

MATAGORDA ISLAND
NATIONAL WILDLIFE REFUGE
Austwell, Texas

ANNUAL NARRATIVE REPORT
Calendar Year 2000

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

REVIEW AND APPROVALS

MATAGORDA ISLAND NATIONAL WILDLIFE REFUGE

Austwell, Texas

ANNUAL NARRATIVE REPORT

Calendar Year 2000

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3/14/01
Date

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4/3/01
Date

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11/9/01
Date

**National Wildlife Refuge
and
State Park**

Unauthorized Entry Prohibited



U.S. Fish & Wildlife Service
Texas Parks and Wildlife Department
Texas General Land Office



Consult Manager for current regulations

Boundary sign for Matagorda Island. JS 03/01

Introduction

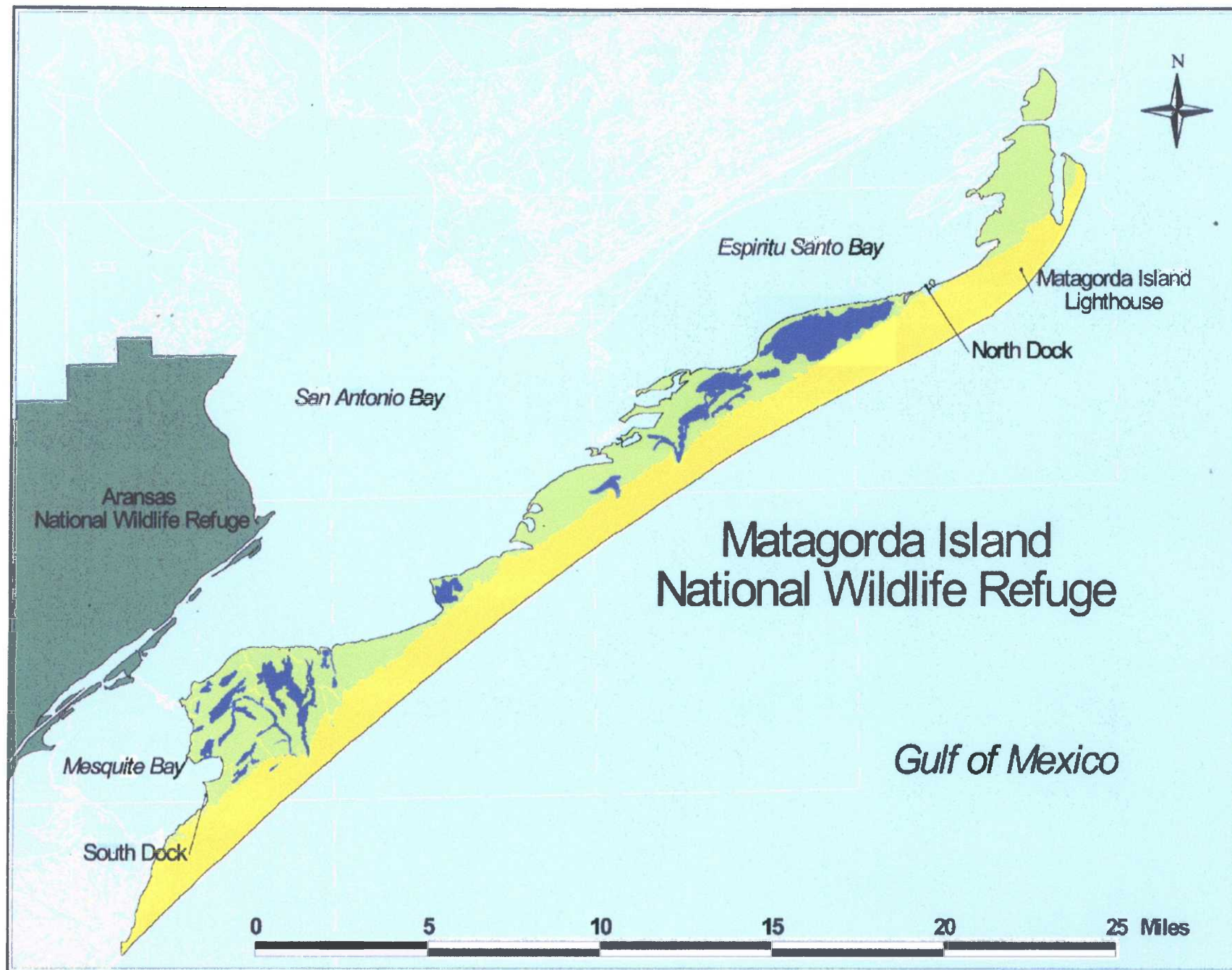
Matagorda Island National Wildlife Refuge and State Natural Area encompasses 56,668 acres on the coastal barrier island in Calhoun County, Texas. The island is approximately 38 miles long and varies between .75 and more than four miles in width. The island is located approximately six miles off the coast between Port O'Connor and Fulton, Texas. Matagorda is bounded on the southeast by the Gulf of Mexico and on the northwest by Mesquite, San Antonio, and Espiritu Santo Bays. Natural passes separate Matagorda from San Jose Island to the southwest and Matagorda Peninsula to the northeast.

Matagorda Island is an actively accreting barrier island. Offshore currents carry sand from river deltas to the Island's beach. Physiographic zones are oriented parallel to the Gulf edge across the island; swash zone and beach, stabilized dunes, barrier flats, and tidal flats. Wildlife numbers are often impressive, particularly migratory birds; however diversity is much less than on the mainland. Grass species are dominant from the dunes to the upper edges of tidal flats. Climatic influences, including winds, storms, rainfall and tidal changes create a dynamic island and refuge.

The northern end of the Island (19,000 acres) was transferred to the Service in 1971 from the Department of Defense. The Service managed the area until 1982 when management authority was transferred to Texas Parks and Wildlife Department. The Service purchased the south end of the Island (11,502 acres) through the Texas Nature Conservancy from the Wynne Family in 1987 and 1988. In addition to Service lands, the State of Texas owns approximately 26,166 acres of marsh and beach on the Island. In 1990 a Comprehensive Management Plan was prepared by the Service, Texas Parks and Wildlife Department and Texas General Land Office. The plan, along with a memorandum of agreement between these agencies, brings the island under a unified management strategy and provides for a new name: Matagorda Island National Wildlife Refuge and State Natural Area. In November 1994 the plan was signed by the Governor of Texas. The U.S. Congress has not ratified the agreement and plan. Even without the formal agreement signed, all agencies involved in the island have continued to cooperate and let the goals and strategies outlined in the plan guide operations.

Six management goals have been established for the island.

- ▶ Protect, conserve, and enhance the population and habitats of endangered and threatened species,
- ▶ Fulfill international treaty obligations, especially migratory birds.
- ▶ Preserve the components of a coastal barrier island ecosystem and encourage natural diversity of wildlife species.
- ▶ Provide biological, archeological, and other appropriate research opportunities.
- ▶ Provide interpretive and environmental education activities for visiting public so they can better understand the coastal barrier island ecology and their role in the environment.
- ▶ Provide high quality, safe, wholesome, and enjoyable recreational experiences for increasing visitation.



INTRODUCTION

TABLE OF CONTENTS

A. HIGHLIGHTS

Page 1

B. CLIMATIC CONDITIONS

Page 2

C. LAND ACQUISITION

1. Fee Title	4
2. Easements	NTR
3. Other	NTR

D. PLANNING

1. Master Plan	NTR
2. Management Plan	5
3. Public Participation	NTR
4. Compliance with Environmental Resource Mandates	NTR
5. Research and Investigations	5
6. Other	NTR

E. ADMINISTRATION

1. Personnel	10
2. Youth Programs	12
3. Other Manpower Programs	NTR
4. Volunteer Program	12
5. Funding	14
6. Safety	15
7. Technical Assistance	17
8. Other Items	17

F. HABITAT MANAGEMENT

1. General	19
2. Wetlands	21
3. Forests	NTR
4. Croplands	NTR
5. Grasslands	23

F. HABITAT MANAGEMENT (cont.)

6. Other Habitats	NTR
7. Grazing	NTR
8. Haying	NTR
9. Fire Management	23
10. Pest Control	NTR
11. Water Rights	NTR
12. Wilderness and Special Areas	NTR
13. WPA Easement Monitoring	NTR

G. WILDLIFE

1. Wildlife Diversity	26
2. Endangered and/or Threatened Species	27
3. Waterfowl	34
4. Marsh & Water Birds	36
5. Shorebirds, Gulls, Terns, and Allied Species	39
6. Raptors	42
7. Other Migratory Birds	44
8. Game Animals	46
9. Marine Mammals	48
10. Other Resident Wildlife	48
11. Fisheries Resources	49
12. Wildlife Propagation and Stocking	NTR
13. Surplus Animal Disposal	NTR
14. Scientific Collections	NTR
15. Animal Control	50
16. Marking and Banding	50
17. Disease Prevention and Control	NTR

H. PUBLIC USE

1. General	51
2. Outdoor Classrooms - Students	56
3. Outdoor Classrooms - Teachers	59
4. Interpretive Foot Trails	59
5. Interpretive Tour Routes	NTR
6. Interpretive Exhibits/Demonstrations	60
7. Other Interpretive Programs	61
8. Hunting	61
9. Fishing	62
10. Trapping	NTR

11. Wildlife Observation	NTR
12. Other Wildlife Oriented Recreation	NTR
13. Camping	62
14. Picnicking	NTR
15. Off-road Vehicling	NTR
16. Other Non-Wildlife Oriented Recreation	NTR
17. Law Enforcement	63
18. Cooperating Associations	NTR
19. Concessions	NTR

I. EQUIPMENT AND FACILITIES

1. New Construction	64
2. Rehabilitation	66
3. Major Maintenance	69
4. Equipment Utilization & Replacement	71
5. Communication System	72
6. Computer System	72
7. Energy Conservation	72
8. Other	72

J. OTHER ITEMS

1. Cooperative Programs	74
2. Other Economic Uses	NTR
3. Items of Interest	NTR
4. Credits	77

K. FEEDBACK

A. HIGHLIGHTS

The northern aplomado continue to nest and fledge young on Matagorda Island. In 2000, 3 pairs attempted to nest and successfully fledged one young falcon. She joins a group of about 20 falcons on Matagorda Island. See section **G.2** for additional information.

In 2001, Matagorda Island NWR will be implementing an island-wide feral hog trapping operation. Actions will include opening the refuge via a special use permit to an independent hog trapper to cooperatively assist with the management of this species. The intent is to reduce the hog population on the island to a more acceptable level. See section **G.15** for additional information.

The Enron Environmental Education Center completes its seventh year of operation. The center is a cooperative program between a private corporation, a non-profit organization and the Service. The Center offers hands-on Island ecology and teacher workshops. See section **H** for additional information.

In 2000, we completed a color photo brochure for Matagorda Island. The brochure identifies the cooperation between the FWS and TPWD. This brochure also describes both the natural and historical aspects of the island with color photographs. See section **H.1**. A Matagorda Island display was put up in the Visitor Center at Aransas NWR. See section **H.7**.

The boat house on Aransas NWR was completed and will greatly serve the boating needs for both refuges. See section **I.1** for additional information.

Utilizing 1998 emergency supplemental funds, sections of levee-culvert sites were planned for bulkheading, a vibro-hammer for sheet-pile installation was purchased, the mainland dock was replaced and enlarged, new boundary signs were purchased, an engineering assessment on the hangar was completed and the hangar was demolished (almost), new engines were purchased for the gray cabin boat, and the finger piers at the Port O'Connor dock were replaced. See section **I.2** for additional information.

To better meet the transportation needs of the EE Center, interested parties, partners and other periodic visits of delegates to the Island we decided to acquire via a property transfer from Delta NWR in Louisiana a 42' aluminum crew/work boat. With some work this boat would easily transport up to 25 people. See section **I.3**.

The Matagorda Island Lighthouse and three tracts of land were acquired from the Coast Guard at the end of the year. The cooperative agreement to allow Calhoun County to restore and manage the lighthouse was completed and awaited signatures at years end. See section **C** and **J.1**.

B. CLIMATIC CONDITIONS

Matagorda Island's climate can be characterized as subtropical with mild winters and hot, humid summers. Climatic influences include boom or bust rainfall patterns, moderate temperature variations, and persistent coastal winds. Tropical storms and hurricanes can greatly influence climatic conditions in any given year. Because of the length of the island (38 miles) precipitation varies greatly. Winds and precipitation are influenced by the surrounding Gulf of Mexico and Bay waters. Temperature differences between the water and mainland create local weather patterns that move across the Island. Long-term climate data for the island does not exist. Records by refuge staff date back only eight years. To date average annual precipitation is approximately 38 inches and the average temperature 70° F.

Total rainfall for 2000 was 30.56 inches. This is about eight inches below average for the island. Temperature ranges between high (day) and low (night) temperatures typically is up to 20° during the summer and 40° during the cooler seasons. This year September produced an extreme range of 47° between the monthly low and high. Figure 1 shows monthly minimum, maximum and average temperatures and figure 2 shows monthly rainfall for the Island during 2000. The year started with mild temperatures and typical fog. Temperatures fluctuated from a low of 34° to a high of 78° with an average of 62°. A total of 2.3 inches of rain fell. February was similar to January. Temperatures continued to be mild with a range from 42° to 79° and a total of 0.58 inches of rainfall recorded. March continued the warming trend and produced the most rainfall all year with 8.91 inches. Temperatures rose in April with an average temperature of 72° but ranged from 51° to 88° and rainfall totaled 1.23 inches.

May continued to warm up, temperatures ranged from 66 to 89° and averaged 80°. May produced 3.11 inches of rainfall. June temperatures averaged 84° and got as high as 92°. Rainfall for June totaled 0.54 inches. July temperatures were virtually a copy of June; with an average of 85°, a range from 74 to 93° and 0.03 inches of rainfall. August also proved to be a copy of June but with greater rainfall. The average was 85° with a range from 74 to 93° and a total of 2.69 inches of rainfall was recorded. In August we recorded the highest average temperature for the year.

The high temperature of 104° for the year was recorded on September 5th. A total of 1.28 inches of rain fell during September. Temperatures ranged from 57 to 104° with an average of 82°. September brought relief as the first cool fronts passed late in the month giving us our low. October continued relief as the cool fronts begin to drop temperatures, the low to 45° and the monthly average to 74°. October continued with the occurrence of rainfall in each month thus far, with 2.51 inches recorded. Several cold fronts during November dropped air and water temperatures, although several 80°+ days were recorded. The average temperature was 63°, range 43 to 85° and 4.93 inches of rain fell. The second highest amount this year. We ended the year with a range of 33 to 78°, a cool 53° average monthly temperature and a total of 2.45 inches of rain for the month.

Temperature, Matagorda Island NWR 2000

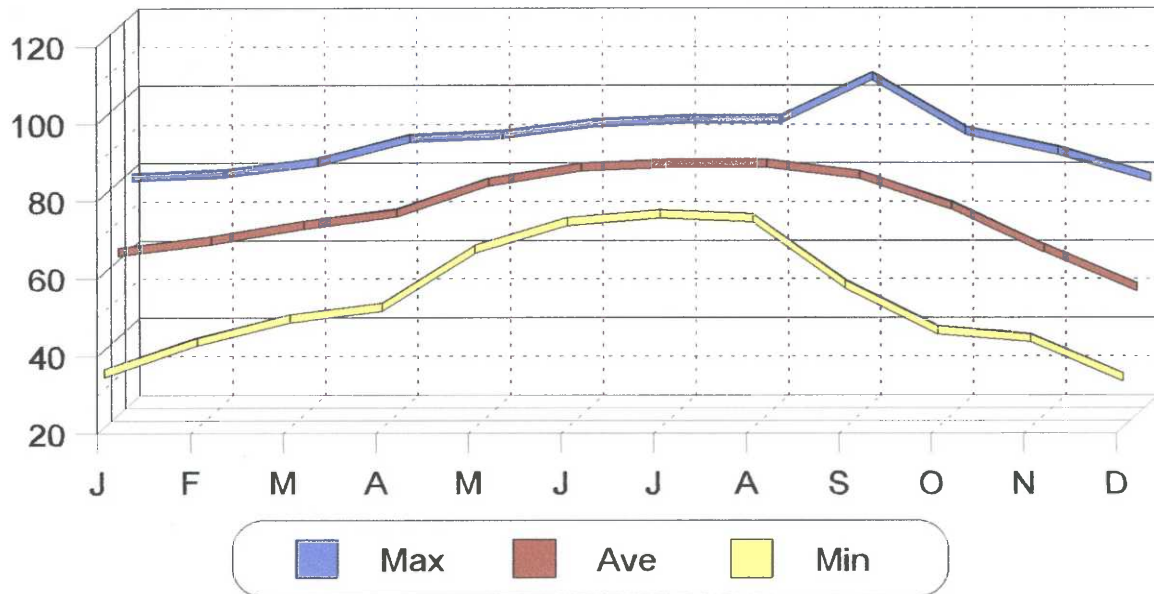


Figure 1. Minimum, maximum and average temperature by month.

Rainfall, Matagorda Island NWR 2000

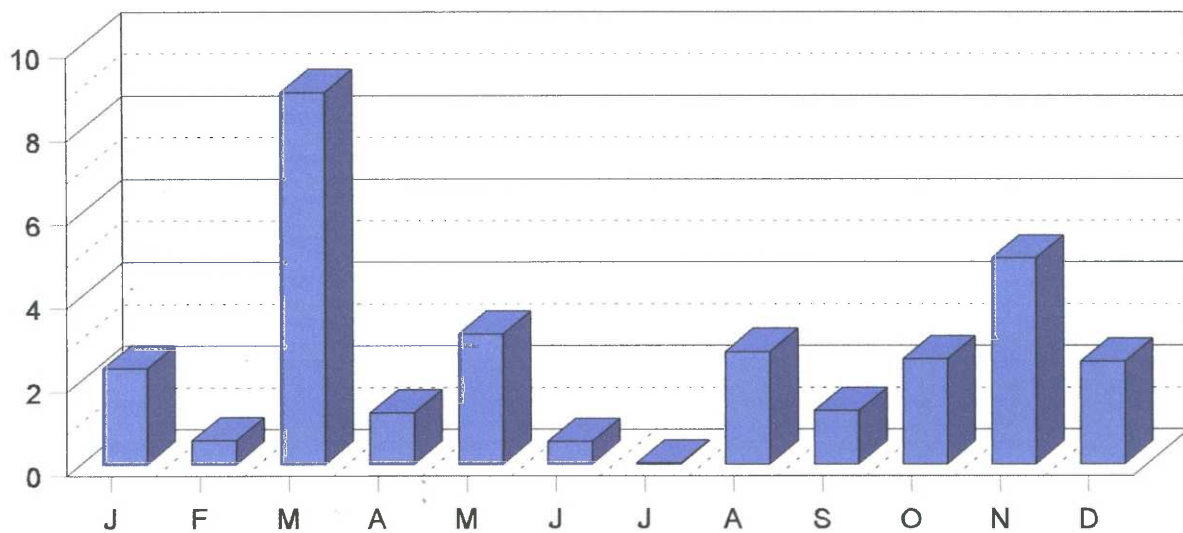
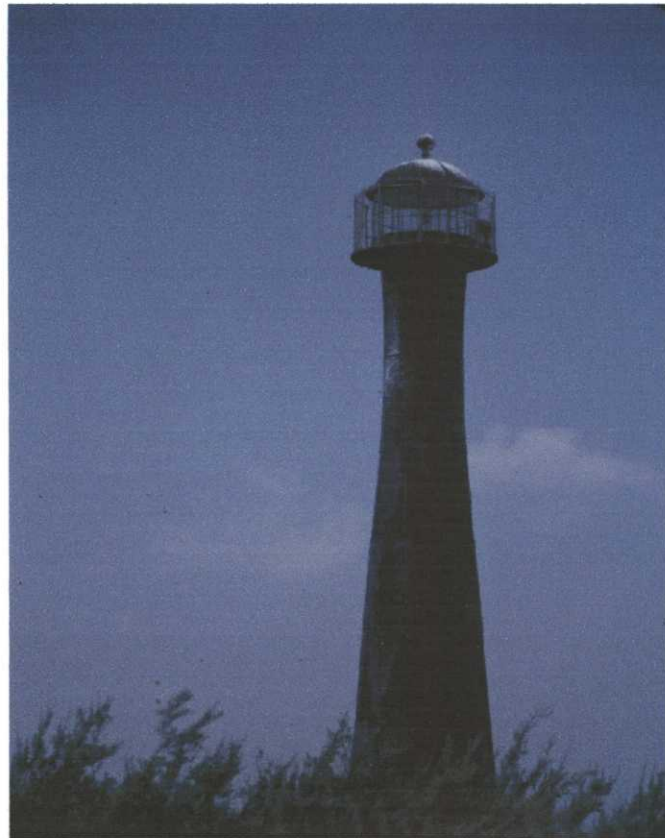


Figure 2. Rainfall by month.

C. LAND ACQUISITION

1. Fee Title

In December of 1998, the U.S. Coast Guard notified the Service that they intended to excess 15.29 acres of land held on Matagorda Island. Property was divided among three tracts including the present day 10 acre Matagorda Island Lighthouse reservation. The other two tracts were the original lighthouse location (5 acres) and the life saving station reservation (.29 acres). In 1999 the Service requested receipt of the property, including the lighthouse. May 30, 2000 the Coast Guard completed their package for excess and forwarded it to GSA for disposal. The U.S. Fish and Wildlife Service was notified that it was ready for transfer. A meeting on June 28th in Albuquerque brought together reality, planning, public use and refuge personnel to discuss the acquisition. Concern over liability, acquisition of all three parcels, and the agreement with Calhoun County stalled the process until September 26 when refuge supervisor Rod Krey met with Judge Marshall and Dewey Stringer. Doug St. Pierre worked the next month preparing the required documentation and obtaining letters of support and signatures for the transfer. The cooperative agreement was completed and approved by the Calhoun County Commissioner Court on December 8, 2000.



