

*FY 2007-2008*  
*Progress*  
*Report*

on activities of the

Florida Fish and Wildlife Conservation  
Commission

Endangered and Threatened  
Species Management and  
Conservation Plan





FLORIDA'S ENDANGERED AND THREATENED SPECIES  
MANAGEMENT AND CONSERVATION PLAN  
FY 2007-2008 PROGRESS REPORT

by the

Florida Fish and Wildlife Conservation Commission

Prepared by Staff of the  
Florida Fish and Wildlife Conservation Commission

Kenneth D. Haddad  
Executive Director  
Florida Fish and Wildlife  
Conservation Commission



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

TABLE OF CONTENTS

LIST OF TABLES .....	VII
LIST OF FIGURES.....	VIII
EXECUTIVE SUMMARY .....	IX
SUMMARY OF IMPERILED WILDLIFE LISTS .....	X
STATUTORY REQUIREMENTS.....	1
CRITERIA FOR RESEARCH AND MANAGEMENT PRIORITIES.....	1
STATEWIDE POLICIES PERTAINING TO LISTED SPECIES.....	1
REQUIRED LEGISLATION.....	2
FUNDING REQUEST.....	2
PROGRESS REPORT .....	3
Black Bear.....	3
Florida Mice.....	5
Beach Mice .....	6
Florida Bonneted Bat .....	7
Gray Bat.....	8
Florida Panther.....	9
Florida Manatee .....	11
North Atlantic Right Whale .....	14
Bald Eagle.....	15
Burrowing Owl .....	16
Florida Grasshopper sparrow .....	16
Florida Scrub-Jay .....	17
Ivory-billed Woodpecker .....	23
Red-Cockaded Woodpecker.....	24
Roseate Tern .....	31
Everglades Snail Kite.....	32
Southeastern American Kestrel.....	33
Whooping Crane .....	33
Wood Stork .....	34
Wading Birds .....	37
Gopher Frogs .....	38
Bog Frog and Okaloosa Darter.....	38
Eastern Indigo Snake .....	38
Flatwoods Salamander .....	39
American Crocodile.....	41
Gopher Tortoise .....	42
Marine Turtles.....	46
Smalltooth Sawfish .....	49
Sturgeon .....	50
Other Imperiled Fish .....	52
Miami Blue Butterfly.....	53
Panama City Crayfish .....	55
Florida Cave Crayfish.....	56
Black Creek Crayfish.....	56
Freshwater Mussels.....	57
Habitat Modeling .....	57
Sandhill .....	58
Wildlife Conservation Prioritization and Recovery .....	58
Coordination and Assistance.....	59
Critical Wildlife Areas.....	61
Florida's Incentive-Based Conservation Programs.....	63

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Law Enforcement.....	65
Permitting And Assistance.....	66
CITIZENS AWARENESS PROGRAM.....	67
APPENDIX A. LISTED WILDLIFE SPECIES AS OF JUNE 30, 2008 .....	77
APPENDIX B. LIST OF ACRONYMS USED IN THIS REPORT .....	83
APPENDIX C. FWC STAFF PUBLICATIONS DURING 2007-2008.....	85
APPENDIX D. COMMON AND SCIENTIFIC NAMES OF NON-LISTED SPECIES MENTIONED BY COMMON NAME IN THE REPORT. ....	87
APPENDIX E. GLOSSARY OF TERMS .....	88

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

LIST OF TABLES

Table 1. Summary of Official Lists of Florida’s Endangered Species (E), Threatened Species (T), and Species of Special Concern (SSC), as of June 30, 2008.....x

Table 2. FWC Endangered/Threatened Species Budget Request for FY 2009-2010.....2

Table 3. FY 2007- 2008 Small mammal survey results for Florida Mouse by habitat type.....6

Table 4. Critical wildlife areas in Florida in 2008.....62

Table 5. Major habitat management techniques contracted with 22 private landowners through the Landowner Assistance Program (LAP) by dollar amount obligated vs. spent during FY 2007-2008.....63

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

LIST OF FIGURES

Figure 1. Distribution of the number of fledglings/nests for wood stork nests recorded at colonies in the SJRWMD region of North and Central Florida.....35

Figure 2. Annual number of wood stork nests recorded at colonies in the SJRWMD region of North and Central Florida.....36

Figure 3. Landowner Assistance Program Focal Areas.....64



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

## EXECUTIVE SUMMARY

This document constitutes the 30<sup>th</sup> progress report and update of the Florida Endangered and Threatened Species Management and Conservation Plan as required by the Florida Endangered and Threatened Species Act of 1977 [§379.2291(5), Florida Statutes (F.S.)]. Subsection five of the Act required the preparation of an initial plan for submission to the 1978 Florida Legislature, and the annual preparation of a revised and updated plan for management and conservation of endangered and threatened species. Species of special concern also are included in this report. Species designated as endangered, threatened, or species of special concern are collectively referred to as listed species.

The initial plan submitted in March 1978 remains the basic reference document for the annual updates. Subsequent annual reports may be consulted regarding a chronological history of the listed species activities of the former Florida Game and Fresh Water Fish Commission (GFC) and Florida Department of Environmental Protection (FDEP). These activities have since become the responsibility of the Florida Fish and Wildlife Conservation Commission (FWC) upon the merger of the GFC with the Marine Fisheries Commission and certain organizational programs of FDEP on July 1, 1999. Copies are available from the Division of Habitat and Species Conservation, Species Conservation Planning Section, of the FWC, Tallahassee or at <http://www.myfwc.com>.

This report covers the fiscal year (FY) 2007-2008, a period from July 1, 2007 to June 30, 2008. It includes a description of FWC's criteria for research and management priorities, statewide policies pertaining to listed species, required legislation, a funding request, a progress report providing a description of agency actions for listed species, and a description of FWC's citizen awareness program. The progress report section includes reports of staff activities covering listed mammals, birds, amphibians, reptiles, fish, and invertebrates. Additionally, this section reports on agency actions to provide coordination and assistance, Critical Wildlife Areas, incentive-based conservation programs, law enforcement, and permitting for listed species. Please contact FWC's Listed Species Coordinator if you would like more information about anything in this report.

This report includes five appendices to help the reader. Appendix A is the list of species listed by Florida as endangered, threatened, or species of special concern, as of June 30, 2008. Appendix B defines acronyms used in the report. Appendix C is a list of FWC staff publications published during FY 2007-2008. Appendix D is a list of the common and scientific names of non-listed species mentioned by common name in the report. Appendix E is a glossary of biologic terms used in the report.

I would like to express my appreciation to each person who contributed to this report. Special appreciation is expressed to Caly Murphy for her assistance in the preparation of this report, and Elsa Haubold, Jackie Fauls, and Lawson Snyder for editorial review.

Bradley J. Gruver, Ph.D.  
Listed Species Coordinator  
Florida Fish and Wildlife Conservation Commission  
Division of Habitat and Species Conservation  
Species Conservation Planning Section  
850-488-3831  
[brad.gruver@myfwc.com](mailto:brad.gruver@myfwc.com)

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

## SUMMARY OF IMPERILED WILDLIFE LISTS

The first Florida endangered species list was promulgated in 1972 and consisted of 23 species. The listing concept was expanded in 1973 to include threatened species, and again in 1979 to include species of special concern. The official State lists are kept in Florida Administrative Code (F.A.C.) as Rules 68A-27.003 (endangered), 68A-27.004 (threatened) and 68A-27.005 (species of special concern). Currently, the Florida Fish and Wildlife Conservation Commission (FWC) lists 117 species (Table 1) as endangered (41), threatened (26), or species of special concern (50). A complete listing of Florida's listed species as of June 30, 2008 is included as Appendix A. The current listing of Florida's listed species may be accessed at <http://myfwc.com/imperiledspecies/pdf/Threatened-and-Endangered-Species-current.pdf>. The rules noted above may be viewed at the F.A.C. Web site <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27>. Federal agencies also list species as endangered and threatened. The National Oceanic and Atmospheric Administration (NOAA)-National Marine Fisheries Service (NMFS) is responsible for listing most marine species and the U.S. Fish and Wildlife Service (USFWS) is responsible for other species. The Federal list of animals and plants is administered by the USFWS, and is published in 50 CFR 17 (animals) and 50 CFR 23 (plants). Additional information regarding Federal listings can be located at <http://www.nmfs.noaa.gov> for NOAA-NMFS and <http://www.fws.gov/endangered/wildlife.html> for USFWS.

The Florida Department of Agriculture and Consumer Services (DOACS) is responsible for the "Florida Statewide Endangered and Threatened Plant Conservation Program." More information on this program is available at [http://www.fl-dof.com/forest\\_management/plant\\_conservation\\_index.html](http://www.fl-dof.com/forest_management/plant_conservation_index.html).

Table 1. Summary of Official Lists of Florida's Endangered Species (E), Threatened Species (T), and Species of Special Concern (SSC), as of June 30, 2008.

STATUS DESIGNATION	FISH	AMPHIBIANS	REPTILES	BIRDS	MAMMALS	INVERTEBRATES	TOTAL
E	3	0	6	8	20	4	41
T	2	0	11	9	4	0	26
SSC	10	5	7	18	6	4	50
<b>TOTAL</b>	<b>15</b>	<b>5</b>	<b>24</b>	<b>35</b>	<b>30</b>	<b>8</b>	<b>117</b>

## STATUTORY REQUIREMENTS

### CRITERIA FOR RESEARCH AND MANAGEMENT PRIORITIES

The Florida Fish and Wildlife Conservation Commission (FWC) uses a variety of tools to evaluate and prioritize research and management needs for State-listed species. One tool used is the State listing process described in Rule 68A-27.0012, F.A.C. This process uses a quantitative system to identify Florida's most imperiled species and directs the development of a management plan for each species undergoing a listing action. In addition to the listing process, the FWC uses a species ranking process that was developed by FWC staff and published in Wildlife Monographs (Millsap, B. M., J. A. Gore, D. E. Runde, and S. I. Cerulean. 1990. Setting priorities for the conservation of fish and wildlife species in Florida. Wildlife Monographs 111). This ranking process provides a biological score, which is intended to rank species based on their biological vulnerability; an action score that ranks species based on the amount of available information and ongoing management actions for a species; and a supplemental score that looks at variables not included in biological or action scores. These scores help identify species most in need and the amount of effort previously expended on them, which then is used to help in prioritizing agency resources. In addition to these tools, the FWC must address activities mandated by legislation, court rulings, grant agreements, and approved management plans when setting priorities. The FWC uses the listing process, the species ranking process, and consideration of mandated and other activities to allocate resources for the management and conservation of Florida's State-listed species.

### STATEWIDE POLICIES PERTAINING TO LISTED SPECIES

Listing Actions (*Brad Gruver*).--The Commission worked on five listing actions during FY 2007-2008. These were the proposed delistings of the bald eagle and peregrine falcon, and the proposed reclassifications of the Florida manatee, gopher tortoise, and Panama City crayfish. The Gopher Tortoise Management Plan was approved by the Commission in September 2007 and the gopher tortoise was reclassified as a threatened species.

The Manatee Management Plan was approved by the Commission in December 2007. In December 2007, the Commission decided to defer all further listing actions except for the peregrine falcon and bald eagle and they directed staff to not accept any petitions on listing until the listing process has been reviewed by staff with input from stakeholders. The Commission deferred making a decision on the reclassification of the manatee's status until FWC staff reviewed the listing process. The Commission also deferred any further action on the Panama City crayfish until FWC staff reviewed the listing process.

The Bald Eagle Management Plan was approved by the Commission in April 2008 and final action was taken to remove the eagle from the threatened species list. A biological status report on the peregrine falcon was completed and presented to the Commission in June 2008. The Commission decided the delisting of the falcon was warranted and directed staff to proceed with developing a management plan in FY 2008-2009.

Final biological status reports, draft, and final management plans are available at <http://myfwc.com/imperiledspecies/petitions.htm>.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

REQUIRED LEGISLATION

Currently, the FWC has no requests for legislative changes affecting wildlife species that are listed as endangered or threatened. The staff of the FWC will work with the Legislator should any legislation involving listed wildlife species be proposed.

FUNDING REQUEST

Recommended Funding Level (*Sandy Wilson*).--The recommended level of funding for the FWC endangered species programs in FY 2009-2010 is \$20,983,750 (Table 2). This includes funding to maintain current programs, additional funding to enhance Florida Panther recovery and marine turtle conservation efforts, and continuation of awards from Federal grants designed to assist in the development of recovery programs.

Table 2. FWC Endangered/Threatened Species Budget Request for FY 2009-2010.

Funding Source	Amount
Nongame Wildlife Trust Fund (NGWTF)	\$1,772,162
Florida Panther Research & Management Trust Fund (FPRMTF)	\$1,410,097
Save the Manatee Trust Fund (STMTF)	\$3,718,737
Marine Resources Conservation Trust Fund (MRCTF)	\$7,851,201
Land Acquisition Trust Fund (LATF)	\$2,300,000
State Game Trust Fund (SGTF)	\$217,587
General Revenue	\$212,437
Federal Grants	\$3,348,047
Non-Federal Grants	\$153,482
<b>Total</b>	<b>\$20,983,750</b>

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

PROGRESS REPORT

Management of endangered, threatened, and special concern species are those actions taken by the Florida Fish and Wildlife Conservation Commission (FWC) in fulfilling its mission of “managing fish and wildlife resources for their long-term well-being and the benefit of people” with regard to these species. It includes surveying and monitoring of species, habitat improvement and restoration, development and implementation of management plans, conservation planning, agency commenting on potential impacts to species, and citizen awareness. Research is a systematic means of generating the scientific information that is necessary to support and guide management of endangered, threatened, and special concern species. Significant research has been conducted on many listed species during the past three decades, and results are leading to a better understanding of the population processes and how managers may alter these processes through management actions. Research studies have led to management actions that have aided in species stabilization and recovery, may assist in the recovery of some species, and preclude further population declines of others. This section briefly describes the progress of ongoing listed species management and research by the FWC staff. Comprehensive annual reports of some of these species activities are available upon request.

*Black Bear*

Black Bear Management and Research Program (*Stephanie Simek, Walt McCown*).-- FWC continues to engage in research and management efforts to ensure the conservation of the Florida black bear for future generations of Floridians. The black bear is currently listed as a State threatened species and exists primarily on large segments of public and private tracts of land, in rural and urban areas throughout the state.

Florida black bear populations are rebounding from historic lows in many areas throughout the state. As the bear populations expand and Florida’s human population continues to grow and encroach upon potential bear habitat, human-bear encounters continue to increase in number and intensity. The impacts of human activity on Florida black bears have led to concern regarding the status of and outlook for remaining populations and their habitats. Bears require large areas to live, their populations are fragmented, and increasing human activity could cause conflict and create an uncertain long-term future for black bears in Florida. FWC began an aggressive effort to provide proactive conservation and management planning tools to residents and partnering organizations to maintain the Florida black bear for the benefit of the species and Florida residents and visitors.

FWC staff developed a comprehensive, statewide draft management plan designed to conserve Florida black bears. While drafting the plan, Staff solicited input from a Technical Advisory Group that included stakeholders. Staff is currently designing a strategy for public review and input on the draft management plan.

During FY 2007-2008, FWC personnel received 3,490 calls regarding bears (this includes observations, sick and injured bears, bear in yard, complaints, etc.). The number of reported bear roadkills totaled 160 individuals for the year, a record. FWC staff worked with the Florida Department of Transportation (FDOT) to create a motorist notice regarding bears and other wildlife on the FDOT’s construction pamphlet for motorists. Several requests were received from citizens and organizations requesting bear crossing signs at various locations.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

These requests were forwarded to FDOT.

The Bear Response Agent Program remains active in North and Central Florida. Contracted responders were dispatched by FWC staff to respond to specific types of bear complaints that were determined by staff to pose a hazard to people or property. Agents responded to 329 events. The Bear Response Agent Program will continue into FY 2008-2009. FWC contracted with a private entity to conduct an evaluation of the Bear Response Agent Program using the data collected by FWC during 2002-2006. The report is being prepared for final approval.

In addition to the Bear Response Agent Program, intensive efforts and programs to reduce negative human/bear encounters were developed focusing on partnerships with local governments and communities and improving waste management techniques. FWC staff developed bear-specific events (Bear Days) which offered residents ways to minimize attracting black bears, tools for securing garbage and other attractants, and other tips for living with their wild neighbors. Several success stories include Collier County requiring wildlife resistant dumpsters at their new schools, retrofitting existing garbage cans, providing wildlife resistant options to residents at Carrabelle and Navarre Bear Days, replacing commercial dumpsters at a “hot-spot” apartment complex in Carrabelle, and reducing bear calls to zero.

FWC staff began an internship program to develop future conservation professionals and expand the abilities of the FWC to address bear related topics. The Internship Program is designed to allow students to gain credit through their universities for their experience while acquiring training in the profession of wildlife management and research. Five interns from Florida State University and one intern through Ability First (provides programs and services for adults and children with disabilities) participated in the inaugural Summer 2008 Session. These students contributed over 1,000 hours of time to bear management and research.

Through support from Conserve Wildlife funds through the Wildlife Foundation of Florida, FWC staff contracted the University of Georgia to conduct a public perception survey about bears. The survey was designed to assess public perception of bears. The results of this survey are expected to aid in the development of the final bear management plan.

Staff plans are to use the remainder of the grant during FY 2008-2009 to print an Aversive Conditioning Field Guide and an Attractant Checklist Booklet. In addition, staff worked on developing a FWC approved protocol for law enforcement to follow when implementing aversive conditioning or hazing techniques on Florida black bears. A bear attack response plan was drafted and includes roles for staff from across the agency. The intent is to provide guidance to FWC staff and others who may be called upon to assist in investigating a report of an attack. The document will be finalized during the FY 2008-2009.

FWC partnered with the U.S. Forest Service and the University of Florida to examine the ecology of the Florida black bear in the urban-wildland interface (UWI). The study was completed and the final report is being written. FWC staff helped design this project and supervised all field activities. This project began in June 2005 and closely monitored the movements and activities of Florida black bears living in the UWI of Ocala National Forest (ONF). Areas with adjoining bear and human habitats such as the ONF, generate the majority of the more than 2,000 calls that FWC receives each year regarding bears. As part of the study, 32 bears (17 males, 15 females) were captured and radio-collared. Of these, 25 bears (13 males, 12 females) were captured in two different communities and 7 bears (4 males, 3 females) were captured in the interior of ONF as controls. Preliminary results suggest that bears that live in the UWI are more nocturnal than are bears that live in the forest, and that the distribution of bears in

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

the UWI varies significantly in response to seasonally available resources in the highly fragmented habitat. Results will be contained in a thesis published by a graduate student as a Master of Science degree requirement due by December 2008.

The final report examining the distribution and relative abundance of black bears in a four-county area of the Big Bend region (Dixie, Lafayette, Levy, and Taylor) was accepted and published in December 2007. This study was funded through a grant from the Wildlife Foundation of Florida. The Big Bend region constitutes the largest expanse of bear habitat in the state that appears to be sparsely occupied by bears. Results indicated that bears were well established in northern Taylor County, but rare elsewhere. However, two female bears with cubs were detected in Levy County near the Lower Suwannee National Wildlife Refuge.

FWC staff served on an advisory committee with representatives from the U.S. Forest Service, Department of Agriculture and Consumer Services (DOACS), Florida Department of Environmental Protection (FDEP), Florida Department of Transportation (FDOT), and several non-governmental organizations (NGOs) that were part of the Project Design and Environmental (PD&E) study to consider improvements to SR-40 in Marion, Lake, and Volusia counties. Project Design and Environmental study is a formal process that FDOT uses to ensure consideration is given to engineering design, project costs, environmental, and social impacts in the development of major transportation projects. The advisory committee advised FDOT on the number, design, and placement of wildlife crossing structures to be incorporated into the traffic capacity enhancement project that is being planned for SR-40. SR-40 bisects a large bear population and currently accounts for more than 50% of the state's annual roadkilled bears.

FWC staff provided assistance to the University of Kentucky on a study that is designed to gather information on movements of bears through highly fragmented remnants of the Lake Wales Ridge scrubland in Highlands County.

### *Florida Mice*

Small Mammal Survey of Andrews Wildlife Management Area (Jayde Roof).--A small mammal survey was conducted to determine the suite of small mammals using the area in North-Central Florida, including any listed small mammals. Three sessions of small mammal trapping were completed in fall, winter, and spring. Within each season, four habitat types were sampled.

The Florida mouse was the only imperiled species captured and was documented at one upland hardwood site. No gopher tortoise burrows were observed along or near this trap site transect.

Future surveys will be conducted near where the Florida mouse was captured to determine the status of this species population.

Small Mammal Trapping at Lake Wales Ridge Wildlife and Environmental Area (Mike McMillian and Heidi Hoffman).--Small mammal trapping has been conducted on the Lake Wales Ridge Wildlife and Environmental Area (WEA) in Southwest Florida since June 2005. The WEA is composed of 19 individual tracts spread out over 75 miles. Each year, two to three tracts are selected for small mammal surveys and each tract is surveyed quarterly for one year. Trapping takes place in June, September, December, and March. Line transects are established with trap stations placed 32.8 feet (10 m) apart. Each station consists of one large and one small Sherman live trap. The number of transects is determined by the tract size. The following habitat cover types (as designated by Florida Natural Areas Inventory, FNAI) were sampled:

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

flatwoods, scrub, scrubby flatwoods, sandhill, wetland, cutthroat seep, bayhead, and oak hammock.

During the trapping periods, 307 Florida mouse captures were recorded. More individuals were captured in scrub and scrubby flatwoods than any other habitat (Table 3). Data collected since 2005 shows the same trend. Over three years of trapping, regardless of the tract surveyed, spring (March) appears to be the best time to trap Florida mice and fall (September) is the worst time. During the FY 2007-2008, 117 captures occurred in March while only 10 occurred in September.

Land management activities on tracts surveyed for small mammals include prescribed burning and mechanical reduction of shrubby and hardwood vegetation.

Table 3. FY 2007-2008 Small mammal survey results for Florida mice by habitat type (N=307).

Habitat	No. of Captures	Percentage of Total (%)
Flatwoods	61	19.9
Scrub	100	32.6
Scrubby Flatwoods	90	29.2
Sandhill	37	12.1
Wetland	9	2.9
Cutthroat	10	3.3

*Beach Mice*

Beach Mouse Conservation (Jeff Gore).--Several subspecies of the old-field mouse inhabit dune habitat along Florida's coast and are collectively known as beach mice. Due to the extensive development of their coastal habitat, all but one of the beach mouse subspecies are listed as threatened or endangered by State or Federal agencies. FWC biologists completed a report summarizing the status of beach mice in Northwest Florida and presented a technique for monitoring populations by detecting mouse tracks at bait stations using track tubes rather than by capturing mice. In May, FWC biologists participated in an interagency workshop on conservation of beach mice that was attended by State, Federal, and NGO biologists. FWC biologists also responded to permitting issues regarding development in beach mouse habitat on the Atlantic and Gulf coasts.

FWC biologists worked with land management partners to implement track-monitoring stations on public lands within the range of each of the endangered subspecies of beach mice in Northwest Florida. Florida Park Service staff helped FWC biologists continue to monitor the population of Choctawhatchee beach mice at Topsail Hill Preserve State Park through monthly checks of 32 track tubes. Beach mice tracks were detected in 54.7% of the tubes checked from July 2007 to July 2008. Planning began to establish track tubes in fall of 2008 for long-term monitoring of Choctawhatchee beach mouse populations at Deer Lake State Park and Grayton Beach State Park.

In fall of 2007, FWC biologists re-established a network of track tubes to monitor distribution of St. Andrew's beach mice on East Crooked Island at Tyndall Air Force Base and at Rish Park (State property) on the St. Joseph Peninsula. At East Crooked Island, 42 tube stations were set in October 2007 and mouse tracks were detected in 84.4% of the tubes checked from



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

October to June. In February 2008, FWC biologists set track tubes at 22 stations in Rish Park. Mouse tracks were detected in 56.1% of tubes checked at Rish Park. Although mouse tracks had been observed at Rish Park in recent years, no animals had been captured to confirm presence of beach mice. In February 2008, FWC biologists trapped an adult female beach mouse during 200 trap-nights of effort.

The Perdido Key beach mouse has the smallest current distribution of all the subspecies of beach mice and populations have at times dipped to extremely low levels. In 2004, Hurricane Ivan significantly impacted beach mouse populations and habitat on Perdido Key, and the mouse population has not recovered. FWC biologists, along with partners from Florida Park Service and National Park Service (NPS), monitored track tubes in Perdido Key State Park (PKSP) and Gulf Islands National Seashore that were first established in 2005. Beach mouse tracks were detected in 28.7% of tubes checked at Gulf Islands National Seashore. At PKSP, monitoring in 2006-2007 indicated a decline in the mouse population and in FY 2007-2008 the situation deteriorated. From July 2007 to January 2008 the proportion of tubes with tracks each month averaged 2.9% (range 0- 5.3%) and no tracks were detected in PKSP after January. To confirm the status of Perdido Key beach mice at PKSP and Gulf Islands National Seashore, FWC biologists and State and Federal partners set traps for mice in April 2008. At Gulf Islands National Seashore, 30 individual mice were captured in 1,794 trap nights, but no mice were captured at PKSP in 1,056 trap nights. Beach mice are presumed to be absent from PKSP and a reintroduction of mice to the park will likely be necessary to reestablish the population. The status of beach mice on private lands outside of Gulf Islands National Seashore is unknown.

Just prior to landfall of Hurricane Ivan in 2004, eight beach mice were taken from PKSP and transferred to a holding facility at the University of South Carolina. These mice were deemed unlikely to be returned to the wild due to potential for disease transmission and because the mice had become acclimated to captivity. In 2007, the original eight mice and their descendants were moved to three Florida zoos in order to provide the public an opportunity to see beach mice and to educate visitors about beach mouse biology and conservation (see summary at [http://www.aza.org/Publications/2008/08/f\\_mice\\_aug08\\_web.pdf](http://www.aza.org/Publications/2008/08/f_mice_aug08_web.pdf)). As of the summer of 2008, the Florida zoos continued to support captive colonies of Perdido Key beach mice and each zoo provided opportunities for the public to view the mice and learn about their status in the wild. The mice are breeding in captivity and discussions continue regarding the need and feasibility of reintroducing captive-bred mice into vacant habitat at Perdido Key.

#### *Florida Bonneted Bat*

Florida Bonneted Bats in the Southwest Region (Jennifer Morse).--In May 2008, FWC contracted with the Florida Bat Conservancy (FBC) to conduct acoustical bat surveys on selected public lands in the Southwest Region. Surveys were conducted at Babcock-Webb, Hilochee, Kicco and Hickory Hammock Wildlife Management Areas (WMAs), the Lake Wales Ridge Wildlife and Environmental Area (WEA) and the Kissimmee River Public Use Area (PUA). Stationary and roving surveys using echolocation detection equipment were conducted at each area. Final reports for each area, including suggested land management considerations and detailed field survey reports, were prepared by the FBC and are located on the Terrestrial Habitat and Conservation and Restoration Section SharePoint site for the Southwest Region.

A total of seven bat species were found to be utilizing the survey areas. Five of these species have been identified as “Species of Greatest Conservation Need” by Florida’s Wildlife

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Legacy Initiative, including the Florida bonneted bat and the Southeastern myotis. The Florida bonneted bat is listed as endangered by FWC and was detected in surveys at Babcock-Webb WMA and along the Kissimmee River (KICCO Wildlife Management Area and Kissimmee River Public Use Area). The discovery of the Florida bonneted bat along the Kissimmee River was unexpected and is of note as the nearest known population is over 50 miles away at Babcock-Webb Wildlife Management Area. It is not known where Florida bonneted bats are roosting at these areas and the Florida Bat Conservancy identified this as a need so the roosts can be monitored and protected. As this species has been documented only in a few locations, protection of known roosts could be significant in preservation of the species.

Florida bonneted bats have been recorded utilizing bat boxes for roosting habitat in Southwest Florida. The Florida bonneted bat is larger in body size than any other Florida bat and prefers wider crevices for roosting. Based on results of the surveys, FWC erected eight single-chambered bat boxes at Babcock-Webb WMA. Five more boxes will be installed at KICCO WMA and the Kissimmee River PUA to provide additional roosting habitat for this species in FY 2008-2009. These boxes will be checked two to three times annually to detect occupancy. If the boxes are occupied, an attempt will be made to capture bats leaving the box in order to verify that they are Florida bonneted bats.

### *Gray Bat*

Monitoring Gray Bats at Roosts (Jeff Gore).--The gray bat is a colonial cave-roosting species that occurs through much of the South Central United States. Its rangewide population appears to be increasing after severe past declines due to disturbance of its cave roosts. In Florida, however, the gray bat roosts only in a few caves in Jackson County and the population appears to be declining even though the roost caves have been protected. Gray bats occupy different caves in summer and winter based upon temperature and some bats migrate out of Florida during winter. The size of the summer population cannot be easily determined because the bats roost within large colonies of a similar species, the Southeastern myotis. Regardless, no gray bats have been observed or captured at summer roosts in Florida for several years. In spring of 2008, emerging bats were counted at Judges Cave, the largest former maternity roost for gray bats, and at other caves where Southeastern myotis roost. Southeastern myotis were present at all sites but no gray bats were observed. In addition, no gray bats were present in a small sample of bats captured at Judges Cave.

The gray bat winters in only two Florida caves and the hibernating bats can be readily counted at both sites. Biologists from FWC and the Florida Park Service conduct an annual census of the winter roosts and very few gray bats have been observed in recent years. In January 2008, biologists found no gray bats in the smaller hibernation cave and seven gray bats in the larger cave. This represents a modest increase from 2007 when no hibernating gray bats were seen, but the number of gray bats remains critically low and the species may soon be absent from Florida. Because the roost caves have been protected, factors other than disturbance of roosts may be responsible for the decline. For example, protection of large roost caves in northern Alabama may have attracted bats that formerly raised their young in the smaller, and potentially less optimal Florida caves. In addition, because the gray bat prefers low temperatures for hibernating, increases in winter temperatures at Florida caves may have made them unsuitable for gray bats. A more thorough census might determine more accurately the status of the species in Florida but it would not address causes for any decline.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

*Florida Panther*

Florida Panther Research and Management (Darrell Land, Mark Lotz, Dave Onorato, Marc Criffield).--Florida panthers are endangered due to a combination of small population size and habitat loss. Habitat fragmentation and unregulated killing over the past two centuries have reduced and isolated populations in the southeastern United States to the point where only one population, estimated at less than 120 adults and sub-adults, exists on approximately two million acres of habitat in South Florida. Small population size and geographic isolation increases the chance for extinction of Florida panthers due to small numbers and erosion of genetic diversity from restricted gene flow and inbreeding. In the spring of 1995, the FWC released eight female puma from Texas into areas occupied by Florida panthers in order to offset the potential harmful effects of inbreeding and to diversify the panther population's genetic composition. None of these eight female Texas puma remain in the population today but FWC continues to monitor the effects of this genetic infusion and its impact on the panther population.

Telemetry data were collected on 36 radiocollared Florida panthers in southern Florida during the reporting period by FWC and our two Federal cooperators, Big Cypress National Preserve (BCNP) and Everglades National Park (ENP). Six new panthers were added to the sample population monitored by FWC this past capture season. Eight panther dens were documented by the three agencies during the study period producing a minimum of 21 (14 males, 6 females, 1 sex unknown) kittens. This includes two failed dens that contained four dead kittens (2 males, 1 female, and 1 unknown). All kittens were permanently marked with subcutaneous transponder chips and genetic material was acquired. A total of 164 panthers has been radiocollared since 1981 and 273 neonate kittens have been handled at dens since 1992. Twelve free-ranging panther mortalities, including six (4 males, 2 females) radiocollared and six (3 males, 3 females) uncollared panthers, were documented during the reporting period. Vehicular trauma accounted for five (3 males, 2 females) panther mortalities, while intraspecific aggression resulted in three (2 males, 1 females) mortalities. Three panthers (1 male, 2 females) died from undetermined causes. One radiocollared male panther died of pneumonia.

