

NATIONAL KEY DEER REFUGE

Big Pine Key, Florida

GREAT WHITE HERON REFUGE

KEY WEST REFUGE

CROCODILE LAKE REFUGE

ANNUAL NARRATIVE REPORT

Calenday Year 1984

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

TABLE OF CONTENTS

	<u>Page</u>
A. <u>HIGHLIGHTS</u>	
	1
B. <u>CLIMATIC CONDITIONS</u>	
	1
C. <u>LAND ACQUISITION</u>	
	1
1. Fee Title.....	1
2. Easements.....Nothing to report...	
3. Other.....Nothing to report...	
D. <u>PLANNING</u>	
	2
1. Master Plan.....	2
2. Management Plan.....Nothing to report...	
3. Public Participation.....Nothing to report...	
4. Compliance with Environmental Mandates.....Nothing to report...	
5. Research and Investigations.....	2
6. Other.....	4
E. <u>ADMINISTRATION</u>	
	4
1. Personnel.....	4
2. Youth Programs.....	4
3. Other Manpower Programs.....Nothing to report...	
4. Volunteer Programs.....	5
5. Funding.....	6
6. Safety.....	6
7. Technical Assistance.....Nothing to report...	
8. Other Items.....Nothing to report...	
F. <u>HABITAT MANAGEMENT</u>	
	6
1. General.....Nothing to report...	
2. Wetlands.....	6
3. Forests.....Nothing to report...	
4. Croplands.....Nothing to report...	
5. Grasslands.....Nothing to report...	
6. Other Habitats.....Nothing to report...	
7. Grazing.....Nothing to report...	
8. Haying.....Nothing to report...	
9. Fire Management.....	8

TABLE OF CONTENTS

	<u>Page</u>
A. <u>HIGHLIGHTS</u>	
	1
B. <u>CLIMATIC CONDITIONS</u>	
	1
C. <u>LAND ACQUISITION</u>	
	1
1. Fee Title.....	1
2. Easements.....Nothing to report...	
3. Other.....Nothing to report...	
D. <u>PLANNING</u>	
	2
1. Master Plan.....	2
2. Management Plan.....Nothing to report...	
3. Public Participation.....Nothing to report...	
4. Compliance with Environmental Mandates.....Nothing to report...	
5. Research and Investigations.....	2
6. Other.....	4
E. <u>ADMINISTRATION</u>	
	4
1. Personnel.....	4
2. Youth Programs.....	4
3. Other Manpower Programs.....Nothing to report...	
4. Volunteer Programs.....	5
5. Funding.....	6
6. Safety.....	6
7. Technical Assistance.....Nothing to report...	
8. Other Items.....Nothing to report...	
F. <u>HABITAT MANAGEMENT</u>	
	6
1. General.....Nothing to report...	
2. Wetlands.....	6
3. Forests.....Nothing to report...	
4. Croplands.....Nothing to report...	
5. Grasslands.....Nothing to report...	
6. Other Habitats.....Nothing to report...	
7. Grazing.....Nothing to report...	
8. Haying.....Nothing to report...	
9. Fire Management.....	8

	<u>Page</u>
10. Pest Control.....	8
11. Water Rights.....Nothing to report...	
12. Wilderness and Special Areas.....	8
13. WPA Easement Monitoring.....Nothing to report...	

#### G. WILDLIFE

1. Wildlife Diversity.....	8
2. Endangered and/or Threatened Species.....	9
3. Waterfowl.....	14
4. Marsh and Water Birds.....	14
5. Shorebirds, Gulls, Terns and Allied Species.....	15
6. Raptors.....	16
7. Other Migratory Birds.....	17
8. Game Mammals.....Nothing to report...	
9. Marine Mammals.....Nothing to report...	
10. Other Resident Wildlife.....	17
11. Fisheries Resources.....Nothing to report...	
12. Wildlife Propagation and Stocking.....	17
13. Surplus Animal Disposal.....Nothing to report...	
14. Scientific Collections.....	17
15. Animal Control.....	18
16. Marking and Banding.....	18
17. Disease Prevention and Control.....Nothing to report...	

#### H. PUBLIC USE

1. General.....	19
2. Outdoor Classrooms - Students.....Nothing to report...	
3. Outdoor Classrooms - Teachers.....Nothing to report...	
4. Interpretive Foot Trails.....	19
5. Interpretive Tour Routes.....Nothing to report...	
6. Interpretive Exhibits/Demonstrations.....	20
7. Other Interpretive Programs.....Nothing to report...	
8. Hunting.....Nothing to report...	
9. Fishing.....Nothing to report...	
10. Trapping.....Nothing to report...	
11. Wildlife Observation.....	20
12. Other Wildlife Oriented Recreation.....Nothing to report...	
13. Camping.....Nothing to report...	
14. Picnicking.....Nothing to report...	
15. Off-Road Vehicling.....Nothing to report...	
16. Other Non-Wildlife Oriented Recreation.....Nothing to report...	

	<u>Page</u>
17. Law Enforcement.....	21
18. Cooperating Associations.....Nothing to report...	
19. Concessions.....Nothing to report...	

I. EQUIPMENT AND FACILITIES

1. New Construction.....Nothing to report...	
2. Rehabilitation.....Nothing to report...	
3. Major Maintenance.....	22
4. Equipment Utilization and Replacement.....	23
5. Communications Systems.....Nothing to report...	
6. Energy Conservation.....	23
7. Other.....Nothing to report...	

J. OTHER ITEMS

1. Cooperative Programs.....Nothing to report...	
2. Items of Interest.....	27
3. Credits.....	29

K. FEEDBACK

NTR

GREAT WHITE HERON REFUGE

30

KEY WEST REFUGE

31

CROCODILE LAKE REFUGE

32



4 7 2 3 5

BG

PERSONNEL

1. Don J. Kosin	Refuge Manager (Transferred 6-10-84)	GS-11 PFT
2. Deborah G. Holle	Refuge Manager (EOD 6-22-84)	GS-11 PFT
3. Bonnie Bell	Assistant Refuge Manager	GS- 9 PFT
4. Edward D. Freeman	Assistant Refuge Manager (EOD 7-22-84)	GS- 7 PFT
5. Chester J. Eldard	Maintenance Worker	WG- 7 PFT
6. Judith A. Kosin	Clerk-Typist (Resigned 6-10-84)	GS- 3 PPT
7. Phyllis A. Copeland	Secretary/Typing (EOD 8-20-84)	GS- 4 PPT

Review and Approvals

Deborah Holle 3/4/85  
Submitted by Date

Bill A. Gabriel 3/15/85  
Regional Office Review Date

## INTRODUCTION

National Key Deer Refuge located in Monroe County, Florida, was established under the following authorities: Interior Department Appropriation Act, February 1, 1954, which provided authority for the leasing and management of lands for Key deer. Public Law 85-164, August 22, 1957, which established National Key Deer Refuge not to exceed 1000 acres located in townships 65 and 66 south, ranges 28, 29, and 30 east. Public Law 89-669, October 15, 1966, provided the Secretary of the Interior to acquire land by purchase, lease, exchange, and donations; including the use of donated funds for lands located in the above townships. The purpose for establishing the refuge was for the conservation and management of Key deer and other wildlife. Total acreage within the refuge was approximately 6005 acres at the close of the year.

The topography is flat and low in elevation and consists of limestone formations believed to be the remnant of a massive coral reef exposed over 50,000 years ago. A very thin layer of topsoil covers most of the Keys and consists primarily of disintegrated rock mixed with organic matter, shell, and some sand.

The vegetation is typically tropical. Due to the lack of suitable topsoil, plants grow slowly and usually do not attain large proportions. Vegetation tends to be non-continuous; with plants establishing themselves where they can in the cracks and crevices of the limestone. Within the undisturbed hardwood hammocks, a peat-humus layer, 12 to 18 inches thick, covers the limestone and vegetative growth is continuous.

### A. HIGHLIGHTS

Crocodile Lake, Key West and Great White Heron Refuges are treated in summary form and are bound separately within this volume.

Key deer receive increased local and national news attention.  
(See G.2.- Wildlife, Endangered Species)

Infusion of new blood into personnel ranks  
(See E.1.- Administration Personnel)

Key deer roadkills decline dramatically  
(See G.2.- Wildlife, Endangered Species)

Crocodile Lake explodes with new acquisitions  
(See Crocodile Lake NWR Report)

Law Enforcement activities expand (See H.17-Public Use, Law Enforcement)

### B. CLIMATIC CONDITIONS

Florida Keys' weather is characterized by moderate temperatures that average from about 82°F (28°C) in the summer to about 68°F (20°C) in the winter months. The annual rainfall cycle is very distinct; with a rainy season from June to October and about 70% of the rainfall occurring then. The ten-year-rainfall average exceeds 40" which is 15-20" less than that of the mainland.

Hurricanes occur in the Keys on the average of once every 4.2 years. This past year, hurricane Lily developed in the Atlantic, but posed no threat to the refuge. Several tropical storms were experienced with extensive erosion along the Atlantic coastline near Vero Beach being felt.

	88	83	87	88	90	91	93	92	89	89	84	85	AVER.
MAX	88	83	87	88	90	91	93	92	89	89	84	85	88.25
MIN	47	43	43	52	64	62	68	71	69	68	61	46	57.8
RAINFALL	.62	3.67	2.58	2.37	5.09	4.00	2.48	3.87	6.12	2.26	1.61	.14	34.91"

34.19" represents a 25% decrease in rainfall from a ten-year average of 46.55 and is a 40.5% decrease in rain from 1983.

### C. LAND ACQUISITION

#### 1. Fee Title

With acquisition funding of \$2.0 million for FY84 and \$2.45 million for FY85, National Key Deer has acquired by Fee Title or had monies obligated for 1004.09 acres at a cost of 2,281,000. This eighteen percent increase in the size of National Key Deer results from renewed efforts by

National Audubon Society, The Trust for Public Lands and the Service to protect remaining undeveloped Key deer habitat. Future acquisition energies will be directed toward No Name Key which is the largest undisturbed remnant of Key deer home range. Service purchases on No Name Key presently include 237 or 24% of the island's 1002 acres.

Tract #	Owner	Acres	Cost
102 m,n,p,q	TPL	30.75	370,000
102 g	TPL	95.50	290,000
87 g,h	Nat'l Audubon Soc.	235.00	500,000
261	Weidman, Ralph B.	2.73	9,500
266a-e	Heil, Charles C.	70.00	130,000
102f	TNC	80.00	(Gift)
Sub-totals		531.98	\$1,299,500

Agreement Executions

266	Heil	1.0	30,000
286	Heil	.88	5,000
273	Orr	.88	5,000
250	Stankunas	59.47	195,000
102s,t	TPL	392.93	700,000
258a	Garcia	6.75	23,000
102r	TPL	25.00	12,500
249a	Stennett	3.2	11,000
Sub0totals		490.11	\$981,500
TOTALS		1,004.09	\$2,281,000

D. PLANNING

1. Master Plan

Refuge objectives were updated. This consisted of listing Crocodile Lake NWR objectives separate from National Key Deer Refuge objectives. Production figures for endangered species were also added.

5. Research and Investigation

National Key Deer NR82 - Interactions of Key deer and Selected Habitat Types

In 1982, five (5) exclosures and control plots were established to study browse pressure in selected habitat types by Key deer. Two (2) of the 625 square feet exclosures were placed in pine woods with one each in mangroves, mixed hardwoods, and a grass prairie. Karen Achor, a contract botanist, has carried out the investigation with assistance from ARM Bell in 1984. By correlating a new herbarium collection to the exclosure sites, greater continuity now exists between past and future investigations by newer personnel unfamiliar with tropical vegetation.

To date, 85% of the known species have been dried in a newly constructed dryer and mounted by volunteer Virginia Goulet.

National Key Deer NR81 - The Status and Distribution of the Silver Rice Rat in the Florida Keys

Surveys for the silver rice rat on Boca Chica, Johnston, and Big Pine Keys were conducted during 15-29 February. Efforts on Boca Chica and Big Pine were hindered by raccoon and deer interference with traps.

Although no rats were found on these Keys, available habitat and freshwater supplies imply their presence.

In contrast, trapping success was 90% on Johnston Key. Twelve (12) individuals were caught, providing the highest trap-night success of all surveys conducted for the silver rice rat. Age-class distribution indicates ongoing reproductive activity and recruitment of offspring.

It appears that the rat is more abundant on certain larger Keys. Due to an ability to exist on up to 50% seawater, they survive more easily on these large Keys during dry periods. Drought induced mortality is probably the rule on smaller Keys as freshwater supplies diminish. This ebb and flow of the population will become more extreme as larger Keys are developed and habitat is lost.

6. Other

The revised Key Deer Recovery Plan was completed on December and forwarded to the Endangered Species Office in Jacksonville, Florida. This revision was started in 1983 by refuge biologist Steve Klett and completed by Assistant Manager Bell.

E. ADMINISTRATION1. Personnel

Personnel changes for the year were quite extensive. Don Kosin, the second manager ever at National Key Deer Refuge, transferred to Big Lake NWR after contributing nine (9) years of service at the refuge.

Deborah Holle transferred from St. Marks NWR on July 23rd to assume the duties of Refuge Manager of National Key Deer.

Don's wife, Judy, resigned as clerk-typist just prior to his transfer. Judy was hired in 1982 on a special 30-day appointment after the clerk retired and numerous difficulties were encountered in filling the position. Judy's appointment was extended several times and in March, 1983, she was converted to PPT 16 hour work week.

On August 20th, Mrs. Phyllis A. Copeland was hired as a secretary/typist. Her husband is stationed at the Naval base in Key West.

On July 23rd, Edward D. Freeman transferred from Bogue Chitto NWR as a Refuge Manager (trainee) and will be assigned to Crocodile Lake NWR next year.

Bonnie Bell was promoted to a GS-9 Refuge Manager on December 23rd.

## Personnel Status

	Permanent		<u>Temporary</u>	Total <u>FTE</u>
	<u>Full-time</u>	<u>Part-time</u>		
FY84	4	1	0	4.8
FY83	3	1	1	3.8
FY82	3	1	1	-
FY81	3	1	0	-
FY80	3	2	1	-

2. Youth Programs

It would appear that "island living" is not always favorable to youth programs as once again we were unable to fill both YCC positions. Fortunately, our one enrollee, Tom Teet, proved to be worth his weight in gold; whether it be performing general maintenance or data analysis.



Tom Teet - YCC 6/84 CE

Not only did Tom complete the program, 6-11 thru 8-17, but he continued to volunteer his time throughout the year; especially during holidays. Youths of such caliber are few and far between in the Keys. Hopefully, next year we will be able to overcome the lack of interest and transportation that has plagued the program.

#### 4. Volunteer Programs

1984 was a "boom or bust" year for the volunteer program. We began the year with four (4) active volunteers ranging in age from 21 to 79 who served both in the office and in the field. By early summer, we were down to one (1) youth who was assigned 48 hours of community service through the Monroe County Sheriff's department. New jobs, new schools and a new home were responsible for the reduction in volunteers. With the numerous changes in personnel during the second half of the year and the resulting breaking-in period, the volunteer program was briefly set aside. "Unofficial volunteers" continue to help in the monthly deer census.

Although there is a large retired community in the vicinity, numerous reservations as to working with the station have been expressed. The primary objection, often from spouses, is that one should not work for the federal government for free. A few individuals would rather not be associated with the "environmentalist" but there are still a few good soldiers out there that could be brought in with some effort. It has often been difficult, due to the size of the staff, to coordinate with the volunteer their access to the station. With a new part-time

secretary things should improve logistically once the program is cranked up again.

#### 5. Funding

The refuge received \$221,800 at the beginning of FY84, only to have \$35,000 taken away for YOC expenses and to cover part of the Regional deficit. The budget included money for the start up of Crocodile Lake NWR which included a pickup, boat, tractor and mower, plus personal costs.

#### FY84 Budget by Program

Refuge Operations & Maintenance	1260	\$102,000	55%
ARMM Projects	1260	70,000	37%
Qtrs. Operations & Maintenance	1994	3,000	2%
Endangered Species-Recovery	1480	11,000	6%

In FY83 the special funds were for firetrail and building rehabilitation of the headquarters area and for waterhole construction on the islands in the back country. Also, money was available for the activation of Crocodile Lake in FY81. The activation did not take place since land acquisition money was cut from the budget.