Matagorda Lighthouse. MB Fall/00

D. PLANNING

2. Management Plan

Fire Management Plan

The draft fire management plan, which had been submitted in 1998 continued to be reviewed in the Regional Office. The plan was returned to the station in September and requested edits completed. The plan was resent to the RO where it is awaiting signatures.

Feral Hog Management Plan

A draft feral hog management plan was prepared. Hog population levels on Matagorda Island have reached a level where damage to the habitat and native species exists. Feral hogs negatively impact all habitat components: coastal prairie grassland, dunes, beach, bayside marshes, and wetlands on the Island. State operated public hunts and the shooting of feral hogs by qualified refuge personnel has not controlled the population and are considered an ineffective means of control. The proposed actions, primarily a cooperating trapper, are expected to reduce hog population numbers to a more acceptable level. No significant adverse impacts to non-target species are expected. Negative impacts to public use activities are not expected and no adverse socioeconomic impacts are anticipated. For a complete copy of the draft plan see the attachment envelope at the back of this narrative.

5. Research and investigations

In 2000, two doctoral graduate students from Texas A&M University finished their field work on Matagorda Island.

Dawn Sherry is studying the foraging ecology of wintering wading birds along the Gulf coast. She is examining patterns of habitat and food resource partitioning and investigating the influence of mixed-species foraging aggregations on behaviour and feeding success. Dawn visited the island monthly from October-March over the past three years. She spent her time afield observing and video taping the birds. She also took fish and invertebrate samples to correlate bird foraging behaviour with prey type, size and availability. She completed comparable work at other sites: Laguna Atascosa NWR, two sites in Florida, one in Louisiana and one in Tamaulipas, Mexico.

Dan Kim is performing a comparative study of the relationships among wintering raptors on Matagorda Island and the King Ranch. On the island he has focused his attention on interspecific interactions between these birds (including loggerhead shrikes) on a series of plots provided with artificial perch sites. Dan is also studying site fidelity by following banded individuals. Over the past three years he visited the island bimonthly from Sept-April.

During March-June, Angel Montoya and Amy Nicholas of the Peregrine Fund visited the island monthly to spot-check the resident population of aplomado falcons. They decided not

to introduce more birds onto the island this year. More details on the falcons are given under Wildlife, Section 2.



Dawn Sherry and Carl Schmidt working on field data collection. WM Spring/00

In 1999, we combined education and research by forging a partnership with Victoria College to have undergraduate students visit the island to help with several on-going projects characterizing the kinds and abundance of resident beach invertebrates.. The program was continued and expanded in 2000. Larry Garrett provided counseling for the students. Doc and Martha McAlister helped plan and coordinate the study encompassing the entire Gulf beach with seven stations set up at 6-mile intervals, stretching from Cedar Bayou to Pass Cavallo.

On 22 October, 13 students laid out plant transects across the beach and dunes and later analysed their data. Their information will serve as a basis for judging future changes in plant zones at the site.

From 22-26 May we hosted 9 students. They continued a transect program begun last year by surveying the resident invertebrate fauna on the beach and in the surf. Their data is forming a valuable index for judging the ecological well-being of this important zone. This information can be used as a yardstick for evaluating the ecological health of other Texas barriers that are exposed to human presence, and it can be used to gauge the impact of natural or man-induced catastrophes on the Matagorda beach.

This same group also began what is projected to be a continuing effort to survey the bayside shallows. They used standardized seine hauls to collect fish and invertebrates. The students then learned to identify their catch and compile their data. Again, such systematic investigation will give us a baseline for judging ecological change in the critical marsh habitat. We not only began to get the information we wanted, but also gave the students valuable field experience.

On 3-4 June Chris Hice, a graduate student from Texas Tech University, visited the island. She is interested in the biogeography of mammals on the Texas barriers. Doc and Martha gave her a tour of Matagorda to view habitats and discuss the local mammalian fauna.

Two Student Career Education Program (SCEP) participants, Tina Lynsky and Saul Hernandez visited the island on 20 July to set up five 10 x 10 foot net wire exclosures in the grassland. We plan to periodically photograph these sites as part of an effort to evaluate the impact of rooting by feral hogs. On 1 Aug, Tina and Saul enjoyed participating in an aerial survey of Matagorda Island to chart GPS coordinates on all fresh water ponds so these can be accurately mapped.

On 18-19 October, two members of the Texas Nature Conservancy visited the island to ground-truth vegetation for an aerial habitat mapping project. Doc and Martha enjoyed giving them a grand tour.

Keith Ramos, a Student Career Education Program participant from the University of Connecticut, was on the island from 1-4 Dec to plan and set up a project for surveying winter grassland birds. He established a series of six observation points and developed a protocol for checking the kinds and numbers of birds. We hope to use his sites twice a month from Dec-Mar of each year. Results will reveal the nature and abundance of the grassland avifauna, and it will allow us to evaluate the impact of prescribed burns on the birds.

Our Refuge staff engaged in several research projects during the year.

In April, Doc McAlister completed his year-long survey of aerial plankton--small creatures that float in the air over Matagorda Island. Samples were collected monthly in open cups mounted atop 10-foot poles set in the marsh, the grassland and on the beach. Insects of 7 orders were captured, dominated by flies, wasps, ants and beetles. Ten families of spiders were collected. Captures were more frequent after summer rains and much reduced during dry, windy weather. The aeolian biota has never been studied on any Texas barrier island. This brief study demonstrates that the air above Matagorda is working alive with drifting and flying creatures. This fauna surely works into insular food chains, most directly as prey for aerial-feeding birds (swallows, nighthawks, flycatchers, etc) and flying insects (dragonflies, robberflies).

Jennifer Sanchez conducted a breeding bird count on 11-13 May. Her results are presented in the Wildlife section.

The Matagorda beach was covered with an exceptional deposit of sargassum throughout the spring months. After stranding, this marine alga gradually deteriorates. In May, Doc McAlister put several samples of dehydrated sargassum into a Berlese funnel to extract small creatures that might be living in the material. He found a seething menagerie of tiny flies, fly larvae, spider mites, rove beetles and assorted insects. While it lasts, this community of tinies doubtless supplements the usual food web on the beach.

Several members of the Aransas/Matagorda staff helped conduct the local Colonial Waterbird Count from 24-30 May. They checked 20 known rookeries in San Antonio, Mesquite and Aransas bays. Eleven of the sites had active nests. A grand total of 3815 breeding pairs of 18 species of birds was estimated. Thanks to an exceptional gathering of sandwich terns, Long Reef/Deadman's Island was the most productive site with 53% of the paired birds. The Second Chain hosted 24% of the total estimated pairs and the greatest diversity (14 species). The four most common kinds of nesting birds were sandwich tern (31%), royal tern (21%), black skimmer (14%) and laughing gull (12%). Other details are presented in the Wildlife section.

On 10 June the fourth annual butterfly count was held on the Aransas NWR. This endeavour surveys the same 15 mile diameter circle used for the annual Audubon Christmas bird count. A small part of Matagorda Island falls within the circle. Doc and Martha McAlister spent several hours counting butterflies in the designated area on the island. Despite windy, overcast conditions, they recorded 130 butterflies and skippers of 10 species. To underscore the reduced biodiversity on Matagorda compared to the adjacent mainland, on the same day under the same weather conditions, 63 species of butterflies were scored on the Aransas.

From 1987-1991 FWS monitored the vegetation on the south end of Matagorda Island with a series of photopoints. In 2000 it was decided to reactivate this program to continue tracking the status of plants and also to document the impact of prescribed burns. In July, Doc and Martha McAlister relocated many of the original photopoints and selected 10 sites for continuation of the project. Photographs will be taken quarterly as well as before/after burns. The first quarterly photos are scheduled for February, 2001.

Feral hogs constitute a significant ecological disturbance and a nuisance on Matagorda Island. This year plans are being laid to hire a private contractor to trap and remove hogs from the island. To judge the effectiveness of this management program we need before-and-after estimates of the size of the hog population. Direct counts of these largely nocturnal and wary animals have proved unreliable. An aerial census, even with the aid of a thermosensing device, only detected a few hogs. In July, Doc and Martha McAlister began using two indirect census techniques. They laid out a hectare plot in grassland heavily rooted by hogs, and they established three mile-long transects along the backbeach where hogs routinely dig for ghost crabs. Once a month, they count the number of new root-holes in the hectare plot and on each of the beach transects. Although counts do not reveal the actual number of hogs, they do indicate the intensity of hog activity. Counts were begun in July.

Observations are due to continue during and after the trapping program, which is scheduled to begin in 2001.

Although they are seldom seen, it is well established that burrowing owls are winter migrants on Matagorda Island. This December Doc and Martha McAlister began taking a night drive along the 25 mile main road to tally owls seen flying up from the roadside. They did indeed observe burrowing owls. They will make a monthly drive from Dec-March. For more details see Wildlife section 6.

The annual Audubon bird count was held on the Aransas on 27 December, a cold and windy day. Doc and Martha McAlister spent several hours censusing the small part of Matagorda Island included in the count circle. They discovered no surprises, but among the 38 species that were tallied, they saw the only yellow-crowned night-herons of the day.

Once a month Doc and Martha McAlister made a bird census along a 2-mile frontage of Gulf beach and a comparable transect along the levees in the salt marsh. These data were used as a basis for writing much of Wildlife sections 3-5, and a graph given there summarizes the results.

When tides, sargassum accumulation and weather allowed, Martha McAlister made a weekly survey of the entire island beach throughout the year. She tallied and documented stranded marine mammals and sea turtles and kept notes on brown pelican mortality. Sea turtle reports are passed on to STSSN and dolphin reports are sent to TMMSN. When their duties take them onto the beach, the entire staff helps with this stranding-watch. Martha's data are incorporated into the Wildlife section.

Doc McAlister maintains an updated annotated list of the vascular plants of Matagorda Island. This year he added 5 new plants to the compilation which now includes 470 species belonging to 90 families, by far the most extensive plant list for any Texas barrier island. The top four families of plants are: grasses (88 species), daisies (62 species), legumes (37 species) and sedges (22 species). Fifty-five plant species (12%) are not native to the island.

Doc McAlister continued to mark and release box turtles in the vicinity of HQ. Since the study began in 1993, he has notched the shells of 78 animals. Recent recaptures confirmed an early conclusion: box turtles do not wander very far. The most notable recapture this year was of #13, a male box turtle marked in October 1993. He was found again within a few feet of his original capture site. In the 7 year interim #13 had grown 1.5 mm in carapace length and gained 26 grams in body mass.

E. ADMINISTRATION

1. Personnel

Matagorda Island is a satellite station of the Aransas/Matagorda Island NWR Complex. The island has a six-person staff including a Manager (RM), Refuge Operations Specialist (ROS), Environmental Education Specialist (EES), Small Craft Operator (SCO), and two Maintenance Workers (MW). Except the Environmental Education Specialist, who resides on the island, personnel travel daily by boat, to and from the island.

At the beginning of 2000 the ROS position was not yet filled. Former Refuge Biologist, Felipe Prieto continued as acting Refuge Operations Specialist although his temporary promotion ended in November 1999. In February 2000, Felipe Prieto, was selected for the ROS position on the Island and his promotion to GS-11 ROS became official on March 18, 2000.

Joe Saenz (ROS from Aransas) and Felipe did interviews with the candidates on the OPM certificated for maintenance workers. Upon approval from Albuquerque RO, Adolfo Cantu accepted the offer of maintenance worker on Matagorda Island on August 18 and reported to work on September 11 (EOD September 10).

Award recommendations from supervisors and coworkers are forwarded to the project leader for approval. On-the-Spot awards were presented for exceptional work in conjunction to a theme. The themes were as follows: Working Hands, Beyond the Blue Goose, Safety First, For the Birds and It's a Better Place. Day-off awards were presented for significant contributions during the month. At the end of the fiscal year, the staff voted for a Star award given to the employee giving the most toward refuge achievements throughout the year.

David and Felipe received On-The-Spot Awards for their work on the lighthouse board walk in January. David, Will and Phillip received Time Off awards for their efforts in removing approximately 70 yards of debris at the end of the runway. About half of the material went to a recycler. Jennifer received a Star award for her effort in overseeing the expenditures of the 1998 Emergency Supplemental Funds, including 13 contracts for the Complex.

Matagorda Island Staff:

Jennifer L. Sanchez	Refuge Manager, GS 0485-12
Felipe G. Prieto	Refuge Operations Specialist, GS 0485-11
Wayne H. McAlister	Environmental Ed. Spec., GS 1701-09
J. David Stringo	Small Craft Operator, WG 5786-09
G. Will Coppock	Maintenance Worker, WG 4749-08
Adolfo T. Cantu	Maintenance Worker, WG 4749-08



From Left to Right: Felipe G. Prieto, Wayne McAlister, Jennifer Sanchez, J. David Stringo, G. Will Coppock and Adolfo T. Cantu. MM 12/00



Back Row: Will Coppock, Adrian Castro, Jesse Cortez, Felicia Saenz.
Front: Johnny Gutierrez, Rubin Garza and Thomas Gomez. FGP 8/00

2. Youth Programs

The Aransas NWR YCC crew worked on the Island for one week during their 8 week session. The crew of four and crew leader finished the boardwalk at the lighthouse. The boardwalk cuts through the salt cedars between the lighthouse and lighthouse pond. The walk provides excellent birding opportunities and environmental interpretation within the historical setting of the lighthouse. The project was started by the 1998 YCC crew and completed in 2000.



Lighthouse boardwalk. FGP 8/00

The crew stayed on the Island for two nights at the Enron Environmental Education Center. The enrollees participated in a star gazing workshop and observed evening feeding activity by birds at Cedar Bayou during their stay. The last day of the stay on the Island was devoted to environmental education. Wayne McAlister set up and the enrollees participated in a beach mini course. They learned to seine nets into the surf and gathered creatures.

4. Volunteer Program

Martha McAlister continues to put in numerous hours of assistance to the refuge each year. She assists with all environmental education classes providing a second knowledgeable teacher during learning activities. She completed turtle and marine mammal stranding surveys throughout the year.

Several winter resident volunteers from Aransas volunteered on Matagorda Island this year. Vern and Sherry Metzger from Wisconsin each volunteered 40 and 17 hours to the refuge. They assisted with general maintenance activities. Some of the work involved the assembly of windmills, limb trimming, cleaning around headquarters and demolishing old fishing shelters at Cedar Bayou.

Clarence and Betty Ellsworth from Colorado, were the first winter resident volunteers on Matagorda Island. Their stay began in 1999 and went through April 13, 2000. Clarence, a recently retired architecture millworker, and Mrs. Ellsworth moved into the refuge's 42 foot Shasta trailer on the Island. The Ellsworths were invited to Matagorda Island to construct louvers for the front porch of the lodge, as part of planned mothball efforts for the building. Clarence also made upgrades to the carpenter shop by building extensions to the cutting platforms on the table saw and compound miter saw. Betty entered into a database 10 years of turtle stranding data. At their departure in April Clarence had volunteered 647 hours and Betty 412 hours in 2000.



Clarence and Frank working on louvers for the lodge. JS 3/00



Clarence and Betty with lodge "mothballing" louver project completed. JS
4/00

5. Funding

Base funding allocations for 2000 included salary for 6 FTE's. The Refuges O & M budget for Fiscal Year 2000 was \$456,822. Annual maintenance funds (1262) comprised \$75,700, operations (1261 funds) \$373,122 and challenge cost sharing funds (1261 CCSI) \$8,000. There were no MMS projects funded this year. Salary expenditures for fiscal year 2000 totaled \$258,642 or 69% of our operations (1261) allocation. This was due to the vacancy of the maintenance worker position until the end of the fiscal year. This left \$190,180 for operations and maintenance costs.

Maintenance of the barge was the largest expenditure. Costs included dry docking for replacement of portions of the bottom, painting the bottom, and mechanical work to the drive train, expenditures totaled \$57,500. Matagorda spent \$20,638 on the purchase of a new vehicle for the Island. Boat maintenance and a set on new motors totalled \$16,525. Vehical repair and parts costs \$9,000. The Wynne Ranch lodge moth balling project costs were \$8,000. The remaining funds were utilized for fixed costs, small parts and supplies.

An \$8,000 Challenge Cost Share Agreement was prepared with the Peregrine Fund, Inc. for the release of northern aplomado falcons on Matagorda Island. This is the third CCS agreement for releases on the Island.

Matagorda Island NWR 2000 funding:

1261	Operations	\$373,122
1261	Challenge Cost Share	8,000
1262	Annual Maintenance	75,700
	MMS	0
TOTAL		\$456,822

End of year purchasing took priority and we expended funds on a new EEC generator, gooseneck trailer, tool box, pickup, engine analyzer, and new freezer for Doc

Supplemental Emergency Funds. Two funding allocations were utilized in 2000. The 1997 storm funds which were for 1997 fall floods included \$645,000 for roads. Due to the condition of the dock (silted in and missing bulkheads) it had been determined that dock work needed to be performed prior to the road work. Two bids were sought on the dock. Corps of Engineers added on dredging of the entry channel and turning basin to their intra-coastal canal maintenance dredging. Total cost for dredging was \$243,250. Dock work included replacing the finger piers and bulkhead costed \$447,957.

Emergency funds for 1998 tropical storms Charlie and Francis allocated \$1,282,230.00 for the Complex. From this, Matagorda spent funds on the following:

Aransas Boathouse	\$ 31,875
Breakwaters	\$ 9,063
Road Tractor Rental	\$ 5,784
Outboards	\$ 10,910
Trailer House Removal	\$ 978
Hangar	
Structural Assessment	\$ 9,925
Removal	\$122,600

6. Safety

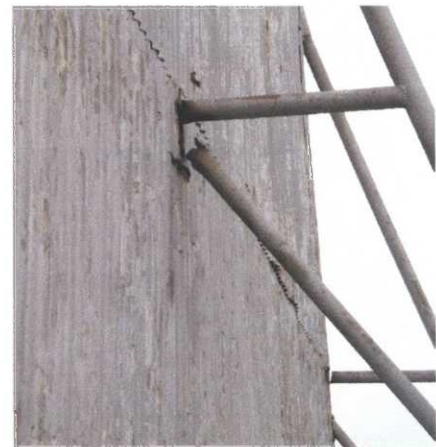
Matagorda Island holds its safety meetings in conjunction with the Aransas National Wildlife Refuge. Jennifer Sanchez is the CDSO and David Stringo was a member of the Safety Committee.

Senior Engineer John W. Cox of Merrick & Company looked at the structural integrity of the hanger (Jan 18 & 19). This was the beginning of the process for approval to demolish this structure.

In February staff fire fighting physicals were conducted at Port Lavaca.



Deterioration of the Hangar due
to age and environment. JS
10/99



A safety review of the Complex was completed by the Regional Safety Officer Vic Segura on June 18-21. Many electrical cords were cut and Wayne and Martha's ceiling in the pilot house had to be replaced immediately. Additionally, the conestoga used for environmental education had rusted to such a point that it had to be replaced.

There was one time loss accident on the refuge this year. David and Will left on August 31 for a two week fire detail out of the Balcones NWR as Dozer Boss trainee and Operator, respectively. Will was injured in a dozer accident on September 1. After being released from the hospital on September 3, he was out on workmans compensation until September 25. David remained out on Fire Duty until September 15.

David received a diagnosis of lyme disease on June 26, 2000. He was put on anti-biotics and required not to spend days in the sun. By years end his diagnosis improved, additional tests showed no signs of the disease.

7. Technical Assistance

SCO David and PL Charlie presented Motorboat Operator Certification Courses (MOCC) training to eight employees from Brazoria and Clear Lake ES office on May 22 thru 25.

David and Charlie also provided the MOCC boat course to the five special needs hires on June 28, 29, 30.

SCO Stringo assisted the Audubon Society in mowing and treating fire ants on Sundown Island, in Matagorda Bay on October 26.

8. Other Items

Training during the year:

March 1	Jennifer and Felipe attended Lotus Notes training on site
April 2-21	Felipe attended the Refuge Academy at NCTC
May 30-31	Staff attended Ambassador Training on site
July 5	David and Garland attend scaffold erection and safety locally
July 10-21	Felipe attended supervisory training at NCTC
July 18-19	Staff attended Ambassador Training on site
Aug/Sep	David and Will were detailed to Balcones NWR as a Fire Dozer Boss trainee and Dozer Operator, respectively
Sept 13	Jennifer requalified with handgun and shotgun for law enforcement
Sept 25-29	David, Will and Adolf attended the maintenance worker workshop in Marble Falls, Texas
Oct 4	Felipe attended a GIS brush sculpting workshop in Alice, TX
Oct 6	Jennifer, David, Adolf & Will attended mentoring training in Tivoli, Tx

Nov 13-17 Adolfo completed the basic fire behavior and safety course on site
Dec 21 Adolfo completed the basic tractor safety course held on Aransas NWR

Other Items of Interest:

October - Reports Due: MMS update, RCAR, Volunteer Report.

Last years Annual Narrative was completed in October.

Felipe will now be the PCO for the Complex.

November - All staff attended the Refuge Day Celebration future planning meeting.

