Fee easement	
Group III	Interior wetlands (Salt lakes and brush)				
	Woodland potholes and basins	40	10,000 10,000 20,000	Fee easement	Complete acquisition of 2 FWS management units. Post and protect brush from further clearing and connect fee areas between brush and salt lakes by use of easements.
Group IV	Coastal Wetlands				
	Lomal/Tidal flats	5	5,000 400 5,400	Lease or agreement fee	Complete acquisition of Loma FWS management unit. Post and protect brushlands and coastal wetlands. Negotiate agreement with Brownsville navigation district and State to protect remaining wetlands.
	Coastal brushland/potholes	25	2,000 5,000 3,000 10,000	lease or agreement easement fee	Establish 2 fee management units. Post and protect brush and potholes. Connect fee areas with easements. Negotiate agreement with State to protect remaining wetlands.
TOTALS	10 Wildlife Areas	1,000 tracts	34,533 29,631 8,736 24,000 96,900	Fee easement lease or agreement determine ownership	

**See map on page 4 and table on page 9*