FY 2004-2005 Progress Report

on activities of the

Florida Fish & Wildlife Conservation Commission

Endangered/Threatened Species Management & Conservation Plan

FLORIDA'S ENDANGERED AND THREATENED SPECIES

MANAGEMENT AND CONSERVATION PLAN -

FY 2004-2005 PROGRESS REPORT

by the

Florida Fish and Wildlife Conservation Commission

Prepared by Staff of the
Florida Fish and Wildlife Conservation Commission

Submitted by: _____

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EXECTIVE SUMMARY

This document constitutes the 27th progress report and update of the Florida Endangered and Threatened Species Management and Conservation Plan as required under Section 5 of the Florida Endangered and Threatened Species Act of 1977 [s. 372.072, Florida Statutes (F.S.)]. That section of the Act required the preparation of an initial plan for submission to the 1978 Florida State Legislature, and that a revised and updated plan for management and conservation of endangered and threatened species shall be submitted annually.

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 the Florida Department of Environmental Protection (DEP). 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 Fish Commission and certain organizational functions of DEP on July 1, 1999. Copies are available from the Division of Habitat & Species Conservation, Species Conservation Planning Section of the FWC, Tallahassee.

This document consists of two main sections. The "Statutory Requirements" section covers five of the six elements listed in Statute, including a description of FWC's criteria for research and management priorities, a description of FWC's citizen awareness program, policies pertaining to listed species, required legislation, and a funding request. The sixth element required by Statute is a progress report. The "Progress Report" section provides a description of agency actions for listed species, and provides contact information for individuals who desire more knowledge about a specific species or action. This Progress Report includes reports of staff activities for four listed mammals, two reports that cover multiple listed mammals, 16 reports on listed birds, two reports on listed amphibians, two reports on listed reptiles, one report that covers a group of reptiles, three reports on specific listed fish, one report that covers a number of listed fish, three reports on listed invertebrates, and one report on habitat modeling efforts. In addition, this section covers agency actions to provide technical assistance and coordination, efforts with Critical Wildlife Areas, the Landowner Incentive Program, law enforcement actions for listed species, and a summary of listed species permitting.

I would like to express my appreciation to the many people who contributed to this report. Judy Gillan, Bonnie Abellera, and Sandy Wilson provided information regarding statutory requirements while Mike Allen, Gray Bass, Shane Belson, Joan Berish, Robin Boughton, Pat Bowman, David Cook, Stuart Cumberbatch, Michael Delany, Nancy Douglass, Harry Dutton, Mark Endries, Steve Glass, Jeff Gore, Brad Gruver, Katherin Haley, Elsa Haubold, John Himes, Jay Holder, Don Holway, Walt Jaap, Carol Knox, Darrel Land, Adriene Landrum, Ed Matheson, Anne Meylan, Karl Miller, Steve Nesbitt, Gregg Poulakis, Dan Roberts, James A. Rodgers, Steve Shattler, Stephanie Simek, Robbin Trindell, Harley Weaver, John West, Angela T. Williams, and Ricardo Zambrano contributed to the progress report. Special appreciation is expressed to Ms. Christine Yannett for her assistance with preparation of this report, and Thomas Eason, Katherine Diersen, Kipp Frohlich, and Jessica Norton for editorial review.

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SUMMARY OF IMPERILED WILDLIFE LISTS

The first Florida endangered species list consisted of 23 species and was promulgated in 1972. The listing concept was expanded in 1973 to include threatened species, and again in 1979 to include species of special concern. The State lists are revised as needed and constitute Rules 68A-27.003 (endangered), 68A-27.004 (threatened) and 68A-27.005 (species of special concern) of the Florida Administrative Code (Title 68A, F.A.C.). Currently, the Florida Fish and Wildlife Conservation Commission (FWC) lists 118 species as endangered (41), threatened (26), and species of special concern (51; Table 1). A complete listing of Florida's imperiled wildlife species may be accessed at http://myfwc.com/imperiledspecies/pdf/Endangered-Threatened-Special-Concern-2004.pdf, or at the F.A.C. website, located under Chapter 68 - FWC, section 27.003 - .005 http://fac.dos.state.fl.us/. Fifty-seven species of wildlife listed by the United States Fish and Wildlife Service (USFWS) as threatened (36), endangered (20), or experimental non-essential (1) occur in Florida (Table 1). Additional information regarding federal listings may be accessed at http://endangered.fws.gov/wildlife.html#Species. A listing of plants that are protected under the jurisdiction of the Florida Department of Agriculture and Consumer Services (DOACS) may be accessed at http://www.doacs.state.fl.us/~pi/index.html.

Table 1. Summary of Official Lists of Florida's Endangered Species, Threatened Species and Species of Special Concern.

Status Designation	Fish	Amphibians/ Reptiles	Birds	Mammals	Invertebrates	Total
FWC						
Endangered	3	6	8	20	4	41
Threatened	2	10	10	4	0	26
Special Concern	10	13	18	6	4	51
Subtotal	**15**	**29**	**36**	**30**	**8**	**118**
USFWS[a]						
Endangered	2	5	5	18	6	36
Threatened	1	8	5	2	4	20
XN[b]	0	0	1	0	0	1
Subtotal	**3**	**13**	**11**	**20**	**10**	**57**

[a] United States Fish and Wildlife Service
[b] Experimental Non-Essential

STATUTORY REQUIREMENTS

CRITERIA FOR RESEARCH AND MANAGEMENT PRIORITIES

To ensure the State's resources are properly spent on conserving Florida's imperiled species, the Florida Fish and Wildlife Conservation Commission (FWC) uses a variety of tools to prioritize research and management decisions for State-listed species. The primary tool used is the state listing process described in 68A-27.0012 Florida Administrative Code (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 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 et al. 1990). 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 a combination of the listing process, the ranking process, and other mandated activities to allocate resources for the protection of Florida's state-listed species.

CITIZEN AWARENESS PROGRAM

Summary *(complied by Judy Gillan and Bonnie Abellera)*.--Citizen awareness programs are conducted by FWC staff throughout the agency. The following is an attempt to combine the efforts that occur throughout the agency into one cohesive report.

Media Relations and Information Requests.--The FWC issued 25 statewide news releases concerning listed species this fiscal year. They included one about sea turtles, one about rare birds, 12 concerning West Indian manatees (*Trichechus manatus latirostris*), and two regarding Florida panthers (*Puma concolor coryi)*. Others included two about American alligators (*Alligator mississippiensis*) (excluding alligator harvests), one about Florida black bear (*Ursus americanus floridanus)* and six about listed species in general. Tallahassee-based staff served as media spokespersons regarding listed species on at least 75 occasions, including 14 regarding manatees, 11 regarding Florida panthers, 24 concerning alligators (excluding alligator harvests) and three regarding Florida black bear. Other species that were the subject of media contacts were whooping cranes (1) (*Grus Americana*), red cockaded woodpeckers (2) *(Picoides borealis),* gopher tortoises (1) *(Gopherus polyphemus),* bald eagles (*Haliaeetus leucocephalus*)(4), Miami blue butterflies (1) (*Cyclargus [=Hermiargus] thomasi bethunebakeri*) and the listing process in general (10). In addition, staff fielded numerous media inquiries regarding the overall impacts of hurricanes on listed species.

In addition to print news releases, the Media Relations Section and Media Services Section produced three video news releases concerning alligators, manatees and the Wildlife

Legacy Initiative, which included footage of black bear and Florida sandhill cranes (*Grus canadensis pratensis*).

Regional staff produced 36 news releases and responded to approximately 350 media and informational inquiries regarding listed species. Black bear, alligators, gopher tortoises, panthers, sea turtles, and manatees were the most common subjects of regional listed species news releases. Florida panthers, manatees, black bears, sea turtles, and alligators were the subjects of most listed species media contacts. Others included hawks, shorebirds, right whales (*Eubalaena glacialis*), bald eagles and sandhill cranes. Over 4,000 e-mails were received and responded to in the manatee outreach and community relations sub-section.

Articles were written to promote programs such as the Landowner Incentive Program (LIP) and placed in publications such as "North Florida Farm Credit" magazine and the FWC hunting regulations. A Public Broadcasting Service (PBS) documentary was filmed about the LIP and listed species management on private lands. The documentary was aired on PBS during spring 2005. The program featured two private landowners in central Florida who are enrolled in LIP and how they are using the LIP to help them manage their land to benefit listed species.

Two black bear media events occurred in Santa Rosa County regarding the same bear--the night of capture and when the bear was released in Okaloosa County on Eglin AFB.

School-based Presentations and Programs.--FWC staff presented at least 13 talks to approximately 600 elementary school students about manatees, sea turtles and other threatened and endangered species such as the American alligator, gopher tortoise and Florida black bear. Four presentations were given to 150 high school students that included a power-point presentation about bald eagles, gopher tortoise, red cockaded woodpecker management and a wildlife skull and bone demonstration. Four university presentations were given, one about sea turtles and three about manatees. In addition to school presentations, staff assisted with at least five elementary school science fairs and two regional science fairs in Palm Beach and Leon counties.

FWC staff co-hosted an environmental awareness day at Jennings Forest Wildlife Management Area. Various wildlife and environmental stations were set up for students to rotate through, which included: static displays of black bear, gopher tortoise and an abandoned burrow that is used to teach about gopher tortoise life history, and other species that use its burrow. Elementary and middle schools attend the event with approximately 400 students, teachers and parents in attendance.

Staff attended the Leon County Association of Science Teachers as a guest speaker to talk about Florida's imperiled species, distribute educational materials and offer other services from the FWC imperiled species Loan Library.

A state-wide manatee decal art contest was announced during Manatee Awareness Month (November) to encourage middle school students to learn more about this species and to express their concerns through art. Artwork was judged by FWC employees and the winning artwork was made into a decal. During the 2004-2005 fiscal year, 80 students from 17 schools participated in the contest for the 2005-2006 decal.

Educator Learning Kits.--FWC's Treasure Box Program began its fourth year at the "Welcome Back Teachers" event sponsored by the Community Classroom Consortium. The attendees (100 plus) were from Leon, Wakulla, Jefferson, Madison and Taylor counties. The

treasure box program targets students in elementary and middle school. Staff continued to work with schools in Leon and Wakulla counties reaching approximately 500 elementary aged students with the manatee program. New this year, was the creation of treasure boxes for both sea turtles and right whales.

Throughout the year, staff participates in events to promote the treasure boxes such as at the Coastal Cleanup and Kids Fishing Clinics. Staff created a resource loan library in FWC's Imperiled Species Section. The library includes the three treasure box programs and supporting publications, posters, videos and books.

In addition, various locations have expressed interest in being a treasure box loan site for schools in their areas. In response to this, staff sent material and information for the creation of Manatee Treasure Boxes to Merritt Island National Wildlife Refuge, Cedar Key Museum State Park, the FWC field office at Fort Meyers and the Fort Pierce Education Center in Vero Beach.

FWC's "Suitcase" learning kits target teachers of middle to high school aged students in Pinellas, Hillsborough and Manatee Counties. Suitcases are designed to provide teachers with complete lessons about manatees and sea turtles. The suitcases provide lesson plans and activities that are correlated to Sunshine State Standards, bones and biofacts to provide an up close feel of the animal that could not be brought into the classroom, and different types of media to supplement the learning including: books, videos, slideshows and computer activities. The manatee suitcase was checked out nine times and the sea turtle suitcase was checked out twice.

Community Outreach.--The 6th annual Florida Black Bear festival was held October 30, 2004 in Umatilla, Florida. Country music legend, Mel Tillis was the featured presenter with approximately 5-7,000 people attending. Staff led field trips into bear country and gave a "Living in Bear Country" presentation. In addition, staff maintained a static display and answered questions all day.

Staff targeted marinas around the state to send manatee educational information and order forms (~100). Several marinas responded by requesting additional materials. A site visit to the Tampa Bayside Marina was the result of one of the requests. Staff set up displays and provided species information and activities at three manatee-related festivals.

Staff hosted one nighttime turtle walk for Cabinet Aides and issued 27 permits for public sea turtle walks and 22 permits for sea turtle educational displays. Additionally, staff participated in area festivals such as the Coastal Cleanup and Fishing Clinics promoting availability of the manatee and sea turtle treasure boxes.

At the Chinsegut Nature Center, Staff hosted one talk on red-cockaded woodpeckers for the general public (15 people) and a talk on Florida bats (27 people) for the general public using outside FWC expertise to present the talks. The Reptile and Amphibian Expo, an annual festival, was held in October at Chinsegut Nature Center (280 people). This festival included two talks on gopher tortoises and a demonstration of a burrow cam (infrared camera scope) in a gopher tortoise burrow.

A public meeting regarding Perdido Key Beach mouse conservation was held, and staff provided two programs on Florida scrub jays. In addition, staff received 13 gopher tortoise calls, six alligator calls, one bear call, one panther call and two sandhill crane calls.

Volunteer Opportunities.--The Lake Wales Ridge Wildlife and Environmental Area coordinates the Ridge Rangers program, which uses volunteers to monitor scrub jays (*Aphelocoma coerulescens*) and gopher tortoises in various areas along the Lake Wales Ridge.

A statewide network of volunteers assists with marine turtle nesting patrols. These volunteers are permit holders and in turn have a group of volunteers who assist them with the patrols. Approximately 1,400 individuals around the state monitor the beaches and mark marine turtle nests.

Each year, several students and individuals assist the manatee program by volunteering to document manatees at warm water sites. Photos are taken of manatees with scars so that life history records can be updated.

Web-based Outreach.--Staff created a Landowner Incentive Program (LIP) Web site, http://www.myfwc.com/lip/, which has links to numerous listed species Web sites.

For the second year in a row, the manatee e-field trip, "The Manatee—A Florida Treasure" was available for students on a statewide, national and international level. An internet company specializing in Web-based field trips for students, helped up-date the field trip to include items that students could do to help the species. Student participation was just over 5,000 students with at least one school in almost all 50 states participating. The good news is that the majority of visitors to the site were students in key manatee areas around Florida. Go to www.efieldtrips.org.

FWC initiated a shorebird Web site in the spring of 2005 (www.myfwc.com/shorebirds) which allows "beach-nesting bird partners" to enter their observations on-line and help FWC monitor listed shorebirds that nest on Florida's beaches. Close to 700 observations were entered during the first test year from a diverse array of partners from local Audubon members, to county natural resource staff, to Florida Park Service staff, to U.S. Fish and Wildlife service employees.

Staff developed two new Web sites: one for Florida Manatee at http://research.myfwc.com/features/default.asp?id=1001 and Whooping Cranes at http://research.myfwc.com/features/category_sub.asp?id=5947

Workshops.--Staff and volunteer facilitators provided approximately 75 one-day workshops to approximately 1,600 educators, including workshops involving Project WILD, Aquatic WILD, Schoolyard Activities and Ecosystems. K-12 program volunteers throughout the state continue to donate thousands of hours of their time and expertise annually, to provide one-day workshops to educators and promote our programs through their workplaces and networks. Species covered in Project WILD include the Florida panther, Florida black bear, West Indian manatee, American alligator, American crocodile (*Crocodylus acutus),*gopher tortoise, loggerhead seaturtle (*Caretta caretta),* green seaturtle (*Chelonia mydas),* leatherback seaturtle (*Dermochelys coriacea),*hawksbill seaturtle (*Eretmochelys imbricata),* Kemp's ridley seaturtle (*Lepidochelys kempii),* osprey (*Pandion haliaetus*) and burrowing owl (*Athene cunicularia*).

Ten Florida Black Bear Curriculum Guide (FBBCG) workshops were held reaching 189 educators about black bear biology, behavior, management and resolving human-bear conflicts. An additional 23 people were trained at Project WILD's annual facilitator training workshop to teach other educators to utilize the FBBCG.

A landowner workshop was presented in Madison County—a talk was given to approximately 50 landowners on listed species management (gopher tortoises, red-cockaded

woodpecker, Sherman's fox squirrel (*Sciurus niger shermani*) and listed species state/federal programs available for private landowners.

Staff continued to offer a training workshop, "The Official Marine Turtle Exterior Lighting Course and Exam," for lighting designers, local government personnel, turtle volunteers, businesses and landscape architects. The course was developed jointly with the USFWS and hosted by various organizations around the state. Approximately 228 individuals have passed the exam, which tests participant's knowledge of sea turtle behavior and specific lighting fixtures.

FWC staff hosted the 2005 Marine Turtle Permit Holder Workshop, co-sponsored by The Florida Aquarium, for approximately 200 Marine Turtle Permit holders and volunteers. This two day event included approximately 16 presentations by agency management and research staff, conservation organizations, and local governments as well as summaries of Marine Turtle Grant projects. FWC staff summarized information on the Section's programs in two poster papers presented at the International Sea Turtle Symposium in Savannah Georgia.

FWC hosted the 18th Eastern Black Bear Workshop in Tallahassee. This professional biennial workshop brings together approximately 100 researchers and managers from state, provincial, federal, university, and non-governmental organizations as well as students to discuss research and management issues facing black bears in Eastern ecosystems. The workshop entails presentations of professional papers, invited speakers, panel discussions, and field trips.

Staff presented information about black bears at a workshop on Wildlife Protection for the Big Bend Scenic Byway Corridor and a workshop on Habitat Conservation, Land Use & Transportation Planning In 'Black Bear Country'.

Staff gave oral presentations about sea turtles at the following workshops: International Sea Turtle Rehab workshop in Marathon, International Nesting Beach Survey Program (INBS)/Statewide Nesting Beach Survey Program (SNBS) Training Workshops (5 - statewide), and the Florida Department of Transportation (FDOT) Regional Endangered Species workshop in Boca Raton.

A landowner workshop was presented in Madison County—A talk was given to approximately 50 landowners on listed species management (gopher tortoises, red-cockaded woodpecker, Sherman's fox squirrel, etc.) and listed species state/federal programs available for private landowners.

FWC staff conducted a workshop entitled "Managing Wildlife of Florida's Private Lands" in June 2005 at the Osceola County Extension Service Office in Kissimmee. The purpose was to inform the public of the variety of financial and technical assistance programs available to landowners who wish to manage their lands for wildlife. Topics included Florida's Private Lands Programs; Pond Management; Wetland Restoration and Enhancement; and Florida's Ranchland Quail Initiative. The event was hosted by the University of Florida-Institute of Food and Agricultural Sciences/Osceola County Cooperative Extension Service Office.

Publications.--Since 1998, FWC has published a two-page insert in *Florida Monthly* magazine, called, "Watching Wildlife with the Florida Fish and Wildlife Conservation Commission." *Florida Monthly*, formerly known as *Florida Living*, is Florida's only statewide monthly lifestyle magazine and has a paid circulation of 215,000 people per month. An additional 2,200 copies are mailed each month to state and local government officials and leaders within the private sector. *Florida Monthly* estimates the value of this two-page insert to be

$13,870.00 per month. In readership surveys conducted by the magazine, "Watching Wildlife" is one of the more popular features. Within each issue, "Watching Wildlife" highlights a natural area with significant wildlife viewing opportunities and includes a species profile and other wildlife conservation information.

From July 1, 2004 through June 30, 2005, three state-listed wildlife and two plant species were featured in *Florida Monthly*: alligator snapping turtle (*Macroclemys temminckii*); scrub plum (*Prunus geniculata*); Suwannee bass (*Micropterus notius*); osprey (*Pandion haliaetus*) and lignum vitae (*Guaiacum sanctum*)

Landowner Incentive Program brochures (approximately 2000) were distributed and staff responded to approximately 50 informational requests (phone/mail/email) associated with LIP and or Partners for Fish and Wildlife (PFW)--both programs provide technical support and financial assistance to private landowners to create beneficial habitat for listed species. Often, these inquiries offered opportunities to provide standard listed species information (technical assistance) for species such as the black bear (Living in Bear Country brochures), red cockaded woodpecker (Safe Harbor program), Flatwoods salamander (brochure for private landowners) and gopher tortoise.

In addition staff produced a LIP poster that was presented at approximately 10 public speaking engagements.

Staff provided publications, posters or videos to 275 individuals or groups requesting manatee information. Of these requests, 115 were for bulk orders (200-5,000 pieces each order) for distribution at various events or through businesses or organizations such as Chambers of Commerce, tax collector offices, libraries, parks, schools, visitor centers, marinas, dive shops or FWC regional or field offices. Staff distributed 22,925 sea turtle publications to various individuals and groups, with tax collector offices receiving the bulk of the publications. Sea turtle materials include publications created by other groups such as Florida Power & Light and the U.S. Fish and Wildlife Service.

Staff reviewed drafts of two books about manatees that are slated for private publication, both will credit the agency for its input. One book is a general information book about manatees and the other is a fictional storybook geared toward middle school readers.

An update of the multi-lingual Mind Your Waterways boater card and site specific speed zone brochures occurred this year. Both items are manatee related and are popular distribution items for law enforcement officers around the state.

Bear Response Agents hand distributed several thousand "Living in Bear Country" brochures and educational packets in various neighborhoods. Additional materials were mailed out to people who called the regional office with concerns about bears.

Two newsletter style publications called "Sea Stats" were printed: 2,000 copies regarding right whales and 4,000 copies regarding sea turtles.

Other Events or Meetings.--FWC staff participated in several meetings such as those with the Archie Carr NWR Working Group (sea turtle), the Manatee Education Working Group, the 25th Annual Sea Turtle Symposium in Savannanah, GA, St. Joe Hunt Club Annual meetings (black bear) and several public forums (black bear).

FWC staff operated an information booth at the Florida Sportsman Show in Ft. Walton Beach to promote Florida's Landowner Incentive Program as well as the Wildlife Habitat Incentive Program and Forest Stewardship programs.

Awards were given to tax collectors who participated in the Voluntary Contribution Campaigns for the manatee and sea turtle programs. The campaign is a kick-off for the distribution of the manatee and sea turtle decals, which are created each year.

Signs.--FWC staff contributed to the development of seagrass protection signs and provided graphic masters to vendors for the production of manatee-related signs (warm water sites and monofilament recycling). Staff distributed 6,598 Sea Turtle Nesting signs to permit holders assigned to locate and mark nests.

STATEWIDE POLICIES PERTAINING TO LISTED SPECIES

Listing Process Rule Revision (*Dan Sullivan*).--Prior to creating policy to protect imperiled species, one must first have a tool to determine which species are the most imperiled. The tool used to determine which species deserve Florida Fish and Wildlife Conservation Commission (FWC) listing is the listing process described in rule 68A-27.0012. This process was initially developed with the assistance of a stakeholder group in 1999. Since the implementation of the current criteria-based listing process, one species was removed from the list, two species have been added, and one species moved from a threatened species to a species of special concern. Controversy arose over efforts to apply the new criteria to two charismatic species. In response to this controversy, the Commission initiated a review of the listing process in 2003, and reconvened the Listing Process Stakeholder Panel. Based on input received from the stakeholders, FWC staff drafted a recommendation for altering the listing process rule, and presented this draft at the December 2004 Commission meeting. Draft rule change language was presented at the February Commission meeting, and final action occurred at the April Commission meeting, with the Commission voting to approve new listing rules. To view the new listing process rules, please see http://myfwc.com/imperiledspecies/listingproceduresanddefinitions.pdf. For more information on the history of the development of the rule changes, please see http://myfwc.com/imperiledspecies/listing-process.htm. For further information on listing actions and the listing process, please contact the Endangered Species Coordinator.

REQUIRED LEGISLATION

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

FUNDING REQUEST

Recommended Funding Level (*Sandy Wilson*).--The recommended level of funding for the FWC listed species programs in FY 2006-2007 is approximately $22,682,379 (Table 2). This includes funding to maintain current programs in addition to anticipated awards from federal

grants that are designed to assist development of new recovery programs which include assistance to local governments and private individuals for development of conservation plans, acquisitions, and private conservation efforts to benefit listed species.

Table 2. FWC Endangered/Threatened Species Budget Request for FY 2006-2007.

Funding Source	Amount
Nongame Wildlife Trust Fund (NWTF)	**$1,415,211**
Florida Panther Research & Management Trust Fund (FPRMTF)	**$1,947,978**
Save the Manatee Trust Fund (STMTF)	**$3,582,157**
Marine Resources Conservation Trust Fund (MRCTF)	**$9,645,568**
Federal Grants	**$4,798,310**
General Revenue	**$1,223,046**
Other	**$70,109**
Total	**$22,682,379**

PROGRESS REPORT

PROJECT SPECIFIC REPORTS

Research is a systematic means of generating the scientific information that is necessary to guide conservation of endangered, threatened, and special concern species. Additionally, research is a critical process for addressing the biological and management needs of those resources in a way that affords consistent monitoring and evaluation. Significant research has been conducted on many listed species during the past three decades, and results are leading to a better understanding of the extinction process and how managers may alter this process through management actions. Research results 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 describes the progress of ongoing listed

species research and management by FWC staff. Annual reports of these activities are available upon request.