Property inventory was begun.

November 8th was an all-staff day on MI.

Scott Sealy (Real Estate Appraiser) visited the refuge to determine the in-lieu of tax payment for the county for the next five years.

Completed short description on MI for the 2003 Centennial Celebration.

December - 11th we picked up trash along FM 2040.

F. HABITAT MANAGEMENT

1. General

Coastal barrier islands are relatively simple ecosystems due to their youth as well as constant influence by natural processes. Tropical storms, tidal surges, strong northerns, lightning fires, drought, and the feral hog have created a mosaic of habitats on the island. These natural processes and the feral hog will continue to influence the island.

Habitat management on Matagorda Island is an evolving process. The principle management concept is to maintain the Island's undisturbed natural barrier island environment, dominated by coastal prairie. Today, prescribed fire is being used as the primary management tool. Research into the effects of burning on island wildlife and habitat continues. This one topic has been the focus of the research being done on the island and many questions remain unanswered. This year was the sixth year of scheduled burning in a planned five year rotation.

A habitat concern and management notion that has come to the forefront is the desire to control feral hogs. Feral hogs directly impact the islands habitats through their rooting. This rooting is thought to consume desirable species and increase the spread of exotic species. Also, at times extensive rooting makes difficult assessing the benefits of prescribed fire. In 2000 we began the process of drafting a feral hog management plan. This process lead us to some knowledgeable local people concerning the intricacies of controlling feral hogs. For more on feral hog see section **D.2**

Unseasonable warm temperatures brought a flush of wildflowers out early (January). Species included bull thistle, fleabane, flax, Spanish dagger, lime prickly ash, and Texas nightshade.

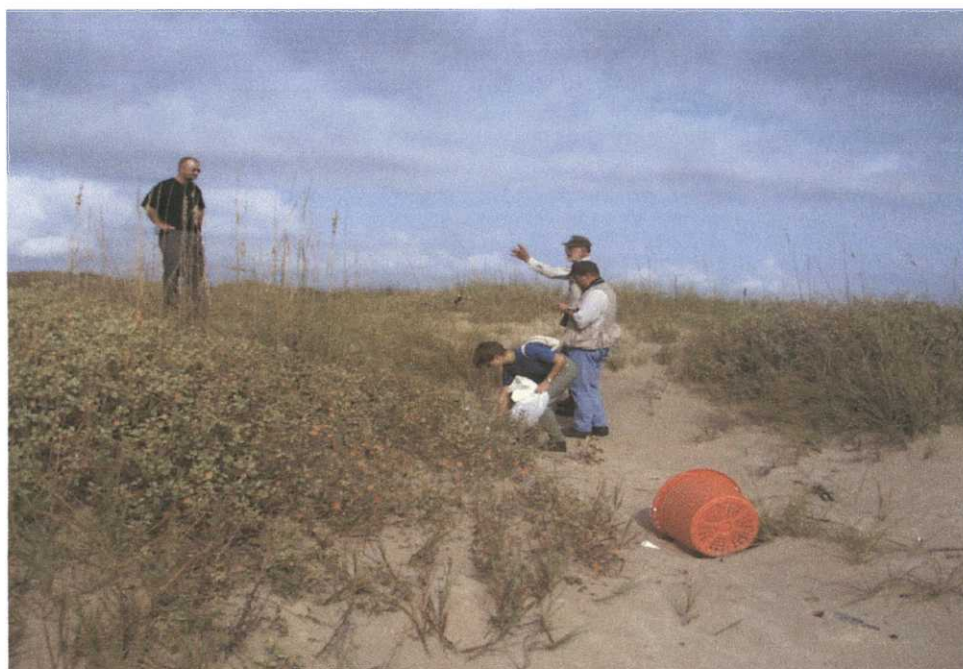
The San Jose Island folks made a fly-over of the island in February to compare vegetative dune cover of two differently managed barrier islands. We have one management disturbance (fire) and an uncontrolled feral hog population, they have two disturbances (fire and grazing) and a highly controlled feral hog population. Here in the last couple of years we have increased efforts to communicate and compare management efforts and habitats where applicable.

Emergency hires (Carlos Gonzales, Ismael Martinez, Guillermo Dominguez, Juan H. Salinas, Jesse Cortez, Stephen Rubio and Rubin Garza) to assist with boundary posting and invasive species control were brought on board June 27. They received training the last week of the month.

Dune Doctors of Florida visited Matagorda Island on November 29th to assess our sea oat stand and reproduction and to pick seeds for future dune restoration at the McFaddin NWR.



Firelane on San Jose Island separating dunes from uplands. FGP 3/00



Dune Doctors (Frederique Perret and assistant), Doc McAlister and Keith Ramos collecting seeds. FGP 11/00

2. Wetlands

Wetlands encompass over 25% of the island. Under the Comprehensive Management Plan, the General Land Office owned marshes and beach are included within the refuge as a cross easement arrangement to unify management strategies. The beach and marshes are rich habitats in terms of wildlife diversity. Vast quantities of invertebrates found in the beach and marsh mud as well as fish nurseries support migratory and resident wildlife.

Storm tides created by tropical storms and water accumulated by strong northerns often inundate the highest margins of the marsh. Levee culverts on the south end of the Island generally work well and allow the marsh to maintain levels close to the bay levels. Some damage to the culverts and erosion of the levee at Shell Reef Bayou and Little Brundrette Lake occurred because of the tides and high WNW winds. Damage is the result of heavy winds rather than pressure from differences in the water levels between the inside and outside. Future plans include the installation of wavebreaks along consistently eroded portions of the levee and bulkheading around culvert locations. Project plans and purchase requests using storm damage monies were submitted to the Regional Office for approval late in January and little progress was seen throughout the year.

Freshwater wetlands are considered an important limiting factor for wildlife populations on Matagorda Island. Freshwater can be found seasonally in swales, dugouts and ditches that penetrate the shallow aquifer. However, with only 22 inches of rainfall in 1999 and 30 in 2000 freshwater sources were depleted rapidly. From several consecutive seasons of normal to abundance rainfall, the vegetation within the swales can change. The typical drier season vegetation complex is dominated by gulf dune paspalum and marshhay cordgrass. These grasses retreat to all but the higher ridges while American bulrush, flatsedge, spikesedge, smartweed and rushes invade the low lying areas. Alternatively during drought, these species will die back and a nearly homogeneous community of paspalum and cordgrass will reinhabit the swales.

Concern over the amount of freshwater available for wildlife during a drought, prompted an overflight of the island two years ago. From this we learned that the majority of available water was located at the south end due primarily to dugouts. Hence, we determined that future water management projects should aim at maintaining existing dugouts and create others at the north end of the Island. In August 2 Tina and Saul did an overflight of Matagorda Island to inventory freshwater resources. Results were similar to the 1998 survey.

Under this freshwater management plan we managed to clean-out two existing dugouts near the south end in November and December 2000. One of the factors in deciding these locations was the proximity to several whooping crane territories. Additionally, two windmills and 1500 gallon tanks were purchased in 2000 for the added advantage of providing freshwater during critical times. One of the windmills is planned for a site near the north end and the other near the lower-mid section of the island. However, delays and a tremendous

workload prevented use from installing these mills in 2000.

On August 2 Jennifer made an overflight to survey the marshes for hotspots on crab pots. On August 4 and 5 we assisted TPWD game wardens with picking up crab pots in the bays and marshes around Aransas and Matagorda Island. By the end of the second day, an estimated 700 crab pots had been removed.



Redfish, S. flounder, sheepshead and bluecrab in abandoned crabpots.
FGP Summer/00

5. Grasslands

The barrier flats extend from the dunes to the bay side marshes comprising the interior of the island. Predominantly Coastal Prairie grasslands, the flats are characterized by a ridge and swale topography. This ridge and swale topography is oriented linearly the length of the Island and is interspersed with fresh water ponds. Periodically, this usual pattern is broken by shallow drainages flowing to the bay or Gulf.

Spot application of Grazon P+D (approx 52 lbs.) to control Macartney rose continued in August 2000. Bio-techs were able to spend a week and a half on Matagorda Island to complete the spraying in unit C4. This was the fourth year of application. About 200 acres were spot treated using backpack sprayers and an ATV sprayer. Application generally occurs during the growing season (April/May) following burns. One advantage of burning before application is the removal of large amounts of litter and thigh-high tangle of southern dewberry allowing access to the rose by foot or 4-wheel ATV. Application has been moderately successful in killing the plants, however it is a time consuming process.

Chinese tallow was also spot treated on the island using backpack sprayers. Approximately 30 acres (45 trees and 75+ seedlings) were treated using 2.2 gallons of Garlon 4.

One of the primary goals for the prescribed burning program on the Island is the reduction of invasive woody vegetation; *baccharis* is the primary species targeted. This native invasive plant is found on the entire Island. The thickest stands are in the center of the Island (burn zones B & C). The stands are generally targeted with late summer fires to increase the rate of kill. We are mindful of the value of some woody cover for neotropical migrants during spring fallouts and the value of late summer/fall (August - October) *Baccharis* flowers for the vast array of insects collectively known as pollinators.

9. Fire Management

Prescribed fire is the primary habitat management tool used on Matagorda Island. The program was initiated in 1995 following three years of study on the affects of fire on the barrier island habitat and wildlife. Past research has only indicated that there are no clear detriments nor cure-all benefits to burning. General observations however, indicate some clear short-term benefits to burning. For example, in normal and above average rainfall years, the "opening-up" effect created by burning can be beneficial to a wide variety of migrant and resident bird life. Conversely, burning on the Island during less than ideal conditions (i.e. during a drought) is generally not recommended due to the potential damage to plant and animal populations. During years of less than average rainfall amounts deer, hogs and sandhill cranes are the primary recipients in the months following burning. In years of low aquatic food availability burning allows whooping cranes to forage on the uplands.

Baccharis is generally considered to be kept in check through burning. Additionally, the

benefits of litter reduction and the flush of green are distinctly visible postburn. From a grassland management perspective these benefits are largely interpreted as a sign of vigor and freshness. However, in an attempt to remain receptive to differing opinions, burning continues as a priority for research projects.

The Island is divided into 38 burn units ranging in size from 300 to 1200 acres (Figure 3). Permanent firebreaks are not maintained between units. During the month prior to burning, the firebreaks are mowed, raked and/or disced. Seven units were burned this year totaling 4023 acres. Units B-4 (816 acres), A-1 (804 ac), A-7 (596 ac), B-1 (473ac), and A-3 (392 ac) were burned in February. Whereas units C-3 (600 ac) and C-4 (342 ac) were burned in March.

The fire on A-1 escaped and the fire line was backed up to include A-3 and described in the fire management plan. After walking the A-1 burn on the following day, numerous scorched reptiles and three LeContes sparrows were found.

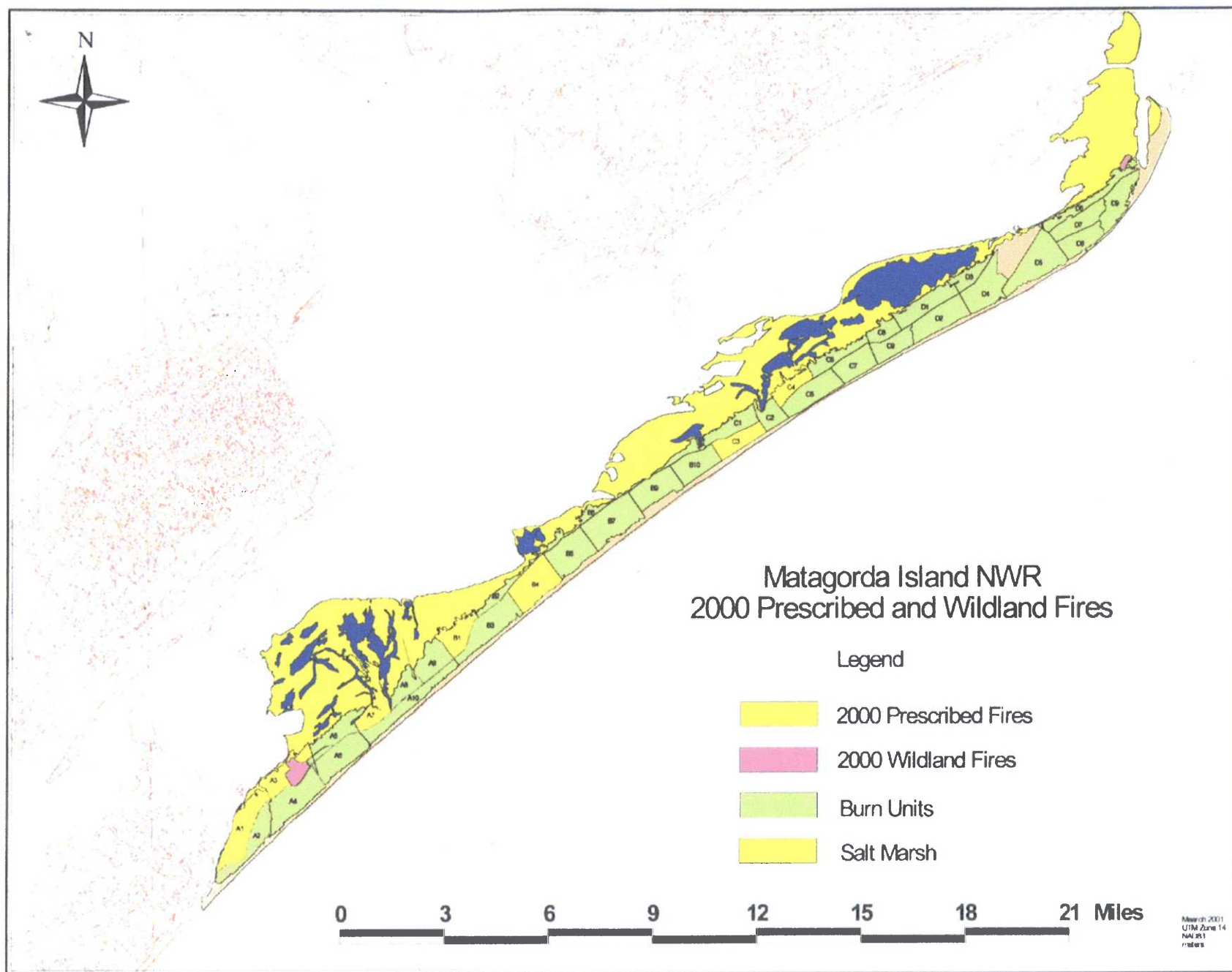
Unit A-7 was burned with the assistance of the Balcones Canyonlands NWR crew. The final two burns were completed on March 9 by a team of Fire Use Training Academy (FUTA) from Cibola NF in New Mexico. The fires however, trapped two deer and two hogs causing their mortality. The dry ground and fuels enabled the fire to consume nearly all above ground plant matter in these units. Approximately 95%+ of all the units burned. In general the prescribed burns proceeded without any major incident.

Two wildfires occurred this year. A wildfire ignited just south of headquarters. The ignition source remains unknown. One known fact, the grass was dry. The fire ignited about 4:00 PM on January 17. Doc, Martha, Clarence and Betty stood guard to protect the facilities, (namely the propane tank). Doug and Jennifer arrived on the Island later and burned out the area by using the pen road as a fire break. Fire on the west side of the road was extinguished at 2:00 am. Backing fires with the humidity approaching 100% had flame lengths in excess of six feet. Unfortunately the area burned was a "no burn" zone on the south end. This fire consumed approximately 289 acres. Another wildfire started by lightning and extinguished by a crew on July 31. Approximately 40 acres of salt marsh burned.

Prescribed fire plans for A-4, A-9, B-7, B-10, C-6, C-9 & D-4 were prepared in November. Due to the trapping of wildlife during the previous burns, several changes to the plans were made.

1. We will emphasize backing and flank fires to burn out units.
2. Headfires can be used at the discretion of the burn boss but will be spot headfires (25 feet wide) separated by .1 mile distances.
3. No burn will be conducted after March 1, due to nesting raptors.
4. Mowed fire breaks will be installed at the grassland dune interface to limit fires within the dunes.

Preparatory work for prescribed burn units A4 and A9 was completed in December for the 2000/2001 burn season. A burn crew tried to burn A4 on the 13th but it was too wet.



G. WILDLIFE

1. Wildlife diversity

The biota on Matagorda Island is typical for a relatively undisturbed Texas barrier ecosystem: it is much reduced in diversity compared to that on the mainland, and it is attended by a biomass that fluctuates markedly with the seasons.

The case for reduced insular diversity is readily made by comparing the flora and fauna on Matagorda with that of the main unit of the Aransas NWR on Blackjack Peninsula five miles across the bay. Both areas are protected and managed with similar conservation goals. The island encompasses 56,000 acres while the peninsula covers about 47,000 acres. Despite its smaller area, Aransas definitely harbors a larger variety of creatures.

Twelve biotic communities are recognized on Aransas while only five occur on Matagorda. The mainland supports twice as many kinds of plants, including many woody species and their associated epiphytes. The shifting sands of Matagorda are dominated by grasses and hardy forbs. Excluding fish, 492 species of native vertebrates are known to inhabit Aransas while Matagorda, with 354 species, has fewer than three-quarters as many. Only the mobile birds come close to an equal distribution between the two sites (392 species on Aransas, 321 on Matagorda). Otherwise, the island is conspicuously deficient in such groups as rodents, bats, passerine birds, snakes, lizards, and frogs, and it harbors only one species of fresh water fish (introduced). The comparison probably holds for invertebrates as well, but except for butterflies, these groups have not been censused systematically enough to judge. The annual tally of butterfly species on the Aransas consistently exceeds the number on the island by several fold. As far as is known, only one kind of terrestrial vertebrate and a scant handful of kinds of plants occur on Matagorda that do not also occur on Aransas.

In the case of a barrier island, low biodiversity does not imply poor ecological health. It is, in fact, to be expected and the reasons are not hard to find. Matagorda Island is isolated by 5 miles of open bay from the mainland, so most potential immigrants have to run a gauntlet to gain access. The island presents a relatively hostile, windswept environment devoid of trees, rocks, loams or significant topography and it exists under constant threat of saltwater overwash--not an easy place for an immigrant to establish a beachhead. In addition, the island is only 5,000 years old while the mainland was laid down 120,000 years ago. So Matagorda has had less time than Aransas to attract and develop a resident biota.

Only if the surrounding shallows are considered does Matagorda Island "loom large" compared to Aransas. Fishes, cnidarians, ctenophores, echinoderms, crustaceans, polychaete worms, gastropods, bivalves, and even protochordates abound in greater variety in the offshore shallows around the island than along the muddy estuarine perimeter of the mainland. Although these creatures do not occur "on" the island, they most surely are parts of the island ecosystem.

Matagorda Island routinely experiences tremendous fluctuation in the abundance of many resident and migrant species. The most spectacular examples are migrating birds. Because the island is a critical staging area on the Central Flyway, each spring and fall thousands of hurrying birds pause there for food and rest. Their numbers can change by several magnitudes in a few hours. For many other birds the island serves as a winter refuge or a summer feeding and nesting haven. Less evident but equally important are the tremendous silent pulses of crustaceans, fishes and other marine creatures that move through the tidal passes from the Gulf into the bays and back again as they pass through critical phases in their life cycles.

There are many other examples of the island's periodic exuberance, most of which pass unnoticed: fluttering waves of migrating monarch butterflies, eruptions in the population of cotton rats, silent explosions of marine plankton, billowing clouds of flying ants celebrating a summer rain shower, a thousand uninterrupted acres turned silver by the matured seedheads of seacoast bluestem, the air suddenly thick with parachuting thistle seeds, the seasonal appearance of uncountable millions of juvenile striped anchovies in the surf, the seethe of crab megalops crowding through the tidal passes each spring, the emergence on a single moonlit night of tens of millions of egg-laden polychaete epitokes in the bays. The heat of summer or the thrashing of a hurricane can quench these fountains of life and for a time the island seems nearly lifeless by comparison. Then the seasons turn, the cycles begin to churn again and Matagorda goes into riot.

Of the five Texas barrier islands, Matagorda is the only one under total protection and conservation management. Because the island has not suffered a history of abuse and over development, it is unparalleled and absolutely irreplaceable as an example of what a natural barrier ecosystem should look like.

2. Endangered and/or threatened species

The following table updates the current status of Federal and State endangered/threatened species that occur or may be reasonably anticipated on Matagorda Island during at least part of their life cycle. There are no known listed plant species on the island.

Whooping crane

Although whoopers were on the island as usual when the year began, the pair that "owns" Stilt Flats kept its distance from us. When we observed them from the observation platform near HQ, they appeared to be searching for razor clams in the tidal pools and scrounging for blue crabs at the edge of the marsh. From the observation platform at Shell Ridge we could usually see 2 or 3 pairs of whoopers foraging far out in the marsh. Aerial counts revealed that we had about 25 adults and several juveniles on the island. A premigratory group of 14 whoopers was seen in the marsh on 19 March. As usual, the cranes began to hie out later that month; they were gone by the last week in April.

Birds	Federal	State
Whooping crane	E	E
Brown pelican	E	E
N. aplomado falcon	E	E
*Eskimo curlew	E	E
Piping plover	E	E
*Interior least tern	E	E
Reddish egret .....	.....	T
White-faces ibis .....	.....	T
White-tailed hawk .....	.....	T
American swallow-tailed kite .....	.....	T
Wood stork .....	.....	T
Roseate tern .....	.....	T
Sooty tern .....	.....	T
Reptiles		
American alligator	T	
Kemp's ridley sea turtle	E	E
Hawksbill sea turtle	E	E
Leatherback sea turtle	E	E
Loggerhead sea turtle	T	E
Green sea turtle	T	T
Texas horned lizard .....	.....	T

* Not confirmed on Matagorda Island

The first pair of whooping cranes of autumn set down on the Aransas on 13 October, and we saw our first pair on Stilt Flats 5 days later. According to aerial counts, the population of whoopers on the island grew to about 33 adults and several juveniles by the end of the year.