FWC is continuing the evaluation of Global Positioning System (GPS) radiocollars. GPS radiocollars work reasonably well on panthers but do not perform as well as the manufacturer's expectations. Regardless, GPS radiocollars offer a significant advancement over traditional aerial monitoring of panthers because they allow us to determine where the individual panthers are several times a day without the need for expensive, dangerous flying over the area. Additionally, our testing of GPS systems that send data locations via text-messaging has shown promise and could assist in preventing data loss experienced with currently used "store-on-board" GPS collars while also alleviating flight costs associated with traditional VHF (very high frequency) collar monitoring.

Staff are continuing several research projects that were deemed a priority via the recommendations received from the Florida Panther Scientific Review Team commissioned by FWC and the USFWS in 2002. Current research includes the development of a panther demographic model, improving estimates of adult and kitten survival, continuing to evaluate panther habitat selection through use of GPS radiocollars, and finalizing analysis on nearly 30 years of panther genetic data. Research has also been initiated that focuses on predation patterns of panthers and the impact of various factors on predation events (for example: season, associated habitat, sex, reproductive status). All research plans are vetted with our partners to ensure our research and monitoring efforts are well-designed, coordinated, and meet priority

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

needs.

FWC convened a team comprised of administrators, biologists, and law enforcement officers from the National Park Service (NPS), USFWS, and FWC with the goal of developing a Florida Panther Response Plan. This plan provides guidance when dealing with human/panther interactions. A draft of the response plan called Guidelines for Living with Florida Panthers and Interagency Florida Panther Response Plan, is going through an Environmental Assessment Review (EAR) and USFWS has received and addressed public comments. Once the EAR is completed, the plan can be finalized and adopted.

FWC and its interagency partners investigated twelve depredation events, four encounters, and one incident during the reporting period. A depredation event is when domestic livestock or pets are preyed upon by a panther. Panthers were confirmed as being involved in ten of the twelve reported events. Although mitigating circumstances prevented confirmation in two cases, a panther was suspected in both instances based on strong circumstantial evidence. Eight of the twelve depredation events consisted of hobby livestock loss, while the remaining four were non-fatal attacks. Repeat depredations occurred at two residences before changes in husbandry practices were implemented. Uncollared panthers were responsible for all depredations except one. A radiocollared male is suspected in one case because the cat was resting less than 400 m from where a goat was killed and he was photographed returning to the pasture the following night. Animals preyed upon by panthers included goats, sheep, and a fallow deer. Animals that were attacked but survived included a goat, a shepherd-mix dog, a llama, and a one-month-old calf.

Four encounters, defined as the unexpected, direct meeting between a human and a panther, were reported. The first involved a 1.5-year-old radiocollared female kitten in Everglades National Park (ENP) that was discovered resting in an oak tree next to a popular hiking trail. The trail was temporarily closed and the panther left the area without incident. Similarly, a panther was treed by neighborhood dogs in a rural residential area in Golden Gate Estates. The area was cleared of people and dogs and the panther then left the area. The other two encounters involved people meeting panthers while walking on boardwalks. In ENP, a couple rounded a junction at the Mahogany Hammock boardwalk and witnessed a panther staring off across the sawgrass. The couple moved away from the boardwalk intersection and the panther ran by. At the Corkscrew Regional Ecosystem Watershed (CREW) Corkscrew Marsh Unit, a lone hiker sighted a panther as they unwittingly walked towards each other on a boardwalk. The individual slowly retreated in the direction from which he entered the boardwalk while the panther retreated in the opposite direction.

A single incident, defined as an unexpected, direct interaction between a human and a panther, occurred during the reporting period. An individual was conducting a songbird survey on the Florida Panther National Wildlife Refuge when he noticed a panther approaching to within eight meters. The researcher banged on a clipboard, yelled, and hit the ground with a palm frond and the panther retreated 3-4 meters and hid behind some brush. The panther was subsequently noticed following the person for about 30-50 meters as he walked away. After several minutes, the panther was no longer observed.

For more information, an extensive collection of panther reports and publications can be found at the following Web sites: <http://myfwc.com/panther/>, <http://www.wildflorida.org/critters/panther/index.asp>, and <http://www.fws.gov/verobeach/index.cfm?Method=programs&NavProgramCategoryID=10&programID=64&ProgramCategoryID=10>.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

*Florida Manatee*

Conservation Efforts (*Carol Knox*).--The FWC is involved in many conservation efforts for the Florida manatee. The manatee is native to Florida's coastal and riverine waters and is listed by both the USFWS and the FWC as an endangered species. The State of Florida's efforts to conserve the manatee are funded primarily by the Save the Manatee Trust Fund (STMTF) that derives approximately half of its funds from the sale of automobile license plates with the manatee design. Florida has protected manatees since 1892. Current State efforts to conserve the population are guided by the Florida Manatee Sanctuary Act of 1978 and the USFWS Florida Manatee Recovery Plan of 2001. In addition, the manatee is protected under the Federal Marine Mammal Protection Act and Endangered Species Act. FWC staff participated as members of the Federal Manatee Recovery and Implementation Team, which was disbanded in September of 2007. A new team will be formed during the next fiscal year. The FWC and the USFWS continue to work closely to address manatee issues. For more details about the FWC Marine Mammal Program, please see the Save the Manatee Trust Fund annual report provided to the President of the Florida Senate and the Speaker of the Florida House of Representatives each year, available at [http://research.myfwc.com/features/category\\_main.asp?id=1986](http://research.myfwc.com/features/category_main.asp?id=1986).

Listing Evaluation (*Brad Gruver*).--In FY 2005-2006, a Biological Review Panel (BRP), in accordance with the listing process (Rule 68A-27.0012 F.A.C) reviewed the status of the Florida manatee and concluded that the manatee warranted listing as threatened. FWC agreed with this conclusion, deciding that reclassifying the manatee as threatened was warranted, and directed staff to move forward with management plan development. A team was assembled to develop the management plan during FY 2006-2007 and several draft versions were available for public review and comment during the year. A final draft plan was presented to FWC for their initial review in June 2007. The Florida Manatee Management Plan was approved at FWC's December 2007 meeting, however, reclassification of the manatee to a threatened species was deferred while staff review FWC's imperiled species listing system.

Conservation Management Activities (*Carol Knox*).--In December 2007, the FWC approved the first ever Florida Manatee Management Plan that provides detailed actions needed to conserve manatees now and into the future. The plan was developed over 18 months by a team of staff from across the FWC. Extensive stakeholder and public input was provided throughout the process of developing the plan. Input was incorporated as appropriate into the final document. Management plan development is the last step in the listing process under the current State-listing rule.

The Conservation Management Activities are now directed by the State's management plan and focuses on five program areas:

Manatee Protection Plans (MPPs) – This involves the development and implementation of county-based MPPs. Staff assisted both Broward and Palm Beach counties in completing their MPPs, which are currently being implemented. Staff are currently assisting Duval and Collier counties as they initiate review of their exiting MPPs for revisions. Review of comprehensive plan amendments concerning adoption of Boat Facility Siting Provisions of MPPs were also provided to the Department of Community Affairs.

Permits – A total of 808 correspondence letters were produced for projects during the year. These requests for additional information, biological opinions, and recommendations on

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

ways to reduce potential impacts to manatees were provided to regulatory agencies. Implementation of the Boat Facility Siting portion of FWC-approved Manatee Protection Plans is accomplished during the permit review process. FWC staff worked extensively with the USFWS and the U.S. Army Corps of Engineers (USACOE) to revise the “Manatee Key,” a tool used to make decisions in the Federal permit review process.

Rule Making – Staff members develop boat speed and safe haven regulations to protect manatees statewide. Extensive work is required involving county governments, stakeholder groups, and the general public in order to complete rule-making efforts. Amendments to the Duval County rule that began in the previous fiscal year were completed in July 2007. Staff assisted Citrus and Hillsborough Counties in the consideration of local zones. Work to evaluate the existing speed zones in Sarasota County has begun with the initial acquisition and analysis of newly available data.

Manatee Habitat – Staff participated in various inter-governmental groups and task forces regarding warm-water refuges, comprehensive Everglades restoration, minimum flows at springs, and other habitat-related concerns. Staff continued to work to address the potential loss of artificial warm-water manatee habitat provided by power plant discharges. Staff also focused on determining habitat-based manatee population carrying capacity.

Public Information – Programs focused on continuing to provide information to various user groups including school children, boaters, tourists, marina owners, and law enforcement entities. A total of 170 phone or mailed requests for information were received and completed. Of these, 74 were requests for bulk orders of materials to be distributed through the requestor’s organization. A new library program on manatees and a few other listed species was developed for Brevard County and is currently underway.

Manatee Research Program (Leslie Ward-Geiger).--The manatee research program included work in the following areas:

Manatee Mortality and Rescue – For FY 2007-2008, 305 manatee carcasses were documented in Florida. All but six of these carcasses were recovered and necropsied in order to determine cause of death. Collision with watercraft was the primary cause of death in 80 of the 305 cases. The other manatee mortalities were attributed to entrapment in a flood gate or canal lock (1), entanglement (6), cold stress (19), other natural causes including red tide (49), perinatal complications (79), undetermined cause (65), and 6 corpses were not recovered. An interactive searchable web-based database with manatee mortality information is available at FWC’s Web site ([http://research.myfwc.com/features/category\\_sub.asp?id=2241](http://research.myfwc.com/features/category_sub.asp?id=2241)).

FWC staff and cooperators rescued 84 sick or injured manatees statewide under the Federal rescue program. Three oceanaria participated in the rehabilitation program for critical care treatment and are reimbursed for these costs by the State of Florida through FWRI. Manatee rescues provide specific information on causes and geographic locations of manatee injuries and illness. The information obtained during manatee rehabilitation, treatment, and necropsy assists in reducing manatee mortality.

Population Assessment – FWC scientists use a variety of methods to assess and monitor the current and to protect the future status of the manatee population. Population assessments currently include a) conducting manatee counts at winter aggregation sites, b) distributional aerial surveys to determine regional distribution of manatees, to assess habitat use, and to estimate survival, population growth, and c) photo-identification, d) and the potential application of genetic tags to determine reproductive rates. Assessments also include estimates of risk to the

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

population, including projected declines in population size and probability of persistence into the future (i.e., risk of extinction).

The annual statewide manatee synoptic survey was not conducted in Winter 2008 due to above average temperatures and no significant cold fronts. According to the National Weather Service, La Niña conditions in Florida lead to winter temperatures well above average. The synoptic survey yields a minimum manatee population count. For more information about aerial surveys and the synoptic count, please visit [http://research.myfwc.com/features/category\\_sub.asp?id=2190](http://research.myfwc.com/features/category_sub.asp?id=2190).

Currently, researchers are developing new aerial survey techniques that will provide precise and reliable estimates of distribution and population size. These new methods and resultant data will contribute to models that incorporate information that has been lacking in previous counts: 1) how well observers detect manatees from the air and 2) environmental variables that can affect the number of animals counted by observers. Preliminary surveys incorporating the new distribution survey methods were tested in Collier County and the results from this study are currently being analyzed. A pilot study to test new methods for the statewide synoptic survey was flown in Winter 2008 in the Southwest Region. These new methods are not as dependent upon cold weather that causes manatees to aggregate at warm water sites as traditional methods have been. Data is being evaluated and results will be used to inform and refine the design for an improved statewide survey design. Details are described in the “Monitoring Activities” and “Ongoing and Future Research” sections of the Manatee Management Plan (<http://myfwc.com/imperiledspecies/plans/Manatee-Mgmt-Plan.pdf>).

FWC, in cooperation with the U.S. Geological Survey (USGS) Sirenia Project and Mote Marine Laboratory, maintains an image-based, computerized database called the Manatee Individual Photo-Identification System that is used for photo-identification of individual manatees. These data provide life history information and assist scientists in estimating survival and reproduction rates, critical data required for determining the status of the manatee population. Manatee Individual Photo-Identification System currently contains the sighting records of over 2,000 manatees, each of which have met stringent criteria for cataloging. In a continued effort to transition to a digital platform, FWC completed the scanning of manatee carcass slides. Over 43,000 carcass slides dating back to 1980 were scanned.

Critical data gaps still exist in Florida manatee population assessments. In particular, it has been very difficult to estimate vital statistics for Florida manatees in Southwest Florida through photo-identification because of photographic conditions, animal accessibility, and other extrinsic factors. Three demographic parameters are in need of refinement to better model manatee status and recovery: annual reproductive rates, annual gender-specific movement probabilities between the Northwest and Southwest Regions, and gender-specific adult survival rates in the Southwest Region. Genetic testing offers a complementary means of identifying individual manatees and its application could greatly enhance existing monitoring and assessment studies. The Manatee Management Plan identified the need for optimal genetic tissue sampling protocols for free-swimming manatees in order to implement a robust genetic identification program for the above-described monitoring applications. Sampling devices were tested this year on captive and then on free-ranging manatees. A comparative analysis of two sampling devices and various field collection strategies was conducted and an evaluation is underway. The results of the evaluation will help to form genetic field sampling work to be performed during Winter 2009.

The behavioral ecology program continued a new research initiative to study manatee

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

interactions with motorized watercraft in collaboration with researchers at Florida State University and Woods Hole Oceanographic Institution. A thorough understanding of the behavioral and sensory mechanisms underlying manatee-boat collisions is necessary in order to devise effective avoidance approaches. The goal of the project is to create a combined picture of manatee behavior, acoustics, and vessel trajectories so that Staff can better understand the responses displayed by manatees when approached by boats and the acoustic cues that may mediate such responses.

Previous work focused on research, development, and pilot testing of a state-of-the-art digital acoustic recording tag (“dTag”) designed to record manatee response to vessels. In FY 2007-2008, the main field project was conducted on tagged manatees in southwestern Florida. In addition to the Save the Manatee Trust Fund, this project was funded by the FWC Florida Manatee Avoidance Technology Program, the FWC Boating and Waterways Section, and the Disney Wildlife Conservation Fund. This research is now in the analysis phase.

Contracts for Manatee Research – FWC managed a contract for Mote Marine Laboratory to conduct the following manatee research studies: Photo-Identification Studies; Recreational Boat Traffic Surveys of Brevard County, Florida; and Manatee Rescue and Verification.

Florida Manatee Avoidance Technology Program contracts were managed through FWC. Two new projects were awarded and initiated in Fall 2006 in response to a solicitation for proposals. The first project seeks to expand our knowledge of manatee hearing by performing behavioral hearing tests on two captive manatees. This work expands on research that was conducted previously on two other captive animals and will double the data set for behavioral hearing tests on manatees. The second project involves attaching a dTag to record the response of manatees to underwater sounds, including boats. Both studies were awarded three-year grants and are ongoing. Solicitation for new projects is on hold due to budget constraints.

### *North Atlantic Right Whale*

North Atlantic Right Whale Research Program (Leslie Ward-Geiger)--The FWC is involved in recovery efforts for the North Atlantic right whale, one of the most endangered of the world’s large whales. This work is supported almost entirely through grant funding provided by National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. Efforts have been heightened to prevent human-caused mortality in this species. Even one death per year has a significant impact on the population that is estimated to number less than 400 individuals. In 1994, NOAA Fisheries Service designated portions of Florida and Georgia coastal waters as critical habitat for the right whale, as it is the only known calving ground for this species. FWC is instrumental in assisting a recovery plan implementation team whose aim is to help NOAA Fisheries Service by providing advice to and support of recovery activities. During FY 2007-2008, FWC staff continued to chair this team.

During the North Atlantic right whale calving season (December 1, 2007 – March 31, 2008), staff coordinated and conducted aerial surveys off the coastal waters of Florida in an effort to alert vessels to the presence of right whales, monitor calf production, identify individuals, and describe whale distribution and habitat. FWC staff conducted 70 aerial surveys this season. The effort contributed to a total of over 218 right whale sightings (not all unique individuals) and 23 cow/calf pairs. Preliminary photo-analysis indicates that FWC documented 99 individual whales – this is likely the highest number of individual right whales (excluding calves) documented by FWC within a single calving season. FWC staff participated in the



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

retrieval and subsequent necropsy of two North Atlantic right whale calves, a juvenile fin whale, and a badly decomposed adult humpback whale between January and March 2008. Both right whale calves (neonates) were determined to have died from complications at birth.

In collaboration with Georgia Department of Natural Resources (GDNR), staff conducted 31 right whale biopsy sampling trips, which resulted in 23 biopsy samples collected. Of the 23 biopsy samples collected, fifteen were of calves, two were of adult females, one was of a juvenile whale, and an additional five were collected for health assessment purposes. The skin samples will be used to generate information on kinship, individual gender and identification, stock identity, and genetic variability within the population. The blubber portion of the samples will be used to determine contaminant levels and to gain information about feeding ecology and nutritional condition.

A leading cause of right whale mortality is collisions with ships. Since the loss of even one individual is critical to the recovery of the species, information provided by aerial observers is immediately reported to a Federally implemented Early Warning System network. Working with the Fleet Area Control and Surveillance Facility at the Naval Air Station in Jacksonville, FL, the Early Warning System disseminates right whale location information to mariners in the waters of Florida and Georgia via the typical marine communication network and via a right whale pager system coordinated by FWC researchers. Using this approach, mariners are alerted to the presence of right whales in order to alter course to avoid collisions with right whales in the calving grounds. Another cause of human-related right whale mortality is entanglements in fishing nets and other gear. FWC staff participated in three disentanglement responses during the FY 2007-2008 season.

### *Bald Eagle*

Bald Eagle Management Plan Development and Implementation (*Robin Boughton and Ulgonda Kirkpatrick*).--FWC adopted a final management plan and delisted the bald eagle in April 2008, available at <http://myfwc.com/imperiledspecies/petitions/bald-eagle.htm>. USFWS delisted the bald eagle in August 2007. An internal implementation team was formed immediately following the adoption of the plan. A public Web site has been developed to accommodate all of the current management plan and permitting information at [http://www.myfwc.com/eagle/Eagle\\_Index.htm](http://www.myfwc.com/eagle/Eagle_Index.htm).

Currently, FWC staff is working with the USFWS to coordinate permitting efforts between the two agencies. Currently, FWC staff is working with the USFWS to coordinate permitting efforts between the two agencies. The USFWS currently does not have an approved permitting framework but it is anticipated the USFWS will be able to begin issuing permits for eagles in FY 2008-2009 or FY 2009-2010. Population monitoring will continue to ensure that the management plan is adequately achieving the goal of maintaining a stable or increasing population of eagles throughout Florida in perpetuity.

Bald Eagle Nesting Surveys on Apalachicola River Wildlife and Environmental Area (*Derek Fussell*).--Nesting surveys for bald eagles were conducted during December 2007 and again in February 2008 on the Apalachicola River Wildlife and Environmental Area (ARWEA) in North-Central Florida. Systematic aerial transects were flown on the ARWEA and the surrounding area, as well as St. Vincent Island National Wildlife Refuge. All nests were recorded as either active or inactive and the number of eggs/nestlings was recorded for all nests.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

During the December 2007 aerial survey, 31 nests were visited with 27 of those being actively used (87.1%). During the February 2008 aerial survey, the same 31 nests, as well as 2 newly discovered nests, were visited. Of the 33 nests, 30 were being actively used (90.9%). This is an increase in active nests over last year's total of 27 active nests.

Bald Eagle Surveys on John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area and J. W. Corbett Wildlife Management Area (Valerie Sparling).--An aerial nest survey for bald eagles was conducted in January 2008. Ground surveys were also conducted throughout the breeding season at John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area and J. W. Corbett Wildlife Management Area, both in South Florida. A helicopter survey was used to establish which nests were active and later ground surveys monitored nest success. Volunteers with Audubon's Eaglewatch program assisted with ground surveys. The status of nests (active or inactive) and number of young were recorded. The six active nests observed at Dupuis produced five fledglings. The three nests at Corbett were active in January, but lack of resources prevented further surveys to determine nest success.

*Burrowing Owl*

Burrowing Owl Research and Conservation (Katherin Haley).--FWC and City of Cape Coral staff completed a five-year study to evaluate the effectiveness of FWC management policies for burrowing owls in urban areas. FWC policy regulates take of nests during land clearing and development, with more active protection during the breeding season (Feb. 15 - July 10). On the study area in Cape Coral that was used for earlier studies (1987 - 1991), field work was conducted to determine the number and distribution of nest sites, nest success of pairs, survival of adult and juvenile owls, and dispersal characteristics of adults and juveniles. FWC staff is currently drafting the final report for this study. The results of this project will be compared to the previous study in order to assess the need for modifying FWC management policy for burrowing owls in urban areas.

*Florida Grasshopper Sparrow*

Florida Grasshopper Sparrow Meta-Population Study, Effects of Prescribed Fire and Landscape Features (Michael Delany).--The Florida grasshopper sparrow is a State and Federal endangered subspecies occurring in the dry prairie landscape of South-Central Florida. Following a status survey conducted by FWC personnel, the bird was Federally listed as endangered in 1986 because of its low numbers, restricted distribution, and habitat loss. The recovery objective is to down-list the sparrow to threatened when greater than 10 protected locations contain stable, self-sustaining populations of greater than 50 breeding pairs. However, only two extant populations, Three Lakes Wildlife Management Area (TLWMA) and Kissimmee Prairie Preserve State Park meet recovery criteria. Three other protected populations occur on Avon Park Air Force Range. The long-term (4-8 years) decline of most (4 of 5) populations on public lands was described in the previous report. Populations are known from only seven locations and fewer than 1,000 birds may exist. Grassland habitat is maintained for sparrows with prescribed fire during the dormant and growing seasons at two to three year intervals. Information on the effects of burn frequency and seasonality and features of the landscape are needed to implement conservation strategies for the sparrow.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Populations of grassland birds vary over time and space in response to an inherently unstable habitat. Non-prairie edges (anything that is not a grassland) adversely affect Florida grasshopper sparrow density, reproductive success, and survival. The frequency and seasonality of prescribed fire, local hydrology, and rainfall may also influence sparrow density and reproductive success. Florida grasshopper sparrows on TLWMA are monitored with annual point count surveys. The monitoring stations are visited three times each year and all Florida grasshopper sparrows seen or heard within a five minute period are recorded. Point counts are a standard method used to obtain an index of avian abundance. Point count data from 1998 to 2008 were obtained and will be examined in light of data obtained on time following fire, distance from edge, elevation contours, and monthly rainfall. This analysis may provide insight into factors influencing the population of Florida grasshopper sparrows on TLWMA. Results and management recommendations will be provided in a final report due next fiscal year.

A Web site providing information on the Florida grasshopper sparrow was established at [http://research.myfwc.com/features/category\\_sub.asp?id=7681](http://research.myfwc.com/features/category_sub.asp?id=7681).

Florida Grasshopper Sparrow Monitoring on the Three Lakes Wildlife Management Area (*Tina Hannon*).--Point count surveys for Florida grasshopper sparrows have been conducted on the Three Lakes Wildlife Management Area (TLWMA) in Northeast Florida since 1991. The surveys are conducted each spring (April – June) and consist of a grid of 190 stations, 0.25 mi (0.40 km) apart. Each station is surveyed three times and all Florida grasshopper sparrows that are heard or observed are recorded. Beginning in 2002, 60 stations were established north of the main population to determine if a translocation of 18 juvenile sparrows in 2001 and 2002 was successful. In 2008, surveys estimated there were at least 142 different male Florida grasshopper sparrows at the main site and no males at the translocation site. These data indicate an increasing trend in Florida grasshopper sparrow numbers at the main site (2006: 112 males, 2007: 125 males) and a decrease at the translocation site from 2007 surveys (3 males). Two Florida grasshopper sparrows were banded on the translocation site during the 2007 breeding season and banding efforts on the translocation site will be conducted every breeding season that males are detected.

Monitoring will continue at the TLWMA in 2009 and stations will be expanded to monitor changes in population due to habitat improvement. Tree removal was conducted on 210 acres (84.98 ha) of the TLWMA's main site during FY 2007-2008. In addition, rollerchopping was conducted on 572 acres (231.48 ha) within the main site during FY 2007-2008. Further tree removal and rollerchopping on the TLWMA's main site will be conducted during FY 2008-2009.

#### *Florida Scrub-Jay*

Florida Scrub-Jay Conservation Coordination (*Adam Kent*).--The goal of this project is to coordinate range-wide conservation efforts for the State and Federally threatened Florida scrub-jay. Due in large part to insufficient land management, scrub-jay populations have continued to decline despite protection of approximately 75% of the state's scrub vegetation. Conserving this species requires the efforts of multiple local, State, and Federal agencies, as well as non-governmental organizations and private landowners. The Florida Scrub-Jay Conservation Coordination Project assists these efforts by facilitating communication among partners, collecting and distributing information regarding monitoring and management, and developing

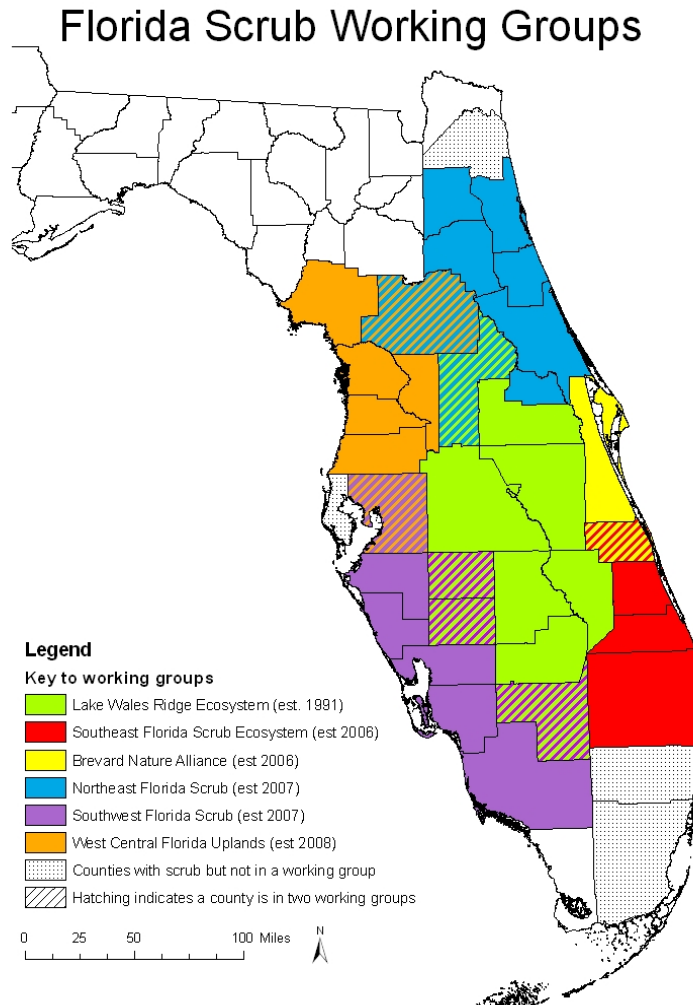
Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

standards and guidelines for conservation efforts.

FWC facilitated communication among partners through the continued development of scrub/uplands working groups in Northeast, Southwest, and West-Central Florida (see map attached below). Participants included representatives from major public land management entities (USFWS, Department of Agriculture and Consumer Services, Florida Department of Environmental Protection, FWC, county governments), as well as The Nature Conservancy (TNC), Florida Natural Areas Inventory (FNAI), universities, Audubon, other non-governmental organizations, and private landowners. Additionally, FWC participated in the Southeast Florida Scrub Ecosystem and the Lake Wales Ridge Ecosystem working groups. FWC assisted in forming steering committees and identifying chairpersons for four of the working groups (northeast, southwest, west-central, and southeast) and in organizing committees within these groups. The Northeast Florida Scrub Working Group's Land Management Committee conducted site visits to Seminole State Forest and Tiger Bay State Forest. The Northeast Florida Education Subcommittee held a scrub-jay workshop for regional conservation leaders. Sixty people from more than 20 organizations attended the workshop.

FWC assisted conservation efforts by gathering and distributing data and information to partners. Project personnel continued to develop the Scrub-Jay Web site (<http://share2.myfwc.com/scrubjay/default.aspx>) as a clearinghouse of information on working groups, scrub-jay distribution, options and funding opportunities for scrub-jay management, and scrub-jay monitoring. FWC continued to collect data on the distribution of scrub-jays on public lands and to compile manuscripts and management documents into a comprehensive scrub-jay library. Project personnel also participated in the Sarasota County Habitat Conservation Plan (HCP) Steering/Technical Committee, the Jay Watch Steering Committee, and the Florida Wildlife Legacy Initiative Scrub/Sandhill team. FWC provided recommendations for scrub management to Sarasota, Hernando, Lake, and Collier county governments, Department of Agriculture and Consumer Services (DOACS), Florida Department of Environmental Protection (FDEP), Water Management Districts, and a private land owner. FWC prepared a biological opinion of scrub-jay research projects and grant proposals. In October 2007, project personnel gave a presentation on the "Natural History and Conservation of the Florida Scrub-Jay," to 40 people in Charlotte County.

Finally, the project participated in efforts to develop standards and guidelines for habitat management and scrub-jay monitoring. FWC wrote drafts of two documents relating to the management of scrub: one document gives recommendations for conducting a scrub restoration project; the other document contains general guidelines for managing scrub. The project also met with Archbold Biological Station biologists to discuss the possibility of a statewide scrub-jay banding program.



Florida Scrub-Jay Demographics in Suburban Charlotte County Study Objectives and Progress (*Karl Miller*).--FWC staff continued to study Florida scrub-jay population demographics in suburban Charlotte County of Southwest Florida. The study focuses on the Deep Creek region, which supports the second largest population of scrub-jays in Southwest Florida. Thirty-one previously un-banded scrub-jays were captured and color-banded during July-September 2007. At the end of the 2007 breeding season, the Deep Creek population consisted of 59 family groups comprising 170 scrub-jays, which was a slight decline from the previous year, while the east county population was unchanged at 20 family groups comprising 71 scrub-jays.

The majority of staff time during the fiscal year was dedicated to data proofing, data analysis, and preparation of a final report for this project. The final report is scheduled for completion in February 2009.

Research staff continued to attend interagency meetings for habitat conservation planning in Charlotte and Sarasota Counties and to provide assistance and biological opinions to county, State, and Federal agencies, as well as the public.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Assessing Impacts of Hurricane Charley on Florida Scrub-Jays in Charlotte County, Study Objectives and Progress (*Karl Miller*).--FWC has completed a final report for a two-year investigation into the effects of Hurricane Charley on Florida scrub-jays in Southwest Florida. Hurricane Charley, a Category 4 hurricane with sustained winds of > 145 mph, struck Port Charlotte and Punta Gorda in Charlotte County on August 13, 2004, passing directly over the second largest population of Florida scrub-jays in Southwest Florida. Demographic research initiated in 2003 by the FWC provided knowledge of baseline conditions in this suburban scrub-jay population prior to the hurricane.

Some scrub-jays were killed from direct impacts of wind during the storm. Re-sighting rates on October population surveys also demonstrated lower survival during the hurricane season (July – October) of 2004 than in subsequent hurricane seasons. The total number of family groups declined 18% during the first year after Hurricane Charley but began to rebound during the second and third years post-hurricane. The population in Deep Creek is still below the 68 family groups recorded in 2004 prior to the hurricane, but the percent of family groups with adult non-breeders has rebounded to pre-hurricane levels (38% in 2004, 41% in 2007).

One of the most interesting findings was the effect of storm damage on habitat in and around these suburban neighborhoods. A large majority of pine trees were destroyed, and oak shrubs and trees were extensively “pruned” by the storm. These changes caused short-term reductions in acorn availability but also appeared to bring about modest habitat improvements in the second and third years following the hurricane. Beginning in 2006, additional novel territories were established on undeveloped lots and easements that had been unsuitable prior to the hurricane because of extensive tree canopy.