Black Bear

Black Bear Management and Research *(Stephanie Simek)*.--FWC staff is involved in research and management efforts to ensure the long-term perpetuation of the Florida black bear (*Ursus americanus floridanus*). In Fiscal Year (FY) 2004 – 2005, FWC personnel received 1,559 calls regarding bears (this includes sick and injured bears, bear in yard, complaints, etc.) while the number of reported bear roadkill equaled 130 individuals.

Efforts to prevent human/bear conflicts continued with the previously established Bear Response Agent Program in the Northeast Region. The Program was expanded to include the Northwest Region. In the Northeast, Agents responded to 132 events; which included 47 carcass recoveries, 3 hit/alive bears, 47 site visits, and 35 capture efforts in FY 2004 - 2005. In the Northwest, Agents responded to 23 events; which included 19 carcass recoveries and 4 capture efforts in FY 2004 - 2005. FWC staff continued response to public inquiry by distributing information and education packets and through email and telephone correspondence. For further details on the education effort, please refer to the Citizens Awareness Program section of this report.

Staff coordinated and conducted a variety of projects in cooperation with researchers and managers from state, federal, university, and non-governmental organizations. Progress was made on 3 funded projects addressing impacts of roads on black bears and implemented by FWC and Florida Department of Transportation (FDOT). Data collection and analysis efforts continued on the "Non-invasive Assessment of Black Bear Movements and Abundance Relative to US 98 within the Aucilla Wildlife Management Area" project. This project was designed to estimate the size of the local bear population and reveal the rates and specific locations where bears cross US 98. FWC researchers completed the Final Report for the "Black Bear Movements and Habitat Use Relative to Roads in Ocala National Forest" project which outlines the movements, habitat use, and population dynamics of black bears along a portion of State Road 40 in the Ocala National Forest. Data collection and analyses were concluded for the "Statewide Assessment of Road Impacts on Bears in Florida" project and the Final Report was completed in June 2005. The study identified percent roadkill impact within 6 bear populations and provided updated extrapolated population estimates, range and distribution information.

Efforts on the "Habitat Use and Genetic Relatedness of Female Black Bears in the Ocala National Forest" project, conducted and funded in cooperation with the University of Florida, were completed during FY 2004 - 2005. This study assisted FWC staff in understanding bear movements, seasonal and annual habitat use throughout the Ocala National Forest. In addition, FWC initiated two new projects through funding from the Wildlife Foundation of Florida, Inc., the U.S. Forest Service, and the University of Florida. One study is investigating whether relocation is an effective management tool. Relocation is often perceived as a tool to reduce nuisance bear activity. Although this method has been practiced for several years, minimal data are available to determine the fate of bears after relocation and whether such actions are effective in reducing the level of nuisance bear activity. Determining the fate of relocated bears in Florida could alter the nuisance bear management activities currently practiced in the state. The second study is examining bears in the urban-wildland interface in Ocala National Forest. The study

will determine the effects of capture and on-site release of bears in the urban-wildland interface as a deterrent to nuisance behavior, as well as document the fine-scale habitat use of bears utilizing the urban-wildland interface.

The Bear Management and Research Program hosted the 18th Eastern Black Bear Workshop in Tallahassee. This professional biennial workshop brought together approximately 100 researchers and managers from state, provincial, federal, university, and non-governmental organizations as well as students to discuss research and management issues facing black bears in Eastern ecosystems. The workshop entailed presentations of professional papers, invited speakers, panel discussions, and field trips. In addition, the FWC staff has been involved in several outreach efforts. Staff participated in the 2004 Umatilla Bear Festival, the Workshop on Wildlife Protection for the Big Bend Scenic Byway Corridor, and the Habitat Conservation, Land Use & Transportation Planning In 'Black Bear Country' Workshop at the Apalachicola National Estuarine Research Reserve. FWC staff also presented information on Bear Conservation and Management at several St. Joe Hunt Club Annual meetings and presented to several other public forums.

Current activities and reports can be viewed on the FWC's black bear web page at http://www.wildflorida.org/bear/Online_reports.htm. For more information on the activities of the FWC involving bear, please contact the black bear coordinator.

Nongame Wildlife Grant - Black Bear Education Program (*Stuart Cumberbatch*).--Ms. Christine Denny, Pandion Systems, Inc. continued work on the development and evaluation of an education campaign for communities with Florida black bear issues. This project expands the education efforts previously completed by FWC to help develop a proactive approach of dealing with bear issues in order to decrease human/bear conflicts. Data collected during the project will be evaluated in concert with FWC biologists to create a manual to assist communities in creating action plans for dealing with human/bear issues.

Beach Mice

Overview ***(****Jeff Gore****)***.--Several subspecies of the old-field mouse (*Peromyscus polionotus*) inhabit dune habitat along Florida's coast and are collectively known as beach mice. Due to the extensive development of their coastal habitat, several subspecies of beach mice are listed as threatened or endangered by state or federal agencies. Biologists have traditionally monitored beach mouse populations through periodic live-trapping; however trapping is labor intensive and therefore, not affordable as a routine long-term monitoring method. FWC biologists are currently developing a method of monitoring the distribution and abundance of beach mice that relies on detecting mouse tracks rather than capturing mice. The method developed involves attracting mice to bait inside plastic tubes that contain an ink pad and paper. Initial testing on 2 subspecies over the past year indicates that mice will readily use the tracking tubes and leave suitable tracks on the paper. These records of mouse presence will be used to monitor both distribution and abundance of mice. For more information on the FWC's actions for these species, contact Jeff Gore at 850-265-3677.

Choctawhatchee Beach Mouse.--FWC staff selected the eastern population of the Choctawhatchee Beach Mouse (*Peromyscus polionotus allophrys)* for preliminary testing of

tracking tubes as a monitoring technique. Mice were found at a high density throughout the surveyed area.

Perdido Key Beach Mouse.--The Perdido Key Beach Mouse (*Peromyscus polionotus trissyllepsis)* is restricted to Perdido Key, Escambia County, Florida. In September 2004 Hurricane Ivan overwashed most of Perdido Key and destroyed much of the dune habitat occupied by the beach mouse. Just before the storm, FWC biologists captured 8 adult beach mice and secured them at the Peromyscus Genetic Stock Center at the University of South Carolina. The animals remained in captivity as potential reintroduction stock in the event that all remaining mice on Perdido Key were destroyed by the storm.

Post storm assessments showed that some mice survived the storm at Perdido Key State Park and on a small area of Gulf Islands National Seashore. FWC biologists installed a grid of tracking tubes on public lands on Perdido Key and have used the tracking data to monitor changes in the distribution of mice after the hurricane.

St. Andrew Beach Mouse.--Assisted by a grant from the U.S. Fish and Wildlife Service, FWC biologists began a range-wide assessment of suitable habitat for the St. Andrew Beach Mouse (*Peromyscus polionotus peninsularis)*. Staff also tested tracking tubes as a monitoring technique on the western population of St. Andrew beach mouse. This data should provide a current estimate of the habitat occupied by this beach mouse and allow FWC to better plan for the long-term conservation of this animal.

Mitigation Options Development (*Brad Gruver*).--Development and redevelopment of lands on Perdido Key may require Federal and State permits due to impacts to Perdido Key beach mice (PKBM) and their habitat. Such permits usually require mitigation to offset the impacts to the endangered species. Traditional methods of mitigation often are not feasible on Perdido Key due to the limited size of the key and land prices. The FWC, USFWS, and Escambia County have worked together to create a mitigation option that will allow most development to proceed while enhancing the survival potential of the PKBM. The option, used in conjunction with efforts to minimize the impacts of development to PKBM, provides funding for implementing the Perdido Key Beach Mouse Conservation Strategy, which was developed in conjunction with this effort.

Florida Panther

Genetic Restoration and Management (*Darrell Land*).--Florida panthers (*Puma concolor coryi*) are endangered by a combination of population and habitat factors. Loss and fragmentation of habitat 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 87 adults and sub-adults in 2003, exists on approximately 2 million acres of habitat in south Florida. Small population size and geographic isolation increase the chance for extinction of Florida panthers due to demographic instability inherent in small numbers and erosion of genetic diversity from restricted gene flow and inbreeding. In the spring of 1995, the FWC released eight female puma (*Puma concolor*) from Texas into areas occupied by Florida panthers in order to offset the potential deleterious effects of inbreeding and to diversify the

panther population's genetic composition. None of these 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 40 radiocollared Florida panthers in southern Florida by FWC and National Park Service (NPS) researchers during the reporting period. Five new panthers, and three that had failed or dropped collars, were added to the radiocollared population monitored by FWC this past capture season. Eleven female panthers denned during the study period producing a minimum of 25 (10♂, 10♀, 5 unknown) neonate kittens. All kittens, excluding two litters, were handled successfully at their dens, were permanently marked with subcutaneous transponder chips, and had genetic samples taken. Two female neonate kittens were removed to permanent captivity after being abandoned by their mother. A total of 139 panthers have been radiocollared since 1981, and 189 neonate kittens have been handled at dens since 1992. Seven (4♂, 3♀) radiocollared panthers and 12 (8♂, 4♀) uncollared panthers died during the reporting period. Three of the uncollared mortalities were males handled as neonates and identified by their transponder chips. Eleven (8♂, 3♀) panthers died from vehicular trauma and three panthers, including one female, died from intraspecific aggression. One radiocollared panther died of septicemia and other infections that were likely secondary to concurrent feline leukemia virus infection. One female died of spinal trauma caused by an unknown blunt force. Three (1♂, 2♀) panthers died of unknown causes. Apparently, genetic introgression is reducing the occurrence of kinked tails, cowlicks, and cryptorchidism.

Genetic analyses continues through our cooperative relationship with Dr. Stephen O'Brien at the National Cancer Institute. FWC has completed genotyping at 25 microsatellite loci of over 200 animals from several groups of different genetic ancestry. These included individuals from the Everglades subpopulation, the canonical Florida panther group, Texas females, crosses with some Texas-heritage captive animals of generally unknown origin held in various facilities throughout Florida, and pumas from Florida of unknown origin. For a large percentage of the population staff assigned probable dams and sires; for the remaining animals, staff were generally able to determine their ancestry. Staff continue to compare results from molecular genetic analyses with panther field data and also completed, to a large extent, a pedigree of the Florida population spanning the last 30 years.

Staff is continuing our evaluation of Global Positioning System (GPS) radio-collars and deployed three units on panthers during FY 2004-2005 and is completing analyses on the first seven GPS radio-collars that have been recovered from panthers since 2002. Preliminary evaluations show that GPS radio-collars work reasonably well on panthers but do not perform as well as the manufacturer's expectations. Regardless, GPS radio-collars offer a significant advancement over traditional aerial monitoring of panthers with respect to gathering multiple locations throughout a 24 hour day.

FWC staff has completed a study titled "Use of least cost pathways to identify key highway segments for Florida panther conservation". Least cost path (LCP) modeling uses landscape features that have been classified according to their value to panthers, to construct pathways that minimize impediments to panther movements between two areas. Staff modeled LCP's between six major use areas in southern Florida. These areas were chosen because they represent the extent of occupied panther habitat where both male and female panthers live and staff also documented panthers traveling between these areas. Seventeen key highway segments were identified where these LCP's intersected improved roadways; these highway segments

matched up well with documented panther roadkill locations. Staff believes this methodology can be used to better inform panther conservation planning that will be necessary as current road networks are improved or new roads are constructed.

FWC staff is conducting a research prioritization process using recommendations we received from a Florida Panther Scientific Review Team commissioned by FWC and the United States Fish and Wildlife Service (USFWS) in 2002. To this list of recommendations, FWC added ongoing projects and those projects being considered for implementation by staff. Staff has been soliciting input from the NPS, the USFWS and FWC staff on these recommendations. This information will be used to develop a work plan for staff to follow in developing and implementing research and monitoring for the Florida panther. The plan will be vetted with our partners to ensure our research and monitoring efforts are well designed, well coordinated, and meet priority needs.

FWC convened a team comprised of administrators, biologists, and law enforcement officers from the NPS, USFWS, and FWC and tasked them with developing a Florida Panther Response Plan. This plan will provide guidance when dealing with human/panther interactions. A draft plan called "Guidelines for Living with Florida Panthers and Interagency Florida Panther Response Plan" has been completed and will undergo an Environmental Assessment by the USFWS before it is finalized and adopted.

For more information on current panther management and research, please contact Darrell Land at 239-643-4220 or by e-mail at Darrell.Land@myfwc.com. An extensive collection of panther reports and publications can be found at the following websites: http://myfwc.com/wildlife/ and http://myfwc.com/panther/ .

Key Largo Woodrat and Key Largo Cotton Mouse

Conservation efforts (*Jeff Gore*).--The Key Largo woodrat (*Neotoma floridana smalli*) and the Key Largo cotton mouse (*Peromyscus gossypinus attapaticola*) are listed as endangered at both the state and federal levels. Both animals are found only in Key Largo, Monroe County, Florida. Due primarily to loss of the tropical hardwood hammock habitat upon which these animals depend, populations of both woodrats and cotton mice are now restricted to the northern half of the Key and almost exclusively to public lands.

Wildlife managers need to regularly monitor woodrat and cotton mouse populations to ascertain their status over time, especially their response to management activities. Monitoring in the traditional manner requires trapping, but trapping is both labor-intensive and potentially stressful to the captured rodents. FWC biologists have been evaluating alternative methods of monitoring populations. Over the past year they have been refining a method of determining the presence of woodrats and cotton mice using tracking tubes. The tubes are short sections of plastic (PVC) pipe that contain an inkpad, a clean paper, and bait. The animals enter the tubes and leave distinctive ink footprints on the paper. Biologists plan to use the tracking data to determine the current distribution of Key Largo woodrats and cotton mice and detect trends in their abundance.

FWC biologists also provided technical advice and assistance on woodrat conservation and participated in the Key Largo Woodrat Working Group. The Working Group has addressed multiple management issues for woodrats including captive breeding, predator control, and

habitat restoration. For more information on the FWC's actions for these species, contact Jeff Gore at 850-265-3677.

Manatee

The FWC is involved in many recovery efforts for the Florida manatee (*Trichechus manatus latirostris)*. The manatee is native to Florida's coastal and riverine waters and is listed by both the U.S. Fish and Wildlife Service (USFWS) and the FWC as an endangered species. The State of Florida's efforts to recover 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 recover 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.

The Imperiled Species Management Section (ISM) conducts management conservation activities for manatees. The FWC's Fish and Wildlife Research Institute (FWRI) conducts research on marine mammals. FWC staff from both FWRI and ISM participate as members of the various working groups of the federal manatee recovery and implementation team. A staff member from each division is a member of the steering committee for the team. In addition, the FWC and the USFWS have been working to address the existing controversy surrounding manatee issues. During 2004-05 we initiated and held a series of four Manatee Forums with selected stakeholders to improve communication and understanding among key stakeholder groups and participating agencies. The Executive Director of the FWC and the Director of Region Four of the USFWS have been instrumental in the development of the Forum and its implementation.

For more detail about the FWC Marine Mammal Program please see the STMTF 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_sub.asp?id=3686.

Conservation Management Activities *(Carol Knox).*--FWC staff implements many tasks of the Florida Manatee Recovery Plan. Conservation management activities are focused in the following five program areas:

Manatee Protection Plans (MPPs) - This involves the development and implementation of county-based MPPs. Staff reviewed and prepared comments on the Duval, Volusia, Broward, Palm Beach, and Clay County MPP drafts. The FWC approved the final MPP for Lee County.

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. New rule development was completed for three Tampa Bay counties (Hillsborough, Pinellas, Manatee) in December 2004. Rule development activities in Lee County, begun in fiscal year 2003-04, continued throughout fiscal year 2004-05 (with an amended rule adopted in August 2005). Rule development was also initiated to consider a change to the zones in a portion of Charlotte County, with this effort expected to be completed next fiscal year.

Permit Review - A total of 560 projects were reviewed during the year. Biological opinions and recommendations on ways to reduce or eliminate potentially negative effects to manatees were provided to regulatory agencies such as the Florida Department of Environmental Protection (DEP), water management districts, and the Department of Community Affairs.

Manatee Habitat - Staff participated in various working groups and task forces regarding seagrass protection, warm water refuges, comprehensive Everglades restoration, minimum flows at springs, and other habitat related concerns. Staff is currently involved in several efforts to reduce the prop scarring of seagrass meadows.

Public Outreach and Information - Programs focused on grade school students are ongoing involving various materials but particularly the Manatee Treasure Box program. The boxes were developed to provide a free resource to teachers on a loan basis so that they could educate their students about manatees, habitat protection, and their environment. Several boxes are now available around the state. An intranet company worked with staff to develop an e-field trip about manatees. This is a self-guided tour into the life of the manatee and it is available to students nationally and internationally and is available at http://www.eFieldTrips.org.

Manatee Research Program *(Elsa Haubold).*--Manatee Mortality and Rescue—During calendar year 2004, 276 manatee carcasses were recovered. There were 69 watercraft related mortalities. For the fiscal year from July 1, 2004 through June 30, 2005, 346 manatee carcasses were documented in Florida. All but 3 of these carcasses were retrieved and necropsied in order to determine causes of death. An interactive searchable web-based database with manatee mortality information is available at FWRI's web page (http://research.myfwc.com/features/category_sub.asp?id=2241).

FWC staff and cooperators rescued 56 sick or injured manatees statewide under the federal rescue program. Three oceanaria participate 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 - Research and management staff participated as members of the USFWS Florida Manatee Recovery and Implementation Team's Manatee Population Status Working Group which developed a status statement on the Florida manatee.
One interagency, statewide "synoptic" aerial and ground survey of manatees was conducted in January 2005 to meet legislative requirements of conducting an annual manatee census. These surveys yield a minimum manatee population count. Good weather conditions contributed to the second highest count ever: 3,142 manatees were counted. For more information about aerial surveys and the synoptic count please go to http://research.myfwc.com/features/category_sub.asp?id=2190.

Behavioral Ecology and Movements - Research on manatee use of Florida's coastal habitats is essential to understanding what resources are required to sustain a healthy population. By tracking the movements of individual manatees in fresh, brackish, and saltwater habitats, valuable information is obtained about their seasonal and daily movement patterns, migratory behavior, site fidelity, and habitat use. To continue the study on winter foraging movements and attendance patterns at industrial warm-water sources in Tampa Bay, researchers tagged six manatees at Apollo Beach outside the TECO Big Bend power plant discharge canal in December

2004. The six manatees carried Global Positioning System (GPS) tags, time-depth recorders, and temperature dataloggers that provided data about movements, diving behavior, and water temperature throughout the winter and early spring.

FWRI, in cooperation with United Stated Geological Survey Sirenia Project and Mote Marine Laboratory, maintains an image-based, computerized database called the Manatee Individual Photo-Identification System (MIPS) 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. FWRI maintains the west-central and southwest Florida MIPS catalog that currently contains 559 fully-documented animals. FWRI continued to upgrade its photo-identification program to a completely digital system.

Contracts for Manatee Research - FWRI managed a contract for Mote Marine Laboratory to conduct the following manatee research studies: Studies in Matlacha Isles and Other Areas of Southwestern Florida: Fatty Acid Signature Analysis as a Potential Tool for Manatees; Modeling and Data Analysis; Calibration Studies at Ft. Myers Power Plant; Studies in Matlacha Isles and other areas of southwestern Florida: Facilitating adult survival estimations and documenting manatee habitat use patterns in southwestern Florida; Assessment of Thermal Biology and Potential for Thermal Stress; Boat Traffic Surveys of Broward County, Florida; and Manatee Rescue and Verification.

In addition, contracts related to manatee avoidance technology were managed through FWRI. Three projects funded under an RFP in 2003-04 continued during FY2004-05. An infrared camera project was completed and it was determined that this technology as it currently exists will not be useful in detecting manatees. None of the technology investigated to date is yet ready to be used in Florida waterways to alert boaters to the presence of manatees. For more details and completed project final reports see: http://research.myfwc.com/features/category_sub.asp?id=4468.

North Atlantic Right Whale

North Atlantic Right Whale Research Program (*Elsa Haubold*).--The FWC is involved in recovery efforts for endangered marine mammals including the north Atlantic right whale (*Eubalaena glacialis*), 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 - National Marine Fisheries Service (NOAA-NMFS). 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 approximately 325 individuals. In 1994, NOAA Fisheries designated Florida and Georgia coastal waters as critical habitat for the right whale as it is the only known calving ground of the north Atlantic right whale. FWC is instrumental in assisting a recovery plan implementation team whose aim is to help NOAA Fisheries by providing advice to and support of recovery activities. During FY 2004-05, FWC staff continued to chair this team.

During the 2004-2005 North Atlantic right whale calving season (December 01, 2004 – March 31, 2005) 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 unique individuals, and describe whale distribution and habitat. FWC staff conducted more than 100 aerial

surveys this season. The effort contributed to sightings of a total of 109 individual right whales. These data contributed to the identification of 28 mother/calf pairs, the second highest on record. Staff also assisted with the retrieval and necropsy of a 14-year old pregnant right whale in January 2005.

A leading cause of right whale mortality is collisions with ships. Since the loss of as few as 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 (EWS). Working with the Fleet Area Control and Surveillance Facility at the Naval Air Station in Jacksonville, FL, the EWS 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 close calls or collisions with right whales in the calving grounds. Another cause of human-related mortality is entanglements in fishing, and other, gear. Three entangled right whales were sighted in southeast US waters during the winter season. FWC staff participated in the successful disentanglement of one of the animals as well as documentation of the other two that could not be disentangled.

Bald Eagle

Statewide Nesting Population Survey (*Steve Nesbitt*).--The bald eagle is currently listed as a threatened species by both the Florida Fish and Wildlife Conservation Commission (FWC) and the United States Fish and Wildlife Service (USFWS). Florida has traditionally supported the largest nesting population of bald eagles (*Haliaeetus leucocephalus*) in North America south of the 40th parallel. Statewide eagle nesting surveys have been conducted annually since 1973 in an effort to monitor Florida's bald eagle population and identify trends in population status. The survey is conducted by using aircraft to visit all known nest territories in the State during the reproductive season. The goal of this study is to be aware of fluctuations in the bald eagle population that may be the result of development of Florida's wild lands, or other factors that may influence the eagle population.

The number of active bald eagle nesting territories documented in 2005 (1,133) was a 3.7% increase over the corrected number of nests documented in 2004, however this is the same number of active territories in Florida that were documented in 2002 and 2003. The estimated number of young produced (1,292) was close to the number estimated last year. The number of young produced per active territory and the number of young per successful nest were similar to last year and to the most recent 10 year average. These numbers represent an estimated population of between 3,014 (breeding adults and estimated non-breeder subadults) and 4,306 (breeding adults, non-breeder subadults, and young produced in 2005). The recent tendency of the flattening of the population's growth continues. This flattening would be expected as available eagle nesting habitat in Florida reached the point of population saturation.

A technical paper on the productivity of bald eagles in Florida that was to be written during the period was not completed due to delays in data analysis. The manuscript "Effects of drought on bald eagles nesting in North Central Florida" was published during the period in The Florida Field Naturalist. Another manuscript "A model to prioritize management decisions for bald eagle nesting territories in Florida" is completed and will be submitted to the Wildlife Society Bulletin for publication consideration.

Three hurricanes (Charley [Aug. 13], Frances [Sept. 5], and Jeanne [Sept. 25]) crossed peninsular Florida during a 6 week period in 2004. Though there was the potential that a third of the eagle nesting sites in Florida could have been affected, the actual consequence of the three storms, in terms of bald eagle productivity, was minimal. In some areas the impacts were more significant. Desoto County went from 6 active territories in 2004 to only 1 in 2005 as a result of Hurricane Charley. Generally less than 10% of the nests in the paths of the 3 storms showed any lasting impacts. In most cases nests were rebuilt or relocated near the original site.

The FWC website (http://myfwc.com/imperiledspecies/eagle.htm) that displays the most current record of bald eagle nest site information received 35,000 inquires from the public during the year. The most frequent use of this database was to search for nest locations.

Seasonal Movements (*Katherin Haley*).--Despite the recent population increase, concern remains for the long-term welfare of the bald eagle in Florida due to increased human development in bald eagle habitat and the species vulnerability to habitat loss. In order to better understand the risks that human development pose to Florida's eagles, it is important to determine how eagles nesting close to development fare compared to pairs nesting in more typical settings. Therefore, a project was initiated in 1997 to compare nesting success and post-fledgling survival of bald eagles from a random sample of developed (suburban) and undeveloped (rural) bald eagle nest sites over the next six years. To determine survival, five-year satellite transmitters [platform terminal transmitters (PTTs)] were attached to as many as 20 nestling bald eagles each year so that their fate could be determined.