On the mainland traditional food resources for the cranes were reported to be limited--few acorns, blue crabs and wolfberries. The birds may have fared better on Matagorda. Wolfberries were in good supply and seine hauls indicated the usual number of juvenile blue crabs in the marsh. Cranes often were seen foraging well out in the shallows of San Antonio Bay near Panther Point where they were probably dipping for razor clams.

On 23 Dec, Doc observed the pair of whoopers foraging on Stilt Flats. The male caught and dismembered a large adult blue crab. The female came over and joined in the feast. The two seemed to share amicably. Later the female was seen to extract and swallow a benthic organism, almost surely a razor clam. When foraging for clams the whoopers often worked with their heads entirely submerged for 5-10 seconds.

Brown pelican

This symbol of the Gulf Coast continues to be gratifyingly common the year round. We presume that most of our birds are associated with the rookery of some 1200 pairs on Sundown Island in Matagorda Bay and perhaps some hark from the rookery on Pelican Island in Corpus Christi Bay. (Both sites are designated Audubon Coastal Sanctuaries.) On 24 August, at least two thousand brown pelicans presented a real spectacle as they loafed on the beach two miles above Cedar Bayou. Doubtless this mix of juveniles and adults had just broken ties with nearby Sundown Island. Groups of birds were seen foraging and resting at the mouth of the pass and on Mesquite Bay during the remainder of the year.

We were pleased to find very few dead brown pelicans during our weekly beach surveys. Sometimes pelicans, especially juveniles, suffer mortality when they get tangled in rigging and nets around shrimp trawlers. Apparently they dodged that hazard this year.

Northern aplomado falcon

From 1996-99 the Peregrine Fund introduced a total of 75 fledgling aplomados on Matagorda Island. The birds eventually established a resident population of about 20 individuals. In 1999 a pair of these birds successfully raised three young. In 2000 three nests were discovered; one of these fledged a single chick. The falcons shunned our offering of artificial nest sites and chose to build in clumps of Macartney rose.

In June, Peregrine Fund personnel decided not to release aplomados on Matagorda this year. This was partly dictated by logistics. (The U.S. Coast Guard could not afford to haul the chicks to the island.) Also, a pair of resident falcons had established its territory at one of the hack towers, and it was felt that introduction of chicks would lead to confrontations. Whether the release program will be continued at this site in the future is yet to be determined.

A pair of falcons occasionally visited HQ to perch on the radio antenna and playfully dive on flocks of great-tailed grackles. Single birds were occasionally seen perched on snags on the beach, and pairs of adults were routinely sighted in the grassland along the main road. On 23 April Doc saw an aplomado perched on a fence post ripping into a freshly caught male painted bunting.



Aplomado falcon fledged on Matagorda Island. JS Spring/00

In addition to helping reestablish the species in its natural range in South Texas, the presence of the aplomados on the island is a boost to our environmental education program. All visitors are thrilled to observe the birds, and groups are given a tour of the hack towers for a chance to see an endangered species recovery program in action. They are properly impressed.

Piping plover

This plover is a moderately common winter resident on Matagorda Island. This year postnesting birds began to appear on the beach in August. Fewer than a dozen birds were recorded on monthly surveys from Sept-Nov. As usual, the species disappeared entirely when the winter chilled. We saw a few northbound birds as they made brief stops in March. By mid-April they had passed through.

Pipers feed and rest with flocks of snowy plovers at the Gulf mouth of Cedar Bayou. A high surf can send them across the island to forage on open mud flats, but they were not observed there this year.

Least tern

Although they lack distinguishing field marks, because our least terns remain on the island through the nesting season, we presume that they belong to the nonlisted coastal variety.

The first least terns of the season were seen at Cedar Bayou on 2 Apr. Their numbers rapidly escalated to normal abundance. In late April males were seen courting females with offerings

of fish. By early May the birds had begun forming scrapes at the wash-over tip of the island beside Cedar Bayou. The first eggs were seen there on 28 May. These nests were spot-checked and it appeared that all failed. Predation by feral hogs and coyotes and perhaps foot traffic by fishermen caused the birds to abandon the site. Least terns did not attempt to nest further up the beach or on the levees in the marsh where they had scrapes last year.

Least terns routinely nest on the abandoned air strip on the north end of Matagorda Island. This year dredge spoil had been deposited in pits dug between the runways. An area of spoil dried and after wind smoothed the surface, the terns considered this a fine nesting site. Jennifer Sanchez and Carl Schmidt estimated 35 breeding pairs of terns in the area on 24 May. On 29 May Doc and Martha McAlister surveyed the spoil bank and airstrips for least tern nests. They found nests with eggs: 19 on the spoil and 4 in cracks in the asphalt on the airstrip. The fate of these nests was not followed, but it definitely looks like we inadvertently enhanced the birds' nesting ground with the spoil.

The Colonial Waterbird Count yielded an estimate of 4 pairs of nesting least terns at Blackjack Point and 17 pairs on St. Joseph Island at the Gulf mouth of Cedar Bayou.

Reddish egret

In 2000 reddish egrets maintained their usual sparse numbers. During monthly surveys across a 2 mile sector of prime marsh and bayside habitat, reddish egrets accounted for 7% of the sightings among eight resident species of diurnal herons and egrets. In our Colonial Waterbird Count conducted in May, reddish egrets were found nesting primarily on the Second Chain of Islands, where their 64 nests comprised 17% of the heron/egret nests tallied there.

White-faced ibis

These birds are not common on Matagorda Island. No nests were found on our local Colonial Bird Count, although the species does nest on islets both north and south of our locale. This year one flight of about 30 ibis was seen over Mesquite Bay.

White-tailed hawk

Adult white-tails were present in their usual numbers. Although no systematic search was mounted, they seemed to have a satisfactory reproductive season. On 22 Feb a bird flew off a nest precariously balanced atop a fence post in the grassland. This nest was inspected several times during the spring, but it was never used. On 13 April a nest with 2 eggs was found in a huisache just N of HQ at a site that had been used by both white-tails and by caracaras in the past. Two sturdy chicks occupied the nest on 12 June. On 3 July both these birds had fledged. For the next month or so they could usually be found perched on fence posts near the nest site. On 24 April a nest with 2 eggs was found in a huisache in South Pasture; it was subsequently lost to predation before the eggs hatched.

Wood stork

Wood storks are summer visitors to Matagorda. We presume our birds hatch in Mexico. The first bird was seen at Mesquite Pond on 5 June. A flock of 18 was observed circling high

over HQ three days later. The main complement of wood storks descended on Matagorda during the last week of June. Over 100 individuals were seen plowing through the shallows on Stilt Flats on 27 June. The birds should have enjoyed good foraging when the ponds and levees began to draw down during our dry summer. Stork numbers began to dwindle in late August. The last two birds were seen at Mesquite Pond on 1 September.

American alligator

Except for drought that inhibited their nesting activity, our considerable population of alligators went through what was for them a rather unremarkable year. Most specimens that we can recognize individually were in their usual haunts. By mid-June, as the 'gator ponds drew down, many animals began to move to brackish water in the levees. There they positioned themselves at the openings to the culverts where all they had to do was open their jaws to harvest a mouthful of striped mullet.

On 7 Feb a female alligator and her three yearlings were taking in the winter sunshine at Mesquite Pond.

On 23 Mar the large bull alligator that lives near HQ was seen courting a female in Nest Pond. The 'gator "growled" and generated vibrations in the water; his consort merely sank out of sight.

On 5 June the one and only alligator nest of the year was found in a pond near Cedar Bayou. The fate of this nest was not followed. No nests were found on 11 June and 9 July during surveys of known favored sites. On 24 July a gator attended by 12 yearlings was seen in a small pond in the grassland SE of HQ. In mid-July 18 alligators were counted in the stagnant water at Long Pond.

Texas horned lizard

This year this warm weather species was observed from March-November. The first individual was seen on 25 Mar. By June horned lizards were common along our shell roads. Although no broods were noticed, one recent hatchling was seen on 21 Sept. The last horned lizard was seen on the Cedar Bayou Road on 29 Nov.

In June, Doc McAlister dissected several fecal pellets deposited by horned lizards. Not surprisingly, these were largely composed of ant exoskeletons (*Crematogaster* sp and *Conomyrma flavus*). There were incidental remains of darkling and scarab beetles, pentatomid bugs, halictid bees, and small wasps.

Sea turtles

Only 15 sea turtle strandings were recorded on the Gulf beach this year, less than half the 32 encounters in 1999 (Figure 4). As usual, loggerheads accounted for most incidents, the 10 individuals making up two-thirds of the total. Four Kemp's ridleys and one hawksbill turtle also were found (Figure 5).

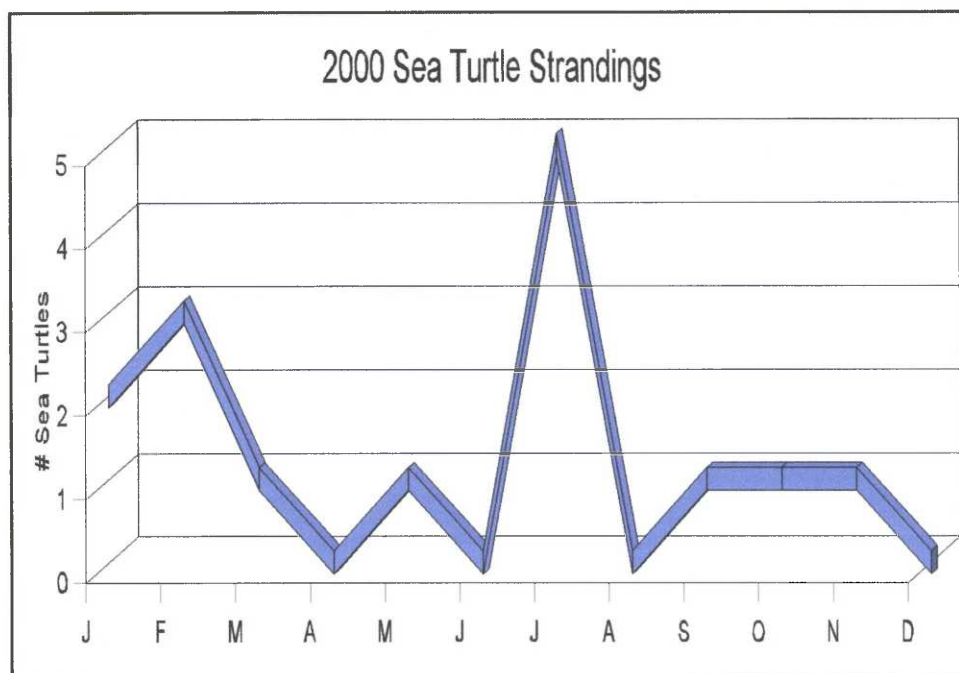


Figure 4. Number and spatial occurrence of strandings during 2000.

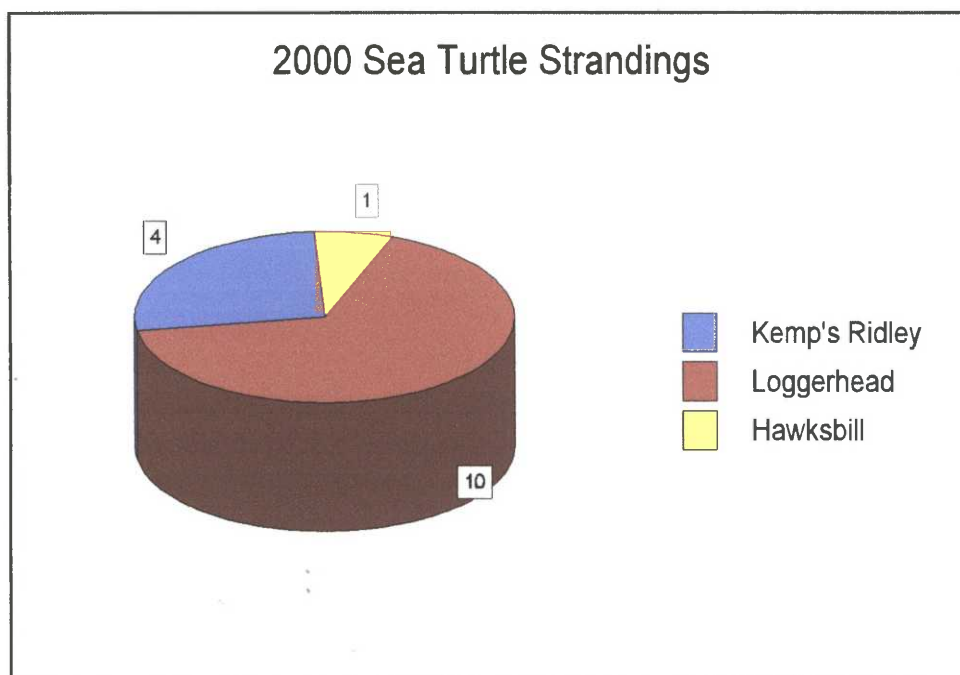


Figure 5. Number of sea turtles strandings by species for 2000.

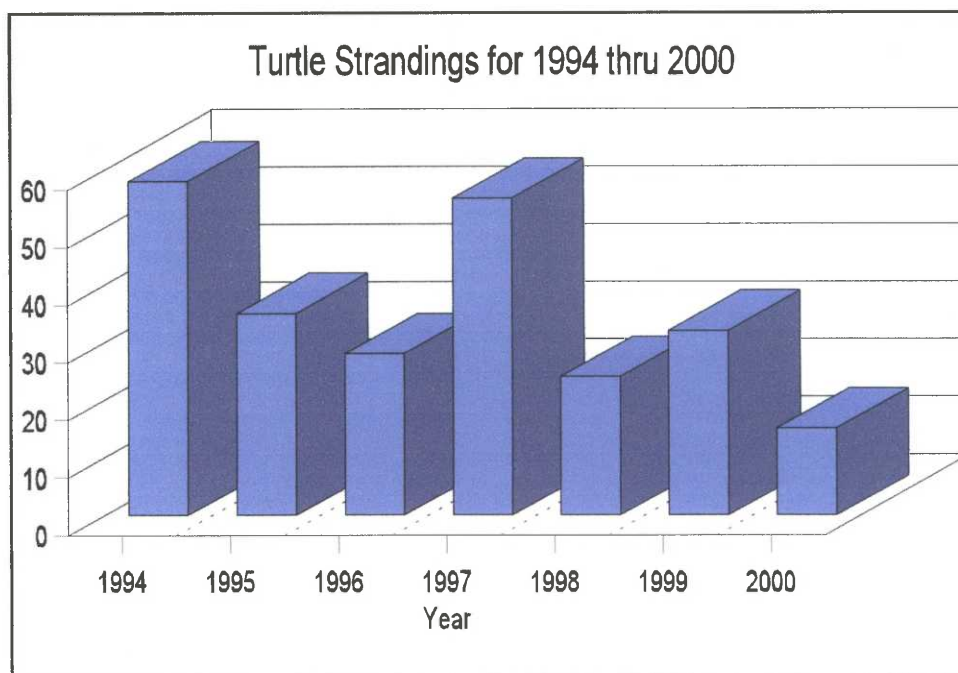


Figure 6. Sea turtle strandings for the past six years.

The pattern of turtle strandings in space and time conformed with what we have seen in the past (Figure 6). Most carcasses (80%) were found in a stretch of 14 miles between the Wynne access road and the wreck of the Darlington. Occurrences were sprinkled through the year with one outstanding exception. Four loggerheads and one Kemp's were found dead on the beach on 14 July, a few days after a large shrimp fleet was seen just offshore. The incidence of strandings is shown in the graphs below.

The loggerheads were all adults (average straight carapace length 68 cm). Three of the Kemp's were adults (average length 59 cm) and one was a juvenile (31 cm). The lone hawksbill was an unusual find. It was clearly a juvenile (5 cm carapace length). Most turtles were designated code 3-4 (severely decomposed-dried carcass) except for one loggerhead. It was a code 1 (fresh dead) and had recently succumbed with a large long line hook snagged through its trachea.

Water temperature chilled into the 40's F during the latter half of December. Federal marshals reported seeing several comatose green sea turtles in the bays near Matagorda Island. We did not find carcasses on the bayshore and saw no evidence of hypothermic turtles along the beach.

3. Waterfowl

After last year's rather paltry season, the most significant event on the waterfowl front was the appearance this autumn of a considerable number of bay ducks and plenty of northern pintails.

Rafts of several thousand redheads were seen at the bay mouth of Cedar Bayou and in Bray Cove the first two weeks of January. No way to tell if these were winter residents temporarily up from the south or birds already beginning their northbound migration. By the first week in March most bay ducks had hauled out, and puddle ducks soon followed. Green-winged teal continued to stack into Hangar Pond and then abruptly disappear as they moved through. By the first week in April blue-winged teal had finished doing the same. Except for the two species that nest locally, by the end of March we were out of the duck business until fall.

The first flight of 20 black-bellied whistling ducks was seen over HQ on 16 March. By early April the species was common on the island. However, an early summer dry spell apparently inhibited reproduction. On 9 June a brood of 11 fresh ducklings was seen on Dragonfly Pond and another of 10 was on Oedogonium Pond. On 19 Sept a brood of fledged whistling ducks was seen at Far Pond. These may have been the same ones seen on Dragonfly Pond in June. The latter site had long since dried up.

For the second year in a row we saw no evidence of nesting among the few mottled ducks that spent the summer on the island.

The fall waterfowl season began on 13 August when blue-winged teal began to appear. They were common by early September and then began to push on south. Green-winged teal arrived in mid-October. Northern pintails were first seen in the marsh on 23 Oct, and they continued to arrive until they were plentiful all along the bayside of Matagorda Island. They were soon joined by abundant northern shovelers, a moderate number of American widgeon and a scattering of gadwall. These ducks held the same proportions through the remainder of the season.

The first lesser scaups were seen on a fresh water pond on 18 Nov, and that same day the first few buffleheads descended on Mesquite Bay. By mid-November both species were fairly common on the bay. One pair of American goldeneyes was seen at Little Brundrett and several more in Cedar Bayou in December. On the last day of the year from our boathouse we could see rafts of lesser scaups resting and clusters of buffleheads diving for dwarf surf clams out in the bay.

Red-breasted mergansers were present in their usual abundance in Mesquite Bay and in Little Brundrett, while small groups of hooded mergansers were routinely seen among the levees.

American white pelicans are winter residents on Matagorda Island. They begin to depart March, although two lingering individuals were seen on 8 April. The birds return to Matagorda in September; the first three were seen on the 14th. On 7 October, several hundred pelicans were seen at Cedar Bayou, one of their favorite haunts on the island. They remained common through the end of the year.

We casually observe common loons on Mesquite Bay throughout the winter. Isolated individuals arrived and departed in synchrony with the bay ducks this year.

Eared grebes are usually an abundant winter resident on Matagorda. This year we did not see them in the surf at all and only in reduced numbers in the bay. The first birds were recorded on Mesquite Bay on 25 Nov. On 18 Nov three horned grebes were seen in the bay near our boathouse. Pied-billed grebes were likewise uncommon; only a few showed up in the levees around the culverts, where they are usually numerous. There were no sightings of least grebes this year.

Through January we had scattered flocks of 60+ foraging snow geese on the inland edge of the marsh and in swales in the interior of the island. They frequently set down on the shell roads to pick up grit. The birds hauled out in February.

The first high flight of 15 white-fronted geese passed over Cedar Bayou on 7 October. By 23 October small flights of snow geese were heard. From that time to the end of the year the island hosted scattered feeding flocks. No Canada geese were observed on or passing over the island this year.

4. Marsh and water birds

All of the kinds of long-legged wading birds native to North America spend time on Matagorda Island. Most nest on emergent oyster reefs in the bay, while some utilize swamps on the mainland. There are a few small rookeries on the island itself, most of which are not used every year. All species forage on the island, and many freshly fledged young follow their parents to the insular food basket. Although they are not known to be long distance migrants, we apparently do get a considerable influx of waders from the south each year. In March large, obviously weary flocks of great-blue, little-blue and tricolored herons as well as many cattle egrets and night-herons appear on the beach and soon disperse inland.

We estimated wading bird numbers in two ways: a count during a monthly 2-mile drive through bayside salt marsh habitat; a nest count among oyster shell islets in the local bays during our Colonial Waterbird Count. We chose six common species as indicators: great-blue, little-blue and tricolored herons and great, snowy and reddish egrets. Based on a total annual headcount of 505 indicator birds seen on the marsh transects, the pie graph below shows the proportion of each of the six species (Figure 7). (Note: Each observation was recorded, although almost surely some of the same individual birds were counted more than once in different monthly surveys. Therefore, the 505 total probably overestimates the actual number of individuals on the marsh during the year.)

The next figure shows the relative nesting abundance of the indicator species at 11 sites around the edge of the island surveyed in the Colonial Waterbird Count (Figure 8). Percentages are based on a total of 485 estimated nesting pairs. By comparing the two graphs, it is evident that the ratio of species seen in the marsh is quite different from their relative use of the islet rookeries.