#### 6. Safety

Formal safety meetings are held each month. They generally revolve around a safety film and/or any memos or other information the Regional Safety Office sends.

During the year, three (3) films on defensive driving were viewed to partially fulfill defensive driver training requirements. No accidents occurred during 1984. The last lost-time accident was reported in 1974.

In September, it was noted that the chlorine tanks in the sewage treatment plant were rusted and had not been hydrostatically tested since 1977. Arrangements were made to have the unsafe containers removed, but they were still in the STP at the close of the year.

### F. HABITAT MANAGEMENT

#### 2. Wetlands

Florida Keys wildlife, its pristine water quality, commercial and sport fisheries, and a host of tourist related activities are directly affected by the quality of the Keys' wetlands and submerged grass beds. A delicate relationship existing between wetlands, wildlife, and man is underscored by the many tiered regulatory attention provided them by local, state, and Federal agencies as well as numerous citizens groups.

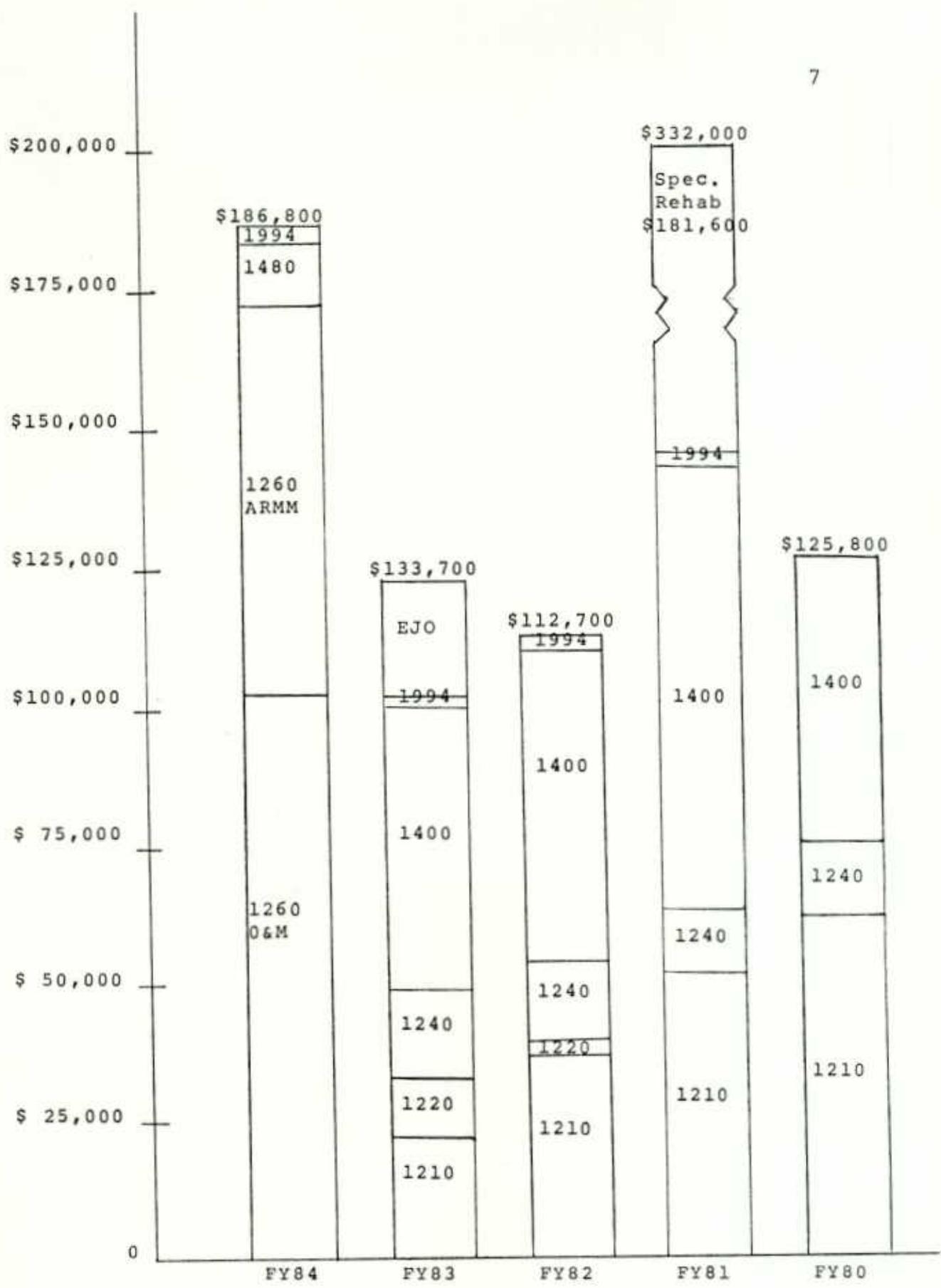


Figure 1. Five Year Funding Summary at National Key Deer Refuge, FY80-84.

Florida Keys' wetlands are dominated by immense communities of red, white, and black mangroves and their associated transitional plants. These mangrove ecosystems occupy diverse physiographic niches as tidal forests, tidal swamp forests, mangrove swamps, fringing forests, and overwash islands. Their ability to invade this wide spectrum of ecotypes is related to their climate, saltwater, tidal, and substrate requirements being successfully met in Florida's tropics.

#### 9. Fire Management

The FY84 Prescribed Burning Plan was approved, but all actions were deferred until Frank Cole, Fire Management Officer at Merritt Island NWR, could make an on-site evaluation of the burning program. Smoke management is a major concern as the prescribed burn units are adjacent to housing developments.

Only one wildfire was reported during the year. It occurred near Blue Hole, a public use area, but involved less than  $\frac{1}{2}$  an acre and other than exposing an abundance of old bottles and cans, there was no damage to the habitat.

#### 10. Pest Control

Chemical and/or biological control proposals from Monroe County Mosquito Control were not received by the end of the year. Cooperation with guidelines for aerial spraying, established in 1982, has been adequate although notification of the spraying of refuge lands is sometimes overlooked. The effects of Dibrom, altocid, Tecknar B.T.I. and Abate 5G on the endangered American crocodile hatchling and Shaus' swallowtail butterfly are not yet known.

#### 12. Wilderness and Special Areas

National Key Deer Refuge has 2,278 acres designated as wilderness; Key West NWR, 2,019; and Great White Heron NWR, 1,830 for a total of 6,127 acres. The wilderness areas consist of numerous mangrove islands. Most mangrove islands are inhospitable to the average visitor. The Marquesas Islands are the exception as they provide white-sand beaches which are attractive to campers. Camping, fire, and littering detract from the wilderness aspect of the area. The Marquesas Islands are within 25 miles of Key West and the area has had a history of non-conforming uses, particularly camping. Due to the island's remoteness, only limited patrols are possible.

### G. WILDLIFE

#### 1. Wildlife Diversity

The tropics is often considered one of the most diverse biomes in the world. The climate and the insular environment support a vast array of

species; both endemic and exotic in origin. The pressures from man's development of the islands place distinct limitations on the wildlife population numbers. As a result, management is primarily directed at maintaining stable and diverse wildlife populations rather than the addition of numbers.



Bayonet Trees (Agave sisalana) 1/84 DK

## 2. Endangered and/or Threatened Species

### A. Key Deer

On January 18th, a meeting was held at refuge headquarters with representatives of the U.S. Fish and Wildlife Service, Army Corps of Engineers, Florida Freshwater Fish and Game Commission and Southern Illinois University to address the present status and future of the Key deer and its management.

For many, the meeting was quite an eye opener in view of a gradual decline in the population since 1978. Census and mortality data in connection with field observations resulted in the reduction of the estimated population from 400 in 1978 to the present level of 250 to 300 animals. The gradual decline is primarily attributed to rapid development; both within and around the refuge boundaries and the ensuing habitat losses and human disturbances associated with such encroachment. Widening and refurbishing of US Hwy 1 and its bridges have made the Lower Keys far more accessible to tourists and residents alike. The two major causes of man-induced mortalities are cars and free-roaming dogs (Table 1). These factors are indicative of the ever growing human populace in the Keys.

Table 1. Key deer mortalities 1973 through 1984.

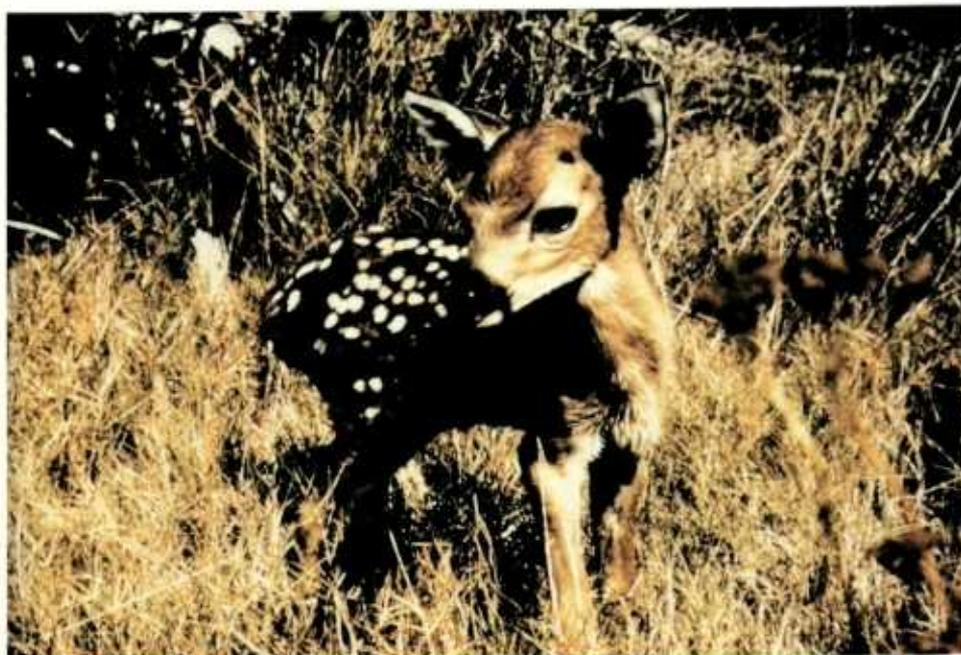
MORTALITY	YEAR												TOTAL
	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	
Total Mortalities	56	43	48	48	53	70	88	61	59	52	53	38	669
Roadkill	46	40	45	43	47	59	60	50	48	45	42	29	554
Total Miscellaneous Deaths	10	3	3	5	6	11	28	11	11	7	11	9	115
Unknown/ Natural	6	1	2	4	3	6	18	7	4	3	4	4	62
Dog related	-	-	-	1	2	1	5	2	4	1	5	4	25
Poaching	-	2	1	-	-	3	5	2	3	2	-	-	18
Drowning	4 <sup>a</sup>	-	-	-	1	1	-	-	-	1	2	1	10

<sup>a</sup>includes three drownings of fawns in mosquito ditches

As a result of the January meeting, the following management priorities addressing the Key deer were identified.

- continued emphasis on land acquisition
- reduction of mortalities from dogs
- updating and continuation of monitoring program
- further evaluation of research needs as they address the management program outlined by the Recovery Plan with special emphasis on population dynamics and habitat manipulation

During the remainder of the year, efforts were directed at addressing the above priorities. The land acquisition program was in high gear throughout the year with special emphasis on No Name Key (Section C). Numerous radio spots addressing free-roaming dogs, as well as articles on the impact of dogs on the Key deer herd, were on the increase; especially with the cooperation of State Wildlife Officer Larry Lawrence. Pressure continues by local residents and members of Friends of Animals on the county to provide an animal shelter on Big Pine Key. Many residents, concerned about the number of free-roaming pets, are assisting in the battle by reporting and identifying dogs and owners. Such cooperative efforts are vital to the reduction of dog related deaths of Key deer.



Young of the Year

4/83 SK

ARM Bell completed the Revised Recovery Plan incorporating the new management directives and updating the present status and needs of the Key deer. Further updating of census and mortality data as it

reflects population levels and distribution was investigated. Dr. Stephen Humphries of the Florida State Museum offered assistance in the data analyses. The ADP office in Atlanta will also be utilized in the computer assimilation of a data base and statistical package.

At the closing of FY84, it became apparent that monies ear-marked for the filling of mosquito ditches which entrap and drown fawns could be better utilized for the purchase of radio-telemetry equipment. The completion of the EA and the subsequent filling of the ditches had been held up due to concern over the effect(s) on the Key mud turtle (Kinosternon bauri bauri). Approximately \$8,000 of radio-telemetry equipment including collars, receiver, accessories, and environ-housings were requisitioned from Telonics, Inc. The project is directed at assessing numbers, distribution as well as providing an opportunity to mark members of various age classes of Key deer. The implementation of the program was awaiting selection of researcher(s). By the year's end, interest in the project had been expressed by the Florida Freshwater Fish and Game Commission and the University of Florida Cooperative Research Unit.

Twenty-nine roadkills and nine miscellaneous deaths, including four by dogs, were recorded for 1984. These numbers show a 28% decrease in total mortalities and a 31% decline in roadkills from 1983. The reduction in mortalities may be attributed to the following:

- increased activity i.e., vehicles, construction, lighting along US #1 which historically is the location of the greatest number of roadkills; such activity appears to have redistributed the deer north and south of the highway
- gradual decline in the Key deer population
- reduction in hand feeding of deer which has habituated deer to the roads

Despite what appears to be a drastic decline in deaths, there is by no means room for a sigh of relief. The question always arises as to whether the public is more aware, or the deer are fewer in number. Unfortunately, it is felt that the decrease is due to a decline in deer numbers. Population monitoring via gross necropses and monthly road censuses continued throughout the year. The numerous staff changes precipitated the monthly sampling of water holes on various outlying Keys. Three samples were run for salinity with associated observations on deer use in the area. When monies are available, galvanized "Guzzlers" may be employed in lieu of the hand-dug holes. It is hoped that these structures would reduce maintenance costs as well as provide a more stable source of freshwater for the deer.

The plight of the Key deer got state and national attention following an article by Al Burt in the Tropic magazine, an insert in the Sunday Miami Herald. The article, entitled "The Key deer - Dying", factually described the declining status of the deer in view of man's increased development of the Keys. Two television segments were spawned from

the article, one with national network CNN, and the other with Channel 10 in Miami. The latter proved to be an excellent 3 minute segment that addressed the falling population and the impact of man and dogs on the deer. The news team was commended for its efforts.



Water hole on Water Key

1/84 DK

On the "homefront", the same article drew the attention of Under Secretary Ann McLaughlin, who requested a statement addressing the factuality of the article and the who, what, why, when, and where of the situation. A statement was sent to McLaughlin via the Atlanta office. Although the reply was forwarded to Endangered Species in Washington intact, the section addressing funding needs for research, etc. was omitted from that which was forwarded to the Under Secretary.

#### B. American alligator

The lower Keys support a small population of 100 to 150 American alligators. The lack of good freshwater habitat is the reason so few use the area. Most observations are made at the Blue Hole, a popular public use area that resulted from an old quarry operation. The pond is often occupied by one or two mature gators measuring 10 to 12 feet in length. Juveniles up to 304 feet are occasionally present. Despite their close proximity to residences and their occasional use of the canals for travel, the alligators are accepted by most of the community.

Unfortunately, one five foot gator was not deemed too valuable. On November 16th, the one-eyed creature was on the corner of Narcissus and Pine Street near ARM Bell's residence; she relocated it to refuge

property that afternoon. The following Monday, the 18th, the report of a dead gator in the Blue Hole came to the refuge staff. Upon inspection, it was found that the one-eyed gator had been killed by one of the larger ones in the pond. Further "snooping around" revealed that local residents, disturbed by the presence of the creature in their canal, had placed it in the Blue Hole. Most of the locals are well aware that very few small gators can compete and survive in the pond.

