# *FY 2008-2009 Progress Report*

on activities of the

Florida Fish and Wildlife Conservation Commission

# Endangered and Threatened Species Management and Conservation Plan

# FLORIDA'S ENDANGERED AND THREATENED SPECIES MANAGEMENT AND CONSERVATION PLAN FY 2008-2009 PROGRESS REPORT

by the

## Florida Fish and Wildlife Conservation Commission

Prepared by Staff of the
Florida Fish and Wildlife Conservation Commission

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# EXECUTIVE SUMMARY

This document constitutes the 31st progress report and update of the Florida Endangered and Threatened Species Management and Conservation Plan as required by the Florida Endangered and Threatened Species Act of 1977 [§379.2291(5), Florida Statutes (F.S.)]. Subsection five of the Act required the preparation of an initial plan for submission to the 1978 Florida Legislature, and the annual preparation of a revised and updated plan for management and conservation of endangered and threatened species. Species of special concern also are included in this report. Species designated as endangered, threatened, or species of special concern are collectively referred to as listed species.

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

This report covers the fiscal year (FY) 2008-09, a period from July 1, 2008 to June 30, 2009. It includes a description of FWC's criteria for research and management priorities, statewide policies pertaining to listed species, required legislation, a funding request, a progress report providing a description of agency actions for listed species, and a description of FWC's citizen awareness program. The progress report section includes reports of staff activities covering listed mammals, birds, amphibians, reptiles, fish, and invertebrates. Additionally, this section reports on agency actions to provide coordination and assistance, Critical Wildlife Areas, incentive-based conservation programs, law enforcement, and permitting for listed species. Please contact FWC's Listed Species Coordinator if you would like more information about anything in this report.

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

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# SUMMARY OF IMPERILED WILDLIFE LISTS

The first Florida Endangered Species List for wildlife was promulgated in 1972 and consisted of 23 species. The listing concept was expanded in 1973 to include threatened species, and again in 1979 to include species of special concern. The official State lists for wildlife are kept in Florida Administrative Code (F.A.C.) as Rules 68A-27.003 (endangered), 68A-27.004 (threatened) and 68A-27.005 (species of special concern). Currently, the Florida Fish and Wildlife Conservation Commission (FWC) lists 116 species (Table 1) as endangered (40), threatened (26), or species of special concern (50). A complete listing of Florida's listed wildlife species as of June 30, 2009 is included as Appendix A. Florida's listed wildlife species may be accessed at http://myfwc.com/imperiledspecies/pdf/Threatened-and-Endangered-Species-current.pdf. The rules noted above may be viewed at the F.A.C. Website https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27. Federal agencies also list species as endangered and threatened. The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA-Fisheries) is responsible for listing most marine species and the Department of the Interior, U.S. Fish and Wildlife Service (USFWS) is responsible for other species. The Federal list of animals and plants is administered by USFWS, and is published in 50 Code Federal Regulations (CFR) 17 (animals) and 50 CFR 23 (plants). Additional information regarding Federal listings can be located at http://www.nmfs.noaa.gov for NOAA-Fisheries and http://www.fws.gov/endangered/wildlife.html for USFWS.

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

Table 1. Summary of Official Lists of Florida's Endangered Species (E), Threatened Species (T), and Species of Special Concern (SSC), as of June 30, 2009.

| STATUS DESIGNATION | FISH | AMPHIBIANS | REPTILES | BIRDS | MAMMALS | INVERTEBRATES | TOTAL |
|---|---|---|---|---|---|---|---|
| E | 3 | 0 | 6 | 7 | 20 | 4 | 40 |
| T | 2 | 0 | 11 | 9 | 4 | 0 | 26 |
| SSC | 10 | 5 | 7 | 18 | 6 | 4 | 50 |
| TOTAL | 15 | 5 | 24 | 34 | 30 | 8 | 116 |

# STATUTORY REQUIREMENTS

## CRITERIA FOR RESEARCH AND MANAGEMENT PRIORITIES

The Florida Fish and Wildlife Conservation Commission (FWC) uses a variety of tools to evaluate and prioritize research and management needs for State listed species. One tool used is the State listing process described in Rule 68A-27.0012, F.A.C. This process uses a quantitative system to identify Florida's most imperiled species and directs the development of a management plan for each species undergoing a listing action. In addition to the listing process, FWC uses a species ranking process that was developed by FWC and published in Wildlife Monographs (Millsap, B. M., J. A. Gore, D. E. Runde, and S. I. Cerulean. 1990. Setting priorities for the conservation of fish and wildlife species in Florida. Wildlife Monographs 111). This ranking process provides a biological score, which ranks 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, FWC also must consider available funding sources and activities required by legislation, court rulings, grant agreements, and approved management plans when setting priorities. FWC uses the listing process, the species ranking process, available funding sources, consideration of other required activities, including approved management plans to allocate resources for the management and conservation of Florida's State listed species.

## STATEWIDE POLICIES PERTAINING TO LISTED SPECIES

Listing Actions (*Brad Gruver*).--The Commission worked on one listing action during FY 2008-09. A peregrine falcon management plan was approved by the Commission and the peregrine was removed from the State Endangered Species List in June 2009. Biological status reports and management plans are available at http://myfwc.com/imperiledspecies/petitions.htm.

Imperiled Species Management System and the Listing Process (*Brad Gruver*).--The FWC, with the assistance of stakeholders, adopted in 1999 an imperiled species listing process modeled upon listing criteria developed by the International Union for the Conservation of Nature (IUCN). However, because of controversy surrounding some listing actions, the FWC subsequently placed a moratorium in 2002 on listing actions and, again with stakeholder input, re-evaluated the listing process. The Commission modified the listing process in April 2005 based on stakeholder consensus of some items; however, the stakeholders could not reach consensus on several issues, and controversy has continued to surround the listing process. In December 2007, the Commission directed staff to review the listing process to further explore options for listing species in Florida. Additionally, the Commission asked staff to better define the context of the listing process within a broader imperiled species management system. A leadership team was developed and began working on these issues in early 2008. A summary of the team's progress to date was given to the Commission in June 2008, and the team received

additional direction from the Commission to continue development of a revised listing process and imperiled species management system.