Long-legged waders irregularly nest in small rookeries on Matagorda Island. On 23 April six known sites were checked. Only 3 great blue herons were found brooding eggs. This survey

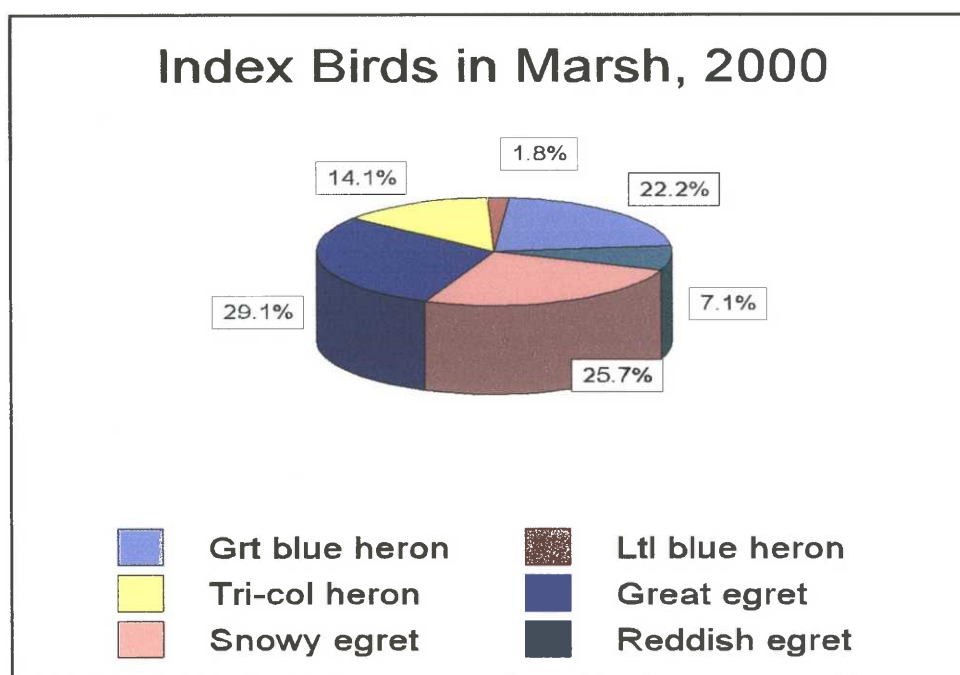


Figure 7. Wading birds counted on monthly salt marsh surveys during 2000

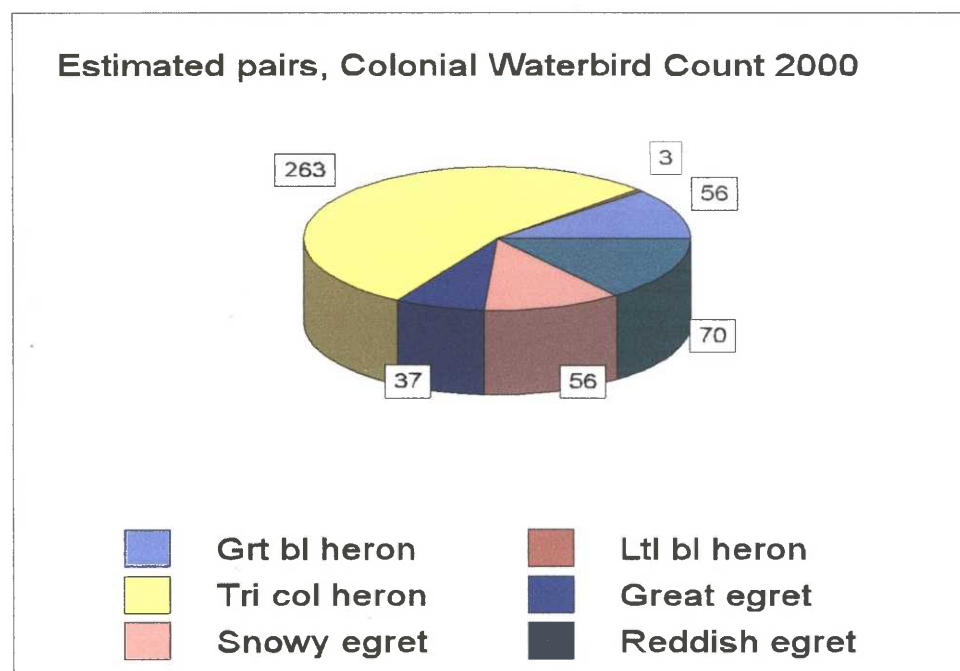


Figure 8. Wading birds nests counted during the Colonial Waterbird Count on islets.

may have been too early. On 24 May 9 great blue heron nests were found at one of the island rookeries. Later a solitary nest was seen atop the mast of a wreck in the surf. The fate of these nests was not followed. As one more indication of the abundance of great blue herons on the island. On 16 Dec sixty-three of these big birds were seen hunkered out of the wind on the lee side of sand dunes at Cedar Bayou.

Mixed flocks of exhausted cattle egrets and little blue herons began arriving on the beach on 23 March. On 2 April the first weary groups of tricolored herons showed up. Through the end of the month cattle egrets, great-blue and little-blue herons, and both black-crowned and yellow-crowned night-herons could be found resting on the beach. Although southbound waders are not as noticeable as springtime migrants, we did record aggregations of cattle egrets staging on the beach on 29 September. The birds waited until sunset and then launched out over the Gulf.

Although we saw and heard adult clapper rails in the marsh, we did not observe a single batch of chicks. This year we saw no sora, yellow or black rails. We may have simply missed these secretive birds.

We had only a few common moorhens this year. Hens with chicks were seen at the ponds near HQ in mid-June. American coots were limited to a few winter residents on the ponds. Purple gallinules deserted us.

We hosted an unusually high number of American bitterns. These winter residents arrived in September and thereafter they commonly spooked from moist but water-less swales when we drove past. On 8 June a least bittern was seen at Nest Pond and two more birds were seen at Long Pond a week later. This species may have bred on the island this year.

Another reminder of a dry summer: only one lone common snipe was seen this fall.

Both black-crowned and yellow-crowned night-herons occur on the island. The former is the more common species. On our Colonial Waterbird Count we estimated 22 nests of black-crowns but no yellow-crowned nests. The rookery occasionally used by black-crowns in the salt cedars at the lighthouse was inactive. To account for the number of adults on Matagorda, both species must use rookeries outside our purview.

Our hordes of winter resident double-crested cormorants came and went about as usual this year. Neotropical cormorants are moderately common residents on Matagorda. A few birds were usually seen perching on the boardwalk. This species apparently breeds in swamps on the mainland.

On 12 Mar, on the eve of their northbound departure, a large flock of long-billed curlews was seen foraging on a fresh burn. The first long-billed curlew of autumn appeared in the yard at HQ on 19 June. By early summer the birds had become common along the edge of the marsh. As usual, whimbrels were seen only occasionally as they moved through in spring and fall. Individuals were seen in both the marsh and on the beach.

White ibis are residents on Matagorda Island, and at least small flocks of these birds can usually be found foraging for shrimp, saltmarsh snails, killifish and fiddler crabs in the salt marsh at any time of the year. They move to offshore islets to nest. For some reason, they usually shun our local sites. We only recorded one white ibis nest on the Second Chain of islands during our Colonial Waterbird Count. Postnesting adults and juvenile ibis appear in large numbers on the Matagorda marshes and they remain common thereafter.

Willetts are one of our most common residents. They are so generalized in feeding habits that willetts are as often seen on the bayside as on the Gulfside of the island. They are among the few larger birds that habitually gamble against the raccoon and coyote odds to ground nest on Matagorda Island. Willetts were observed in skylarking courtship on 20 Mar, and pairs were seen copulating on 13 April. However, we did not happen upon a single willet nest this year and no fledglings were observed.

The first black-necked stilt was seen on 11 March, and a flock of stilts was observed two days later. The birds rapidly attained normal abundance. Two broods of cute, long-legged young were seen at Mesquite Pond on 22 May. Judging by the antics of adults, there were several other nests nearby. The last sighting of a stilt was on 3 Oct.

We estimated 40 pairs of roseate spoonbills during our Colonial Waterbird Count and 99 individuals were tallied during the monthly marsh surveys. Adults and juveniles were in normal abundance on the island during the year.

5. Shorebirds, gulls, terns etc.

Through Jan-March we hosted our usual complement of winter resident long-billed dowitchers, dunlin, black-bellied plovers, western and least sandpipers and greater yellowlegs. These species were supplemented by flocks of other shorebirds in late March as northbound migrants began to push through. In early April, short-billed dowitchers, semipalmated plovers, pectoral sandpipers, and lesser yellowlegs, along with a few whimbrels, flocks of marbled godwits and a few stilt sandpipers were scattered across Stilt Flats. All these species soon pushed on.

Southbound migrants begin moving back through as early as July. The first greater yellowlegs arrived on 22 July. Upland plover sky calls were heard on 30 July. By mid-August we had shorebirds all over the mud flats and around our fresh water ponds. On 10 Sept a lone buff-breasted sandpiper was seen on the beach. The wave gradually dwindled into late October, when only winter residents were left.

We saw the first two Wilson's plovers on the beach on 23 Mar. Within days the species was common on the beach and individuals were appearing on the bayside. In mid-April Wilson's plover's were nesting on the back beach. The first fuzz-ball chicks were seen sniping flies and huddling on the back beach in early May. Wilson's plovers abruptly hauled out right on schedule in early September.

Snowy plovers occurred in their usual moderate abundance on the beach and especially at the mouth of Cedar Bayou during the winter months.

In March we are often briefly swamped with northbound American golden-plovers. This year we only saw a moderate number of these birds on a burn on 16 Mar and others scattered along the back beach on 30 Mar.

In late April, American avocets began leaving their favored feeding grounds at the mouth of Cedar Bayou and moving onto Stilt Flats. We have learned this is preliminary to their northbound migration. Sure enough, the last birds departed on 13 May. The first avocet of autumn showed up at Mesquite Pond on 3 Oct. The main flock soon followed, and by early November several thousand birds had settled for the winter at the mouth of Cedar Bayou. There they loafed on sand spits until the tide began to rise; then they moved into the shallows in close-packed groups, busily gleaning larval fishes and crustaceans at the mouth of the pass.

During their spring migration Wilson's phalaropes never stay long on Matagorda. One pair was seen in a puddle on 27 Apr and a small flock was feeding on ostracods in a pond on 13 May.

Small flocks of red knots were seen on the Matagorda beach right on schedule: in April-May and again in September-October. The last southbound groups were seen on 20 Nov. These long-distance migrants tarry here only long enough to stoke up on coquina clams.

As usual, we had famished flocks of northbound ruddy turnstones appear on the beach during April and May. Then they were gone. Only to return in even greater numbers and at a more leisurely pace from August through November.

We again experienced a year with fewer killdeers than usual, although we did see one hatch of two young behind one of the shops at HQ.

Our common resident gull, the laughing gull, began to get vocal in early March and bred in its usual abundance on the offshore islets in the local bays. We estimated 472 pairs on the Colonial Waterbird Count, most of these on the Second Chain. We had a report of more birds nesting on two islets in Pringle Lake, but these were not checked out.

In early March, the numerous winter resident ring-billed and herring gulls began to stage in premigration flocks on the beach. By the first week in March the ring-bills were gone and the herring gulls left a month later. Both these species reappeared on 14 Aug and soon swelled to their usual concentrations.

During the last week in December the first Bonaparte's gulls were seen on Mesquite Bay and in Little Brundrett Lake, where they were "water-walking" amid groups of foraging ring-billed gulls. Through the winter a few Bonaparte's could usually be found at the Gulf mouth of Cedar Bayou.

Our common species of terns were present in their usual abundance. Least terns are discussed under endangered/threatened species. Northbound black terns showed up on 2 May and were gone by the end of the month. Southbound birds appeared in June and leisurely built to a peak of thousands on the beach in mid-August before moving on. Gull-billed terns arrived on 23 Mar. We estimated 72 breeding pairs on the Colonial Waterbird Count.

Figure 9, below shows estimated pairs of the several species of terns on the local islets in the bays according to our Colonial Waterbird Count. Percentages are based on a total tally of 2195 pairs. We failed to find a single pair of Caspian terns, but were gratified to discover a good reproductive effort by gull-billed terns, which had a poor season last year. The large complement of sandwich terns was found exclusively on Long Reef/Deadmans Island.

Although a few linger in the vicinity, many black skimmers move down the coast in the winter time, but they begin to return in March. During our Colonial Waterbird Count on 21 May, we estimated 524 active skimmer scrapes on the oyster shell isle. American oystercatchers are year round residents, but they are never very common. We occasionally saw pairs or small groups of half a dozen wintering birds feeding on coquinas in the intertidal zone or working the mud flats at Cedar Bayou. Four pairs were observed during our Colonial Waterbird Count.

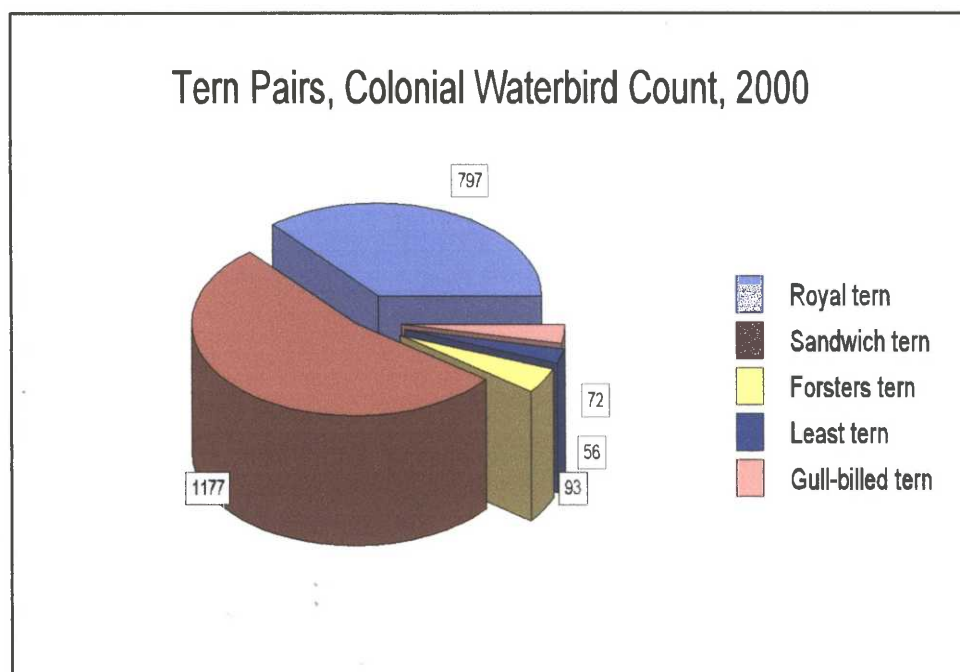


Figure 9. Relative numbers of tern species counted on nearby islets during Colonial Waterbird Count.

The figure below summarizes the results of twelve monthly bird censuses performed during the year (Figure 11). On each survey birds were tallied from a vehicle on a designated 2-mile stretch of Gulf beach and immediately thereafter birds were counted on a designated 2-mile levee road in the salt marsh. Except for September, monthly species diversity was consistently higher in the marsh, sometimes considerably higher. Over the year, 57 kinds of birds were tallied in the marsh compared to 33 kinds on the beach. The usual bimodal peaks in biodiversity caused by migrants are evident on the beach, but they are obscured on the marsh because of the large mix of resident species. Numbers of individuals tallied in the two habitats were approximately equal: 3498 on the beach, 3657 in the marsh.

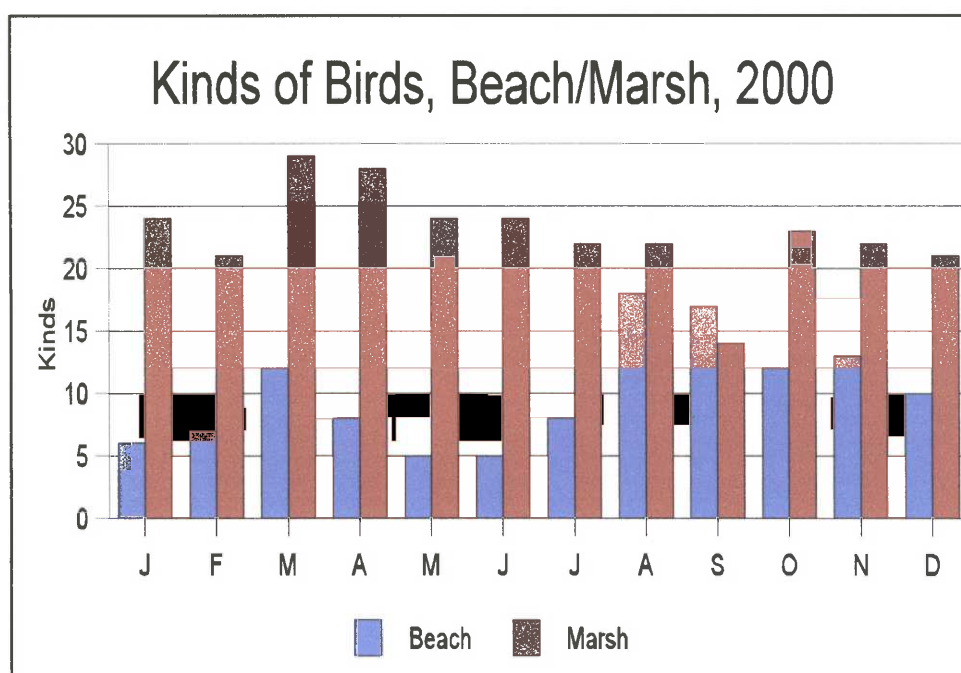


Figure 11. The number of shorebirds species in the marsh was consistently greater than the beach throughout the year.

6. Raptors

The white-tailed hawk and northern aplomado falcon are discussed under endangered/threatened species.

Matagorda Island lies in the flight path of migrating arctic peregrine falcons, and many birds drop off to remain as winter residents. A peregrine was observed on a snag on the beach feeding on a freshly-killed willet on 20 Feb. The first bird of autumn was seen on the beach on 3 Sept. Thereafter they increased in abundance to peak in late October, when 10 falcons were seen during a beach survey on 17 October. Although most peregrines are observed

along the beach, they are also seen in other insular habitats. They routinely harass ducks on the bayside.

Although red-tailed hawks are common on the mainland, they do not favor the open terrain of the island, where their soaring niche is filled by white-tailed hawks. A lone red-tail was seen soaring over Stilt Flats on 3 Feb.

Winter resident northern harriers continued to quarter over the grassland into early spring. The last bird was seen on 27 April. On 4 Sept we ushered in the change of the seasons by sighting the first northern harrier. The second bird was seen on 15 Sept. By October these fine birds had achieved their usual abundance, and they continued to skim low over the grass canopy for the remainder of the year.

Although it is regarded as a resident species and has nested on Matagorda Island, the white-tailed kite has been reduced lately to an uncommon winter visitor. A solitary individual was observed in a mesquite tree in the grassland on 6 Oct. Later a pair of birds was routinely seen in the same vicinity. On 17 Nov a kite was perched on a post near HQ busily tearing apart a fresh-caught cotton rat.

Crested caracaras are colorful, frequently observed residents on Matagorda Island. On 16 Jan a bird was seen apparently inspecting an old nest site in a prickly ash tree near HQ. On 27 Feb another bird (or the same one) was observed sitting quietly among the fronds of a palm tree at HQ, a spot eventually chosen for a nest. By 30 Mar it was confirmed that the palm was a nest site, and on 12 Apr a caracara was routinely brooding there. Two large young could be seen in the nest by early June, and later in the month they exercised by climbing among nearby palm fronds. On 1 July one of these birds fledged; the fate of the other was not determined. The family of two adults and one juvenile stayed around HQ into autumn. Three other caracara nests were found during the spring, but their fates were not followed. On 11 Mar a caracara was seen feeding on a freshly-killed cotton rat, and on 8 Dec the remains of a barn owl were found beneath a caracara roost site. Caracaras were frequently observed in company with turkey vultures at carrion.

As usual, migrating ospreys passed over the island and stopped briefly, and we had a few winter residents. What was probably a northbound bird was seen on a post in the bay at the Wynne Cut on 11 Mar, and an early southbound individual was seen there on 30 June. The first southbound osprey to settle for the night on our high radio antenna did so on 9 Sept. On 16 Sept an osprey began to use the antenna regularly each evening into early October. This individual eventually got accustomed to our activity below and occasionally showed up in the afternoon with a striped mullet upon which it leisurely feasted before bedtime. For awhile in late September, we had a second bird roosting on the low antenna at the office. The last osprey was seen at HQ in early November.

American kestrels arrived on a cold front on 28 September. By the first week in October they were common and they remained so through the end of the year. The first two merlins were seen on 9 Oct and another was observed on 20 Nov, but the species otherwise went

unnoticed. A Cooper's hawk was seen on 12 Mar, 8 Oct and 24 Nov, each time harassing small birds in the vicinity of HQ. On 9 Nov two ferruginous hawks were seen soaring high over the beach, and on 18 Dec a solitary individual was sighted sitting on a post in the sand dunes.

Turkey vultures manned their routine beach patrols, and they were joined by a few black vultures at carrion in the grassland.

Barn owls once again took only partial, tardy advantage of our two nest boxes at HQ. One box was not used at all; the second had a small clutch of 3 eggs on the relatively late date of 3 May. On 4 June two owlets were in the box; the third egg never hatched. By 23 June the owlets were well feathered, and on 4 Aug both flew out of the box when it was checked. A second, more timely, brood of barn owls evidently had been started in a sequestered site high in the hangar, for a fledged juvenile was seen there on 21 May and others in June.