C. Southern bald eagle

This year showed a distinct change in our bald eagle nesting activity. Historically, three nests have been active in the Lower Keys, generally producing two young each. In early August of 1983, pairs returned to Cudjoe and Little Spanish nests. In late September, only a single adult was seen on Little Pine Key. Subsequent observations through March of 1984 reported the fledging of two young; both from Cudjoe and Little Spanish Key. No sign of young were observed at Little Spanish. It was felt that there had been a loss of a mate, resulting in the single mate returning to the nest which is not uncommon. Our suspicions were somewhat confirmed when the same pattern was noted this winter. Sightings of pairs at Cudjoe and in the vicinity of Little Spanish Key were reported at year's end.

D. Key tree cactus

The Key tree cactus (Cereus cereus robinii) was listed as endangered on July 19, 1984. This "woody" cactus often reaches a height of 10 meters. One, out of a population of five, is found on the refuge in Cactus Hammock. The isolated populations and over-collecting were major factors leading to the federal listing.

E. Peregrine falcon

Falcon sightings pretty much held their own with six individuals reported during the year. One falcon was sighted along a power line by refuge headquarters in December.

Just a note: a cursory review of current state and federal listings for endangered and/or threatened species in the Florida Keys revealed that 81 species are found on the refuge, 13 listed as federally endangered. Four new plant and animal species are proposed for listing during 1985.

3. Waterfowl

Blue-winged teal and red-breasted mergansers are the primary waterfowl species found on the refuge. Their arrival was somewhat delayed by the unusually warm weather, with populations peaking in December 1983. Sightings of Northern shovelers and ring-necked ducks were also recorded during December.

4. Marsh and Water Birds



Immature white ibis                      1/84                      DK

The first quarterly aerial bird census was conducted on December 17th by RM Holle and ARMs Bell and Freeman. It was the first time for the staff to get an aerial view of birds on the refuge. The 1,968 birds recorded included five species of marsh and water birds totaling 709. Double-crested cormorants and common egrets topped the list. Thirty-nine great white herons were reported during the flight. Not including staff time, the 3½ hour flight cost \$481.13.

On December 19th, ARM Freeman "ground truthed" by boat a portion of the aerial census. As with the Christmas Bird Count of the 15th, the extreme tidal fluctuations during the month did not provide access to portions of the route. It is felt that due to the 925 square miles of suitable habitat in the area, censusing colonial bird nesting sites might give us a better population estimate.

##### 5. Shorebirds, Gulls, Terns, and Allied Species

Here again, the vast habitat for these species makes adequate estimates difficult. Generally, shorebird censusing has been conducted along a ½ mile stretch of beach at Bahia Honda State Park in conjunction with the Manomet Survey. Censusing was limited this year due to reductions in staff and other personnel changes.

Despite the limitations during the Christmas Bird Count, it was felt that shorebird counts were truly down for the year. Use days and peak populations were down close to 5%. Least tern numbers and production levels which are surveyed by the State were steady with an 8% increase

in production.

6. Raptors

An unusually high number of turkey vultures, our #1 raptor, was observed throughout 1984. By the fall, use days and peak populations for the vultures were up 14%. Red-shoulder hawk, American kestrels, and ospreys, the Keys "roadside pigeon", remained stable with peak populations occurring at the close of the year.

Unfortunately, long periods of high winds during the fall and early winter took its toll on both young and adult raptors. Three ospreys, an adult red-shouldered hawk, and an immature broad-winged hawk were brought to the headquarters for treatment. Gross observations indicated that most had been stunned during collisions with power lines and/or windows. Some had been "grounded" long enough to have become somewhat emaciated.



Injured young broad-winged hawk suffered one fall too many.

12/84 EDF

With the exception of the broad-winged hawk, all patients were released after a few days. The broad-winged seemed to be on its way to recovery when it fell victim to a freak accident. Apparently, the bird fatally injured its neck when it fell from its perch.

Interestingly enough, when pin fish were not readily available, ospreys would partake of small amounts of deer liver. One individual took to the air after just a few morsels.

#### 7. Other Migratory Birds

July and August saw the yearly influx of the white-crowned pigeon and the Florida mangrove cuckoo; two of the most sought after species by birders in the area. These species represented over a million use days for the year. On the whole, use days and peak populations for our migratory birds remained steady.

#### 10. Other Resident Wildlife

Dr. James D. Lazell of The Conservation Agency reported a new marsh rabbit from the Lower Keys. Dr. Lazell determined that Silvilagus palustris hefneri was a separate subspecies from the Upper Keys S. p. paludicola. Interestingly enough, the patronym comes from none other than Hugh H. Hefner whose Playboy Corporation supported that study. Needless to say, rumor has it that this is Hugh's true "bunny".

#### 12. Wildlife Propagation and Stocking

On June 17th, a roadkilled doe, age 7 years, was picked up on Cudjoe Key, 9 miles west of Big Pine Key. The lactating doe was one of seven relocated from Port Pine Heights subdivision on Big Pine to Upper Sugarloaf Key on March 9, 1982. Upper Sugarloaf is approximately 15 miles from Big Pine. The relocation was part of a continuing effort to reduce remnant groups of pet deer which were habituated by residents in the development. Four corporalutera scars were found during the necropsy.

Although sightings of tagged deer in the area have been reported, this is the first concrete evidence as to the success of the relocation program. Attempts to further reduce the "pet" deer will continue as directed under the Revised Recovery Plan.

#### 14. Scientific Collections

The following collections and/or surveys were active during 1984:

<u>Researcher</u>	<u>Subject</u>	<u>Organization</u>
R. M. Baranowski	Hemiptera spp.	Agriculture Research Education Center Homestead, Florida

<u>Researcher</u>	<u>Subject</u>	<u>Organization</u>
Lynne Chase	Saltwater mosquitos: ( <u>Aedes sollicitans</u> & <u>Aedes taeniorhynchus</u> )	Rutgers University
Loretta Nyberg	Fall army worms - ( <u>Spodoptera frugiperda</u> )	AREC, Homestead Florida
Joel Trexler	Sailfin mollies ( <u>Pecilia latipinna</u> )	Florida State University Tallahassee
John Jaenike	Fruit fly ( <u>Drosophila tripunctata</u> )	University of Rochester, New York
Craig Faanes	Prairie warbler ( <u>Dendroica discolor</u> & White-eyed vireo <u>Vireo griseus</u> )	USFWS Northern Prairie Research Center
Russell Monson	<u>Flaveria linearis</u>	Univ. of Colorado, Boulder
Stewart B. Peck	Scavenging beetles ( <u>Leiodidae</u> spp. & <u>Stephylinidae</u> )	Carleton University Ottawa, Canada

#### 15. Animal Control

The refuge provides live traps for local residents in their continuing battle against the notorious raccoon. By late winter, it is not unusual to have a waiting list for the traps. We only ask that they be replaced if damaged and that the raccoons are not returned to us. The raccoon problem was diminished slightly in the spring by a distemper breakout. Unfortunately for most of the community, it was not enough.

The few reports of nuisance alligators are referred to the state which will relocate those five feet or more in length.

#### 16. Marking and Banding

All injured Key deer that survive are tattooed and tagged upon release. There were no survivors this year. The need for more tagged animals, especially for census and life table data, is very important. Efforts to tag fawns and adults have been limited by lack of personnel. It is hoped that the necessary marking can be performed in conjunction with the proposed radio-telemetry project.

The following band return reports were filed during the year:

<u>Date</u>	<u>Species</u>	<u>Location</u>
1/26	Immature Eastern brown pelican	Saddlebunch Key
2/13	Adult black skimmer	Big Pine Key

<u>Date</u>	<u>Species</u>	<u>Location</u>
7/13	Laughing gull	Big Pine Key
12/23	Adult Eastern brown pelican	Bahia Honda

Can you identify this band? F.C.C. 27519  
 It belongs to a pigeon confiscated by the USDA Animal and Plant Health Service in Key West on March 20th. The bird was found aboard a yacht from Cuba. Neither the Bird Banding Laboratory nor several pigeon banding organizations could identify it.

#### H. PUBLIC USE

##### 1. General

Public use on the refuge showed a dramatic decline as total visits were down 26%. This drastic drop may be due to several factors. Since August of 1983, our directional signs on US Hwy #1 have been absent. They were removed by the Department of Transportation during widening of the road. Further work on the highway by the Florida Keys Aquaduct Authority, Southern Bell and City Electric Systems, Inc. were the reasons given for the delay in their replacement. Negotiations with DOT as to their location and replacement were still ongoing at years end. In addition, the trail counter at the nature trail has not been replaced since its theft in September of last year. Public use estimates are calculated based on the traffic counter at refuge headquarters. Although the percentage of trail users in relation to the traffic count has been incorporated in the calculations, there is room for error.

	<u>VISITS</u>		
FY81	FY82	FY83	FY84
37954	37864	38816	28803

Five on-refuge programs reached 67 people for a total of 50.5 activity hours. The number of programs was down 61%. An average of 13 persons attended each program.

On the up side, off-refuge programs increased 27% with eleven programs reaching 448 people for 304 activity hours. The majority of the off-refuge programs are given to local civic or conservation groups and the local schools. With the exception of the public parking area at the headquarters, there are no adequate facilities for programs, especially those involving slides.

##### 4. Interpretive Foot Trails

The long awaited revised guides for the nature trail arrive in March. They had been on order since February 1983. In memory of former manager Jack Watson, the brochures were changed from the Pine Woods Nature Trail

to the Jack C. Watson Nature Trail. Additional changes to text and one drawing were incorporated in the revision. Efforts by local organizations to place a permanent plaque at the trails entrance were in progress at the closing of the year.

6. Interpretive Exhibits/Demonstrations

In August, a three paneled kiosk depicting public use opportunities, the National Wildlife Refuge System and wildlife management programs at the refuge was ordered from Wilderness Graphics Inc., Tallahassee. It is to replace the present interpretive exhibit in the parking lot at refuge headquarters. The kiosk is expected to arrive by next summer.

11. Wildlife Observation



Bromeliads abound in hardwood hammocks of the Florida Keys Refuges. This example of Tsilliandia utriculata serves as a water reservoir for numerous bird and insect species.

Although questions as to the whereabouts of the Key deer are the most common, other local flora and fauna such as orchids, songbirds, and the tropical hammocks are of concern to our visitors. Interest in Watson's Hammock, a mature hardwood hammock on the west coast of Big Pine Key, appeared to be on the upswing. Due to its rarity in the Lower Keys, only those who express specific interest are directed to the site. Despite the encroachment of man in the last few years, the refuge still provides a haven for those who seek a little respite from the growing commercialism of the Keys.

#### 17. Law Enforcement

In late 1984, LE efforts were increasingly devoted to reducing the impact free-running dogs have on endangered Key deer. The 37% mortality attributable to dogs, excluding roadkills, has led to cooperative patrolling of Key deer habitat by refuge and FL Game and Freshwater Fish Commission personnel. These patrols have resulted in five cases being referred to state court and seven dogs being removed. State peace officer credentials received by RM Holle and ARM Freeman will lend added authority to enforce local ordinances prohibiting free-running dogs. Local residents have continued their support for the program by becoming the "ears" of the refuge and reporting deer-chasing dogs.

Harassment of Key deer has declined since passage of a state no-feeding law. Although enforcement by state and refuge personnel keeps the issue alive and in the minds of year-round residents, feeding of deer by tourists occasionally still occurs.



This poached gator was found in September off refuge property.

1985

DH

In September, the remains of a poached six foot gator were investigated by RM Holle. She found that its rear legs and tail had been removed and that its advanced decomposition precluded further inquiry from being effective.

RM Holle and ARM Freeman assisted LE Special Agents with a task force operation against baited dove fields in west-central Florida. The 6-7 October effort resulted in approximately 200 cases being made for shooting over bait, unplugged guns, over-limit, and shooting after hours. The experience showed how effective refuge and LE Division cooperation can be when the need arises.

<u>Date</u>	<u>Offense</u>	<u>Status</u>	<u>Officer</u>
7/15/84	Free-running dogs	\$10.00 fine	Holle/Lawrence*
8/ 3/84	Harassing Endangered Species	pending	Holle
8/ 3/84	Harassing Endangered Species	pending	Holle
11/12/84	ATV Trespass	pending	Eldard
12/1/84	1-Taking Endangered Species 2-Harassing Endangered Species	pending	Lawrence
12/27/84	Free-running dogs	pending	Holle/Lawrence*
12/27/84	Free-running dogs	pending	Holle/Lawrence*
12/29/84	Free-running dogs	pending	Holle/Lawrence*
12/29/84	Harassing Endangered Species	pending	Holle/Lawrence*
12/29/84	Free-running dogs	pending	Holle/Lawrence*

\* Sgt. Larry Lawrence, Florida Game and Freshwater Fish Commission

#### I. EQUIPMENT and FACILITIES

##### 3. Major Maintenance

Due to the purchase of new equipment and new BLHP facilities there was no new construction or rehabilitation on the refuge this year.

Maintenance in a saltwater environment is probably more important than in inland areas and accounts for an inordinate amount of time, trouble, and dollars. The old cliché "an ounce of prevention is worth a pound of cure" was never more appropriate.

Maintenance jobs for the year included painting the refuge quarters and cleaning the carpet prior to occupancy by the new refuge manager. The screening on the quarters porch was replaced.

- The sewage treatment plant and lift station were steam cleaned and painted
- The public bathrooms at the headquarters were painted and metal kick plates installed on the doors
- The Saxon III copier was given a major overhaul, but expired a month later
- The 50hp Johnson outboard on the 17' Hewes Bonefisher had its lower unit overhauled and shift & steering cables replaced
- The Bobcat loader bucket rusted through on one end. A metal plate was welded on and the bucket was painted

#### 4. Equipment Utilization and Replacement

New Mako boats were received to replace the 22' aquasport and the 17' Hewes Bonefisher. The 22' and the 17' Makos were rigged with two 90hp and one 50hp Johnson outboard motors respectively.

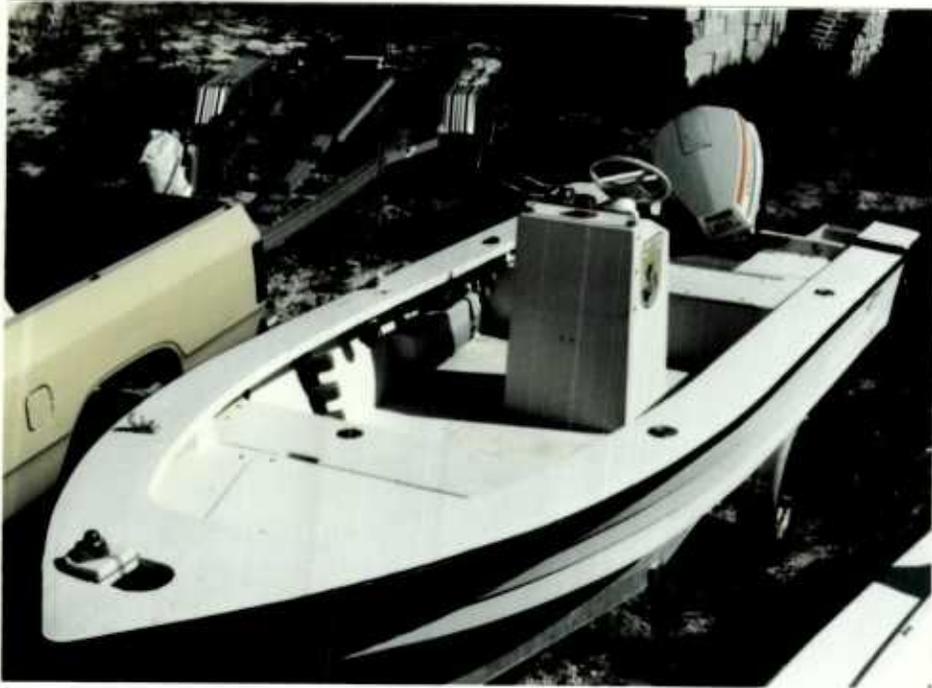
Trailex aluminum boat trailers were received unassembled. This is the refuge's first experience with aluminum trailers. Hopefully, they will hold up well in the saltwater environment.

Telemetry equipment, including one receiver and seven radio collars were purchased from Telonics. This equipment will be used on an upcoming Key deer research project.