The team met numerous times during FY 2008-09 to develop the initial vision and concept for an imperiled species management system, including a revised listing process. The team's vision included a system that combines listing, protections, and management that:

- Is understood and supported by the people of Florida, conservation interests, and the regulated communities;
- Is transparent, science-informed, objective, and quantitative;
- Accurately identifies imperiled species that require special action to prevent their further decline or extinction in Florida;
- Provides a framework to effectively conserve imperiled species in Florida;
- Is supported with adequate funding and people;
- Provides a platform for partnerships with other state and federal agencies, conservation organizations, and other interests to effectively conserve imperiled species;
- Is complemented by FWC's management of game, sport fish, commercially harvested species, common nongame species, and control of exotic species.

In February 2009, the team held meetings with four major stakeholder groups, including those whose primary interests were environmental, governmental, recreational, or regulated business/industry. Stakeholder concerns and suggestions were analyzed, discussed, and incorporated with the team's vision and concepts during the spring of 2009 to begin the development of a package of proposed rule changes to establish a revised listing process within an imperiled species management system. The first draft of this proposed rules package was prepared in June 2009.

Stakeholder review of the draft proposed rule package will be completed in early FY 2009-10. It is anticipated that a revised draft proposed rule package will be presented to the Commission in December 2009, with a request to come to the Commission with a final rule package for adoption in February 2010.

## REQUIRED LEGISLATION

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

## FUNDING REQUEST

Recommended Funding Level (*Sandy Wilson*).--The recommended level of funding for FWC's endangered species programs in FY 2010-11 is $22,697,102 (Table 2). This includes funding to maintain current programs, additional funding to enhance Florida panther conservation and marine turtle conservation efforts, and continuation of awards from federal grants designed to assist in development of conservation programs.

Table 2. FWC Endangered/Threatened Species Budget Request for FY 2010-11.

| **Funding Source** | **Amount** |
|---|---|
| Nongame Wildlife Trust Fund (NWTF) | $1,810,961 |
| Florida Panther Research & Management Trust Fund (FPRMTF) | $1,303,218 |
| Save the Manatee Trust Fund (STMTF) | $3,539,690 |
| Marine Resources Conservation Trust Fund (MRCTF) | $8,113,176 |
| Land Acquisition Trust Fund (LATF) | $3,433,091 |
| State Game Trust Fund (SGTF) | $575,014 |
| General Revenue | $39,012 |
| Federal Grants | $3,882,940 |
| **Total** | **$22,697,102** |

PROGRESS REPORT

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

**Black Bear** (*Dave Telesco and Walter McCown*)

The black bear is a State listed threatened species and exists primarily on large segments of public and private tracts of land in rural and urban areas throughout the state. Black bear populations are rebounding from historic lows in many areas, and as bear populations and Florida's human population continue to grow, human-bear encounters continue to increase in number and intensity. The impacts of human activity on Florida black bears, primarily due to encroachment upon potential bear habitat, have led to concerns regarding the status of and outlook for remaining bear populations and their habitats. Since bears require a large home range, their existing populations are fragmented, and human/bear conflicts are increasing, an uncertain long-term future for black bears in Florida exists. To address these issues, FWC began an aggressive effort to provide proactive conservation and management planning tools to residents and partnering organizations in order to conserve Florida black bear populations for the benefit of the species and Florida residents and visitors.

FWC has continued work on a comprehensive, statewide draft management plan designed to conserve Florida black bears. While drafting the plan, FWC solicited input from a 12-member technical advisory group that included stakeholders from other agencies and private organizations. The stakeholder groups helped FWC understand the issues and differing points of view. The plan establishes a framework for community involvement for the benefit of bears and citizens. The draft plan will be provided to a wide array of stakeholders and the public for full review and to gather feedback. FWC anticipates presenting the final draft plan to the Commission for approval in the fall of 2010.

During FY 2008-09, FWC received 2,715 calls regarding bears (this includes observations, sick and injured bears, bear in yard complaints, etc.). The number of reported bear road-kills totaled 162 individuals for the year. Several requests were received from citizens and organizations requesting bear crossing signs at various locations. These requests were forwarded to the Florida Department of Transportation (FDOT).

The Bear Response Agent Program remains active in North and Central Florida. FWC dispatched contract agents to handle complaints that were determined to pose a hazard to people

or property. During FY 2008-09, agents responded to 467 events. The Bear Response Agent Program is a cost and time-efficient component of FWC's Bear Management Program. In addition to the Bear Response Agent Program, intensive efforts and programs focusing on partnerships with local governments and communities, such as improving waste management techniques, were developed to reduce negative human/bear encounters. FWC attended public events to offer residents ways to minimize attracting black bears, tools for securing garbage and other attractants, and other tips for living with their wild neighbors.

FWC bear management staff ran an internship program to develop future conservation professionals and expand the abilities of FWC to address bear related topics. The internship program is designed to allow students to gain credit through their universities for their experience while acquiring training in the profession of wildlife management and research. Twenty-one interns from Florida State University participated in the fall 2008, and spring and summer 2009 sessions. These students contributed over 3,000 hours of time to bear management and research. Intern projects have provided valuable information on a wide range of bear management and research topics, including a follow-up study on citizens who have contacted FWC about bear problems, mapping high concentrations of bear complaints to focus management efforts, and coordinating public events and volunteer efforts to increase public awareness of bears.

The Bear Management Program used Conserve Wildlife license plate funds awarded by the Wildlife Foundation of Florida for two projects during FY 2008-09. FWC offered a cost-share program in North and Central Florida to help people secure their garbage and other attractants to keep bears and other wildlife out of their neighborhoods. The program provided technical and financial assistance. FWC partnered with private citizens, local governments, nonprofits and businesses. Waste Pro USA made a substantial investment by purchasing 200 wildlife-resistant residential garbage cans for the Florida Panhandle. Because of the added costs for these specialized cans, Waste Pro is charging an extra fee for service. FWC's program provided funds so that the first 200 customers who sign up for those cans will have the increased fees waived for six months. Local citizens, businesses, and government agencies also contributed up to 50% of the costs to purchase secure cans, dumpsters, and other materials. Overall, the program helped Floridians receive 21 dumpsters, 22 garbage can sheds, 220 locking kits to retrofit garbage cans, five electric fences, and 358 wildlife-resistant garbage cans.

In addition to the cost-share program, the Conserve Wildlife license plate funds allowed FWC to hire a community information specialist for the Florida Panhandle. Based in Franklin County, FWC's information specialist has been distributing information, giving presentations, and meeting individually with people. The information specialist will continue working through spring 2010.