Many of Florida's sub-adult bald eagles migrate north along the east coast to summering areas from North Carolina to Canada, where they spend 4-5 months. They then return to Florida, where they winter in areas that are often far away from their natal areas. Current bald eagle management primarily focuses on nest sites, but areas used regularly by sub-adult (non-breeding) eagles are also important resources that warrant management consideration. Since the study was initiated, 70 eagles have been fitted with satellite transmitters transmitting latitude, longitude, and mortality data. The locations will help the FWC and other state, federal and local land managers manage for bald eagles. The results of this study have expanded the knowledge of area and habitat requirements of Florida's sub-adult bald eagles by providing locations on migration routes and by determining summer and winter home range sizes and location. In 2006, FWC will continue to analyze and map location data and plan to publish this information as a Florida Bald Eagle Atlas. For more information, please contact Kate Haley at 850-488-3831.

Surveys on select FWC lands (*Phil Manor*).--Nesting surveys for bald eagles were conducted in January 2005 on Apalachicola River WEA and Aucilla WMA. Systematic aerial flights were conducted to locate bald eagle nests. Nest locations were recorded using GPS and the status of nests (active or inactive) was recorded. On Apalachicola River WEA 19 nests were observed, 17 of which were active and 2 of which had not been observed in previous years. On Aucilla WMA 1 active nest (observed in previous years) was recorded. For more information, contact Phil Manor at 850-827-2934.

Brown Pelican

Population Monitoring (*Steve Nesbitt*).--The United States population of brown pelicans (*Pelecanus occidentalis*) experienced a major reduction in the 1950s and 1960s. The objective of this project is to monitor the population status and gross productivity of the brown pelican in Florida.

A statewide aerial survey of brown pelicans was conducted in Florida on May 2 and 19, 2005. Ground checks were completed in early July. The number of nesting pairs estimated this year was 8,524 in 42 sites (Florida Bay and the lower Florida Keys being lumped as one site). This is above the mean for all years (8,167) and an increase of 21% over last years totals. Nesting success was measured at three Atlantic coast colonies. Based on 179 nests inspected, production was estimated to be 1.54 young per productive nest. This is consistent with the average for the past few years. There was one new nesting colony reported this year in Dade County on a small spoil island near the Rickenbacker Causeway. Though the total number of pairs was low (50), it does represent a new breeding site in a part of the state that has traditionally supported few nesting pelicans. The above numbers are indicative of an estimated population of 22,675 adult and subadult brown pelicans, and 13,127 young of the year for 2005 (this number may have been reduced due to the an early season hurricane, see below). The decline in the annual brown pelican nesting effort that was previously documented on the Gulf coast (particularly Tampa Bay and Charlotte Harbor) seems to have leveled off to some extent in 2005.

Hurricane Charley came ashore in Lee County (Charlotte Harbor) August 13, 2004 with 150 mph winds near the eye wall. On August 25, 2004 staff flew over the colonies that were in the vicinity of the storm in Charlotte Harbor. Bird Key, traditionally one of the larger colonies in Florida (600 -1,200 pairs), was the most dramatically affected. There were 100-150 pelicans on the island or in the water around the island and there was evidence that birds have been recently using the island for loafing or roosting. The vegetation on the island looked mostly denuded. There was a remnant of green just above the waterline on the island's edge, especially in the SW quadrant. At the center of the island the larger mangroves were broken off just above the ground, and the tops looked as thought they might be dead. The mangroves may sprout new growth, but whether any new growth will be sufficient to support the number of nesting pairs that traditionally use this site is unknown. Hemp Key typically supports 400 to 700 nesting pairs of pelicans and lies south and east of Bird Key. There were approximately100 pelicans in the area with signs of recent roosting. Here the mangroves showed about the same level of destruction as on Bird Key. In addition to the green rim of the island, there did appear to be some green vegetation at the center of the site, but this may not have been mangrove. Staff also checked Matlacha Pass, which is on the other side of Pine Island, to the east and south of Hemp Key. Matlacha is not as large a site (60 to 100 pairs) as either of the other two sites, but does have regular use by nesting pelicans. There were two to three dozen pelicans at the site and the vegetation was not as severely affected as at the previous two sites. Some damage was apparent to the mangroves at the center of the colony. The colony in Tarpon Bay, which is south of Pine Island on the northwest end of Sanibel Island, appeared to be intact and, for the most part, unaffected by the hurricane.

This spring, FWC staff took note of the nesting efforts in areas of Charlotte Harbor that were affected by Hurricane Charley in August. Only one site, Bird Key, showed a noticeable

reduction in nesting this year. Bird Key had only 150 nesting pairs using the site this year; the average is typically 890. Nesting was confined to the west side where there was a line of living mangrove; the remaining mangroves on this site appeared to be dead.

The panhandle nesting colonies were devastated when Hurricane Dennis came ashore in west Florida on July 10, 2005. Reportedly, the storm surge and wave action over-washed some of the colony sites and may have significantly reduced or eliminated any potential to fledge young at these sites.

For more information please contact the project coordinator at FWC's Gainesville Wildlife Research Lab Field Office at 352-955-2230.

Burrowing Owl

Research and Conservation (*Katherin Haley*).--FWC and City of Cape Coral staff completed the fourth year of a five-year study to evaluate the effectiveness of FWC management policies for burrowing owls (*Athene cunicularia*) in urban areas. The burrowing owl is currently listed as a species of special concern. FWC policy regulates take of nests during land clearing and development, with more stringent restrictions 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 is being 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. Preliminary analysis of this year's data: staff found approximately 230 nests, banded 89 adults and 68 juveniles, observed 117 individuals banded in previous years, and monitored 80 nests to estimate nest success, which averaged 3.4 young/successful pair (approx. 2/3 of nests were successful). 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. Questions about the burrowing owl project can be directed to the Project Coordinator at 850-410-0656, extension 17320.

Crested Caracara

Nongame Wildlife Grant - Crested Caracara Habitat (*Stuart Cumberbatch*).--Dr. Joan Morrison, Trinity College continued work on the development of a population viability analysis (PVA) for the state and federally threatened crested caracara (*Caracara plancus audubonii*) in Florida. The habitat suitability model developed during the previous year was tested and work was initiated on the PVA for the species. The projects' final report will examine the use of the PVA to simulate changes in population size, dynamics, and persistence given changes in land use across the region.

Florida Grasshopper Sparrow

Monitoring and Management Needs (*Michael Delany*). --The Florida grasshopper sparrow (*Ammodramus savannarum floridanus*) is an endangered subspecies endemic to the south-central prairie region of the State. Much of the native prairie has been altered by agriculture which probably caused the extirpation of the sparrow from some of its historic range. The minimum criteria for federal down-listing from Endangered to Threatened is that at least 10 protected locations contain stable, self-sustaining populations of ≥50 breeding pairs.

Distribution surveys during 2004 revealed an estimated 556 sparrows at seven locations. A Florida Fish and Wildlife Conservation Commission (FWC) contracted project with the Department of Defense to monitor Florida grasshopper sparrows at Avon Park Air Force Range (APAFR) was completed (1997-2005). Annual point count surveys were conducted at 240 monitoring stations on the installation. A continued decreasing trend since 1998 was observed for Florida grasshopper sparrows on APAFR, with all three populations now near extirpation. A spatial analysis of sparrow distribution showed a contraction away from forested edges with encroaching woody vegetation, and at locations that may not have received adequate prescribed fire to maintain suitable nesting habitat. The synchronous decline of once thriving populations on APAFR may be due to a decrease in demographic performance related to changes in vegetation caused by habitat degradation. There does not appear to be a similar decline at other monitored populations in Florida. For a subspecies already low in numbers and restricted in distribution, the decline of three protected and managed populations is especially troubling. The decline warrants intensive management and recent efforts have been made to improve and expand suitable grassland habitat for each population on APAFR. However, increased military activities on base may further jeopardize the bird and additional restrictions in access to populations on target areas may affect future monitoring.

A study initiated this year will examine point count survey data, landscape features, and land management information for all Florida grasshopper sparrow populations on public lands. This analysis is needed to evaluate recovery efforts. Comparisons among populations may provide insight into population fluctuations and declines, and serve as a basis for management guidelines.

For additional information on Florida grasshopper sparrows, please contact the principal investigator at 352-955-2230.

Surveys Conducted on Three Lakes Wildlife Management Area (*Steve Glass*).--Point count surveys for Florida grasshopper sparrows have been conducted at Three Lakes Wildlife Management Area (TLWMA) since 1991. The surveys are conducted each spring (April- June) and consist of a grid of 190 stations, 0.25 mi (.40 km) apart. Each station is surveyed 3 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 2005, surveys estimated there were at least 114 different male Florida grasshopper sparrows at the main site and only 1-2 different males at the translocation site. These data indicate a decrease in Florida grasshopper sparrow numbers from 2004 surveys at both the main site (124 males) and the translocation site (7 males). Monitoring will continue at TLWMA and efforts will be made to expand the population through habitat improvement.

For additional information or questions about this report, please contact Steve Glass at 407-436-1818.

Florida Sandhill Crane

Florida sandhill cranes on Mitigation Parks (*Shane Belson*).--Florida sandhill crane (SHC, *Grus canadensis pratensis*) habitat management was conducted during Fiscal Year 2004-2005 at FWC Mitigation Park Program facilities. Three sites that regularly support SHCs

are Split Oak Forest Mitigation Park (SOMP) Wildlife and Environmental Area (WEA), Platt Branch Mitigation Park (PBMP) WEA, and Bullfrog Creek Mitigation Park (BCMP) WEA. The principal management strategy is to maintain and reestablish open grasslands for SHC foraging.

At SOMP, 60 ac (24 ha) of improved and semi-improved pastures were mowed and burned to provide foraging and loafing areas for SHCs. Wax myrtle (*Myrica cerifera*) was roller chopped on 25 ac (10 ha) of pasture at PBMP to improve foraging conditions. At BCMP, 60 ac (24 ha) of pasture were mowed and burned to provide foraging areas for resident breeding SHCs and prevent wax myrtle reestablishment.

Additional information on SHC management at FWC Mitigation Park Program facilities is found in the "FWC Mitigation Park Program FY 2004-2005 Annual Report" on file at the Kissimmee Field Office. Contact Shane Belson at 407-846-5300 for information.

Florida Scrub Jay

Demographics in Suburban Charlotte County (*Karl Miller*).--FWC staff continued to study Florida scrub jay (*Aphelocoma coerulescens*) population demographics in suburban Charlotte County, focusing on the Deep Creek region which supports the second largest population of scrub-jays in southwest Florida. Limited research has been done on scrub-jay demographics in suburbs even though 30-40% of the statewide scrub jay population occurs in suburban habitats. The primary goal of this color-banding study is to determine if this population is stable or declining. Second, if it is declining, the study will determine what life history stage is most affected (nest success, productivity, recruitment, or adult survival) and make recommendations about how the causative factors can be addressed in the context of land use planning and metapopulation dynamics.

During FY 2004-2005, FWC staff conducted summer, fall, and spring population surveys to census the size, location, and composition of all Florida scrub jay family groups in the study area. The population size had declined from 69 family groups during the 2004 breeding season to 61 family groups early in the 2005 breeding season. This decline was largely related to the disappearance of several 'ephemeral' territories temporarily established by one-year-old birds in 2004. Staff captured and color banded 174 scrub jays in Charlotte County, including 20 adult jays, 5 one-year-old jays, and 149 nestling or fledgling jays. Each scrub jay was fitted with a unique combination and sequence of 3 plastic color bands and 1 numbered aluminum USGS band. Family groups were monitored during the breeding season (February – July) to determine the onset and duration of breeding activity. We located and monitored 146 scrub jay nests, at least 34 (23%) of which succeeded in fledging young. Access was restricted to 5 nests, and we were unable to determine conclusively if those nests were successful; thus, 23% is a minimum estimate of nest success. Nest predation accounted for nearly all of the nest failures. Nests were built at heights ranging from 2.30 to 18.04 feet (0.7 to 5.5 m), with a mean nest height of 5.58 feet (1.7 m) above ground. Of particular concern was the large percentage of nests located in exotic vegetation in, or near, suburban yards (Table 3).

Blood samples were collected from Charlotte County scrub jays for collaboration with the statewide genetics study being conducted by Archbold Biological Station and Cornell University. Staff prepared several different educational handouts and pamphlets in both English and Spanish and distributed them to citizens, homeowners, laborers, and local government staff.

Table 3. Nest substrate used by suburban Florida Scrub Jays, Charlotte County, Florida, 2005.

Plant species	# nests	% of total
Native		
Oaks (*Quercus* spp.)	57	39.0
Q. virginiana	(27)	
Q. myrtifolia	(19)	
Q. geminata	(4)	
Q. laurifolia	(4)	
Q. chapmanii	(3)	
Wax myrtle (*Myrica cerifera*)	38	26.0
Vine (*Vitis*) tangles on dead foliage	14	9.6
Other native shrubs and trees	3	2.1
Non-native		
Ornamental evergreen shrubs and trees	23	15.8
Brazilian pepper (*Schinus terebinthifolia*)	11	7.5
Total	146	

During FY 2005-2006, the project will continue to: 1) monitor group size and composition of family groups during bi-annual surveys; 2) determine juvenile production in July; 3) determine recruitment of young into the population as one-yr-old helpers; 4) determine adult survival; 5) monitor dispersal on and off the study site; and 6) examine correlates of demographic success on a territory-by-territory basis using both vegetation measurements and GIS data layers. In addition, special attention will be given to monitoring the effects of recent hurricanes on the study population. Educational efforts will continue with citizens and landowners. For more information on the above project, contact Karl Miller (352-955-2230).

Monitoring and Management of Florida Scrub-Jays at Cedar Key Scrub State Reserve/WMA and Vicinity (*Karl Miller / Norberto Fernandez*).--Monitoring of the Florida scrub jay population in and around Cedar Key Scrub State Reserve / Wildlife Management Area (WMA) in Levy County, Florida, continued during FY 2004-2005. During the 2005 breeding season, staff color banded 2 adult and 4 fledgling Florida scrub-jays and re-captured additional individuals to collect blood for genetics research being conducted by Archbold Biological Station and Cornell University. At the end of FY 2004-2005, the known population consisted of 8 resident family groups, totaling approximately 25 scrub-jays. Of particular note was the immigration of additional jays into the northeastern portion of the WMA in an area that had been treated with prescribed fire 4 years ago, with the eventual settling of a new breeding pair in xeric oak scrub. Approximately 280 acres (113 ha) were prescribed burned during the growing season and an additional 260 acres (105 ha) were roller-chopped to reduce the vegetative height of the scrub prior to the scheduled burning of that parcel in FY 2005-2006. During FY 2005-2006, FWC staff will continue to assist the Florida Park Service in training volunteers to monitor the

number and composition of family groups and to color band adults and fledglings. Ongoing scrub-jay population monitoring will be critical in assessing the effectiveness of scrub habitat restoration activities being conducted by agency partners. For more information contact Karl Miller (352-955-2230) or Norberto Fernandez (352-493-6740).

Florida Scrub-Jays on Mitigation Parks (*Shane Belson*).--Florida scrub jay monitoring and management are priority activities at FWC Mitigation Park Program facilities. Three sites, Hickey Creek Mitigation Park (HCMP) Wildlife and Environmental Area (WEA), Platt Branch Mitigation Park (PBMP) WEA, and Moody Branch Mitigation Park (MBMP) WEA, currently support scrub-jays. Annual population surveys [expressed as family (F), individual (I), average family size (AFS)], banding, and habitat enhancement projects were conducted at these sites during Fiscal Year (FY) 2004-2005.

A comprehensive scrub-jay management plan for HCMP was developed for FWC by Archbold Biological Station. The plan evaluates metapopulation trends (≈50% decline since 1995), provides current population census data for HCMP (3 F, 7 I) and within a 6.2 mi (10 km) radius (5 F), recommends site-specific habitat management strategies, and establishes maximum population goals (12-14 F). An annual population survey performed by FWC provided similar results (3 F, 8 I, 2.7 AFS). Five birds were color banded in conjunction with management plan development.

FWC completed an annual population survey at PBMP (7 F, 23 I, 3.3 AFS). Recruitment consisted of a total of five juveniles among four families. Since acquisition in 1995, the population at the site has remained fairly stable, but the number of family groups has declined slightly (9 F, 29 I in 1994).

A population survey at MBMP (2 F, 8 I, 4.0 AFS) was performed by a U.S. Fish and Wildlife Service contractor as part of a metapopulation-wide census ("Distribution of the Florida Scrub-jay (*Aphelocoma coerulescens*) within the Hillsborough/Manatee Metapopulation", Grant Agreement No. 401813G024). Six birds were color banded under the Duette Park Short Term Scrub Habitat Management Plan project administered by Manatee County. In addition, MBMP was incorporated into Jay Watch, a volunteer-based scrub-jay monitoring program established by The Nature Conservancy.

Scrub-jay habitat enhancements during FY 2004-05 included mechanical treatments and prescribed burning. Hydro-ax and chainsaw treatments were applied to 20 ac (8 ha) at HCMP. Scrubby flatwoods and pasture were roller chopped [65 ac (26 ha)] and large oaks (*Quercus* spp.) were removed using chainsaws [30 ac (12 ha)] at PBMP. Enhancement at MBMP commenced with the prescribed burning of 20 ac (8 ha) of overgrown scrub. Management strategies at HCMP, PBMP, and MBMP will continue to focus on habitat enhancements that facilitate population stability or expansion.

Additional information on scrub-jay management at FWC Mitigation Park Program facilities is found in the "FWC Mitigation Park Program FY 2004-2005 Annual Report" on file at the Kissimmee Field Office. Contact Shane Belson at 407-846-5300 for information.

Florida Scrub Jay Monitoring Activities, Camp Blanding Wildlife Management Area (*Jim Garrison*). --A small, remnant population of Florida scrub jays has existed within the cantonment area at Camp Blanding Wildlife Management Area (WMA) for several years. It is believed this is the most northern extent of scrub-jays in Florida. The population size has varied

over the years, with 7 or fewer individuals normally counted. The only monitoring activities conducted concerning scrub-jays were random surveys with tape recorded calls. During this reporting period, 3 scrub-jays were located in the portion of the cantonment area called the Kingsley Scrub.

It is believed that a significant population of scrub jays occurs in the artillery impact area, about 5 miles (8.05 km) south of the Kingsley Scrub at Camp Blanding WMA. This area is off limits to all personnel due to the dud artillery shells that occur in the area. Therefore, no scrub jay surveys can be completed and the population level is unknown. However, this area is subject to frequent fires from munitions impact and aerial prescribed burning. Habitat in the impact area should be suitable for scrub-jays for the foreseeable future, and scrub-jays seen on other areas of Camp Blanding WMA are probably dispersing from the impact area population.

Florida Scrub-Jay Population Survey and Habitat Management on Half Moon Wildlife Management Area (*Nancy Dwyer*).--FWC staff continued monitoring the Florida scrub jay population on the Half Moon Wildlife Management Area in west central Florida. To better monitor the population, 8 scrub jays were banded in 2004-05 for a total of 65 birds banded since 2001. Half Moon WMA supports about 8 family groups but only two fledglings were observed this year. The present population is still estimated at about 30 birds. A dispersal event was documented in October 2004 when a jay banded on Halpata Tastanaki Preserve in Marion County occupied an area on Half Moon restored through roller chopping and burning. Scrub jays had last occupied this site in 1997 when it apparently became too overgrown; 5 scrub jays now occur in this area.

Habitat management has focused on growing season prescribed burning and mowing overgrown oak trees. Prescribed burns in the past two growing seasons comprised about 400 acres (161.87 ha) of potential or occupied scrub jay habitat. Half Moon likely harbors a maximum of 500 acres (202.34 ha) of potential scrub jay habitat. Oak trees (*Quercus* spp.) and palmetto (*Serenoa repens*) areas have been mowed prior to burning where vegetation is too dense or tall relative to scrub jay habitat preferences. Eighty acres (32.37 ha) of roller chopping is planned for 2005-06.

Florida Scrub Jay Population Monitoring on Select Wildlife Management Areas- Lake Wales Ridge Wildlife and Environmental Area (WEA) (*Mike McMillan*).--Florida scrub Jay monitoring is a priority activity at the Lake Wales Ridge Wildlife and Environmental Area (WEA). FWC staff monitors scrub jays at 20 individual sites on the WEA using the Archbold Biological Station (ABS) and Jay Watch, a local volunteer group sponsored by The Nature Conservancy. ABS and Jay Watch conducted scrub jay surveys between 17 June and 27 July 2004. This time period is selected because most annual reproduction is complete, surviving young are nearing or have recently reached nutritional independence from their parents, but are still likely to be in close proximity to their natal territory. Additionally, the young still have the brown crown plumage characteristic of juveniles, enabling FWC to estimate the number of independent young produced per group for each survey site.

In 2004, Jay Watch and ABS surveyed four common sites (Gould Road, Carter Creek, Holmes Avenue, and Silver Lake) as a test for comparison of data collected between trained volunteers and biologists. It was found that Jay Watch data are comparable to ABS data. There were a total of nine different sites surveyed in 2004. The WEA had a total of 133 groups with a

mean group size of 2.99 individuals. This is an increase from 2003 when only 97 groups were found, but mean group size was only slightly lower, 2.93. The mean number of young per group was 0.86 in 2004. The data collected in this monitoring effort is key in determining annual population estimates on the WEA and will be use to assess the success of scrub restoration and management on these properties.

Peregrine Falcon

Annual Population Monitoring Contract (*Brad Gruver*).--Each fall, the narrowing of the Florida Peninsula into the Florida Keys concentrates large flights of migrating raptors en-route to southern wintering grounds. Counts of migrating raptors at major concentration points, such as the Florida Keys, are valuable for monitoring long-term trends in raptor populations, which are difficult to survey using other methods. HawkWatch International (HWI), under contract with the FWC, conducted a standardized daily count of migrant raptors annually from 1999 to 2004 at Curry Hammock State Park in the Middle Florida Keys, with emphasis on monitoring the peregrine falcon (*Falco peregrinus*). HWI also conducted banding and stable isotope studies at Curry Hammock State Park to describe the geographic origins of migrants, and implemented an environmental education program to share the results of this research with visitors to the research site, and with classrooms and community groups throughout the Florida Keys. A draft final report on the results of this work was submitted and a final report is being prepared for publication.

Red-cockaded Woodpecker

Red-cockaded Woodpecker Management on Select FWC Managed Lands (*Robin Boughton*).--The red-cockaded woodpecker (*Picoides borealis*; RCW) is a federally endangered species listed by Florida as a species of special concern. RCW population surveys continued on 3 wildlife management areas (WMA) in southern Florida – Three Lakes Wildlife Management Area (TLWMA) in Osceola County, Babcock-Webb WMA in Charlotte County, and J.W. Corbett WMA in Palm Beach County. The scope of work scheduled for fiscal year (FY) 2004-2005 included monitoring the number of active clusters, monitoring active clusters for nests, color-banding nestlings, determining fledging success, and increasing population size and success through translocation and installation of artificial cavities in existing clusters and recruitment clusters.

The number of active clusters at TLWMA has been stable since 1999. The number of active clusters at Babcock Webb WMA and J.W. Corbett WMA has slowly increased since 2002. In comparison to previous years, reproduction during the 2005 nesting season was poor. Hurricanes struck all three WMAs; many cavity trees were blown down or broken and many birds disappeared. Staff replaced lost cavities by installing artificial cavities following the hurricanes. During the 2005 nesting season, there were 51 active RCW clusters at TLWMA. Thirty-three of these clusters fledged young, and fledgling production averaged 1.14 (1.52 per successful nest). At Babcock-Webb WMA, there were 27 active clusters in 2005, an increase of two over 2004. Sixteen clusters fledged young, and fledgling production averaged 0.69 (1.00 per successful nest). At J.W. Corbett WMA, there were 13 active clusters in 2005, an increase of

three clusters over 2004. Four clusters fledged young, and fledgling production averaged 0.67 (1.00 per successful nest).

Corbett WMA received six juvenile RCWs from Apalachicola National Forest prior to the breeding season to increase the number of potential breeding groups. Birds were paired and placed in new recruitment clusters created by installing artificial cavities in previously unoccupied habitat. In total, 19 artificial cavities were installed at TLWMA, 21 were installed at Babcock-Webb WMA and 13 were installed at J.W. Corbett WMA. At J.W. Corbett WMA, habitat restoration for RCWs also included chopping 126 acres (51.03 hectares) to reduce midstory height.

During FY 2005-2006, active clusters will be monitored for nests, nestlings will be banded, and fledging success will be determined on each of the 3 WMAs. Work will continue to focus on active management to enhance reproductive success and to increase population size. Questions about this project should be directed to the Avian Coordinator at 352-732-1225.