#### 6. Energy Conservation

The staff at National Key Deer Refuge does everything it can to help reduce energy costs. Consolidated trips are made whenever possible. The hot water heater has a blanket and timer on it to conserve power.

Our Achilles heel is the use of the air conditioners in the headquarters during the summer. The staff keeps them set on 80°F and utilizes fans whenever possible. We try to use the AC sparingly, but it is difficult to sit and write in a hot, humid environment.



This 17' Hewes Bonefisher served its purpose well and...  
1985 EDF



Hopefully, the new 17' Mako will also be a good back country  
boat.  
1985 EDF



This 22' Aquasport was replaced by..... 1985 EDF



23' Mako 1985 EDF



It took several weeks to get three aluminum boat trailers assembled in the hot August sun. 1985 DH



Hopefully, these aluminum trailers will hold up better than the galvanized ones. 1985 DH

J. ITEMS OF INTEREST

ARM Bell attended a safe boating and seamanship program offered by the United States Coast Guard Auxiliary during January.

On February 28 & 29, D. Kosin was at the annual Project Leaders' meeting which was held at Loxahatchee NWR.

A revenue sharing check for \$81,688.00 was awarded to Monroe tax collector Harry Knight on 21 February. This brings the total revenue sharing monies given to the county up to \$633,060.38.

Refuge Supervisor Bill Grabill toured the Florida Keys refuges on April 16 and 17 and again during November 13 through the 16th. Crocodile Lake and recovery efforts for the Key deer were major items of interest for Bill.

During April 16th through May 14th, ARM Bell attended the Refuge Managers' Training Academy at Blair, Nebraska. While there, she was exposed to a wide range of Service responsibilities.

On April 18th, Don Kosin represented National Key Deer Refuge at a land acquisition meeting held in Jacksonville, Florida.

Don Kosin addressed the Florida Keys Recreation and Conservation Council on Florida Keys' refuges on April 13th. The council presented Don with a plaque for his seven years active service at National Key Deer on May 11.

Reynaldo Arostegui, Director of Nicaragua's National Park Service and Wildlife Institute of Natural Resources and the Environment, visited Key Deer July 9 through the 11th as an intern from Colorado State.

Craig Faanes and Paul Sykes of the Kirtland's Warbler Recovery Team practiced radio-telemetry techniques on prairie warblers and white-eyed vireos from July 18 through the 31st.

ARM Freeman attended the Basic Law Enforcement program for Land managers at FLETC, July 19 through September 25th. He was also able to complete the Basic Firefighter (S-130) and Intro to Fire Behavior (S-190) courses at Loxahatchee NWR during December 4 through the 6th. On a personal note, Dean traveled to Argentina and surprised us all by getting married during his visit.

ARM Bell assisted the New York Zoological Society with a Jaguar study in Belize August 6 through the 16th.

Refuge Manager Holle began and completed a ten-week Power Squadron course from October through December. Navigation, small boat handling, rules of the road and seamanship were covered during the program.

Interior Secretary Clark toured the Everglades, Big Cypress National

Preserve and Crocodile Lake NWR via helicopter on October 6th.

In November, Maintenceman Chet Eldard received his ten-year-service award from Area Supervisor Bill Grabill. Everyone agrees that Chet's involvement in the community and knowledge of refuge management activities makes him a vital member of the Key Deer Team.



Chet Eldard receives his much deserved Ten-year Length of Service Certificate from Area Supervisor Bill Grabill. 11/84 DH

On November 16th, Stuart Bernard Duck Stamp Promotion Consultant toured the refuge with his wife.

In December, Asst. District Attorney Tim Thomas toured Key Deer with RM Holle. He left with a greater appreciation of deer feeding and free-running dog problems.

ARM Freeman and Maintenceman Eldard passed firearms requalification on November 5th at Homestead, Florida.

### 3. Credits

Sections of this narrative were written by the following staff members:

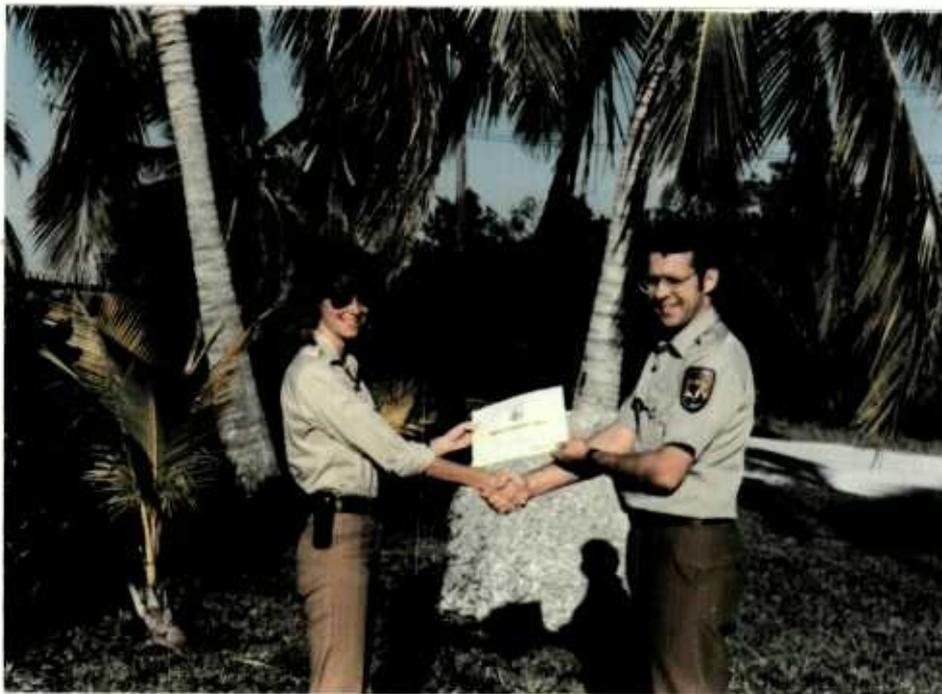
3. Credits

RM Deborah Holle - D.1, 6; E.1, 5, 6; F.9, 10, 12; I.3, 4, 6; K;  
Crocodile Lake I.1, 3, 4.

ARM Bonnie Bell - E.2, 4; G.1 thru 16; H.1, 4, 11.

ARM Dean Freeman - A; B; C.1; D.1; F.2; H.17; J.1, 2, 3; Great White  
Heron; Key West Refuge; Crocodile Lake; C.1; F.2;

Secretary Phyllis A. Copeland deserves credit for her patience and skill  
while typing this narrative.



Bonnie Bell receiving her Special Achievement Award from Area  
Supervisor Bill Grabill. 11/84 DH

GREAT WHITE HERON NATIONAL WILDLIFE REFUGE

Big Pine Key, Florida

ANNUAL NARRATIVE REPORT

Calendar Year 1984

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

## GREAT WHITE HERON REFUGE

Established in 1938 by Executive Order #7993, Great White Heron Refuge serves to protect the largest of North America's wading birds and its many allies. Its 7,404 acres extend over 264 square miles of open water, expansive marine grass beds and a multitude of overwash and fringe mangrove islands.

A white morph of the Great blue heron, the Great white, is found only in the Florida Keys and along the southern extreme of Florida's mainland. Presently numbering only 150-200 individuals within the refuge, it is commonly mistaken for the Great egret, a cousin of similar appearance.

While providing habitat for a variety of other herons and egrets (18 species), the refuge is also utilized by the roseate spoonbill, white-crowned pigeon and brown pelican. Open water associated with the refuge also provides excellent foraging for the West Indian manatee and several species of endangered marine turtles.

Although most of the refuge can be visited only by boat, the value of Great White Heron can be found in its importance to local fisheries; its appealing aesthetics and the intangible benefits derived from a sense of open space teeming with life.

Summary

A quarterly bird census was conducted in December along a route established by the station inventory plan. The flight covered portions of National Key Deer and Key West Refuges with the greatest emphasis being given to Great White Heron. This inventory identified 1,968 birds along a straight-line census route. Additional nesting bird surveys will be initiated in 1985 along routes that include all known nesting colony sites.

A "ground-truthing" boat inventory was also conducted in December 1984 along a pre-designated portion of the aerial route. This census of 425 birds emphasized the frustrating nature of aerial bird counts over heavy mangrove island canopies.

KEY WEST NATIONAL WILDLIFE REFUGE

Big Pine Key, Florida

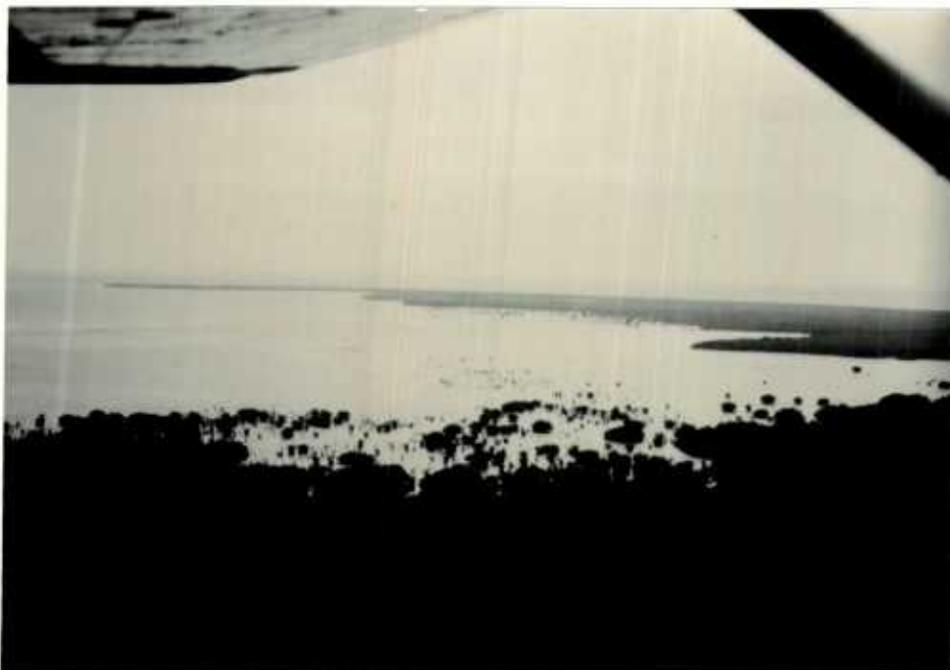
ANNUAL NARRATIVE REPORT

Calendar Year 1984

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

## KEY WEST REFUGE

Established by Executive Order #923 on August 8, 1908 by President Theodore Roosevelt, Key West National Wildlife Refuge remains one of his more important contributions to wildlife conservation. Its 2,019 acres, spreading over 375 square miles of open water, are made up of eleven keys and the Marquesas atoll. Averaging only three to eight feet above mean high water, these islands are dominated by mangrove plant communities common to the tropical Florida Keys.



The Marquesas atoll is home to the only nesting colony of Magnificent frigatebirds (Fregata magnificens) found in North America.

Other than an overflight during the December bird survey, Key West was not visited by Service personnel in 1984. During that flight, 258 Magnificent frigatebirds (Fregata magnificens) were observed in the immediate vicinity of the Marquesas nesting colony. Added emphasis will be given to Key West Refuge as the nesting season resumes in February.

One of only two wild examples of Yellowheart (Xanthoxylon flavum) found in the United States is on North Marquesas Island. This dioecious plant may grow to 35 feet; has pale gray bark and alternate light green leaves. The leaves are approximately eight inches long with five to seven leaflets and are distinguished by translucent glandular "windows" found when holding the leaf up to light. Its distribution is reported to include the Bahama and Greater Antilles Islands.

CROCODILE LAKE NATIONAL WILDLIFE REFUGE

Big Pine Key, Florida

ANNUAL NARRATIVE REPORT

Calendar Year 1984

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

## INTRODUCTION

Crocodile Lake National Wildlife Refuge is located in Monroe County, Florida and was established under the following authorities: Land and Water Conservation Fund Act of 1965 as amended in 1976 (Public Law 94-422) and the Endangered Species Act of 1973 (Public Law 93-295, 87 Stat. 884) as amended. The refuge was established on April 2, 1980, with the proposed purchase of approximately 7100 acres located on North Key Largo. The purpose of the refuge is to protect critical habitat, including prime feeding and nesting areas of American crocodile. Total acreage purchase to date is ~~534~~ acres. Its topography and vegetation is similar to that described under National Key Deer Refuge.

→ 3,023

A. LAND ACQUISITION

Nineteen eighty-four was a year of explosive growth for Crocodile Lake as its acreage more than doubled from 1,433 to 3,023 acres. This increase reflects an expenditure or obligation of \$1,633,340 from an FY84 acquisition budget of \$6,303,000. The carryover to FY85 will swell future acquisition funding to a total of \$9,569,660.

By the end of calendar year 1984, more than \$3,231,022 had been outlaid for the purchase of Crocodile Lake's proposed 7100 acres. Unfortunately, although the refuge encompasses 42% of its acquisition boundaries, the core nesting habitat necessary to Service efforts for the crocodile is yet to be purchased.

3. Fee Title

Tract #	Owner	Acres	Cost
93	Keim, Stanley	.61	7,500
92	Keim, Iris	.74	7,500
38	Guise, Gary	4.00	40,000
81	Coral Way Int.	23.36	120,000
74	McMath, John	4.33	43,000
96	Gay, Ruth Ann	.77	10,000
102a-c	Ericsson, Eric	8.74	87,000
80	Gannaway, Adaline	3.17	32,000
29	University of Miami	126.18	135,000
63	Ericsson, Eric	.51	(Gift)
62	Jasper, Stuart	13.33	5,240
33a	Ragen, Mary C.	22.01	90,000
206,c	TNC (Dillworth)	813.71	611,000
Sub-totals		<u>1,021.46</u>	<u>1,188,240</u>

Agreement Executions

Tract #	Owner	Acres	Cost
98	Morgan, Charles O.	.88	11,500
20d	TNC (Morgan)	50.00	20,000
20a	TNC (Field, N.R.)	518.00	413,600
Sub-totals		568.88	445,100
TOTALS		1,590.34	1,633,340

#### F. HABITAT MANAGEMENT

##### 2. Wetlands

The importance of wetlands to the American crocodile is found in their exclusive association with mangrove-lined creeks, bays, and canals. Utilization for nesting, hatchling dispersal and protection, feeding by juveniles and adults, denning and hauling-out reflect the necessity of wetlands to croc life history. These important wetland functions are provided for crocodiles by the 5,900 acres of mangrove wetlands found at Crocodile Lake NWR. Representing 83% of Crocodile Lake's 7,100 acres, the American crocodile will continue to have inviolate areas managed for its recovery.

Although the primary nesting habitat around which the refuge was designed has not been purchased yet, important changes are occurring there. Recent court decisions have required the landowner to rehabilitate a mangrove swamp by filling sections of an unpermitted canal system, removing soil, ditching to provide drainage to impounded mangroves, and installing barriers to waterborne and vehicular intrusion into nesting areas. It is hoped that this vital portion of Crocodile Lake will be in Service hands by the summer of 1985.

Old Card Sound Road, an abandoned roadway through refuge wetlands, will soon be receiving the attention of the Florida Lands Mitigation Trust, a court directed wetlands' restoration fund. Coordination between Trust representatives, crocodile recovery specialists, and Service employees will benefit both crocodiles and wetlands in several respects. Removal of roadway sections will increase flushing of impounded mangroves and detrital export to the local food web. Additionally, islands will be left as the roadway is removed to provide haul-out and possible nesting sites for crocs.

#### G. WILDLIFE

##### 2. Endangered and/or Threatened Species

Paralleling the increased acquisition pace on Crocodile Lake has been the listing of two (2) Key Largo rodents on the Federal Endangered Species List. Both the Key Largo woodrat (Neotoma floridana smalli) and the Key Largo cotton mouse (Peromyscus gossypinus allapaticola) are found

in mature tropical hammocks such as those on Crocodile Lake.

The Key Largo cotton mouse is a nocturnal herbivore; characterized by its brown and white coloration, furry tail, and protuberant eyes. Its seasonal reproduction begins in June when it makes use of small spherical leaf-lined nests in logs, tree hollows, and the crevices of limestone rock. The two-three litters per season average four (4) young that are weaned at four weeks of age. Life expectancy for most is less



than one year. Cotton mouse management will be based upon continued land acquisition by the Florida Dept. of Natural Resources and the Service. Proposals by both agencies include 630 acres of hardwood hammocks that support about half of the remaining population.