FWC has been working on several important management and policy documents during FY 2008-09. The Aversive Conditioning and Hazing Field Guide has been revised and will become a part of the permit for non-FWC partner agency personnel who have been trained in those techniques to reduce human-bear conflicts. FWC anticipates the permit and guide will be finalized in fall 2009. The Bear Management Program conducts aversive conditioning and hazing bear workshops to both internal and partner agency law enforcement personnel. The workshops teach people about bear behavior, how to avoid bear conflicts, and how to use fireworks, rubber bullets and other "less-than-lethal" techniques to teach bears to stay away from people. The Bear Incident Response Plan has also been revised and will be finalized in fall 2009. The plan provides guidance to FWC and others who may be called upon to assist in

investigating a report of a serious incident involving bears and humans.

FWC produced a peer-reviewed article, published in the scientific journal *Ursus* that examined the effects of traffic volume on bears on State Road 40 (SR-40). FWC also served on an FDOT advisory committee with representatives from the U.S. Forest Service (USFS), Florida Department of Agriculture and Consumer Services (FDACS), Florida Department of Environmental Protection (FDEP), and several non-governmental organizations. This effort was part of the Project Design and Environmental study to consider improvements to SR-40 in Marion, Lake, and Volusia counties. Project Design and Environmental study is a formal process that FDOT uses to ensure consideration is given to engineering design, project costs, and environmental and social impacts during the development of major transportation projects. The committee advised FDOT on the number, design, and placement of wildlife crossing structures that should be incorporated into the traffic capacity enhancement project being planned for SR-40. SR-40 bisects the home range of a large bear population and currently accounts for more than 50% of the state's annual road-killed bears. Additionally, FDOT asked FWC biologists to review highway plans on two other projects.

FWC designed and implemented a study to estimate the number and range of bears in Citrus, Hernando and Pasco counties. This population is the smallest and most imperiled in the state and information gathered in this study will help FWC and other State and Federal land managers conserve bears in the area.

**Florida Mouse** (*Mike McMillian, Randy Havens, Sharon Hester, Gabriel Miller and Travis Blunden*)

The Florida mouse is a State species of special concern. Florida mice are surveyed during the course of small mammal trapping efforts in Wildlife Management Areas (WMA) and Wildlife and Environmental Areas (WEA) around the state. Trapping typically is conducted along line transects with trap stations established at 32.8 feet (10 meter) intervals. Stations typically consist of one large and one small Sherman live trap. Representative habitat types sampled may include: sandhill, flatwoods, scrub, scrubby flatwoods, mesic flatwoods, wetland, cutthroat seep, bayhead, salt marsh, and blackgum swamp. These habitat types range from dry, upland areas to seasonally and permanently inundated areas.

Lake Wales Ridge Wildlife and Environmental Area in Highlands and Polk Counties – Small mammal trapping has been conducted on the Lake Wales Ridge Wildlife and Environmental Area (WEA), an area composed of 19 individual tracts spread out over 75 miles, since June 2005. Each year, two to three sites are selected and each site is surveyed quarterly for one year. To date, ten sites have been surveyed. Trapping generally takes place in June, September, December and March. The following habitat cover types (as classified by the Florida Natural Areas Inventory) have been sampled: flatwoods, scrub, scrubby flatwoods, sandhill, wetland, cutthroat seep, bayhead and blackgum swamp.

During the FY 2008-09 trapping period, 496 Florida mouse captures were recorded. More Florida mice were captured and released this year at the Sunray Tract in Polk County and the Silver Lake Tract in Highlands County than the past three years combined, suggesting ideal habitat conditions or an exceptional year for Florida mice production. As in all trap years to date, more individuals were captured in scrub and sandhill than any other habitat (Table 3). During four years of trapping, regardless of the tract surveyed, spring (March) results in the

highest capture rates and fall (September) results in the lowest.

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

Table 3. FY 2008-09 survey results for the Florida mouse by habitat type in Lake Wales Ridge Wildlife and Environmental Area.

| **Habitat** | **Number of captures** | **Percentage of total (%)** |
|---|---|---|
| Flatwoods | 85 | 17 |
| Scrub | 107 | 21 |
| Scrubby Flatwoods | 87 | 18 |
| Sandhill | 143 | 29 |
| Wetland | 55 | 11 |
| Cutthroat | 9 | 2 |
| Blackgum Swamp | 6 | 1 |
| Bayhead | 4 | 1 |
| **Total** | **496** | **100** |

Big Bend Wildlife Management Area in Taylor and Dixie Counties – Small mammal surveys were conducted on each of the five different management units of Big Bend WMA. One session of small mammal trapping was completed in spring 2009; fall and winter surveys will be completed in the coming months. Five habitat types were sampled (Hickory Mound Unit-salt marsh, mesic flatwoods, scrubby flatwoods; Spring Creek Unit-scrub, sandhill, mesic flatwoods; Tide Swamp Unit-scrub, sandhill, scrubby flatwoods). The Florida mouse was the only imperiled species captured and documented in scrub and sandhill habitat types. Sixty-seven Florida mice were captured and released.

Half Moon Wildlife Management Area in Sumter County – In FY 2008-09, FWC initiated the first small mammal survey on Half Moon WMA. Five upland communities and a ground cover restoration site were sampled. Each site had two 650ft (200m) transects with 20 stations: each station had two live traps and was trapped for three nights. The Florida mouse was captured in every community except for pasture and the ground cover restoration area. The most individuals (35) were captured and released in the sandhill site. A more intensive survey is planned for FY 2009-10 that will include more sites and density estimates.

**Beach Mice** (*Jeff Gore and Melissa Tucker*)

Several subspecies of the old field mouse inhabit dune habitat along Florida's coast and are collectively known as beach mice. These subspecies include Choctawhatchee beach mouse (State and Federally endangered), Southeastern beach mouse (State and Federally threatened), Anastasia Island beach mouse (State and Federally endangered), St. Andrews beach mouse (State and Federally endangered), and Perdido Key beach mouse (State and Federally endangered). Due to the extensive development of their coastal habitat, all but one beach mouse subspecies is listed as threatened or endangered by state or federal agencies.