Although it is difficult to determine their time of arrival and departure, short-eared owls are routine winter residents on the island. A bird was seen on the airstrip at HQ on 15 Jan. The first short-eared owl of autumn was seen flapping over the grassland at sunset on 17 Nov. Two birds were spotted flying up from the roadside during a night time owl survey conducted on 22 Dec.

Burrowing owls are consistent but infrequently observed winter residents on Matagorda. They remain hidden during the daytime and are most often seen when they spook from the roadside at night. One individual was spotted crouched on the roadside one afternoon near HQ. On 22 December on a night drive along the 24-mile main road that proceeds along the bayside edge of the grassland, two short-eared owls, two barn owls and four burrowing owls were flushed.

Great horned owls are not common on Matagorda. Birds are occasionally sighted on the brushy oyster shell ridges and in mesquites in the grassland. However, on 4 Dec a horned owl was discovered roosting inside the hangar at HQ. It became a fixture there and on 9 Dec a second individual appeared. The pair used the hangar continually as a diurnal roost until the middle of the month, when the structure was demolished. The owls then moved to roosts in nearby palm trees. Through the end of the year the mellow hoots of the pair of horned owls could be heard at dawn. The invasion of great horned owls is doubtless not going to be welcomed by either our resident barn owls or our local population of jackrabbits.

7. Other migratory birds

The breeding bird count was performed on 12-13 May. It was conducted as in the past. Thirty stops are made at .25 mile intervals and all bird species seen or heard within a .1 mile range are counted for 6 minutes. The difficulty with the count is usually due to on-shore breezes which make counting the bay-side very difficult in more than moderate (>8 mph) winds. As has been done in the past areas that had been burned within the past 9 months were recorded separately and denoted as burned areas. This is done to compare species

distributions and preference for habitats where sufficient burned versus unburned points are counted.

Four species are the primary focus of the count: bobwhite quail, red-winged blackbird, eastern meadowlark and dickcissel. These four species make up over 90 per cent of the birds nesting in the grasslands on Matagorda Island. Of the four species, dickcissel was the only species that exhibited a preference for unburned versus burned habitat. Ninety per cent of the dickcissels were located on unburned habitat which accounted for 70% of the habitat counted on this year's count. This is consistent with data gathered over the previous four years.

A total of 36 bobwhite quail were counted. This is an increase over the past three years in which the average number counted has been 22 birds. Only 71 red-winged blackbirds were counted this year in comparison to the previous four year average of 112.

Doc McAlister noted the following observations during the year.

- 9 Jan--Sandhill cranes digging nutgrass tubers & scarab beetle grubs from fresh burn on N end
- 9 Feb--3 pairs of long-billed thrashers on Rattlesnake Ridge
- 10 Feb--Seaside sparrows starting to sing on Stilt Flats
- 19 Feb--1 pyrrhuloxia at HQ
- 23 Feb--First barn and cliff swallows at HQ
- 28 Feb--Only a few lingering sandhill cranes still on island
- 16 Mar--First ruby-throated hummingbird
- 19 Mar--First wood warblers: yellow-throated, black & white, and hooded
- 24 Mar--First scissor-tailed flycatcher
- 29 Mar--Sandhills gone
- 2 Apr--Wave of chipping & vesper sparrows; rough-winged and tree swallows passing through; first common nighthawk
- 3 Apr--Lark & Lincoln's sparrows; wood warblers and orchard orioles; large passing flock of purple martins
- 4 Apr--One robin, 1 pyrrhuloxia
- 6 Apr--First summer tanager
- 8 Apr--First eastern kingbirds; a lone yellow-bellied sapsucker
- 9 Apr--First blue grosbeaks and first wave of many indigo buntings
- 11 Apr--Waders getting pretty plumage and bright facial skin
- 14 Apr--First Baltimore orioles and American redstarts; many tanagers, vireos and wood warblers
- 17 Apr--First dickcissels
- 22 Apr--Many passerines in brush at Cedar Bayou: chats, hummers, cuckoos, pewees, kingbirds, buntings, orioles, thrashers, catbirds; and Bell's vireos
- 23 Apr--First yellow-headed blackbird, first rose-breasted grosbeaks and 3 bobolinks
- 2 May--First frigate-bird
- 7 May--First brood of barn swallows fledging
- 19 June--Barn swallows feeding second brood

1 July--Second brood barn swallows fledging
 13 July--First loggerhead shrike in months
 14 July--Southbound orchard orioles passing through
 24 July--Southbound purple martins on antenna
 3 Aug--Three white-winged doves at HQ
 9 Aug--Many common nighthawks in air, but no nests this year
 13 Aug--Eastern kingbirds & orchard orioles southbound
 18 Aug--Barn swallows leaving
 23 Aug--Great-tailed grackles feeding on palm fruits
 25 Aug--Lark sparrows, ruby-throated hummers passing through
 26 Aug--Blue-gray gnatcatchers southbound
 1 Sept--Large array of southbound passerines; scissortail flycatchers restive; 1 ladder-backed woodpecker at HQ; 1 frigate-bird aloft; cliff swallows gathered on radio antenna
 12 Sept--Chuck-will's-widow at HQ; 2 late frigate-birds
 15 Sept--Common nighthawks gone; 1 frigate-bird
 16 Sept--Vermilion flycatcher at HQ
 25 Sept--Loggerhead shrikes finally repopulating the island
 3 Oct--One groove-billed ani at HQ
 10 Oct--First 2 sandhill cranes; many cliff & barn swallows dead at boathouse--migrants caught by several dark, cold days
 13 Oct--Sparrows southbound: lark, chipping, savannah, vesper and grasshopper; also wave of indigo buntings
 28 Oct--One frigate-bird, very late lingerer
 30 Oct--Ladder-backed woodpecker still around HQ
 6 Nov--Eastern phoebes suddenly all over
 8 Nov--Lark sparrows passing through
 11 Nov--White-crowned sparrows at HQ
 12 Nov--Northern flicker, catbirds, vermilion flycatchers at HQ
 21 Nov--Flock of robins at HQ; 1 very late scissor-tailed flycatcher
 22 Nov--Many sparrows: savannah, grasshopper, lark, chipping, vesper, field and a few LeConte's
 25 Dec--A rare eastern bluebird here to celebrate Christmas Day
 26 Dec--Two northern gannets on the beach, one dead the other hurt
 28 Dec--Flock of 30 robins took off over Mesquite Bay
 29 Dec--Three cedar waxwings, the first in several years

8. Game animals

White-tailed deer were introduced onto Matagorda Island by early ranchers and by military personnel, and animals immigrate from St Joseph Island and the adjacent mainland. Deer are almost continually in sight around HQ and some animals wander about the compound in semidomestic fashion. Matagorda Island is not prime white-tail habitat, but the animals have adapted well to the general absence of browse and cover. They lead an antelope-like life style. Coyotes apparently serve as effective population control predators on the island deer herd, and some weakened animals succumb during severe mosquito plagues. Although we

do not manage white-tailed deer on the south end, the herd does not appear to be beyond carrying capacity.

TPWD conducts an annual aerial survey of the white-tailed deer herd on Matagorda Island. This year their population estimate was 900 individuals. Although these animals are not hunted or managed on the south end, TPWD conducted a restricted deer hunt on the Wildlife Management Area over 5 weekends in December 2000 and January 2001. This year 110 hunters killed 93 deer, 33 of them bucks.

Deer seemed to be in good physical condition and in normal numbers on the South end this year. The first fawn was seen on 13 May, but they did not become common until the first week in June. By mid-June most does were followed by fawns and bucks were in velvet. On 30 Sept three pairs of bucks were seen clashing antlers. By mid-October the rut was in full swing. The ardor of the bucks finally wound down by mid-November.

Bobwhite quail apparently experienced a poor reproductive season on the island this year. We did not hear a cock begin to call until 20 Apr, and we saw no broods around HQ. One small brood of 4 was seen on the Beach Road on 8 July, and thereafter small coveys including young birds were spooked up from the roadsides through the summer.

Rio Grande wild turkeys were introduced onto Matagorda by the military and carefully tended for hunting. When the military left the island in 1977, about 200 turkeys remained and they have not been hunted since. These birds were definitely not in favorable turkey habitat; they lacked roost sites, reliable water, mast and browse. The flock dwindled and moved toward the working ranch on the south end where several roost poles were set up for them. Recently a small group of turkeys has split from the ranch flock and taken up residence around the State Park on the North end of the island. There is apparently also some interchange of individuals from the ranch flock and birds that live on St. Joseph Island.

When the current year began we had 4 gobblers and a group of about 20 hens and juvenile males around Headquarters, where they roosted inside the hangar and wandered about with semidomestic indifference. They delighted visitors.

The gobblers were observed strutting on 20 Jan. A hen was seen with a solitary poult on 21 May and another with 2 poults on 6 July. Both these hens managed to rear their offspring, although by fall the flock still had not accepted them. Then in December the turkeys suffered two setbacks. First, a pair of great-horned owls moved into the hangar. The hens immediately responded by disappearing from HQ. Then the entire hangar was demolished. The four lingering gobblers began roosting on a nearby scaffold. In late December the hens appeared to spend one night with the gobblers, and then they vanished again. At the end of the year we had the 4 dedicated gobblers but no hens.

Mourning doves are common residents on Matagorda and their numbers increase significantly in early autumn when southbound flocks pause to feed on the crop of sunflower and croton seeds. Doves began arriving on the island on 13 Aug and by the end of the month

they seemed to be everywhere. On the morning of 30 Sept the roof of every building at HQ was adorned with mourning doves. The bulk of these birds had pushed on by late November. Nesting doves have adapted to the general lack of woody growth, building their flimsy platforms atop clumps of Gulf cordgrass, in mesquites and prickly pear clumps, and around Headquarters on everything from swaying palm fronds to the abandoned mud platforms of barn swallow nests. TPWD has not conducted a dove hunt on the island in recent years.

In addition to routine hunting of waterfowl in the marsh along the bayside of the island, TPWD permitted 53 hunters into the freshwater ponds on the Wildlife Management Area during the waterfowl hunting season.

Although exotic feral hogs are not regarded as game animals, TPWD did allow deer hunters to take hogs. This year 13 hogs were killed.

9. Marine mammals

We frequently observe pods of bottle-nosed dolphins in Mesquite Bay and occasionally we see them beyond the breakers in the Gulf. However, our only close contact is with stranded individuals encountered during weekly beach surveys. These incidents are reported to TMMSN. This year we found no stranded marine mammals of any sort.

10. Other resident wildlife

The following is a chronological sequence of excerpts of wildlife and plant observations from Doc's Monthly Activity Reports for 2000.

- 1 Jan--First Spanish daggers in bloom; 4 kinds of snails, 4 of clams and 2 of marine worms from mud flat at the boathouse
- 3 Jan--First bull thistle in bloom
- 6 Jan--Early spring wildflowers: fleabane, flax and stinging nettle, and a pretty scatter of antillean blue butterflies.
- 8 Jan--After a rain shower, a huge emergence of flying termites
- 18 Jan--A bolas spider--a most unusual critter--on Rattlesnake Ridge
- 23 Jan--More Spanish daggers in flower; southern white butterflies across the marsh
- 24 Jan--First prickly poppy in bloom
- 9 Feb--Turkeys following and clucking at the season's first diamondback rattler
- 12 Feb--First box turtle abroad, and the second diamondback
- 13 Feb--Third rattler and first cottonmouth moccasin; first globe mallows in bloom
- 14 Feb--First lantana in bloom, attended by 3 kinds of skipper butterflies
- 28 Feb--Spring has sprung--wildflowers galore
- 4 Mar--Small blue crabs, brown shrimp and southern flounder in the bays
- 5 Mar--Beach covered knee-deep in sargassum
- 9 Mar--A few monarchs floating past; first prairie race runner; many butterflies
- 14 Mar--After a good rain, spadefoot toads calling in South Pasture for the first time in several years

20 Mar--Good amphibian choruses, now joined by first green tree frogs
 26 Mar--A plague of saltmarsh mosquitoes
 23 Apr--First mexican milksnake
 11 May--Three diamondback rattlers in one day, all around HQ; watch your step!
 14 May--First tiger beetles on beach
 16 May--Many juvenile brown shrimp in the bay
 20 May--Two diamondback rattlers at HQ; lightning killed one of our palms
 30 May--Clouds of tiger beetles on beach
 10 June--Few dragonflies this year, but one new one--great pondhawk
 11 June--Baby raccoons twittering in the loft at the shop; bluebells in bloom
 19 June--Fresh-hatched glass lizard on the airstrip
 1 July--With few high tides & no storms, beach plants growing to within 30 yds of waterline
 7 July--Clutch of Mediterranean gecko eggs in lumber pile
 14 July--Gecko eggs hatched
 30 July--Sixteen jackrabbits on the lawn at HQ, and 16 adult geckos on window screens tonight
 20 Aug--Forbs in bloom: sunflower, partridge pea, coffeebean senna and 2 kinds of Croton
 21 Aug--Remains of a Spanish lobster stranded on the beach
 6 Oct--Island turning yellow with composite flowers
 9 Oct--Crinkleawn grass beginning to bloom
 17 Oct--Killer bees in building at North end; more in the Duplex
 22 Oct--Many moon jellyfish stranding on beach
 28 Oct--Fresh-born diamondback rattler on airstrip and fresh-hatched speckled kingsnake on beach road
 10 Nov--Several hundred monarchs roosting in oaks at HQ
 12 Nov--Fluff from parachuting seeds drifting all over the island
 22 Nov--Two diamondback rattlers abroad on the dikes; first black mangrove fruits stranding on beach
 24 Nov--Cabbage head jellyfishes stranding on beach
 10 Dec--Late diamondback rattler on beach road

11. Fisheries resources

Despite a dry summer our culverts allowed fish, blue crabs and other mobile aquatic life to escape from the stagnating levee pools so we had no die-offs.

In early September red tide and attendant fish kills appeared along the coast just north of the island. On 18 Sept an irritating aerosol caused by red tide was evident on the beach opposite HQ. Finally, on 24 Sept, fish began stranding. We counted 35 large red drum between the Charisma and the Public Beach. There were intermittent windrows of several other species, mostly gafftop catfish, speckled trout and Gulf menhaden. Strangely, there were few striped mullet and no Atlantic croakers. There were reports of patchy red tide in Mesquite Bay, but we saw no evidence of it on the island shoreline. We had another siege of aerosol on the local beach on 5 Oct, but no associated fish kill. After that conditions gradually returned to normal.

A great blue heron and serendipity combined to let us know that there is a species of fresh water fish on Matagorda Island. This spring a heron flew out of Lodge Pond and dropped a fresh-caught fish at Doc's feet. It was a bluegill (*Lepomis macrochirus*), doubtless a survivor from artificial introduction by the rancher who owned the land before it became a refuge.

15. Animal Control

The pending management plan for reducing feral hogs (*Sus scrofa*) on Matagorda Island National Wildlife Refuge and State Park is under Section **D.2**.

16. Marking and banding

On 1 June Dan Kim, a graduate student at Texas A&M University banded several nestling crested caracaras and white-tailed hawks. He was interested in banding loggerhead shrikes, but we know of no nests this year.

H. PUBLIC USE

1. General

Public access to and use of Matagorda Island during 2000 was about the same as in the previous year. Management is still operating under an interim CMP that has been signed by state and federal authorities but not ratified by Congress. Therefore, although dockside facilities were upgraded on the north end of the island, there were no major changes in policies to accommodate visitors.

TPWD operated the public ferry four days a week and on holidays to bring recreational visitors to the state park on the north end of the island and continued to make available two camping areas and a bunkhouse for overnight use. In addition, throughout the year state personnel scheduled special tours for holders of Texas Conservation Passports and conducted exercises in environmental education for public school groups. In December and January, TPWD monitored public hunts for white-tailed deer, wild hogs and waterfowl on the wildlife management portion of the island. USFWS and The Nature Conservancy of Texas (TNCT) continued joint operation of the Enron Matagorda Island Environmental Education and Research Center (EEC) on the south end of the island. Visitation at this facility is by appointment only and is oriented toward formal classes in environmental education and the support of professional field research.

Annual visitation to Matagorda Island is difficult to estimate because many parties, especially fishermen, come and go in their own boats. The only systematic headcounts are the number of passengers on the public ferry and attendance at the EEC. Both TPWD and FWS spot check the surrounding waters and shores to judge the number of people who arrive in private vessels. FWS keeps monthly visitation records for the south end of Matagorda Island according to the Refuge Management Information System (RMIS) format.

According to our estimates for 2000, we hosted 8,885 visitors on the south end. The bulk of these were recreational fishermen; a few were beach combers; 489 attended the environmental education program. TPWD reckoned 63,001 visitors to the north end of the island during the year. Again, most were recreational fishermen. Combining this total with the estimate made by FWS for the south end gives a grand total of 71,886 visitors to Matagorda Island in 2000.

Monthly visitation to the south end of the island is shown in the bar graph below (Figure 12). Although we wish for a better balance, it is obvious that the big calling on Matagorda Island is recreation rather than education.

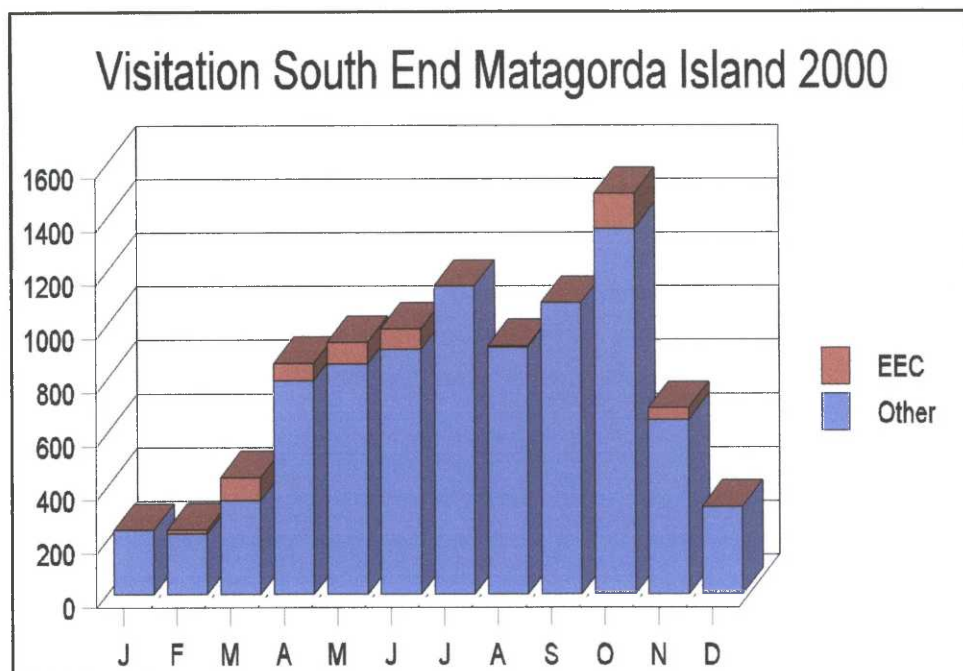


Figure 12. Monthly visitation throughout the year on the south end of Matagorda Island.

We began the millennium and our seventh year of operation at the Environmental Education Center (EEC) by reviewing our goals and judged that they did not need to be changed from their original statement in our Visitors Guide:

to promote a public awareness, understanding and appreciation for all aspects of the cultural and natural history of Matagorda Island and to encourage a conservation/preservation ethic toward coastal barrier islands and the general out-of-doors through interpretive environmental education activities

to solicit, support and participate in professional research directed toward understanding and managing the ecosystem of Matagorda Island with emphasis on endangered/threatened species and migratory birds.

This year the EEC hosted 489 visitors during its eight active months (the Center is closed Jan-Feb and July-Aug). Although we had some near misses, for the first year ever we managed to transport all parties on schedule. Of the 42 groups that made reservations, we had only 6 cancellations, all due either to inclement weather or group request. Among the 36 groups that we hosted, 17 were day trips, 14 stayed overnight and 5 stayed for several nights. In addition, we carried our message to several hundred people in four local outreach presentations.