Conservation Planning (*Robin Boughton*).--Statewide conservation planning for the Red-cockaded woodpecker (RCW) continued throughout fiscal year (FY) 2004-2005. Progress on the priority actions identified in the plan and not previously completed is outlined below.

Develop a Memorandum of Agreement (MOA) with the United States Fish and Wildlife Service (USFWS) - FWC staff have discussed development of an MOA with USFWS staff and determined that there is no immediate need for an MOA to guide conservation activities. Staff of the FWC and the USFWS have a history of close cooperation on RCW recovery in Florida. Both agencies are currently under a MOA with the Forest Service that guides translocation activities in Florida. Upon completion of the Risk Assessment (see below) and identification of immediate management needs, staff will reevaluate the need for an MOA to accomplish management needs.

Develop and maintain a RCW database for Florida - The RCW database previously developed was updated with current information on population size, ownership, habitat, and management activities.

Conduct a risk assessment for each metapopulation and prioritize metapopulations according to their immediate management needs - The RCW database was expanded to include biological, spatial, and management data relevant to a risk assessment. Site visits were conducted for nearly every Florida RCW population to evaluate management activities, habitat condition, and management needs. Risk assessment data was distributed and discussed at the Central Florida RCW Working Group meeting in August 2004 and at the panhandle populations banding meeting in April 2005. Discussions at the meetings facilitated development of a list ranking risk factors for RCW populations. An analysis of populations and metapopulations most at risk is complete.

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

Coordinate the initiation of MOAs, management plans, and conservation activities for metapopulations - Management plans for each Florida RCW population are on file with FWC as a prerequisite to translocation activities. Preparation of MOAs for each metapopulation has not been pursued because interagency cooperation and communication has been and continues to be exceptional. MOAs will be developed on an as-needed basis for the populations most at risk and those where improved cooperation or management is needed.

Coordinate with the USFWS to develop a statewide Safe Harbor program for RCWs in Florida - A draft RCW Safe Harbor Agreement was prepared and submitted to the USFWS for preliminary review during FY 2003-2004. A revised draft was prepared incorporating the changes requested by the USFWS and was submitted to FWC staff for review. Internal review by FWC was completed and a formal application for the RCW Safe Harbor was submitted to the USFWS after the reporting period and will be reviewed early 2006.

At the close of the 2005 RCW breeding season, Florida RCW populations were on track to achieve and in many cases exceed the year 2020 population and metapopulation goals outlined in the Management Plan. Field visits to RCW populations have confirmed that by and large RCW 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 RCW recovery in Florida. Continued implementation of the Management Plan will ensure cooperation among managing agencies and eventual recovery of the species.

Questions about conservation planning for RCWs should be directed to the Avian Coordinator at 352-732-1225.

Blackwater WMA (*Pat Bowman*).--The RCW has been intensively managed on Blackwater WMA by Florida Division of Forestry (DOF) cooperatively with FWC since 1996. The population has been monitored using leg bands, banding of nestlings and unmarked adults, "fledge checks", translocations, and installation of artificial cavities where appropriate. During the time period of July 1, 2004 to June 30, 2005 management efforts for RCW's intensified due in part to Hurricane Ivan which made landfall in September of 2004, devastating cavity trees and most of the eastern half of the WMA. A total of 70 artificial cavities were installed to mitigate tree loss caused by Ivan and there were three confirmed RCW mortalities. Of approximately 400 standing trees prior to Ivan, 96 were damaged and found to be unusable by the birds and another 44 were leaning at least 15 degrees.

In preparation for incoming translocation of 3 pairs, 4 recruitment clusters were installed, each with 4 artificial cavities. Separate from these recruitment clusters, an additional 19 cavities were installed due to continuing tree damage left over from Ivan and more recently Hurricane Dennis. No trees were uprooted or broken during Dennis, but the additional wind and rainfall increased the lean of some trees or otherwise made the trees unsuitable to the birds. During the nesting season, 42 chicks were banded and checked for fledging.

Apolachicola River WEA (*Phil Manor*).--In an effort to improve and enhance habitat for RCWs, three recruitment clusters were established on Apalachicola River WEA. Clusters were established in suitable habitat and within the appropriate proximity of existing RCW clusters. A total of 14 artificial cavities were installed and monitored.

Red-cockaded woodpeckers on Mitigation Parks (*Steve Shattler*).--Management of the Fisheating Creek RCW population in Highlands and Glades Counties is conducted primarily under the direction of FWC. This population includes three clusters at Platt Branch Mitigation Park (PBMP) Wildlife and Environmental Area (WEA) and 11 clusters at the adjacent Lykes Bros., Inc. (LBI) property. FWC conducts annual monitoring of cluster activity and breeding success by color-banding and surveying all known adults and hatchlings.

Annual population monitoring during FY 2004-2005 determined that thirteen clusters were active. Ten clusters consisted of breeding pairs, two contained single individuals, and one consisted of two birds of the same sex. Two females dispersed during the breeding season. Nine clusters produced eggs and eight clusters successfully fledged a total of eight young. One adult and 11 nestlings were color banded.

FWC assists with the management of RCW habitat at the LBI property through a cooperative agreement with the U.S. Fish and Wildlife Service (USFWS) and LBI. With the assistance of a USFWS grant, extensive habitat enhancement continued on LBI during FY 2004-2005 including mid-story and understory mowing of 1,000 ac (405 ha) which improved habitat conditions at two RCW clusters. This activity brings to 2,000+ ac (809+ ha) the total area treated with mowing and prescribed fire since FY 2003-2004 on LBI.

The Fisheating Creek RCW population has historically been limited by a shortage of suitable cavities. A recruitment cluster was created through the installation of six USFWS-approved cavities at PBMP and LBI combined with mowing of understory and mid-story vegetation. All clusters currently contain at least four suitable cavities, which is the minimum recommended by the USFWS RCW Recovery Plan. Additional measures taken to improve habitat and protect nest trees include installing snake guards on newly active cavity trees; reducing fuel around cavity trees for fire protection; repairing degraded cavities; and providing alternative nest boxes for RCW cavity competitors.

FWC management of the Fisheating Creek RCW population will continue at PBMP and LBI with additional monitoring and habitat enhancement projects. Additional information on RCW management at FWC Mitigation Park Program facilities is found in the "FWC Mitigation Park Program FY 2004-2005 Annual Report" on file at the Kissimmee Field Office. Contact Shane Belson at 407-846-5300 for information.

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 (WMA) is to assist the lead area manager with management, and provide technical assistance for the RCW population on the site. During the reporting period, useable RCW habitat increased to 141 cavity trees in 24 active clusters (21 potential breeding groups, mean group size = 3.23). A total of 22 clusters were reported as suitable ($\geq$ 4 cavity trees per cluster), and 3 recruitment clusters were brought up to suitable status. This continues a steady increase in active clusters. In November of 2004, five birds were relocated to Camp Blanding from Apalachicola National Forest. In addition, several internal relocations were accomplished.

Of the 21 family groups, 20 nested and 18 were successful in hatching chicks. Twenty-six nestlings were banded, and 20 were fledged (1.11 fledglings per successful nest). A total of 74 cavity inserts were intact and useable during the reporting period, including several inactive clusters. Debris was removed from 8 cavities and invasive animals were displaced in 7 nest cavities. Nineteen new cavity inserts were installed and four were replaced. Habitat surrounding seven clusters was subject to prescribed fires during the growing season.

Monitoring and Management of Red-cockaded Woodpeckers on the Goethe WMA (*Norberto Fernandez*). --The FWC currently assists the Division of Forestry (DOF) in monitoring and managing the RCW population on Goethe State Forest / Wildlife Management Area (WMA) in Levy County, Florida. During FY 2004-2005, there were 40 active clusters of

RCWs on Goethe WMA. The monitoring program for FY 2004-2005 included roost checks at each of the 40 active clusters, cavity and tree inventories at 40 active and 16 inactive clusters, non-systematic searches for new RCW cavities, removal of cavity competitors (i.e. flying squirrels), and the banding and sexing of chicks of the year (n = 42). During the search for new cavities, two previously undetected cavities were documented. Twenty-four artificial cavities were inserted as required for the 3 pairs of RCWs trans-located to Goethe WMA from the Apalachicola National Forest during FY 2004-2005. As a result of last year's hurricanes, an emergency inventory was conducted to assess the loss of RCWs and cavity trees, and work was completed to drain water from flooded RCW cavities. Protective measures were taken to protect cavity trees by mowing or burning within a 30-ft (9-m) diameter of the trees prior to conducting approximately 4,000 acres (1,619 ha) of prescribed burns designed to improve RCW nesting and foraging habitat on the area during FY 2004-2005. During FY 2005-2006, the FWC will continue to assist the DOF in monitoring and managing the RCW population on Goethe WMA.

Red-cockaded Woodpecker Population Management on Citrus Wildlife Management Area (*Rick Spratt*).--FWC staff, in cooperation with the DOF, continued monitoring the Red-cockaded Woodpecker (RCW) population on the 49,000-acre Citrus tract of the Withlacoochee State Forest in west central Florida. Of 47 active RCW clusters, 44 nested and 38 of these were successful in fledging 59 young (38 male, 21 female) which was an 11% increase from 2004. The number of nesting clusters increased to 44 in 2005 from 33 in 1999. Color banding continued with 70 nestlings banded during FY 2004-2005. No translocations were attempted and the current adult population stands at 106.

Active management to increase reproductive success, population size, and habitat quality included installation of artificial cavity inserts and hardwood control. In FY 2004-2005, six new recruitment clusters (at least four artificial cavities installed in each chosen area) were created while cavity numbers were augmented at existing clusters using additional cavity inserts for a total of 41 installed inserts. Encroaching oak trees (*Quercus* spp.) were cut and cavity trees in clusters located within prescribed fire units were protected by raking and pre-burning.

Roseate Tern

Management Actions (*Ricardo Zambrano*).--The Caribbean population of the roseate tern (*Sterna dougallii*) is designated as Threatened by both the FWC and the U.S. Fish and Wildlife Service. There are only two known nesting sites in North America. The first is a natural nesting site designated as Pelican Shoal Critical Wildlife Area (CWA), located approximately 7 miles south-east of Key West. The second is an artificial site; the roof top of the state government building located in the Marathon Government Center, Marathon, Florida.

Under the designation as a CWA, FWC has the responsibility to manage the area with the goal of resource conservation. FWC biologists post Pelican Shoal every year between April 1 and August 31 with "No Trespassing" signs during the roseate tern nesting season. Staff also surveys the CWA and roof site to conduct nest, egg, juvenile, and adult counts. One-hundred fifty three chicks and seven adults are captured, banded, and released onsite. It is hoped that band results from this project will lead to information on the wintering grounds of this species as well as detect inter and intra-colony movement as well as fledgling survivorship.

Concern about erosion at Pelican Shoal has prompted FWC staff to look for alternate roseate tern breeding habitat. Historically, roseate terns nested at the Dry Tortugas National Park. FWC biologists would like to re-establish this colony. In cooperation with the National Park Service, 15 wooden decoys cut and painted to resemble roseate terns were placed on potential nesting habitat in the Dry Tortugas prior to the nesting season. Unfortunately, this attempt was not successful in attracting the terns back to the Dry Tortugas. Next year staff will attempt to broadcast roseate tern calls using solar-powered CD players next to the decoys.

For more information on the roseate tern, please contact Ricardo Zambrano at 561-625-5122 or email at ricardo.zambrano@myfwc.com.

Snail Kite

Surveys Conducted on the Kissimmee Chain of Lakes during 2005 (*Adriene Landrum*).--In compliance with the Lake Tohopekaliga Environmental Impact Statement issued by the United States Army Corps of Engineers, quarterly surveys of the Everglade Snail Kite (*Rostrhamus sociabilis)* have been conducted by FWC staff on the Kissimmee Chain of Lakes (KCOL) since October 2002. The surveys are used to monitor usage and nesting activities before, during, and after the 2004 Lake Tohopekaliga Habitat Enhancement Project.

Monitoring of the endangered snail kite was conducted via airboat surveys on lakes Tohopekaliga, Kissimmee, Cypress, Hatchineha and Tiger during FY 2004-2005. In 2004-2005, annual mean number of birds on Lake Tohopekaliga increased from 5 (2003-2004) to 16 birds, which is similar to pre-enhancement estimates (2002-2003). Recently and during the July 2005 survey, increased activity and a prolonged nesting season on Lake Tohopekaliga were discovered. This indicates that nesting may continue until the birds fledge in October 2005. It is poignant to add that in recent meetings (August 2005), the United States Fish and Wildlife Service informed state and local resource managers that the KCOL is the focal nesting area statewide for the 2005 nesting season. Additionally, a notable increase in egg production of the exotic channeled apple snail (*Pomacea canaliculata*) has been observed at Lake Tohopekaliga during spring and summer 2005. Apple snails are the staple prey item for these raptors. This increase in snail production may have contributed to the centralized and extended nesting activities presently occurring on Lake Tohopekaliga. Annual mean number of snail kites observed on Lake Kissimmee was 29 birds in 2004-2005 and has remained consistent with 2003-2004 estimates (30 birds). In fall 2004, violent wind and wave action due to the hurricanes altered and diminished nesting habitat on the north and western shorelines of Lake Kissimmee. As a result, nesting activities on Lake Kissimmee declined in spring 2005. One successful nest was documented in 2005 in a Carolina willow (*Salix caroliniana*) patch on Ox Island. No snail kites were observed on Lakes Cypress, Hatchineha and Tiger during the report period.

On-going monitoring of snail kites has occurred on the KCOL since 1989. Monitoring has typically been associated with evaluating impacts to the species during large-scale enhancement projects. The endangered raptor has increasingly utilized the KCOL in the past 20 years. In the early 1990's, kites inhabited the KCOL secondarily as "refugia" during unfavorable hydrological conditions in south Florida; however, recently the system has become important habitat for the imperiled bird as habitat conditions have declined in Lake Okeechobee and the Everglades (the kites' primary habitat).

Table 4. Average number of Snail Kites observed during surveys on the Kissimmee Chain of Lakes.

Lake	FY 2002-03	FY 2003-04	FY 2004-2005
Tohopekaliga	15	5	16
Kissimmee	52	30	29
Cypress	<1	0	0
Hatchineha	1.7	<1	0
Tiger	<1	<1	0

For additional information concerning Everglade Snail Kite surveys on the KCOL, contact Adriene Landrum, Florida Fish and Wildlife Conservation Commission at 407-846-5300.

Snowy Plover

Status and Distribution *(John Himes/Nancy Douglass)*.--The snowy plover (*Charadrius alexandrinus*) breeds and winters along the coastal beaches of Florida. Loss of nesting habitat and a reduction in productivity has apparently led to a decline in breeding populations of snowy plovers in the southeastern United States. As a consequence, the snowy plover is listed as Threatened by the FWC.

A cooperative agreement with the United States Fish and Wildlife Service (USFWS) provided funds to re-assess the status and distribution of both wintering and breeding snowy plovers. This reassessment was undertaken from January to August 2002 and final data analysis was undertaken in 2005. The survey found the winter snowy plover population consisted of approximately 300 individuals and the breeding population consisted of at least 213 breeding pairs. The number of individuals present in the breeding population is about 1.5 times the winter population, and thus a large portion of the breeding population in Florida presumably winters outside the state.

The breeding population of snowy plovers in Florida was 27.5% greater in 2002 than it was during the last statewide survey in 1989. However, the larger population size estimate was most likely the result of increased survey effort along the southwest coast, and not reflective of an actual population increase. Based on results where direct comparison between years was possible, the size of the snowy plover population appears to have changed little over the last 13 years. While the size of the population has not changed significantly, its distribution amongst sites has shifted. Areas in the western panhandle where snowy plovers were concentrated in 1989 had far fewer nesting pairs in 2002; areas in the eastern panhandle had a significantly larger proportion of the population. In southwest Florida, a larger number of occupied sites were documented, though a majority of sites supported only one or two isolated breeding pairs; the exception was Sanibel Island, which accounted for nearly 1/3 of the region's snowy plover population and almost 10% of the statewide population.

Another important finding of the study related to the length of the breeding season of snowy plovers in Florida. Plovers were found nesting in mid-February in southwest Florida and late-February in the panhandle. This is several weeks earlier than the earliest recorded nesting pairs in 1989 and is substantially earlier than other breeding shorebirds and seabirds (terns and skimmers) on which most protection efforts are based.

Productivity Pilot Study (*John Himes/Nancy Douglass*).--Although the 2002 status and distribution study was supposed to assess snowy plover productivity, the long survey interval utilized and the lack of uniquely color banded birds made it impossible to effectively measure productivity. Differences in productivity may occur at small versus large sites or at sites with high versus low levels of human disturbance. Determining productivity and the factors that potentially influence productivity could help in the development of management actions to conserve snowy plovers.

The cooperative grant agreement with the USFWS was extended to provide additional funds for a study of techniques for assessing productivity of breeding snowy plovers in Florida. Field surveys were initiated in March 2004 and continued through the end of August 2004 at three sites in the Florida panhandle. Sites were surveyed once every 3 days by foot or on an All Terrain Vehicle (ATV). Locations of snowy plovers were recorded and birds were observed for a short period of time to determine breeding status. When snowy plovers exhibited breeding behavior, the area was searched on foot for a nest. Nest contents were recorded and habitat features measured. If nests were found with a full clutch (i.e. 3 eggs), eggs were floated to determine approximate hatching date.

Nests were randomly assigned to two treatment groups. The first group was monitored at 3-day intervals to determine the fate of nests and chicks without any color marking of adults or young. The second group was monitored on the same schedule, but adults and chicks were uniquely color-banded. Trapping of adult plovers was accomplished using either a noose mat or bow net trap. Chicks were trapped at nests using a hand net.

Data analysis is ongoing to determine which method (banding vs. not banding) is most effective and efficient in assessing snowy plover productivity. Data will be analyzed to determine snowy plover productivity at the three survey areas. Based on the outcome of this pilot study, a broader scale project could be implemented to determine productivity at beaches statewide. This technique could be used in future studies comparing snowy plover productivity at nests undergoing different management treatments.

For more information on the results of the 2002 statewide survey or the 2004 pilot productivity study, please contact Dr. John Himes at 850-265-3676 or Ms. Nancy Douglass at 863-648-3203.

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 (*Falco sparverius paulus*) on Camp Blanding Wildlife Management Area consist of providing and maintaining nest boxes and conducting surveys. During February and May of the reporting period, 38 nest boxes were surveyed and 12 contained active kestrel nests. Nests contained from 4 to 5 eggs and one contained 5 fledglings. Eight boxes were used by

flying squirrels (*Glaucomys volans*), 6 contained bluebird nests (*Sialia sialis*), 4 contained great-crested flycatcher nests (*Myiarchus crinitus*), 2 contained active eastern screech owl nests (*Otis asio*), and 6 boxes were empty.

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 consist of providing and maintaining nest boxes and conducting surveys. During February and May of the reporting period, 14 nest boxes were monitored and maintained. Three boxes were active with nest material and 1 box had egg fragments present. Therefore, 4 of 14 (29%) nest boxes were used this nesting season. It was undetermined how many kestrels had hatched or fledged. Four boxes contained flying squirrels (*Glaucomys volans*), and one box contained owl pellets. Two new nest boxes were installed after the nesting season had concluded.

White-crowned Pigeon

Nongame Wildlife Grant - White-Crowned Pigeons in the Lower Florida Keys (*Stuart Cumberbatch*).--Dr. Kenneth Meyer, Avian Research and Conservation Institute, initiated a radio telemetry study on the state threatened white-crowned pigeon (*Columba leucocephala)* in two Florida Keys National Wildlife Refuges. The project will compare foraging habitats between the refuges and also will identify critical foraging sites, determine the extent of winter residency and philopatry, and estimate survival of adult birds in the unstudied populations of the lower Florida Keys.

Whooping Crane

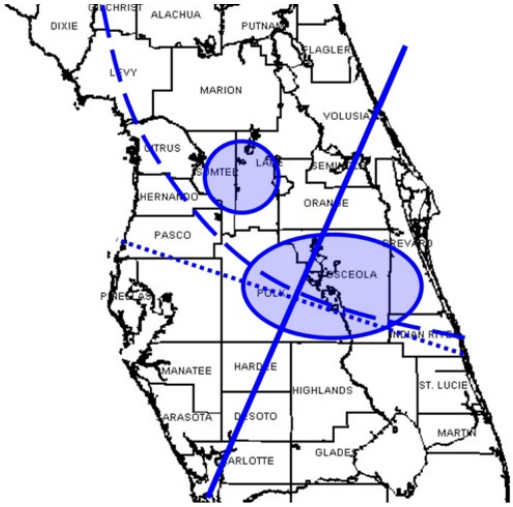
Whooping Crane Reintroductions in Florida (*Steve Nesbitt*).--The whooping crane (*Grus americana*) is listed by the FWC as a species of special concern. Federally endangered, the Florida population is listed as experimental non-essential by the United States Fish and Wildlife Service (USFWS). The minimum criteria for federal reclassification of the whooping crane from endangered to threatened are to meet the goal of establishing two self-sustaining wild populations in addition to the Wood Buffalo-Aransas population (USFWS 1994), and these populations must be reproducing at an acceptable rate for 10 years. The goal of releasing whooping cranes in Florida is to produce a population of $\geq$ 25 breeding pairs of non-migratory whooping cranes in Florida by 2020. The objective of this project is to release annually 20 to 40 whooping cranes between 7 - 10 months of age in central Florida and determine the rate and causes of mortality for released whooping cranes. Dispersal and movements will be monitored and reproductive efforts (pairing, territoriality, and nesting) and the success of released whooping cranes will be documented.

Release procedures were based on modifications of the standard soft-release techniques developed during previous segments of this study. This year, five captive-reared whooping cranes were released at the Polk County site. Staff recovered remains of 13 whooping cranes that died during the year. Collisions with power lines accounted for a majority of the mortalities this year and efforts were made by Progress Energy to mark the lines in the area where this mortality occurred. Five whooping cranes were captured for replacement of failed or broken transmitters.

This year marked the first time interaction of non-migratory whooping cranes and a bird from the experimental migratory population was documented. There were no unusual or adverse interactions noticed between the cranes derived from the two different release methods.

One of the more dramatic events in 2004 was an unprecedented three hurricanes that crossed over the range of the non-migratory flock this summer (Fig. 1). Despite winds over 100 mph at times and significant damage throughout the region, staff did not detect any whooping crane mortality or injury associated with the storms. Overall the storms may have benefited the cranes by bringing rain. However, as far as tropical weather systems are concerned, the three storms in the crane area were not big "rain-makers". Hurricane Charley came through the crane area on August 13, 2004 with winds gusting to 110 mph. It was a fast-moving storm that did not have time to drop much rain (ca. 4 inches). Hurricane Frances also crossed the crane area of central Florida (September 4 & 5, 2004), moving slower and dropping approximately 6 inches of rain in crane habitats. Finally, Hurricane Jeanne brought winds of around 100 mph and more rain on September 26, 2004.

Figure 1. Distribution (Shaded areas) of most non-migratory whooping cranes during the hurricane season. Approximate paths of Hurricanes Charley (solid line), Frances (dotted line), and Jeanne (dashed line) are shown.



The nesting season this year followed a trend begun last year. Eleven nests were laid by eight pairs, but only one hatched and the chick disappeared after 6 days. The majority of the other nests were either infertile of suffered early embryo mortality (Table 5). Last year also saw a number of similarly unproductive nesting efforts.

Staff documented five subadult whooping cranes that left Florida in early May and were spotted on the 23rd on the Ace Basin National Wildlife Refuge (NWR) in coastal South Carolina. They have not been accounted for since that sighting. This was the first long range dispersal from Florida in several years. Ironically this is the same area where some of the birds from the eastern migratory population wintered this year as well.

Table 5. Nest information for non-migratory whooping cranes in Central Florida for 2005.

Laying Date	Pair	Clutch Size	Hatched	First Attempt	Unhatched Egg Collected	Egg Condition	Nest
27-Jan	591/369	unk					disturbance by 512
9-Feb	800/898	1			1	no embryo	incubated> 34 days
11-Feb	591/396	2			2	mid+mid	flooded nest
28-Feb	641/sc	2			2	no embryo	incubated > 34 days
15-Mar	1008/1018	1	1	y			chick lived 6 d
6-Apr	800/898	unk					aban. At day 34
13-Apr	772/512	1					flooded nest
3-May	1297/1299	unk		y			abandoned
12-May	1015/1026	unk			1	pending	abandoned
13-May	1009/1020	1		y	1	no embryo	aban. Sm. pointy egg
27-May	800/898	unk					?flooded

This year's information on the history of non-migratory whooping crane population was made available from the agency website: http://myfwri.com/features/category_sub.asp?id=5947. In addition to providing information on the agency's involvement in crane restoration, the site provides a way for the public to report whooping crane sightings. Project information is updated every quarter and the site provides links to other whooping crane related sites. Again this year, as conditions allowed, FWC staff escorted field trips to see the cranes. In all cases, these trips were conducted so that the birds were not disturbed and the wishes of private landowners were respected. Access was contingent on our schedule and the behavior of the cranes.