Conservation and Population Monitoring – For the past few years, FWC biologists have worked with land management partners to monitor beach mouse populations with track stations set in dune habitat on public lands. The presence of mice is monitored on public land so that FWC has an indication of the status of the population of each subspecies. This information helps managers make appropriate decisions regarding activities that might impact local beach mouse populations. The monitoring data also guides managers in determining the effects of disturbances such as hurricanes, and in deciding upon the need for habitat improvements or reintroduction of mice. The stations contain baited tubes with inked pads that record tracks of beach mice as they enter the tubes. Track stations have been established within the range of each of the endangered subspecies in northwest Florida, and they are checked monthly to determine the presence of mice. Monthly monitoring using track stations allows land managers to respond more quickly to potential changes than quarterly, biannual, or yearly trapping, with the added benefit that track stations are less costly to resource agencies. In FY 2008-09, FWC expanded the monitoring to new areas, revised the written monitoring protocol for use by interagency personnel, and established a process within FWC's Fish and Wildlife Research Institute (FWRI) volunteer program for individuals to assist with beach mouse monitoring.

FWC biologists monitored St. Andrew beach mice, a State and Federally endangered species, at two public areas – East Crooked Island at Tyndall Air Force Base in Bay County and at Rish Park on the St. Joseph Peninsula in Gulf County. At East Crooked Island, 42 track stations were monitored during FY 2008-09. All of the tubes recorded tracks in some month during the year and an average of 93% of the stations checked each month detected mouse tracks. FWC biologists also trapped mice at three grids in April 2009 on East Crooked Island to compare density of mice on the grids with density in prior years. All 21 stations at Rish Park also recorded tracks, with a monthly average of 85% of stations detecting mouse tracks.

The Florida Department of Environmental Protection (DEP) and FWC continued to monitor the population of Choctawhatchee beach mice, a State and Federally endangered species, at Topsail Hill Preserve State Park in Okaloosa County through monthly checks of 32 track tubes. All stations at Topsail Hill recorded tracks in at least one month during FY 2008-09, with a monthly average of 67% of stations detecting mouse tracks. During FY 2008-09, FWC biologists expanded the track-monitoring program for Choctawhatchee beach mice to three additional areas, Deer Lake State Park and Grayton Beach State Park in Walton County and Camp Helen State Park in Bay County. During the months checked, beach mouse tracks were detected at ten of 16 stations at Deer Lake State Park with an average of 23% of stations having tracks each month. No tracks were detected at Grayton Beach State Park or Camp Helen State Park.

The Perdido Key beach mouse, a State and Federally endangered species, currently has the smallest distribution of all the subspecies of beach mice and populations have dropped to extremely low levels. In 2004, Hurricane Ivan caused significant declines in beach mouse populations and habitat on Perdido Key and the population has still not recovered. In FY 2008-09, FWC biologists along with partners from the DEP and the National Park Service (NPS) monitored track stations, which have been monitored since 2005 in Perdido Key State Park (Escambia County) and Gulf Islands National Seashore (Escambia, Santa Rosa and Okaloosa counties in Florida; and Jackson and Harrison counties in Mississippi). Beach mouse tracks were detected in 36 of 54 tubes checked at Gulf Islands National Seashore with a monthly average of 44% of stations with tracks. At Perdido Key State Park, detections of mouse tracks have declined steadily since 2006 and in FY 2008-09 only a single mouse track (species

undetermined) was recorded from the 81 tracking stations. Beach mice are presumed to be absent or nearly so from Perdido Key State Park and a reintroduction of mice to the park will likely be necessary to reestablish the population. The status of beach mice on private lands outside of Gulf Islands National Seashore is unknown.

Perdido Key Beach Mouse Captive Breeding – Just prior to landfall of Hurricane Ivan in 2004, eight beach mice were taken from Perdido Key State Park in Escambia County and transferred to a holding facility at the University of South Carolina. These mice were deemed unlikely to be returned to the wild due to potential for disease transmission and because the mice had become acclimated to captivity. In 2007, the original eight mice and their offspring were moved to three Florida zoos (Santa Fe College Teaching Zoo, Palm Beach Zoo, and Brevard Zoo) in order to provide the public an opportunity to see beach mice and to inform visitors about beach mouse biology and conservation. As of summer 2009, the zoos continued to support captive colonies of Perdido Key beach mice and each zoo provided opportunities for the public to view the mice and learn about their status in the wild. The mice have been breeding successfully in captivity and animals could be used to augment wild populations. To evaluate that possibility, FWC biologists participated in an interagency workshop in March 2009 to discuss issues and potential plans to reintroduce mice to portions of Perdido Key where beach mice formerly existed.

Development Impacts – Because habitat loss is a primary cause for the decline of beach mouse populations, regulation of land development within beach mouse habitat is a critical component of beach mouse conservation. FWC works with developers and local governments to identify ways to mitigate the loss of beach mouse habitat while allowing development to continue. In FY 2008-09, FWC biologists responded to permitting issues regarding development at several sites in beach mouse habitat on both the Atlantic and Gulf coasts.

**Florida Bonneted Bat** (*Josh Birchfield and Jennifer Morse*)

Babcock Webb Wildlife Management Area in Charlotte County – The Florida bonneted bat is the largest and rarest bat species in Florida and is a State and Federally listed endangered species. There was only one known colony statewide (in a bat box at a private residence in Ft. Myers) until bonneted bats were detected on Babcock Webb Wildlife Management Area (WMA) in 2006 via acoustic surveys by the Florida Bat Conservancy. In 2007, FWC installed four roosts, each roost consisting of one pair of single-chambered bat houses on Babcock Webb WMA to provide roosting habitat for bonneted bats. In December 2008, two roosts were found to be occupied by bonneted bats. This finding tripled the number of known roosts for this species.

Very little is known about the life history requirements of this species. FWC initiated monitoring on the occupied roosts to track the number of bats in December 2008 by using emergence counts to count the number of bats exiting the roosts in the evening. After each emergence, the number of bats remaining in the box was also counted. To date, FWC has conducted 30 emergence counts.

Emergence counts will continue on known bonneted bat roosts. Thought to be occupied boxes will be checked periodically to determine if this species moves in. In FY 2009-10, eight

single-chambered bat houses will be installed in the vicinity of currently occupied roosts to provide additional bonneted bat roosting opportunities.

**Gray Bat** (*Jeff Gore*)

Monitoring – The gray bat is a State and Federally endangered species and a colonial cave-roosting species that occurs throughout much of the south-central U.S. The gray bat's range-wide population suffered severe declines due to disturbance of its cave roosts. Its range-wide population now appears to be increasing; however, in Florida the gray bat roosts only in a few caves in Jackson County where the population appears to be declining in spite of the fact that the roost caves are protected. Gray bats occupy different caves in summer and winter based upon temperature and some bats migrate out of Florida during winter. Emergence counts were conducted in the evening as the bats exited the roosts.