Tropical hardwood hammocks benefit several endangered species as cool havens from a harsh tropical sun.

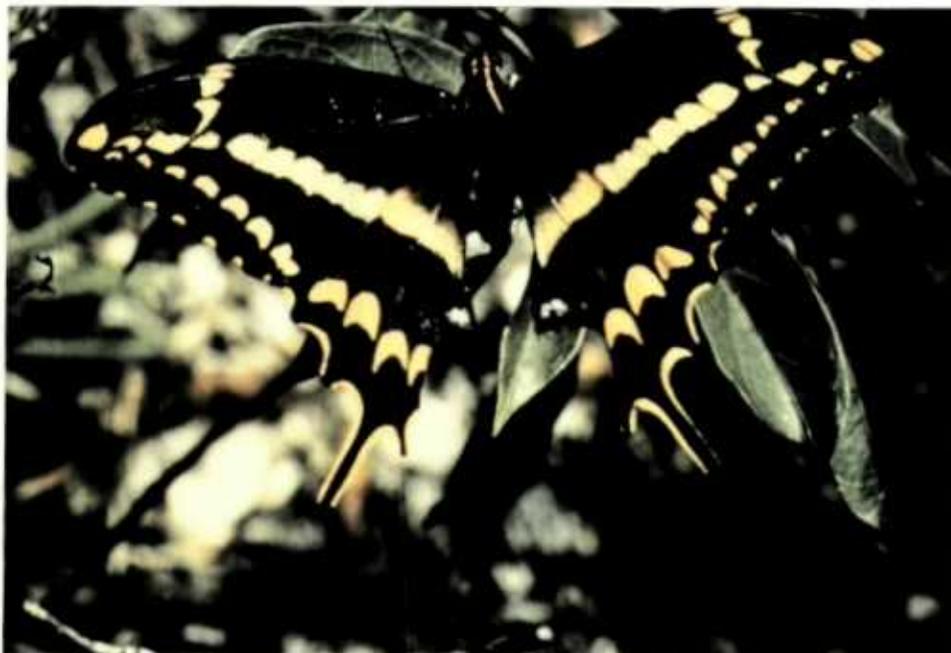
12/84

EDF

Another nocturnal herbivore, Key Largo woodrats are known by their gray-brown dorsal and white ventral coloration, medium size (200-260g) and hairy tails. With sexual maturity at about five (5) months, the female is known to produce two litters per year with litter numbers averaging two young. Like other *Neotoma* members, it builds large houses of dead limbs and sticks for nesting and protection. These nests are used for several generations and are up to four feet high and eight feet in diameter. Conservation measures will be directed toward acquisition and preservation of mature tropical hammocks. An estimated 49% of the known population resides on land slated for purchase by the Service and Florida's DNR.

Although Crocodile Lake will have 1200 acres of tropical hammock within its boundaries, it must be understood that both rodent species are very rare or absent in young or recovering hammock. Extinction is a great possibility if development pressures continue on the remaining mature hammock sites. Unfortunately, past experiences show that some landowners have destroyed woodrat nests to prevent having their lands later identified as critical habitat.

Listed as threatened since 1976, Schaus' swallowtail butterfly was re-evaluated and placed on the endangered species list in 1984. This action was taken to reflect the true status of the butterfly which has a severely limited range, population, and density. Future recovery efforts will be focused on preserving known colonies, relocation to suitable habitats, and protection of remaining tropical hammocks.



A creature of tropical hammocks, Schaus' swallowtail (Heraclides aristodemus ponceanus) has been overcollected to the point of becoming endangered. 12/84 Krisek

The American crocodile population on Key Largo remains stable, with a higher juvenile recruitment than is found in Everglades National Park. Ready access to hatchling nursery areas provides an extremely low mortality of 50% for first year juveniles. This year's nesting season produced six nests, five of which were successful. Later examination of the sixth nest showed those eggs to be infertile.



Crocs are sophisticatedly docile when small, but can be temperamental at this size. 12/78 DK

Refuge staff are now taking a greater part in inventory efforts and will continue a tagging project initiated by state croc specialists. If time permits, a croc telemetry study will commence this spring.

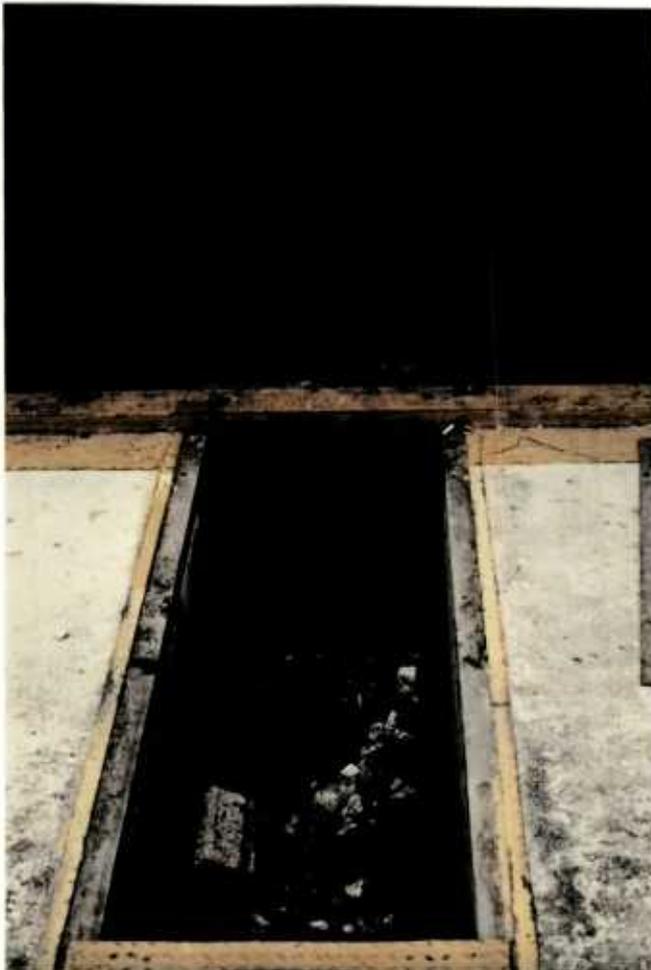
#### H. PUBLIC USE

##### 17. Law Enforcement

The "Big" score of the year came when it was discovered that \$17,455.98 of LE Division property had been stolen from storage facilities at Crocodile Lake NWR. The June 8th theft followed cutting through a heavily chained gate, removal of steel covers from a submerged cable runway and cutting through 1½" welded rods installed to deny entrance into the hangar. Items stolen included a 21' Boston Whaler, boat trailer, 150 hp Mariner outboard, 24hp Evinrude outboard, safety equipment, gas tanks, and tools. Investigations by the Monroe County Sheriffs' Office and the FBI have not resulted in apprehension or property recovery, but there's still hope!

"Gate crashers" entered and vandalized the Nike missile site early in 1984 at Crocodile Lake. Could this have been the prelude to the June equipment theft?

2/84 DK



"If locks are meant to keep honest men honest", it would seem that 1½" steel bars could deter others that are less than righteous.

6/84

BB

## I. EQUIPMENT and FACILITIES

### 1. New Construction

Electrical wiring was installed by Joe Smith, Electric Co. in one of the missile hangars at Crocodile Lake NWR. Components for a small interior office were ordered, but were not received by the end of the year.

### 3. Major Maintenance

The chain link fence at Crocodile Lake NWR was rehabed by Monroe County Fence Company for \$2,420.00.

### 4. Equipment Utilization and Replacement

A John Deere tractor, model 1250, with a rotary cutter mower was purchased for use primarily at Crocodile Lake NWR. A utility trailer was purchased to transport it.

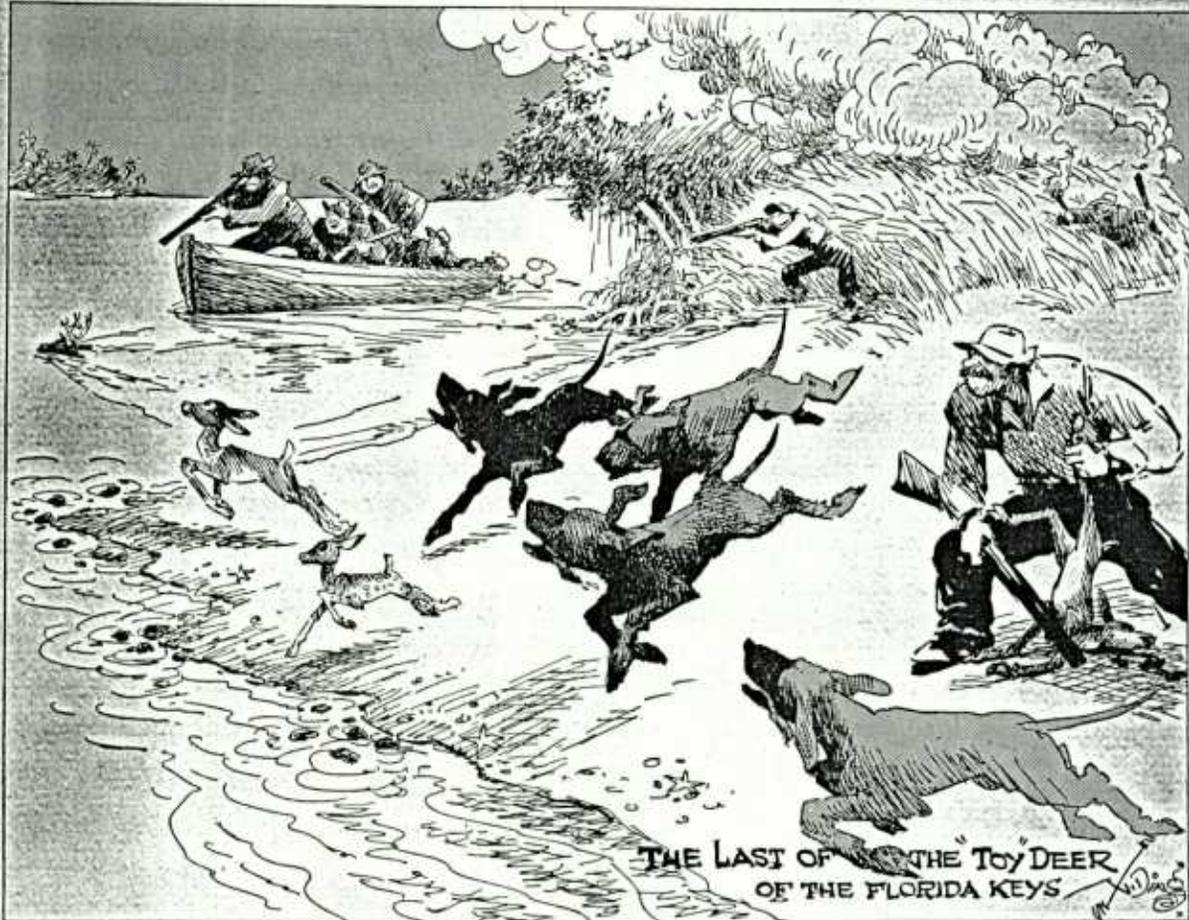
A small 15' Boston Whaler boat was received. It was fitted with a new 50 H.P. Johnson outboard motor and rigged with all appropriate equipment.



This peppy Boston Whaler is ideal for working shallow waters surrounding the mangrove fringed islands of Florida Keys.

12/84 EDF

## A NATIONAL REFUGE HAS SAVED THE KEY DEER



**I**N MIDWINTER OF 1934 the above cartoon was hastily drawn by "Ding" to call attention to the unsportsmanlike hunting methods which were decimating the remaining Florida Key Deer. After the war, the regional office of the U. S. Fish and Wildlife Service in Atlanta reported with increased alarm that an estimated 26 Key Deer remained. In June 1952 the Boone and Crockett Club of New York hired a full-time warden to protect the remaining Key Deer. The National Wildlife Federation contributed towards continued warden service and in 1957 Congress authorized the establishment of the NATIONAL KEY DEER REFUGE. Since 1958 the North American Wildlife Foundation spearheaded a drive for funds to acquire the necessary lands for the establishment of this inviolate refuge. The Boone and Crockett Club, the Wilderness Club of Philadelphia, and public spirited individuals have pledged additional sums which will make possible the preservation of the smallest species of North American Deer. Present estimated Key Deer population—over 200. Thanks for your help.

*Mission Accomplished  
Ding Darling*

# NATIONAL WILDLIFE REFUGES OF THE *Florida Keys*

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



DEPARTMENT OF THE INTERIOR  
U.S. FISH AND WILDLIFE SERVICE



The Florida Keys, curving into the Gulf of Mexico from the southern tip of Florida, are the site of three National Wildlife Refuges—the National Key Deer, the Great White Heron and the Key West Wildlife Refuges. They are administered by the U. S. Fish and Wildlife Service, Department of the Interior. Headquarters for these refuges is on Big Pine Key, which is partly in the National Key Deer Refuge.

The three refuges are made up of scattered islands, more or less within sight of one another, stretching for about 60 miles from the vicinity of East Bahia Honda Key on the east to Marquesas Keys on the west. Except for Key West Refuge, located in the Gulf west of the city of Key West, almost all of the refuge areas lie to the north of U. S. Highway 1, which locally is known as the Overseas Highway. All of the refuge islands are accessible only by boat, with the exception of the parts of National Key Deer Refuge on Big Pine and Little Torch Keys. In addition, portions of the Great White Heron Refuge are found on Cudjoe, Saddlebunch and Boca Chica Keys and are accessible by land. The boundaries of Key Deer and Great White Heron Refuges overlap to some extent. A part of the National Key Deer Refuge was first set aside in 1954, while Great White Heron and Key West Refuges were established in 1938 and 1908, respectively.

#### National Key Deer Refuge

The National Key Deer Refuge was established for the purpose of protecting the Florida Key white-tail deer. By 1947, this small variety of deer had almost reached the vanishing point through overhunting, poaching, and conversion of habitat to residential developments. The plight of the Key deer attracted the attention of conservationists and wildlife enthusiasts throughout the United States. Many individuals and organizations undertook to save it, and their efforts resulted in the establishment of a Federal refuge on leased lands in 1954. Since then the Congress has authorized the acquisition of 4,383 acres to be included in the refuge.

The number of Key deer in 1947 was placed at less than 50 animals by Government biologists. Their numbers began to climb after a patrolman was assigned to encourage local people to take an interest in the deer and to reduce poaching and habitat destruction. In 1978, 24 years after the National Key Deer Refuge was established, the population exceeded 400 animals.

The keys making up the habitat of the Key deer are well vegetated and usually surrounded by shallow water. They have a thin covering of soil over oolitic limestone. The limestone, on Big Pine Key especially, has many natural pockets that catch rainwater and hold it for long periods of time. This makes Big Pine Key particularly important to the welfare of the deer. In times of drought, other keys lack fresh water.

The keys are fringed with red and black mangroves, which give way to a wide variety of tropical and subtropical trees and shrubs on slightly higher ground. These include the white mangrove, buttonwood, scrub palmetto, Jamaica dogwood, biloby, gumbo-limbo, pigeon plum, sea grape, red bay, and poisonwood. The larger keys, especially Big Pine Key, have extensive growths of slash

pine, silver and thatch palms—the latter are especially important food plants to the deer. Orchids and air-plants add to the rich variety of plants. At least 466 species of plant life have been found on Big Pine Key alone.

The bird life of the refuge includes rare and beautiful species, among them the great white heron, roseate spoonbill, reddish egret, and white-crowned pigeon. Here also may be found the mangrove cuckoo, the gray kingbird, and the black-whiskered vireo. Both alligators and American crocodiles are present. Some of the local raccoons are a pale color with almost indiscernable rings on the tail.

#### Great White Heron National Wildlife Refuge

The Great White Heron Refuge was set aside in 1938 as a migratory bird refuge and partly overlaps the National Key Deer Refuge. It consists of a number of keys in an area roughly 40 miles long and 8 miles wide. These keys have a total land area of 6,781 acres in 1978. They are almost without exception low, mangrove-covered islands.