In summary, the Florida scrub-jay population in Deep Creek was negatively impacted by the direct effects of the storm but subsequent indirect impacts on habitat conditions were positive. The study population has remained relatively stable at or around 60 breeding groups each year since the storm.

This is the first empirical data available on the effects of a direct hit by an intense hurricane on any coastal Florida scrub-jay population. However, it is important to remember that hurricanes vary in their intensity, speed, rainfall, and associated storm surge. Hurricane Charley was a rapidly-moving storm with modest rainfall and no storm surge along the Peace River. In addition, the scrub-jay population was large and experienced year-round supplemental feeding by citizens.

Florida Scrub-Jays on Mitigation Parks (*Shane Belson*).--Annual Florida scrub-jay monitoring at Hickey Creek Mitigation Park Wildlife and Environmental Area (HCMP) in Southwest Florida was completed during FY 2007-2008 by FWC staff. The population at HCMP consisted of 12 individuals from three family groups. This is the same number of families from the previous year and a 50% increase in individuals. Additionally, FWC located 29 scrub-jays on property in the vicinity of HCMP. Florida scrub-jay habitat enhancement is a primary management activity at HCMP. FWC mechanically treated 150 acres and conducted growing season burns in 170 acres of scrub-jay habitat on HCMP.

Monitoring of Florida scrub-jays at Platt Branch Mitigation Park (PBMP) in Southwest Florida has been conducted since 1992 with the population fluctuating between 6 and 12 groups. Some expansion of habitat at the site has been successfully accomplished through prescribed fire and mechanical treatments. An annual survey was completed during the fiscal year at PBMP by FWC staff. The population at PBMP was 17 individuals from six family groups. Data from the

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

past several years indicate that the population is stable. Management efforts will continue to focus on maintaining and improving scrub-jay habitat. Mechanical treatment of vegetation is often used in conjunction with prescribed fire to create habitat conditions required by scrub-jays. During the fiscal year, approximately 80 acres of oak scrub was mechanically treated. Prescribed burning will be used to remove the debris and complete the enhancement of the project area.

The small population of Florida scrub-jays at Moody Branch Mitigation Park Wildlife and Environmental Area in Central Florida was monitored through coordinated efforts with The Nature Conservancy's (TNC) Jay Watch Program and through contractual services. Jay Watch volunteers located three family groups consisting of a total of eleven individuals, an increase of one family group and four birds over last year. Habitat monitoring conducted by Jay Watch indicates that vegetation characteristics within scrub-jay territories are satisfactory. Mechanical felling of sand pine stands and large oaks was completed on 140 acres (57 ha) of unoccupied habitat in order to promote conditions that will support additional territories and a general increase of the Moody Branch Mitigation Park Florida scrub-jay population.

Florida Scrub-Jay Population Survey and Habitat Management on Salt Lake Wildlife Management Area (David Turner).--FWC staff continued to monitor the Florida scrub-jay population on the Salt Lake Wildlife Management Area (SLWMA) in East-Central Florida. SLWMA supports about three family groups with an estimated population of 16 birds. There was documented increase in numbers among two of the three families in the fiscal year. This increase totaled six individuals, three individuals in two separate family groups. All three family group territories are located in proximity to the SLWMA boundaries and each family group has territories that extend onto adjacent private properties. Salt Lake Wildlife Management Area staff began a partnership with Brevard Nature Alliance to develop a regional strategy for scrub-jay recovery and management thru the Adaptive Resource Management program. As part of the Adaptive Resource Management program, SLWMA staff, with the assistance of David R. Breininger, banded one individual scrub-jay. Monitoring and additional banding efforts are scheduled to continue into FY 2008-2009.

Scrub-jay habitat management on SLWMA has focused on the prescribed burning of 61 acres (24.7 ha) of potential scrub-jay habitat. Management activities slated for FY 2008-2009 include the continued use of mosaic prescribed fire of approximately 70 acres (28.3 ha) of potential scrub-jay habitat.

Florida Scrub-Jay Population Survey and Habitat Management on Half Moon Wildlife Management Area (Nancy Dwyer).--FWC staff continued to monitor Florida scrub-jays on the 9,500-acre (3845 ha) Half Moon Wildlife Management Area in West-Central Florida. Scrub-jays were surveyed biweekly. To assist in tracking the population, 17 scrub-jays were color-banded in FY 2007-2008 for a total of 97 birds banded since 2001. Half Moon Wildlife Management Area supports eight to ten family groups, which fledged at least 14 juveniles this year. The present population is still estimated at 40 birds but reproduction in 2008 was high compared to past years.

Habitat management has focused on growing-season prescribed burning, roller chopping palmetto, and mowing or applying herbicide to overgrown oak trees. Prescribed burns in the 2008 growing season included about 300 acres (121 ha) of potential or occupied scrub-jay habitat. Half Moon likely harbors a maximum of 500 acres (202 ha) of potential scrub-jay

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

habitat. Because most oak areas are no longer overgrown, habitat management in the future will focus on roller chopping palmetto, increasing open ground cover, and continued application of prescribed fire.

Florida Scrub-Jay Population Survey and Habitat Management on Cedar Key Scrub Wildlife Management Area (Norberto Fernandez).--There are five family groups of scrub-jays in and around Cedar Key Scrub Wildlife Management Area (WMA) in North-Central Florida, three within the WMA, and two in the surrounding area that are monitored yearly. The monitoring program includes weekly monitoring of scrub-jays at specific sites, banding chicks of the year, and determining sex of adults through territorial and nesting behavior. One family group established itself this year in the South-Central part of the WMA in an area that was treated with fire six years ago. During the current year, approximately 82 acres were burned during the dormant and growing season to maintain habitat necessary for scrub-jays.

Florida Scrub-Jay Monitoring Activities, Camp Blanding Wildlife Management Area (Jim Garrison).--A small, remnant population of Florida scrub-jays exists within the Cantonment area at Camp Blanding Wildlife Management Area in North-Central Florida. It is believed this is the most northern extent of scrub-jays in Florida. The population size has varied over the years, with seven or fewer individuals normally counted. Monitoring activities included bait stations and random surveys with tape recorded calls. During this reporting period, one scrub-jay was found in the portion of the Cantonment area called the Kingsley Scrub when the area was surveyed. Approximately ½ of this scrub habitat was subject to growing season prescribed burning in 2004.

Florida Scrub-Jay Population Monitoring on the Lake Wales Ridge (Mike McMillian).--The FWC monitors Florida scrub-jay populations on select FWC properties along the Lake Wales Ridge in cooperation with Lake Wales Ridge Wildlife and Environmental Area (WEA) in Southwest Florida and The Nature Conservancy's (TNC) Jay Watch program. Properties surveyed by Archbold Biological Station included Carter Creek, Holmes Avenue, Gould Road, Henscratch, Leisure Lakes (Highlands Ridge), Royce, Lake Placid Scrub, and McJunkin. Jay Watch surveys were conducted at Gould Road, Holmes Avenue, Royce, Silver Lake, and Sun 'n Lake Sebring. Surveys were conducted from mid-June to the end of July.

In FY 2007-2008, three populations increased, three decreased, and four remained stable from 2006. The populations showing decreased numbers are McJunkin (-3 families), Leisure Lakes (-1 family), and Gould Road (-1 family). These decreases are well within the normal fluctuation of a wild avian community. The McJunkin decrease was preceded by an increase the previous year, (21 families in 2005 to 33 families in 2006) and most likely reflects a shuffling of the new groups. One of the populations most at risk is Carter Creek. Although this population remained stable in FY 2007-2008 at six groups, it has declined from 35 groups in the early 1990's and from 14 groups since 2003.

The results of Florida scrub-jay monitoring on the Lake Wales Ridge WEA properties are used as a tool to guide management decisions. In addition to prescribed burning conducted by FWC staff on other tracts of the Lake Wales Ridge WEA, the FWC has contracted with a private company to burn approximately 1000 acres of the Carter Creek property. The burn units in this area were strategically situated to aid the remaining families and to attract new scrub-jays. At present, 6 of 39 units have been burned. In addition to burning at Carter Creek, FWC has fenced



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

the property to reduce illegal land uses on the area.

As stated in the FY 2006-2007 report, subdivision properties (seven in the Lake Wales Ridge WEA) pose special management problems and often have sub-optimal scrub-jay habitat. The ownership of these properties is a checkerboard pattern of private and State property, and the FWC does not have the authority to manage the private lands when they are interspersed with public lands. At the Holmes Avenue tract, scrub-jay numbers remained stable. Prescribed burns are planned for this site during the next fiscal year. Additional opportunities will be explored at Sun-n-Lakes North and Leisure Lakes. Unfortunately, as of the writing of this report, some populations of scrub-jays are experiencing a die-off from an epidemic of unknown origin. At Archbold Biological Station, approximately 25% of the population has been lost. The effects of this epidemic on FWC properties are unknown at this time but will possibly be reflected in the results of the surveys in the next fiscal year.

Nongame Wildlife Grant--Jay Watch (Stuart Cumberbatch)--Ms. Tricia Martin, The Nature Conservancy, initiated a continuation of the volunteer, citizen-science approach in conducting large-scale monitoring of Florida scrub-jays in the Lake Wales Ridge area. A project previously supported by FWC examined the use of standardized survey protocols and established that volunteer surveys were comparable to more intensive surveys conducted by avian biologists. Annual surveys conducted by volunteers will contribute and augment the range-wide surveys needed to complete the five-year review of the listing status for the species. It is also expected that the expanded use of standardized protocols will provide data suitable for use by land managers managing habitat for scrub-jay populations.

Nongame Wildlife Grant--Florida Scrub-Jay Recovery (Stuart Cumberbatch)--Mr. David Breininger, Dynamac Corporation, completed the second year of the four-year project to quantify habitat and population dynamics for Florida scrub-jays in mainland Brevard and Indian River counties. The study is a follow-up to work started in 1997 to develop biological recovery criteria for several large scrub-jay populations. Many of the objectives of this study are the result of feedback from strategies currently being employed to manage these scrub-jay populations. This study is examining the effects restoration efforts have had so far and how these efforts can be optimized to improve the poor quality habitat currently occupied by scrub-jays. The researchers are focusing on the interactions of habitat edge and fire on population recruitment. Since large numbers of scrub-jays occupy fragmented habitats statewide, it is expected that the results of this study will also be used to help develop a model for managing scrub-jays in fragmented landscapes.

*Ivory-billed Woodpecker*

Search Effort on the Apalachicola and Chipola Rivers – Study Objectives and Progress (Karl Miller)--FWC's search effort for the ivory-billed woodpecker in the Apalachicola and Chipola River basins in North-Central Florida concluded in June 2007, but the final report was drafted during FY 2007-2008. The search covered twenty-three 2-km<sup>2</sup> search patches during an effort of approximately 820 hours in the field using 33 volunteers. The search team had no visual or audio detections of ivory-billed woodpeckers. Search information and vegetation data were sent to the University of Georgia for analysis in a habitat occupancy model developed by the Federal Ivory-billed Woodpecker Recovery Team.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

If additional searches for ivory-billed woodpeckers are to be conducted in river basins in Florida in the future, such efforts can benefit from lessons learned during this study. First, if the Recovery Team field protocols are going to be used, it is crucial to have the search patches selected in advance of the field season. This will greatly aid in logistics and will provide additional time for training of volunteers. Second, when possible, searchers should consider collecting vegetation data during the fall prior to the search, when leaves are still on the trees to facilitate species identification. This also would allow reconnaissance of individual search blocks prior to the actual field season. Third, for safety reasons, a minimum of two searchers should be in the field together. Fourth, if spacing replicate search visits over time is important to maximize scientific or statistical value, then it might make sense to have several big efforts during the course of a few months. This could be achieved by visiting all blocks once during a “sweep” of the river basin, then repeating the visits during subsequent sweeps.

FWC staff continued to attend meetings of the Recovery Team and assist with editing and re-writing portions of the Recovery Plan. Reports from recent decades of possible ivory-billed woodpecker activity in Florida are being reviewed and summarized in a manuscript for publication in a peer-reviewed science journal.

*Red-cockaded Woodpecker*

Conservation Planning (*Robin Boughton*).--Statewide conservation planning for the red-cockaded woodpecker continued in FY 2007-2008. At the close of FY 2006-2007, implementation of the conservation actions identified in the management plan was complete. Progress on the ongoing conservation actions in the plan are outlined below:

Develop and maintain a red-cockaded woodpecker database for Florida – The red-cockaded woodpecker database previously developed is updated with current information on population size, ownership, habitat, and management activities every two years.

Establish and convene a meeting of the Florida red-cockaded woodpecker working groups – Two red-cockaded woodpecker working groups currently meet and agenda items relevant to the Florida red-cockaded woodpecker management plan have been incorporated into working group meetings and will continue as needed in the future.

Coordinate with the USFWS to develop a statewide Safe Harbor program for red-cockaded woodpeckers in Florida – Implementation of FWC’s Red-cockaded Woodpecker Safe Harbor program began in November of 2006. A coordinator was hired for the program and a public kickoff event was held in fall of 2006 at Tall Timbers to advertise the program. The program has been advertised through articles in newsletters, presentations at meetings, and through visits with landowners and conservation organizations that work with private landowners. In addition, informative materials were developed including a program brochure and enrollment forms were finalized. Four private properties were enrolled in the program in the first year and many more applicants have expressed an interest in enrolling.

At the close of the 2007 red-cockaded woodpecker breeding season, Florida red-cockaded woodpecker populations continued on a track to achieve and in many cases, exceed the year 2020 population and metapopulation goals outlined in the Management Plan. Field visits to red-cockaded woodpecker populations have confirmed that large red-cockaded woodpecker populations in Florida are well-managed and that fire suppression, reliance on dormant season prescribed fire, and low availability of old-growth pines remain the greatest threats to red-cockaded woodpecker recovery in Florida.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

The activities above will continue until the species meets its conservation goals. These activities include meetings of the red-cockaded woodpecker working groups, updating of the red-cockaded woodpecker database, and implementation of the statewide Red-cockaded Woodpecker Safe Harbor program.

Red-cockaded Woodpecker Management on J.W. Corbett Wildlife Management Area (Michael Baranski).--J.W. Corbett Wildlife Management Area (Corbett) in South Florida is managed by FWC, and all monitoring and management of the red-cockaded woodpecker population on the area is conducted by FWC staff. The scope of work included monitoring the number of active clusters, monitoring active clusters for nests, color-banding nestlings, determining fledging success, and installing artificial cavities in existing and recruitment clusters. Habitat management included maintaining a three-year growing season burn rotation within red-cockaded woodpecker habitat. Habitat restoration within red-cockaded woodpecker habitat included treating 200 acres (81 hectares) of exotic plant species. A total of three artificial cavity inserts were installed in areas where few existed previously.

At Corbett, there were 11 active clusters and eight potential breeding groups during the 2008 nesting season; three clusters were occupied by single males. Compared to 2007, three active clusters were lost (one captured, two inactive) but the number of potential breeding groups remained the same. Six clusters fledged a total of eight young, the same number that fledged during the 2006 and 2007 nesting season. Corbett's red-cockaded woodpecker population remained stable but again did not grow despite continued efforts in all aspects of red-cockaded woodpecker management.

FWC is planning to conduct its first intra-population moves within Corbett to pair up three single males with three female sub-adults. FWC is also maintaining eight potential recruitment sites for four pairs of birds to be received in the fall from Apalachicola National Forest.

Corbett biologists spoke on the management and population status of red-cockaded woodpeckers at Audubon of the Everglades September meeting.

Red-cockaded Woodpecker Management at John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area (Valerie Sparling).--Prior to 2006, red-cockaded woodpeckers were last observed on the John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area (Dupuis) in South Florida in 1989. The FWC, in conjunction with the South Florida Water Management District (SFWMD), and the USFWS, developed a plan to reintroduce red-cockaded woodpeckers to the area. Prior to reintroducing birds, FWC biologists identified habitat improvement activities critical for reintroduction and coordinated these activities with the SFWMD. These actions included mechanical clearing of understory, frequent prescribed burning, and installation of artificial nest boxes. In both 2006 and 2007, ten red-cockaded woodpeckers were captured and translocated from public lands in Florida and Georgia and translocated to Dupuis. In 2008, four active clusters produced two male fledglings. In addition, a female bird fledged in 2007 remained in the population as a floater. As of the end of the breeding season, 11 birds were observed in the Dupuis population.

As part of the plan, FWC will release an additional ten woodpeckers on the area in Fall 2008. Additional cavities were installed in new clusters to bring the total number of cluster locations to 17. During the next breeding season, clusters will continue to be monitored for nests, nestlings will be banded, and fledging success determined. Additionally, habitat

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

management activities to reduce midstory height and enhance red-cockaded woodpecker habitat will continue.

Restoration of the woodpecker at Dupuis will provide an important additional population in southeastern Florida as part of the Federal recovery plan. The only other group of red-cockaded woodpeckers in southeastern Florida is at J.W. Corbett Wildlife Management Area.

Red-cockaded Woodpeckers on Babcock-Webb and Yucca Pens Unit Wildlife Management Area (Wendy Wilsdon).--FWC has been actively managing and monitoring red-cockaded woodpeckers in Southwest Florida on the Babcock-Webb Wildlife Management Area since 1999, and the Yucca Pens Unit since 2005. Annual monitoring began in 2001 with roost checks to determine cluster activity and nest monitoring, nestling banding, and fledge checks to determine productivity. Thirty two active clusters were monitored, including one active cluster with three adult red-cockaded woodpeckers in the Yucca Pens Unit. Twenty-two clusters contained potential breeding groups and 15 of these produced 17 fledglings. Although active clusters have increased slowly since 2001, the population size has remained relatively steady.

Four new recruitment clusters were established to improve connectivity between and among cluster aggregations and to provide for the planned arrival of translocated birds. Fourteen new artificial cavities were installed in these clusters by FWC staff. Plans are in place to receive six birds from Osceola National Forest in Fall 2008. One intra-population translocation was conducted post-breeding season. This was the moving of a fledgling female to a single male cluster.

Habitat management on the area has focused on prescribed fire, the removal of exotic species from 8,265 acres, and roller chopping to diminish the understory of saw palmetto on 2,435 acres. Following roller chopping, the fire return interval will increase to 2-3 years (rather than 1-2) to promote natural pine regeneration and an herbaceous understory. Pines have been planted on 1,450 acres from 1985 to present and will provide good foraging habitat for the western aggregation of clusters. The installation of six culverts through major access roads will facilitate natural vegetation regeneration by restoring a more natural hydroperiod.

Annual monitoring, intra-population translocations, and habitat improvements will continue through FY 2008-2009.

Red-cockaded Woodpecker Population Management at Platt Branch Mitigation Park Wildlife and Environmental Area (Steve Shattler).--Monitoring of red-cockaded woodpeckers in the Fisheating Creek population has been conducted by FWC on an intensive level since 2002. A total of 13 active clusters comprise this population within the Platt Branch Mitigation Park (PBMP) Wildlife and Environmental Area in Southwest Florida, and surrounding properties owned by the Lykes Bros. Corporation, portions of which are protected by a conservation easement.

Annual surveys conducted by FWC indicate there were five potential breeding pairs within the population prior to nesting season. Successful nesting occurred in four clusters, resulting in eight hatchlings. All hatchlings were banded with unique color band combinations and all eight of the nestlings fledged and became part of the population.

Habitat enhancement within the red-cockaded woodpecker population is a priority management concern. FWC contracted the mowing of 300 acres of overgrown habitat within red-cockaded woodpecker habitat at PBMP. Growing season burning was conducted within portions of red-cockaded woodpecker habitat as well. Three artificial cavities were drilled

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

within clusters and four existing cavities were repaired. One of the Fisheating Creek's red-cockaded woodpeckers was identified within the newly acquired Babcock Ranch, having dispersed approximately six miles to its new location.

Red-cockaded Woodpecker Population Management on Blackwater Wildlife Management Area (Barbara Schmeling).--The red-cockaded woodpecker has been intensively managed on Blackwater Wildlife Management Area (WMA) in Northwest Florida by the Department of Agriculture and Consumer Services cooperatively with the FWC since 1996. The population is monitored using leg bands, banding of nestlings and unmarked adults, fledge checks, translocations, and installation of artificial cavities where appropriate. In October 2007, three pairs of birds were translocated from Eglin Air Force Base. Currently, there are 59 potential nesting groups and eight single bird clusters on the WMA, consisting of approximately 174 adult birds. This is an increase over the 52 potential breeding groups and 142 adults documented last year. Active clusters successfully fledged 89 nestlings this past year.

In 2006, FWC staff initiated a habitat enhancement program to reduce midstory and hardwood encroachment in several red-cockaded woodpecker clusters. Since the program's inception, Blackwater WMA staff improved habitat in 76 red-cockaded woodpecker clusters using a combination of a Brown tree cutter and a skid steer. Habitat improvement was followed by herbicide treatment of hardwoods in selected clusters in preparation for future prescribed burning.

Red-cockaded Woodpecker Population Augmentation and Monitoring on Apalachicola River Wildlife and Environmental Area (Phil Manor).--Both natural and artificial clusters within the Apalachicola River Wildlife and Environmental Area (ARWEA) in Northwest Florida were monitored throughout the breeding season. During late December 2007 and early January 2008, a total of 14 new artificial cavity inserts were installed to enhance the potential for population growth and connectivity. The cavity inserts were used to form two new red-cockaded woodpecker recruitment clusters as well as supplement existing clusters with replacement cavity trees. Red-cockaded woodpecker recruitment clusters are located in suitable but unoccupied habitat by installing artificial cavity inserts into live pines of sufficient diameter. There are currently a total of eight known clusters being monitored on the ARWEA, three natural and five artificial. Seven of the eight clusters showed signs of activity and six of the clusters contained red-cockaded woodpecker nests. Of the six nests, two occurred in the natural clusters and the other four nests were in artificial cavities within recruitment clusters that were established in March 2005 and January 2008. The two nests within the natural clusters produced three total fledglings this past breeding season. The four clusters with artificial cavities produced five total fledglings (one nest with two fledglings and three nests with one fledgling each). All five red-cockaded woodpecker recruitment sites with artificial cavity inserts were active this year with at least one adult bird observed roosting in the site and four of the five sites had successful nests and produced young. All of these population parameters are increases over last year's values. The number of active clusters increased from five to seven, the number of nests increased from three to six, and the number of fledglings produced increased to eight.

Red-cockaded Woodpecker Population Survey, Nest Monitoring and Habitat Management on Citrus Wildlife Management Area (Rick Spratt).--FWC staff, in cooperation with the Department of Agriculture and Consumer Services (DOACS), continued monitoring the

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

red-cockaded woodpecker population on the 49,317 acre (19,959 ha) Citrus Wildlife Management Area within the Withlacoochee State Forest in West-Central Florida. Of 66 active red-cockaded woodpecker clusters, 52 nested and 49 of these were successful in fledging 73 young. The number of potential breeding groups increased 12% from 2007 to 2008. Color-banding continued with 80 nestlings banded during the 2008 nesting season.

In October 2007, for the first time, Citrus acted as a donor site under Federally-supervised translocation projects. Two females from the Citrus population were moved to St. Mark's National Wildlife Refuge and three male-female pairs were donated to Picayune State Forest.

Due to its continued successful growth, Citrus will again donate red-cockaded woodpeckers in October 2008. Three females are to be moved to St. Sebastian State Buffer Preserve, a single female will be moved to Camp Blanding, and one female will go to the newly-established population at the Disney Wilderness Preserve in Orlando. These single females will be paired with single males in the recipient populations.

Active management to increase reproductive success, population size, and habitat quality included installation of artificial cavity inserts, prescribed burning, and hardwood control. In FY 2007-2008, two recruitment clusters (four artificial cavities installed in a chosen area) were created. Cavity numbers were augmented at existing clusters using cavity inserts for a total of 30 inserts installed. Encroaching oak trees were cut and treated with herbicide via contract on 100 acres, as well as in clusters where needed. Cavity trees were protected from fire by raking and pre-burning.

Red-cockaded Woodpeckers Monitoring and Management on the Goethe Wildlife Management Area (Norberto Fernandez).--FWC staff, in cooperation with the DOACS, monitored 41 active clusters of red-cockaded woodpeckers on Goethe State Forest in North-Central Florida. While this is a slight decrease from last year's count of 44 active clusters, the population trend on the area is stable to increasing. The annual monitoring program includes roost checks, cavity tree inventories, searches for new cavity trees, the banding of un-banded adults and chicks of the year, and determining the sex of newly fledged chicks. In preparation for the three pairs of red-cockaded woodpeckers expected to be translocated to Goethe from Fort Stewart, Georgia, six recruitment clusters were created by installing 24 artificial cavities. Another 16 artificial cavities were installed to increase the number of suitable cavities available in active clusters and to create recruitment clusters in strategic locations. Forest stands that have red-cockaded woodpecker clusters are given priority in planning prescribed fire. To ensure protection of cavity trees during prescribed fire, prior to the burn, a 30-ft diameter circle was burned or mowed around all cavity trees in stands scheduled for prescribed fire.

Red-cockaded Woodpecker Population Surveys, Nest Monitoring and Habitat Management at Camp Blanding Wildlife Management Area (Jim Garrison).--The FWC's role at Camp Blanding Wildlife Management Area in North-Central Florida is to assist the lead area manager with habitat improvement and restoration, and provide assistance for the red-cockaded woodpecker population. The 2008 nesting season saw 28 active clusters, the highest number recorded in history on Camp Blanding. However, there were only 21 potential breeding groups (a decline of 2 from 2007) with a mean group size of 2.7; six male-only groups; and one captured cluster. Of the 21 potential breeding groups, 20 nested and 17 were successful in fledging chicks. Forty-two nestlings survived to banding age (5-10 days) and 39 successfully fledged

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

(93% successful fledgling rate).

Six artificial cavity boxes were installed and three cavity boxes were replaced. Habitat surrounding one cluster was subject to a prescribed fire. Herbicide was applied to hardwoods in at least six clusters.

Red-cockaded Woodpecker Management on Three Lakes, Triple N Ranch and Bull Creek Wildlife Management Areas (Michelle Wilcox).--Management of the red-cockaded woodpeckers for fiscal year FY 2007-2008 on Three Lakes, Triple N Ranch and Bull Creek Wildlife Management Areas (all in Northeast Florida) included increasing population size and success through translocations, and installation of artificial cavities, as well as monitoring the activity status of clusters, nest monitoring, color-banding, and determining fledging success. Habitat management activities performed include prescribed fire (on a three-year burn rotation) and roller chopping.

The number of active clusters on Three Lakes Wildlife Management Area (TLWMA) consisted of 47 in 2007 with 45 of those having potential breeding groups. This is a small increase over the 46 from last year, but the trend is stable. There was an increase in nestlings banded this year over last, with 67 nestlings banded this year compared to 54 last year. Thirty-eight of the 48 nesting attempts made were known to be successful. There were 1.16 fledglings per breeding group and 2.49 adults per active cluster. Twenty-one artificial cavity inserts were installed to augment established clusters and four inserts were installed in the creation of a new recruitment cluster. Nine old and damaged inserts were replaced. Two red-cockaded woodpeckers were translocated within the forest for an intra-population translocation.

The adjacent properties of Bull Creek WMA and Triple N Ranch WMA are managed as a single unit and supported eight active clusters, and eight potential breeding groups. This is an increase over last year's total of six active clusters and five potential breeding groups. Eight nestlings were banded and five of the ten nesting attempts were successful. There were 0.63 fledglings per breeding group and 2.75 adults per active cluster. Seven artificial cavity inserts were installed to augment existing clusters and four inserts were installed in the creation of a new recruitment cluster. Four old and damaged inserts were replaced. Six red-cockaded woodpeckers were translocated from Apalachicola National Forest to this property.

During FY 2008-2009, red-cockaded woodpecker work will continue to focus on active management to increase population size and demographic connectivity through translocations and habitat improvement, including creating new recruitment clusters, adding artificial cavity inserts and prescribed fire.

Red-cockaded Woodpecker Population Surveys, Nest Monitoring and Habitat Management on Osceola Wildlife Management Area (Ralph Holton).--The FWC's role is to assist the lead area manager (U.S. Forest Service) with population monitoring and management, nest monitoring, and habitat improvement for the red-cockaded woodpecker. Of the 266,270 acres (107,750ha) in the Osceola Wildlife Management Area (North-Central Florida), 92,400 acres are designated as red-cockaded woodpecker habitat, all occurring on the Osceola National Forest portion of the Wildlife Management Area.

In the winter of FY 2007-2008, Osceola National Forest achieved the short-term goal of 100 active clusters. As a result, Osceola National Forest was designated as a donor population. Translocation of up to 20 young red-cockaded woodpeckers is scheduled for October/November 2008. Due to the new designation, aggressive measures were taken by installing 216 artificial

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

cavity boxes (inserts). Twenty-four recruitment clusters were created with the balance of inserts installed in active clusters to give breeding groups up to six suitable cavities. Installation of artificial cavities has been a critical tool in facilitating red-cockaded woodpecker population growth.

At the end of the reporting period, there were 112 active clusters with 395 active cavity trees. Of the 112 active clusters, 105 are potential breeding groups, and seven are single male clusters. Of the 105 potential breeding groups, 99 family groups nested. To this point, 168 chicks have been successfully banded. Habitat management efforts were achieved with prescribed fire, mechanical reduction of mid-story, and artificial cavity inserts. Of the 24 recruitment clusters installed, 13 are currently active with 5 clusters obtaining breeding group status and successfully nesting this season.

Red-cockaded Woodpecker Management at Big Cypress National Preserve (Michael Baranski).--In cooperation with the National Park Service, J.W. Corbett Wildlife Management Area biologists designed a plan in 2007 for FWC staff to assist with management and monitoring of red-cockaded woodpeckers at Big Cypress National Preserve (BCNP) in South Florida. Due to limited resources and difficult field conditions, the southern-most population of red-cockaded woodpeckers located on BCNP has never been precisely monitored. Accurate information from this red-cockaded woodpecker population, the largest in South Florida slash pine, would assist in determining population status in reference to recovery goals.

Annual monitoring and management by FWC began in the fall of 2007 with tree/cavity surveys to determine cluster status and activity. A total of 28 artificial cavities were installed in cavity limited clusters. Monitoring continued into the 2008 breeding season with nest monitoring, nestling/adult banding, fledge checks, and roost checks.

Because of the remote nature of BCNP, 30 of 87 potential clusters were chosen to be monitored for productivity based on access and cluster activity. This included 16 clusters accessible by all-terrain vehicle and 14 accessible only by helicopter. Twenty-eight of the 30 active clusters selected for monitoring had potential breeding groups. Twenty-three of 28 potential breeding groups attempted nesting with 12 successful nests. Nineteen chicks made it to banding age (6 days) and 14 fledged. No occurrence of helpers was observed in the 30 monitored clusters. An additional 20 clusters were surveyed for signs of activity during the breeding season and 15 were found to be active.

The FWC will continue to survey BCNP for new cluster locations and continue to augment cavity limited clusters. Plans to increase the number of closely monitored clusters for the 2009 breeding season are in place.

Red-cockaded Woodpecker Population Monitoring on Tate's Hell Wildlife Management Area (Adam Warwick).--While a small, isolated red-cockaded woodpecker population remains on Tate's Hell Wildlife Management Area (THWMA) in Northwest Florida, management practices that occurred prior to State acquisition have contributed to a decline in suitable habitat and a subsequent decline in the historic red-cockaded woodpecker population. The THWMA red-cockaded woodpecker population is severely fragmented in most areas of the forest due to intensive silviculture practices and fire suppression while under industrial ownership. Given the large red-cockaded woodpecker population on the adjacent Apalachicola Wildlife Management Area, the THWMA population has great potential of becoming less fragmented by the creation of artificial clusters and restoring foraging habitat, thereby drawing dispersed birds from the



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Apalachicola Wildlife Management Area population.