The size of the summer population cannot be easily determined because the bats roost within large colonies of a similar bat species, the Southeastern myotis. Regardless, no gray bats have been observed or captured at summer roosts in Florida for several years. In spring of 2009, emerging bats were counted at Judges Cave in Jackson County, an FWC-managed site and formerly the location of the largest maternity roost for gray bats in Florida. No gray bats were present in a sample of bats captured at Judges Cave and no gray bats were observed during a visit inside the cave.

The gray bat winters in two Florida caves and the hibernating bats can be readily counted at both sites. Few gray bats have been observed in recent years during the annual census of the winter roosts conducted by biologists from FWC and Florida Department of Environmental Protection (DEP). In January 2009, biologists found no gray bats in either hibernation cave. In comparison, seven gray bats were seen in the larger cave in 2008 and none in 2007.

More frequent surveys or a more thorough census might provide a better estimate of the number of roosting bats, but surveys are limited to once annually to minimize disturbance of the hibernating bats. Despite the apparent fluctuation, the number of gray bats in Florida remains critically low and the species may soon be absent from the state. Since the roost caves are protected, factors other than disturbance of roosts may be responsible for the decline. However, gray bats are found in other states such as Alabama, Georgia and Tennessee.

**Florida Panther** (*Darrell Land, Mark Lotz, Dave Onorato, Marc Criffield, and Mark Cunningham*)

The Florida panther is a State and Federally endangered subspecies of the puma (also called cougar or mountain lion) that at one time occurred throughout much of the southeastern U.S. However, unregulated harvest of panthers through the mid-1900s and, more recently, habitat loss and fragmentation due to the growth of the human population reduced the panther population and isolated it from other puma populations. When the Florida Fish and Wildlife Conservation Commission (FWC) began investigations into the status and distribution of panthers in the early 1970s (then known as the Game and Fresh Water Fish Commission), there were an estimated 30-50 panthers still living in South Florida. The small population size and geographic isolation from other puma populations made the Florida panther very vulnerable to extinction. Therefore, the FWC released eight female puma from Texas into areas occupied by Florida panthers in the mid 1990s to increase the health of the panther population by increasing

the diversity of the population's genetic composition. Of the eight female Texas puma that were introduced into the Florida panther population, five died and the other three were removed from the population in 2002 and 2003 to avoid including too much of their DNA in the Florida panther population. These three puma were placed in captivity. FWC continues to monitor the effects of this genetic infusion and its impact on the panther population. Today, the Florida panther population is estimated to be about 120 (adults and young, but not counting kittens), due in part to these actions.

The FWC and its partner, Big Cypress National Preserve (BCNP), monitor the panther population using radio telemetry. A sample of panthers are captured and fitted with radio collars containing radio transmitters. Panthers are located and their locations recorded several times a week. Since 1981, 171 panthers have been radio-collared, providing essential data for the management and conservation of the population. Radio telemetry data were collected on 26 Florida panthers in FY 2008-09. In addition to monitoring by radio telemetry, FWC and BCNP biologists sample panther dens to record data on newborn kittens. In FY 2008-09, three panthers dens were sampled by FWC and BCNP biologists resulting in the documentation of seven (four males, three females) kittens. Kittens handled at these dens were permanently marked with transponder chips called PIT tags placed below the skin. Since 1992, 280 kittens have been handled (weighed, sexed, dewormed, inserted transponder chip, sample collected) at dens.

In FY 2008-09, 22 wild Florida panthers were known to have died, including five (three males, two females) radio-collared panthers and 17 (ten males, seven females) uncollared panthers. Thirteen panthers died from being hit by cars or trucks, three were killed by other panthers (called intraspecific aggression), two were killed by illegal shooting, and four died from undetermined causes. Additionally, two captive panthers were euthanized due to failing health. One panther survived a vehicular collision; the male panther was watched closely for the first week following the collision but did not require any veterinary care or other interventions.

This year a Florida panther was illegally shot in Troup County, Georgia, a distance of approximately 500 miles (805 km) from the primary panther range in southwest Florida. This is the furthest a Florida panther has been documented from primary panther range.
In addition to monitoring the Florida panther population, several panther management and research activities were conducted during FY 2008-09.
FWC continued the evaluation of Global Positioning System (GPS) radio collars in FY 2008-09. These radio collars work reasonably well on panthers and offer a significant advancement over traditional monitoring of panthers from an aircraft by gathering multiple location information over a 24-hour period. GPS systems that send data locations via text messaging also have shown promise. These collars could potentially assist in preventing data loss experienced with the current GPS collars that store data on the collar itself, and reduce flight costs associated with traditional radio collar monitoring by decreasing the need for aircraft searches.

FWC also convened a Florida Panther Response Team comprised of State and Federal government administrators, biologists, law enforcement officers, and public information staff. The team developed an Interagency Florida Panther Response Plan (Response Plan) to promote public safety while assuring the conservation of the Florida panther. The Response Plan provides guidance for dealing with human-panther interactions, and was finalized on October 14, 2008.

FWC verified panthers were responsible for preying upon four domestic livestock animals and one pet animal (called depredations) during FY 2008-09. Owners were provided guidance on best animal husbandry practices and offered informative brochures for living in

areas where panthers occur. No direct human-panther interactions occurred during the year. Confirmed depredations and interactions declined this fiscal year compared to last fiscal year (12 depredations and one interaction incident during FY 2007-08).

FWC provided information and reviews of numerous road and development projects throughout southern Florida. The footprints of three proposed major road projects fall within important panther habitat and FWC has been providing guidance on minimizing or avoiding panther impacts.

Additionally, an FWC staff member has been participating on an independent team to review the Florida Panther Protection Program proposed for the Rural Lands Stewardship Area of Collier County. This program was developed by a group of large landowners and non-governmental organizations with the goal of achieving better panther conservation than current policies provide across 196,000 acres, while at the same time providing for diverse economic opportunities within the Rural Lands area. The review team should complete a final report during FY 2009-10.

FWC was contacted by Senator Bill Nelson's office in response to constituent concerns with the high number of Florida panthers hit and killed by cars and trucks. FWC provided the Senator's staff with information on the impacts of roadways and traffic on panthers and other wildlife. Wildlife crossings are the most effective solution to alleviating panther deaths on roads but they are also expensive. The last two wildlife crossings completed a few years ago cost an estimated $4.5 million each. FWC discussed with Senator Nelson's staff the idea that a new panther crossing design that could be developed that would be less expensive but equally effective. Through Senator Nelson's efforts, $955,000 of Federal funds was secured for this pilot project. Collier County Department of Transportation Planning is working with the Florida Department of Transportation and FWC to design and build a smaller wildlife crossing on a Collier County road.