Because of an unusually high rate of infertility or early egg death, and what staff feels is an unsustainable level of mortality in older birds, it was recommended to the Whooping Crane Recovery Team that no more captive-reared young be released in Florida until this trend is understood or otherwise resolved. There are no plans to release any captive reared whooping cranes in the coming years. This will be the first year since 1993 (Table 6) that no whooping cranes will be released in Florida.

Eastern Migratory Population.--Though the FWC is not directly involved in the project to establish a second experimental flock of whooping cranes that will migrate from Wisconsin to winter in Florida, FWC does issue a permit to cover instate activities and participates in long range project planning. This year was the fourth year of the Whooping Crane Eastern Partnership (WCEP) project. Twenty-one young whooping cranes are being raised to be led by ultra-light aircraft to wintering grounds in Florida. Once they have completed their fall migration, sometime in November, there will be nearly 60 cranes in this new population.

This past year marks the first time whooping cranes from the WCEP (migratory) project were documented to have interacted with cranes from the non-migratory flock. Contact between the cranes from the two populations was minimal, but in those that were observed, no negative interactions occurred.

Table 6. Whooping Cranes Released by Year (as of April 2005).

Year Released	# Released	# Surviving	Males ♂	Females ♀
1993	14 released:	01 surviving	01♂	00♀
1994	19 released:	04 surviving	01♂	03♀
1995	19 released:	03 surviving	02♂	01♀
1996	47 released:	12 surviving	05♂	07♀
1997	28 released:	08 surviving	02♂	06♀
1998	22 released:	02 surviving	01♂	01♀
1999	28 released:	05 surviving	01♂	04♀
2000	30 released:	15 surviving	09♂	06♀
2001	21 released:	15 surviving	08♂	07♀
2002	27 released:	11 surviving	03♂	08♀
2003	13 released:	10 surviving	05♂	05♀
2004	16 released:	16 surviving	11♂	05♀
2005	5 released:	04 surviving	03♂	01♀
Total	**289 released:**	**106 surviving**	**52♂**	**54♀**

Infectious Bursal Disease.--A staff biologist is working on a MS degree at the University of Florida on Infectious Bursal Disease (IBD). As part of this study, blood samples were collected from sentinel chickens (43 samples) on the 5R Ranch in Polk County, where IBD was initially diagnosed. Additionally, blood was collected from harvested (79) and trapped (54) wild turkeys (*Meleagris gallopavo*). Other project personnel assisted in capturing and bleeding 21 pre-fledged Florida sandhill cranes (*Grus canadensis pratensis*). A potential blood collection method for quail was also tested. Hunters collected twelve blood samples from Webb Wildlife Management Area in Charlotte County. The samples were collected by attempting to saturate a filter paper strip with blood after the quail had been harvested. To test the accuracy of this method, the additional blood samples were collected with the usual method (blood stored in a green-top vacutainer vial and then spun down to separate the serum) and the filter paper strip method from 18 chickens and four harvested turkeys. Analysis of the all the samples is ongoing. Ultimately, it is hoped this study will provide a better understanding of the prevalence and possible etiology of IBD in Florida and its effect on whooping cranes. Grant requests for future funding of this study were submitted to the Association of Avian Veterinarians, Florida

Ornithological Society, Budweiser Conservation Scholarship, and the State Wildlife Grant Program. None of the grant requests were funded.

Wood Stork

Productivity of wood storks in north and central Florida (*James A. Rodgers Jr.*).--The wood stork (*Mycteria americana*) once was a common breeding species throughout the southeast United States (U.S.). However, precipitous declines in the specie's' range and population during the mid-1900s eventually lead to the U.S. population being listed as endangered in 1984. The primary goal of this study is to gather productivity data for storks nesting in Florida, which may be used to determine if the stork population in the U.S. meets recovery criteria for down-listing the species.

Wood stork colonies were visited every two weeks throughout the breeding season of March-August. Either all nests (colonies with less than 100 nests) or a sample of the nests (25-70% of nests at larger colonies) were monitored. Care was taken to reduce researcher effects on the breeding storks and other species of colonial waterbirds by minimizing nest monitoring during the pair-formation period, by visiting colonies during the cooler morning and late afternoon, and by avoiding monitoring events during inclement weather. After the nestlings were 3 to 4-weeks old, all nests were counted from a distance with binoculars to avoid pre-fledging of nestlings. Most stork nests and trees were individually marked with numbered, colored flagging tape or plastic tags.

The average fledging rate (number of large, fully feathered birds about 7-8 weeks of age) of wood storks at 13 colonies in Florida during 2005 was 0.50 fledglings/nest. Approximately 46.7% of nests fledged at least one bird. Significant differences in the average fledging rate existed among colonies (range=0.02 to 2.40 fledglings/nest) during 2005. Colonies exhibiting high or low fledging rates appeared to be evenly distributed across Florida. An examination of the distribution of the number of fledglings per nest provided additional insight into the fledging success within each colony. Jacksonville Zoo, Dee Dot, and Chaires colonies exhibited high fledging rates due to below average number of complete nest failures (i.e. no fledglings) and above average number of two-fledgling and/or three-fledgling nests. In contrast, Lone Palm, Croom, and Matanzas colonies exhibited low fledging rates due to below average number of two fledgling and three-fledgling nests and above average number of complete nest failures. For example, 80 of 154 nests at Croom (51.9%) and 41 of 42 nests at Matanzas (97.6%) were abandoned prior to May 10.

Overall, the fledging rate of 0.50 fledglings/nest in 2005 was disappointingly low compared to 2003 (1.49 fledglings/nest) and 2004 (1.53 fledglings/nest). Most colonies monitored for all 3 years exhibited their lowest production of fledglings in 2005 (Table 7). Only the Dee Dot colony exhibited an increase in productivity in 2005. However, storks never initiated nesting at Devils Creek colony; at Little Gator Creek colony, nest were initiated but abandoned during the early nest building phase. Several colony sites exhibited impacts from the 2004 hurricane season. Devil Creek may not have initiated in 2005 due to the fact that many of the nest trees were blown over or damaged. Similar wind-related impacts to nesting trees were observed at both Little Gator Creek and Lake Rosalie.

Table 7. Comparison of the average fledging rate per nest of wood stork colonies in north and central Florida during the 2003, 2004 and 2005 nesting seasons.

Colony	County	2003	2004	2005
Jacksonville Zoo	Duval	2.21	2.37	2.40
Devils Creek	Pasco	0.21	2.12	Not active
Chaires	Leon	1.06	1.93	0.96
New Port Richey	Pinellas	1.85	1.73	0.51
Ochlockonee North	Leon	1.35	1.70	1.25
Lake Rosalie	Polk	1.52	1.62	0.46
Cypress Creek	Hillsborough	1.85	1.59	0.46
Lone Palm	Polk	1.36	1.48	0.27
Dee Dot	Dual	1.51	1.42	1.77
Little Gator Creek	Pasco	1.68	1.19	Abandoned
Croom	Hernando	1.29	1.09	0.40
Lake Russell	Osceola	1.71	1.05	0.53
Matanzas Marsh	St. Johns	1.39	0.25	0.02

For more information on the status of this study or wood storks, contact James A. Rodgers, at the FWC Gainesville Wildlife Research Field Lab, 4005 South Main Street, Gainesville, FL 32601, 352-955-2230, email: James.Rodgers@MyFWC.com.

Gopher Frog

Nongame Wildlife Grant - Amphibians Use of Ephemeral Ponds (*Stuart Cumberbatch*).--Dr. Cathryn Greenberg, USDA Forest Service, completed a 3-year segment of the long-term, continuous sampling effort of several isolated ephemeral ponds in Florida longleaf pine-wiregrass uplands. Populations of the Florida gopher frog (*Rana capito*) are nearly restricted to these ecosystems and are one of the focal species of this study that began more than 11 years ago. The final report, currently under staff review, documents effects of hardwood invasion on these communities and population trends of the Florida gopher frog, which is a species of special concern, and 21 other amphibian species.

Flatwoods Salamander

Management and Conservation (*David Cook*).--The flatwoods salamander (*Ambystoma cingulatum*), federally listed as Threatened in 1999, was listed by the State of Florida in 2001 as a Species of Special Concern, based on evidence of habitat loss and an estimate of only 38 extant populations in Florida. The flatwoods salamander management plan (http://myfwc.com/imperiledspecies/plans.htm) developed as part of the listing process proposes that 129 self-sustaining populations would need to be located in Florida in order to de-list the species statewide. Progress in FY 2004-2005 toward that goal is presented below in terms of implementation of the 8 priority actions identified in the plan.

Develop a Memorandum of Agreement with federal land managers – A Memorandum of Agreement (MOA) with the USFWS was prepared and approved in February 2002; this document clarifies the respective roles the USFWS and the FWC will play in flatwoods salamander conservation activities in Florida. Preparation of MOAs with individual agencies for flatwoods salamander conservation on specific lands has not been pursued because interagency cooperation and communication has been forthcoming. The Department of Defense has actively supported salamander surveys on Eglin Air Force Base (AFB) by Virginia Tech, on Hurlburt Field by Florida Natural Areas Inventory (FNAI), and on Holley Outlying Landing Field (OLF) by the FWC. The USDA Forest Service (USFS) has actively supported surveys on Apalachicola National Forest (NF) and Osceola NF by The Nature Conservancy and FWC personnel. The FWC completed its contract with the USFS to support continued flatwoods salamander surveys on USFS lands, and to elicit assistance in developing management recommendations documents. St. Marks National Wildlife Refuge (NWR) provided the FWC a special-use permit to conduct flatwoods salamander surveys, and has supported the US Geological Survey (USGS) on drift fence studies through the Amphibian Research and Monitoring Initiative program (ARMI). Draft population-specific management plans for flatwoods salamanders on federal lands (Apalachicola NF, Osceola NF, St. Marks NWR, Eglin AFB/Hurlburt Field, Holley OLF) have been completed and are being reviewed by the respective agencies. Commission personnel serving on the USFWS flatwoods salamander recovery team met twice with USFWS staff to help finalize the flatwoods salamander federal recovery plan, which was submitted for USFWS review in summer 2005.

Coordinate initiation of conservation actions on wildlife management areas – This was the first year since the project began that there seemed to be sufficient and timely rainfall in the northern peninsula to warrant surveying historic and potential ponds in this part of the state. Therefore, surveys (as opposed to ground-truthing during dry conditions) were conducted by FWC staff on Osceola NF, Cary State Forest (SF), Jennings SF, and Lake Butler WMA, as well as on sites in Alachua and Duval counties. Unfortunately, no flatwoods salamander larvae were confirmed on any sites in peninsular Florida in 2005. In the panhandle, however, flatwoods salamander larvae were encountered in 7 previously undocumented ponds in the Apalachicola NF (by TNC surveyors), and were confirmed at known ponds on St. Marks NWR, Eglin AFB/Hurlburt Field (by Virginia Tech surveyors), Holley OLF, and Pine Log SF. Most significantly, Commission personnel found the first flatwoods salamander known from Garcon Point Water Management Area. This site on public land in Santa Rosa County is part of a population known previously only from adjacent private land. In addition to surveys, drift fences were installed and run in 2005 by Commission personnel at Pine Log SF, Point Washington SF,

and Aucilla WMA. Non-Commission biologists ran drift fences on Eglin AFB and St. Marks NWR. The Commission is not the lead management authority on 4 WMAs currently known to harbor flatwoods salamander populations (Pine Log SF, Point Washington SF, Tate's Hell SF, Flint Rock WMA), but is the lead agency on Aucilla WMA. Population-specific management recommendations documents for Pine Log, Point Washington, Tates Hell, Aucilla, and Garcon Point have been completed and are being reviewed by the respective agencies.

Explore the feasibility for cooperative agreements or conservation easements for long-term management for flatwoods salamanders on private lands – The Commission completed a four-year Safe Harbor grant from the USFWS to support survey work on non-federal lands and to investigate the feasibility of developing a statewide Safe Harbor program for flatwoods salamanders. Over the period of the grant, the Commission contacted over 100 private landowners and received permission from 38 landowners to access nearly 15,000 acres for surveys. In 2004, 340 wetlands on private lands were surveyed; 102 were surveyed in 2005. Unfortunately, the surveys conducted on these private lands were generally very discouraging and yielded no flatwoods salamanders. In most cases, on those lands that did have identifiable flatwoods habitat, it was deemed unsuitable to support flatwoods salamanders, and there were few ponds that were ranked as "potential." This seemed due to a combination of many years of fire exclusion and resulting hardwood encroachment, severe disturbance to the soil and hydrology, canopy closure, and loss of native ground cover. This situation was repeated on most private lands visited and has caused Commission staff to be less optimistic about the potential for discovering previously unknown populations of flatwoods salamanders on private land in Florida. Flatwoods salamanders probably do occur on some additional private lands in Florida, but they may be very difficult to detect. The less than optimal habitat may keep such populations at a very low density. This, compounded by the unpredictability of weather conditions to fill potential breeding ponds at the right time, would require intensive and long-term (i.e., multiple visits over several years) survey efforts to be able to detect them. In summary, exploration of the feasibility of a Safe Harbor program for flatwoods salamanders has led Commission staff to conclude that implementation of such a program would be both problematic and largely ineffective at enhancing the conservation of the species in Florida. Management recommendations documents were also prepared for the extant populations known on private lands: 4 populations on St. Joe Company land (i.e., Flint Rock WMA, which was included with the St. Marks NWR plan) and 1 population on International Paper land in Santa Rosa County.

Maintain a comprehensive database – All flatwoods salamander survey data from the 2005 season have been entered into the database. There are currently 48 extant (recorded since 1990) populations known in Florida; of these 28 occur only on public land, 15 only on private land, and 5 populations are shared by both public and private lands.

Explore the potential for a Statewide Habitat Conservation Plan (HCP) – This is not currently being pursued. Instead, the feasibility of a statewide Safe Harbor program for flatwoods salamanders was considered (see above).

Collaborate with state wildlife agencies in Georgia, South Carolina, and Alabama – Constructive interaction among staff of the respective state agencies continues, and information pertinent to flatwoods salamander conservation is shared.

Prepare a "how-to" pamphlet for land managers – Commission personnel prepared, printed 2,000 copies, and distributed a full-color brochure entitled, "The Flatwoods Salamander: Tips for its Management on Private Lands." The brochure provides color photographs of

animals and habitat, basic life history information, habitat requirements, and recommendations for land management activities that could enhance flatwoods salamander populations. Besides serving as an education tool to promote conservation of the species, the brochure may be helpful in encouraging private landowners to allow salamander surveys to be conducted on their property.

Encourage research – Current emphasis on conducting statewide surveys for flatwoods salamanders has postponed proactive support of research. However, both Florida's statewide management plan and the pending federal recovery plan identify important topics for future research. Commission staff met with USGS ARMI personnel to discuss collaboration on a potential research project on St. Marks NWR.

Survey and Monitoring on Pine Log Wildlife Management Area (*Fred Robinette*).--Two of the known breeding sites of the flatwoods salamander occur on Wildlife Management Areas (WMAs) cooperatively managed by FWC in northwest Florida. One breeding site, documented first in 1992 by the FNAI and again with the capture of an adult in 2002, is located on the Pine Log WMA in Washington County. In the spring of 2005, this site was resurveyed and again confirmed as a breeding pond for flatwoods salamanders with the capture of larvae. The other site, documented once in 1998 by USFWS, is located on the Point Washington WMA in Walton County. The Point Washington site continues to be monitored and sampled twice annually; however, breeding has not been documented in recent years.

Survey and Monitoring on Blackwater Wildlife Management Area (*Pat Bowman*).--The flatwoods salamander has not been confirmed to occur on Blackwater WMA. Annual surveys and monitoring of nearly 90 potential breeding ponds continue. This past year, two new breeding site locations were documented in Holley and Garcon Point. Holley and Garcon Point are within 40 miles of Blackwater WMA and indicate the potential for the possibility of future populations in surrounding areas.

Surveys on the Goethe Wildlife Management Area (*Norberto Fernandez*).--The FWC currently assists the Division of Forestry in attempts to document flatwoods salamander populations on Goethe State Forest / Wildlife Management Area (WMA) in Levy County. Surveys of potential ephemeral ponds were again conducted during FY 2004-2005 on Goethe WMA. In addition to the ephemeral pond surveys, herpetological arrays were monitored to detect presence of the Flatwoods Salamander. To date, no occurrence of the Flatwoods Salamander has been documented on Goethe WMA.

American Crocodile

Crocodile Management efforts (*Harry Dutton*).--The American crocodile (*Crocodylus acutus*) is listed as an endangered species by the federal government and the State of Florida. In 1975, when the crocodile was federally listed as endangered, habitat loss had reduced nesting in Florida primarily to northeastern Florida Bay and northern Key Largo. Annual production at that time was 20–22 nests. Since then, Florida crocodile populations have rebounded, and the number of nests has increased to approximately 90 annually. Concomitant with the increasing

crocodile population (currently estimated to be between 800–1,000 animals) has been an increased number of crocodile-human conflicts.

Since 1988, the FWC has operated under guidelines it developed to resolve complaints about crocodiles. These guidelines, however, were outdated due to agency restructuring, and only addressed a limited scope of crocodile–human interactions. American crocodile management and protection are the responsibility of the FWC and US Fish and Wildlife Service (USFWS), with cooperation primarily from the National Park Service (NPS) and Florida Power and Light Corporation, which has staff dedicated to monitoring crocodiles residing and reproducing on their property. To address the increasing occurrence of crocodile-human conflicts, the FWC created an Issue Team comprised of FWC staff and crocodile experts from the USFWS, NPS, and University of Florida. This team's charge was to develop a comprehensive response plan that would provide guidance for dealing with all crocodile–human interactions. The goal of the plan was to promote public safety while recognizing the needs of recovery and conservation of an endangered species. The newly developed plan was approved and distributed in May 2005, and employs the use of contracted crocodile response agents to augment existing FWC staff to support the plan's implementation.

Over fiscal year 2004-05, upwards of 100 nuisance crocodile complaints were received by FWC staff. Most of these complaints were resolved through telephone calls or site visits. There were complaints regarding 12 crocodiles that necessitated capture. Of these, 7 were males and 5 were females. Males averaged 6.9 feet (2.10 m) in length, with the largest one being 7.8 feet (2.38 m) in length; females averaged 7.7 feet (2.34 m) in length, with the largest one being 8.6 feet (2.62 m) in length. Two of the captured crocodiles appeared sick and were placed in captivity. One of these subsequently died. The remaining 10 animals were translocated to canals in close proximity to the Southern Glades Wildlife and Environmental Area, well away from their capture sites to discourage their return. Crocodile occurrences have now been confirmed as far north as Wabasso on the east coast and Punta Gorda on the west coast.

Gopher Tortoise

Gopher Tortoise Issue Team (*Joan Berish*).--The need for a gopher tortoise issue team became apparent during 2003, as FWC staff struggled to reconcile the time spent on permitting issues with the minimal benefits that current relocation efforts contribute to the conservation of this high-profile but declining species. The gopher tortoise is listed as a Species of Special Concern in Florida, but has been petitioned for reclassification to Threatened. The species is often on the front lines of wildlife/development conflicts because it inhabits the same high, dry habitats desired by humans, and its conspicuous burrows draw attention to the fate of individuals as development encroaches. Additionally, this keystone species' burrows provide refuge for many other species and, thus, increases the biodiversity of Florida's uplands. In fall 2003, FWC senior leadership established a Gopher Tortoise Issue Team to determine more effective strategies for conserving Florida's gopher tortoise resource. The 21-person Team first convened in January 2004 and met a total of 6 times between January 2004 and February 2005. The Team's charge was to create a comprehensive, prioritized list of issues pertaining to gopher tortoise mitigation and management and then to create a work plan for addressing the highest priority concerns. Four sub-teams were subsequently created to address specific issues

associated with Permitting, Education, Legal/Law Enforcement, and Partnerships; these sub-teams met and communicated frequently during the summer and fall of 2004.

The overall goals outlined by the team were to: focus on maintaining viable gopher tortoise populations; simplify the permitting process and eliminate permitting not significantly benefiting the species; substantially enhance habitat management on public lands; and emphasize public education regarding tortoise mitigation and management.

In January 2005, the Team's draft recommendations were presented to FWC senior leadership. Preliminary approval to pursue a new tortoise conservation paradigm was given, and 3 action teams (permitting, land management, and education) were created to provide detailed recommendations. The permitting and land management teams met during the summer of 2005; an educational plan had been previously drafted. These teams were later distilled into a single action team of 7 members with a facilitator and a leader from FWC senior leadership. The 9-person team is meeting every other week. Immediate tasks are to develop measurable biological goals for the species and to revise the current mitigation and permitting program. Additionally, stakeholder involvement has been initiated to seek input on these issues.

Gopher Tortoise Burrow Survey, Jennings Forest Wildlife Management Area (*Allan Hallman*). --Approximately every 5 years since 1994, a gopher tortoise burrow survey has been conducted at Jennings Forest Wildlife Management Area. This survey is completed to provide an index concerning the effects of sand pine removal and longleaf pine/wiregrass restoration on a 183 acre (74.06 ha) site. In April 2005, this survey was repeated. A total of 694 gopher tortoise burrows were observed; 217 (31%) were active, 225 (33%) were inactive, and 252 (36%) were abandoned. Burrow density calculations indicated there were a total of 3.79 burrows per acre; 1.19 active, 1.22 inactive, and 1.38 abandoned. The estimated gopher tortoise population on the 183 acre site is 271 gopher tortoises, which gives an average density of 1.5 tortoises per acre. This is an increase from the last survey which estimated 232 gopher tortoises on the site.

Mitigation Park Program (*Shane Belson*).--The FWC Mitigation Park Program (MPP) 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.

The MPP currently consists of nine facilities comprising 9,701 ac (3,926 ha). FWC has mitigation park partnership agreements with Orange, Osceola, Lee, Hillsborough, and Manatee Counties. The most recent addition to the MPP is a 280 ac (113 ha) tract that completes the acquisition of Moody Branch Mitigation Park (MBMP) Wildlife and Environmental Area (WEA) in Manatee County. A 1,652 ac (669 ha) acquisition site in Volusia County was evaluated for potential acquisition.

Most management activities at MPP facilities are intended to benefit the gopher tortoise and its habitat. Activities conducted during FY 2004-2005 applied primarily to new facility start-up; habitat assessment, enhancement, and restoration; and gopher tortoise population monitoring and research. Management activities pertaining to other listed species at MPP facilities are reported separately.

Start-up operations commenced at MBMP, the newest MPP facility. Site improvement was advanced by the delineation of 27 management units, establishment of 14 mi (23 km) of fire lines, construction of 4.4 mi (7.1 km) of boundary fencing, and procurement of management equipment.

Triennial standard habitat assessments were conducted at Branan Field Mitigation Park (BFMP) WEA, Platt Branch Mitigation Park (PBMP) WEA, Fort White Mitigation Park (FWMP) WEA, Suwannee Ridge Mitigation Park (SRMP) WEA, and MBMP.

Prescribed burning for gopher tortoise habitat improvement and maintenance was completed on 2,802 ac (1,134 ha), or 29% of MPP facility acreage. Fire operations were conducted at BFMP, Split Oak Forest Mitigation Park (SOMP) WEA, Bullfrog Creek Mitigation Park (BCMP) WEA, FWMP, SRMP, and MBMP.

Mechanical treatments were used to enhance gopher tortoise habitat at SOMP, where 60 ac (24 ha) of degraded scrubby flatwoods habitat were roller chopped to reduce shrub densities and promote herbaceous ground cover forage. An additional 115 ac (47 ha) of scrubby and mesic flatwoods that were mechanically treated at Hickey Creek Mitigation Park (HCMP) WEA and PBMP for FSJ and RCW habitat enhancement provided corresponding benefits to gopher tortoises.

Exotic plant and animal control was conducted by FWC with the assistance of grant funding and county cooperators. A $59,000 herbicide treatment project on 109 ac (44 ha) at BCMP was implemented through the Florida Department of Environmental Protection (DEP) Upland Invasive Exotic Plant Management Program. A total of 42 feral hogs were removed from HCMP and BCMP through hog trapping contracts administered by the respective county cooperator.