During the 2008 breeding season, FWC staff took the lead role in monitoring red-cockaded woodpecker populations on THWMA after five years of monitoring by the Department of Agriculture and Consumer Services. In total, 43 red-cockaded woodpecker clusters were monitored. Twenty-seven of the 43 clusters were found to be active with 16 being inactive. Of the 27 active clusters, 25 nests were found with 23 having successfully fledged a total of 39 fledglings. An estimated 73 individuals were found to comprise the adult population of red-cockaded woodpeckers on THWMA during 2008.

*Roseate Tern*

Management Practices (Ricardo Zambrano).--The roseate tern is a shorebird designated as threatened by both the FWC and the USFWS. As of 2005, there were only two known nesting sites in Florida: one on Pelican Shoal, a small island off Boca Chica Key that is designated as a Critical Wildlife Area (CWA) by FWC, and the other a rooftop of the State building in the Marathon Government Center in Marathon. Historically, each spring a colony of 150-300 pairs of terns nested on Pelican Shoal and around 50 pairs used the rooftop in Marathon.

After the hurricane season of 2005, Pelican Shoal was submerged under one to two feet of water and thus no longer available as a nesting site for roseate terns. In the spring of 2006, FWC biologists attempted to provide the birds displaced from Pelican Shoal with an alternative nesting area. In cooperation with the National Park Service (NPS), biologists placed plastic tern decoys along with a sound system and speakers broadcasting tern calls on Long Key at Dry Tortugas National Park. These techniques, known as “social attraction,” have been used around the world to attract colonially-nesting birds to nesting areas and to restore seabird colonies. In April of 2008, FWC and NPS biologists again placed social attraction equipment on Long Key at Dry Tortugas National Park. This year, 47 pairs of roseate terns nested at Dry Tortugas National Park. The FWC and NPS will continue using social attraction methods at Dry Tortugas National Park until it is determined that roseate terns have permanently established themselves there.

During the nesting season, FWC biologists also surveyed the Marathon Government Center rooftop colony to conduct nest, egg, juvenile, and adult counts. At one point during the 2008 season, 180 roseate tern nests were counted at this rooftop colony. Based on limited observations, birds in this colony appeared to be abandoning and re-nesting at various intervals, so it was difficult to estimate colony size based on nest counts alone. It was unclear how many pairs were successful in their nesting attempts for the same reason. Subjectively, however, it was clear that the Marathon Government Center colony was larger in 2008 than in 2007. A sample (124) of chicks was captured, banded, and released onsite.

Roseate terns were also found to be nesting among least terns on a condominium rooftop in Marathon during the 2008 nesting season, and FWC biologists located and monitored one roseate tern nest at this location.

Roseate terns were again observed on Bruce Key, a small sandbar approximately 6.5 miles west of Key West, Florida (this species first nested here in 2006). USFWS staff posted the area “No trespassing” with symbolic fencing on the island and buoys surrounding it to prevent disturbance to birds and to encourage nesting. However, roseate terns did not nest at this site in 2008.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

*Everglades Snail Kite*

Everglades Snail Kite Surveys Conducted on the Kissimmee Chain of Lakes (Adriene Landrum).--The Everglades snail kite population remains endangered and the population is declining at an alarming rate. The current population estimate of approximately 800 birds is about 50% of last year's estimate. FWC staff performed quarterly surveys of the Everglades snail kite within the Kissimmee Chain of Lakes in Southwest Florida. These surveys were conducted to comply with the Lake Tohopekaliga Environmental Impact Statement (EIS) issued by the U.S. Army Corp of Engineers (USACOE).

Snail kite utilization on Lake Tohopekaliga (Lake Toho) has remained consistent for the past three years. Since FY 2005-2006, the annual mean number of birds observed range from 42 to 49. During the 2008 nesting season, up to 156 kites utilized the lake. Snail kites on Lake Toho feed on the exotic apple snails and the native apple snails.

FWC is continuing an aggressive educational campaign to protect snail kite nesting areas on Lake Toho. FWC officials met with the local airboat tour companies in February 2008 and provided an update on the current snail kite situation, as well as printed materials and guidelines for minimizing impacts to snail kite nests. Press releases and newspaper articles have been disseminated to inform the public of the concentrated snail kite nesting activity on Lake Toho. All government aquatic herbicide management programs were updated of the situation. A "no activity" zone map was produced by the USFWS and distributed to the airboat tours and local aquatic plant management crews. All nesting areas were posted with signs stating "Stay Back Endangered Snail Kite Nesting". Signage was provided and posted by the FWC.

On Lake Kissimmee, the annual mean number of snail kites has declined in recent years, but is consistent with the previous year. The annual mean was 14 birds. Although nesting habitat and native forage availability dramatically improved on Lake Kissimmee, the birds seem to be attracted to the foraging opportunities provided by the exotic apple snail on Lake Toho. Researchers have suggested that the kites may be returning to birthplace and/or traditional nesting locations on Lake Toho to nest annually. No snail kites were observed on Lakes Cypress, Hatchineha, and Tiger during the report period.

This round of surveys completes and satisfies the requirements for the Lake Toho EIS. The University of Florida, under contract with the USFWS, is monitoring the snail kite population statewide on a monthly basis.

Snail Kite Monitoring Program in Everglades Wildlife Management Area (Marsha Ward).--The Everglades and Francis S. Taylor Wildlife Management Area (WMA) in South Florida, which consists of Water Conservation Areas 2 and 3, is important habitat for the Everglades snail kite. Ongoing monitoring of snail kites has occurred in Everglades and Francis S. Taylor WMA since 1986 by FWC staff. There has been a significant decline in snail kite nesting attempts and success over the last five years in this WMA. The Florida Cooperative Fish and Wildlife Research Unit (FCFWRU), based at the University of Florida, has been conducting monitoring since 1992, designed to provide information about population size, survival, movement, and reproductive success of the snail kite throughout its range in Florida. FWC staff continued coordination with FCFWRU to conduct a survey for snail kites in Water Conservation Area 3 in October 2007. Two sampling units were surveyed from airboats using east-west transects approximately 0.5 miles (0.8 km) apart over a two-day period. Thirteen snail kites were observed, one of which was banded. Throughout the breeding season, there were no

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

successful nests in Everglades and Francis S. Taylor WMA. The collaborative effort between FWC staff and FCFWRU will continue in the future as work towards recovery of the endangered snail kite continues.

*Southeastern American Kestrel*

Southeastern American Kestrel Monitoring and Nest Enhancement Activities, Camp Blanding Wildlife Management Area (Jim Garrison).--Activities to enhance the survival of the State threatened Southeastern American kestrel on Camp Blanding Wildlife Management Area in North-Central Florida consist of providing and maintaining nest boxes and conducting surveys. During February to May, 33 nest boxes were cleaned and maintained. Similar to last year, six nest boxes were verified as having been or currently being used by kestrels. Other wildlife utilizing the nest boxes included screech owls, flying squirrels, blue birds, and gray squirrels.

Southeastern American Kestrel Monitoring and Nest Enhancement Activities, Jennings Forest Wildlife Management Area (Allan Hallman).--Activities to enhance the survival of the Southeastern American kestrel on Jennings Forest Wildlife Management Area in North-Central Florida consist of providing and maintaining nest boxes and conducting surveys. During February of the reporting period, 14 nest boxes were cleaned and maintained. While monitoring occurred early in the nest season, at least one box was used by kestrels for nesting.

Southeastern American Kestrel Nest-boxes in the Southwest Region (Jennifer Morse).--FWC-managed lands in the Southwest Region were evaluated for the potential of nest box installation to enhance breeding opportunities for Southeastern American kestrels. A contractor constructed 43 nest boxes and installed these boxes on free-standing utility poles in areas that were determined to be suitable. An area was considered suitable if kestrels were known to be present on the area during the breeding season and suitable foraging habitat was present. The following locations received nest boxes: Chassahowitzka Wildlife Management Area (6 boxes), Hilochee Wildlife Management Area (6 boxes), Hilochee Wildlife Management Area-Osprey Unit (2 boxes), Lake Wales Ridge Wildlife and Environmental Area (18 boxes), KICCO Wildlife Management Area (6 boxes), Hickory Hammock Wildlife Management Area (3 boxes), and Kissimmee River Public Use Area (2 boxes). These boxes will be maintained and monitored annually by FWC staff and should aid in the recovery potential for this species.

*Whooping Crane*

Whooping Crane Reintroductions in Florida (Marty Folk).--The goal of the Florida release is to produce a non-migratory population of  $\geq 25$  breeding pairs of whooping cranes in Florida by 2020. For more information, visit the FWC Web site at [http://research.myfwc.com/features/category\\_sub.asp?id=5947](http://research.myfwc.com/features/category_sub.asp?id=5947). Staff last released whooping cranes into this flock the winter of 2004-2005. Releases were halted because of concerns about the productivity (reproductive success) and survival of released birds. Though no birds were released this year, staff continued to monitor the surviving members of the flock in order to document mortality, productivity, and other general biology of the birds. Productivity of the flock has been low with considerable yearly variation. Analysis of productivity data shows a

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

correlation with water levels prior to the breeding season. Whooping cranes, like sandhill cranes, rely on shallow marshes for nesting and raising their young. Florida has suitable habitat, but unfortunately, since whooping cranes began nesting in 1999, there have been several record-setting droughts. Only four of the last ten years have been wet enough for the cranes to make any nesting attempts.

Other challenges for this flock include differential survival of the sexes; males have not lived past ten years of age, while the oldest females in the flock are now 15 years of age. Longevity for whooping cranes of the only self-sustaining flock is estimated to be 22-30 + years and captive male whooping cranes have lived to 40 years of age. Another challenge is that results from analysis of dead whooping cranes show that 12% of females and 6% of males of the Florida flock have dysfunctional reproductive tracts that may prevent reproduction. The cause is not known but it may be from inbreeding due to low genetic diversity. Finally, the future of whooping cranes in Florida is also threatened by loss of habitat from development. From 1974 to 2003, suitable crane habitat in Florida declined an average of 16.6% during each of the ten-year increments.

Eastern Migratory Population – A separate reintroduction of migratory whooping cranes is taking place in the eastern U.S. Each year since 2001, whooping cranes have been led by ultra-light aircraft from Wisconsin to Florida. Currently there are 68 birds in this flock, with an additional 20 birds to be released in winter FY 2008-2009. Once these birds are taught the migration route from north to south, they subsequently migrate on their own. FWC's contributions to the reintroduction of migratory whooping cranes consisted mainly of aerial tracking in Florida and advisory support. For more information, visit <http://www.bringbackthecranes.org/>.

### *Wood Stork*

Wood Storks within the St. Johns River Water Management District of North and Central Florida (James A. Rodgers Jr.)--The wood stork once was a common breeding species throughout the Southeast United States, but declines in the species range and population occurred during the mid 1900s. The U.S. population was listed as Federally endangered in 1984 and is also State listed as endangered. The primary objective of this study is to gather productivity (reproductive success) data for storks nesting within the St. Johns River Water Management District of Florida (SJRWMD). These data will be compared with the reproductive success of other North and Central Florida stork colonies within and among colonies and years. These data will be used to determine if the stork population in the U.S. meets criteria for reclassifying the species.

The average fledging rate of wood storks within the SJRWMD region of North and Central Florida during 2008 was 1.51 fledglings/nest (n=419 nests) for six active colonies. Three other colonies (Matanzas Marsh, Hontoon Island, and Pelican Island) active in previous years contained no stork nests in 2008. For only successful nests (fledged at least one stork), the average fledging rate was 2.10 fledglings/nest (n=303 nests). About 72.3% of monitored nests fledged at least one bird and 60.8% of nests fledged  $\geq 2$  birds (Figure 1). It is apparent that the three colonies in the southern range (Lake Disston, Deseret Ranch, and Kemper US192S) exhibited lower fledging rates due to the higher frequency of zero-fledgling and lower frequency of three-fledgling nests. Significant differences in the mean fledging rate existed among colonies (range=1.02 to 2.13 fledglings/nest) during 2008. The greatest fledging rates were at two

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

colonies along the Northeast Region in Duval County (Jacksonville Zoo and Dee Dot). Jacksonville Zoo was the only colony that exhibited nests with 4 fledglings.

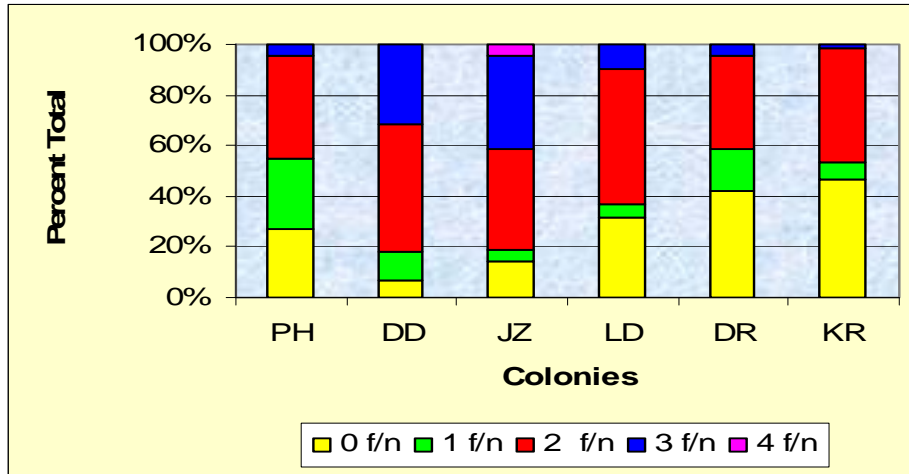


Figure 1. Distribution of the number of fledglings/nests for wood stork nests recorded at colonies in the SJRWMD region of North and Central Florida. Colony abbreviations are as follows: PH=Pumpkin Hill, JZ=Jacksonville Zoo, DD=Dee Dot, LD=Lake Disston, DR=Deseret Ranch, and KR=Kemper US192S Ranch.

Several noteworthy events occurred during the 2008 nesting season. Storks did not nest at Matanzas Marsh, Hontoon Island, and Pelican Island (Figure 2). The lack of nesting at Matanzas Marsh and Hontoon Island probably was due to little or no water present under the nest trees (primarily cypress) prior to the nesting season. The reason for no nesting at Pelican Island is unclear but this site has exhibited a continued decrease in nest numbers during recent years. However, storks did nest at Pumpkin Hill after two seasons of non-breeding (2006 and 2007) and Lake Disston after one year of non-breeding in 2007. All active colonies in 2008 exhibited more nests compared to 2007, an indication of higher breeding effort by storks across the region (Figure 2). Finally, between 37 and 45 storks were observed engaging in courtship and preliminary nest building at the Lake Disston colony during a 3-4 week period in late April and early May. These storks were in addition to the already nesting birds. However, these storks never advanced past the early nest building phase to lay eggs and slowly disappeared from the site by late May. A similar event was observed at Lake Disston in 2006.

Endangered and Threatened Species Management and Conservation Plan  
 FY 2007-2008 Progress Report

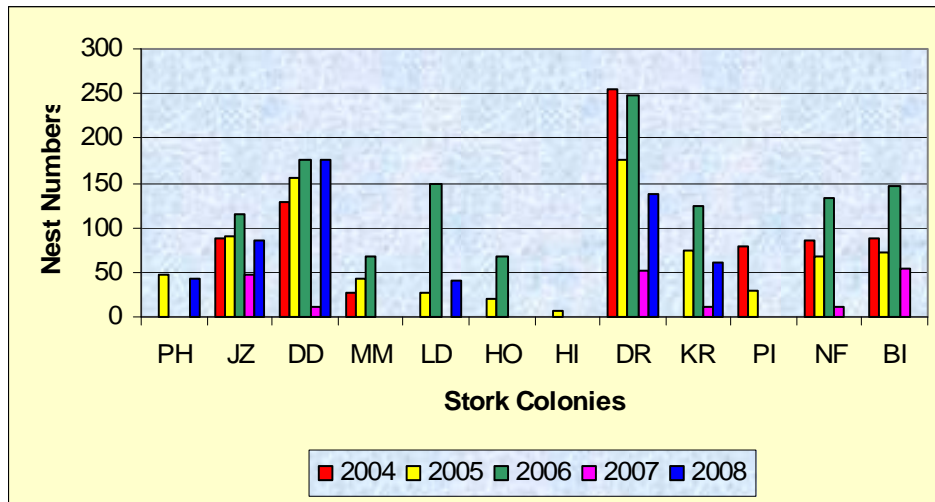


Figure 2. Annual number of wood stork nests recorded at colonies in the SJRWMD region of North and Central Florida. Colony abbreviations are as follows: PH=Pumpkin Hill, JZ=Jacksonville Zoo, DD=Dee Dot, MM=Matanzas Marsh, LD=Lake Disston, HO=Hontoon Island, HI=Horseshoe Island, DR=Deseret Ranch, KR=Kemper Ranch US192S, PI=Pelican Island, NF=North Fork, and BI=Bird Island.

A comparison of the combined fledging rate for all colonies within the SJRWMD region of Florida indicates the rate of 1.51 fledglings/nest in 2008 was over twice the rate of 0.71 fledgling/nest in 2007, and was the second highest fledging rate recorded during the past five nesting seasons of this study. All active colonies in 2008 rebounded from a low number of nests recorded in 2007. However, three colonies were still inactive in 2008. The 2008 nesting season was most similar to the 2005 nesting season.

Most of the area within the SJRWMD has experienced considerable variation in the amounts of rainfall and water levels in wetlands during 2004-2008. Lack of rainfall resulted in no water beneath the nest trees and no nesting at Pumpkin Hill in 2004, but reflooded nest trees resulted in the return of breeding storks in 2005. However, lack of water in 2006 and 2007 resulted in no nesting effort at Pumpkin Hill. The abandonment of nests at both Matanzas Marsh and Pelican Island occurred during above average amounts of rainfall during the latter period of the 2005 nesting season. The low fledging rates in 2007 probably were due to a continuation of the drought conditions that began in 2006, which storks were experiencing at the wetlands used for feeding around their colonies. Whereas lower water levels may contribute to lower fledging rates via lower availability of prey at nearby wetlands used for foraging, higher water levels also may depress productivity by dispersing available prey to breeding adults. These same low water levels in wetlands used for foraging may have facilitated the higher fledging rates by concentrating prey as wetlands dried up and made for easier capture by adults. However, unlike the 2006 nesting season that exhibited some of the greatest fledging rates among colonies and years via concentration of prey in drying wetlands, these same wetlands were mostly dry and lacking any prey in 2007. The reason for the rebound in nest numbers and fledging success at many colonies in 2008 is not understood since their near drought conditions entering the breeding season. Storks may have been forced to alternative foraging sites at greater distances from the colonies in order to breed successfully.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

*Wading Birds*

Wading Bird Surveys - Econfina Creek Wildlife Management Area, Carter Tract (Kelly Bunting).--Numerous wetlands and water bodies present on the Carter Tract of Econfina Creek Wildlife Management Area in Washington County provide excellent nesting habitat for the many species of wading birds found in the Florida Panhandle, most of which are listed or imperiled. In particular, one rookery continues to support nests for various species of colonial-breeding wading birds. In April to July 2008, this rookery was monitored weekly to document the number of individuals present as well as number of nests and nest success. Species of special concern present on nests included little blue heron and tricolored heron. Wood storks have been documented throughout the year foraging on area ponds. All waterways on the Carter Tract will continue to be surveyed annually for possible wading bird breeding activity, and the existing rookery will be monitored monthly during the breeding season (March to July) to document species present, number of birds, and nesting success.

Wading Bird Surveys on Apalachicola River Wildlife and Environmental Area (Phil Manor).--The Apalachicola River Wildlife and Environmental Area (ARWEA) in North-Central Florida consists of a matrix of upland, wetland, and riverine habitats that potentially contain several rare or threatened species. The numerous wetlands on the ARWEA provide habitat for several species of colonial wading birds, including the tricolored heron, little blue heron, snowy egret, white ibis, and wood stork. In order to monitor the relative success of wading bird populations in the area, an annual aerial rookery survey is conducted in the spring of each year. Aerial transects were flown within the lower Apalachicola River basin on April 30, 2008, May 1, 2008, May 27, 2008, and May 28, 2008. There were a total of five great blue heron rookeries and one great egret rookery located throughout the course of the survey. A mixed rookery consisting of wood stork nests, great blue heron nests, and great egret nests was also observed on the Tupelo Bend Waterfowl area just north of Howard Creek, Gulf County. During the wading bird survey, a new bald eagle nest/territory was found in Franklin County and Florida manatees were observed in Chipley Creek, Franklin County, and Lake Wimco in Gulf County.

Wading Bird Surveys on J.W. Corbett Wildlife Management Area (Linda King).--Several wading bird rookeries are intermittently active on J.W. Corbett Wildlife Management Area in South Florida and these sites are monitored yearly to determine use and species composition of nesting birds. Only one active site was found with multiple species utilizing the area for breeding, including great egret, snowy egret, great blue heron, little blue heron, and anhinga.

Wading Bird Surveys on John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area (Valerie Sparling).--The 2,500 acre marsh on the John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area (WEA) in South Florida provides good habitat for the many species of wading bird in Florida. Monthly roadside visual surveys have been conducted since 1996 to monitor wading bird use of this area. The most common wading birds observed have been great egrets, great blue herons, and little blue herons. Numerous other wading birds have been seen feeding on the area including tricolored herons, snowy egrets, white ibis, roseate spoonbills, and wood storks. Although no wading bird rookery has ever been documented at the John G. and Susan H. Dupuis, Jr. WEA, little blue herons were seen in the vicinity of a cattle egret rookery located in a small wetland area outside the marsh. The marsh and other wetland areas at the John

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

G. and Susan H. Dupuis, Jr. WEA will continue to be surveyed monthly to document wading bird feeding and breeding activity.

*Gopher Frogs*

Nongame Wildlife Grant – Habitat Use by Florida Gopher Frogs (Stuart Cumberbatch).--Dr. Steve Johnson, University of Florida, completed the third and final year of a study to determine the extent of upland use by the Florida gopher frog in Florida longleaf pine-wiregrass uplands using radio telemetry and GIS. Researchers tracked juvenile and adult gopher frogs fitted with transmitters in study areas adjacent to several breeding ponds in the Osceola National Forest in North-Central Florida. Movements by transmitted frogs and relative distances from breeding ponds were recorded along with the type of refuges used by the frogs when away from the ponds. In the final report, researchers are expected to relate data and information from this study with results of a long term monitoring effort of the use of isolated ephemeral ponds by amphibians.

*Bog Frog and Okaloosa Darter*

Nongame Wildlife Grant – Bog frog and Okaloosa Darter (Stuart Cumberbatch).--Dr. James Austin, University of Florida, initiated a genetic study on Florida bog frogs and Okaloosa darters. This study will use genetic methods to determine the status of the frogs and darters by quantifying centers of diversity and genetic structure, estimating gene flow, quantifying historical and contemporary population sizes, and comparing genetic information to habitat prediction maps. Researchers focused on securing samples and developing the methodologies needed to examine the genetic material from the species, and completed some preliminary analysis for the Okaloosa darter.

*Eastern Indigo Snake*

Management and Conservation (Kevin Enge).--FWC staff attended two Indigo Snake Conservation Summits (October 2007 and February 2008) in Georgia that were sponsored by Project Orianna, a privately funded indigo snake conservation initiative. At these summits, staff presented preliminary indigo snake potential habitat maps developed for Florida, Georgia, and Alabama. Results of a compilation of indigo snake sightings on Florida conservation lands and findings of a State Wildlife Grant study analyzing the mitochondrial DNA of indigos from Florida and Georgia indicated the existence of separate populations on the Atlantic Coast and Gulf Coast. Sightings of indigo snakes on conservation lands were obtained from the Florida Natural Area Inventory (FNAI) database, museum databases, and solicitation via email from staff in county, State, and Federal environmental agencies, non-governmental organizations, academic biologists, environmental consultants, and amateur herpetologists.

Preliminary results indicate that 42% of Florida's land area provides potential habitat, with 25% of the potential habitat occurring in the Panhandle. Conservation lands contain 41% of potential habitat, and 69 conservation lands contain  $\geq 10,000$  acres (4,050 ha) of potential habitat. Indigo snakes have been sighted on about 100 conservation lands since 2000, but only one of these conservation lands, Pine Log State Forest, is in the Panhandle. Indigo snakes are still common in parts of the peninsula, including some agricultural and residential areas, but they have apparently disappeared from the Keys and much of the Panhandle. Recent indigo snake sightings were also obtained from private lands, and all sightings were plotted on the potential



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

habitat map to ascertain its validity. In June 2008, FWC staff met in the field with Project Oriante staff and other biologists to assess potential indigo snake reintroduction sites in the Panhandle, including Apalachicola National Forest, Apalachicola Bluffs and Ravines Preserve area, Nokuse Plantation, Eglin Air Force Base, and Blackwater State Forest.

Calls from concerned stakeholders resulted in FWC staff meeting with the USFWS and South Florida Water Management District to discuss incidental take of indigo snakes at two John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area sites, the A-1 Reservoir and C-44 Stormwater Treatment Area. Subsequently, FWC staff met with USFWS and U.S. Army Corp of Engineers (USACOE) staff to discuss preparing better biological opinions, possible research projects, and conservation strategies for indigo snakes on this area.

FWC staff met in November to discuss revising current policy regarding the keeping of indigo snakes by private citizens and the breeding of indigo snakes by Florida zoos. FWC staff also consulted with Florida zoos regarding their willingness to participate in conservation projects and discussed the ramifications of a newly developed Indigo Snake Studbook. FWC staff commented on the USFWS's "5-year Review of the Eastern Indigo Snake".

Florida's State Wildlife Grants Program – Genetic Diversity of the Eastern Indigo Snake (Brian Branciforte).--Dr. Kenneth Krysko, University of Florida, continued a project to examine genetic information for the Eastern indigo snake in Florida and southeastern Georgia. The project will evaluate current genetic diversity and regional population structure and relate this information to the development of effective relocation and reintroduction programs. The most notable benefit of this study will be the improved knowledge of current genetic diversity and health of major populations of eastern indigo snakes. This information along with the synthesis of current published and unpublished studies on population ecology and habitat use will benefit future planning and management for conservation reserve systems.

#### *Flatwoods Salamander*

Flatwoods Salamander Critical Habitat Designation by the USFWS (Bill Turner).--In their designation of flatwoods salamander critical habitat, the USFWS recognized a recent proposed split of the species into two new species: the frosted flatwoods salamander and the reticulated flatwoods salamander. The USFWS suggested listing the reticulated flatwoods salamander as endangered and the frosted flatwoods salamander as threatened. FWC staff provided a peer review of the critical habitat designation for the flatwoods salamander species.

Flatwoods Salamander Management and Conservation (Bill Turner).--While surveys for flatwoods salamanders were conducted on several wildlife management areas (WMA) as described below, no systematic surveys for flatwoods salamanders were conducted in 2008. FWC staff spent one day in April visiting breeding sites in St. Marks National Wildlife Refuge in North-Central Florida. Staff also visited sites on the Aucilla Wildlife Management Area in Northwest Florida and commented on plans for vegetation restoration. The current flatwoods salamander management plan is due to be evaluated over the next year with regards to the progress that has been made toward its implementation. In FY 2008-2009, staff will consider whether the current plan will be updated with reference to the previously mentioned taxonomic split.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Flatwoods Salamander Survey and Monitoring on Pine Log and Point Washington Wildlife Management Areas (Fred Robinette).--Two known flatwoods salamander breeding sites are on Pine Log and Point Washington Wildlife Management Areas (WMA) in Florida's Northwest Region. With the recent reclassification of the flatwoods salamander into two distinct species, these breeding sites are now particularly critical for the newly described reticulated flatwoods salamander that is confined west of the Apalachicola River.

Sampling of potential breeding ponds at Pine Log and Point Washington WMAs occurred from October 2007 through April 2008 in an effort to reconfirm known sites and possibly document new breeding populations. Unfortunately, this year's flatwoods salamander breeding season was again disrupted by drought conditions that have plagued the Panhandle for several years. Consequently, very few of the 161 ponds (91 classified as potential breeding sites) on Point Washington WMA and 44 ponds (26 classified as potential breeding sites) normally monitored on Pine Log WMA were wet enough to be sampled during the winter and spring of FY 2007-2008.

In addition to previously used methods such as drift fence and dipnet surveys, the use of minnow traps was employed to the flatwoods salamander sampling protocol. Although no flatwoods salamander larvae or adults were captured in the minnow traps, the capture of larval and adult mole salamanders, in addition to several other amphibian species, suggested that minnow trapping has potential for monitoring breeding ponds. When used in conjunction with other survey methods, minnow trapping enabled more ponds to be sampled and/or monitored in a single season.

Local FWC staff continues to work with the Department of Agriculture and Consumer Services year round to improve potential breeding pond habitat through prescribed fire, mowing, and chopping. On the eastern section of Point Washington WMA, local staff in recent years have provided recommendations for mitigation practices (mowing, burning, or combinations of such) based on pond suitability criteria. These recommendations continue to be employed. The "Management Plan for the Flatwoods Salamander on Pine Log State Forest" (2002) and "Management Recommendations for the Flatwoods Salamander on Point Washington State Forest" (2005) developed by the FWC, will continue to help guide affirmative actions particularly for the locale around historic confirmed ponds. Additionally, considerations for the hydrology and siltation of potential breeding ponds will be undertaken when any forestry activity is conducted. Moreover, with the widening of U.S. Highway 79 directly bisecting Pine Log WMA, plans are to monitor how hydrology on the forest is affected. Several ponds ranked as "potential breeding ponds" touch the footprint of this road-widening project.

Surveys for Flatwoods Salamanders on Blackwater Wildlife Management Area (Barbara Schmeling).--FWC staff has surveyed Blackwater Wildlife Management Area (WMA) in Northwest Florida for flatwoods salamanders for the past few years. As of March 2008, there were no confirmed flatwoods salamander breeding ponds on the WMA.

Property containing a known flatwoods salamander breeding site along the Yellow River has recently been incorporated in the Blackwater River State Forest, managed as the Yellow River WMA. FWC staff began sampling the pond this year and will begin proactive management of this area in cooperation with the Department of Agriculture and Consumer Services.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Surveys for Flatwoods Salamanders on the Goethe Wildlife Management Area (Norberto Fernandez).--Surveys of ponds are conducted to determine the existence of flatwoods salamanders on Goethe Wildlife Management Area (WMA) in North-Central Florida. The pond surveys are conducted in conjunction with the monitoring of arrays established to monitor reptiles and amphibians. To date, no flatwoods salamanders have been found on the WMA.

*American Crocodile*

Crocodile Management Efforts (Lindsey Hord/Blair Hayman).--The American crocodile is currently listed as an endangered species by the State of Florida. Since its initial Federal listing as endangered in 1975, documented nests have increased from 20-22 to 174 in 2008. In March 2007, the USFWS reclassified the Florida population of the crocodile from endangered to threatened. Crocodile occurrences have been documented as far north as Indian River Shores (Indian River County) on the east coast and Ellenton (Manatee County) on the west coast.

With the increasing crocodile population (estimated between 1,500 and 2,000 non-hatchlings), a commensurate increase in crocodile-human conflicts has been documented. The FWC manages these conflicts under a plan developed in May 2005 by an issue team including FWC staff and crocodile experts from the USFWS, the National Park Service (NPS), and the University of Florida. The plan provides guidance for dealing with all crocodile-human interactions and promotes public safety while recognizing the needs of recovery and conservation of a listed species. Over 100 complaints were received by FWC staff, comparable to the number received in the previous fiscal year. Most of these complaints were resolved through telephone calls and site visits. Six animals were captured. Of these, five were males and one was a female. The female was 6.61 feet (2.02 m) in length. She was injured in a vehicle collision, rehabilitated at Miami MetroZoo, and later released back into the wild. The males averaged 8.84 feet (2.69 m) in length, with the largest one being 10.10 feet (3.08 m) in length. Of the captured males, two were translocated to canals in close proximity to the Southern Glades Wildlife and Environmental Area in South Florida. One was captured because it was entangled in fishing line and immediately released at the capture location and two others were placed into captivity at properly licensed and permitted facilities.