Research continues to be an important part of Florida panther conservation. Research plans are vetted with FWC's partners to ensure that the research and monitoring efforts are well-designed, coordinated, and meet priority needs. In FY 2008-09, the FWC continued several research projects that were deemed a priority by the Florida Panther Scientific Review Team commissioned by FWC and U.S. Fish and Wildlife Service (USFWS) in 2002. This research included development of a panther demographic model, improving estimates of adult and kitten survival, continuing to evaluate panther habitat selection through use of GPS radio collars, and finalizing analyses on nearly 30 years of panther genetic data. New research initiated in FY 2008-09 focused on the movement rates of panthers and the impact of various factors on these rates. FWC is preparing manuscripts on genetic introgression (entry or introduction of a gene from one gene complex into another), adult and kitten survival, and habitat selection of panthers.

An extensive collection of panther reports and publications on current panther management and research may be found at the following websites:
http://www.wildflorida.org/critters/panther/index.asp,
http://www.floridapanthernet.org/index.php
http://www.fws.gov/verobeach/Florida_Panther.htm

**Florida Manatee** (*Carol Knox and Leslie Ward-Geiger*)

The manatee, native to Florida's coastal estuaries and riverine waters, is a State and Federally endangered species. Manatees have been protected by Florida since 1892 and are

currently protected federally under the Marine Mammal Protection Act and the Endangered Species Act. Florida's efforts to conserve the manatee are funded primarily by the Save the Manatee Trust Fund that derives approximately half of its funds from the sale of the manatee automobile license plates. Conservation efforts are guided by the Florida Manatee Sanctuary Act of 1978, the Florida Manatee Management Plan approved in December 2008 (http://www.myfwc.com/docs/WildlifeHabitats/Manatee_Mgmt_Plan.pdf), and the USFWS Florida Manatee Recovery Plan of 2001.

FWC and U.S. Fish and Wildlife Service (USFWS) continue to work closely on manatee issues, particularly human-related risks and habitat loss. For more information regarding manatee conservation efforts, please see the Save The Manatee Trust Fund annual report provided to the President of the Florida Senate and the Speaker of the Florida House of Representatives each year, available at: http://research.myfwc.com/features/category_sub.asp?id=3686. Management activities are now directed by the FWC Manatee Management Plan and focus on five program areas:

Manatee Protection Plans (MPPs) – This work involves the development and implementation of comprehensive county-based MPPs and the approval of MPPs by the FWC Commission. FWC is currently assisting Duval and Collier counties as they prepare to revise their existing plans. FWC is analyzing new manatee data and assisting the counties in collecting data needed for updating boat facility inventories. Review of comprehensive plan amendments for Broward, Duval and Brevard counties related to adoption of manatee protection plan provisions was provided to the Department of Community Affairs.

Rule Making – FWC developed boat speed and safe haven regulations to protect manatees statewide. Extensive work is required involving county governments, stakeholder groups, and the public in order to complete rule-making efforts. Work to evaluate the existing speed zones in Sarasota County continues as FWC completed extensive data analysis and identified areas that should be evaluated for possible modifications. The County formed a Local Rule Review Committee to provide local perspective to FWC as part of the evaluation of possible changes. FWC began the initial review of manatee and boating data for consideration of possible rule making in Flagler and St. Johns counties.

Manatee Permits – FWC produced 628 correspondence letters for projects reviewed during the year. These requests for additional information, biological opinions and recommendations on ways to reduce potential impacts to manatees were provided to regulatory agencies. Implementation of the Boat Facility citing portion of FWC Commission-approved MPPs is accomplished during the permit review process.

Manatee Habitat – FWC participated in various inter-governmental groups and task forces regarding minimum flows at springs, invasive aquatic plant control, seagrass monitoring and protection, and other habitat related concerns. FWC worked to address the potential loss of warm water manatee habitat provided by power plant discharges by incorporating protective conditions in permits for two power plant conversions in Palm Beach and Brevard counties. In an effort to secure natural warm water habitat provided by springs, FWC visited several springs this year to evaluate if manatee access can be improved.

Research Activities – The manatee research program included work in the following areas:

Manatee Mortality and Rescue – A network of researchers and law enforcement agencies was established in 1974 to recover manatee carcasses and assist injured manatees. In FY 2008-

09, 418 manatee carcasses were documented in Florida. All but ten of these carcasses were recovered and examined in order to determine causes of death. Collision with watercraft accounted for 91 of the 418 deaths. The other causes of manatee deaths are perinatal issues, cold stress, natural causes, and human influence. An interactive searchable web-based database with manatee mortality information is available at http://research.myfwc.com/features/category_sub.asp?id=2241.

FWC and cooperators rescued 81 sick or injured manatees under the Federally permitted statewide rescue program. Three oceanaria (Lowry Park Zoo in Tampa, Miami Seaquarium, and Sea World in Orlando) participate in the rehabilitation program for critical care treatment and are reimbursed for a portion of these costs by FWC. 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 by identifying important threats.

Population Assessment – FWC scientists use a variety of methods to assess and monitor the current and project the future status of the Florida manatee population. Population assessments currently include (a) conducting manatee counts at winter aggregation sites, (b) aerial surveys used to determine regional distribution of manatees and to assess habitat use, and (c) estimating survival, population growth, and reproductive rates through photo-identification and the application of genetic tags.

The annual statewide manatee synoptic survey was conducted in winter 2009. A team of 21 observers from nine organizations counted 3,801 manatees statewide during the week of January 19, 2009. The count exceeded the previous high count from 2001 by more than 500 manatees. For more information about aerial surveys and the synoptic count, please visit http://research.myfwc.com/features/category_sub.asp?id=2190.

On a regional basis, FWC uses surveys to determine the seasonal distribution and habitat use of manatees. These surveys are usually flown twice monthly in specified counties for a period of two years. In September of 2008, FWC initiated a manatee distribution survey of the western part of Pinellas County. This survey will be conducted twice monthly until August 2010. Currently, researchers are developing new aerial survey techniques that will provide precise and reliable estimates of distribution and population size. These new methods and resultant data will contribute to models that incorporate information about how well observers detect manatees from the air and will relate environmental variables to the number of animals counted by observers.