Timber management planning and implementation were conducted at SOMP and SRMP, respectively. FWC and the Florida Division of Forestry developed a Timber Management Assessment for SOMP in accordance with Section 253.036 F.S. At SRMP, timber removal was combined with herbicide applications to restore gopher tortoise habitat. Two timber sales on 630 ac (255 ha) employed clear cutting and thinning operations to promote the development of open stands of longleaf pine (*Pinus palustris*) and prepare the site for future longleaf pine planting. Net FWC proceeds totaling $200,500 were returned to the MPP (Land Acquisition Trust Fund) for use on future land management projects. In addition to timber removal at SRMP, 61,500 longleaf pine tubelings were hand planted on 146 ac (59 ha) to replace a previously clear-cut sand pine (*P. clausa*) stand. The primary purpose for this activity is to improve habitat condition for T/E species such as the gopher tortoise, pine snake, indigo snake, and other state and federally listed upland species.

An upland habitat restoration plan was developed for MBMP, which contains 235 ac (95 ha) of uplands that were converted to row crops and pasture. The site-specific plan for the restoration of pine flatwoods, scrub, and sandhill natural communities provides detailed guidance on site preparation, seeding, irrigation, maintenance, planting, and monitoring. Spending authority was secured for implementation of the ground cover phase of restoration on 180 ac (73 ha) during FY 2005-2006. The primary purpose for this activity is to improve habitat condition for T/E species such as the gopher tortoise, pine snake, indigo snake, and other state and federally listed upland species.

A triennial gopher tortoise density assessment was conducted at SRMP, resulting in a density estimate of 1.07 individuals/ac (2.68/ha). No signs of elevated mortality were observed.

Research projects on upper respiratory tract disease (URTD), hatchling recruitment, nest site habitat characteristics, and predator exclusion were conducted during this reporting period. As part of a multiyear grant from National Science Foundation, the University of Florida proceeded with work at Perry Oldenburg Mitigation Park (POMP) WEA and BFMP with primary goals to continue the study of URTD disease dynamics, obtain estimates of population demographics, and perform detailed habitat assessments. Additionally, interventional strategies were investigated at BFMP to promote tortoise hatchling recruitment. Concurrently, FWC assessed vegetative structure associated with gopher tortoise nesting at POMP, BFMP, PBMP, BCMP, and FWMP.

Additional information on gopher tortoise management at FWC Mitigation Park Program facilities is found in the "FWC Mitigation Park Program FY 2004-2005 Annual Report" on file at the Kissimmee Field Office. Contact Shane Belson at 407-846-5300 for information.

Monitoring at Point Washington WMA (*Fred Robinette*).--Since the spring of 1993, FWC staff on Point Washington WMA has been surveying, monitoring and assessing the status of the gopher tortoise. Comprehensive surveys or burrow counts across suitable gopher tortoise habitat are used to determine the relative abundance of tortoise populations. These surveys occur during May through September, annually. Burrows are identified as active, possibly active, inactive, or abandoned. Given the relationship between gopher tortoise body size and burrow width/age, burrow size class distribution data are obtained during the comprehensive surveys. Boundaries have been drawn around mapped concentrations of tortoises. Each group of burrows was defined as a burrow cluster. Clusters are primarily delineated for devising management options. No attempt to group burrows using stringent behavioral or spatial criteria was made. Presently, gopher tortoise burrows on Point Washington are grouped into 33 clusters. Management recommendations for individual gopher tortoise clusters have been submitted to DOF (lead manager for the tract).

Monitoring at Pine Log WMA (*Fred Robinette*).--The summer of 2004 marked the first comprehensive survey for gopher tortoises on the Pine Log WMA. The same monitoring and management protocol established for the aforementioned Point Washington WMA was followed at Pine Log WMA. The data collected in this survey will serve as a baseline. Our future work will provide comparative data on tortoise population trends within Pine Log. Presently, gopher tortoise burrows on Pine Log WMA are grouped into 13 clusters. Detailed summary and analysis for 2004 surveying and monitoring of gopher tortoise populations on Pine Log and Point Washington WMAs are contained in completed Progress Reports.

Monitoring at Blackwater WMA (*Pat Bowman*).--FWC area staff at Blackwater WMA began a comprehensive survey of the gopher tortoise population, utilizing burrow counts, in June of 2005. Only a small acreage was surveyed prior to July 2005 but long range plans are in place to evaluate the entire 198,000 acres (80,128 ha) of Blackwater WMA for gopher tortoises. The impetus for obtaining this information is to provide DOF, the lead land manager on the area, with habitat improvement recommendations across the WMA.

Nongame Wildlife Grant - Gopher Tortoise & URTD (*Stuart Cumberbatch*).--Drs. Earl McCoy and Henry Mushinsky, University of South Florida, completed their final report for the

study "Population Consequences of Upper Respiratory Tract Disease (URTD) on Gopher Tortoise." This study resurveyed ten populations of tortoises, collecting blood samples to determine serum levels that can be linked to chronic stress. It is believed that an increase in stress levels could compromise the animal's ability to recover from URTD. We anticipate this report will be made available at http://research.myfwc.com/publications/search.asp in the near future.

Marine Turtles

Management Activities (*Robbin Trindell*).--Under the Florida Marine Turtle Protection Act (Florida Statute 370.12), the Florida Legislature indicated its intention to ensure that the FWC had the authority and the resources to implement the state's responsibilities under the United States Fish and Wildlife Service's (USFWS) Recovery Plans for five species of marine turtle: loggerhead, green, leatherback, hawksbill, and Kemp's ridley. To this end, staff works 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 participates in the review of ongoing and proposed human activities that could impact marine turtles and their nesting and foraging habitats, and in public education about marine turtles. FWC Marine Turtle Protection and Research Programs are fully supported by proceeds from the sale of the marine turtle license plate and a marine turtle decal, and Federal section 6 funds.

Regulatory Permit Review - During FY 2004-2005, staff reviewed approximately 246 requests for comments from the Florida Department of Environmental Protection's (DEP) District Offices, DEP's Bureau of Beaches and Coastal Systems, and the State Clearing House. Projects reviewed included more than 87 Coastal Construction Control Line applications, 17 Environmental Resource Permit applications, and 34 Joint Coastal Permit applications. Final recommendations for activities in marine turtle nesting and foraging habitat were provided for approximately 186 state permits.

Storm Recovery Activities - Staff worked closely with the DEP's Bureau of Beaches and Coastal Systems, the Army Corps of Engineers, the USFWS, local governments, and private citizens to facilitate storm recovery activities while ensuring that state and federal laws for protection of marine turtles were met. Site inspections were conducted in Palm Beach, Martin, St. Lucie, Indian River, Brevard, Flagler, St. Johns, Bay, Escambia, and Walton Counties to assess impacts to marine turtle nesting beaches and to coordinate on storm recovery activities.

Adaptive Management - FWC staff reviews monitoring from beach regulatory projects, including beach nourishment, summarizes this information, and recommends modifications to existing procedures to reduce unnecessary monitoring, to revise construction techniques for turtle protection or to reduce impacts to marine turtles, their nests, hatchlings and nesting habitat from successive projects. During FY 2004-2005, local governments and conservation organizations submitted a total of approximately 31 reports for review from completed or ongoing projects.

Marine Turtle Permit Program - Staff reviewed and approved approximately 178 applications for conservation activities with marine turtles, including nesting beach surveys (92 permits), stranding and salvage work (108 permits), research (42 permits), public turtle walks (27 permits), rehabilitation at captive facilities (17 permits) and educational display (22 permits).

Staff also made presentations at five International Nesting Beach Survey Program (INBS)/Statewide Nesting Beach Survey Program (SNBS) training workshops statewide.

Captive Facilities - FWC authorizes captive facilities to hold marine turtles for rehabilitation (17) or for educational display (22) in Florida. Staff coordinated transfer and release of marine turtles during rehabilitation, supervised two public sea turtle releases, and participated in the annual Marine Turtle Rehabilitation Workshop held at Hidden Harbor Sea Turtle Hospital.

Outreach and Education - FWC staff hosted the 2005 Marine Turtle Permit Holder Workshop, co-sponsored by The Florida Aquarium, for approximately 200 Marine Turtle Permit holders and volunteers. This two day event included approximately sixteen presentations by agency management and research staff, conservation organizations, and local governments as well as summaries of Marine Turtle Grant projects. FWC staff summarized information on the Section's programs in two poster papers presented at the International Sea Turtle Symposium in Savannah, Georgia.

Staff continued to offer a training workshop, "The Official Marine Turtle Exterior Lighting Course and Exam", for lighting designers, local government personnel, turtle volunteers, businesses, and landscape architects. The course was developed jointly with the USFWS and hosted by different organizations around the state, including the City of Destin, Manatee, Flagler, Monroe, and Collier Counties as well as staff from the DEP. To date, approximately 228 individuals have passed the exam, which tests participant's knowledge of sea turtle behavior and specific lighting fixtures.

Interagency Coordination - FWC staff was invited to participate as an expert for The Nature Conservancy's (TNC) "Marine Ecoregional Assessment for Central and South Florida". Staff served on the following teams, working groups, and committees: Archie Carr Sea Turtle Refuge Working Group, DEP's Turtle Friendly Berm Working Group, FWC's Shorebird Issue Team, the Marine Turtle Grants Committee, DOT's Emergency Response Contact List, and the DOT's Regional Endangered Species Workshop. Staff coordinated with local officials on thirteen lighting inspections in coastal communities.

For more information on the FWC's Marine Turtle Protection Program, visit the following web site at http://www.myfwc.com/psm/turtles/turtletemplate2.htm. Questions about Marine Turtle Permits, regulatory permit review, or education can be directed to the Imperiled Species Management Biological Administrator for the Marine Turtle Protection Program at 850-922-4330.

Marine Turtle Research (*Anne Meylan*).--Salvage, Rescue and Necropsy – FWC staff coordinated the Florida portion of the Sea Turtle Stranding and Salvage Network (STSSN), an 18-state program administered by the National Marine Fisheries Service (NMFS). A total of 1,101 dead or debilitated sea turtles were documented in Florida from 1 July 2004−30 June 2005. By species, there were 667 loggerheads (*Caretta caretta*), 298 green turtles (*Chelonia mydas*), 71 Kemp's ridleys (*Lepidochelys kempii*), 21 hawksbills (*Eretmochelys imbricata*), 15 leatherbacks (*Dermochelys coriacea*), and an additional 29 sea turtles not identified to species. Staff reviewed, edited, and entered all submitted STSSN reporting forms, responded to or coordinated the response to approximately 700 reports of dead or debilitated sea turtles, and conducted gross necropsies on approximately 150 of the carcasses. Staff conducted five workshops to train STSSN participants in standardized data collection methodology. Florida stranding updates were

provided weekly to NMFS for incorporation into the Sea Turtle-Shrimp Fishery Management Report. Detailed Florida stranding reports were generated weekly. Staff produced a peer-reviewed article on fibropapillomatosis in Florida green turtles based on work conducted through the STSSN (Foley et al. 2005).

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 assesses nesting abundance and reproductive output by coordinating a network of state, federal 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 Program and the Index Nesting Beach Survey Program, are carried out, each with separate objectives.

The Statewide Nesting Beach Survey 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 2004, 193 survey areas were monitored, comprising 800 miles (1,286 km) of beaches. Statewide, the program documented 47,173 loggerhead nests, 3,577 green turtle nests, 473 leatherback nests, 4 hawksbill nests and 4 Kemp's ridley nests. FWC disseminates results of the Statewide Nesting Beach Survey Program through scientific publications, presentations, reports, the Internet, the media, and the CD entitled "Florida Atlas of Marine Resources."

The Index Nesting Beach Survey Program, started in 1989, differs from the Statewide Nesting Beach Survey 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 17 years at 478 index beach zones surveyed daily during each 109-day season, an effort that currently provides more than 5 million records in the Index Nesting Beach Database. Annual surveyor training, on-site verification, and consistency of the methods used during the 17 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.

FWC staff monitors sea turtle nesting habitat in part by cataloging barriers to nesting. Barriers include coastal armoring, buildings, geotextile tubes, dune-beach walkways, and other man-made structures. Staff has mapped all structures that could be barriers to sea turtle nesting on approximately 450 miles (724 km) of index nesting beaches and additional randomly selected stretches of turtle nesting beach around the State. Randomly selected stretches were split into ten 5-mile (8 km) stretches of beach in each of four regions of the state (i.e., Northeast, Southeast, Southwest and the Panhandle). On these beaches, structures were categorized and mapped with DGPS to sub-meter accuracy. Because beach conditions change, with accretion and erosion covering and uncovering structures, there is a need for this habitat assessment to be ongoing.

Surveys were conducted in 2002 and 2003, and are scheduled to be conducted in late 2005 and 2006.

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. Recovery 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, the Key West National Wildlife Refuge (NWR), Bermuda, and Panama 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 2005, 93 loggerhead turtles were captured during an eight-day sampling session in Florida Bay. All animals were measured and tagged. Nineteen of the turtles had been previously marked, providing data on growth and residency in Florida Bay. Collaborative studies during this sampling session in Florida Bay involved taking skin samples for stable isotope analysis to determine trophic level (collaborating with researchers from the Archie Carr Center for Sea Turtle Research, University of Florida), taking cloacal swabs to test for the presence of Herpes viruses (collaborating with researchers from the College of Veterinary Medicine, University of Florida), and making detailed measurements of the mouth and gape (collaborating with researchers from the National Marine Fisheries Service). Data collected by the Florida Bay project were recently published (Gicking et al. 2004).

FWC staff study 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 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. Between 1992 and 2005, FWC staff recorded 1,345 loggerheads, six green turtles, nine Kemp's ridley, and two hawksbills. Survey locations included Gulf of Mexico waters offshore from Apalachicola and Sarasota, and Atlantic waters offshore from St Augustine, Cape Canaveral, Sebastian Inlet, and Ft Pierce.

As part of a cooperative research project with the government of Bermuda, 173 green turtles were captured in nets, tagged and released during 2004. Over 2,873 green turtles have been tagged as part of this project, which has been ongoing since 1968. Deoxyribonucleic acid (DNA) sequence data have shown that one-third of the population of immature green turtles that inhabit Bermuda waters were derived from Florida nesting beaches. Captures of flipper-tagged turtles and satellite tracks from this project have documented migrations to feeding grounds in Nicaragua, Cuba, Colombia, Florida, the Dominican Republic, Panama, Venezuela, St. Lucia, and Grenada, showing the need for international cooperation in research and management of this endangered species. In conjunction with field sampling in Bermuda, FWC staff collaborated with the Bermuda Aquarium and Eckerd College to sponsor a course on the Biology and Conservation of Sea Turtles for nine resource managers and students drawn from Bermuda,

Canada, Jamaica, the United Kingdom and the United States. A description of the course was recently published (Meylan et al. 2004).

Data on gender, size, maturity, and genetic identity were collected from 24 green turtles and 7 hawksbills captured in nets or on the nesting beach at Zapatilla Cays, Bastimentos Island National Marine Park, Panama. Captures of flipper-tagged turtles from this project have documented reproductive and developmental migrations to feeding grounds in Nicaragua, Costa Rica, Colombia, and Cuba. One hundred thirty hawksbill nests were documented by daily beach surveys; productivity assessments on 151 nests showed that over 17,000 hatchlings successfully emerged from beaches on Zapatilla Cays. This work is part of a larger collaborative effort to restore what was once the most important hawksbill nesting population in the Western Hemisphere. Collaborators include United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), the Caribbean Conservation Corporation (CCC), the Smithsonian Tropical Research Institute, ANAM (National Environmental Authority of Panama) and the indigenous authorities of the Ngöbe-Buglé Comarca. Two female hawksbills were satellite-tracked after nesting at Chiriqui Beach. One was killed by a diver shortly after release; the other has been transmitting from its feeding grounds off central Nicaragua for a year. Genetic, tag-return, and satellite tracking data provide the basis for understanding the ecological geography of these wide-ranging migratory species, and guide regionally-based management.

Scientific Consultation with Management and Educational Outreach - Staff conducted five training workshops around the state for permit holders who conduct surveys of turtle nesting beaches and assist with sea turtle stranding and salvage activities. FWC staff served on several scientific advisory committees and governing boards: the Loggerhead Recovery Team, Carr Refuge Working Group, university graduate committees, editorial boards, the International Union for the Conservation of Nature's Marine Turtle Specialist Group, and International Sea Turtle Society board of directors. Staff contributed three species accounts to a book about the Biology and Conservation of Florida Turtles. Staff reviewed numerous research proposals and all research-related proposals submitted for consideration by the small grants program of the Florida Sea Turtle License Plate. For educational outreach, staff gave presentations to school groups at MarineQuest, held a workshop on sea turtles and beach lighting, presented papers at the International Sea Turtle Symposium, and attended several festivals and expositions around the state to promote sea turtle conservation. In addition, the website was updated with new articles, interviews, data, and video footage of research activities and turtle nesting in order to broaden educational outreach and improve efficiency in Florida's sea turtle data distribution.

For more information on the Marine Turtle Research Program, visit the following website at http://research.myfwc.com/features/category_main.asp?id=1289. Questions about research programs for marine turtles can be directed to Dr. Anne Meylan of the FWC's Florida Wildlife Research Institute at 727-896-8626.

Imperiled Fish

Statewide Survey of Imperiled Fish (*Gray Bass*).--The FWC recently completed a statewide survey of imperiled fishes (Bass et al. 2004). The investigation was cooperatively funded by the United States Fish and Wildlife Service (USFWS) and FWC. A final report on this project has been submitted since preliminary summaries were presented in the previous Progress Report. The intent of the Florida Imperiled Fish Species Investigation was to survey

Florida for presence, distribution, and relative abundance of vulnerable fish and to implement long-term monitoring programs. At the beginning of the project, the current status or population trends, of many of Florida's imperiled fish was unknown. Much of the data concerning fish presence and distribution was obsolete and relative abundance of most species was unknown.

Imperiled fish were collected throughout the state from 783 sites, ranging from the Perdido River in the northwestern Panhandle to the Florida Keys. Specimens of most of Florida's vulnerable freshwater fish were obtained, and future monitoring of imperiled fishes may be pursued at many of the sites visited by this project.

Blackmouth shiner (*Notropis melanostomus*).--Blackmouth shiners were collected at 21 locations. They maintain viable populations in a number of backwaters off the Blackwater River and its tributary, Pond Creek, near Milton. Presence of blackmouth shiners in the Yellow River system was reconfirmed by this project (three samples), and additional efforts should be made to define relative abundance and distribution in that drainage. Because of its habit of random schooling in or near dense vegetation in backwaters, this species will be difficult to monitor quantitatively. The schools are easy to locate visually, and may be collected with dip nets. However, with reasonable effort it would be possible to decimate local populations by this method. Therefore, we suggest this species be monitored by visual observations of schools within known habitats, a few individuals selectively taken by dip net, and the remaining number visually estimated. Presence of a school is sufficient evidence of a viable population for a given backwater. Existence of a number of schools distributed among several well-separated backwaters would confirm species viability throughout the drainage. Long-term monitoring sites may be established from results of this study and from sites sampled by Bortone (1993). Backwaters of the adjacent Escambia and Perdido rivers should also be further examined for presence of blackmouth shiners, to determine whether additional populations exist in Florida. Due to environmental threats within the lower Blackwater River drainage, primarily associated with rapid urbanization and development of the Milton urban area, the species should retain its' Endangered Species status until substantial populations have been located in other drainages. Once thought to be restricted to the extreme western Panhandle of Florida, this species is now also found in the Mobile River system of Alabama and the Pearl River system of Mississippi (O'Connell et al. 1998, O'Connell et al. 2005).

Bluenose shiner *(Pteronotropis welaka*).--In Florida, bluenose shiners exhibit a disjunct distribution, with populations scattered throughout the northwestern section of the state, and another in the St. Johns River drainage of eastern Florida. Bluenose shiners were collected from 21 sites in northwestern Florida, but were not observed in the St. Johns River system. They occupy a variety of habitats, but typically prefer sites where water flow is sluggish, deep holes are nearby, and submersed aquatic vegetation is present. Drainages harboring bluenose shiners included the Escambia, Choctawhatchee, and Yellow rivers. Failure to locate a population within the Apalachicola River system was surprising. As with the blackmouth shiner, the difficulty of sampling some habitats occupied by bluenose shiners precludes quantitative monitoring at most sites. Some localities (e.g. Nichols Creek, in the Yellow River system) may be monitored by boat electrofishing. Other sites should be sampled for presence/absence, using appropriate methods for the site (seines, backpack electrofisher, and dip nets). During the breeding season populations may be located visually by observing the blue-nosed males. Due to

the fact that unexplained absence of bluenose shiners at sites where they have been known to occur is a common phenomenon, monitoring staff should not accept absence at a site as evidence of permanent extirpation without repeated sampling, conducted over several years. The current classification as a Species of Special Concern should be maintained, as a means of preventing over-exploitation by hobby or commercial collectors.

Key silverside (*Menidia conchorum*).--This Threatened marine species is restricted to the Florida Keys. Sampling in the Keys failed to collect any Key silversides. As with many marine and estuarine species of unknown rarity, the distribution and abundance of this species should be the subject of an intensive, widespread investigation. It proved to be beyond the scope and logistical ability of the project to adequately sample the vast complex of habitats in the Florida Keys and Florida Bay. An appropriate next step in the conservation of Florida fishes should be an investigation of the conservation status of marine and estuarine fishes. Such a study would reveal information on the status of two other listed species that occur in the keys, the Rivulus (*Rivulus marmoratus*) and the Key blenny (*Starksia starcki*), both listed as a Species of Special Concern. Though not specifically targeted by this study, these species were searched for without success while sampling in the Florida Keys.

Saltmarsh topminnow (*Fundulus jenkinsi*).--Currently classified by the state as a Species of Special Concern, this fish of low salinity estuaries occurs from Texas to northwestern Florida. Saltmarsh topminnows were collected by staff from 15 sites in the Pensacola Bay and Perdido Bay systems. None were taken from the adjacent Choctawhatchee Bay system. Collections taken by the Imperiled Fishes project indicate this species is not as rare as previously assumed. Although populations are localized, they may be monitored by seining and/or dip netting at sites visited by this project. Saltmarsh topminnows are usually not abundant at any site, and may best be monitored on a presence/absence basis, and their vulnerability assessed by the number of sites at which they are found. This topminnow was collected at brackish sites, where emergent marsh vegetation exists. Long-term survival of this species likely depends on proper salinity regimes and persistence of marsh vegetation. The Pensacola Bay and Perdido Bay ecosystems are known to have substantial environmental problems. Actions to preserve existing emergent vegetation would likely benefit this species. This species may warrant consideration for delisting from the Florida Endangered, Threatened and Species of Special Concern List; however, its close ties to marsh vegetation and estuarine conditions may warrant further investigation. As the areas of distribution in Florida (Pensacola and Perdido bay systems) are affected by environmental problems, including losses of aquatic vegetation and water quality issues, this topminnow may serve as an environmental indicator species for these estuarine systems.

Lake Eustis pupfish (*Cyprinodon variegatus hubbsi*).--Currently listed as a Species of Special Concern by the state, this subspecies of the common marine and estuarine sheepshead minnow is landlocked into lakes forming the headwaters of the Ocklawaha River. Project personnel readily collected Lake Eustis pupfish from 10 sites in these eight lakes of central Florida. They may be efficiently collected by seining and may be monitored with standard seine hauls at locations visited by this project. Lake Eustis pupfish are abundant within their historical range and have adapted to anthropogenic environmental stresses in these lakes. This subspecies does not appear to be imperiled and may warrant re-evaluation for listing.

Suwannee bass (*Micropterus notius*).--Suwannee bass are endemic to the Suwannee and Ochlockonee river systems of Florida and Georgia, and the species has been introduced into the St. Marks River system, presumably by anglers. They were collected from the Suwannee, Santa Fe, St. Marks, and Ochlockonee rivers during the Imperiled Fishes project. Suwannee bass were readily collected from the Suwannee River system, especially the Santa Fe River, where the largest native population occurs. Suwannee bass have successfully colonized the St. Marks River and Wacissa River systems, where they are now abundant. They may be quantitatively monitored by electrofishing at selected stations in the Santa Fe, Ochlockonee and St. Marks rivers. Populations in the Suwannee River proper should be assessed by FWC biologists during routine fishery investigations. Historical records and fishery surveys by the FWC indicate this species has always been uncommon in the Ochlockonee River. Sport fishing for this species is still permitted and has no detrimental effect on populations in the Suwannee River drainage; however, fishery biologists should periodically assess fishery impacts. The current minimum size limit of 12 in (30 cm) total length imposed on bass harvested in this section of the state should protect this species from over-exploitation, as most individuals are less than this length. Although Suwannee bass do not appear to be threatened at present, they should remain on the state list as a Species of Special Concern.