The refuge gives permanent protection to the great white herons, largest of North American wading birds. In the United States this color phase of the Great Blue Heron is found only here and in the southern part of the Florida mainland. In addition, the refuge protects other rare birds, including the white-crowned pigeon and roseate spoonbill, and it helps in substantial measure to preserve the scenic character of the Florida Keys.

#### Key West National Wildlife Refuge

Key West National Wildlife Refuge includes all of the keys except Ballast in an area 15 miles wide extending about 25 miles west from the city of Key West. The Marquesas, Mullet, Boca Grande, Man and Woman, Barracouta, Cottrell, Mule, Archer, Crawfish, Sand, Rock Eastern Dry Rocks and Joe Ingram Keys are in the refuge. They were set aside as a refuge in 1908, and total 2,019 acres. The refuge affords habitat to a wide variety of birds, especially terns, frigatebirds, roseate spoonbills, white-crowned pigeons, ospreys, and great white herons. Like its two sister refuges, it is of great interest scenically as well as scientifically, exemplifying a tropical region unlike any other part of the United States.

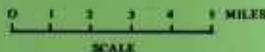
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#### Special Regulations

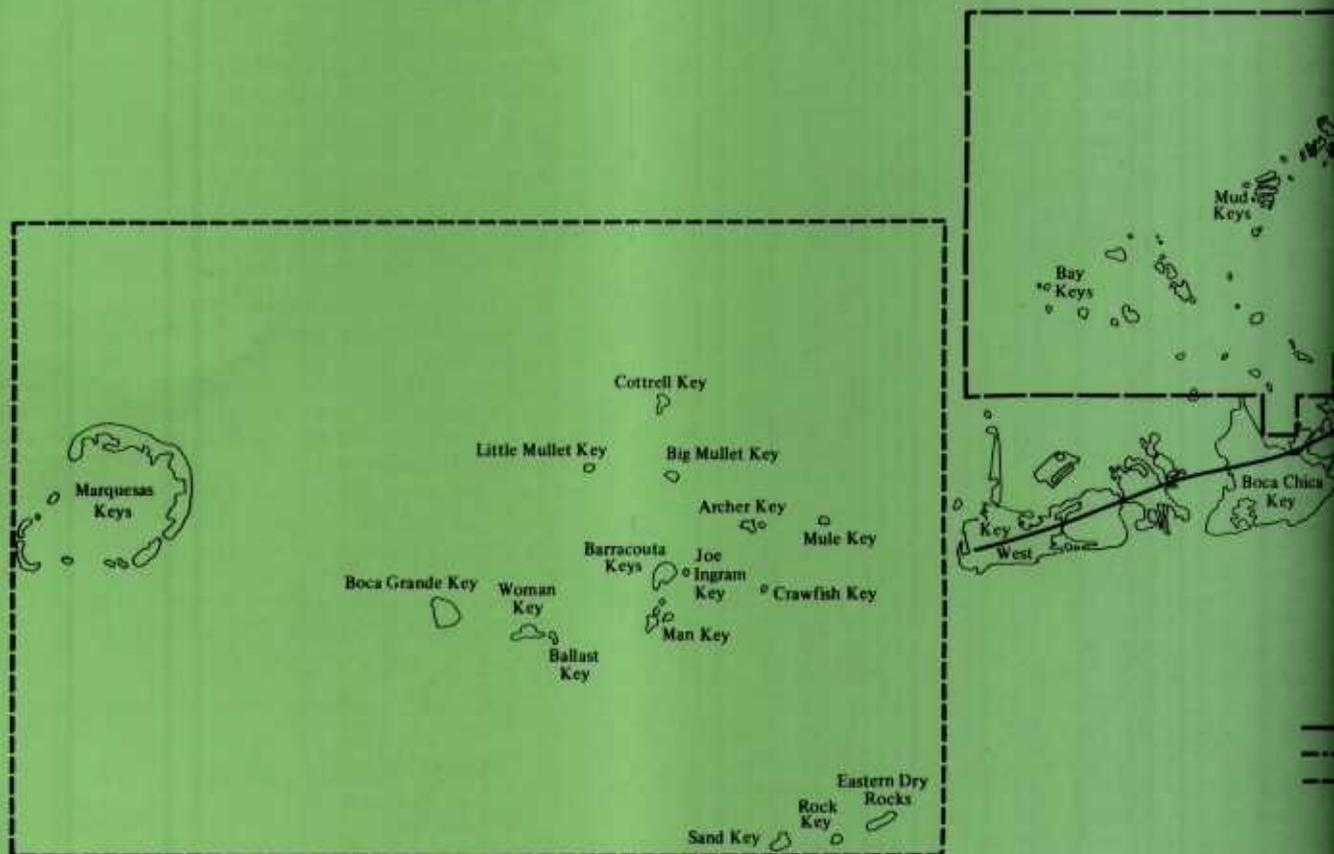
1. *The collecting or disturbing of wildlife, plants or artifacts is prohibited.*
2. *Camping, fires, hunting and firearms are not permitted.*
3. *Littering is prohibited.*

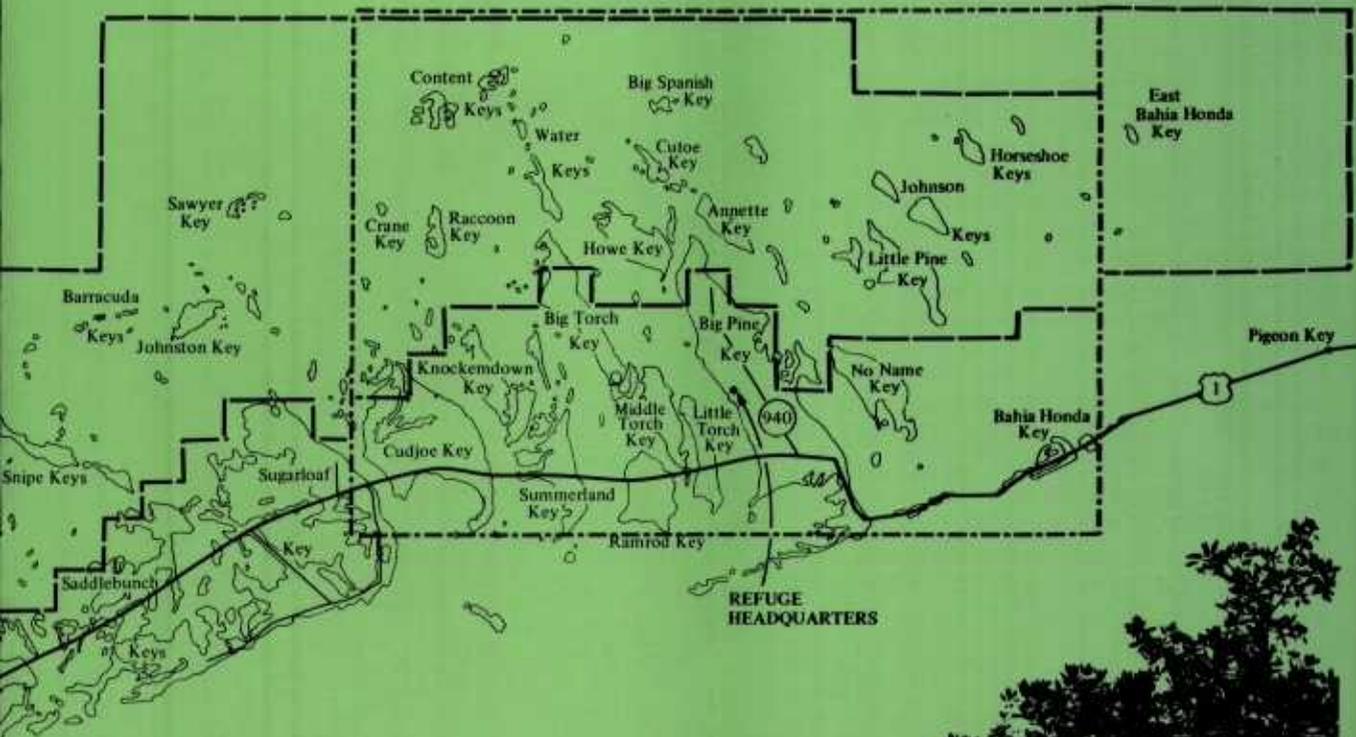
*Additional information may be obtained by contacting the Refuge Manager, P. O. Box 510, Big Pine Key, Florida 33043; phone 305/872-2239.*

# NATIONAL WILDLIFE REFUGES OF THE Florida Keys



GULF OF MEXICO





*STRAITS OF FLORIDA*

- GREAT WHITE HERON NATIONAL WILDLIFE REFUGE
- NATIONAL KEY DEER REFUGE
- KEY WEST NATIONAL WILDLIFE REFUGE



The Key Deer (*Odocoileus virginianus clavium*) is a subspecies of the Virginia white-tailed deer. These deer inhabit Big Pine Key and 16 surrounding keys. Present population is approximately 350 to 400 deer with two-thirds of this population located on Big Pine. The shoulder height of key deer is between 24-28 inches. Does weigh 45 to 65 pounds, while bucks weigh 55 to 75. Rutting season activities begin in September, peaking in early October and decreasing gradually through November and December. Some breeding may occur as late as February. The gestation period is 204 days with fawns being born April through June. At birth fawns weigh 2 to 4 pounds. Antlers are dropped February through March, and regrowth begins almost immediately so that by June, bucks with 2-inch stubs are seen. Antler growth is completed by August, and velvet is rubbed and kicked off in early September. The key deer is smallest of all white-tailed deer. Indigenous to this area, they survive on native plants such as red mangrove, thatch palm berries and several other species of plants. This subspecies of the Virginia whitetail can tolerate small amounts of salt in their water and they will also drink brackish water, but fresh water is essential for survival of key deer. Along with fresh water, they must also have suitable habitat for the assurance of their future existence.



ADDITIONAL INFORMATION MAY BE OBTAINED BY CONTACTING THE REFUGE MANAGER, P. O. BOX 510, BIG PINE KEY, FLORIDA 33043, PHONE 305/872-2239



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RF-41580-1A May 1982



# PUBLIC USE

National KEY DEER Refuge

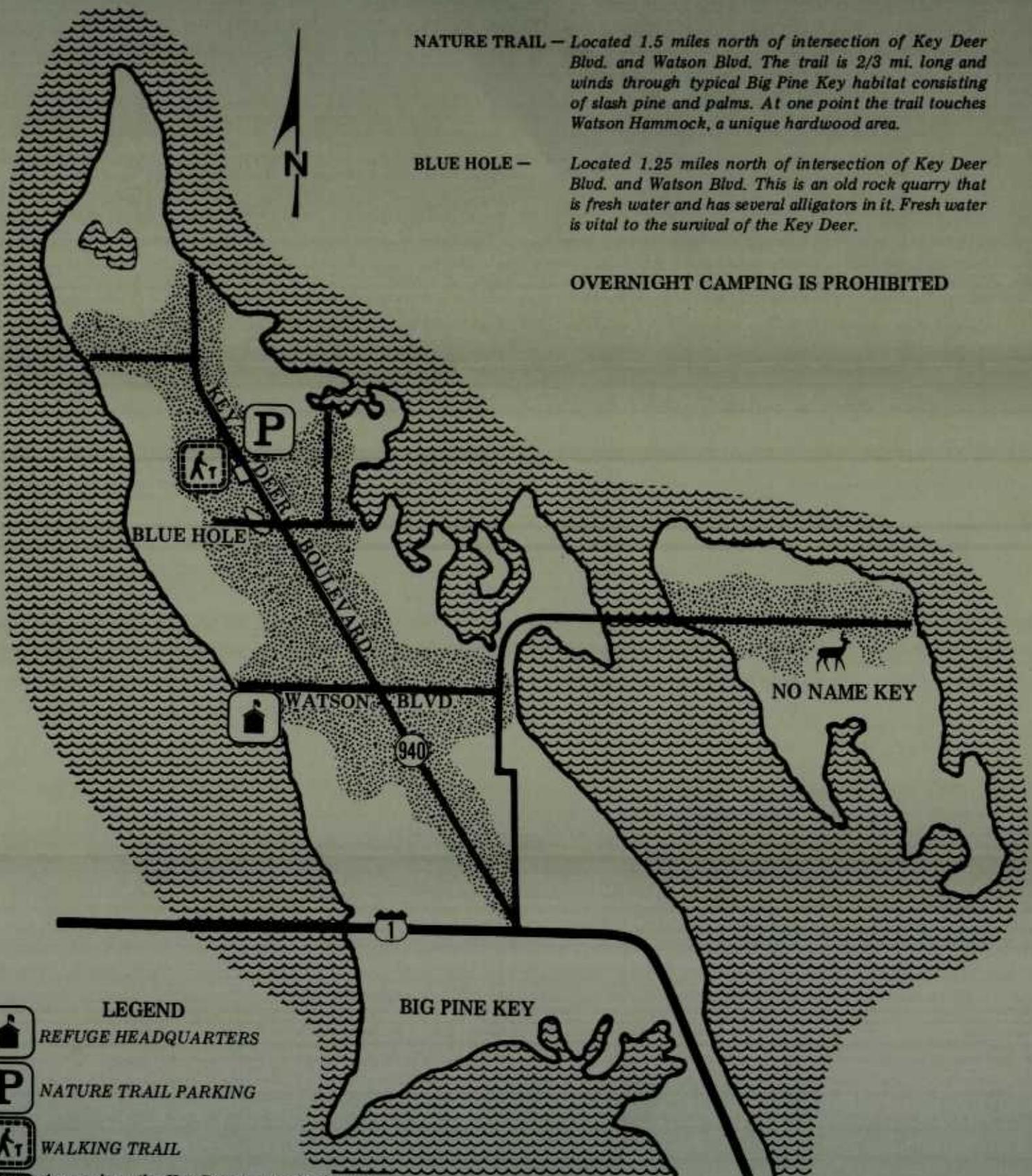
WE ASK YOU PLEASE NOT TO FEED THE WILDLIFE.....FOR YOUR SAFETY AND PROTECTION



**NATURE TRAIL** — Located 1.5 miles north of intersection of Key Deer Blvd. and Watson Blvd. The trail is 2/3 mi. long and winds through typical Big Pine Key habitat consisting of slash pine and palms. At one point the trail touches Watson Hammock, a unique hardwood area.

**BLUE HOLE** — Located 1.25 miles north of intersection of Key Deer Blvd. and Watson Blvd. This is an old rock quarry that is fresh water and has several alligators in it. Fresh water is vital to the survival of the Key Deer.

**OVERNIGHT CAMPING IS PROHIBITED**



**LEGEND**

 REFUGE HEADQUARTERS

 NATURE TRAIL PARKING

 WALKING TRAIL

 Areas where the Key Deer is most likely to be seen. They are best seen in the early morning, late afternoon and evening.

ENJOY THE WILDLIFE TAKE ONLY MEMORIES LEAVE ONLY FOOTPRINTS

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NOTES

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# Calendar of Wildlife Events



DEPARTMENT OF THE INTERIOR  
U.S. Fish and Wildlife Service

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National Key Deer Refuge

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## CALENDAR OF WILDLIFE EVENTS AT NATIONAL KEY DEER REFUGE

This calendar is meant to provide visitors with a general guide to seasonal wildlife events (weather may cause variations of one to two weeks).

**JANUARY** - Red-breasted mergansers are abundant and can be observed in the open bays and channels. Blue-winged teal, wigeon and pintail are here in smaller numbers, occupying isolated mangrove ponds. An ideal observation point for wintering waterfowl is MM 22 pond on Cudjoe Key.

**FEBRUARY** - Nesting of the magnificent frigate birds is in full swing on the Marquesas Keys. Other wading and water birds such as brown pelicans, double-crested cormorants, great white herons and reddish egrets have set up housekeeping throughout the keys. Alligators spend long hours sunning themselves on the banks of the Blue Hole.

**MARCH** - The bald eagle chicks are fledging from the three active nest sites in the lower keys. Waterfowl numbers decline as the birds move north. Raptors also start leaving the area.