An aerial study to test new methods for the statewide synoptic survey was initiated in winter 2008-2009 along the southwest coast. Data are being evaluated and results will be used to inform and refine the design for an improved statewide survey. Details are described in the "Monitoring Activities" and "Ongoing and Future Research" sections of the Manatee Management Plan, which can be accessed at http://myfwc.com/imperiledspecies/plans/Manatee-Mgmt-Plan.pdf.

FWC, in cooperation with the U.S. Geological Survey (USGS) Sirenia Project and Mote Marine Laboratory, maintains an image-based, computerized database called the Manatee Individual Photo-Identification System that is used for photo-identification of individual manatees. These data provide life history information and assist scientists in estimating survival and reproduction rates; critical data required for determining the status of the manatee population. FWC spent over 130 days conducting land and boat-based photo-identification research visiting over 400 visits sites used by manatees in southwest Florida during FY 2008-09.

Critical data gaps still exist in Florida manatee population assessments. In particular, it has been very difficult to estimate vital statistics for Florida manatees in southwest Florida through photo-identification because of less than ideal photographic conditions in some areas, animal accessibility, and other extrinsic factors. Three demographic parameters are in need of refinement to better model manatee status and conservation: annual reproductive rates, annual gender-specific movement probabilities (annual movement probabilities of females and males) between northwest and southwest regions (Federally defined manatee management units), and gender-specific adult survival rates in the southwest region. Genetic testing offers a complementary means of identifying individual manatees and its application could greatly enhance existing monitoring and assessment studies. The Manatee Management Plan identified the need for optimal genetic tissue-sampling protocols for free-swimming manatees in order to implement a robust genetic identification program. FWC successfully tested a new method to collect skin samples from free-swimming manatees in winter (February – March) 2008. During the winter 2009, FWC conducted prospective, "dedicated" genetic sampling surveys with the main objective of collecting manatee skin biopsy samples. These prospective surveys provided a good number of samples and the results will help design future genetic sampling surveys. Additionally, FWC is collaborating with USGS's Sirenia Project to develop statistical models that integrate data from photo-identification and genetic-identification surveys, as well as the carcass recovery program, to estimate population vital rates necessary for assessing the population status.

Behavioral Ecology – In FY 2008-09, the behavioral ecology program completed field research on tagged manatee interactions with motorized watercraft in southwest Florida in collaboration with researchers at Florida State University, Duke University, and Woods Hole Oceanographic Institution. A thorough understanding of the behavioral and sensory mechanisms underlying manatee-boat collisions is necessary in order to devise effective methods of boat avoidance. The goal of the project is to create a combined picture of manatee behavior, acoustics, and vessel movements so that FWC can better understand the responses displayed by manatees when approached by boats and the acoustic cues that may mediate such responses. The research combined state-of-the-art, manatee-borne electronic tags with boat-based observations, and aerial videography. This project was funded in FY 2008-09 by the Save the Manatee Trust Fund, FWC Florida Manatee Avoidance Technology Program, FWC Boating and Waterways Section, and Disney Worldwide Conservation Fund.

Warm-water habitat for manatees is of particular interest to FWC and agency partners because the predicted future loss of this habitat is deemed a key long-term threat to the manatee population. Although warm-water carrying capacity (the population size of the species that the environment can sustain indefinitely, given the food, habitat, water and other necessities available in the environment) is an important factor in population viability models, current estimates of carrying capacity are based on expert opinion. A conceptual framework of studies to determine carrying capacity is needed, as identified within the Manatee Management Plan. Such a framework will help to identify critical information gaps to ensure that limited resources are directed towards the highest-priority research needs. The aim is to place warm-water research in the context of over-arching management needs and to provide a common vision for the future on this important issue. FWC and agency partners developed a draft warm water research framework to conceptualize research needs and connectivity among projects.

**North Atlantic Right Whale** (*Leslie Ward-Geiger*)

The North Atlantic right whale is a State and Federally endangered species. The only known calving grounds for this species are off the coast of northeast Florida and southeast Georgia. FWC conducted aerial surveys to monitor seasonal presence of right whales, mitigate vessel-whale collisions, and assess population dynamics. Most of this work was supported by funds from National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA–Fisheries). Photographs taken by aerial observers are used to identify individual right whales based on the callosity (a natural growth of cornified skin) pattern on their head, natural marks and scars. Over time, population demographics such as reproductive success, mortality, and trends in health, are monitored in part through this photo-identification research. FWC is one of a handful of major contributors to the North Atlantic Right Whale Catalog, the central repository for archiving and maintaining photographs and sighting data on right whales. FWC has also worked closely with federal, state, and non-governmental organizations to compile years of aerial-survey data into a Geographic Information System (GIS). Analyses of these spatial data help scientists and managers evaluate right whale distribution patterns in the southeast calving grounds in relation to environmental factors such as sea surface temperatures and water depth, and human activities such as vessel traffic.

During FY 2008-09, a record-breaking 39 mother/calf pairs were documented in the southeastern U.S. Preliminary photo analysis indicates FWC documented 119 individual right whales (excluding calves). This is the highest number of individual right whales documented by FWC during a single calving season over the past several years.

An unprecedented five new right whale entanglement cases and one chronic entanglement case were documented in the southeastern U.S. during the FY 2008-09 calving season. FWC along with Georgia Department of Natural Resources (GDNR), New England Aquarium, NOAA-Fisheries, Wildlife Trust and many others participated in the documentation and disentanglement responses. FWC also recovered and assisted in the necropsy of a dead North Atlantic right whale calf in February 2009.

FWC in collaboration with GDNR and NOAA-Fisheries conducted 20 right whale biopsy-sampling trips, which resulted in 37 biopsy samples collected. The skin samples will be used to generate information on kinship, individual identification and gender, stock identity, and genetic variability within the population. The blubber portion of the samples will be used to determine contaminant levels and to gain information about feeding ecology and nutritional condition.

**Peregrine Falcon** (*Robin Boughton*)

The U.S. Fish and Wildlife Service (USFWS) delisted the peregrine falcon in 1999. In June 2007, a Biological Review Panel was approved by FWC to assess the peregrine falcon's population and distribution data against species-listing criteria (Rule 68A-1.004, F.A.C.). The panel determined that the peregrine no longer met the criteria for State listing at any level. FWC Commissioners agreed with this conclusion, deciding that removing the peregrine falcon from the list of threatened species was warranted, and directed FWC to move forward with management plan development. A team was assembled to develop the management plan during FY 2008-09 and draft versions were available for public review and comment during the year. A final draft plan was presented to the Commission for their initial review in April 2009. The

Florida Peregrine Falcon Management Plan was approved by the Commission at its June 2009 meeting and is available at http://www.myfwc.com/docs/WildlifeHabitats/ImpSpp_Peregrine_Plan.pdf. After approving the management plan, the Commission removed the peregrine falcon from the State imperiled list.