Shoal bass (*Micropterus cataractae*).--Until recently, shoal bass were considered an undescribed species related to the similar redeye bass. Shoal bass are endemic to the Apalachicola River drainage of Florida, Alabama, and Georgia. They were readily collected from 10 sites in the Chipola and Apalachicola rivers by electrofishing and may be quantitatively monitored by standardized electrofishing. Shoal bass are closely associated with limestone shoals, and their long-term survival depends upon preservation of this habitat and prevention, or reduction, of pollution in the Chipola River. As the bulk of the Chipola River population lies downstream from the city of Marianna and Interstate Highway 10, shoal bass are vulnerable not only to general water pollution, but also to catastrophic chemical spills. Shoal bass may have been more abundant in the Apalachicola River prior to dredging and removal of limestone shoals for commercial vessel traffic; however, localized populations still exist. Sport fishing is still allowed for this species and apparently has no adverse effect upon populations; however, this fishery has not been critically examined. The current minimum-size limit of 12 inches (30 cm) total length imposed on bass harvested in this section of the state should protect this species from over-exploitation, as most individuals are less than this length. It would be desirable to conduct creel surveys and population studies to determine fishery characteristics. Because of their limited range in Florida, specific habitat requirements, and vulnerability to pollution, shoal bass should remain on the protected species list as a Species of Special Concern and should be routinely monitored.

Crystal darter (*Crystallaria asprella*).--In Florida, the crystal darter is only known to occur in the Escambia and (possibly) Perdido rivers. The Escambia River and tributaries have been sampled by fishery biologists of the FWC since 1977 without obtaining specimens. However, they are known from the Alabama section of the Conecuh River. Recently, Walsh, et al. (2003) searched unsuccessfully for this species during an extensive one-year survey of the Escambia River. Staff also intensively sampled the Escambia River in search of this darter,

finally collecting two specimens from the upper river using boat electrofishing in December 2003. These were the first collected in Florida since 1974. Subsequently, three additional individuals were collected from the same site in February 2004. Seining of sand and gravel bars, during both day and night, proved unproductive in sampling for this species. It is unlikely any suitable habitat has been overlooked, confirming the rarity of this fish in Florida. Considering observed scarcity, routine quantitative monitoring may not be feasible and this species will have to be monitored from presence/absence information. If additional occurrence data is desired, it should be collected from the upper Escambia River by intensive electrofishing, targeting this species alone. FWC staff and other biologists should carefully examine darters collected during routine operations, to determine whether additional individuals exist. Our data strongly supports consideration of reclassifying this species from Threatened to Endangered, a conclusion reached previously by Walsh et al. (2003).

Harlequin darter (*Etheostoma histrio*).--In Florida, the harlequin darter is only known to occur in the Escambia River system, and is currently classified as a Species of Special Concern. Harlequin darters may be reliably collected by backpack electrofishing in snag habitats, as the darters position themselves directly upon submerged woody debris, typically snags, in flowing, usually swift, water. Such habitats are often difficult to sample and sampling efforts cannot be readily quantified by distance or time sampled. They also have been collected by seining, backpack electrofishing, and boat electrofishing in the main channel of the Escambia River and some of its smaller tributaries. The Imperiled Fishes project collected harlequin darters at eight sites, all in the Escambia River system. They have been collected from both small creeks and large rivers, in both snag and sand-gravel habitats. Most harlequin darter habitats do not lend themselves to quantitative sampling, thus it may best be monitored by presence/absence sampling at known sites. The number of darters collected per snag or other instream structures could possibly be employed as a surrogate unit of abundance. During the course of this project, the major Florida population was located in the Big Escambia Creek. A substantial tributary of the upper Escambia River near the Florida – Alabama border, this stream catastrophically abandoned its natural channel a number of years ago, and efforts are underway to redirect it into its original course. Although restoration of the creek to its proper floodplain channel will benefit the riverine ecosystem, the impact of snag removal during this restoration will be detrimental to harlequin darters. Preliminary observations suggest harlequin darters use snags as spawning sites, thus excessive snag removal will reduce numbers of this species. Currently, harlequin darters are relatively uncommon and have a very limited distribution in Florida. The key to maintenance of harlequin darter populations in Florida is preservation of in-stream structure, especially snags.

Southern tessellated darter (*Etheostoma olmstedi maculaticeps*).--The tessellated darter ranges from Canada southward along the Atlantic Coast to northeastern Florida. The southern subspecies ranges from North Carolina southward to the St. Johns River drainage of Florida. However, the St. Johns River population is disjunct from the northern distribution of the subspecies. Within the St. Johns River drainage, tessellated darters occur only in the Ocklawaha River system. FWC personnel previously collected tessellated darters from Orange Creek, and Florida Department of Environmental Protection (DEP) workers also collected specimens from Eaton Creek. Both creeks are tributaries of the Ocklawaha River. Southern tessellated darters

were subsequently collected by staff from the Ocklawaha River proper and from Orange Creek, but not the Eaton Creek site. The Orange Creek population could be monitored by standardized backpack electrofishing procedures at the site visited by the project, and the Ocklawaha River population could be assessed by standardized boat electrofishing. Future collectors should be careful not to decimate the Orange Creek population by over-sampling, as this appears to be the best remaining assemblage in Florida. In terms of absolute numerical abundance and geographical range, tessellated darters are rare in Florida, where much of its original habitat was destroyed by construction of Rodman Reservoir. Preservation of in-stream habitat and water quality within the Ocklawaha River valley will be essential for the maintenance of limited, but viable populations. Fortunately, although their small-stream habitat is restricted, they also occur within the main channel of the Ocklawaha River, where they may be less vulnerable to environmental degradation. The size and geographic extent of the main channel population is unknown and would merit further investigation. Though currently listed as a Species of Special Concern, the tessellated darter may warrant consideration for reclassification to a Threatened Species.

The final report for this project is available at http://myfwc.com/fishing/pdf/ImperiledFishReport.pdf. Questions about this report can be directed to the Division of Habitat and Species Conservation, Species Conservation Planning Section, Florida Fish & Wildlife Conservation Commission, Tallahassee, Florida.

Technical Assistance (*Gray Bass*).--Other Imperiled Fish activities included coordination with private and public entities regarding information needed for conservation of fishes and for development of lands. Information was also provided to other sections of the FWC for use in developing management plans for Wildlife Management Areas. In addition, numerous requests for fish and fisheries information were received from the public and answered by the SCPS Fish Coordinator.

Smalltooth Sawfish

Smalltooth Sawfish Research (*Ed Matheson/Gregg Poulakis*).--Smalltooth sawfish (*Pristis pectinata*) were once common in the coastal and estuarine waters of the southeastern United States, but during the 20th 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 of 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 protection under the Endangered Species Act in 2003. These conservation measures were enacted largely on the basis of large scale declines in occurrence and a gross reduction of historical range. Despite the special concern for this fish, there is a dearth of scientific information, making the implementation of conservation and recovery plans for this species difficult.

The FWC has been conducting multi-species fisheries-independent surveys of fishes in many of Florida's estuaries since the late 1980's. This program employs standard methods, which provide high quality fisheries data, some of which are used in developing stock

assessments and setting regulations. 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 design and methods used in this project were adapted from fisheries independent monitoring techniques and the program is funded by monies obtained from the National Marine Fisheries Service/National Oceanic and Atmospheric Administration's (NMFS/NOAA) Southeast Region Office of Protected Resources through the Protected Species Conservation and Recovery with the States program. It is important to note that the FWC applied to the NMFS/NOAA Office of Protected Resources in January 2004 for a permit to conduct these research activities and as of October 2005 this permit is still pending; until issued, FWC is operating under a permit previously issued to Mote Marine Laboratory.

Monitoring - Between November 2004 and June 2005, two complimentary sampling methods were used to collect smalltooth sawfish in the Charlotte Harbor estuarine system which is located on the southwest Gulf coast. Monthly, randomized sampling was conducted using a large (600 ft; 182.9 m) seine in the Caloosahatchee River, which is an area that is known to be frequented by smalltooth sawfish. In addition, monthly directed sampling that targeted sawfish hotspots was conducted throughout the estuary using a multi-gear approach (e.g., gill nets, 600 ft; 182 m seines). Captured sawfish were tagged with a brightly colored rototag and a subdermal passive integrated transponder (PIT) tag and immediately released at the site of capture. The rototags are printed with FWC tagging hotline information on one side and a unique tag number on the other. These tags typically remain on a fish for up to two years. Anglers who encounter these tags can call the hotline and report their catch and location information. The PIT tags are about the size of a grain of rice and contain a uniquely numbered microchip that is detected by an electronic reader that is carried by researchers. The advantage of these tags is that they remain with the sawfish for life. Because of their expense, only selected sawfish were tagged with acoustic tags which are used by researchers to track sawfish movements.

During this eight month period, 17 sawfish were collected (6 during randomized sampling and 11 from directed sampling), including one recapture. A variety of data were taken on all sawfish (e.g., lengths, rostral tooth counts) and each animal was tagged and released. Sawfish were captured between February and June with eleven captured in March. Total lengths ranged from 4.5–5.5 feet (1412 to 1726 mm) for the 5 males and from 2.5–6 feet (776 to 1811 mm) for the 12 females; all of these sawfish were immature. One fish was recaptured at the same location about two weeks after being tagged. Through this monitoring effort, the FWC is identifying habitats that are important during the early life history of this endangered species.

Movement - Successful recovery of the smalltooth sawfish will require a broad understanding of the life history, biology, and ecology of this species, including movement patterns and habitat use. FWC staff is using acoustic technology to determine the movements of individual sawfish. Between November 2004 and June 2005, five smalltooth sawfish were fitted with acoustic tags and were tracked. The data obtained from these and future tracks will help define growth rates, activity space, home range, and the abiotic preferences of this species. This is a collaborative effort between the FWC and the Mote Marine Laboratory.

Communication, Education, and Outreach - FWC staff is a member of the Smalltooth Sawfish Recovery Team. This group includes members with federal, state, academic, and non-profit affiliations and is assembled by the National Marine Fisheries Service to draft a Recovery Plan for this species. Data from the FWC's sampling are provided to the Recovery Team as needed.

Staff presented information on the FWC's smalltooth sawfish research at the Charlotte Harbor National Estuary Program meeting in February and staff gave presentations to local school and fishing groups that included information on the status of this species. In addition, posters, which contain a request that catches or observations of sawfish be reported to the FWC, have been distributed at boat ramps and tackle shops. Information received is compiled and used to help determine potential research sample sites. During these contacts, staff takes the opportunity to educate responders about the smalltooth sawfish and the FWC's role in its protection.

For more information on the Smalltooth Sawfish Research program, please visit the smalltooth sawfish portion of the FWRI website (http://research/myfwc.com) or call Gregg Poulakis of the FWC's Fish and Wildlife Research Institute (SC 758-7404, 941-255-7403).

Gulf Sturgeon

Conservation and Management (*Dan Roberts*).--FWC is involved in efforts to manage the gulf sturgeon (*Acipenser oxyrinchus desotoi*), a fish listed as threatened at the federal level and SSC at the state level. Staff participate in the Florida Sturgeon Production Working Group (FSPWG). The FSPWG was created by F.S. 370.31 for the purpose of developing recommendations regarding the feasibility of commercial sturgeon production and stock enhancement. The working group is composed of six members: 1) a designee of the University of Florida, Institute of Food and Agriculture Sciences; 2) a representative from Department of Environmental Protection; 3) a representative from FWC; 4) a representative from the Department of Agriculture and Consumer Services; and 5) two representatives from the aquaculture industry to be appointed by the Aquaculture Review Council. FWC staff provides continuing input and refinement of sturgeon aquaculture best management practices and insures conservation of native sturgeon stocks. Historically, FWC staff developed and published the Gulf of Mexico Sturgeon Conservation and Management Plan, developed and implemented a sturgeon conservation research grants program, and assisted in completion of a sturgeon aquaculture risk assessment. Although the FSPWG is currently involved in issues mostly related to aquaculture of non-native sturgeons, FWC provides constant vigil over potential impacts of aquaculture on native sturgeon stocks, especially the Gulf of Mexico sturgeon. There were two meetings in 2004-2005, July 23, 2004 and May 19, 2005, respectively. At the most recent meeting, there was discussion of native sturgeon conservation and stock enhancement of Gulf sturgeon. That topic was identified as a high priority issue for the next FSPWG meeting. The Chairman noted that the working group was responsible for evaluating how stock enhancement can facilitate the conservation and recovery of native sturgeon populations. Since stock enhancement, especially of listed fish species is such a complex issue, FWC will undoubtedly play a primary consulting role in such activities if proposed in the coming year.

FWC staff participated in the annual Gulf of Mexico Sturgeon Management and Conservation Workshop held in Covington, Louisiana in November, 2004. There were representatives from all five Gulf States as well as the Atlantic States, NOAA, USGS, and the FWS. Participants presented technical papers and held detailed discussions on management, conservation, mortality estimates, population estimates and physiology of several sturgeon species. Most of the information and discussion was relative to the five Gulf of Mexico sturgeon stocks.

Research.--FWC and Mote Marine Laboratory (MML) staff are completing a report on research conducted from 2000 to 2003 on stock enhancement of Gulf of Mexico Sturgeon. Fifty-three sub-adult Gulf of Mexico sturgeon were equipped with acoustic transmitters and released into each of 3 habitats in each of two reaches of the Hillsborough River, Florida. The objective was to determine if gulf sturgeon could survive and maintain a limited presence in the modified natural system. Most of the fish exhibited excellent survival and very little movement in both the saltwater and freshwater reaches of the river. Fish were tracked and evaluated by their use of various habitats, their dispersal and their movements for over two years. Most of the fish remained in the river for over 9 months, but many abruptly left about the time of hurricane Gabrielle in 2001. During that storm many of the control structures of the Hillsborough River and the Tampa Bypass Canal were opened and the fish scattered into Hillsborough Bay and Tampa Bay proper. This report is nearing completion.

FWC staff plan to continue to provide input when needed to all elements of Gulf of Mexico sturgeon life history, biology, management, conservation and use of critical Gulf sturgeon habitat issues.

Shortnose Sturgeon

Sampling Protocol (*Jay Holder*).--A final report was submitted in December 2004 to the National Marine Fisheries Service (NMFS) regarding use of a sampling protocol for shortnose sturgeon (*Acipenser brevirostrum*), developed by the NMFS. The Survey was conducted over a two-year period beginning on 3 January 2002 and ending 27 June 2003 in an effort to determine if a remnant population of shortnose sturgeon exists in the St. Johns River. Gill net sampling concentrated on historical catch sites of the St. Johns River between the confluence of the Oklawaha River and Jacksonville. One specimen was netted in 4,493 hours of gill net effort. It was captured, tagged, and released on 22 January 2002 near Federal Point, between Palatka and Bostwick, Florida. Tissue samples were sent to the University of South Carolina-Columbia for genetic analysis. This fish was not genetically distinct from other southeastern populations.

Information regarding sturgeon research may be found at the following website http://research.myfwc.com/features/category_sub.asp?id=2734 or you may contact the principal investigator at 386-985-7827.

Pillar Coral

Assessment and Status (*Walt Jaap*).--One species of coral is listed by FWC as endangered: Pillar coral (*Dendrogyra cylindrus*). The species is found off the Florida east coast as far north as Broward County. In the Gulf of Mexico, it is known from Dry Tortugas; however, it is most common in the Florida Keys reefs. In the context of shallow-water, zooxanthellate (corals that contain symbiotic algae within their tissues) Scleractinia, *Dendrogyra cylindrus* has suffered the same population declines as other species of zooxanthellate corals. Since the 1980s, coral abundance and cover have declined on shallow-water coral reefs throughout Florida. The causes include natural and anthropogenic disturbances: hurricanes,

bleaching events, ship groundings, fishing and diving injuries, coastal development, and water quality problems.

FWC's Coral Reef Monitoring Program conducts status and trends monitoring at 41 sites (1996 through 2004); three sites were added at Dry Tortugas in 1999, and ten sites were added between Palm Beach and Miami Dade in 2003. The information that staff collected at these sites includes the presence/absence and cover of scleractinian coral species. Status and trends for pillar coral document change in cover from 1996 to 2004 (Table 8). Pillar coral was present at three sampling sites, Conch, Sombrero, and Sand Key Reefs, in 1996. The species was no longer within the sampling station at Sombrero in 1998. Bleaching and a disease infection caused a reduction in the cover of the colony; however, the surviving portions of the colony were seen beyond the sampling station boundaries. Placement of the Pillar coral on the State of Florida endangered species list was not based on a scientific status review under the current listing criteria.

Table 8. Percent cover of Pillar coral, *Dendrogyra cylindrus* at CREMP monitoring sites, 1996 to 2004. Compiled from CREMP database and Beaver et. al. (2004).

Year, Station	Conch, 4	Conch, 3	Sombrero, 3	Sand Key, 3	Total Study
1996	11.77	0.13	1.98	1.75	0.15
1997	10.06	0	1.05	3.26	0.14
1998	8.80	0	0	1.08	0.09
1999	6.11	0.62	0.11	2.66	0.09
2000	8.42	0	0	2.00	0.10
2001	7.33	0.29	0	0	0.07
2002	5.55	0	0	2.03	0.07
2003	3.66	0	0	1.81	0.05
2004	2.93	0	0	0.78	0.04

Coral protection in Florida is provided by federal statutes and state rules and statutes The federal government protects all corals through Fishery management plans (Magnuson Act), the Marine Sanctuaries Act (Florida Keys) and indirect legislation such as the clean water act (US Army Corps of Engineers, US EPA).

The FWC rule 68B- 42.009 and Florida Statutes 253.01 and 253.04 provide coral protection in Florida. Convention on International Trade in Endangered and Threatened Species (CITES) lists all of the Orders Antipatharia and Scleractinia in Appendix II as threatened.

Miami Blue Butterfly

Recovery Efforts (*Ricardo Zambrano*).--The Miami blue butterfly (*Cyclargus* [= *Hemiargus*] *thomasi bethunebakeri*) is listed by FWC as Endangered. 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. The Miami blue is now only found at one location, Bahia Honda State Park, in the Florida Keys. The wild population ranges 50 – 100 individuals.

FWC has partnered with several government agencies, nongovernmental organizations, and the University of Florida (UF) to protect and recover this species. The agency's Commissioners directed staff to develop a species management plan. This plan can be viewed at: http://myfwc.com/imperiledspecies/plans.htm.

Captive Breeding and Reintroduction - FWC has coordinated closely with the UF, the National Park Service (NPS), and the Florida Park Service with ongoing captive propagation and reintroduction efforts on the Miami blue. As of June 2005, the captive colony had gone through 24 generations. FWC staff has assisted with the release of larvae to reintroduction sites and has helped monitor these release sites. Four reintroductions at eight locations within Everglades National Park and Biscayne National Park took place during FY 2004-2005. Over 2000 larvae and adults were released during the same fiscal year. Unfortunately, monitoring of these sites post reintroductions has not found the butterflies to be flourishing on their own.

FWC was awarded a grant through the Wildlife Foundation's Conserve Wildlife Tag grant program to contract with UF to continue captive breeding of the Miami blue at their McGuire Center for Lepidoptera and Biodiversity. The grant monies will also be used by UF to continue reintroducing Miami blues to suitable sites within their former range and to monitor released individuals post-release. Further, the grant has allowed UF to continue monitoring the Bahia Honda State Park population.

Work Group Meetings - FWC staff has organized and facilitated two Miami Blue Butterfly Work Group meetings. The work group is comprised of the Florida Department of Environmental Protection (DEP), the NPS, the United States Fish and Wildlife Service (USFWS), Monroe, Dade, and Collier mosquito control districts, the UF, Miami-Dade Parks and Recreation, and the North American Butterfly Association. The work group's mission is to coordinate recovery efforts and to present and address potential conflicts with these efforts. The first meeting in FY 2004-2005 was held at Crandon Park in Key Biscayne on 1 September 2004. The second meeting was held at Everglades National Park on 13 May 2005. Agenda items for both meetings included updates on captive propagation and reintroduction efforts, monitoring of released individuals, suitability of future reintroduction sites, and mosquito control spraying conflicts with reintroduction sites.

Research - FWC is funding UF to determine the effects of mosquito control insecticides on Miami blue butterfly larvae. This research also will examine the effects of insecticide drift on larvae. Recommendations on buffer zone distances around Miami blue colonies may result from this study. Additionally, FWC is funding UF to conduct a Miami blue butterfly genetic study. Results of this study should allow UF to develop a long-term strategy for genetic conservation and management of the existing wild colony, captive colony, and reintroduction efforts which are currently ongoing.

Other events - FWC staff gave a presentation to Florida's Pesticide Review Council. The talk was intended to give an overview of Miami blue reintroduction efforts and the concerns of south Florida mosquito control agencies with these efforts.

For more information on the Miami blue butterfly, please contact the South Regional Nongame Biologist Ricardo Zambrano at 561-625-5122 or email at: ricardo.zambrano@myfwc.com.

Nongame Wildlife Grant - Miami Blue Butterfly–Captive Propagation and Reintroduction (*Stuart Cumberbatch*).-- Dr. Thomas Emmel, McGuire Center for Lepidoptera Research, University of

Florida, completed work on the establishment of a captive colony of Miami Blue Butterflies and the development of a plan for reintroducing the species in its historical range. The success of the project, which was supported by a grant from the Nongame Wildlife Grants Program (NWGP), contributed to an award for continuation funds from the Wildlife Foundation of Florida. The current project will continue work to enhance wild population numbers and current geographic range through augmentation and establishment of new viable colonies with captive raised individuals.

Panama City Crayfish

Conservation Efforts (*John Himes/David Cook*).--The Panama City crayfish (*Procambarus econfinae*) is one of 30 endemic or near-endemic species of crayfish in Florida. It is an inhabitant of wet pine flatwoods and is only known from a small portion of Bay County in and around Panama City. The Panama City crayfish has been listed as a Species of Special Concern since 1989.

FWC received two petitions to re-evaluate the status of the Panama City crayfish. The petitions were received in 2001 and 2003, respectively. In fulfillment of the 2001 petition, a biological assessment following the listing process rules was initiated. However, a listing moratorium was initiated in 2003 and the listing process rules were changed in April 2005. This species is currently undergoing a biological assessment in accordance with the current listing rules. This biological review is scheduled for completion by the end of June 2006.

In June 2005, stakeholders from FWC, Gulf Power Company, United States Fish and Wildlife Service, Bay County, and the St. Joe Company agreed that St. Joe would write a Candidate Conservation Agreement with Assurances (CCAA) for the Panama City crayfish in September 2005. The CCAA is intended to provide sufficient protection of Panama City crayfish and their habitat (via Best Management Practices) in order to preclude the need for federal listing.

For more information on the biological status report, management plan, or plan implementation, please contact Dr. John Himes at 850-265-3676 or David Cook at 850-410-0656 x 17315.

Habitat Modeling

Listed species GIS based habitat modeling (*Mark Endries*).-- The FWC is currently involved in updating the 1994 FWC document "Closing the Gaps in Florida's Wildlife Habitat Conservation System". The document is the result of a geographic information system (GIS) based assessment of the degree of security provided to listed and rare wildlife species by the current system of conservation lands in the state of Florida. The publication identifies and recommends protection for important habitat areas with no level of conservation protection. The lands recommended for protection are referred to as Strategic Habitat Conservation Areas (SHCA).

Sixty wildlife species have been selected for analysis. Currently, biologists within FWC are in the process of creating GIS based potential habitat models for each species based on the FWC 2003 land cover dataset. Upon completion of a potential habitat model, a spatially explicit population viability analysis (PVA) is performed to evaluate the likelihood that the species will persist for the next 100 years based upon the habitat identified in the potential habitat model.

The security of each species is then assessed using the species' potential habitat model, PVA analysis, and public lands boundaries. If a species is deemed to not have an adequate base of habitat in the current system of conservation areas in Florida (public lands) then additional, privately owned lands, are identified as SHCA. The results of the analysis are intended to help guide land acquisition, wildlife management, land conservation, land-use planning, as well as serve as an educational document for Florida's imperiled wildlife species. For more information please contact Mark Endries at 850-488-6661.

COORDINATION AND TECHNICAL ASSISTANCE

Program Summary (*Dan Sullivan*).--Endangered species coordination involved overseeing, monitoring, facilitating and otherwise organizing endangered species projects and research; ensuring adherence to federal and state reporting and documentation requirements and guidelines; implementing or facilitating protection through technical assistance, regulatory measures, and permit review; providing or facilitating consultation and technical assistance to private interests and interacting with state and federal agencies, conservation organizations and others regarding a wide range of endangered species matters.