In late 2006, one female crocodile was captured mistakenly as an exotic in Stormwater Treatment Area 1 West (western Palm Beach County) and held in captivity until a determination of its origin could be assessed. The crocodile, determined to be from the Florida population, was released in December 2007 into the Arthur R. Marshall Loxahatchee National Wildlife Refuge L-8 Canal, adjacent to the crocodile's capture location. Prior to release, the University of Florida, in cooperation with the USFWS, FWC, South Florida Water Management District, Miami MetroZoo, Joe Wasilewski of Natural Selections, and Gatorama, telemetered the crocodile in order to track her movements upon release. The crocodile was tracked until the signal was lost approximately ten days later. A visual location was obtained on March 30, 2008 via helicopter. Attempts were made to capture the crocodile to replace the transmitter, the last of which was on April 30, 2008. Her last known location (on that attempt) was approximately two miles south of the release site.

One male crocodile, 6.25 feet (1.91 m) in length, was found on a South Carolina beach in early June 2008. The animal was captured under the direction of the South Carolina Department of Natural Resources staff, and FWC staff helped to coordinate transfer to a captive facility in Florida.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

FWC staff was involved in the recovery of four carcasses, three of which were killed by vehicle collisions. Of these road kills, one was a female 7.87 feet (2.40 m) in length and two were male. The males averaged approximately 8.00 feet (2.44 m), with the largest being 9.04 feet (2.76 m) in length.

*Gopher Tortoise*

Gopher Tortoise Management Plan and Permitting Guidelines (Joan Berish).--After being listed as a species of special concern for the last 28 years, the gopher tortoise was approved for reclassification as threatened at the Commission's September meeting, where the Gopher Tortoise Management Plan was also approved. The plan was the result of intensive efforts by two FWC issue teams and a dedicated stakeholder advisory group. The collaboration of agency staff and stakeholders to create this blueprint for gopher tortoise conservation was unprecedented and has been highly commended.

The management plan's overall conservation goal is to restore and maintain secure, viable populations of gopher tortoises throughout the species' current range in Florida. Specific objectives include increasing the amount of protected habitat; conducting appropriate vegetation management to maintain tortoise habitats (e.g., prescribed fire); restocking tortoises to protected, managed, suitable habitats where densities are low; and drastically decreasing tortoise mortality on lands proposed for development. Numerical targets for these objectives are given to help measure progress.

A suite of conservation actions are proposed for the plan's first five-year cycle. General categories include regulations, permitting, law enforcement, local government coordination, habitat preservation and management, population and disease management, landowner incentives, education, and monitoring and research. An adaptive management approach will be used to implement the many actions proposed in the plan, allowing easy adjustments to policies, guidelines, and techniques based on observed conservation benefits/detriments and sound science.

The gopher tortoise is often involved in wildlife/development conflicts because it inhabits the same high, dry habitats desired by development interests, and its conspicuous burrows draw attention to the fate of individual tortoises as development encroaches. Therefore, the most pressing task for FWC staff and stakeholders was to design detailed permitting and relocation guidelines, as outlined in the approved tortoise management plan. This complex and challenging task was undertaken during the winter and spring, and the draft guidelines were approved by FWC at its April 2008 meeting. The guidelines provide incentives to responsibly relocate and restock tortoises to protected, managed lands rather than unprotected sites. Moreover, receiving displaced tortoises can provide economical and ecological incentives to landowners to manage their habitat for tortoises, species that use tortoise burrows, and other native wildlife. A phased implementation of these guidelines is slated to occur from Spring 2008 through Spring 2009. One of the more complicated aspects of the new guidelines involves the creation of an online permitting Web site that will facilitate permit application, review, and record-keeping.

In June 2008, a third tortoise issue team was convened to implement the numerous and diverse actions in the management plan, and to hone and implement the permitting guidelines. As with the previous FWC tortoise teams, this management plan implementation team will be coordinating with the Gopher Tortoise Technical Advisory Group of stakeholders.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Mitigation Park Program (Shane Belson).--The FWC Mitigation Park Program began as a pilot initiative in 1988. It was developed with the primary goal of improving the biological effectiveness of listed species habitat protection efforts required for new land developments by State and Federal regulations. The program increases the biological value of mitigation by consolidating habitat protection areas into larger tracts, implementing listed species habitat management plans, and providing for permanent management by endowing each facility with a dedicated funding source. Primary management emphasis at mitigations parks has been gopher tortoise habitat enhancement and restoration.

As part of ongoing habitat enhancement activities at Perry Oldenburg Mitigation Park Wildlife and Environmental Area (WEA) in Southwest Florida, FWC applied mechanical mulching treatments to 100 acres (40 ha) of hardwood-dominated sandhills. These treatments create an open canopy habitat structure that promotes the recovery of desirable ground cover vegetation.

During this reporting period, 250 acres (101 ha) of mesic and scrubby flatwoods were mowed at Split Oak Forest Mitigation Park WEA in Northeast Florida to improve habitat structure and prescribed burning conditions. In addition, 31 tortoises were released in an existing 53-acre (21 ha) gopher tortoise restocking enclosure.

At Hickey Creek Mitigation Park WEA in Southwest Florida, 150 acres (61 ha) of mesic and scrubby flatwoods received mechanical treatments to remove excessive understory and canopy hardwoods. These treatments were followed by prescribed burning.

At Platt Branch Mitigation Park WEA in Southwest Florida, 300 acres (121 ha) of scrubby and mesic flatwoods were mechanically treated to improve habitat conditions for gopher tortoises. Follow-up prescription burns will be conducted to complete the treatments.

Hardwood removal was completed on 151 acres (61 ha) of sandhills at Fort White Mitigation Park WEA in North-Central Florida. This activity significantly reduced canopy cover and will promote the recovery of desirable herbaceous ground cover vegetation.

At Suwannee Ridge Mitigation Park WEA in North-Central Florida, 150 acres (61 ha) of uplands with little herbaceous ground cover were planted with containerized wiregrass at a rate of 1000 plants per acre. The intent of this project was to provide a meaningful reintroduction of wiregrass to the ground cover. Wiregrass is an important component of sandhill groundcover that provides the physical ability to carry prescribed fire.

Surveys and Monitoring of Gopher Tortoise Populations on Point Washington and Pine Log Wildlife Management Areas (Fred Robinette).--Since spring of 1993, FWC staff has been surveying, monitoring, and assessing the status of the gopher tortoise on Point Washington Wildlife Management Area (WMA) in Northwest Florida annually. Each spring since 2004, gopher tortoise surveys were conducted on Pine Log WMA, also in Northwest Florida, following the same monitoring and management protocol established at Point Washington.

Aerial photographs were initially used to identify potentially suitable gopher tortoise habitat. Identified sandhills were surveyed for the presence of gopher tortoise burrows. Both quantitative and qualitative data are collected at each burrow. Burrows are classified as active, possibly active, inactive, or abandoned. Using burrow widths, the burrows are further grouped into size class specifications. Burrow locations are recorded using GPS units, and the data points are downloaded into ArcGIS<sup>®</sup> mapping software. Data collected each year provides practical comparative information used to determine population trends and demography of the gopher tortoise populations within the WMAs. Staff recognize the inherent biases of burrow counts

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

when trying to correlate the data with robust gopher tortoise population density estimates. Nonetheless, as a tool to collect information that is used to influence management decisions on Point Washington and Pine Log WMAs, this survey methodology is practical and effective. No attempt to group burrows using any behavioral, demographic, or spatial criteria was made.

In an attempt to calibrate gopher tortoise burrow survey results with actual tortoise presence, burrows were evaluated via the use of two types of infrared cameras. The camera used for each burrow depended upon the size of the burrow scoped. Time allocated for scoping efforts varied depending upon the conditions of each individual burrow. A range of about 10-30 minutes per burrow was typical, however, some burrows required up to an hour of effort. Active, inactive, and possibly active burrows were scoped. Abandoned burrows, when not entirely dilapidated, were also scoped. Individual burrow lengths and encountered commensal species were recorded.

Advances in camera technology appear to offer good potential for using camera systems to complement our standard gopher tortoise burrow surveys on Pine Log and Point Washington WMAs. However, burrow size and characteristics did pose some constraints to our investigations. Number of tortoises scoped/verified with the camera systems and estimates derived from the number of active/possibly active burrows were not readily comparable this first year. Comprehensive burrow counts seem to be the most time efficient way to survey gopher tortoise colonies on Pine Log and Point Washington. Moreover, using strictly burrow counts makes it difficult to determine population estimates. Employing the camera allowed for us to obtain a crude number of tortoises and a baseline determination of the presence of other burrow species.

Working in cooperation with the Department of Agriculture and Consumer Services, the lead management agency, habitat management recommendations for gopher tortoises continued. Habitat improvements are being prescribed and implemented. Prescribed fire continues to be the preferred strategy for improving and maintaining the integrity of these gopher tortoise habitats. Herbicide has proven to be an effective tool on some sandhills to control turkey oaks out of the reach or control of prescribed fire. Sand pine removal is an additional high priority objective in restoring these areas for gopher tortoise repatriation.

Survey and Monitoring of Gopher Tortoise Population on Blackwater Wildlife Management Area (Barbara Schmeling).--FWC staff continued conducting a multi-year comprehensive burrow survey of the gopher tortoise population, designed to evaluate the entire 200,000 acres of Blackwater Wildlife Management Area (WMA) in Northwest Florida. The purpose of the survey is to provide the Department of Agriculture and Consumer Services (DOACS) and the lead land manager on the area with habitat improvement recommendations for gopher tortoises across the WMA. FWC staff surveyed the WMA using the DOACS designated management units. Burrow activity was defined by DOACS compartments so that habitat improvement recommendations provided to DOACS could be more easily translated into management actions.

Survey and Monitoring of Gopher Tortoise Population on the Carter Tract of Econfina Creek Wildlife Management Area (Kelly Bunting).--Gopher tortoise survey and monitoring continued between May and October 2007 on the Carter Tract of Econfina Creek Wildlife Management Area (WMA) in Northwest Florida. The 2,100-acre tract contains about 1,200 acres of sandhill uplands. The same monitoring and management protocol established for Point

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Washington WMA, also in Northwest Florida, was followed on the Carter Tract. Surveys in 2007 yielded 252 total burrows, with 36 being classified as active or possibly active. Of these, 61.4% were estimated to have carapace lengths corresponding to sexual maturity (greater than 9.06 in [23 cm]). Many habitat improvements on the area are currently underway to restore the sandhill ecosystem. Habitat improvements in 2007 and 2008 included prescribed burning, scrub oak reduction, removal of sand pine and slash pine plantations, and planting of longleaf pine and wiregrass. These improvements will allow for future expansion of gopher tortoise population on the area. Surveys will be conducted annually on the WMA between May and October. Future work will provide comparative data on tortoise population trends within the Carter Tract following land management and mitigation strategies.

Gopher Tortoise Assistance, Camp Blanding Wildlife Management Area (Jim Garrison).--Assistance was provided by FWC staff to Camp Blanding Joint Training Center (North-Central Florida) personnel regarding a population survey of gopher tortoises. FWC suggested the use of standard line transect sampling and burrow survey techniques. This survey will be conducted by Camp Blanding's Natural Resource staff and the results will be available next year.

Gopher Tortoise Survey on Half Moon Wildlife Management Area (Travis Blunden).--In 2008, FWC contracted with Florida Natural Area Inventories (FNAI) to conduct a gopher tortoise survey on Half Moon Wildlife Management Area (WMA) in Northeast Florida using transects in all upland communities capable of supporting gopher tortoises. A total of 84 miles (134 km) of transects were surveyed which accounted for over 20% of the potential habitat. Over 200 burrows were scoped to determine occupancy rates for each habitat type. Sandhill and scrubby flatwoods had the greatest densities of tortoises (1.02 and .646 per acre) however, they account for the smallest areas of the suitable habitat (a total of 170 acres or 69 ha). Pasture supported a much lower density (0.103 per acres) but accounts for over 40% of the potentially suitable habitat (1,266 acres or 512 ha). Overall, the combined occupancy rate was 59.2%. The total number of gopher tortoises for all potentially suitable habitat (2,986 acres or 1208 ha) at Half Moon WMA is estimated to be around 600 individuals or 0.2 tortoises per acre. The distribution of burrow sizes encountered indicates a healthy population with recent recruitment.

Candidate Conservation Agreement for the Gopher Tortoise (Thomas Ostertag).--FWC has partnered with the USFWS, Alabama, Georgia, South Carolina, several non-governmental organizations, and Federal agencies to develop a Candidate Conservation Agreement for the gopher tortoise. The agreement outlines voluntary management recommendations for the Partners to implement. These actions benefit the species and may help to preclude Federal listing within the eastern portion of the range.

With the Candidate Conservation Agreement, the Partners hope to organize a cooperative, range-wide approach to gopher tortoise management and conservation. This agreement allows the Partners to leverage knowledge and funding within a common conservation approach and framework. The agreement is voluntary and flexible in nature, and has been developed so different conservation and management actions can be agreed upon and implemented at different levels.

The Candidate Conservation Agreement benefited greatly from the FWC Gopher Tortoise Management Plan, which served as a general guide for development of the agreement.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

FWC staff attended all of the Candidate Conservation Agreement workshops over the course of the development process and wrote the habitat management sections of the document. The agreement is in the signing phase.

*Marine Turtles*

Management Activities (Robbin Trindell).--Work with stakeholders continued throughout Florida to implement the State's responsibilities under the Marine Turtle Protection Act [Florida Statute 379.4321 (1)] and the USFWS's recovery plans for five species of marine turtle: the loggerhead, green, leatherback, hawksbill, and Kemp's ridley. Staff worked closely with the Federal government, State regulatory agencies, volunteer conservation groups, and local governments on the protection of threatened and endangered marine turtles and their critical nesting beaches, developmental habitat, and foraging habitat along Florida's coast. FWC staff continue to provide expertise for requests to conduct human activities that could affect marine turtles and their nesting and foraging habitats. Public education concerning marine turtle biology and important conservation issues such as lighting, debris, and nesting beach protection continues to be a major focus of staff's educational efforts. FWC's Marine Turtle Management program was fully supported by proceeds from the sale of the marine turtle license plate and voluntary donations.

Environmental Commenting – Staff issued approximately 290 comment letters to the Florida Department of Environmental Protection's (FDEP) District Offices, Bureau of Beaches and Coastal Systems, and the State Clearinghouse. Projects reviewed included Coastal Construction Control Line applications, Environmental Resource Permit applications, and Joint Coastal Permit applications. Staff participated in over 91 meetings with staff from local governments, other State and Federal agencies, stakeholders, and more than 115 conference calls on specific projects and marine turtle conservation issues. Staff also participated in development of the statewide costal Habitat Conservation Plan that received a Federal grant in the amount of \$479,518. Staff conducted more than 97 site inspections related to environmental commenting responsibilities and participated in approximately 44 lighting inspections at the invitation of local governments and property owners. The program administrator served as an expert witness in one administrative hearing.

Rule Making by the Commission – The Marine Turtle Permit Rule (Florida Administrative Code Rule 68E-1) was formally adopted in December 2007. This Rule was revised to more clearly specify the requirements for obtaining a Marine Turtle Permit, to clarify the types of authorizations issued for marine turtle conservation work, and to allow more flexibility to local governments whose beach restoration activities require monitoring by a Marine Turtle Permit Holder.

Storm Recovery Activities – Staff worked closely with the FDEP's Bureau of Beaches and Coastal Systems, the U.S. Army Corp of Engineers (USACOE), the USFWS, Federal Emergency Management Agency (FEMA), local governments, and private citizens to facilitate responses to local erosion events as well as larger named storms while ensuring that State and Federal laws for protection of marine turtles were met. Site inspections were conducted in Broward, Collier, Dade, Franklin, Manatee, Palm Beach, Martin, St. Lucie, Indian River, Brevard, St. Johns, Gulf, Bay, and Walton counties to assess impacts to marine turtle nesting beaches and to coordinate on storm recovery activities.

Marine Turtle Permit Program – Staff reviewed and approved approximately 278



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

applications for conservation activities with marine turtles, including nesting beach surveys, stranding and salvage work, research, public turtle walks, rehabilitation at captive facilities, and educational display. Staff also made presentations at six Index Nesting Beach Survey Program (INBS)/Statewide Nesting Beach Survey (SNBS) training workshops statewide. Staff participated in the FWC Permitting Workgroup and associated sub-teams documented their marine turtle permit process.

**Captive Facilities** – FWC authorized captive facilities to hold marine turtles for rehabilitation, educational display, or research in Florida. Staff coordinated transfer and release of marine turtles during rehabilitation, supervised public marine turtle releases and conducted two facility inspections.

**Grants** – Currently staff are administering two Federal grants, one for \$416,000 from the USFWS for Walton County’s Habitat Conservation Plan and one for \$47,292 from the National Fish and Wildlife Foundation for lighting improvements in areas impacted by the 2004 hurricanes. This included oversight of contracts to local governments and vendors as necessary.

**Interagency Coordination** – FWC staff were invited to participate as an expert for the USFWS and USACOE’s Team on the Programmatic Biological Opinion for beach restoration. Staff served on the following teams, working groups, and committees: Archie Carr Sea Turtle Refuge Working Group; FDEP’s Turtle Friendly Berm Technical Advisory Group, Hard Bottom Technical Committee; FWC’s Environmental Commenting and Shorebird Issue Teams; the Marine Turtle Grants Committee; Florida Department of Transportation’s (FDOT) Emergency Response Contact List, and Regional Endangered Species Team. Staff coordinated with local officials on lighting inspections in numerous coastal communities.

Staff was included in a Davis Productivity Award for their participation in FDOT’s Lighting Retrofit project along State Road A1A in Broward County.

For more information on the FWC’s Marine Turtle Protection Program, visit the following Web site at <http://www.myfwc.com/seaturtle>.

Marine Turtle Research (Anne Meylan).--Marine turtle research included the following activities:

**Salvage, Rescue, and Necropsy** – FWC staff coordinated the Florida portion of the Sea Turtle Stranding and Salvage Network, an 18-state program administered by the NMFS. A total of 1,649 dead or debilitated sea turtles were documented in Florida from July 1, 2007 to June 30, 2008. By species, there were 867 loggerheads, 607 green turtles, 79 Kemp's ridleys, 22 hawksbills, 15 leatherbacks, and an additional 59 sea turtles not identified to species. Staff reviewed, edited, and entered all submitted Sea Turtle Stranding and Salvage Network reporting forms, responded to or coordinated the response to approximately 1,100 reports of dead or debilitated sea turtles, directly responded to 27 reports of dead sea turtles, responded to 90 reports of sick or injured sea turtles and transported the turtles to rehabilitation facilities, and conducted necropsies on approximately 100 carcasses. Florida stranding updates were provided weekly to National Marine Fisheries Service (NMFS) for incorporation into the Sea Turtle-Shrimp Fishery Management Report. Detailed Florida stranding reports were generated weekly.

**Population Monitoring** – This long-term monitoring program involves the collection of nesting and habitat information throughout the geographic range of marine turtles in Florida. Approximately 90% of the world’s largest loggerhead nesting population occurs in Florida, and the green turtle and leatherback nesting populations are of regional significance. FWC staff assess nesting abundance and reproductive output by coordinating a network of State, Federal,

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

and volunteer permit holders who monitor sea turtle reproduction on Florida's beaches. FWC establishes scientifically sound monitoring designs, provides training, resolves data collection problems, assesses data collection error rates, analyzes data trends, and serves as a clearinghouse for information on marine turtle populations and habitats. Two overlapping monitoring programs, the Statewide Nesting Beach Survey (SNBS) Program and the Index Nesting Beach Survey (INBS) Program, are carried out each with separate objectives.

The Statewide Nesting Beach Survey (SNBS) Program, initiated in 1979, achieves nearly complete coverage of the State's nesting beaches to provide data on total nest numbers, nest geographic distribution, and nesting seasonality for each species. Managers use results to minimize human impacts to turtles and nesting beach habitats, and to identify important areas for land acquisition or enhanced protection. In 2007, 196 survey areas were monitored, comprising 813 miles (1,309 km) of beaches. Statewide, the program documented 45,024 loggerhead nests, 12,752 green turtle nests, 1442 leatherback nests, 1 hawksbill nest and 3 Kemp's ridley nests.

The Index Nesting Beach Survey Program (INBS), started in 1989, differs from the SNBS program in collecting more detailed data from a smaller set of index beaches. Surveyors identify each sea turtle track to species, identify the tracks as a nest or abandoned attempt, and locate nests within an approximate half-mile beach zone. Nests and nesting attempts have been monitored for 20 years at 478 index beach zones surveyed daily during each 109-day season, an effort that currently provides more than five million records in the INBS database. Annual survey or training, on-site verification, and consistency of the methods used during the 20 years of the program and among the 246 miles (396 km) of index beaches, make the resulting database a representative and unbiased assessment of sea turtle nesting. The program provides a reliable indication of temporal and spatial trends in Florida sea turtle abundance. In 2007, the program documented trends in nesting for loggerheads (declining), green turtles (increasing), and leatherbacks (increasing).

Biology, Ecology, Life History, Migrations – Most research on marine turtles has been conducted on the nesting beach although turtles spend only a small fraction of their lives there. Conservation efforts depend on a broad knowledge of population biology, life history, ecology, and migrations. Ongoing projects in the Western Florida Current, the eastern Gulf of Mexico, Florida Bay, and the Key West National Wildlife Refuge involve capturing live animals at sea. Studies target four species of marine turtles and several life history stages, and address population structure (including natural sex ratios), growth rates, genetic identity, life history, health, diet, habitat preferences, and migrations. FWC research on the early neonate dispersal stage is critical to understanding and managing threats to marine turtles as they leave Florida waters and circulate throughout the North Atlantic.

In June 2008, 98 loggerheads, 1 Kemp's ridley, and 1 hawksbill were captured during a nine-day sampling session in Florida Bay. All animals were measured and tagged. Twenty-eight of the turtles had been previously marked, providing data on growth and residency in Florida Bay. This project has been conducted continuously since 1990. Some individual turtles have now been captured numerous times over periods as long as twelve years.

FWC staff studies the abundance, distribution, behavior, and diet of young-of-the-year and small juvenile sea turtles in open-ocean habitat off Florida (western Florida Current and eastern Gulf of Mexico). These turtles live in surface waters and occupy a pelagic stage in sea turtle development that precedes the shallow-water benthic foraging stage occupied by larger immature and adult sea turtles. Study objectives are to measure relationships between open-ocean habitat and pelagic turtle abundance, and to measure threats unique to this habitat such as

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

mortality and morbidity from plastics and tar ingestion. Staff records physical oceanographic measurements, turtle behavior, their relationships to floating objects and other organisms, turtle weights and measures, and evidence of ingested plastics and tar. Eleven sampling trips were conducted between July and September of 2007. This effort continues a study in which 282 miles (451 km) of search transects were conducted between 2004 and 2007. On these search transects, a total of 374 turtles were observed. Of these, 302 were loggerheads, 41 were green turtles, 21 were Kemp's ridleys, and six were hawksbills. Survey locations included Gulf of Mexico waters offshore from Pensacola, Apalachicola, and Sarasota, and Atlantic waters offshore from Sebastian Inlet. Dead neonate sea turtles were recovered following storm events on Atlantic beaches. These turtles were necropsied and examined for their gut contents. A high proportion of dead stranded loggerhead (72 %) and green turtle (86 %) neonates had ingested plastics or tar.

Scientific Consultation with Management – FWC staff served on several scientific advisory committees and governing boards: the Loggerhead Recovery Team, the Loggerhead Expert Working Group, the Carr Refuge Working Group, university graduate committees, editorial boards, and the International Union for the Conservation of Nature's Marine Turtle Specialist Group. Staff reviewed all research-related proposals submitted for consideration by the small grants program of the Florida Sea Turtle License Plate. Staff presented two papers and six posters at the 28<sup>th</sup> Annual Symposium on the Biology and Conservation of Sea Turtles.

For more information on the Marine Turtle Research Program, visit the following Web site at [http://research.myfwc.com/features/category\\_main.asp?id=1289](http://research.myfwc.com/features/category_main.asp?id=1289).

### *Smalltooth Sawfish*

Smalltooth Sawfish Research (*Phil Stevens and Gregg Poulakis*).--Smalltooth sawfish were once common in the coastal and estuarine waters of the southeastern United States, but during the 20<sup>th</sup> century they became rare throughout their North American range. Currently, South and Southwest Florida are the only areas where this species is regularly found. This decline is attributed to two main factors: 1) bycatch in commercial and recreational fisheries, and 2) life history parameters that include late maturity and production of small numbers of young.

Conservation efforts directed toward smalltooth sawfish in the United States began with their protection by the State of Florida in 1992 and eventually led to Federal listing under the Endangered Species Act in 2003. These conservation measures were enacted largely because of large scale declines in occurrence and a gross reduction of historical range. Despite the special concern for this fish, there is a lack of scientific information, making the implementation of conservation and recovery plans for this species difficult.

In November 2004, FWC staff initiated a long-term monitoring program specifically designed to collect data on the life history, biology, and ecology of the smalltooth sawfish. The program is funded and permitted by (permit number 1475) the National Marine Fisheries Service (NMFS) to conduct this research.

Monitoring--Between July 2007 and June 2008, two complimentary sampling methods were used to collect smalltooth sawfish in the Charlotte Harbor estuarine system, which is located on the southwest Gulf coast of Florida. Monthly directed sampling that targeted sawfish hotspots was conducted in the Caloosahatchee and Peace rivers. Captured sawfish were tagged and immediately released at the site of capture. These tags remain with the sawfish for life, and the reader can be carried by researchers to detect recaptures. Acoustic tags are used by

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

researchers to track sawfish movements with manual and automated hydrophones. The sawfish used habitats further upriver during this time period compared to previous years presumably due to drought conditions within the watershed. The data obtained from these and future tracks will help define activity space, home range, and the abiotic preferences of this species. This is a collaborative effort between the FWC and other scientists.

During this 12 month period, 32 smalltooth sawfish were collected, including two recaptures. One additional sawfish was recaptured by an angler. A variety of data was taken on all sawfish (*e.g.*, lengths, rostral tooth counts) and each new animal was tagged and released. Total lengths ranged from 2.3 to 7.1 feet (706–2172 mm); all of these sawfish were immature.

One FWC staff member is part of the Smalltooth Sawfish Recovery Team and will later become a member of the Smalltooth Sawfish Recovery Implementation Team when the Recovery Plan document is finished. This group includes members with Federal, State, academic, and non-profit affiliations and was assembled by the NMFS to draft and implement a Recovery Plan for this species. Data from the FWC's sampling are provided to the teams as needed.

For more information on the FWC's Smalltooth Sawfish Research program, please visit the smalltooth sawfish portion of the FWC Web site ([http://research.myfwc.com/features/view\\_article.asp?id=26143](http://research.myfwc.com/features/view_article.asp?id=26143)).

Coordination Between FWC and USFWS on Commenting for Actions Permitted in Federally-Designated Critical Habitats (Jeffrey Wilcox).--FWC has initiated coordination with the USFWS in development of commenting recommendations and constraints. Once approved, this input will be included into USFWS permitting comments and actions for projects occurring in Federally-designated critical habitats for Federally-listed smalltooth sawfish.

### *Sturgeon*

Atlantic Sturgeon Restoration (Jeffrey Wilcox).--The St. Marys River once supported a thriving commercial fishery for Atlantic sturgeon, whereas there has been no report of a sturgeon being seen in the river in the past fifty years. FWC has been collaborating with multiple agencies to survey the river and develop a fishery restoration plan to return Atlantic sturgeon to the system. FWC continued collaboration with the Georgia Department of Natural Resources (GDNR), the USFWS, the St. Johns River Water Management District, and the National Marine Fisheries Service (NMFS), as a primary member of the St. Marys Fishery Restoration Committee (SMFRC), completing the draft Atlantic States Marine Fisheries Committee (ASMFC) Plan for diadromous fisheries restoration in the St. Marys River. FWC is now drafting the St. Marys River Fishery Management Plan for Atlantic sturgeon for the SMFRC, based on a presumption that shortnose and Atlantic sturgeons no longer occur in this river system. The NMFS provided funding for the University of Georgia to conduct an estuarine/riverine survey for sturgeons in the St. Marys for two years to confirm the presence or absence of the fish. This survey was delayed until 2009 while the NMFS issues the necessary shortnose sturgeon collecting permit (applied for in February 2008). In coordination with the Florida Department of Environmental Protection (FDEP), the Georgia Department of Environmental Protection (GDEP), the Environmental Protection Agency (EPA), and the St. Johns River Water Management District (SJRWMD), the SMFRC is compiling all agencies water quality, flows and levels, point source discharges, reports of limestone outcroppings for spawning, and toxicity studies to attempt to characterize

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

the entire length of the St. Marys River.

Gulf Sturgeon Coordination (Jeffrey Wilcox).--Gulf sturgeon management included commenting on numerous Developments of Regional Impact, an Environmental Resource Plan, and Joint Coastal Permit project applications impacting Gulf sturgeon (housing developments, highway and bridges, beach renourishment, power plants, dredge and fill activities, dam removal, etc.). Proposed activities had the potential to negatively affect Gulf sturgeon by habitat alteration, water quality degradation, and/or direct take. FWC provided permitting comments, which increased and assured the protection of this species during construction, dredging, or demolition activities in their Federally-designated critical habitat.

Coordination Between FWC and USFWS on Commenting for Actions Permitted in Federally-Designated Critical Habitats (Jeffrey Wilcox).--FWC has initiated coordination with the USFWS in development of commenting recommendations and constraints. Once approved, this input will be included into USFWS permitting comments and actions for projects occurring in Federally-designated Critical Habitats for Federally-listed sturgeon.

Ongoing Evaluation of Hatchery Reared Gulf Sturgeon Releases in the Hillsborough River (Daniel Roberts).--In 2000, hatchery-reared sub-adult Gulf sturgeon were released in the Hillsborough River, Tampa Bay, Florida. Fish were released into sites representing six separate habitats, three located in the lower estuarine reach and three in the upper freshwater reach of the river. Release sites in the upper river included: Hillsborough River Reservoir (Temple Terrace), adjacent to the north side of the dam, Dead River County Park, and Hillsborough River State Park. Release sites in the lower river included: River Crest between Hillsborough Avenue and Columbus Drive, Lowry Park, and Sulfur Springs adjacent to the dam. These fish were tracked using acoustic telemetry for a period of almost two years. Data analysis of this study was hampered due to conflicting location data. Further tracking of these fishes has been delayed by the contractor's incapacity to resolve GPS and GIS location-resolution anomalies due to the river's dense canopy.

Gulf Sturgeon Strike Hazard Information (Jeffrey Wilcox).--Gulf sturgeon, a Federally and State listed fish, were a contributing factor in a few boating-related injuries. These fish are found in the Suwannee River and other Florida Panhandle rivers from early spring to early fall, when they migrate from the Gulf to spawn each year. The sturgeon which grow to 6+ ft. and weigh up to 200 lbs., periodically and frequently jump several yards in the air, which can pose a navigational hazard to vessels. Due to this jumping phenomenon, Gulf sturgeon have garnered national recognition for themselves and the Suwannee River. Due to FWC posting every boat ramp on the Suwannee with sturgeon warning signs and increasing public awareness, and despite an increase in boating activities, the number of sturgeon-human impacts declined from 18 to 4 since the previous reporting period (two injuries on the Suwannee River, and two on the Yellow River.).

Commission personnel across the agency were involved in an extensive effort to inform boaters of this hazard. Signs were posted at most boat ramps on the Suwannee River and decals were handed out to remind boaters to go slow. FWC continued to coordinate with officials from the counties in North Florida affected by this issue. Additionally, FWC provided presentations to the Florida Trails Association, the Rotary Club of Tallahassee, and provided sturgeon-related

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

materials to non-FWC public-information presenters.