**APRIL** - Spring migration of songbirds is in full swing. Bobolinks, indigo buntings and redstarts can be observed in Watson's and Cactus Hammocks. The Key deer fawning season begins.

**MAY** - Key deer fawns can be observed accompanying their mothers to open fields and roadways to feed. Baby alligators can be found in the Blue Hole, Watson's Hammock and in the mangrove marsh along Watson's Blvd. White-crowned pigeons arrive to spend the summer.

**JUNE** - Loggerhead sea turtles commence nesting at Bahia Honda State Park and the other few, isolated beaches in the area. White-crowned pigeons are also nesting in large numbers throughout the keys.

**JULY** - Least terns can be found in large numbers guarding their inconspicuous nests situated around gravel pits and along rocky roadsides.

**AUGUST** - Mourning doves and ground doves are here in numbers, congregating along dirt roads and graveled areas.

**SEPTEMBER** - White-crowned pigeons start moving out of the keys to wintering areas in the Caribbean.

**OCTOBER** - Fall migration of songbirds commences. Blue-winged teal are starting to concentrate on isolated ponds. Wintering raptors such as American Kestrel, sharp-shinned hawks and broadwinged hawks have moved into the area. Peregrine falcons can be seen passing through.

**NOVEMBER** - Red-breasted mergansers return to the keys. Ospreys are at work building or repairing their nests. Osprey nests are a common sight on power poles along U.S. Highway 1.

**DECEMBER** - Numbers of red-breasted mergansers and blue-winged teal are increasing. Bald eagles and osprey are nesting.

### VISITOR INFORMATION

The refuge headquarters is situated on Big Pine Key, approximately 110 miles southwest of Miami. To reach headquarters turn north on Key Deer Blvd., off U.S. Highway 1. Travel approximately 2 miles along Key Deer Blvd. and then turn west on Watson Blvd. Continue on Watson Blvd. until you reach the refuge headquarters.

Overnight facilities are not available on any of the three refuges. Private campgrounds are located on Big Pine Key. Bahia Honda State Recreation Area is located approximately 5 miles from Big Pine Key and provides additional facilities. Motel and restaurants are located along the Overseas Highway U.S. 1 throughout the area. The refuges are open to the public only during daylight hours. Non-wildlife related activities such as camping, horseback riding and picnicking are prohibited. However, wildlife photography, bird watching and hiking are permitted and encouraged.

Because of the Florida Keys tropical climate, light summer clothing is usually all a visitor needs to wear. A warm jacket is advisable for winter visitors as it can get cool at times. Also suntan lotion and mosquito repellent is suggested for those traveling through the keys during the summer.

For further information contact the Refuge Manager, National Key Deer Refuge, P.O. Box 510, Big Pine Key, Florida, 33043, or call (305) 872-2239.



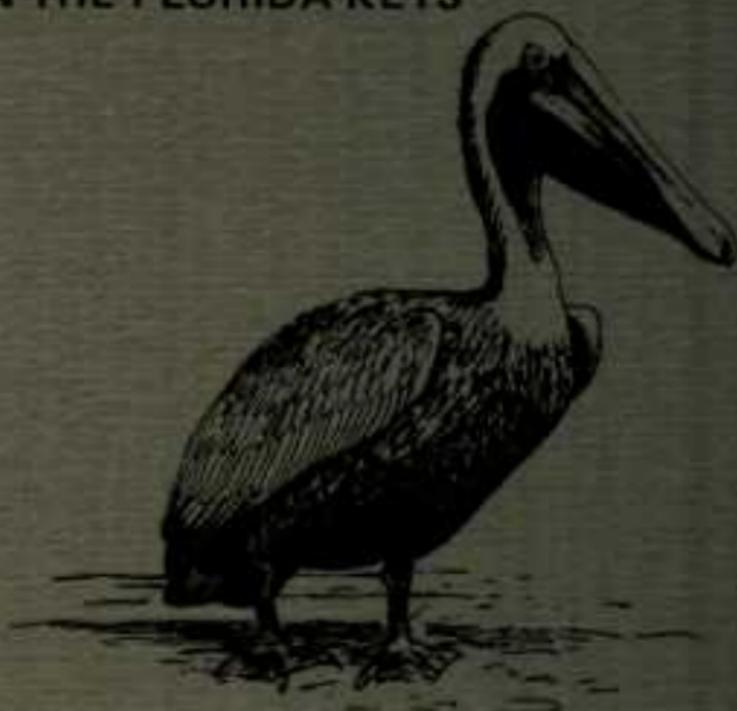
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PLEASE DO NOT FEED. HELP KEEP THE WILD  
IN WILDLIFE

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# BIRDS

of the  
NATIONAL WILDLIFE REFUGES  
ON THE FLORIDA KEYS



## GENERAL INFORMATION

GNATCATCHER · KINGLET · PIPITS · WAXWING ·  
SHRIKE · STARLING · VIREOS · WARBLERS · BLACK-  
BIRDS · ORIOLES · TANAGERS · GROSBEAKS · BUNT-  
INGS · SPARROWS

LOONS · GREBES · PELICAN · CORMORANT ·  
FRIGATEBIRD · HERONS · BITTERNS · STORK ·  
IBIS · SPOONBILL · DUCKS · VULTURES · KITE ·  
HAWKS · EAGLE · FALCONS

LIMPKIN · RAILS · GALLINULE · PLOVERS · TURNSTONE  
SNIPE · SANDPIPERS · WHIMBREL · WILLET · YELLOW-  
LEGS · DOWITCHER · AVOCET · STILT · PHALAROPE ·  
JAEGER · GULLS · TERNS · SKIMMER · DOVEKIE

PIGEON · DOVES · CUCKOO · ANI · OWLS · GOATSUCKERS ·  
SWIFTS · HUMMINGBIRD · KINGFISHER ·  
FLYCATCHERS · SWALLOWS · CROW · JAY · WRENS ·

UNITED STATES  
DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service



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## How to Use Your Checklist:

The bird checklist was constructed to be informative and simple to use. Symbols which appear in this checklist represent the following:

### Seasonal Appearance

Sp-Spring . . . . .	March-May
S-Summer . . . . .	June-August
F-Fall . . . . .	September-November
W-Winter . . . . .	December-February

### Seasonal Abundance

- a - abundant (a common species which is very numerous)
- c - common (certain to be seen in suitable habitat)
- u - uncommon (present but not certain to be seen)
- o - occasional (seen only a few times during a season)
- r - rare (seen at intervals of 2 to 5 years)
- accidental (out of the normal species range)
- \*Birds that nest on Refuge

This checklist contains 256 species of birds and is based on observations by refuge personnel and visiting ornithologists. If you should find an unlisted species, please let us know at Refuge Headquarters. We will appreciate your help in updating our records.

"Have a Safe and Enjoyable Visit"

## GENERAL INFORMATION

GNATCATCHER - KINGLET - PIPITS - WAXWING -  
SHRIKE - STARLING - VIREOS - WARBLERS - BLACK-  
BIRDS - ORIOLES - TANAGERS - GROSBEAKS - BUNT-  
INGS - SPARROWS

LOONS - GREBES - PELICAN - CORMORANT -  
FRIGATEBIRD - HERONS - BITTERNs - STORK -  
IBIS - SPOONBILL - DUCKS - VULTURES - KITE -  
HAWKS - EAGLE - FALCONS

LIMPKIN - RAILS - GALLINULE - PLOVERS - TURNSTONE  
SNIPE - SANDPIPERS - WHIMBREL - WILLET - YELLOW-  
LEGS - DOWITCHER - AVOCET - STILT - PHALAROPE-  
JAEGER - GULLS - TERNS - SKIMMER - DOVEKIE

PIGEON - DOVES - CUCKOO - ANI - OWLS - GOATSUCKERS -  
SWIFTS - HUMMINGBIRD - KINGFISHER -  
FLYCATCHERS - SWALLOWS - CROW - JAY - WRENS -  
MOCKINGBIRD - THRASHER - THRUSHER - ROBIN -  
BLUEBIRD - VEERY

Blue-gray Gnatcatcher	o	cc
Ruby-crowned Kinglet	o	cc
Water Pipit	f	
Cedar Waxwing	n	
Loggerhead Shrike	ft	
Starling	n	nn
Bandit	n	nn
White-eyed Vireo	n	nn
Yellow-throated Vireo	f	ft
Solitary Vireo	f	ft
Black-whiskered Vireo	c	cc
Red-eyed Vireo	n	
Philadelphia Vireo	f	
Warbling Vireo	f	
Black-and-white Warbler	n	nn
Prothonotary Warbler	n	nn
Worm-eating Warbler	n	nn
Golden-winged Warbler	f	
Blue-winged Warbler	f	
Tennessee Warbler	c	
Orange-crowned Warbler	n	nn
Northern Parula	n	nn
Yellow Warbler	c	nn
Magnolia Warbler	o	ot
Cape May Warbler	e	et
Black-throated Blue Warbler	n	
Yellow-rumped Warbler	c	cc
Black-throated Green Warbler	n	nn
Black-throated Gray Warbler	n	nn
Carolina Warbler	f	
Blackburnian Warbler	o	
Yellow-throated Warbler	o	nn
Chestnut-sided Warbler	n	
Bay-breasted Warbler	n	
Blackpoll Warbler	c	
Pine Warbler	n	



UNITED STATES  
DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

—	Ovenbird	U	UU
—	Northern Waterthrush	U	UC
—	Louisiana Waterthrush	U	UF
—	Kentucky Warbler	U	U
—	Connecticut Warbler	U	U
—	Common Yellowthroat	C	CC
—	Hooded Warbler	U	O
—	Wilson's Warbler		F
—	Canada Warbler		F
—	American Redstart	U	UU
—	*House Sparrow	C	CCC
—	Bobolink	C	C
—	*Red-winged Blackbird	A	AAA
—	Yellow-headed Blackbird	F	O
—	Orchard Oriole	U	U
—	Northern Oriole	O	OO
—	*Common Grackle	C	CCC
—	Brown-headed Cowbird		FF
—	Scarlet Tanager	O	O
—	Stripe-headed Tanager		accidental
—	Summer Tanager	O	O
—	*Cardinal	U	UUU
—	Rose-breasted Grosbeak	U	U
—	Blue Grosbeak	U	U
—	Indigo Bunting	O	OU
—	Painted Bunting	O	OU
—	Dickcissel		accidental
—	Pine Siskin		accidental
—	American Goldfinch	F	FO
—	Rufous-sided Towhee		F
—	Savannah Sparrow	O	OU
—	Grasshopper Sparrow	O	OU
—	Lark Sparrow	F	O
—	Dark-eyed Junco		accidental
—	Clay-colored sparrow		F
—	White-crowned Sparrow		F
—	Vesper Sparrow		F
—	Chipping Sparrow		F
—	Lincoln's Sparrow		accidental
—	Swamp Sparrow		O

**GNATCATCHER - KINGLET - PIPITS - WAXWING - SHRIKE - STARLING - VIREOS - WARBLERS - BLACK-BIRDS - ORIOLES - TANAGERS - GROSBEAKS - BUNTINGS - SPARROWS**

**LOONS - GREBES - PELICAN - CORMORANT - FRIGATEBIRD - HERONS - BITTERNs - STORK - IBIS - SPOONBILL - DUCKS - VULTURES - KITE - HAWKS - EAGLE - FALCONS**

**LIMPKIN - RAILS - GALLINULE - PLOVERS - TURNSTONE - SNIPE - SANDPIPERS - WHIMBREL - WILLET - YELLOW-LEGS - DOWITCHER - AVOCET - STILT - PHALAROPE - JAEGER - GULLS - TERNS - SKIMMER - DOVEKIE**

**PIGEON - DOVES - CUCKOO - ANI - OWLS - GOATSUCKERS - SWIFTS - HUMMINGBIRD - KINGFISHER - FLYCATCHERS - SWALLOWS - CROW - JAY - WRENS - MOCKINGBIRD - THRASHER - THRUSHER - ROBIN -**

Fish and Wildlife Service  
 DEPARTMENT OF THE INTERIOR  
 UNITED STATES



	SP	SFW
Common Loon . . . . .	0	00
Red-throated Loon . . . . .		r
Horned Grebe . . . . .		rr
Pied-billed Grebe . . . . .	u	uc
Audubon Shearwater . . . . .		accidental
Sooty Shearwater . . . . .		accidental
White-tailed Tropic-bird . . . . .		accidental
*Brown Pelican . . . . .	a	aaa
White Pelican . . . . .		accidental
Gannet . . . . .	r	rr
Brown Booby . . . . .		accidental
*Double-crested Cormorant . . . . .	a	aaa
Anhinga . . . . .		accidental
*Magnificent Frigatebird . . . . .	c	ccc
*Great Blue Heron . . . . .	u	uuu
*Great Blue Heron (white form) . . . . .	a	aaa
*Great Egret . . . . .	u	uuu
*Snowy Egret . . . . .	u	uuu
*Reddish Egret . . . . .	u	uuu
*Cattle Egret . . . . .	c	ccc
*Louisiana Heron . . . . .	c	ccc
*Little Blue Heron . . . . .	c	ccc
*Green Heron . . . . .	u	uuu
Black-crowned Night Heron . . . . .	0	000
*Yellow-crowned Night Heron . . . . .	u	uuu
American Bittern . . . . .	r	rrr
Least Bittern . . . . .	r	r00
Wood Stork . . . . .		accidental
Glossy Ibis . . . . .	r	rrr
*White Ibis . . . . .	u	uuu
*Roseate Spoonbill . . . . .	0	000
American Flamingo . . . . .		accidental
Snow Goose . . . . .		accidental
Mallard . . . . .		accidental
Pintail . . . . .		00
Bahama Pintail . . . . .		accidental
Blue-winged Teal . . . . .		uc
Green-winged Teal . . . . .		uu
Fulvous Whistling Duck . . . . .		0
American Wigeon . . . . .		00

—	Redhead . . . . .	accidental
—	Ring-necked Duck . . . . .	u
—	Lesser Scaup . . . . .	oo
—	Masked Duck . . . . .	accidental
—	Red-breasted Merganser . . . . .	o cc
—	Black Vulture . . . . .	accidental
—	Turkey Vulture . . . . .	c ccc
—	Swallow-tailed Kite . . . . .	r
—	Sharp-skinned Hawk . . . . .	uu
—	Cooper's Hawk . . . . .	oo
—	*Red-tailed Hawk . . . . .	oo
—	*Red-shouldered Hawk . . . . .	c ccc
—	Broad-winged Hawk . . . . .	cc
—	Swainson's Hawk . . . . .	rr
—	Short-tailed Hawk . . . . .	r
—	*Bald Eagle . . . . .	o ooo
—	Marsh Hawk . . . . .	uu
—	*Osprey . . . . .	c ccc
—	Peregrine Falcon . . . . .	r rr
—	Merlin . . . . .	u uu
—	American Kestrel . . . . .	a aa



LOONS - GREBES - PELICAN - CORMORANT -  
FRIGATEBIRD - HERONS - BITTERNS - STORK -  
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SWIFTS - HUMMINGBIRD - KINGFISHER -  
FLYCATCHERS - SWALLOWS - CROW - JAY - WRENS -  
MOCKINGBIRD - THRASHER - THRUSHER - ROBIN -



SP SPW	Limpkin	o r
	King Rail	r f f f
	Clapper Rail	n u u u
	Virginia Rail	accidental
	Sora	o o
	Purple Gallinule	r f f f
	Common Gallinule	n u u u
	American Coot	cc
	Semipalmated Plover	o c c c
	Piping Plover	n u
	Snowy Plover	r
	Wilson's Plover	n c u u
	Killdeer	o o u u
	Black-billed Plover	o o u u
	Ruddy Turnstone	c c c c
	Common Snipe	r f f
	Spotted Sandpiper	n o u u
	Solitary Sandpiper	r
	Upland Sandpiper	r
	Whimbrel	r
	Willet	c c c c
	Greater Yellowlegs	o o u u
	Lesser Yellowlegs	o o u u
	Red Knot	r f f
	Purple Sandpiper	accidental
	Pectoral Sandpiper	n
	White-rumped Sandpiper	o
	Least Sandpiper	c n c c
	Dunlin	n u u
	Dowitcher sp.	c o c c
	Silt Sandpiper	r f f f
	Semipalmated Sandpiper	c o c c
	Western Sandpiper	n o u u
	Sanderling	e o c c