As shown in figure 13 below, the monthly visitation to the EEC during 2000 followed the usual pattern with highest activity in the spring and fall. In part this distribution reflects our closure during midwinter and midsummer, intervals that are traditionally times of low use or nonuse. (By special request, and because the weather cooperated, we

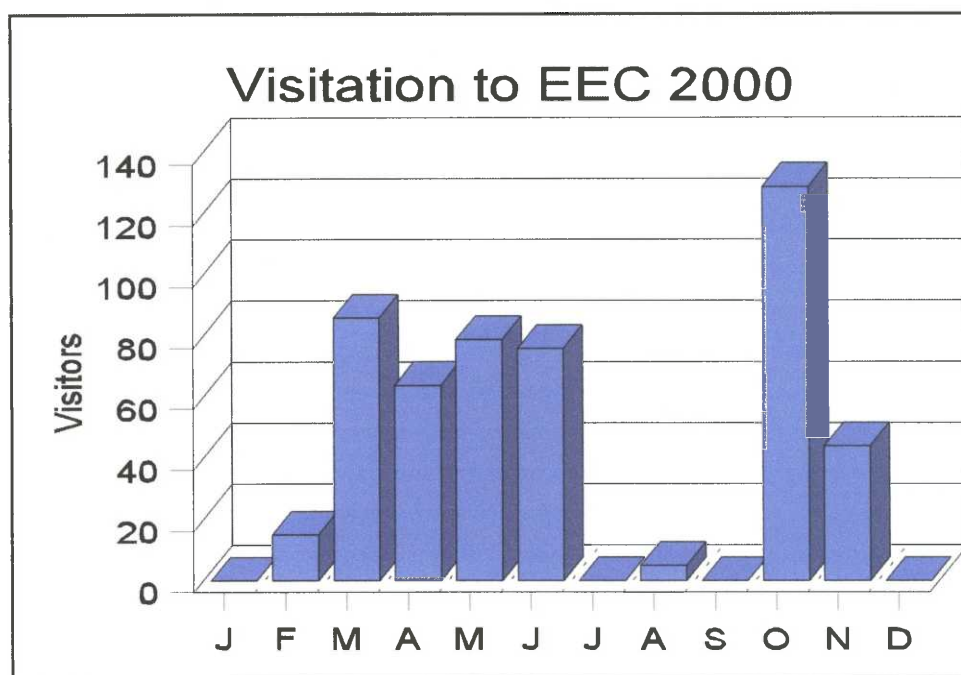


Figure 13. Numbers of students and teachers participating in the environmental education program on Matagorda Island.

did host several groups during the closed interims.) Top visitor months coincide with the biannual migration of birds, the spring and fall burst of wildflowers, pleasant weather and the public school calendar. September is usually a slack month because families are focused on starting the new school year. This year bad weather wiped out our several reservations in December. The next figure displays the year's visitation by group category (Figure 14). We are pleased enough with the distribution except we would like to hold more teacher workshops. The "other" category in the figure includes girl scouts and kids enrolled in summer programs sponsored by local nonprofit organizations.

After seven years of experience at the trade, we are convinced that an annual visitation of about 600 is a reasonable level toward which to aspire at this remote station. Rather than apologize for the relatively low visitation rate, we prefer to look at the up-side. Our participants enjoy quality outings in small, congenial groups in the constant company of knowledgeable guides and at minimal cost. Fully as important, the south end of Matagorda Island does not suffer from the pounding of too many feet. The people are well-served and the island retains its wildness. It is a good balance.

A brief annotation of some of our high points and low points during the year will suggest our interaction with the various kinds of visitor groups as well as the delights and frustrations that come with the territory:

Jan: No visitors and just as well, the bay was frequently too rough to transport them. Volunteers used the time to spruce up the kitchen, including new vinyl tops on the dining tables.

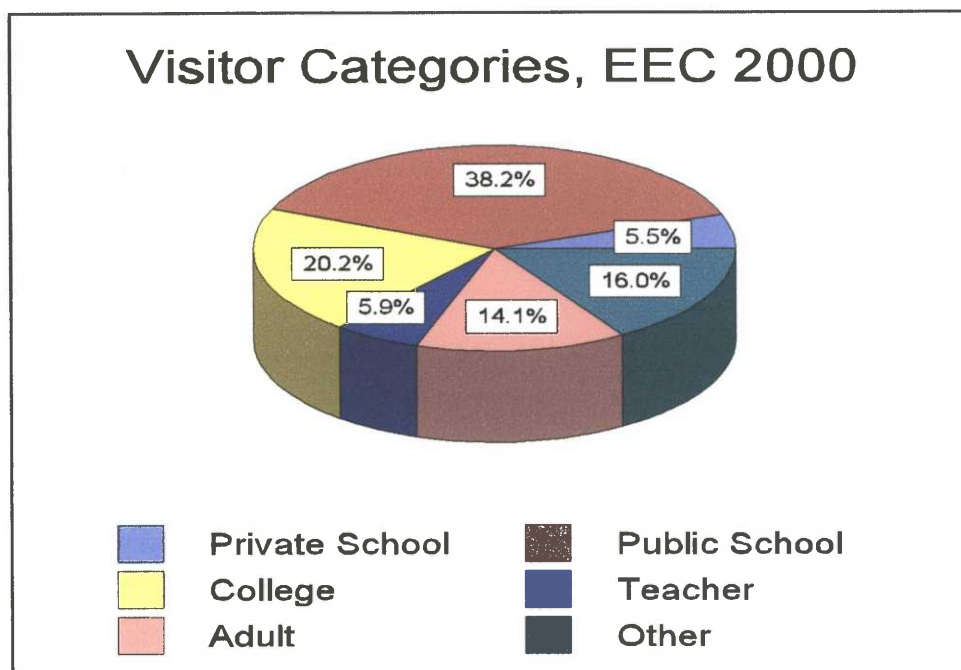


Figure 14. Groups of visitors to the Environmental Education Center during 2000.

Feb: Officially closed, but we held a teacher orientation session. Then hosted a great group of kids from Eagle Pass--youngsters who had never seen an ocean in their lives. Great fun! And TNC christened their new boat, the *Miss Adventure*. We hope she doesn't become the *Misadventure*!

Mar: Off to a running start. Groups from high schools, private schools, college (budding teachers) and local adults. Put them through our minicourses. Some wanted special birding sessions. No problem. Others learned to identify wildflowers. One group didn't let a soaking rain shower dampen their morale. The kids from the private school erected a turkey roost as a service project. The student-teachers rallied to a session on how to conduct field trips. Kids from the panhandle stood in awe of more water than they thought existed in the entire world.

Apr: Doc & Martha began the month with outreach presentations at the Gulf Coast Symposium held in Corpus Christi for high schoolers. Met a college class for a chilling day in a wet norther and still managed to learn some island ecology. Thereafter, great sessions with a troop of super-charged girl scouts, a group of elder hostels with almost as much energy as the scouts, and several high school classes. Weather cooperated, critters were plentiful and the visitors well motivated. This is what our operation is supposed to be all about.

May: A nerve-wracking month. It began with a great troop of girl scouts. But private schoolers from Houston arrived to a wind-whipped bay. We had to haul them across in our cabin boats; finally had a good session. Then high schoolers on another wind-blasted day. Finally college kids from Dallas, and the bay was so rough Doc & Martha had to bump across and hold the session on the mainland. Finally we hosted

college students on a multiple-day research project. Somehow we ended the violent month without a tragedy.

June: Our month revolved around the annual four-day visit by SOAR, youths sponsored by the Matagorda County 4-H organization. They descended on us as usual--over 40 strong, of diverse ages, full of vigor and ready to camp on the beach. The adventure began by getting their chuck wagon stuck in the sand, but we overcame that challenge. We ran them through a variety of learning exercises and they ran us ragged! But it was fun and rewarding. They were well-disciplined and very responsive. Better by far to contain and direct all that energy here than let it run free on street corners. Doc & Martha had to take emergency leave and missed a teacher workshop. Cathy Porter of TNC filled in and the session went well.

July: Closed. Time spent updating our Visitors Guide and getting copies run off. Also wrote a teachers' guide for K-3 classes to be held on the Aransas NWR.

Aug: Closed, but we opened to fete a group of YCC kids who had been working hard on the island. Treated them to everything from constellations to beach ecology. These are the very sort of youths who need such attention. We felt privileged to be with them. Otherwise, we contributed to a display on Matagorda Island being set up at the Visitors Center on the Aransas.

Sept: A group of SOAR volunteers spent several days with us and accomplished two objectives: they collected items for their "beach boxes" to be distributed to teachers; and they contributed sweat and expertise helping Doc revamp the Conestoga wagon used to haul visitors. Late in the month Doc made a day-long presentation in the kick-off session of the MidCoast Master Naturalists program sponsored by the Matagorda County Ag Extension Service and Texas Parks & Wildlife.

Oct: Although the second session of Master Naturalists had to be rescheduled because of a hard norther, the rest of the month was deliriously busy. Doc & Martha spent a day on the Aransas advertising Matagorda Island at the National Wildlife Refuge Day bash. Then they hosted a great group of college kids all the way from Oklahoma. They wanted to study marine invertebrates and we obliged. More student groups from Victoria College; one of them performed plant transects on the beach and across the dunes. Finally we provided plenty of birds to members of a local birding club.

Nov: Got the Master Naturalists onto the island for a long and rewarding day. Then a good day of birding with adult volunteers from the Victoria Zoo. And a busy two days with a group of ornithology students from Rice University who were studying bird foraging behavior and resource partitioning. Wound up with a wonderful experience with the Bay Area Montessori School from Houston. Kids much younger than we usually handle, but very inquisitive and responsive. They learned a lot and had a ball doing so. And we enjoyed being with them.

Dec: A tandem series of blustery northers wiped out each of our reservations for the month. Doc braved a pea soup fog to get to Rockport for an outreach presentation. And we saw the end of the millennium from the quiet vantage of Matagorda Island.

2. Outdoor classrooms--Students

We offer 20 mini-courses that cover diverse aspects of the natural and cultural history of Matagorda Island. Most of these exercises last about two hours and follow the same basic plan: hands-on field work, an investigative approach and a follow-up discussion. Group leaders choose courses for their visit. Our dozen most popular "minis" are listed below.

1. Beach habitat. Where the island meets the sea.
2. Tidal flat habitat. Where the island meets the bay.
3. Sand dunes habitat. A desert beside the sea.
4. Star-struck. Naked-eye observation of the night sky.
5. Plankton. Mighty mites of the aquatic food chain.
6. Karankawa Country. The Indians who once roamed Matagorda.
7. Wildflowers of Matagorda Island.
8. How many are there? Estimating numbers of critters.
9. Sea turtles. Creatures living on the edge.
10. Tracks & traces. Reading the signs of something having passed.
11. To each his own vittles. Feeding strategies among birds.
12. Litter on the beach. The enemy is us.

Minicourses are always offered by an experienced guide. We do not lecture; rather, we *interpret*, which means we try to provoke an answer from the audience instead of blurting out a solution. Sometimes we make a point with respectful silence. We urge participants to handle, to inspect, to marvel, and to think and question; and to put things back in their places, unharmed. This is the "hands-on" approach (on a refuge it might be more



Girl Scouts learning about the bayside ecology. WM Fall/00

appropriately called a "hands-on-and-then-hands-off" approach), and it works to perfection in a setting like an undeveloped barrier island. By modifying the level of discussion so that we neither go above nor speak down to a group, the same adventuresome approach is applicable to young and old.

Each course is listed in our Visitors Guide along with some thought-provoking questions that we answer during the course of the exercise. For instance, during our minicourse entitled *Habitat: tidal flat. Where the island meets the bay*, we consider:

- What is an *estuary* and why is it important?
- Outline the geography of our local estuary.
- What role does a tidal pass play in estuarine ecology? a river?
- Why is this area referred to as a nursery ground? a food basket?
- What does *brackish* mean?
- What is a halophyte? Name three local halophytes.
- What did you learn about smooth cord grass?
- What does *anaerobic* mean? Is there life in anaerobic sites?
- Name one *keystone species* of this habitat.
- Name one worm, one mollusc, one crustacean and one fish you saw.
- What was your favorite critter? Why?
- How might people disrupt the ecology of the tidal flat?

Group leaders choose courses to suit their interests and needs. Every minicourse is designed both to educate and to entertain. We have included enough academic substance to satisfy the needs of public school and college classes as well as provide exposure to the principles of refuge management and good environmental citizenship. The format common to all of these presentations is designed to achieve six goals:

- 1) provide direct outdoor experience on a barrier island
- 2) promote creative, logical individual thinking
- 3) impart factual information about Matagorda Island
- 4) instill a conservation/preservation ethic
- 5) urge contemplation about one's individual lifestyle and the natural environment
- 6) offer an enjoyable excursion into the out-of-doors

In addition to achieving the USFWS mission for public environmental education and interpretation, our approach addresses almost all of the essential knowledge and skills proposed by the Texas Education Agency for public school students. Some colleges confer academic credit for attendance at our classes.

If, by the above, we help fashion more informed and gentle stewards for our beleaguered planet, our main goal will be achieved.



Kids with a kingsnake. WM Fall/00



Class seigning the Gulf beach. WM Fall/00

3. Outdoor classrooms--Teachers

Teacher workshops are given high priority in our environmental education program. Public and private school classes are our main avenue to reaching youngsters and the teachers are our principal liaison. We strive to convince teachers that we have something of value to offer their students, including application of the state mandated essential knowledge and skills criteria. We stress that they can overcome the inertia of logistics and getting administrative approval to enjoy a successful field trip to Matagorda Island. Teacher workshops are also a valuable testing ground for our program; we get constructive criticism from brainstorming sessions. In addition to being among our most appreciative patrons, teachers become goodwill ambassadors for the program.

We require that every potential group leader visit the island for an orientation session prior to bringing students. The teachers get a chance to meet Doc and Martha, to see the physical facilities, to visit the sites where minicourses are conducted, to participate in abbreviated exercises, to discuss safety precautions and to ask questions. At the end of the session each teacher has a clear idea of what to expect, and he/she has been made to feel welcome and confident of being able to bring kids to Matagorda.

4. Interpretive foot trails

We have developed several trails for use by visitors to the EEC, and all of these will be available to drop-in guests when the general public is admitted. Since guides currently accompany environmental education groups along the trails, there is currently no need for brochures and only a few interpretive signs have been erected.

We have four trails within an easy reach of the EEC. Each is used repeatedly during our season of visitation.

- 1) Wetlands Trail (3 mi), which includes six interpretive signs, two boardwalks spanning the shallows between Mesquite Bay and the shoreline and a path that provides an excellent elevated view of a vast expanse of salt marsh. Along the way there is an observation platform which is a great site for general viewing and discussions of the importance of estuaries. For birding and general wildlife observation, this is our most popular route. At the moment there is an erosion gap at the end of the large boardwalk which limits access to the dike, but visitors still safely enjoy the boardwalk itself and the observation platform..

- 2) Bayside Trail (0.33 mi), which skirts the edge of the salt marsh and is ideal for observing halophytic vegetation and the transition from marsh to grassland.

- 3) Grassland Trail (0.75 mi) that takes the visitor deep into a luxurious waist-deep stretch of climax gulf coast prairie.

- 4) Sand Dunes Trail (0.33 mi), which gives visitors a closeup view of the unique geology and marvelously adapted xeric vegetation of a dune field and a good chance to see tracks and trails left by the previous night's scrambling fauna.

On Shell Reef Bayou four miles north of HQ there is an elevated wooden observation deck that overlooks extensive wetlands. The site is used by guided groups transported aboard the Conestoga from the EEC and also by TPWD groups brought by bus from the state park. This is one of the best sites for visitors to view whooping cranes in the winter time and wood storks in the summer time, and it provides a great vista over salt marsh habitat.

6. Interpretive exhibits/demonstrations

The EEC is equipped with a slide projector and screen. We have amassed an extensive slide collection depicting all aspects of the natural history of Matagorda Island. Slides are used to illustrate special topics associated with minicourses and for evening and inclement weather presentations. Doc also uses the slides during outreach presentations.

We have a microvideo camera and a 20-inch color TV monitor with VCR. The micro video allows us to exhibit small live creatures on the monitor. A popular activity is to let students collect plankton and then have the group view their catch on video. We also have a small collection of commercial video tapes to show for special interest groups or during inclement weather.

Despite our color slide and video capability, we de-emphasize their use. Certainly these tools have their place in our program, but we put top priority on first-hand, outdoor experience. If visitors want to see ghost crabs or periwinkle snails, for instance, we prefer to take them to the beach or the salt marsh rather than show them pictures.

We have several terraria and cages in the EEC for temporary display of live reptiles, amphibians and rodents, and we maintain two aquaria for exhibiting water critters.

We have shelves and cabinets loaded with bones, shells, teeth, exoskeletons, sea beans, and sundry other items relating to Matagorda Island. Most groups are treated to a show-and-tell session which stimulates endless questions and discussion. We also use commercial posters, topographic maps and aerial photographs to stimulate interest and orient visitors.

Our museum is housed in a separate building and has become a favorite with visitors. Shells, sea beans, messages in bottles, and an assortment of other interesting items collected on the beach are on display.

On our front lawn we have a display of provocative items that were found on the beach. These range from a hand-crafted West Indian pirogue to sea turtle shells and TEDs. All are excellent attention getters.

We erected an interpretive kiosk at Cedar Bayou near the camping shelters. This has been well-received by drop-in visitors, and we include it on the itinerary when we take groups from the EEC to observe the tidal pass.

7. Other interpretive programs

In 2000 staff completed a color photo brochure for Matagorda Island. The brochure identifies the cooperation between the FWS and TPWD and also describes the natural and historical aspects of the island with color photographs. We printed 5000 copies at a cost of \$3000.00 utilizing the Aransas/Matagorda Island Complex Fee account. This brochure is available at the Aransas Visitor Center and the Matagorda Island State Park Visitor Center.

On 1 April Doc and Martha participated in the Gulf Marine Symposium in Corpus Christi. The audience was composed of high school students from the entire coastal region of the state. Doc presented slides and commentary on the ecology of Matagorda Island, while Martha demonstrated and discussed items found on the Matagorda beach. The session was not only educational for the students, it was good PR for our island program.

Doc and Martha both assisted in the premier program of the Texas Master Naturalist Mid-Coast Chapter, a venture jointly sponsored by the Texas Agricultural Extension Service and Texas Parks and Wildlife. The mission of the program is to develop a corps of well-informed volunteers to provide education and service for the better management of the natural resources of the state. Doc presented the lead-off lectures on 23 Sept, and he and Martha led a half-day field trip on the Aransas NWR. On 3 Nov the group met on Matagorda Island, where Doc and Martha spent the day leading participants through several minicourses. Both instructors and students judged the sessions very beneficial.

National Wildlife Refuge Day was celebrated on the Aransas NWR on 14 Oct. Doc and Martha each manned booths and educated the crowds on the mysteries and attractions of Matagorda Island.

On 15 Dec Doc gave a slide presentation to a group of adults in Rockport. The audience was composed of "winter Texans" from diverse parts of the nation. The session was a good chance to let them know what Matagorda Island NWR is all about.

From September through December Adolfo Cantu built two display cases and a frame for the Aransas/Matagorda Island Visitor Center. One case displays Matagorda Island the barrier island and other case displays a miniature lighthouse. The wooden frame contains a hand painted map of the island created by Martha McAlister. The displays are complemented by photographs of wildlife and habitats found on the Island.

8. Hunting

Most of the south end of Matagorda Island falls within the two environmental education/interpretive zones designated as off-limits to hunting (cf. CMP, Map 5). There is a provision that a public deer hunt might be allowed in this area if necessary for population control.

TPWD is authorized at its discretion to conduct annual monitored public hunts for white-tailed deer, mourning doves, bobwhite quail, waterfowl and feral hogs on the Wildlife Management portion of the island. Both TPWD and FWS insure that this activity is compatible with refuge objectives. Results of this year's hunts are given under Wildlife, part 8.

Despite the hunting restriction on the island-proper, the extensive bayside marshes are all open to waterfowl hunting according to regular State and Federal regulations. Considerable wildlife disturbance results when guides use air boats to transport duck hunters to hunting blinds along the bayshore.

9. Fishing

Saltwater fishing is, hands-down, the most popular recreational goal of visitors to Matagorda Island. The sport is pursued year-round along the entire bayside, at both tidal passes and the adjacent surf, and at the public beach on the north end.

Fishermen arrive by private vessel and via the TPWD pedestrian ferry. When the Gulf is calm, fishing boats cruise through Pass Cavallo and anchor just beyond the surf zone along the northern two thirds of the island. Cedar Bayou is a designated fish pass and is not open to boat traffic, so the surf on the southern third of the island is fished mostly within walking distance of the tidal pass. On any given day when the bay is not too rough, private boats and wade fishermen can be seen on the oyster reefs and around the margins of the bays. Many of these parties are served by professional guides. During the summertime small boats ply the bayside shallows at night using powerful lights to locate flounder. Some fishermen moor their boats in Power Lake and walk across the island to fish at the Darlington shipwreck on the Gulf beach. They have been permitted this access so long as they do not litter the area or disturb the whoopers. Of greater concern are the fishing parties who enter the bayside inlets in air boats. The roar and vibration from these craft disturb wildlife and any other recreationists in the vicinity. However, such ingress is entirely legal.

On the south end of the island our main contact with fishermen is at the Gulf mouth of Cedar Bayou. On weekends in peak months more than 100 people visit this site and as many as 15 groups may camp overnight on the tip of the island. In general the fishermen are well behaved and present no problem to our management program. By providing them with shade shelters (see Camping) we have enticed them off the islets used by birds. There is a minor trash problem around the shelters, and sometimes dogs are allowed to roam unleashed. A word from uniformed personnel usually elicits willing compliance.

13. Camping

Camping is permitted at designated sites only. Primitive camping with access to shade shelters with tables, biodegradable toilets and an outdoor cold water shower is available

for a \$4 daily fee at the Army Hole and Public Beach at the state park. Free day-use is permitted on the J-Hook.

On the south end of the island almost all campers are fishermen, sometimes accompanied by their families, who visit Cedar Bayou. In 1995, FWS erected eight shade shelters complete with picnic tables on a sandy upland inside the Gulf mouth of the pass. These were available free of charge to anyone desiring to camp at the site. No additional services were provided, and campers were asked to pack out their refuse. By the end of 2000, the weather and the inherently unstable topography at the tip of the island had begun to take their toll on the camping area. Only three serviceable shade shelters remain and several plastic picnic tables have been displaced. The area is still used, but we need to evaluate the stability of the site before making renovations.

17. Law enforcement

On 21-23 Jan and again on 3-5 Nov, federal marshals stayed at the Center while they monitored local duck hunters. On 1-5 May a contingent of 7 federal agents stayed at the Center while conducting a business meeting.