Nongame Wildlife Grant – Historical Population Trends of Gulf Sturgeon in Florida Waters (Stuart Cumberbatch)--Dr. William Pine, University of Florida, continued the second year of a study to reconstruct the historical population size of Gulf sturgeon in Florida. The study will incorporate 20 years of sampling data, along with historical landings from the late 19<sup>th</sup> and early 20<sup>th</sup> century. The research question to be addressed is whether declines in the Gulf sturgeon population have been caused by impacts to the species due to alteration of essential habitat or intensive harvesting. Researchers completed and tested the development of a preliminary retrospective population model. Future work includes refining the model and working with partners to gather all the data that will be used to complete the analysis to estimate the historical population.

*Other Imperiled Fish*

Gulf Coastal Plain Stream Monitoring (Costas Katechis and John R. Knight)--FWC's Gulf Coastal Plain Stream Monitoring Program completed the final year of a three-year State Wildlife Grant funded research project. The goal was to provide a long-term strategy to monitor freshwater fish communities from the Gulf Coastal Plain ecosystem. While imperiled fish taxa were not specifically targeted, several collections/observations were made during this reporting period. Data collected were essential to fill in the gaps of knowledge pertaining to population trends, status, and distribution of these species. All information gathered was critical for developing proper conservation/management strategies to protect Florida's imperiled freshwater fish species.

Blackmouth shiner--Listed as endangered in Florida, the blackmouth shiner was not encountered during this reporting period. Sampling was conducted within the known range of the species (Blackwater and Yellow watersheds), but specific habitats were not targeted. As noted in previous work, this species is likely difficult to monitor quantitatively, warranting an alternative monitoring strategy to properly assess the status of the species. Known locations of blackmouth shiners have not been recently sampled and no new blackmouth shiners populations have been discovered in the past three years.

Bluenose shiner--Listed as a species of special concern in Florida, the bluenose shiner was collected at one location during the past year (Holmes Creek, a tributary to the Choctawhatchee River). Again, habitats where bluenose shiners were most likely to occur were not targeted. As with the blackmouth shiner, this species appears difficult to quantitatively monitor.

Saltmarsh topminnow--Listed as a species of special concern in Florida, the saltmarsh topminnow was not collected by FWC officials during this previous year. Euryhaline species, such as saltmarsh topminnows, are rarely encountered in freshwater habitats and have yet to be collected by the Gulf Stream Monitoring Program. Additional research is needed to properly assess the status of the species in Florida.

Shoal bass--Listed as a species of special concern in Florida, the shoal bass was collected from the Chipola River during the previous year. Populations of shoal bass from this watershed

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

appear locally abundant and secure, although fragmented from their source population (in Georgia and Alabama) due to Woodruff Dam. The dam represents a barrier to gene flow, making this species susceptible to catastrophic events, since there is no other population in Florida, aside from the Chipola watershed. Continued monitoring is needed to ensure persistence of the species in Florida.

Crystal darter--Listed as threatened in Florida, the crystal darter has not been collected in Florida since 2004. This species is only known to occur in the Escambia River system and numerous sampling efforts from this watershed have yet to collect the species. Concurring with previous research, the species' classification may need to be re-evaluated.

Harlequin darter--Listed as a species of special concern in Florida, the harlequin darter is only known to occur in the Escambia River watershed. While restricted in range, the species is regularly collected from both tributaries and mainstem Escambia River, when suitable habitats were present (submerged woody debris). Additional long-term monitoring from this system is still needed to determine population trends for the species.

State-listed Fish Species Activities: Permit Commenting (Jeffrey Wilcox)--FWC has provided comment on numerous developments of regional impact, Environmental Resource Plan, and Joint Coastal Permit project applications impacting State-listed species (housing developments, highway and bridges, beach renourishment, power plants, dredge and fill activities, dam removal, etc.). Many of the permit applicant's proposed activities have had the potential to negatively affect State-listed fishes by increased sediment loading, habitat alteration, water quality degradation, and/or direct take of a member of the species. State-listed fishes directly protected from unacceptable impacts this year by FWC commenting activities include: bluenose shiner, saltmarsh topminnow, Gulf sturgeon, Atlantic sturgeon, shortnose sturgeon, Okaloosa darter, and Southern tessellated darter. Projects involving demolition in the western Panhandle were also required to avoid blasting injuries to the protected, but not State-listed, alligator gar.

FWC provided biological guidance to the FDEP on potential impacts and benefits to State-listed species accruing from their application for the proposed (partial) removal of the Rodman Dam across the Ocklawaha River.

### *Miami Blue Butterfly*

Miami Blue Butterfly Management (Ricardo Zambrano)--The Miami blue butterfly received emergency listing as an endangered species in Florida in 2002 to prevent imminent extinction. The butterfly was formerly found from Hillsborough County to the Dry Tortugas on the Gulf Coast and from Merritt Island to the Florida Keys on the Atlantic Coast. From 2002-2006, the butterfly was found at only one location, Bahia Honda State Park in the Florida Keys. The wild population in the park ranges from 50-100 individuals.

FWC has partnered and coordinated closely with several government agencies including the National Park Service and the Florida Park Service, nongovernmental organizations, and the University of Florida to protect and recover this species. The agency's commissioners directed staff to develop a species management plan. FWC's management plan for the Miami blue butterfly can be viewed at <http://myfwc.com/imperiledspecies/plans.htm>.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

In 2006, staff from the USFWS discovered Miami blue butterflies on eight islands within the Key West National Wildlife Refuge. These are the first populations to be found outside of Bahia Honda State Park in the Lower Keys.

FWC has a representative on the Florida Coordinating Council on Mosquito Control and on the Council's Imperiled Species Subcommittee. One of the main objectives of the Subcommittee has been to resolve issues and concerns between Mosquito Control districts and imperiled butterflies. Several agreements have been worked out which allow FWC to proceed with reintroduction efforts but do not prevent mosquito control districts from performing their duties.

FWC has permitted a study being conducted by Florida A&M University to determine the effect of current Florida Keys Mosquito Control District insecticide spraying on Miami blue butterfly larvae. FWC staff assisted with the research trials during FY 2007-2008.

FWC continued funding University of Florida to conduct a Miami blue butterfly molecular diversity study. This study is allowing FWC and University of Florida to develop a long-term strategy for reintroduction efforts and for the genetic conservation and management of the existing wild colonies and captive colony.

FWC staff expanded the Miami Blue Butterfly Workgroup, which was composed of several governmental agencies, organizations, and mosquito control districts into the Imperiled Butterflies of South Florida Work Group (IBWG). This new work group is taking a more proactive approach to butterfly conservation in South Florida. The IBWG first established a SharePoint site to facilitate the sharing of information (<http://share2.myfwc.com/IBWG/default.aspx>). The workgroup then established a research and monitoring subcommittee, a habitat management subcommittee, and an education and information subcommittee. Several imperiled butterfly species, including the Miami blue butterfly, will be addressed by this new work group.

Florida's State Wildlife Grants Program – Conservation and Field Surveys of the Endangered Miami Blue Butterfly (*Brian Branciforte*).--Dr. Jaret Daniels, University of Florida, is acquiring additional information needed regarding the status, relative abundance, and ecology of the Key West National Wildlife Refuge populations of Miami blue butterflies. Additional research will also evaluate multiple reintroduction methods. The project will survey identified sites that have reported to support existing Miami blue butterflies. Checklist and mark-recapture methods will be used to help determine population status, relative abundance, and phenology. Additional observations will be conducted to help confirm host usage, identify plant associations, evaluate potential competition with the Cassius blue butterfly, and better understand adult organism behavior. Lastly, wing fragment samples will be taken from adult individuals and used for polymerase chain reaction (PCR) analysis/genotyping. The resulting data will be used to help determine the current genetic diversity of identified extant populations. The Key West National Wildlife Refuge surveys will provide FWC with needed information on Miami blue population status and relative abundance critical for organism management and listing criteria review. The reintroduction method research will provide needed information to enhance overall organism reintroduction success and recovery. The information gained can also be applied to other imperiled insect taxa.

Nongame Wildlife Grant – Miami Blue Butterfly Molecular Diversity (*Stuart Cumberbatch*).--Dr. Thomas Emmel, University of Florida, completed and submitted the draft final report for his



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

project, Molecular Diversity of the State-endangered Miami blue butterfly. The project examined the genetic diversity of populations of Miami blue butterfly at Bahia State Park in the Florida Keys and of a captive colony at the University of Florida. Results indicated there was a greater than expected genetic diversity in the wild population at Bahia State Park and the captive colony maintained representative diversity from the wild population indicating they were suitable for reintroduction to new sites within the range of the Miami blue butterfly. The results of this project will help facilitate the implementation of the conservation strategies outlined in the Miami Blue Butterfly Management Plan and will promote the management of the species.

*Panama City Crayfish*

Listing Evaluation (*Brad Gruver*).--In accordance with the listing process (68A-27.0012 F.A.C.), a draft management plan for the Panama City crayfish was submitted to FWC for consideration at its June 2007 meeting in Melbourne. This draft, dated May 7, 2007, is available on the FWC Web site at <http://myfwc.com/imperiledspecies/plans/Revised-Draft-PCC-Plan.pdf>.

FWC directed staff to proceed with finalization of the draft Panama City crayfish management plan, to be submitted for approval at its February 2008 meeting in Panama City. However, at its December 2007 meeting, FWC directed staff to suspend further listing action on the Panama City crayfish until the listing process has been reviewed. Therefore, completion and approval of the draft Panama City crayfish management plan are pending.

Management and Conservation (*David Cook, John Himes, and Tom Ostertag*).--As indicated above, final consideration and approval of the draft Panama City crayfish management plan are on hold pending the revision of the FWC listing process. Highlights of the draft management plan include: (1) conservation objectives and strategies that, if achieved, will cause the Panama City crayfish to no longer meet the criteria for listing; (2) the inclusion of Best Management Practices (BMPs), developed through considerable stakeholder input that enable road maintenance, development, silviculture, and other activities to proceed without the need for an incidental take permit if BMPs are followed; (3) a rule establishing a no-cost permit for crayfish recreational harvest that will enable staff to collect information on the possible impact of this activity on the species; and (4) an implementation strategy and schedule.

One of the issues that had arisen during development of the draft management plan was concern about being able to distinguish the Panama City crayfish from other species of crayfish. On November 8, 2007, at Gulf Coast Community College in Panama City, crayfish expert and retired FWC biologist Paul Moler presented a Panama City Crayfish Identification Workshop for the public. The workshop was offered three times during the day and evening and was attended by 19 members of the public, including representatives of other State, county, and municipal agencies. A local TV news station and a local newspaper also attended. The workshop revealed that with minimal training, it is simple to distinguish the Panama City crayfish from other species that may be encountered within the Panama City crayfish's range.

Regional FWC staff addressed questions involving developments and other activities with possible impact to the Panama City crayfish, and made several site visits to evaluate potential crayfish presence or habitat. In particular, a number of Wetland Dredge and Fill Permit applications were reviewed by staff. Staff consulted with the Florida Department of Environmental Protection (FDEP), to whom the application had been submitted and environmental consultants to provide guidance on proposed development projects and to prevent

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

unauthorized taking of Panama City crayfish. Additional consultation and guidance was provided to Panama City and Bay County officials as needed. In conjunction with the USFWS and Biological Research Associates, staff also evaluated a number of sites as conservation easements within the range of the Panama City crayfish, three of which were determined to provide suitable habitat. Arrangements are currently underway to relocate Panama City crayfish to these sites in an effort to increase the species' area of occupancy.

The preparation of a Candidate Conservation Agreement with Assurances is in the final stages of review between the FWC, the USFWS, and the St. Joe Company. This incentive-based conservation agreement will establish a "Panama City Crayfish Conservation Area" in the eastern part of the Panama City crayfish range, and guide habitat restoration and management activities to enhance conservation for the long-term survival of the species.

*Florida Cave Crayfish*

Nongame Wildlife Grant – Florida Cave Crayfish (Stuart Cumberbatch).--Mr. Kevin Enge, FWC, initiated a project to determine the phylogenetic relationship among Florida's cave crayfish. This study will collect and examine samples from at least 14 species of described crayfish in Florida using DNA sequencing. In addition to providing information on the diversity of the species, the study will record and report the distribution of the species to assist with conservation efforts.

*Black Creek Crayfish*

Status Survey on Jennings Forest Wildlife Management Area and Camp Blanding Wildlife Management Area (Anna Liner, Allan Hallman, and Jim Garrison).--The status of the Black Creek crayfish has not been examined in the North Fork of the Black Creek system (Clay County) since an initial study in 1990. Significant development has occurred during the ensuing period, causing concern that negative impacts may have affected the crayfish population. The Black Creek crayfish requires sand-bottom streams with cool, highly oxygenated water, and sufficient daytime retreats. Siltation, disturbance, and pollution can cause crayfish to disappear from portions of their habitat. The FWC funded the University of Florida to conduct a survey for the Black Creek crayfish (State-listed as a species of special concern) in the upper reaches of both the North Fork and South Fork of Black Creek within Camp Blanding Joint Training Center (CBJTC) and Jennings State Forest (JSF), both found in North-Central Florida. Field work for the survey was conducted March 5 to May 7, 2008, at 25 sites on Camp Blanding Joint Training Center and 33 sites on Jennings State Forest. Survey results showed Black Creek crayfish continue to occur at 18 of 24 historic sites (75%) identified in a 1990 report by R.W. Brody; reasons for extirpations at the other six sites were not obvious. Overall, Black Creek crayfish were collected at 11 sites (44%) on Camp Blanding Joint Training Center and at 25 sites (76%) on Jennings State Forest. The results of the surveys indicated significant populations of Black Creek crayfish remain at a majority of the historic sites, but the loss of 25% of those populations is a cause for concern because the reasons for those losses are unknown. The absence of Black Creek crayfish from the headwaters of the North Fork of Black Creek on CBJTC also is a cause for concern. This information can be used as a baseline for future monitoring events. A formal report was generated and is available upon request.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Threat Evaluation (Terry Doonan)--Siltation and turbidity observed at several crayfish sites are a cause for concern. Sites considered good quality habitat in undisturbed areas had clear water, were sand-bottomed, and were relatively free of silt. Human-caused incidents involving negative impacts to Black Creek crayfish habitat occurred on Camp Blanding Joint Training Center (CBJTC) in 2004 and 2008 when significant amounts of heavily silted water were introduced into the North Fork of Black Creek. Stream crossings on both CBJTC and Jennings State Forest (JSF) can potentially be causes of both good habitat conditions and negative impacts. Open-tree canopies at stream crossings can result in greater light penetration and enhance crayfish habitat. However, potential disturbances can occur to stream habitats at road and trail crossings. FWC staff is working with the Florida Army National Guard, Department of Agriculture and Consumer Services (DOACS), and the St. Johns River Water Management District (SJRWMD) to evaluate impacts to the crayfish and make recommendations to avoid future incidents. Culverts emptying into Black Creek on CBJTC, primarily in areas initially developed during World War II, also may represent potential threats to Black Creek crayfish as point sources for drainage water of unknown quality.

*Freshwater Mussels*

Survey and Monitoring (Ted Hoehn)--FWC staff participated in a joint sampling effort with USFWS staff from Panama City to determine potential habitat on the Apalachicola River for the Federally endangered fat three-ridge mussel. FWC staff surveyed over 40 miles of river bank habitat documenting occurrence of the fat three-ridge. FWC staff are also investigating collected fat three-ridge mussels to gain an understanding about the ages of the mussels. Outside expert assistance will be used to verify the ages from the thin-sectioned shells. FWC staff also participated in tagging over 100 purple bankclimbers (another mussel species) where they are mainly known to occur (Race Shoals near the town of Chattahoochee). Observations of the rivers during the low-flow summer months indicated significant mortality of the purple bankclimbers, most of which was believed to be human related. Law Enforcement staff was advised of the human activities and was provided information on identification of the various mussels.

*Habitat Modeling*

Species GIS Based Habitat Modeling (Mark Endries)--Continuing from the listed species potential habitat mapping work the FWC did for the "Wildlife Habitat Conservation Needs in Florida" report, FWC staff completed potential habitat maps for all remaining listed amphibians, reptiles, birds, and mammals. These FWC maps are based on known locations of species of wildlife, information on the land cover and vegetation types used by each species, and published or well-documented information on the life-history requirements of the species. The potential habitat maps identify those areas statewide that could serve as potential habitat for an individual wildlife species. The work to date now includes a potential habitat map for every listed amphibian, reptile, bird, and mammal in the state and brings the total count of potential habitat maps created for a species to 95.

FWC staff updated the Integrated Wildlife Habitat Ranking System (IWHRS) over the last year to keep the project current with available datasets. The IWHRS is a geographic information system (GIS) computer assessment tool that ranks the Florida landscape based upon

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

the habitat needs of listed and rare wildlife species as a way to identify ecologically significant lands in the state, and to assess the potential impacts of land development projects. The IWHRS incorporates a wide variety of land cover and wildlife species data and presents it in an easy-to-understand classification schema. The IWHRS is provided as part of the FWC's continuing assistance to various local, regional, State, and Federal agencies, and entities interested in wildlife needs and conservation in order to: (1) determine ways to avoid or minimize project impacts by evaluating alternative placements, alignments, and transportation corridors during early planning stages, (2) assess direct, secondary, and cumulative impacts to habitat and wildlife resources, and (3) identify appropriate parcels for public land acquisition for wetland and upland habitat mitigation purposes. The IWHRS was originally developed in 2001, revised in 2007, and again revised in 2008. In 2008, changes were made to five of the data layers (Listed Species Locations, Species Richness, Managed Lands, Distance to Managed Lands, and Florida Forever Board of Trustees/Save Our Rivers Lands) used in the calculation of the IWHRS using data not available in 2007, and one data layer (Landscape Diversity) was replaced with a Spatial Heterogeneity layer.

*Sandhills*

Non-Game Grant – Sandhill Restoration (*Stuart Cumberbatch*).--Dr. Eric Menges, Archbold Biological Research Station, completed and submitted the final report for a study examining the dynamics of using prescribed fire and mechanical management as restoration techniques on a Lake Wales Ridge sandhill ecosystem. The study examined the establishment of viable populations of Florida ziziphus and two other listed plant species, scrub plum and scrub buckwheat, in response to employed management practices in the study area. The results indicate that while the burn-only and the saw-and-burn treatments were effective in creating more bare sand and altering the structure of the sandhill community, species composition was not dramatically changed. These results provide valuable information to land managers involved with restoration activities for sandhill communities in the Lake Wales Ridge area.

*Wildlife Conservation Prioritization and Recovery*

Initiating a Program to Prioritize Actions for Focal and Imperiled Species on FWC Managed Lands (*Dan Sullivan*).--FWC is taking a pro-active, science-based approach to evaluating management needs of imperiled species on FWC managed lands. This approach is being implemented through the Wildlife Conservation Prioritization and Recovery (WCPR) Program. The program integrates conservation planning, population viability analysis results, and geospatial analytical techniques to model potential habitat. Using this information, staff determine where focal species conservation can be proactively affected on each area within each Wildlife Management Area (WMA). The outcomes of the landscape level assessments are integrated with area specific and expert knowledge to produce a Species Management Strategy. Strategies are particular to each WMA and outline the role of the area in wildlife conservation. Each strategy contains measurable objectives for managing priority species and their habitat, a list of actions necessary to achieve these objectives, and monitoring to verify progress towards meeting the objectives.

To implement the program a process for compiling the necessary information, providing the information to area staff, and conducting area specific workshops to discuss the species

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

potential was established. A template management strategy was created. The first workshop was conducted in March 2008 (see “WCPR Workshop on Aucilla WMA” below). Five workshops covering six areas are planned for the FY 2008-2009. It is anticipated the final Aucilla WMA Strategy will be available in Fall 2008.

With recent passage of the new Florida Forever legislation and the emphasis this legislation places on managing imperiled species on State lands, the workshop process and strategy has been modified to include all listed species known to occur on an area. As such, this program will help meet the intent of this important legislation.

The Wildlife Conservation Prioritization and Recovery Program continues to assess the changing needs of wildlife at the statewide level. Area-specific Strategies are updated in conjunction with required updates to Conceptual Management Plans. In implementing the Strategies long-term and continuing to assess species’ needs, FWC plays an integral role in aiding the recovery of listed species, preventing future imperilment of declining species, and keeping common species common.

Wildlife Conservation Prioritization and Recovery Workshop on Aucilla Wildlife Management Area (Paul Scharine).--A Wildlife Conservation Prioritization and Recovery (WCPR) workshop was held in March of 2008 at Wakulla Gardens State Park to prioritize management of listed and focal species on Aucilla Wildlife Management Area (WMA) in Northwest Florida. The product of these workshops is a bulleted list of land management and species management actions that the group believes need to occur. This list is then transformed into a management strategy that is designed to influence work plan development, budget requests, and field activities. The end product of the Aucilla workshop, the Aucilla Wildlife Management Area Wildlife Conservation Prioritization and Recovery Management Strategy, includes specific land management recommendations with goals and measurable objectives for species including the red-cockaded woodpecker, the frosted flatwoods salamander, and the gopher tortoise. Also included in the strategy are land management considerations focused on such species as the Florida black bear, the Southern bald eagle, Sherman’s fox squirrel, and wading birds. In addition to land management recommendations, species management and monitoring recommendations were made for many species including frosted flatwoods salamanders, gopher tortoises, red-cockaded woodpeckers, Sherman’s fox squirrels, and limpkins.

*Coordination and Assistance*

Listed Species Coordination (Brad Gruver).--Listed species coordination included overseeing, monitoring, facilitating and otherwise organizing activities associated with listed species. It also included ensuring adherence to Federal and State reporting and documentation requirements and guidelines; implementing or facilitating protection through coordination of assistance, regulatory measures, and permit review; providing or facilitating consultation and assistance to private interests and interacting with State and Federal agencies, conservation organizations and others regarding a wide range of listed species matters. Funding for coordination was jointly derived from the USFWS through Section 6 of the Federal Endangered Species Act of 1973, the Nongame Wildlife Trust Fund, and the Florida Panther Research and Management Trust Fund.

Assistance on listed species was provided to State and Federal agencies, environmental-

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

related consulting firms, private individuals, and local regulatory authorities. Assistance was provided through telephone calls, e-mails, written correspondence, and agency commenting. The Section 6 Cooperative Agreement was administered including preparing emergency handling reports, preparing and executing Section 6 grants, and developing the Cooperative Agreement renewal packet.

Initial planning for a coordination meeting between the USFWS and FWC was completed (final planning and the meeting to be conducted in FY 2008-2009). FWC staff provided informal and formal comments on proposed Federal listing actions, changes to the Endangered Species Act, and other Federal projects potentially impacting listed species.

Five species were involved in the State listing process during FY 2007-2008. FWC staff coordinated the development of associated biological status reports, management plans, and rule changes. Please refer to the "Listing Action" item in the "Statewide Policies Pertaining to Listed Species" section of this report.

The imperiled species Web site, <http://myfwc.com/imperiledspecies>, was maintained. Information was added, updated, or removed as necessary. The site includes, among other things, copies of previous legislative reports, the updated list of imperiled wildlife, information on listed species permits, and listed species management plans.

Center for Biostatistics and Modeling (*Richard Kiltie, Erin Leone, and Kristin Rogers*).-- Staff from the Fish and Wildlife Research Institute (FWRI) Center for Biostatistics and Modeling provided biostatistics, quantitative modeling, and data management support for multiple projects focused on threatened and endangered species and species of special concern. Activities performed by Center for Biostatistics and Modeling staff focused on the following: population trends of American alligators, bald eagles, Florida scrub-jays, Southeastern American kestrels, and Gulf surfer; Florida panther genetic restoration, prey selection, movement patterns, and veterinary histories; American alligator night-light detection probabilities and the influence of environmental factors and organochlorine compounds on egg viability; beach mouse detection methodology and population monitoring; whooping crane reproduction and environmental factors; indigo snake growth and allometry; red-cockaded woodpecker nesting success; gopher tortoise respiratory disease incidence; and black bear movement patterns.

FWC Reviews and Assistance (*Terry Gilbert*).--The Habitat Conservation Scientific Services Section of the FWC performed a total of 65 reviews of highway projects in support of the Florida Department of Transportation's (FDOT) Efficient Transportation Decision Making Process from July 1, 2007 through June 30, 2008. Each review included a biological assessment of the direct and indirect effects of the transportation project on imperiled bird, mammal, amphibian, and reptile species. Recommendations were provided to the FDOT's seven Districts and the Turnpike Enterprise on methods to avoid, minimize, or mitigate these effects on listed species.

The Habitat Conservation Scientific Services Section staff also provided assistance through more than 275 phone calls, 200 e-mails, and 35 inter-agency coordination meetings statewide with State and Federal agency representatives of the Florida Department of Environmental Protection (FDEP), Department of Agriculture and Consumer Services (DOACS), USFWS, National Marine Fisheries Service (NMFS), U.S. Army Corp of Engineers (USACOE), Florida's Water Management Districts, and Florida Department of Transportation (FDOT). This assistance was designed to reduce the effects of specific highway projects on

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

listed fish and wildlife species. It was related to road design issues, locations and design of Florida black bear and Florida panther wildlife underpasses, wildlife species occurrence information and field survey methodologies, wetland and upland habitat restoration strategies and techniques, and suitability evaluations of a moderate number of land parcels for mitigation through public land acquisition.

FWC Public and Private Land Use Planning Activities (Joseph Walsh).--During FY 2007-2008, the Division of Habitat and Species Conservation provided assistance to public and private land use planning activities that had the potential to impact imperiled wildlife species and their habitats. Assistance was provided both formally and informally through numerous letters, emails, and meetings. The content of consultations was based on established best management practices, species management guidelines, and geographic information systems analysis. Staff assisted the Florida Department of Environmental Protection (FDEP) and the five water management districts with Environmental Resource Permits and coordinated all reviews for FWC-imperiled wildlife permits. In addition to these programs, the Division received 699 requests for assistance from other various regulatory programs. Staff responded to 92 of these requests with formal consultation letters and 14 with informal consultations. Another 25 requests were reviewed but were deemed to have addressed wildlife issues appropriately and received no formal comments.

*Critical Wildlife Areas*

Summary (Terry Doonan).--Critical Wildlife Areas (CWA) are established by the FWC under rule 68A-19.005 F.A.C., to protect important wildlife concentrations from human disturbance during critical periods of their life cycles such as nesting or maternity seasons. For each CWA, the boundaries and periods of time when portions of the area may be posted "closed to entry by people," are defined in the CWA establishment order. These areas are typically small, with the largest managed area covering 145 acres. Staff are responsible for evaluating needs for potential CWAs, developing or revising establishment orders, managing the posting of appropriate signage, and coordinating the monitoring of the wildlife populations using those areas each year. Biologists monitored CWAs and sites were posted seasonally to reduce disturbance and advise the public of the importance of the CWAs. Protection efforts were coordinated with local government, other agencies, organizations, and FWC law enforcement personnel, as appropriate. Seventeen of the twenty established CWAs supported populations of important wildlife species during the year (Table 4). Almost all of the active CWAs supported listed species, the most notable of which included: Alafia Banks (wading birds, American oystercatchers, and brown pelican rookeries); ABC Islands (wading birds and brown pelican rookeries); Fort George Inlet (terns and black skimmers); St. George Causeway (least terns); Big Marco Pass (least terns, black skimmers, plovers, and wintering shorebirds); and Gerome's Cave (Southeastern myotis bats). Habitat at Pelican Shoal, which had supported the primary United States nesting site for the Caribbean population of roseate terns, remained unavailable as a result of impacts from hurricanes in previous years. The establishment order for the Ponce de Leon Inlet Critical Wildlife Area in the Northeast Region expired and that area is no longer an established critical wildlife area (Table 4).

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Table 4. Critical Wildlife Areas (CWA) in Florida in 2008.

Region CWA name	County	Closure period	Primary taxa	Status <sup>a</sup>	Managed area
<b>Southwest</b>					
Alafia Banks	Hillsborough	1 Dec. to 1 Sept.	Hérons, egrets, ibis, pelicans, spoonbills, oystercatchers	10,520 nests	75 acres
Little Estero Island	Lee	1 April to 1 Sept.	Least terns, Wilson's plovers, snowy plovers	160 nests	25 acres
Anclote River Islands	Pasco/Pinellas	1 Feb. to 1 Sept.	Hérons, egrets pelicans	Inactive <sup>b</sup>	--
Myakka River	Sarasota	1 March to 1 Nov.	Wood storks, egrets, herons, anhingas	110 nests	1 acre
<b>North Central</b>					
Amelia Island	Nassau	1 April to 1 Sept.	Least terns	100 nests	10 acres
Bird Islands	Duval	1 April to 1 Sept.	Royal terns, black skimmers, gull-billed terns, American oystercatchers	50 nests	2 acres
Fort George Inlet	Duval	1 April to 1 Sept.	Royal terns, black skimmers, gull-billed terns, laughing gulls	>500, ~100, ~20, >3,000 nests	10 acres
<b>Northwest</b>					
Tyndall	Bay	Year-round	Least terns, black skimmers, snowy plovers, Wilson's plovers, American oystercatchers, piping plovers	59, 0, 47, 27, 5 nests	10 acres
Alligator Point	Franklin	1 April to 1 Sept.	Least terns, black skimmers, snowy plovers, Wilson's plovers, American oystercatchers	0, 0, 1, 5, 4 nests	145 acres
St. George Causeway	Franklin	1 April to 31 Aug.	Least terns, laughing gulls, royal terns, sandwich terns, American oystercatchers, black skimmers	137, 3,747, 835, 128, 0, 0 nests	32 acres
Gerome's Cave	Jackson	1 March to 1 Sept.	Southeastern myotis bats	15,000 individuals	2 acres
<b>South</b>					
Deerfield Island Park	Broward	Year-round	Gopher tortoise	10 individuals	56 acres
ABC Islands	Collier	Year-round	Hérons, egrets, glossy ibis, pelicans	200 nests	75 acres
Big Marco Pass	Collier	Year-round	Least terns, black skimmers, snowy plovers, Wilson's plovers, wintering shorebirds	340 tern, 390 skimmer, 20 Wilson's plover nests	60 acres
Caxambas Pass	Collier	1 April to 1 Sept.	Least terns, wintering shorebirds	140 nests	1 acre
Rookery Island	Collier	Year-round	Hérons, egrets, pelicans	Inactive	5 acres
Bill Sadowski	Dade	Year-round	Shorebirds, herons, egrets (foraging only)	1,000 individuals	700 acres
Pelican Shoal	Monroe	1 April to 1 Sept.	Roseate terns, bridled terns	Inactive - not emergent now	1 acre
<b>Northeast</b>					
Jennings Cave	Marion	15 Feb. to 31 Aug.	Southeastern myotis bats	Inactive	1.9 acres
Matanzas Inlet	St. Johns	1 April to 1 Sept.	Least terns, Wilson's plovers, willets	223 tern and 4 plover nests	28 acres

<sup>a</sup>Estimated peak numbers of individuals and/or successful nests at each site during the closed period in FY 2007-2008.

<sup>b</sup>Inactive means the site was not used during FY 2007-2008.



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

*Florida's Incentive-Based Conservation Programs*

Landowner Assistance Program Summary (Chris C. Wynn).--In cooperation with the USFWS, the FWC has been working to implement the Landowner Assistance Program (LAP) since October 2003. Florida's LAP is a vital natural resource-driven tool used to promote stewardship on private lands while also playing a fundamental role in the conservation of imperiled species not only for Florida, but also across the nation. Florida's LAP is a voluntary cost-share program designed to provide assistance and financial support to private landowners interested in improving habitat conditions on their properties to benefit listed species. The program's new focal area approach ensures that Federally funded dollars are being distributed in the most efficient and equitable manner possible on properties with the greatest potential benefits for listed species (see Figure 3 on next page).