Funding for coordination was jointly derived from the USFWS via Section 6 of the Federal Endangered Species Act of 1973, the Nongame Wildlife Trust Fund (NGWTF) and the Florida Panther Research and Management Trust Fund (FPRMTF). Coordination included initiating and/or responding to correspondence dealing with various endangered species issues, processing numerous requests for endangered species information and representation of the FWC at various meetings and conferences. All endangered species activities funded from federal sources were monitored and overseen, and annual reports were prepared to document their progress. Technical assistance in endangered species matters was provided to a number of state and federal agencies, consulting firms, private individuals and local regulatory authorities. Greater than 2,800 phone calls, a large number of emails and formal letters were provided to provide this technical assistance. All aspects of the Section 6 Cooperative Agreement were maintained, and the necessary paperwork for renewing this agreement was submitted. This included drafting 68 emergency handling reports, administering the section 6 grant paperwork, and drafting the section 6 renewal packet.

During FY 2004-2005, staff used stakeholder input to draft proposed changes to the FWC listing process. These changes were discussed at 3 Commission meetings, and resulted in new rules being approved at the April 2005 Commission meeting. To view the new listing process rules, please see http://myfwc.com/imperiledspecies/listingproceduresanddefinitions.pdf. For more information on the history of the development of the rule changes, please see http://myfwc.com/imperiledspecies/listing-process.htm.

In an effort to make information more readily available to the public, the imperiled species website was updated, and information was added. For copies of previous legislative reports, the updated list of imperiled wildlife, information on listed species permits, or listed species management plans, please visit http://myfwc.com/imperiledspecies/ or contact the Endangered Species Coordinator at 850-488-3831.

CRITICAL WILDLIFE AREAS

Program Summary (*Nancy Douglass*).--Critical Wildlife Areas (CWAs) are established by the FWC to protect wildlife concentrations from human disturbance during critical nesting, feeding, or resting periods (68A-19.005). The areas are defined in establishment orders and are closed to human entry during the period of time defined in the order. The five FWC regional nongame biologists are responsible for evaluating potential CWAs, drafting rules for their establishment, modification or deletion, and administering their posting and maintenance each year.

During FY 2004-2005, designated sites were monitored by biologists and signs posted seasonally to advise the public of the importance of the CWA. Protection efforts were coordinated with local government, other agencies, organizations, and FWC law enforcement personnel. Seventeen of the 21 established CWAs supported varying amounts of nesting, resting or feeding habitat during the year (Table 9). All the active CWAs supported listed species, the most notable of which included: Bird Island (wading birds, oystercatchers and pelican rookeries); ABC Islands (wading birds and 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 Pelican Shoal [the primary United States nesting site for the Caribbean population of roseate terns (*Sterna dougalli*)].

Table 9. Name, County, Closure Period, and Status With Species and Numbers of Nests, for Critical Wildlife Areas in Florida in FY 2004-2005.

Region CWA name	County	Closure period	Primary taxa	Status[a]	Managed area
Southwest					
Bird Island	Hillsborough	1 Dec. to 1 Sept.	Herons, egrets, ibis, pelicans, spoonbills, oystercatchers	Active [c]	75 acres
Little Estero Island	Lee	1 April to 1 Sept	Least terns, Wilson's plover	147LETE, 2 WIPL	25 acres
Anclote River Islands*	Pasco/Pinellas	1 Feb. to 1 Sept.	Herons, egrets, pelicans	Inactive [b]	--
Myakka River	Sarasota	1 March to 1 Nov.	Wood storks, egrets, great blue heron, anhinga, black-crowned night heron	66 Pairs	1 acre
Northwest					
Tyndall	Bay	Year-round	Terns, gulls, skimmers, shorebirds, oystercatchers	1 oystercatcher nest	10 acres
Alligator Point	Franklin	1 April to 1 Sept.	Terns, oystercatchers	Data unavailable	145 acres
St. George Causeway	Franklin	1 April to 31 Aug.	Terns, gulls, oystercatchers, skimmers	2587 nests	32 acres
Gerome's Cave*	Jackson	1 March to 1 Sept.	Southern Myotis	500-5,000 bats	2 acres
South					
Deerfield Island Park*	Broward	Year-round	Gopher tortoise	Active [c]	56 acres
ABC Islands	Collier	Year-round	Herons, egrets, pelicans	947 nests	75 acres
Big Marco Pass*	Collier	Year-round	Terns, black skimmers, plovers, wintering shorebirds	2203 birds	60 acres
Caxambas Pass*	Collier	1 April to 1 Sept.	Least Terns, wintering shorebirds	291 birds	1 acre
Rookery Island	Collier	Year-round	Herons, egrets, pelicans	241 nests	5 acres
Bill Sadowski*	Dade	Year-round	Shorebirds, herons, egrets (foraging only)	Active [c]	700 acres
Pelican Shoal	Monroe	1 April to 1 Sept.	Roseate terns, bridled terns	600 birds	1 acre
North Central					
Amelia Island	Nassau	1 April to 1 Sept.	Least terns	35 birds	4 acres
Bird Islands*	Duval	1 April to 1 Sept.	Black skimmers, oystercatchers	800 birds	2 acres
Fort George Inlet*	Duval	1 April to 1 Sept.	Royal terns, laughing gulls	2,000 nests	10 acres
Northeast					
Jennings Cave	Marion	15 Feb. to 31 Aug.	Bats	Data unavailable	1.9 acres
Matanzas Inlet*	St. Johns	1 April to 1 Sept.	Least terns, Wilson's plovers, willets	Data unavailable	28 acres
Fort George Inlet*	Duval	1 April to 1 Sept.	Royal terns, black skimmers, laughing gulls	2,000 nests	10 acres

[a] Estimated peak numbers of individuals and/or successful nests at each site during the closed period in FY 2004-05
[b] Inactive means the site was not used during FY 2004-05
[c] Active means the site was documented as active, but counts not available for FY 2004-05
* Indicates sites that may require re-description or merit deletion from the CWA system.

FLORIDA'S LANDOWNER INCENTIVE PROGRAM

Program Summary (*Harley Weaver*).--In cooperation with the United States Fish and Wildlife Service (USFWS), the FWC has been working to implement the Landowner Incentive Program (LIP) since October 2003. Florida's LIP is a vital natural resource-driven tool used to promote stewardship on private lands while playing a fundamental role in the conservation of imperiled species not only for Florida, but across the nation. Florida's LIP is a voluntary cost-share program designed to provide technical and financial support to private landowners interested in improving habitat conditions on their properties to benefit listed species. New technological advances amongst cost-share programs are being implemented to ensure that the federally funded dollars are being distributed in the most efficient and equitable manner possible on properties with the greatest potential benefits for listed species.

Applicant properties are individually evaluated for natural resource value using a state-of-the-art Geographic Information System (GIS) based process that assigns a property rank based on the best available databases. These databases are layers of environmental information such as land cover imagery, current listed species habitats, wildlife occurrence data and potential listed species habitat models. Once ranked, FWC biologists recommend beneficial and cost-effective practices based on the GIS analysis, site visit, and the targeted listed species.

During fiscal year 2004-2005, FWC biologists visited 27 private landowners and have obligated $335,526 at a 50% cost-share rate to conduct practices across 16,118 acres (6,523 ha) to directly benefit those identified species. Some of the management practices that have been funded include: prescribed fire [$102,944 being obligated across 12,868 acres (5,208 ha)]; longleaf pine and natural groundcover restoration [$124,486 was obligated on 20,653 acres (8,358 ha) to establish native trees, shrubs, forbs or grasses to restore or improve habitat conditions]; habitat modification [$94,368 has been obligated to mechanically and chemically enhance over 2,111 acres (854 ha) by re-establishing more natural stand conditions that improve habitat for listed species]; nest platform/cavity creation [$10,213 has been obligated to install 92 red-cockaded woodpecker (*Picoides borealis*) inserts].

Affected habitat included pine flatwoods, scrub, tropical hardwood hammocks, hardwood swamp, bottomland hardwoods, and mixed hardwood and pine. Treatments were applied to these plant communities to provide improved habitat conditions for Flatwoods salamander (*Ambystoma cingulatum),* Eastern indigo snake (*Drymarchon corais couperi),* short-tailed snake (*Stilosoma extenuatum),* Suwannee cooter (*Pseudemys concinna suwanniensis),* tricolored heron (*Egretta tricolor)*, white ibis (*Eudocimus albus)*, wood stork (*Mycteria Americana)*, little blue heron (*Egretta caerulea)*, red-cockaded woodpecker (*Picoides borealis)*, sandhill crane (*Grus canadensis pratensis)*, scrub jay (*Aphelocoma coerulescens)*, burrowing owl (*Athene cunicularia)*, Southeastern American kestrel (*Falco sparverius paulus)*, crested caracara (*Caracara cheriway)*, and osprey (*Pandion haliaetus)*.

Future expectations for Florida's LIP 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 LIP.

Please visit the LIP website at http://www.myfwc.com/lip/ for more information on Florida's LIP or contact the LIP Coordinator at 850-410-0656, extension 17336 for questions regarding this report.

LAW ENFORCEMENT

Statewide Enforcement (*Capt. John West, Lt. Colonel Don Holway*).--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:

1. Regular patrols of the three Florida panther reduced-speed zones in Collier County (two on State Road 29 and one on United States [US] 41).
2. Patrol efforts targeting coastal nesting areas of marine turtles to reduce nest destruction and unlawful egg removal or theft.
3. Enhanced enforcement efforts directed towards utilizing radar in designated Manatee Zones to insure compliance and to prevent manatee vessel strikes.
4. Manatee zone enforcement efforts coordinated with the United States Fish and Wildlife Service, Collier County Sheriff's Department and the City of Naples Police Department.
5. Regular patrols in Monroe County enforcing the Key Deer speed zone on Big Pine Key.
6. Assisting FWC biologists working with the Perdido Key Beach mouse with increasing public awareness on sensitive habitat after several hurricanes.

FWC's Division of Law Enforcement issued at least 77 citations involving Endangered, Threatened and Species of Special Concern during FY 2004-2005. The majority of these were for violation of a speed zone, or illegal take or possession. For more information please contact the Division of Law Enforcement at 850-488-6253.

PERMITTING AND TECHNICAL ASSISTANCE

Program Summary (*Angela T. Williams*).-- FWC staff provided federal agencies, other state agencies, environmental consultants, regional and local regulatory authorities with technical 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 technical assistance and guidance when applying for scientific collecting, captive possession, relocation and incidental take permits for listed species.

Technical assistance for developers, environmental consultants, and regulatory agencies usually consisted of any 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 are issued in accordance with Rules 68A-9, 68A-12, 68A-25 and 68A-27 Florida Administrative Code (F.A.C.). 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 (*Athene cunicularia floridana*) in Urban Areas, Osprey (*Pandion haliaetus*) Nest Removal Policies, Guidelines for the Relocation of Gopher Tortoises (*Gopherus polyphemus*) 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.

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 our website at http://myfwc.com/permits/protected-wildlife/ for those interested in applying for permits to handle or impact terrestrial listed species.

FWC staff technical assistance efforts resulted in more than 2,803 telephone accounts and hundreds of formal letters and emails. Additionally, 526 listed species scientific collection, captive possession, relocation and incidental take permits (and 114 permit amendments) were issued during Fiscal Year (FY) 2004-2005. For more information on issued permits, contact the Imperiled Terrestrial Species Permit Coordinator at 850-921-5990 extension 17310.

APPENDIX A. CURRENTLY LISTED WILDIFE SPECIES.

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

Common Name	Scientific Name	Designated Status		
		FWC	USFWS	NOAA-NMFS
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC (2)		
short-tailed snake	*Stilosoma extenuatum*	T		
Florida brown snake	*Storeria dekayi victa*	T[1]		
rim rock crowned snake	*Tantilla oolitica*	T		
Florida ribbon snake	*Thamnophis sauritus sackeni*	T[1]		
bluetail mole skink	*Eumeces egregius lividus*	T	T	
Florida Key mole skink	*Eumeces egregius egregius*	SSC (1)		
sand skink	*Neoseps reynoldsi*	T	T	
gopher tortoise	*Gopherus polyphemus*	SSC (1,2,3)		
Barbour's map turtle	*Graptemys barbouri*	SSC (1,2)		
alligator snapping turtle	*Macroclemys temminckii*	SSC (1)		
striped mud turtle	*Kinosternon baurii*	E[1]		
Suwannee cooter	*Pseudemys concinna suwanniensis*	SSC (1,2)		
loggerhead seaturtle (loggerhead sea turtle)	*Caretta caretta*	T	T	
green seaturtle (green sea turtle)	*Chelonia mydas*	E	E[a] & T[b]	
leatherback seaturtle (leatherback sea turtle)	*Dermochelys coriacea*	E	E	
hawksbill seaturtle (hawksbill sea turtle)	*Eretmochelys imbricata*	E	E	
Kemp's ridley seaturtle (Kemp's ridley sea turtle)	*Lepidochelys kempii*	E	E	
BIRDS				
piping plover	*Charadrius melodus*	T	T	
snowy plover (Cuban snowy plover)	*Charadrius alexandrinus*	T		
American oystercatcher	*Haematopus palliatus*	SSC (1,2)		
brown pelican	*Pelecanus occidentalis*	SSC (1)		
black skimmer	*Rynchops niger*	SSC (1)		
least tern	*Sterna antillarum*	T		
roseate tern	*Sterna dougalli (Sterna dougallii dougallii)*	T	T	
Limpkin	*Aramus guarauna*	SSC (1)		
reddish egret	*Egretta rufescens*	SSC (1,4)		
snowy egret	*Egretta thula*	SSC (1)		
little blue heron	*Egretta caerulea*	SSC (1,4)		
tricolored heron	*Egretta tricolor*	SSC (1,4)		

Common Name	Scientific Name	Designated Status		
		FWC	USFWS	NOAA-NMFS
white ibis	*Eudocimus albus*	SSC (2)		
Florida sandhill crane	*Grus canadensis pratensis*	T		
whooping crane	*Grus americana*	SSC (5)	XN	
wood stork	*Mycteria americana*	E	E	
roseate spoonbill	*Platalea ajaja*	SSC (1,4)		
burrowing owl (Florida burrowing owl)	*Athene cunicularia* (*Athene cunicularia floridana*)	SSC (1)		
crested caracara (Audubon's crested caracara)	*Caracara cheriway* (*Polyborus plancus audubonii*)	T	T	
peregrine falcon	*Falco peregrinus*	E		
Southeastern American kestrel	*Falco sparverius paulus*	T		
bald eagle	*Haliaeetus leucocephalus*	T	T	
Osprey	*Pandion haliaetus*	SSC[2] (1,2)		
snail kite (Everglades snail kite)	*Rostrhamus sociabilis plumbeus*	E	E	
Florida scrub jay	*Aphelocoma coerulescens*	T	T	
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E	E	
Florida grasshopper sparrow	*Ammodramus savannarum floridanus*	E	E	
Scott's seaside sparrow	*Ammodramus maritimus peninsulae*	SSC (1)		
Wakulla seaside sparrow	*Ammodramus maritimus juncicolus*	SSC (1)		
white-crowned pigeon	*Columba leucocephala*	T		
Kirtland's warbler	*Dendroica kirtlandii*	E		
Bachman's warbler	*Vermivora bachmanii*	E		
ivory-billed woodpecker	*Campephilus principalis*	E		
red-cockaded woodpecker	*Picoides borealis*	SSC	E	
Marian's marsh wren	*Cistothorus palustris marianae*	SSC (1)		
Worthington's marsh wren	*Cistothorus palustris griseus*	SSC (1)		
MAMMALS				
Florida panther	*Puma concolor coryi* (*Puma* [=*Felis*] *concolor coryi*)	E	E	
puma (= mountain lion)	*Puma* [=*Felis*] *concolor*		T (S/A)**	
red wolf	*Canis rufus*		E†1	
Florida black bear	*Ursus americanus floridanus*	T[3]		
Everglades mink	*Mustela vison evergladensis*	T		
key deer	*Odocoileus virginianus clavium*	E	E	

Common Name	Scientific Name	Designated Status		
		FWC	USFWS	NOAA-NMFS
Lower Keys marsh rabbit	*Sylvilagus palustris hefneri*	E	E	
Big Cypress fox squirrel	*Sciurus niger avicennia*	T		
Sherman's fox squirrel	*Sciurus niger shermani*	SSC (1,2)		
Eastern chipmunk	*Tamias striatus*	SSC (1)		
Sanibel Island rice rat	*Oryzomys palustris sanibeli*	SSC (1,2)		
silver rice rat (rice rat, lower FL Keys)	*Oryzomys argentatus* (*Oryzomys palustris natator*)	E	E	
Key Largo woodrat	*Neotoma floridana smalli*	E	E	
Key Largo Cotton Mouse	*Peromyscus gossypinus allapaticola*	E	E	
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	E	E	
Southeastern beach mouse	*Peromyscus polionotus niveiventris*	T	T	
Anastasia Island beach mouse	*Peromyscus polionotus phasma*	E	E	
St. Andrews beach mouse	*Peromyscus polionotus peninsularis*	E	E	
Perdido Key beach mouse	*Peromyscus polionotus trissyllepsis*	E	E	
Florida mouse	*Podomys floridanus*	SSC (1)		
Florida mastiff bat	*Eumops glaucinus floridanus*	E		
gray bat	*Myotis grisescens*	E		
Indiana bat	*Myotis sodalis*	E		
Florida saltmarsh vole (Florida salt marsh vole)	*Microtus pennsylvanicus dukecampbelli*	E	E	
Sherman's short-tailed shrew	*Blarina carolonensis [=brevicauda] shermani*	SSC (2)		
Homosassa shrew	*Sorex longirostris eionis*	SSC (2)		
sei whale	*Balaenoptera borealis*	E		
fin whale (finback whale)	*Balaenoptera physalus*	E		E
North Atlantic right whale (right whale)	*Eubalaena glacialis* (*Balaena glacialis* [*incl. australis*])	E		E
humpback whale	*Megaptera novaeangliae*	E		E
sperm whale	*Physeter macrocephalus*	E		
Caribbean monk seal	*Monachus tropicalis*			E†d
Florida manatee (West Indian manatee)	*Trichechus manatus latirostris* (*Trichechus manatus*)	E	E	

Common Name	Scientific Name	Designated Status		
		FWC	USFWS	NOAA-NMFS
INVERTEBRATES				
CORALS				
pillar coral	*Dendrogyra cylindrus*	E		
CRUSTACEANS				
Panama City crayfish (econfina crayfish)	*Procambarus econfinae*	SSC (1)		
sims sink crayfish (Santa Fe cave crayfish)	*Procambarus erythrops*	SSC (1)		
black creek crayfish	*Procambarus pictus*	SSC (1)		
squirrel chimney cave shrimp (Florida cave shrimp)	*Palaemonetes cummingi*		T	
INSECTS				
Miami blue butterfly	*Cyclargus* [*=Hermiargus*] *thomasi bethunebakeri*	E		
Schaus' swallowtail butterfly	*Heraclides aristodemus ponceanus*	E	E	
MOLLUSKS				
Florida tree snail	*Liguus fasciatus*	SSC (1)		
Stock Island tree snail	*Orthalicus reses* *Orthalicus reses* [*not incl. nesodryas*]	E	T	
fat three-ridge	*Amblema neislerii*		E	
chipola slabshell	*Elliptio chipolaensis*		T	
purple bankclimber	*Elliptoideus sloatianus*		T	
shinyrayed pocketbook	*Lampsilis subangulata*		E	
Gulf moccasinshell	*Medionidus penicillatus*		E	
Ochlockonee moccasinshell	*Medionidus simpsonianus*		E	
oval pigtoe	*Pleurobema pyriforme*		E	

KEY TO ABBREVIATIONS AND NOTATIONS

LIST ABBREVIATIONS

FWC =	Florida Fish and Wildlife Conservation Commission
USFWS =	United States Fish and Wildlife Service
NOAA-NMFS =	National Oceanic and Atmospheric Administration-National Marine Fisheries Service
E =	Endangered
T =	Threatened
SSC =	Species of Special Concern
T (S/A) =	Threatened/Similarity of Appearance
XN =	Experimental Population, Non-Essential

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-27.002, 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)

[1] Lower keys population only.

[2] Monroe County population only.

[3] Other than those found in Baker and Columbia Counties or in Apalachicola National Forest.

(USFWS)

[a] Breeding colony populations in FL and on Pacific coast of Mexico.

[b] Wherever found except where listed as endangered.

†[c] = (Except where XN) Presumed extinct in wild except experimental populations in NC & TN.

T (S/A)[*] = Similarity of Appearance to a Threatened Taxon in the Entire Range.

T (S/A)[**] = All subspecies except coryi. Similarity of Appearance to a Threatened Taxon in the U.S.A. (FL).

(NOAA-NMFS)

†[d] = No known populations in the wild, presumed extinct.

APPENDIX B. LIST OF ACRONYMS USED IN THIS REPORT

Term	Acronym
Air Force Base	AFB
All Terrain Vehicle	ATV
Amphibian Research and Monitoring Initiative	ARMI
Archbold Biological Station	ABS
Average family size	AFS
Avon Park Air Force Range	APAFR
Branan Field Mitigation Park	BFMP
Bullfrog Creek Mitigation Park	BCMP
Candidate Conservation Agreement with Assurances	CCAA
Caribbean Conservation Corporation	CCC
Convention on International Trade in Endangered and Threatened Species	CITES
Critical Wildlife Area	CWA
Deoxyribonucleic Acid	DNA
Differential Global Positioning System	DGPS
Division of Forestry	DOF
Early Warning System	EWS
Environmental Protection Agency	EPA
Fiscal Year	FY
Fish and Wildlife Research Institute	FWRI
Florida Administrative Code	F.A.C.
Florida Black Bear Curriculum Guide	FBBCG
Florida Department of Agriculture and Consumer Services	DOACS
Florida Department of Environmental Protection	DEP
Florida Department of Transportation	FDOT
Florida Fish and Wildlife Conservation Commission	FWC
Florida Game and Fresh Water Fish Commission	GFC
Florida Natural Areas Inventory	FNAI
Florida Panther Research & Management Trust Fund	FPRMTF
Florida scrub jay	FSJ
Florida Statutes	F.S.
Florida Sturgeon Production Working Group	FSPWG
Fort White Mitigation Park	FWMP
Geographic Information System	GIS
Global Positioning System	GPS
Habitat Conservation Plan	HCP
HawkWatch International	HWI
Hickey Creek Mitigation Park	HCMP
Imperiled Species Management Section	ISM
Index Nesting Beach Survey Program	INBS
Infectious Bursal Disease	IBD
Kissimmee Chain of Lakes	KCOL
Landowner Incentive Program	LIP
Least Cost Path	LCP

Appendix B. Continued

Term	Acronym
Lykes Bros., Inc.	LBI
Manatee Individual Photo-Identification System	MIPS
Manatee Protection Plans	MPPs
Marine Resources Conservation Trust Fund	MRCTF
Memorandum of Agreement	MOA
Mitigation Park Program	MPP
Moody Branch Mitigation Park	MBMP
Mote Marine Laboratory	MML
Autoridad Nacional del Ambiente (National Environmental Authority of Panama)	ANAM
National Forest	NF
National Marine Fisheries Service	NMFS
National Oceanic and Atmospheric Administration	NOAA
National Park Service	NPS
National Wildlife Refuge	NWR
Nongame Wildlife Grants Program	NWGP
Nongame Wildlife Trust Fund	NGWTF
Outlying Landing Field	OLF
Partners for Fish and Wildlife	PFW
Perdido Key beach mice	PKBM
Perry Oldenburg Mitigation Park	POMP
Platform Terminal Transmitters	PTTs
Platt Branch Mitigation Park	PBMP
Population Viability Analysis	PVA
Public Broadcasting System	PBS
Red-cockaded woodpecker	RCW
Sandhill crane	SHC
Save the Manatee Trust Fund	STMTF
Sea Turtle Stranding and Salvage Network	STSSN
Species Conservation Planning Section	SCPS
Split Oak Forest Mitigation Park	SOMP
State Forest	SF
Statewide Nesting Beach Survey Program	SNBS
Strategic Habitat Conservation Areas	SHCA
Suwannee Ridge Mitigation Park	SRMP
The Nature Conservancy	TNC
Three Lakes Wildlife Management Area	TLWMA
United States	US
United States Department of Agriculture	USDA
United States Fish and Wildlife Service	USFWS
USDA Forest Service	USFS
United States Geological Survey	USGS
University of Florida	UF
Upper Respiratory Tract Disease	URTD
Whooping Crane Eastern Partnership	WCEP

Appendix B. Continued

Term	Acronym
Wildlife and Environmental Area	WEA
Wildlife Management Area	WMA

APPENDIX C. FWC STAFF PUBLICATIONS DURING THE CURRENT FISCAL YEAR

Bass, G., T. Hoehn, J. Couch, and K. Mcdonald. 2004. Florida Imperiled Fish Species Investigation. Final report to the U. S. Fish and Wildlife Service. Federal Grant R-3. Florida Fish & Wildlife Conservation Commission, Holt, Florida. 59 pages.

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