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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

— American Avocet . . . . .	accidental
— *Black-necked Stilt . . . . .	u u
— Northern Phalarope . . . . .	accidental
— Pomarine Jaeger . . . . .	accidental
— Parasitic Jaeger . . . . .	accidental
— Herring Gull . . . . .	c cc
— Ring-billed Gull . . . . .	c ca
— *Laughing Gull . . . . .	c caa
— Bonaparte's Gull . . . . .	o ou
— Iceland Gull . . . . .	accidental
— Lesser Black-backed Gull . . . . .	f
— Gull-billed Tern . . . . .	f f
— Forster's Tern . . . . .	c cc
— Common Tern . . . . .	o ou
— *Roseate Tern . . . . .	f o
— Sooty Tern . . . . .	f f
— *Least Tern . . . . .	a ac
— Royal Tern . . . . .	c cc
— Sandwich Tern . . . . .	o oo
— Caspian Tern . . . . .	u uu
— Black Tern . . . . .	u uu
— Noddy Tern . . . . .	f ff
— Bridled Tern . . . . .	accidental
— Black Skimmer . . . . .	o oc
— Dovekie . . . . .	accidental



LIMPKIN - RAILS - GALLINULE - PLOVERS - TURNSTONE  
 SNIPE - SANDPIPERS - WHIMBREL - WILLET - YELLOW-  
 LEGS - DOWITCHER - AVOCET - STILT - PHALAROPE -  
 JAEGER - GULLS - TERNS - SKIMMER - DOVEKIE

PIGEON - DOVES - CUCKOO - ANI - OWLS - GOATSUCKERS -  
 SWIFTS - HUMMINGBIRD - KINGFISHER -  
 FLYCATCHERS - SWALLOWS - CROW - JAY - WRENS -

Fish and Wildlife Service

DEPARTMENT OF THE INTERIOR  
UNITED STATES

	SP	S	FW
___ *White-crowned Pigeon . . . . .	a	ccc	o
___ White-winged Dove . . . . .			uu
___ *Mourning Dove . . . . .	u	uuu	u
___ *Ground Dove . . . . .	a	ccc	ccc
___ *Rock Dove . . . . .	a	ccc	ccc
___ *Inca Dove . . . . .	u	uuu	u
___ *Mangrove Cuckoo . . . . .	u	uu	uu
___ *Yellow-billed Cuckoo . . . . .	u	uu	uu
___ Black-billed Cuckoo . . . . .	f		
___ *Smooth-billed Ani . . . . .	o	ooo	o
___ Barn Owl . . . . .			rr
___ Screech Owl . . . . .	f	rrr	r
___ *Burrowing Owl . . . . .	f	rrr	r
___ *Chuck-will's widow . . . . .	o	ooo	uu
___ Whip-poor-will . . . . .			ro
___ *Common Nighthawk . . . . .	o	oc	
___ *Bahamian Highhawk . . . . .		u	
___ Chimney Swift . . . . .	f	r	
___ Antillean Palm Swift . . . . .		accidental	
___ Ruby-throated Hummingbird . . . . .	u	uu	
___ Belted Kingfisher . . . . .	c	ccc	
___ Common Flicker . . . . .	o	ooo	
___ *Red-bellied Woodpecker . . . . .	u	uuu	
___ Yellow-bellied Sapsucker . . . . .		ou	
___ Eastern Kingbird . . . . .	c	c	
___ *Gray Kingbird . . . . .	c	cc	
___ Western Kingbird . . . . .		uu	
___ Tropical Kingbird . . . . .		accidental	
___ Scissor-tailed Flycatcher . . . . .		uu	
___ *Great Crested Flycatcher . . . . .	u	uuu	
___ Eastern Phoebe . . . . .	o	ou	
___ Eastern Wood Pewee . . . . .	u	u	



— Olive-sided Flycatcher . . . . .	f
— Acadian Flycatcher . . . . .	rr
— Tree Swallow . . . . .	o ooo
— Bank Swallow . . . . .	o oo
— Rough-winged Swallow . . . . .	r rr
— *Barn Swallow . . . . .	c oao
— Cliff Swallow . . . . .	r
— Bahama Swallow . . . . .	accidental
— Purple Martin . . . . .	u uu
— *Blue Jay . . . . .	r rrr
— Common Crow . . . . .	r rrr
— Fish Crow . . . . .	accidental
— House Wren . . . . .	u uc
— Carolina Wren . . . . .	r
— *Northern Mockingbird . . . . .	a aaa
— Gray Catbird . . . . .	c cc
— Brown Thrasher . . . . .	r o
— American Robin . . . . .	r o
— Wood Thrush . . . . .	o o
— Hermit Thrush . . . . .	r
— Swainson's Thrush . . . . .	u u
— Gray-checked Thrush . . . . .	u u
— Veery . . . . .	o o
— Eastern Bluebird . . . . .	accidental



PIGEON - DOVES - CUCKOO - ANI - OWLS - GOATSUCKERS -  
 SWIFTS - HUMMINGBIRD - KINGFISHER -  
 FLYCATCHERS - SWALLOWS - CROW - JAY - WRENS -  
 MOCKINGBIRD - THRASHER - THRUSHER - ROBIN -

# NOTES

Date \_\_\_\_\_ Species Total \_\_\_\_\_

Weather \_\_\_\_\_ Time \_\_\_\_\_

Observer \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

For further information contact: Refuge Manager,  
National Key Deer Wildlife Refuge, P. O. Box 510,  
Big Pine Key, Florida 33043.



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## MAMMALS, REPTILES AND AMPHIBIANS OF THE FLORIDA KEYS NATIONAL WILDLIFE REFUGES

The National Wildlife Refuges of the Florida Keys, consisting of a diversity of habitats ranging from open ocean to pine woods, support a wide variety of mammals, reptiles and amphibians. Due to the keys tropical climate, some of these animals are unique to the area and found nowhere else in the United States. The isolation of the keys from the mainland has also resulted in common Florida species evolving into separate forms. The close proximity of major travel and trade ports such as Miami and Key West has spurred the introduction of exotic creatures from the Caribbean and South America. These established exotics, along with the notable native species provide an excellent opportunity to observe a fascinating array of wildlife in the Lower Florida Keys.

The following symbols are used to indicate relative abundance:

C - Common                      U - Uncommon                      R - Rare

### MAMMALS

Florida Pipistrelle ( <i>Pipistrellus subflavus floridanus</i> ) . . . . .	R
Key Deer ( <i>Odocoileus virginianus clavium</i> ) . . . . .	U
Keys Raccoon ( <i>Procyon lotor auspiciatus</i> ) . . . . .	C
Marsh Rabbit ( <i>Sylvilagus palustris paludicola</i> ) . . . . .	U
Silver Rice Rat ( <i>Oryzomys argentatus</i> ) . . . . .	U
Lower Keys Cotton Rat ( <i>Sigmodon hispidus exiputus</i> ) . . . . .	U
Black Rat ( <i>Rattus rattus</i> ) . . . . .	C
Norway Rat ( <i>Rattus norvegicus</i> ) . . . . .	C
Free-tailed Bat ( <i>Tadarida brasiliensis</i> ) . . . . .	R
House Mouse ( <i>Mus musculus</i> ) . . . . .	U
West Indian Manatee ( <i>Trichechus manatus</i> ) . . . . .	R

### REPTILES

#### Crocodylians

American Alligator ( <i>Alligator mississippiensis</i> ) . . . . .	U
American Crocodile ( <i>Crocodylus acutus</i> ) . . . . .	R

#### Lizards

Green Anole ( <i>Anolis carolinensis carolinensis</i> ) . . . . .	C
Brown Anole ( <i>Anolis sagrei</i> ) . . . . .	C
Six-lined Racerunner ( <i>Cnemidophorus sexlineatus sexlineatus</i> ) . . . . .	C
Keys Mole Skink ( <i>Eumeces egregius egregius</i> ) . . . . .	U
Southeastern Five-lined Skink ( <i>Eumeces inexpectatus</i> ) . . . . .	C
Mediterranean Gecko ( <i>Hemidactylus turcicus turcicus</i> ) . . . . .	U
Reef Gecko ( <i>Sphaerodactylus notatus notatus</i> ) . . . . .	C



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U.S. Fish and Wildlife Service

Ashy Gecko ( <i>Sphaerodactylus cinereus</i> ) . . . . .	C
Crested Anole ( <i>Anolis cristatellus</i> ) . . . . .	U
Ground Skink ( <i>Leiolopisma laterale</i> ) . . . . .	R

**Snakes**

Southern Black Racer ( <i>Coluber constrictor priapus</i> ) . . . . .	C
Eastern Diamondback Rattlesnake ( <i>Crotalus adamanteus</i> ) . . . . .	C
Key Ringneck Snake ( <i>Diadophis punctatus acricus</i> ) . . . . .	U
Eastern Indigo Snake ( <i>Drymarchon corais couperi</i> ) . . . . .	U
Corn Snake ( <i>Elaphe guttata guttata</i> ) . . . . .	C
Rosy Rat Snake ( <i>Elaphe guttata rosacea</i> ) . . . . .	U
Mangrove Water Snake ( <i>Nerodia fasciata compressicauda</i> ) . . . . .	C
Rough Green Snake ( <i>Opheodrys aestivus</i> ) . . . . .	C
Florida Brown Snake ( <i>Storeria dekayi victa</i> ) . . . . .	U
Peninsula Ribbon Snake ( <i>Thamnophis sauritus sackeni</i> ) . . . . .	C

**Turtles - Marine**

Atlantic Loggerhead ( <i>Caretta caretta caretta</i> ) . . . . .	C
Atlantic Green Turtle ( <i>Chelonia mydas mydas</i> ) . . . . .	U
Atlantic Leatherback ( <i>Dermochelys coriacea coriacea</i> ) . . . . .	R
Atlantic Ridley ( <i>Lepidochelys kempii</i> ) . . . . .	U
Atlantic Hawksbill ( <i>Eretmochelys imbricata imbricata</i> ) . . . . .	U
Mangrove Terrapin ( <i>Malaclemys terrapin rhizophorarum</i> ) . . . . .	U

**Turtles - Fresh Water**

Chicken Turtle ( <i>Deirochelys reticularia</i> ) . . . . .	U
Snapping Turtle ( <i>Chelydra serpentina</i> ) . . . . .	U
Peninsula Cooter ( <i>Chrysemys floridana peninsularis</i> ) . . . . .	U
Key Mud Turtle ( <i>Kinosternon bauri bauri</i> ) . . . . .	U
Florida Box Turtle ( <i>Terrapene carolina bauri</i> ) . . . . .	C

**AMPHIBIANS**

**Frogs**

Oak Toad ( <i>Bufo quercicus</i> ) . . . . .	C
Southern Toad ( <i>Bufo terrestris</i> ) . . . . .	U
Greenhouse Frog ( <i>Eleutherodactylus planirostris planirostris</i> ) . . . . .	U
Narrow-mouthed Toad ( <i>Gastrophrynae carolinensis</i> ) . . . . .	R
Green Treefrog ( <i>Hyla cinerea</i> ) . . . . .	C
Squirrel Treefrog ( <i>Hyla squirella</i> ) . . . . .	U
Cuban Treefrog ( <i>Osteopilus septentrionalis</i> ) . . . . .	C
Southern Leopard Frog ( <i>Rana sphenoccephala</i> ) . . . . .	C
Eastern Spadefoot Toad ( <i>Scaphiopus holbrookii holbrookii</i> ) . . . . .	R

**POSSIBLE SPECIES FOUND IN THE LOWER KEYS  
BUT NOT YET CONFIRMED**

**Mammals**

Eastern Woodrat ( <i>Neotoma floridana</i> )
Evening Bat ( <i>Nycticeius humeralis</i> )
Opossum ( <i>Didelphis marsupialis</i> )
Florida Water Rat ( <i>Neofiber alleni</i> )

**Snakes**

Scarlet Kingsnake ( <i>Lampropeltis triangulum elapsoides</i> )
Florida Cottonmouth ( <i>Agkistrodon piscivorus conanti</i> )

**INTRODUCED SPECIES ESTABLISHED IN KEY WEST  
AND/OR ISOLATED AREAS IN THE LOWER KEYS**

**Lizards**

Yellow-headed Gecko ( <i>Gonatodes alboquararis fuscus</i> )
Ocellated Gecko ( <i>Sphaerodactylus argus argus</i> )
Indo-Pacific Gecko ( <i>Hemidactylus garnoti</i> )
Green Bark Anole ( <i>Anolis distichus dominicensis</i> )

**Amphibians**

Giant Toad ( <i>Bufo marinus</i> )
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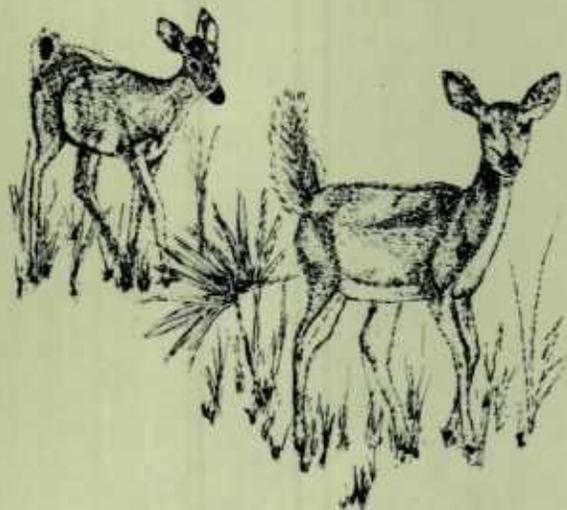
**NOTES**

Please do not feed the Key deer. Besides being detrimental to the well-being of these diminutive creatures, it is also against the law:

State regulations implemented by the Florida Game and Fresh Water Fish Commission make feeding Key deer a 2nd degree misdemeanor.

Federal law prohibits the feeding of Key deer on the Florida Keys National Wildlife Refuges.

Additional information may be obtained by contacting the Refuge Manager, P.O. Box 510, Big Pine Key, Florida 33043; telephone 305/872-2239.



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

**DEPARTMENT OF THE INTERIOR  
U.S. FISH AND WILDLIFE SERVICE**

## THE FACTS ON Public Feeding



**NATIONAL  
Key DEER  
Refuge**

## HISTORY OF THE KEY DEER

No records exist documenting the origin of the deer in the keys. It is believed the deer migrated to the keys from the mainland many thousands of years ago, across a long land bridge. As the Wisconsin Glacier melted, the sea rose breaking up the land bridge into small islands now known as the Florida Keys. Through time, those deer, which were then identical to other white-tailed deer in Florida, evolved into a distinct subspecies you see at present.

The earliest mention of Key Deer is found in the memoirs of Fontaneda, a shipwrecked Spaniard held captive for 17 years by the Calusa Indians. Records suggest that the deer were plentiful around Key West and were used for food by residents and ship crews alike. At one time Key Deer ranged from Key West to Duck Key, but now are restricted to Big Pine Key and 16 surrounding islands.

Key Deer were never really plentiful in the area. Due to uncontrolled hunting and habitat destruction, their numbers dropped to less than 50 animals in 1947. With the establishment of National Key Deer Refuge in 1954 and intensive law enforcement efforts, the population has since increased and has now stabilized at approximately 400 animals.

## FEEDING OF KEY DEER IS DISCOURAGED FOR THE FOLLOWING REASONS:

- (1) Deer that are accustomed to being hand fed lose their natural fear of humans and become easy targets for would-be poachers.
- (2) Public feeding attracts deer to roads and highways where they are killed each year by passing motorists.
- (3) Supplementing the natural diet of the Key deer with the completely unnatural foods used in public feeding may have adverse effects on the deer's behavior, population and even it's physical appearance.
- (4) Public feeding is usually centered in areas of high human concentrations such as subdivisions. These developments expose the deer to man-related accidents such as entanglement in wire or other debris, accidental drownings in canals and harassment and attacks by dogs.
- (5) Deer tend to concentrate in large numbers around public feeding areas and are more susceptible to contagious diseases, fighting or other density related mortalities.