Applicant properties are individually evaluated for natural resource value using a Geographic Information System (GIS)-based process that assigns a property rank based on the best available databases. These databases contain environmental information such as land cover imagery, current listed species habitats, wildlife occurrence data, and potential listed species habitat models. Properties within predetermined priority habitat focus areas ([www.myfwc.com/wildlifelegacy](http://www.myfwc.com/wildlifelegacy)) receive the highest value. Once ranked, FWC biologists recommend beneficial and cost-effective practices based on the GIS analysis, site visit, and the targeted listed species.

During FY 2007-2008, FWC biologists visited 22 private landowners and obligated \$254,780.75 at a 50% cost-share rate to conduct land management practices across 51,999 acres (21,043 ha) to directly benefit listed species. Landowners spent a total of \$67,203.50 and were reimbursed \$30,677.00 (landowner contributed over half of the total restoration costs). Some of the management practices that were funded included prescribed fire; longleaf pine and natural groundcover restoration to establish native trees, shrubs, forbs and/or grasses; mechanical vegetation enhancement to re-establish more natural stand conditions that improve habitat for listed species; chemical vegetation enhancement to re-establish more natural stand conditions to improve habitat for listed wildlife species; and nest structure installation to create beneficial habitat for listed species. Table 5. below details how the monies were spent in land management practices through the LAP.

Table 5: Major habitat management techniques contracted with 22 private landowners through the Landowner Assistance Program (LAP) by dollar amount obligated vs. spent during FY 2007-2008.

Habitat Management Techniques	Acres	Hectares	Dollars Obligated by LAP (\$)	Dollars Landowner Matched (\$)	Total Dollars Spent (\$)
Prescribed Fire	18,809	7,611	87,612	87,612	16,992
Longleaf Restoration	11,819	4,783	51,912	51,912	4,680
Mechanical Vegetation Enhancement	8,133	3,291	60,182	60,182	23,132
Chemical Vegetation Enhancement	4,689	1,898	40,367.25	40,367.25	2,550
Nest Structure Installation	8,548	3,459	14,707	14,707	14,000
TOTAL	51,998	21,042	254,780	254,780	61,354

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Restored and conserved habitats included pine flatwoods, tropical hardwood hammocks, hardwood swamp, bottomland hardwoods, and mixed hardwood and pine. Management treatments were applied to these plant communities to provide improved habitat conditions for the flatwoods salamander, gopher frog, Eastern indigo snake, Florida pine snake, white ibis, wood stork, little blue heron, red-cockaded woodpecker, sandhill crane, Southeastern American kestrel, crested caracara, Sherman's fox squirrel, and gopher tortoise.

Future expectations for LAP are being held to a high standard to meet the needs of private landowners in order to benefit the greatest number of at-risk species. To that end, it is imperative that future funding be secured for private landowners in order to perpetuate the success and sustain long-term meaningful benefits for those imperiled species dependent upon the LAP. Please visit the LAP Web site at [www.myfwc.com/lap](http://www.myfwc.com/lap) for more information.

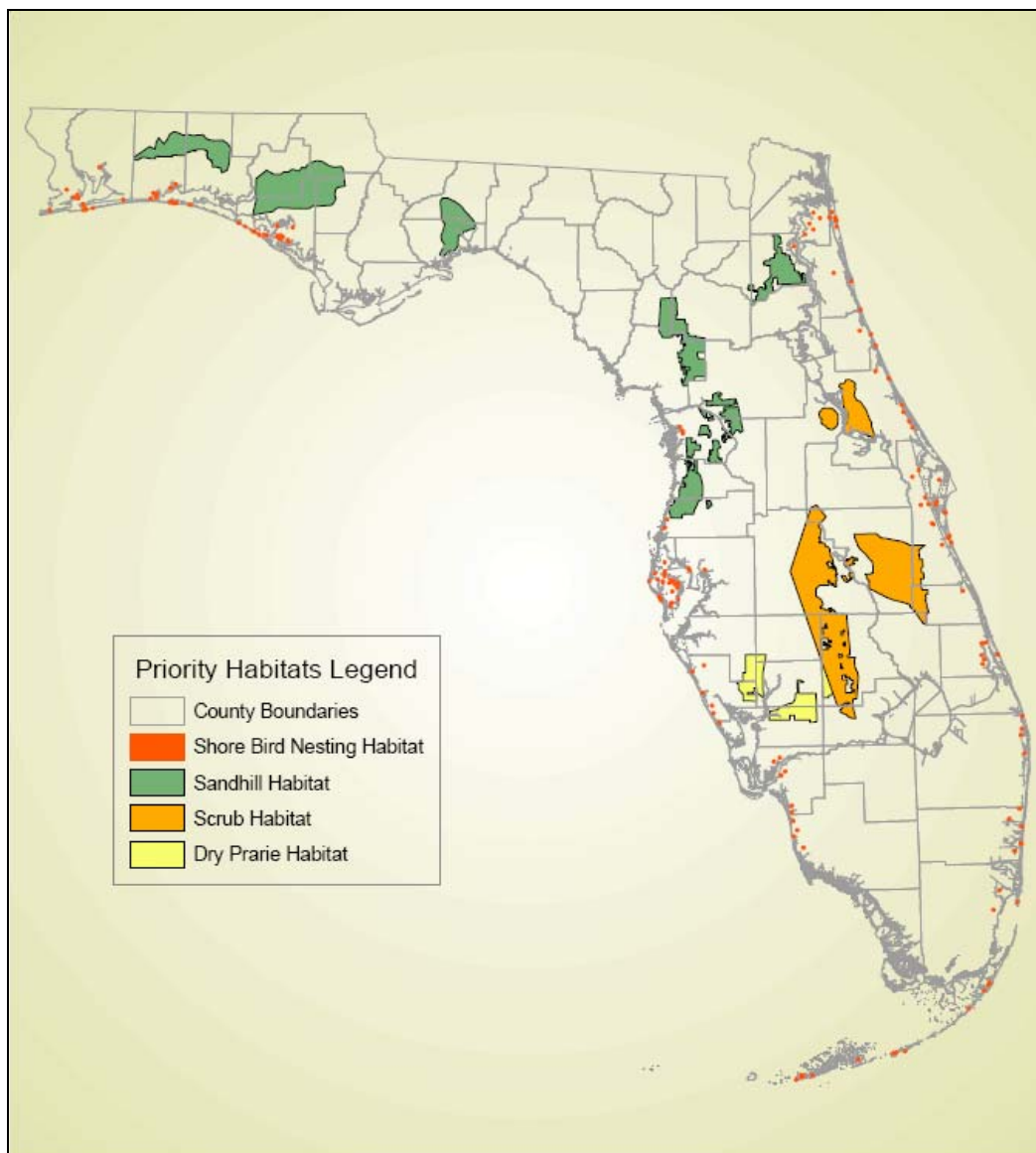


Figure 3. Landowner Assistance Program Focal Areas

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Incentive-Based Conservation Program Summary (Katherine Marois).--In 2008, the focus of the "Safe Harbor" conservation program begun in 2007 was broadened to include other types of incentive-based conservation programs and the "Safe Harbor" name was dropped. New projects undertaken since this change mostly involve working in partnership with the USFWS to develop, administer, and implement Habitat Conservation Plans (HCP). Federal grants were awarded to the FWC to assist in the development of HCPs for the City of Cape Coral (\$151,450), Highlands County (\$277,247), and Charlotte County (\$226,390). Contracts between FWC and these local governments to administer the grant funds have been approved.

State-listed species that will benefit from the City of Cape Coral HCP include burrowing owl, Florida scrub-jay, wood stork, Southeastern American kestrel, least tern, red-cockaded woodpecker, Eastern indigo snake, Key ringneck snake, and gopher tortoise. State-listed species that will benefit from the Highlands County HCP include bluetail mole skink, sand skink, Eastern indigo snake, Florida scrub-jay, and gopher tortoise. State-listed species that will benefit from the Charlotte County HCP include Florida scrub-jay, gopher tortoise, and Eastern indigo snake.

Other incentive-based conservation efforts begun this year include exploration of possible conservation measures for the endangered St. Andrews beach mouse in Gulf County and a potential HCP in Collier County to protect red-cockaded woodpeckers in the Immokalee urban area. Continued involvement with the Florida Ranchlands Environmental Services Project, and the investigation of other new applications of incentive-based conservation programs for State-listed species were on-going in FY 2007-2008.

### *Law Enforcement*

Statewide Enforcement (Captain Rob Beaton and Lt. Colonel Mike Wiwi).--FWC's Division of Law Enforcement continued statewide enforcement activities to protect specific endangered and threatened species during the year. These special programs consisted of the following:

Regular patrols of the Florida panther reduced-speed zones in Lee and Collier County to protect panther and prey species, and provide public safety.

Regular patrols in Monroe County as part of a multi-agency task force enforcing the Key deer speed zone on Big Pine Key.

Patrol efforts targeting coastal nesting areas of marine turtles to reduce nest destruction and unlawful egg removal or theft.

Enhanced statewide enforcement efforts directed towards utilizing radar and the Manatee Cam surveillance technology to ensure compliance with boat speed zones and to prevent manatee vessel strikes and manatee harassment. Nearly 51,000 water patrol hours were dedicated to manatee enforcement resulting in 2,440 citations, and over 5,500 warnings.

FWC's Division of Law Enforcement issued 33 additional citations separate from manatee, involving endangered, threatened, and species of special concern. The majority of these were for illegal take or possession of gopher tortoise.

The Division of Law Enforcement continues to work with other governmental agencies and citizen groups to work through issues concerning the Florida panther in Southwest Florida. Law Enforcement also worked closely with FWC biologists on black bear, Perdido Key beach mice, and other species to provide public education and awareness about the various species and their habitats.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Captain Mark Warren was part of a workgroup within FWC currently reevaluating the process of how endangered, threatened, and species of special concern are listed. The workgroup, along with the USFWS and constituent groups, is attempting to develop a more comprehensive system for the protection of imperiled species.

*Permitting And Assistance*

Program Summary (Angela T. Williams).--FWC staff provided Federal agencies, other State agencies, environmental consultants, regional, and local regulatory authorities with assistance in protecting listed species on managed lands and lands slated for development. Many of these entities in addition to researchers, landowners, and educational facilities utilized the assistance and guidance when applying for scientific collecting, captive possession, relocation, and incidental take permits for listed species.

Assistance was provided for developers, environmental consultants, and regulatory agencies usually consisted of some combination of the following mechanisms: (1) comments on species management plans submitted for review, (2) development of individual species management plans or guidelines, and (3) on-site visits to determine species management needs. Generally, the public was provided information regarding listed species; (1) life history and other biological information, (2) locality and occurrence data, (3) listing status, and (4) solutions to nuisance situations (i.e., education on the species behavior and habitat requirements and suggestions for coexisting with the species).

Applicants requested permits to handle or impact listed species throughout the state. Permits were issued in accordance with Rules 68A-9, 68A-12, 68A-25, and 68A-27 Florida Administrative Code. Some of those permits were issued conditioned upon implementation of an approved site or species specific management plan. Others required adherence to the following FWC species management guidelines/policies: Florida Burrowing Owls in Urban Areas, Osprey Nest Removal Policies, and Guidelines for the Relocation of Gopher Tortoises on Lands Slated for Development. Scientific permits were conditioned on an approved research proposal. The permit review process usually involves coordination between FWC offices, environmental consultants, other State agencies, Federal agencies, and regional and local regulatory entities.

FWC staff assistance efforts resulted in thousands of telephone calls and hundreds of formal letters and emails. Additionally, 603 listed species scientific collection, captive possession, relocation and incidental take permits (and 118 permit amendments) were issued.

Overall, FWC staff provided biological and regulatory guidance to ensure that the permitted activities would result in a net conservation benefit for the involved species. Additional information (including guidelines, policies, and applications) is available on the following Web site <http://myfwc.com/permits/Protected-wildlife/default.htm> for those interested in applying for permits to handle or affect terrestrial listed species.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

CITIZENS AWARENESS PROGRAM

Introduction (Compiled by Judy Gillan. Information contributed by Wendy Quigley, Jessica Pernell, Carli Segelson, Elissa Riley, Bonnie Abellera, Mike Orlando, Tom Shupe, Kristin Wood, Rebecca Brown, Ann Morrow, Gabby Ferraro, Lori Haynes, Stan Kirkland, Joy Hill, Henry Cabbage, Pat Behnke, Gary Morse, Mark Lotz, Kathleen Smith, Blair Hayman, Kelly Broderick and Judy Gillan).--Citizen awareness programs were conducted by FWC staff throughout the agency. The following text summarizes these efforts.

Media Relations.--FWC issued 39 statewide news releases concerning 12 listed species in FY 2007-2008 including: Florida manatee, Florida panther, red-cockaded woodpecker, gopher tortoise, bald eagle (while they were still listed), American alligator, loggerhead sea turtle, Florida black bear, peregrine falcon, brown pelican, sperm whale, and the new imperiled butterflies Web site.

FWC regional staff distributed another 31 press releases and media alerts on listed species including right whale, Florida panther, snowy plover, Miami blue butterfly, Florida manatee, American crocodile, roseate tern, gopher tortoise, Florida black bear, and Everglades snail kite.

In addition to statewide and regional news releases, staff responded to 844 media inquiries about listed species.

Information Requests.--Community Relations staff fulfilled more than 221 phone, email, or mail information requests about listed species. The FWC Knowledge Base (Ask FWC) public service system is now used to handle most of the routine imperiled species questions that come into the agency. This service provides the individual with an automatic response to their question and a link to the FWC imperiled species pages (<http://myfwc.com/imperiledspecies/>) for more information.

School-based Programs and Presentations.--Several research staff members participated in the Pinellas County Great American Teach-In, in November. Four participants spoke with students about manatees and one participant spoke with students about sea turtles.

Staff gave 33 presentations to students in K-12 schools, with another 10 presentations given to college students. Topics included manatee, listed shorebirds, sea turtles, gopher tortoise, Florida black bear, American alligator, and bald eagle.

Staff responded to 27 requests for educational materials concerning sea turtles as well as responding to requests for marine turtle decals (~20) and nesting signs (20).

School Based Presentations and Programs on Blackwater Wildlife Management Area.--Blackwater Staff participated in two public programs held at the Blackwater Fish Hatchery in Northwest Florida. More than 300 school-aged children from Pensacola and Navarre were able to interact with live species found in the area, and learn about listed species including the gopher tortoise and the red-cockaded woodpecker. Staff also educated the groups about the natural history of the Florida black bear and how people can prevent attracting bears into their backyards.

This year, Blackwater staff were asked to present a lecture on Florida black bear ecology and human-bear interactions in Northwest Florida for two 7<sup>th</sup> grade science classes at King

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Middle School in Milton. Students learned about the natural history, reproductive biology, and behavior of the Florida black bear. They also discussed how humans and bears interact and ways to avoid negative interactions. The lectures were given as part of a larger bear ecology and awareness curriculum in the science department of the school.

Educator Learning Kits and Treasure Boxes.--FWC has compiled curriculum kits that are provided to teachers of middle to high school-aged students to teach them about manatees and sea turtles. The kits provide lesson plans and activities, bones and biofacts, and different types of media to supplement the learning including books, videos, slideshows, and computer activities. During 2007–2008, the manatee and sea turtle kits were each checked out one time. Efforts are underway to redesign the curriculum kits so the materials can be provided on a single CD or DVD along with an accompanying book.

A sea turtle treasure box was created for the Leon County schools by staff within FWC Imperiled Species Management Section. Included in the box is a hawksbill sea turtle specimen, a green sea turtle skeleton carapace, ten sea turtle egg fragments, and the permit to hold these items. Leon County received five poster sets with one manatee, one sea turtle, and three habitat-related posters. Four small manatee treasure boxes were sent out this year to educators.

E-Field Trips.--Florida manatee and right whale e-field trips were provided free this fiscal year. Both field trips provided an engaging self-guided tour into the life of those species giving elementary to high school students, nationally and internationally, a tool to learn about these animals without traveling to or within Florida. A total of 291 schools registered (6,769 students) to use the manatee e-field trip. Data was not available on the right whale e-field trip usage.

FWC Web Sites.--The FWC Web site contains many entries about specific listed species such as manatee, sea turtles, Florida panther, and Florida black bear. The FWC hosts Panther Net on its main Web site (<http://www.MyFWC.com/panther>). Teachers, students, and the public use Panther Net, which received just over 100,000 hits. A section called *Field Notes* is published on Panther Net and it contains periodic entries of information from FWC panther biologists on panther births, deaths, capture activities, and other material of interest. Brochures, activities, and annual reports are also posted to the Web site.

Public Education efforts related to the American alligator include an Alligator Management Program Web site, <http://www.MyFWC.com/gators>, where visitors can download the “Living with Alligators” brochure and a PowerPoint presentation.

Education efforts related to American crocodiles included the Crocodile Web site, <http://www.MyFWC.com/crocodile>, where visitors can find information and download the “Living with Crocodiles” brochure.

*Wildlife 2060: What's at stake for Florida* is a new Web site at <http://www.MyFWC.com/wildlife2060> that addresses the potential future impacts of Florida's continued human growth and development, and helps us understand what this means for Florida's fish and wildlife. Species discussed are Florida scrub-jay, Florida panther, Florida black bear, sea turtles, manatee, corals, gopher tortoise, burrowing owl, wood stork, and bald eagle.

In addition, many listed species are mentioned as benefitting from protection on cooperatively managed wildlife management areas (WMAs).

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Manatee Decal Program.--In May 2008, a school press event was held at West Boca Raton High School to present awards to the 2008-2009 Manatee Decal Art Contest winner. Thirty students sent entries to the 2008-2009 Manatee Decal Art Contest. Each year, tax collectors participate by selling decals for \$5 each at the tax collection sites around the state. The FY 2007-2008 decals were available for sale from July 1, 2007 to June 30, 2008, raising \$45,000 for the Save the Manatee Trust Fund.

Manatee License Plate Redesign Launch.--The manatee license plate designed in 1990 was created to raise funds for manatee research and conservation. Once the highest selling specialty plate in Florida, the manatee license plate has dropped to number six in popularity. With the popularity of the license plate and related revenue declines, the FWC worked with Florida artist Nancy Blauers to redesign the license plate.

FWC developed a communications campaign to launch the redesigned manatee license plate. The Manatee License Plate Redesign Launch Event was held at Homosassa Springs Wildlife State Park in Homosassa, Florida on December 20, 2007. The unveiling of the new plate design took place in the "Garden of the Springs," with manatees present nearby. Launch materials carried the slogan "A new look for an old favorite," to reflect the new plate design and to address the public's affection for the manatee.

At the event, invited speakers unveiled the new plate design and addressed the importance of the manatee license plate and its proceeds to manatee research and conservation. Press kits were distributed to attendees and a post-event press release was distributed. The new plate graphic was unveiled online in the press kit at the same time. The day of the launch event, press kits were also hand-delivered to several major media outlets (TV and print) in the Tampa Bay area. Within a week of the launch event, the redesigned plate was covered on at least 13 television stations statewide (from the Florida Panhandle to Naples and Palm Beach Gardens), in at least 8 newspapers statewide (from Gainesville to Naples), and on over 15 other Web sites or blogs.

"Save the Manatee" plate sales data from the Florida Department of Highway Safety and Motor Vehicles show that from February to June of 2007, there was 4,531 new plates purchased and 21,648 plate renewals; from February to June of 2008, there was 5,514 new plates purchased and 22,589 plate renewals. This shows an 8% increase in new plates purchased and a 9.5% increase in plate renewals for the months of February to June 2007 compared to February to June of 2008. In February 2007 compared to February 2008, there was a 10% increase in manatee plate sales. This was the first month in over three years with an increase in new registrations as well as renewals.

Manatee Mortality Database.--The Manatee Mortality Database, housed on the FWC Web site <http://research.myfwc.com/manatees/>, provides internet users a way to search for data on manatee mortalities in Florida. The summary report allows users to search manatee mortality data by Florida county, probable cause of death, month, and year, while the individual report allows users to search manatee mortality data by Florida county, probable cause of death, and date range, and also provides more detailed information including sex, size, and region in which the death occurred. The reports are updated monthly or more often if needed. Web visitors can subscribe to receive a notification e-mail when the database has been updated, or new or updated tables have been posted. During FY 2007-2008, the number of subscribers to this service grew from 871 to 1063. Forty total messages with updates to the database were sent to subscribers.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Community Meetings and Presentations.--FWC staff gave 96 presentations on listed species to various audiences including community groups, homeowners groups, local law enforcement personnel, State park staff, and zoo staff. Species discussed included manatee, Florida black bear, Florida panther, American alligator, sea turtles, North Atlantic right whale, and gopher tortoise. Approximately 8,000 people were reached through these presentations.

FWC and USFWS staff met with Collier County Commissioner Jim Coletta to provide him a copy of the Florida Panther Response Team's annual report and to discuss concerns about panthers. Commissioner Coletta was pleased with the informative efforts that the Team and partnering non-government organizations accomplished during FY 2007-2008.

A Public Information Meeting on living with panthers and bears was held at the Corkscrew Elementary School in the Orange Tree Community on April 28, 2008. FWC panther management staff collaborated with FWC bear management staff and Florida Panther National Wildlife Refuge (FPNWR) staff to discuss living with panthers and bears. The event was videotaped and replayed several times on the Collier County government channel. Thirty people attended the meeting.

For the thirteenth consecutive year, FWC staff presented Voluntary Contribution Campaign awards to Florida's tax collectors at their annual conference. The awards were supplied from various organizations that support the manatee and sea turtle programs and were used to recognize the counties who promote manatee and sea turtle conservation through decal sales or donations.

The Wild Treasures of Brevard County informative program made its debut this year to county residents and visitors who use the 17 libraries in Brevard County, Florida. The focus for the series is to provide educational materials, presentations or displays about manatees, sea turtles, Florida black bear, and North Atlantic right whale, with emphasis on species awareness, habitat conservation, and actions people can take to recreate and live compatibly with these species. During the latter part of the fiscal year, six libraries hosted nine Wild Treasures programs/displays. Seven hundred and fifty volunteer hours were logged in support of Wild Treasures programming. The information from the displays had the potential to reach thousands of people in the county (at least 3,000 per library/month when displays are scheduled). Supporting materials include posters, bookmarks, laminated education cards, books, and activity sheets. *Florida Wildlife* magazines are distributed and when available, videos or DVDs and other support materials are provided. Thirty presenters from local Brevard County environmental agencies agreed to participate with the Wild Treasures program. Feedback following visitation showed that attendees better understood the species and the efforts needed for conservation or habitat protection after participating in the program. The program will continue through FY 2008-2009.

Interpretive staff at FWC's Chinsegut Nature Center gave five presentations to over 110 attendees about crested caracara, Florida rails, and gopher tortoise. Two onsite hikes included discussion about the importance of gopher tortoises and the gopher frog to a group of 30 participants on each hike. Listed species such as little blue heron, wood stork, and American alligator are frequently seen on hikes around the Center. In addition, there were 46 one-on-one interactions with listed species such as Florida sandhill crane, Florida black bear, Eastern indigo snake, and red rat snake.

Staff gave presentations to school groups at MarineQuest, to permit holders at the 11<sup>th</sup> Annual Permit Holders Workshop, to county code enforcement staff, and to the public at the Bermuda Aquarium, the Coastal Wildlife Society, the Environmental Learning Center, and the



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Smithsonian Tropical Research Institute. Two film interviews were done with PBS.

Information on the FWC's smalltooth sawfish research and the status of the species has been made available and was presented at a variety of venues, including scientific presentations at the Estuarine Research Federation meeting in November and the Fisheries-Independent Monitoring program meeting in January, as well as general presentations for fishing groups (6 presentations throughout Southwest Florida), and local school classes (5 presentations). Over 600 people attended these presentations.

Staff represented the FWC on the ASMFC Sturgeon Technical Committee and the NMFS smalltooth sawfish recovery team.

Staff attended the Gulf sturgeon management meeting in Mobile, Alabama and met with USFWS, U.S. Geological Survey (USGS), and U.S. Army Corp of Engineers (USACOE) staff.

Community Presentation on Blackwater Wildlife Management Area.--Each year, FWC staff set up an interactive exhibit at the Munson Heritage Festival. Thousands of people learn about forest animals and how habitat management protects the red-cockaded woodpecker, the gopher tortoise, and other rare species found in the area. A popular display is the Florida black bear exhibit where people learn the life history of the black bear and ways to reduce human-bear conflicts. Management staff set up similar displays for the annual "Beaches to Woodlands" tour at the Coastal Encounters Festival and the annual Forestry Conclave and Lumberjack Festival held at Pensacola Junior College, Milton campus.

Florida Black Bear Community Presentation.--In June of 2007, the FWC Naples office biologists delivered a Florida black bear educational presentation and interactive activity to approximately 100 kindergarten through 5<sup>th</sup> grade students attending a Collier County summer camp at Max Hasse Park in Naples. The FWC presentation was prompted by a bear call received from the camp coordinator a few weeks earlier when a bear was lured to the park by an overfilled dumpster. Through a partnership between FWC, Waste Management, Inc., Collier County Solid Waste Management Department, and Collier County Commissioners, a bear-proof dumpster was installed at the park, alleviating both the overflowing dumpster and the bear attractant challenge.

FWC staff along with interns redesigned and updated many of the information materials and created new materials including: Spanish versions of the "Living in Bear Country" brochure and magnets, redesigning the FWC Bear Web site, creating Aversive Conditioning Field Guides for FWC staff and partners, and continued efforts to address public inquiry and distribute information and education packets through mail, e-mail, and telephone correspondence. Staff were also involved in over 35 public information efforts during the fiscal year. Staff participated in many educational informative opportunities at public schools, clubs, and organizations; including events at the Florida State University Marine Lab, FWC sponsored Bear Days, Senior Days at area Senior Centers, and the 2008 Wakulla Wildlife Festival.

Bear Management staff organized and hosted two full-day events and participated in one single day event with another organization to assist residents and visitors on safety in bear country, reducing human food attractants, and providing bear-resistant trash containers and information.

Other Information.--MarineQuest was held April 17-19, 2008, and is a three-day annual open house of FWC's Fish and Wildlife Research Institute in St. Petersburg. The first two days accommodate students in grades 4-12 who are invited to participate in "School Daze," a special

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

version of MarineQuest available to schools by registration only. The third day, a Saturday, is open to the public. The event hosted 2,100 students, chaperones, and teachers during the School Daze program and 4,000 visitors during the general open house. Displays discussed several listed species including the Florida manatee, Florida panther, North Atlantic right whale, sea turtles, whooping cranes, American alligator, American crocodile, and Florida black bear. Four public talks focusing on listed species were presented as part of the MarineQuest auditorium program: "Native Crocodilians in Florida" had 75 attendees; "Lessons Learned from Bears" had 55 attendees; "To Catch a Manatee" had 72 attendees; and "Whooping it up in Florida!" had 70 attendees.

Staff presented manatee-related information during 13 fairs and special events held throughout the state. Events with higher attendance numbers included the Charlotte Harbor Nature Fest, the grand opening of Sting Ray Bay and an Earth Day event, all held at the Jacksonville Zoological Gardens, the Orange City Manatee Festival, and Riverfest. Displays at these events included general information on manatees, manatee conservation, manatee rescue, and the new manatee license plate. Attendance at events ranged from 8 to over 5,000.

Earth Day at the Capitol was a huge success with hundreds of elementary school children visiting FWC's display about Florida black bear, Florida panther, sea turtles, and manatee.

FWC established the Coastal Wildlife Conservation Initiative (CWCI) to focus on inter-agency coordination of State permitting activities and policies to insure the continued survival of beach-dependent species, including listed species, which use the beach-associated areas for living habitat or nursery activities.

FWC collaborated with the FDEP to sample the fauna of the proposed dredge site for beach renourishment west of the St. Andrews Aquatic Preserve, since this site is in designated critical habitat. By conducting a survey pre-dredging, FWC and FDEP will be better able to assess the impact to prey availability, allow for recovery of available original biomass to 80%, and time for prey diversity and representative biomass to fully recovery.

Workshops.--Staff and volunteer facilitators provided approximately 154 one-day Project WILD, Aquatic WILD, Flying WILD, and Florida Black Bear Curriculum Guide workshops to 1,737 educators. Species covered included the Florida panther, Florida black bear, Florida manatee, American alligator, American crocodile, gopher tortoise, loggerhead sea turtle, green sea turtle, leatherback sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, osprey, bald eagle, Florida scrub-jay, roseate spoonbill, snowy egret, wood stork, brown pelican, and burrowing owl.

In addition, Florida black bear ecology, behavior, and reducing attractants information was presented to 35 educators participating in the annual Project WILD new facilitators training workshop.

Three Florida black bear workshops were conducted for local sheriff's office and police department personnel from Santa Rosa, Orlando, and Lee counties. Topics covered included ecology, behavior, reducing attractants, and aversive conditioning.

FWC staff hosted the 2008 Marine Turtle Permit Holder Workshop for over 300 Marine Turtle Permit Holders, volunteers, local government, State, and Federal agency staff. This two-day event included approximately fifteen presentations by agency management and research staff, conservation organizations, and local governments as well as summaries of Marine Turtle Grant projects.

At the request of local governments, staff participated in three public workshops hosted

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

in the Panhandle. Upon request, staff also conducted educational presentations concerning marine turtles, lights, and other impacts.

Staff conducted five training workshops, "The Official Marine Turtle Exterior Lighting Course and Exam," for lighting designers, local government personnel, turtle volunteers, businesses, and landscape architects. Approximately 101 people participated in the course, which was developed jointly with the USFWS and was hosted by different organizations around the state, including Walton, Sarasota, Palm Beach, Broward, Volusia, and Brevard counties.

Program staff also hosted the 2007 Sea Turtle Rehabilitation Workshop for approximately 100 individuals responsible for the care and treatment of sea turtles in captive facilities. This one-day event included representatives from facilities throughout Florida, the United States, and the Caribbean Islands. Attendees observed eight presentations from facility staff members and participated in a roundtable discussion regarding topics such as care of long term, non-releasable animals.

Staff conducted seven workshops with 145 attendees in seven counties to train Sea Turtle Stranding and Salvage Network participants in standardized data collection methodology. Research staff held three workshops for the Sea Turtle Stranding and Salvage Network in Fernandina Beach, with 52 attendees; Naples, with 42 attendees; and Dunedin, with 10 attendees. Research staff also held two workshops on the Statewide Nesting Beach Survey (SNBS) and Index Nesting Beach Survey (INBS). The workshop in Juno Beach had 119 attendees and the workshop in Port Charlotte had 199 attendees. Staff conducted six training workshops with 744 attendees around the state for permit holders who conduct surveys of turtle nesting beaches.

A workshop on Panama City crayfish was given at the Gulf Coast Community College in Panama City. Nineteen participants of all ages attended.

FWC participated in the Atlantic States Marine Fisheries Commission (ASMFC) fish passageway workshop to maintain familiarity with the latest protocols, strategies, and technology to address bi-directional migrations of listed diadromous fishes around riverine barriers.

Fairs, Festivals and Special Events.--The FWC exhibit at the 2008 Florida State Fair attracted over 473,000 visitors and featured either live displays or interpretive information on the Florida black bear and the Florida panther. Two special signing events were held at the Florida State Fair to help promote the new manatee license plate. Plate artist Nancy Blauers, was at the fair both Saturdays to sign a limited-edition poster featuring the new plate artwork. One thousand copies of the poster were distributed during the event.

The 9<sup>th</sup> annual Florida Black Bear Festival was held on April 12, 2008 in Umatilla, Florida. FWC staff helped organize the festival and provided interactive exhibits about reasons why bears visit human areas, reducing human food attractants, presentations about living in bear country, bear behavior, and a field trip interpretation in bear habitat. Approximately 5,000 people attended and learned about Florida black bears through guided field trips, presentations, exhibits, and a children's activities pavilion.

Chinsegut Nature Center held the annual Bird and Wildlife Festival in April, which included two offsite burrowing owl field trips; festival attendance was 395.