Park Ranger Richard Ramirez while on patrol on the Matagorda Island State Park discovered a 2.5 lb brick of cocaine. Calhoun county Sheriff's Department Officers D. Blevins and P. Anderle took possession of the brick and determined that it was 100% pure with an estimated value of 50-80 thousand dollars street value.

I. EQUIPMENT AND FACILITIES

1. New Construction

The lighthouse boardwalk stretching from the lighthouse area through salt cedars and overlooking lighthouse pond was begun in 1998 as a YCC project. YCC continued working on the project in 1999. After the holidays staff resumed working on the lighthouse boardwalk in January 2000. In July refuge staff and YCC worked on the lighthouse boardwalk in preparation for adding the observation deck overlooking lighthouse pond. YCC began their week on the Island on August 1. They worked hard and nearly completed the observation deck. Rubin Garza (bio-tech), Jesse Cortez (laborer) and our staff completed the work in the following weeks.

In 1999 an Aransas NWR RONS project was construction of a boathouse at the Aransas dock for \$60,000. The dock area received damage in the 1998 tropical storms and was included for supplemental funding. Thus, an additional \$31,875 were added from 1998 storm damage funds to replace the damaged bulkhead. Materials were purchased in 1999 but the presence of whooping cranes, put off construction until April, 2000.



Staff demolishing the old boat dock on Aransas. FGP 4/00



Frank and Will (on excavator) using vibro-hammer to install sheet-piling.
FGP Summer/00



Frank, Will and Adolfo framing the boat house. FGP Summer/00



Completed boathouse on Aransas/Matagorda Island NWR Complex.
FGP 1/01

Will and Frank began May 1 working on the boat dock/bulkhead and continued throughout the month. The old dock and bulkhead was removed and 460 cubic yards of old spoil were excavated to increase the dock area. About 200 feet of fiberglass sheet piling were installed using a vibro-hammer to form the bulkhead. The contract for the boathouse piling installation was awarded and pilings were installed by Shirley and Sons Inc. Steve Rubio was brought on board June 10, as a laborer to assist with boathouse construction. By the end of June bulkhead installation was completed and work began on the boathouse. In July Steve, Will and David worked on the boathouse in between emergencies and other duties.

In August Jesse Cortez (laborer), Will, Rubin Garza (bio-tech), and David worked relentlessly on the boathouse. September was devoted to other projects and it was not until the end of October that work resumed on the boathouse and continued through November with the installation of the sheet metal. Boathouse work progressed rather well considering the many concurrent tasks in December. Shade cloth and water tanks were ordered for the boathouse. This project was near completion by the end of the year with overlap through February 2001.

2. Rehabilitation

The north dock on Matagorda Island, deteriorated due to years of neglect, was further damaged during the 1996 storms. Supplemental appropriations of 646K were designated to rehabilitate the damaged dock and entry channel. Work begun in November 1999 was completed in 2000. Shirley & Sons Inc. completed the finger pier construction and the bulkhead around the dock

building in January. The contract was finalized in May and an additional \$20,500 was paid for differing conditions. Following the north end dock, Shirley and Sons Inc. moved over to the Port O'Connor dock in February and constructed four finger piers in that dock as well. In March, refuge staff installed two dolphins at the north dock and pilings between the finger pilings at the Port O'Connor dock using the excavator on the barge

Kingfisher Marine, from Port Lavaca received the U.S. Corps of Engineers contract for dredging the Intra-Coastal Canal in Matagorda Bay and south of Port O'Connor. Dredging of the entry channel into the north dock was an add on in the contract. The portion for the Fish & Wildlife Service Channel dredging totaled \$222,250. Work on the spoil site construction began in December 1999 but dredging didn't occur until March and April of 2000. All pipe was removed by May 15.

Concurrent with the construction of the boat house, Kingfisher Marine was dredging and lining portions of the Intra-Coastal Canal along the Aransas refuge. As such, we came to an agreement with them to include the FWS channel from the boathouse to the Intra-Coastal Canal in return for past and current use of our boat launching facilities. The results of this work were tremendous, the channel has been deepened allowing us to park the barge during storms and the bank has been greatly stabilized allowing the channel depth to be maintained for a longer period.



FWS channel from Aransas boathouse to Intra-coastal waterway prior to dredging and lining. FGP 4/00



FWS channel being lined with reticulated concrete matting. FGP 6/00



FES channel half completed with concrete matting. FGP 6/00

The Enron Environmental Education Center's needs received some attention. In August Will went to El Campo to pick up a used cotton trailer to replace the existing one used to transport participants in Island's EE program. The original cotton trailer converted to a Conestoga was condemned due to heavy rust following a RO safety inspection by Vic Segura. In September Doc spent the month sprucing up the area in preparation for the fall reopening of the EEC.

Refuge staff cleaned debris from the headquarters area and made a barge run (Feb 16th) for disposal of approximately 40 yds of solid wastes and 30 yds scrap metal (given to a local recycler).

In June Steve and Will replaced the ceiling in the Matagorda residence (pilot house). The foam ceiling squares were replaced with paper pulp due to fire safety concerns after a safety inspection by RO Safety Officer Vic Segura.

3. Major Maintenance

Facilities

By years end the EEC reverse osmosis system required replacement of the motor, pump, filters, membrane and hose lines.

In February the shop generator (Onan) quit working. As a result portable generators were hooked-up to provide power in the meantime. Southern Field Maintenance out of Victoria was called out for repairs. Problems with Doc's (pilot house) main generator occurred in April. Doc's main generator remained down into May as parts were on backorder. The generators for the pilot's house continued to act up most of June. As a result, a representative from Waukesha Pierce was brought out to work on the Kohler to finally properly diagnose and repair the machine. Near the years end both Onan generators (6.5 & 7 kw's) were given major tuned-ups.

The headquarters windmill needed repairs to be operational. The Shasta Trailer was taken to ABC Trailer in Rockport for repairs. In November windmill assembly began and continued through December. We now need to anchor and erect the mills in the field. In addition, two 1500 gallon water storage tanks were purchased for the windmills for water storage. A third, 1500 tank was purchased for the Aransas boathouse to store water for cleaning the boats with.

Levees

Bids, purchase requisitions and plans for breakwaters and supplies were submitted to the RO for approval and purchase in February. These plans were intended as a permanent fix to the annual repairs required on the levees and culvert sites. Plans call for using sheet pile and lumber to create a 4' wall at the toe of the levee and extending around the culverts. In anticipation of this work we purchased a vibro-hammer for sheet piling installation. By years end the contract had still not gone out.

Boats & Barge

Typically water craft maintenance is the highest expenses for doing business on a barrier Island. The work boat was hauled out and required repairs during the spring. In June new motors (duel 135hp Mercury) were installed on the gray cabin boat. Boats were down throughout the month of July and kept David busy. At one time only one boat was operational, we had the work boat down with a leak in the steering, the blue boat down with a clogged oil line, the lower units on the shoalwater and Toms boat were out, and the coast guard boat had fuel problems from dirty tanks. That left only the Gray boat operational with new engines recently installed. The blue cabin boat was scheduled for a paint job and window replacement in September at House of Boats in Rockport. However, after the contract had been issued, the contractor went bankrupt and could not work on our boat. In November routine maintenance and repair of the blue cabin, shoalwater and coast guard boat occurred. At the end of the year we had to installed a new Raytheon radar and display in the blue cabin boat, the original Koden no longer worked. At the end of the year we still needed to get the blue cabin boat painted and window replaced.

At the end of the year the decision was made to accept via a transfer of property a 1971 42' aluminum crew/work boat from Delta NWR. This boat is equipped with twin GM V8-71 diesel engines, radar, fathometer, 14' beam, dinette, 4 bunks, galley, head and GPS and more.

The barge was in need of a bottom paint job and zinc anode replacement. In June bids for the barge were received and a contract was to be issued in July. On July 27 the barge contract was issued and the barge hauled out and dry-docked by Aransas Marine Ways in Aransas Pass. Its move to Aransas Marine Ways in Aransas Pass took nine hours. Upon dry-docking additional work was deemed required and a contract modification was issued. This work included the replacement of the cutlass bearings and repair of several small patches on the hull. The barge was

received back from Aransas Marine Ways on August 17. The first run following repairs was made on August 29. Unfortunately prior to making the run, the barge had to be pumped out due to an unknown leak. Thereafter, diligent periodic checks to keep the barge afloat were required until a new contract modification for warranty work and repairs was issued. The barge was returned to Aransas Marine Ways on September 19 to have the bottom rechecked for holes.

Felipe and David worked with Joe and Aransas Marine Ways on a modification to the contract. After inspecting the area of concern, a much larger piece (approx 400 sq ft) of the bottom panel needed to be replaced and repainted. Additionally, the barge engine room was thoroughly cleaned and oily wastes disposed of. The engine room was also coated with an anticorrosion compound for added protection. It was November 16 when barge work was completed and was returned to Port O'Connor. On November 20 the barge required the reinstallation of a packing gland, apparently it was too tight and ruined enroute from Aransas Pass. This work was completed by Will and David.



Barge getting worked on at Aransas Marine Ways, Aransas Pass. DS 8/00

Heavy Equipment and Tractors

The 3-point hitch on the John Deere 2555 tractor required repair due to use of heavy romo plow. The backhoe required replacement of one ball joint. The JD tractor required the replacement of all new hydraulic lines due to corrosion.

4. Equipment Utilization and Replacement

Regardless of the source new or used vehicles have a short life on Matagorda Island. Generally we take decently running vehicles excessed from other Service offices and use them on the Island for a couple of years. Unfortunately that has created a large group of difficult vehicles to maintain and repair. In 2000 a 1991 Ford Bronco was transferred to Matagorda Island from Law Enforcement who had used the vehicle under cover work. Also via Law Enforcement a 1986 Blazer was moved to the Island in October. The Dodge Dakota was removed to the excess yard as was the Dodge Van used by TPWD. This gives us a total of six vehicles on the island. This year we excessed 15 vehicles for the Complex and GSA put them up for sale.

On the mainland the white Dodge dually pickup was taken to Aransas Pass for replacement of the recalled headlight wiring harness as a fire hazard. The red 1987 Chevrolet van, originally on the island, was made serviceable to be used on the mainland between the headquarters and the boathouse.

5. Communication System

The hand-helds work moderately well except in stormy weather and from the north end of the Island. A second repeater/booster needs to be installed at Port O'Connor.

6. Computer System

The two ITP computers purchased for the station using Y2K funding by the regional office continue to comprise our computing system.

7. Energy Conservation

Energy Conservation has been a driving force over the past couple years. Propane generators are now our primary source of energy. Plans include continual upgrading to get a backup system in place, to meet actual energy needs and to incorporate reliable component for this harsh environment. In the past when primary generators were down for repairs or maintenance, we temporarily went without power.

This year we purchased a primary generator for the stations field office and EE Center. The setup will be similar to the setup for the Pilot House which incorporate a 10kw Kohler primary and 6.5 kw Onan backup. In this case a 12kw Kohler will provide the primary power and original 7kw Onan will be the back up. Total fuel costs are generally less than \$12,000.

8. Other

Cultural and Historical - Matagorda Island Hanger

The engineering assessment was contracted and the engineer spent a day in the hangar in January 2000. In February the engineering assessment on the hangar was completed. The report declared the building as unstable and unable to meet required wind loads. The refuge received guidance from the RO to remove all equipment from the hangar and not enter the facility. In March the hangar was emptied of all vehicles and equipment for safety concerns. Additionally, Charlie and Jennifer met with Texas Historical Commission on March 9. They were presented with the engineering report on the hangar and a need for their input into the MOA process between us and the State. The meeting went well. In May we received concurrence from THC on the removal of the hangar. Already in contracting's hands and moving forward, Bernie Freeman and Charles Caldwell worked on a contract to remove the hangar and other debris from the headquarters area. Potential contractors made a site visit for the hangar demolition project on June 24 and bid opening was scheduled for July 10. Bids closed on the Hangar demolition early July however, a contract had not been issued by the end of the month. At the end of August, we were notified that A/P Resources out of San Antonio was the successful bidder on the hangar demolition project. A/P Resources was given a notice to proceed on the hangar demolition but this was side-tracked when an asbestos survey became required. Benjamin Hernandez of Astex Environmental Services came out to inspect the hangar on MI for asbestos, none was found. Between the

pending engineers report, THC's approval, contracting and the asbestos survey much of 2000 went by. It was not until Dec 7 that the hanger demolition crew came over to assess the project and December 14 that hanger demolition began and overlapped into January 2001. The contractor AP Resources accepted an additional contract modification that included more debris removal from the Matagorda Island headquarter. This contractor did a good job.

Matagorda Island Lodge

In January supplies were purchased and the barge ran for delivery of lumber for impending "mothballing" project of the Matagorda lodge. In February work began on securing and stabilizing the lodge. Lodge grounds were mowed and louvers for the front porch of the lodge were in the process of being built, additional leveling was completed and patching of the roof was initiated by refuge staff and volunteers. In March the lodge consumed much of the month. Frank, Clarence, & Betty completed installing the louvers on the front porch. David and Will worked on covering the exposed roof surfaces. In April due to an injury to Will's hand, not as much of the lodge roof was patched. Although the areas where the roof was leaking were patched. To date much exposed cedar shingles remain uncovered as does the need for miscellaneous related mothballing needs.

J. OTHER ITEMS

1. Cooperative Programs

Matagorda Island is a cooperatively managed program between Texas Parks and Wildlife Department and the Service. In the 1990 (signed 1994) MOA and Comprehensive management plan, the agencies are separated by a division of duties rather than land. TPWD has primary responsibility for wildlife and habitat management; including the lead for environmental education. The Service takes the lead for wildlife and habitat management programs. Cooperation has continued to grow between the two agencies during these past couple of years.

On March 29 a meeting was held between TPWD, TGLO, THC, and USFWS to discuss the existing MOA between the agencies. Except for changes to require TSHPO's review on activities involving cultural resources, the agencies were pleased with the current agreement. A second meeting between TPWD and USFWS occurred July 10 to discuss specific wildlife/habitat issues between the two agencies. On September 14 we attended our first-ever Matagorda Island staff get-together. TPWD employees and FWS employees got together over lunch to introduce new employees and improve our working relationship.

The Service provided assistance to the TPWD program beginning in 1999 by rehabilitating the north dock, constructing the lighthouse board walk and removing the finger piers at Port O'Connor. Plans continue with a boardwalk through the bayside marsh to the Army Hole (a highly regarded fishing area). The FWS road grader was on loan to the MI State Park (TPWD) during September to work on the beach access road.

Several barge runs were completed to support both FWS and TPWD programs. April trips to the Island allowed volunteers on and off the Island and to bring a termite control contractor out for TPWD. Several Round trips for propane were conducted. A barge trip on April 27 with a return on May 7 to support the annual Adopt-a-beach cleanup. Two barge runs were made during May to move vehicles and supplies on and off the Island. In July Two barge runs were made to the Island: the first to bring out dumpsters and propane and the second to deliver lumber for the YCC project. In December the Wildlife Division (TPWD) put a new roof of their building and we assisted through bringing the roof contractor and supplies.

1st Annual Celebrating our National Wildlife Refuges

On August 16, Charlie announced he wanted to have a Refuge celebration on October 14. Both Felipe and Jennifer were members of the committee. The idea was to have a public annual event celebrating the existence of both Aransas and Matagorda Island NWR's in cooperation with local groups and businesses. Foremost for this celebration, was the importance of the local public to the refuge. This event involved a great deal of work from the entire staff. When it was all over we went to Matagorda Island for a day of fishing, cooking and fun.



Refuge Complex staff on Matagorda taking a break. WM 11/00

Matagorda Island Lighthouse

The initial focus for the foundation is restoration of the lighthouse. To this end, partners worked to prepare a Texas Department of Transportation (TXDOT) Grant for 80% of restoration costs (\$906,000). Notification to recipients brought good news, in January Calhoun County received the T21 grant from TXDOT for the restoration of the lighthouse. Private grants and donations were sought to meet the 20% required for matching funds. To this fund the refuge contributed \$20,000. We entered the new millennium with a strong partnership in place.

Through April, excess of the lighthouse still remained in the U.S. Coast Guards hands. In May the Coast Guard finally passed the excess of the lighthouse to GSA. One more step and it would fall into FWS ownership. However, discussion with Regional Office on June 28th, determined that acquisition of the lighthouse was not a preferred option for FWS. Concern over the outstanding claim of Joe Hawes on the .29 acre tract, the completeness of the Environmental Assessment and following historical guidance for excess were discussed. A meeting between Rod Krey, Dewey Stringer, Judge Arlene Marshall and the Refuge Managers was held September 26 regarding the lighthouse transfer. Afterwards, the Fish and Wildlife Service agreed to accept the transfer of properties and enter into an agreement with Calhoun County for the restoration and maintenance. In October work furiously began on completion of the transfer of the Matagorda Island lighthouse and the Cooperative Agreement with Calhoun County to meet deadlines.

Other Cultural Resources

Charlie and Jennifer hosted Joe Hawes and Dewey Stringer in May for a look-about on the Island. Dewey would like to do a magnetometer search over the trenches and where Joe picked up a rib from a Spanish Gallion.

Enron Environmental Education Center

The Enron Environmental Education Center continued its operation for the sixth year. The Center is a cooperative program between the Service and The Nature Conservancy of Texas (TNC). The Center is supported by an Enron Grant which is administered by TNC. From the grants proceeds TNC supports the Center by providing booking and transportation to the Island for the Center. In addition they help maintain the facility.

Beach Contaminants

In 1994 an MOA was established between the Texas General Land Office and the Service for cleaning up beach. The agreement enabled the Service to expend appropriated funds to reimburse the TGLO for costs associated with cleanup on the Matagorda Island beach. Funds were primarily for the cleanup of items that could not be covered by NPA or CIRCLA funds. Items in this list include: mercury vapor bulbs, medical waste, compressed cylinders and empty drums.

We conduct surveys inventorying the amounts of 5 gallon and above containers with fluids. The information is then forwarded to TNRCC who contracts a cleanup. Containers with contents are removed from the Island and then tested for contents prior to disposal. Emergency cleanup of leaking containers are handled by the U.S. Coast Guard on a need be basis. All loose oil or bagged oil is reported to the Texas General Land Office for cleanup.

In March of this year, we conducted an inventory of containers on the beach. Fifty-eight containers were noted. TNRCC was contacted and a cleanup was tentatively scheduled in May. The cleanup was not done because TNRCC had not completed reports on previous cleanups and submitted them for reimbursement. After finalizing previous cleanups, TNRCC was ready to schedule an October cleanup. In late August we did another survey of containers and found 63.

In October, the Texas Natural Resource Conservation Commission coordinated with the Texas National Guard, Center for Coastal Studies and a private contractor to pick up containers on the Matagorda Island beach. Four 40 yard roll-off containers were filled with empty containers. Among the containers with contents were hydrocarbons, benzene, and tetra-ethyl-ed. They cleaned the Island over a six day period which included a media event.

Four barrels of concern were picked up of the beach on November 2nd by the U.S. Coast Guard when a leaking barrel was discovered on October 29 by Wayne McAlister.



Contractor removing contaminants of concern from Matagorda Island.
FGP 2000

4. Credits

Wayne "Doc" McAlister wrote Sections D.5, G and H. Martha McAlister assisted with the graphics and transfer of data from the Macintosh to the IBM system.

Felipe Prieto wrote sections A, B, C, D.2, E, F, I, and J.

Jennifer Sanchez wrote section K and edited this Narrative.

Photo Credits: DS - David Stringo
FGP - Felipe G. Prieto
JS - Jennifer Sanchez
MM - Martha McAlister
MB - Micky Betties
WM - Wayne McAlister

K. FEEDBACK

A new millennium!!! The lighthouse, a symbol of the past, is relit and becomes a symbol of the future. A solid foundation and structure that has stood for nearly 150 years received an automated battery/solar recharged light. It is a beacon on the darkest night and has endured time, storms and battles. In the same way, Matagorda Island National Wildlife Refuge, has endured and remains alight.

Nearly 30 years ago, Matagorda Island became a part of the Aransas National Wildlife Refuge. Initially through an MOU with the U.S. Air Force, the Service began managing the Island for its wildlife values. A decade later the Service entered into an MOU with the State of Texas which established the Matagorda Island State Park and Wildlife Management Area, a unit of the National Wildlife Refuge System. In the early 1990's a new MOU with the State of Texas was forged and established the Matagorda Island National Wildlife Refuge and State Natural Area (State Park).

I use the term Matagorda Island National Wildlife Refuge liberally, in light of the fact that the second MOU was never ratified by the U.S. Congress. As the on-the-ground managers, the various facets of Texas Parks and Wildlife as well as myself manage according to the 1990 (signed 1994) MOU. This unratified agreement does put us in a very unsettled state. I am periodically reminded that we are not a National Wildlife Refuge. Thanks to Art Needleman, who argued our case, we received approval for a full color brochure. As a unit of the Aransas Refuge we were entitled to only a single-color brochure. Once again thanks to Art, we now have boundary signs that depict our partnership.

During the first year of the new millennium, Matagorda Island continues to stand firm. Our partnership with the State is strengthened through increased communication. Together we are seeking solutions to habitat and public use issues. Through new partnerships and developments, we continue to improve means of interpreting Matagorda Island for visitors and non-visitors. Through the support of the Aransas Refuge we continue to improve access, interpretation and on-island facilities.

We may never lose our stormy reputation but we endure and continue to look through the darkness for the light.