The Reptile and Amphibian Festival in October included a gopher tortoise hike, two gopher tortoise burrow-cam talks, and two alligator talks. Additionally, FWC staff and the Gopher Tortoise Council had an exhibit during the festival. Festival attendance was 651 people.

The Wakulla Wildlife Festival was held in April 2008 at the Wakulla Springs State Park. FWC staff provided several exhibits including Florida black bear, Project Wild, and The Great

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Florida Birding Trail. The event included field trips, presentations, exhibits, and activities for both adults and children.

In November 2007, FWC assisted the non-governmental organization, Defenders of Wildlife, with an informational campaign in Collier County. Defenders, along with many volunteers, distributed 1,050 information packets to households in Golden Gate Estates and portions of Belle Meade that have the highest incidence of conflicts with panthers. The information packets included the brochure "A Guide to Living With Florida Panthers" and information pertaining to living safely and wisely in panther and bear country, including information to protect livestock. FWC also participated in a public information meeting sponsored by Collier County about living with panthers and bears at Corkscrew Elementary School in April 2008.

FWC panther management staff operated a booth at the Naples Zoo on March 8 as part of the 3<sup>rd</sup> Annual Florida Panther Week. The exhibit booth highlighted Florida panther life history information, radio telemetry, and capture techniques. Over 1000 people visited the zoo on that day. To recognize Florida's official mammal, Governor Crist declared March 15th "Save the Florida Panther Day," which was celebrated at Florida Panther National Wildlife Refuge with swamp buggy birding and plant tours and a photography workshop. Nine partnering agencies and organizations, and over 2,200 people participated in the week's activities.

Publications, Signs and Exhibits.--FWC's *Florida Wildlife* magazine contained 21 feature stories on listed species including Florida black bear, crested caracara, loggerhead sea turtle, burrowing owl, Florida manatee, Florida scrub-jay, indigo snake, pine barrens tree frog, Florida gopher frog, Florida bog frog, bald eagle, and American crocodile. The magazine included another 33 short articles featuring swallow-tail kite, gopher tortoise, Everglades snail kite, red-cockaded woodpecker, Florida panther, sea turtles, manatee, Florida black bear, and Florida mottled duck.

*Wildlife 2060: What's at stake for Florida* is a new booklet that was produced during FY 2007-2008. The booklet addresses the potential impacts of Florida's continued human growth and development, and helps us understand what this means for Florida's fish and wildlife. Species discussed in the booklet include Florida scrub-jay, Florida panther, Florida black bear, sea turtles, manatee, corals, gopher tortoise, burrowing owl, wood stork, and bald eagle. The booklet can be found on the FWC Web site at <http://www.MyFWC.com/wildlife2060>.

The Sea Stats series of brochures provided information on some of FWC's areas of marine research including fish, manatee, and right whale. Staff distributed 2,586 copies of the Sea Turtles Sea Stats and 890 copies of the Right Whale Sea Stats.

The manatee coloring and activity booklet underwent a major overhaul during the fiscal year.

The "Florida Manatees – A Florida Treasure" brochures were updated to include harassment rule definitions and an updated list of behaviors that would receive harassment charges if reported or observed. Brochures were distributed at Chambers of Commerce, visitor centers, parks, and law enforcement offices, and staff distributed 1,140 copies. "Florida sea turtles – Share the beach" was redesigned, updated, and printed during FY 2007-2008. The sea turtle activity sheets were also reprinted.

Florida law [§370.12(4)(b), Florida Statutes] requires that each year, by December 1, the Fish and Wildlife Conservation Commission (FWC) provide a report to the President of the Florida Senate and the Speaker of the Florida House of Representatives on expenditures from the

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Save the Manatee Trust Fund. This report provides brief summaries of accomplishments, descriptions of research projects, and conservation and enforcement activities. The Trust Fund report is produced in both a hardcopy format, as well as posted to the Web site at [http://research.myfwc.com/features/view\\_article.asp?id=31532](http://research.myfwc.com/features/view_article.asp?id=31532) in PDF format.

The Community Relations office produced four (one each quarter) newspaper pages called "Featured Creature," reaching approximately 280,000 readers in key areas such as Jacksonville Beach, Tampa Bay area, and Kissimmee. This year's featured creatures were Florida manatee, Florida panther, Florida black bear, and sea turtles (loggerhead, Kemp's Ridley, leatherback, and green). "Featured Creature" is sent quarterly to approximately 150 weekly newspapers. In addition, the editors have access to a "Featured Creature" section of the Web site that contains all the articles and photographs for individual downloading.

Since 1998, FWC has published a two-page feature in *Florida Monthly* magazine called "Watching Wildlife." *Florida Monthly* magazine has an average paid circulation of 229,102 per month. An additional 2,300 copies are mailed each month to State and local government officials and leaders within the private sector. Two articles on listed species were featured this year: red-cockaded woodpecker in April 2008 and the Florida scrub-jay in June 2008.

Information and photo on the red-cockaded woodpecker was placed in a reprint of the J.W. Corbett Wildlife Management Area Recreation Guide; 6,000 copies were printed.

Panther awareness and safety signs measuring approximately 3 ft. X 5 ft. were created by FWC staff and fabricated. Signs will be installed next fiscal year at kiosks on five FWC wildlife management areas throughout Southwest Florida. These signs will be viewed by all visitors and hunters entering the management areas.

A panther exhibit from Arthur R. Marshal Loxahatchee National Wildlife Refuge's old visitor center was transferred to the Collier County Extension Service office to be used as an informative tool with adult and youth groups that utilize this facility. This exhibit complements the demonstration livestock pen that was built at the extension service facility last year (June 2007) by Defenders of Wildlife, FWC panther management staff, and volunteers, to educate the public about protecting livestock and pets from large predators.

FWC law enforcement staff funded a life-like taxidermic mount prepared from a road-killed panther. This portable exhibit is used by various government and non-government organizations at special events to educate the public about Florida panthers. When not in use, the exhibit can be viewed at the Rookery Bay Environmental Learning Center where hundreds of people have an opportunity to view this lifelike mount.

The "Living with Alligators" brochure is available in hard copy, and this fiscal year, staff distributed approximately 50,000 copies. Staff also shared materials such as our "All About Alligators" coloring books (approximately 24,000) and magnets with the "Nuisance Alligator Hotline" phone number (approximately 2,000).

"Living with Crocodiles" brochures were distributed to nearly 1,400 people and a limited number of "Caution" signs were posted in areas where human/crocodile interactions have taken place.

FWC is working to develop a tri-fold brochure to educate the public on the Gulf sturgeon prior to next year's migration. These brochures will be distributed to local marine vendors, bait and tackle shops, and issued during law enforcement boating safety inspections.

Chinsegut Nature Center's spring volunteer newsletter featured the gopher frog.

Signs were posted on various wildlife management areas that contained photos of: Sherman's fox squirrel and red-cockaded woodpecker for Babcock-Webb Wildlife Management

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

Area (WMA) in Southwest Florida; gopher tortoise at J.W. Corbett WMA in South Florida; gopher tortoise and Sherman's fox squirrel at Chassahowitzka WMA in Southwest Florida; crested caracara at Dinner Island WMA in South Florida; wood stork at Everglades Wildlife and Environmental Area (WEA) in South Florida; and roseate spoonbill and wood stork at Spirit-of-the-Wild WMA in South Florida.

To date, 66 permanent smalltooth sawfish informational signs have been posted at popular boat ramps and fishing piers statewide. In addition, laminated posters, which contain a request that catches or observations of sawfish be reported to the FWC, have been maintained at boat ramps and tackle shops.

New signs warning of the dangers of jumping sturgeon were designed. These signs will be posted on docks, bridges, and at key locations along the river before the fish begin their annual migration next spring from the Gulf back into the Suwannee and other rivers. These signs will be visible to boaters while they are recreating and will be additional reminders to go slow.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX A. LISTED WILDLIFE SPECIES AS OF JUNE 30, 2008

Common Name	Scientific Name	Status
FISH		
Atlantic sturgeon (Gulf sturgeon)	<i>Acipenser oxyrinchus</i> ( <i>Acipenser oxyrinchus desotoi</i> )	SSC (1)
shortnose sturgeon	<i>Acipenser brevirostrum</i>	E
shoal bass	<i>Micropterus cataractae</i>	SSC (1,2)
Suwannee bass	<i>Micropterus notius</i>	SSC (1)
rivulus (mangrove rivulus)	<i>Rivulus marmoratus</i>	SSC (1)
Lake Eustis pupfish	<i>Cyprinodon variegatus hubbsi</i>	SSC (1)
blackmouth shiner	<i>Notropis melanostomus</i>	E
bluenose shiner	<i>Pteronotropis welaka</i>	SSC (1,2)
saltmarsh topminnow	<i>Fundulus jenkinsi</i>	SSC (1)
key silverside	<i>Menidia conchorum</i>	T
crystal darter	<i>Crystallaria asprella</i>	T
harlequin darter	<i>Etheostoma histrio</i>	SSC (1)
Okaloosa darter	<i>Etheostoma okalossae</i>	E
Southern tessellated darter (tessellated johnny darter)	<i>Etheostoma olmstedi</i> <i>Maculaticeps</i>	SSC (1)
key blenny	<i>Starksia starcki</i>	SSC (1)
AMPHIBIANS		
flatwoods salamander	<i>Ambystoma cingulatum</i>	SSC
Georgia blind salamander	<i>Haideotriton wallacei</i>	SSC (1,2)
pine barrens treefrog	<i>Hyla andersonii</i>	SSC (1)
Florida bog frog	<i>Rana okaloosae</i>	SSC (2)
gopher frog	<i>Rana capito</i>	SSC
REPTILES		
American alligator	<i>Alligator mississippiensis</i>	SSC (1,3)
American crocodile	<i>Crocodylus acutus</i>	E
key ringneck snake	<i>Diadophis punctatus acricus</i>	T
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T
red rat snake	<i>Elaphe guttata</i>	SSC <sup>1</sup> (1)
Atlantic salt marsh water snake (Atlantic salt marsh snake)	<i>Nerodia clarkii taeniata</i>	T
Florida pine snake	<i>Pituophis melanoleucus...mugitus</i>	SSC (2)
short-tailed snake	<i>Stilosoma extenuatum</i>	T

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX A. Continued

Common Name	Scientific Name	Status
Florida brown snake	<i>Storeria dekayi victa</i>	T <sup>1</sup>
rim rock crowned snake	<i>Tantilla oolitica</i>	T
Florida ribbon snake	<i>Thamnophis sauritus sackeni</i>	T <sup>1</sup>
bluetail mole skink	<i>Eumeces egregius lividus</i>	T
Florida Key mole skink	<i>Eumeces egregius egregius</i>	SSC (1)
sand skink	<i>Neoseps reynoldsi</i>	T
gopher tortoise	<i>Gopherus polyphemus</i>	T
Barbour's map turtle	<i>Graptemys barbouri</i>	SSC (1,2)
alligator snapping turtle	<i>Macrochelys temminckii</i>	SSC (1)
striped mud turtle	<i>Kinosternon baurii</i>	E <sup>1</sup>
Suwannee cooter	<i>Pseudemys concinna Suwanniensis</i>	SSC (1,2)
loggerhead sea turtle (loggerhead sea turtle)	<i>Caretta caretta</i>	T
green sea turtle (green sea turtle)	<i>Chelonia mydas</i>	E
leatherback sea turtle (leatherback sea turtle)	<i>Dermochelys coriacea</i>	E
hawksbill sea turtle (hawksbill sea turtle)	<i>Eretmochelys imbricata</i>	E
Kemp's ridley sea turtle (Kemp's ridley sea turtle)	<i>Lepidochelys kempii</i>	E
BIRDS		
piping plover	<i>Charadrius melodus</i>	T
snowy plover (Cuban snowy plover)	<i>Charadrius alexandrinus</i>	T
American oystercatcher	<i>Haematopus palliatus</i>	SSC (1,2)
brown pelican	<i>Pelecanus occidentalis</i>	SSC (1)
black skimmer	<i>Rynchops niger</i>	SSC (1)
least tern	<i>Sterna antillarum</i>	T
roseate tern	<i>Sterna dougalli (Sterna dougallii dougallii)</i>	T
limpkin	<i>Aramus guarauna</i>	SSC (1)
reddish egret	<i>Egretta rufescens</i>	SSC (1,4)
snowy egret	<i>Egretta thula</i>	SSC (1)
little blue heron	<i>Egretta caerulea</i>	SSC (1,4)
tricolored heron	<i>Egretta tricolor</i>	SSC (1,4)
white ibis	<i>Eudocimus albus</i>	SSC (2)
Florida sandhill crane	<i>Grus canadensis pratensis</i>	T



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX A. Continued

Common Name	Scientific Name	Status
whooping crane	<i>Grus Americana</i>	SSC (5)
wood stork	<i>Mycteria Americana</i>	E
roseate spoonbill	<i>Platalea ajaja</i>	SSC (1,4)
burrowing owl (Florida burrowing owl)	<i>Athene cunicularia</i> ( <i>Athene cunicularia floridana</i> )	SSC (1)
crested caracara (Audubon's crested caracara)	<i>Caracara cheriway</i> ( <i>Polyborus plancus audubonii</i> )	T
peregrine falcon	<i>Falco peregrinus</i>	E
Southeastern American kestrel	<i>Falco sparverius paulus</i>	T
osprey	<i>Pandion haliaetus</i>	SSC <sup>2</sup> (1,2)
snail kite (Everglades snail kite)	<i>Rostrhamus sociabilis</i> <i>Plumbeus</i>	E
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	T
Cape Sable seaside sparrow	<i>Ammodramus maritimus</i> <i>Mirabilis</i>	E
Florida grasshopper sparrow	<i>Ammodramus savannarum</i> <i>Floridanus</i>	E
Scott's seaside sparrow	<i>Ammodramus maritimus</i> <i>Peninsulae</i>	SSC (1)
Wakulla seaside sparrow	<i>Ammodramus maritimus</i> <i>Juncicolus</i>	SSC (1)
white-crowned pigeon	<i>Columba leucocephala</i>	T
Kirtland's warbler	<i>Dendroica kirtlandii</i>	E
Bachman's warbler	<i>Vermivora bachmanii</i>	E
ivory-billed woodpecker	<i>Campephilus principalis</i>	E
red-cockaded woodpecker	<i>Picoides borealis</i>	SSC
Marian's marsh wren	<i>Cistothorus palustris marianae</i>	SSC (1)
Worthington's marsh wren	<i>Cistothorus palustris griseus</i>	SSC (1)
MAMMALS		
Florida panther	<i>Puma concolor coryi</i> ( <i>Puma [=Felis] concolor coryi</i> )	E
Florida black bear	<i>Ursus americanus floridanus</i>	T <sup>3</sup>
Everglades mink	<i>Mustela vison evergladensis</i>	T
key deer	<i>Odocoileus virginianus clavium</i>	E
Lower Keys marsh rabbit	<i>Sylvilagus palustris hefneri</i>	E
Big Cypress fox squirrel	<i>Sciurus niger avicennia</i>	T
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	SSC (1,2)
Eastern chipmunk	<i>Tamias striatus</i>	SSC (1)
Sanibel Island rice rat	<i>Oryzomys palustris sanibeli</i>	SSC (1,2)

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX A. Continued

Common Name	Scientific Name	Status
silver rice rat (rice rat, lower FL Keys)	<i>Oryzomys argentatus</i> ( <i>Oryzomys palustris natator</i> )	E
Key Largo woodrat	<i>Neotoma floridana smalli</i>	E
Key Largo Cotton Mouse	<i>Peromyscus gossypinus</i> <i>Allapaticola</i>	E
Choctawhatchee beach mouse	<i>Peromyscus polionotus</i> <i>Allophrys</i>	E
Southeastern beach mouse	<i>Peromyscus polionotus</i> <i>Niveiventris</i>	T
Anastasia Island beach mouse	<i>Peromyscus polionotus</i> <i>Phasma</i>	E
St. Andrews beach mouse	<i>Peromyscus polionotus</i> <i>Peninsularis</i>	E
Perdido Key beach mouse	<i>Peromyscus polionotus</i> <i>Trissyllepsis</i>	E
Florida mouse	<i>Podomys floridanus</i>	SSC (1)
Florida mastiff bat	<i>Eumops glaucinus floridanus</i>	E
gray bat	<i>Myotis grisescens</i>	E
Indiana bat	<i>Myotis sodalist</i>	E
Florida saltmarsh vole (Florida salt marsh vole)	<i>Microtus pennsylvanicus</i> <i>dukecampbelli</i>	E
Sherman's short-tailed shrew	<i>Blarina carolonensis</i> [= <i>brevicauda</i> ] <i>shermani</i>	SSC (2)
Homosassa shrew	<i>Sorex longirostris eionis</i>	SSC (2)
sei whale	<i>Balaenoptera borealis</i>	E
fin whale (finback whale)	<i>Balaenoptera physalus</i>	E
North Atlantic right whale (right whale)	<i>Eubalaena glacialis</i> ( <i>Balaena glacialis</i> [ <i>incl.</i> <i>australis</i> ])	E
humpback whale	<i>Megaptera novaeangliae</i>	E
sperm whale	<i>Physeter macrocephalus</i>	E
Florida manatee (West Indian manatee)	<i>Trichechus manatus latirostris</i> ( <i>Trichechus manatus</i> )	E
INVERTEBRATES		
<u>CORALS</u>		
pillar coral	<i>Dendrogyra cylindrus</i>	E

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX A. Continued

Common Name	Scientific Name	Status
<u>CRUSTACEANS</u>		
Panama City crayfish (econfina crayfish)	<i>Procambarus econfinae</i>	SSC (1)
Sims Sink crayfish (Santa Fe cave crayfish)	<i>Procambarus erythrops</i>	SSC (1)
black creek crayfish	<i>Procambarus pictus</i>	SSC (1)
<u>INSECTS</u>		
Miami blue butterfly	<i>Cyclargus [=Hermiargus] thomasi bethunebakeri</i>	E
Schaus' swallowtail butterfly	<i>Heraclides aristodemus ponceanus</i>	E
<u>MOLLUSKS</u>		
Florida tree snail	<i>Liguus fasciatus</i>	SSC (1)
Stock Island tree snail	<i>Orthalicus reses</i> <i>Orthalicus reses [not incl. nesodryas]</i>	E

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX A. Continued

KEY TO ABBREVIATIONS AND NOTATIONS

LIST ABBREVIATIONS

E =	Endangered
T =	Threatened
SSC =	Species of Special Concern

Reasons for SSC listings prior to January 1, 2001 are indicated by the number in parenthesis under the following criteria:

- (1) has a significant vulnerability to habitat modification, environmental alteration, human disturbance, or human exploitation which, in the foreseeable future, may result in its becoming a threatened species unless appropriate protective or management techniques are initiated or maintained;
- (2) may already meet certain criteria for designation as a threatened species but for which conclusive data are limited or lacking;
- (3) may occupy such an unusually vital or essential ecological niche that should it decline significantly in numbers or distribution other species would be adversely affected to a significant degree;
- (4) has not sufficiently recovered from past population depletion; and
- (5) occurs as a population either intentionally introduced or being experimentally managed to attain specific objectives, and the species of special concern prohibitions in Rule 68A-27.0012, F.A.C., shall not apply to species so designated, provided that the intentional killing, attempting to kill, possession or sale of such species is prohibited.

(FWC)

- <sup>1</sup> Lower keys population only.
- <sup>2</sup> Monroe County population only.
- <sup>3</sup> Other than those found in Baker and Columbia counties or in Apalachicola National Forest.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX B. LIST OF ACRONYMS USED IN THIS REPORT

Term	Acronym
Apalachicola River Wildlife and Environmental Area	ARWEA
Atlantic States Marine Fisheries Committee	ASMFC
Apalachicola Wildlife Management Area	AWMA
Big Cypress National Preserve	BCNP
Best Management Plan	BMP
Biological Review Panel	BRP
Camp Blanding Joint Training Center	CBJTC
Critical Wildlife Area	CWA
Coastal Wildlife Conservation Initiative	CWCI
Deoxyribonucleic Acid	DNA
Digital Acoustic Recording Tag	dTag
Environmental Assessment Review	EAR
Environmental Impact Statement	EIS
U.S. Environmental Protection Agency	EPA
Federal Emergency Management Agency	FEMA
Florida Bat Conservancy	FBC
Florida Cooperative Fish and Wildlife Research Unit	FCFWRU
Florida Department of Agriculture and Consumer Services	DOACS
Florida Department of Environmental Protection	FDEP
Florida Department of Transportation	FDOT
Florida Emergency Management Agency	FEMA
Florida Natural Areas Inventory	FNAI
Florida Panther National Wildlife Refuge	FPNWR
Florida Panther Research & Management Trust Fund	FPRMTF
Florida Park Service	FPS
Florida Fish & Wildlife Conservation Commission	FWC
Florida Fish and Wildlife Research Institute	FWRI
Fiscal Year	FY
Georgia Department of Environmental Protection	GDEP
Georgia Department of Natural Resources	GDNR
Geographic Information System	GIS
Global Positioning System	GPS
Hickey Creek Mitigation Park	HCMP
Habitat Conservation Plan	HCP
Habitat and Species Conservation	HSC
Imperiled Butterflies of South Florida Work Group	IBWG
Index Nesting Beach Survey	INBS
Integrated Wildlife Habitat Ranking System	IWHRS
Jennings State Forest	JSF
Landowner Assistance Program	LAP
Land Acquisition Trust Fund	LATF
Manatee Management Plan	MMP

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX B. Continued.

Term	Acronym
Marin Resources Conservation Trust Fund	MRCTF
Manatee Protection Plan	MPP
Non-Governmental Organization	NGO
Nongame Wildlife Trust Fund	NGWTF
National Marine Fisheries Service	NMFS
National Oceanic & Atmospheric Agency	NOAA
National Park Service	NPS
Ocala National Forest	ONF
Perdido Key State Park	PKSP
Platt Branch Mitigation Park	PBMP
Project Design and Environmental	PD&E
Protect Species Cooperative Conservation	PSCC
Public Use Area	PUA
Species Conservation Planning	SCP
South Florida Water Management District	SFWMD
State Game Trust Fund	SGTF
Statewide Nesting Beach Survey	SNBS
St. Johns River Water Management District	SJRWMD
Salt Lake Wildlife Management Area	SLWMA
St. Marys Fishery Restoration Committee	SMFRC
Save the Manatee Trust Fund	STMTF
Tate's Hell Wildlife Management Area	THWMA
Three Lakes Wildlife Management Area	TLWMA
The Nature Conservancy	TNC
U.S. Army Corp of Engineers	USACOE
U.S. Fish & Wildlife Service	USFWS
U.S. Geological Survey	USGS
Urban-Wildland Interface	UWI
Wildlife Conservation Prioritization and Recovery	WCPR
Wildlife and Environmental Area	WEA
Wildlife Management Area	WMA

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX C. FWC STAFF PUBLICATIONS DURING FY 2007-2008.

- Arruda, J., Costidis, A., Cramer, S., Ketten, D.R., McLellan, W., Montie, E.W., Moore, M., and Rommel, S. 2007. Odontocete salvage, necropsy, ear extraction, and imaging protocols. Report supported by Office of Naval Research, Contract No. N00014-06-1-0298, 171 pp.
- Benson, J.F., Lotz, M.A., and Jansen, D. 2008. Natal den selection by Florida panthers. *Journal of Wildlife Management*, v.72 no.2, p.405-410.
- Blanvillain, G., Wood, L.D., Meylan, A.B. and Meylan, P.A. 2007. Sex ratio prediction of juvenile hawksbill sea turtles (*Eretmochelys imbricata*) from South Florida, USA. *Herpetological Conservation and Biology*, v.3 no.1, p.21-27.
- Brown, M.A., Cunningham, M.W., Roca, A.L., Troyer, J.L., Johnson, W.E., and O'Brien, S.J. 2008. Genetic characterization of Feline Leukemia Virus from Florida panthers. *Emerging Infectious Diseases*, v.14 no.2, p.252-259.
- Eaton, E. McMichael, Witherington, B., Foley, A., Hardy, R., and Meylan, A. In-water sea turtle monitoring and research in Florida: review and recommendations. NOAA Technical Memorandum NMFS-OPR-38, 233 pp.
- Edwards, H.H., Pollock, K.H., Ackerman, B.B., Reynolds III, J.E., and Powell, J.A. 2007. Estimation of detection probability in manatee aerial surveys at a winter aggregation site. *The Journal of Wildlife Management*, v.71 no.6, p.2502-2060.
- Foley, A. M., Singel, K.E., Dutton, P.H., Summers, T.M., Redlow, A.E., and Lessman, J. 2007. Characteristics of a green turtle (*Chelonia mydas*) assemblage in northwestern Florida determined during a hypothermic stunning event. *Gulf of Mexico Science* 2007, v.2 p.131-143.
- Garrison, E.P., McCown, J.W. and Oli, M.K. 2007. Reproductive ecology and cub survival of Florida black bears. *Journal of Wildlife Management* (online), v.71no.3, p.720-727.
- Hirama, S. and Ehrhart, L.M. 2007. Description, prevalence, and severity of green turtle fibropapillomatosis in three developmental habitats on the east coast of Florida. *Florida Scientist*, v.70 no.4, p.435-448.
- Land, E.D., Shindle, D.B., Kawula, R.J., Benson, J.F., Lotz, M.A., and Onorato, D.P. 2008 Florida panther habitat selection analysis of concurrent GPS and VHF telemetry data. *Journal of Wildlife Management*, v.72 no.3, p.633-639.
- Loggins, R. E., Gore, J. A., and Slaby, L. A. 2008. Long-term monitoring of beach mouse populations in Florida. Final Report Submitted to U.S. Fish and Wildlife Service, Panama City, Florida.
- Miller, K.E. and Faulhaber, C.A. 2007. Avian pox-like lesions in a Florida scrub-jay population.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX C. Continued

Florida Field Naturalist, v.35 no.2, p.39-72.

Mortimer, J.A., Donnelly, M., Meylan, A.B., and Meylan, P.A. 2007. Critically endangered hawksbill turtles: molecular genetics and the broad view of recovery. *Molecular Ecology*, v.16, p.3516-3517.

Moyer, M.A., McCown, J.W. and Oli, M.K. 2007. Factors influencing home-range size of female Florida black bears. *Journal of Mammalogy*, v.88 no.2, p. 468-476.

Moyer, M.A., McCown, J.W., and Oli, M.K. 2008. Scale-dependent habitat selection by female Florida black bears in Ocala National Forest, Florida. *Southeastern Naturalist*, v.7 no.1, p.111-124.

Ordoñez, C., Troëng, S., Meylan, A., Meylan, P., and Ruiz, A. 2007. Chiriqui Beach, Panama, the most important leatherback nesting beach in Central America. *Chelonian Conservation and Biology*, v.6 no.1, p.122-126.

Rodgers Jr., J.A., Schwikert, S.T., Griffin, G.A., Brooks, W.B., Bear-Hull, D., Elliott, P.M., Ebersol, K.J., and Morris, J. 2008. Productivity of wood storks (*Mycteria americana*) in North and Central Florida. *Waterbirds*, v.31 (Special Publication 1), p.25-34.

Simpfendorfer, C. A., Poulakis, G.R., O'Donnell, P., and Wiley, T.R. 2008. Growth rates of juvenile smalltooth sawfish (*Pristis pectinata*) in the western Atlantic. *Journal of Fish Biology* v.72, p.711–723.

Stacy, B. A., Santoro, M., Morales, J.A., Huzella, L.M., Foley, A., Mettee, N., and Jacobson, E.R. 2008. Renal oxalosis in free-ranging green turtles (*Chelonia mydas*). *Diseases of Aquatic Organisms* v.80, p.45-49.

Stacy, B. A., Wellehan, J.F.X., Foley, A.M., Coberly, S.S., Herbst, L.H., Manire, C.A., Garner, M.M., Brookins, M.D., Childress, A.L., and Jacobson, E.R. 2008. Two herpes viruses associated with disease in wild Atlantic loggerhead sea turtles (*Caretta caretta*). *Veterinary Microbiology* v.126 no.1, p.63-73.

Tringali, M.D., Seyoum, S., Carney, S.L., Davis, M.C., Rodriguez-Lopez, M.A., Reynolds III, J.E., and Haubold, E.M. 2008. Eighteen new polymorphic microsatellite markers for the endangered Florida manatee (*Trichechus manatus latirostris*). *Molecular Ecology Resources*, v.8, p.328-331.

Tringali, M.D., Davis, M.C., Rodriguez-Lopez, M.A., Bolen, E.E., Sullivan, J.G., and Haubold, E.M. 2008. Simultaneous use of the X- and Y-chromosome genes SMCX, SMCY, and DBY for sex determination in the Florida manatee (*Trichechus manatus latirostris*). *Marine Mammal Science*, v.24 no.1, p.218-224.



Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX D. COMMON AND SCIENTIFIC NAMES OF NON-LISTED SPECIES  
MENTIONED BY COMMON NAME IN THE REPORT.

Common Name	Scientific Name
FISH	
Alligator gar	<i>Atractosteus spatula</i>
smalltooth sawfish	<i>Pristis pectinata</i>
spotted bass	<i>Micropterus punctulatus</i>
AMPHIBIANS	
mole salamander	<i>Ambystoma talpoideum</i>
BIRDS	
anhinga	<i>Anhinga anhinga</i>
bald eagle	<i>Haliaeetus leucocephalus</i>
great blue heron	<i>Ardea herodias</i>
great egret	<i>Ardea alba</i>
MAMMALS	
Choctawhatchee beach mouse	<i>Peromyscus polionotus allophrys</i>
old-field mouse	<i>Peromyscus polionotus</i>
puma	<i>Puma concolor stanleyana</i>
Southeastern bat	<i>Myotis austroriparius</i>
INVERTEBRATES	
apple snail	<i>Pomacea insularum</i>
PLANTS	
Florida slash pine	<i>Pinus elliottii var. densa</i>
longleaf pine	<i>Pinus palustris</i>
oak, oak scrub, scrub oak	<i>Quercus spp.</i>
sand pine	<i>Pinus clausa</i>
saw palmetto	<i>Serenoa repens</i>
slash pine	<i>Pinus elliotti</i>
wiregrass	<i>Aristida sp.</i>

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX E. GLOSSARY OF TERMS

DEFINITIONS

Allometry – Measurement of the rate of growth of a part or parts of an organism relative to the growth of the whole organism; determines the organism's final shape.

Benthic – An organism that lives on or in sea or lake bottoms.

Cavity – A hollow or hole occupied by an organism.

Cavity insert – A premade box with a cavity built into it that is used to mimic natural cavities.

Clade – A group of living organisms, including all descendants that share specific genetic traits of a common ancestor.

Cluster – The aggregation of cavity trees previously and currently used and defended by a group of woodpeckers.

Colonial-breeding – Breeding between individuals of the same species that occupy the same colony.

Diadromous – Describes fish that migrate between fresh and salt water.

Euryhaline – Describes organisms that tolerate varying levels of salinity.

Extirpation – To remove.

Fledge – To raise a young bird until it is capable of flight.

Fledgling – A young bird that has recently developed flight feathers and is capable of flight.

Hydroperiod – The cyclical changes in the amount or stage of water in a wet habitat.

Listed species – Species designated as endangered, threatened, or species of special concern are collectively referred to as listed species.

Morbidity – A disease or the incidence of disease within a population.

Necropsy – The examination of a body after death.

Pelagic – An organism that lives in open oceans or seas rather than waters adjacent to land or inland waters.

Phylogeny – The development over time of a species, genus, or group, as contrasted with the development of an individual.

Endangered and Threatened Species Management and Conservation Plan  
FY 2007-2008 Progress Report

APPENDIX E. Continued

Productivity – The ability to produce; fertility.

Recruitment – The addition of individuals into a breeding population through reproduction and/or immigration and attainment of breeding position.

Recruitment cluster – A cluster of artificial cavities in suitable nesting habitat, located close to existing clusters.

Rookery – A colony of breeding animals.

Translocation – Capture, transport, and release or introduction or reintroduction of wildlife.