**Bald Eagle** (*Robin Boughton, Ulgonda Kirkpatrick, Derek Fussell and Valerie Sparling*)

The bald eagle was removed from the Federal Endangered Species List in August 2007. It was removed from the State of Florida threatened list in April 2008. However, we will continue reporting the work we do on bald eagles for the five-year post-delisting period established by the USFWS.

Management Plan Implementation and Permitting – Bald eagle management and monitoring is funded by the Wildlife Foundation of Florida. The Commission approved a final management plan and delisted the bald eagle in April 2008. The USFWS delisted the bald eagle in August 2007. An internal implementation team was formed immediately following the adoption of the State plan. A public Website was developed and is updated periodically to accommodate all current information including the final management plan, permitting information, and latest nest locations at http://myfwc.com/WILDLIFEHABITATS/Eagle_Index.htm.

FWC is working with USFWS to coordinate permitting efforts between the two agencies. Although the U.S. Fish and Wildlife Service (USFWS) is not currently issuing bald eagle permits, it is anticipated that the USFWS will issue implementation guidance for permits and begin issuing those permits for bald eagles in late 2009. In the interim, FWC is providing assistance on projects, reviewing permit applications, and issuing State bald eagle permits. Population monitoring is ongoing and will continue to ensure that Florida is achieving the management plan goal of maintaining a stable or increasing population of bald eagles throughout Florida in perpetuity. The first five-year plan review is scheduled for 2013.

Nesting Surveys – Nesting surveys for bald eagles were conducted during December 2008 and again in March 2009 on the Apalachicola River Wildlife and Environmental Area (WEA) in Gulf and Franklin counties. Systematic aerial transects (all potential eagle areas) were flown on the WEA and the surrounding area, including St. Vincent Island National Wildlife Refuge. Nests were recorded as either active or inactive and the number of eggs/nestlings was recorded. During the December 2008 aerial survey, 16 of 31 nests visited were actively used (51.6%). All adult eagles observed were in incubating posture (a position that maximizes the transfer of heat from the bird to the eggs and indicates the presents of eggs) on the nests. During the March 2009 aerial survey, the same 31 nests and six newly discovered nests were visited. Of the 37 nests, 19 were actively used (51.3%). This is a decrease in active nests over last year's total of 30 active nests.

Aerial nest surveys were conducted in January and March 2009 at John G. and Susan H. Dupuis, Jr. WEA (DuPuis) and J.W. Corbett Wildlife Management Area (Corbett) in Palm Beach County. Ground surveys were conducted throughout the breeding season. The initial helicopter surveys determined active nests and later surveys monitored success of the nestlings. Volunteers with Audubon's Eaglewatch program assisted with ground surveys. The status of nests (active or inactive) and number of young were recorded. This year, new nests were found

on both areas. Eight active nests observed at Dupuis produced eleven fledglings. Four active nests at Corbett produced five fledglings.

**Florida Grasshopper Sparrow** (*Michael Delany and Tina Hannon*)

The Florida grasshopper sparrow is a State and Federally endangered subspecies occurring in the dry prairie landscape of south-central Florida. Florida's dry prairie is a distinct floristic region of the state characterized as flat, open expanses dominated by fire-dependent grasses, saw palmetto, and low shrubs. Following a status survey conducted by FWC personnel, the Florida grasshopper sparrow was Federally listed as endangered in 1986 because of its low numbers, restricted distribution, and habitat loss. The Federal recovery objective is to down-list the sparrow to threatened when ten protected locations contain stable, self-sustaining populations that contain more than 50 breeding pairs each. Although Florida grasshopper sparrows are known to exist at seven locations, only two populations meet recovery criteria: Three Lakes Wildlife Management Area (TLWMA) in Osceola County and Kissimmee Prairie Preserve State Park (KPPSP) in Okeechobee County. Three protected populations occur on Avon Park Air Force Range (APAFR) in Highlands and Polk counties. Florida grasshopper sparrows on protected lands are monitored by annual point count surveys, a standard method used to assess the relative abundance of bird populations.

Population Study and Factors Affecting Abundance and Detection – The first part of this project examined historic point count data (1991-2005) from 591 monitoring stations (Figure 1). Significant long-term decreasing trends were indicated for all populations except for the TLWMA population. The estimated total population size was 1,100 individuals. Except for KPPSP, there was an overall reduction in occupied area over time. The decline in abundance and the simultaneous decrease of formerly large populations on APAFR is cause for concern. The low number of individuals and the paucity and fragmented distribution of suitable dry prairie will be limiting factors for conservation.

Factors affecting sparrow abundance and detection were examined during the second part of this project to provide insight into population declines, and guide conservation and monitoring efforts. During FY 2008-09, point count data (2001-2008) from 166 monitoring stations at TLWMA (Figure 1) were analyzed for Florida grasshopper sparrow densities relative to time following prescribed fire, seasonality of fire, rainfall, elevation, and distance from prairie edge. The influence of individual observers, day of survey, and observation start time on Florida grasshopper sparrow detection probabilities also was examined. Preliminary results indicated a decrease in sparrow density with time following fire, ranging from > 1.5 sparrows per 24.7 acres (10 hectares) two months following fire to < 0.5 sparrows per 24.7 acres (10 hectares) at three years' post-burn. The seasonality of fire, whether a growing season or dormant season burn, was not an important factor affecting density. The density of sparrows decreased with increased rainfall during the 12 months prior to counts, but increased with increased rainfall during the month prior to counts. Florida grasshopper sparrow density at TLWMA peaked at an elevation of 63 feet (19.2 m) above sea level, and density increased with distance from non-prairie edges (e.g., forested areas). The probability of detecting a Florida grasshopper sparrow during the point count surveys varied with observer experience. The probability of detection peaked early in the survey season (by late April), and gradually decreased with a later daily start time.

Project results and management and monitoring recommendations will be presented in a final report due FY 2009-10. For additional information, please visit the Florida grasshopper sparrow webpage at http://research.myfwc.com/features/category_sub.asp?id=7681.

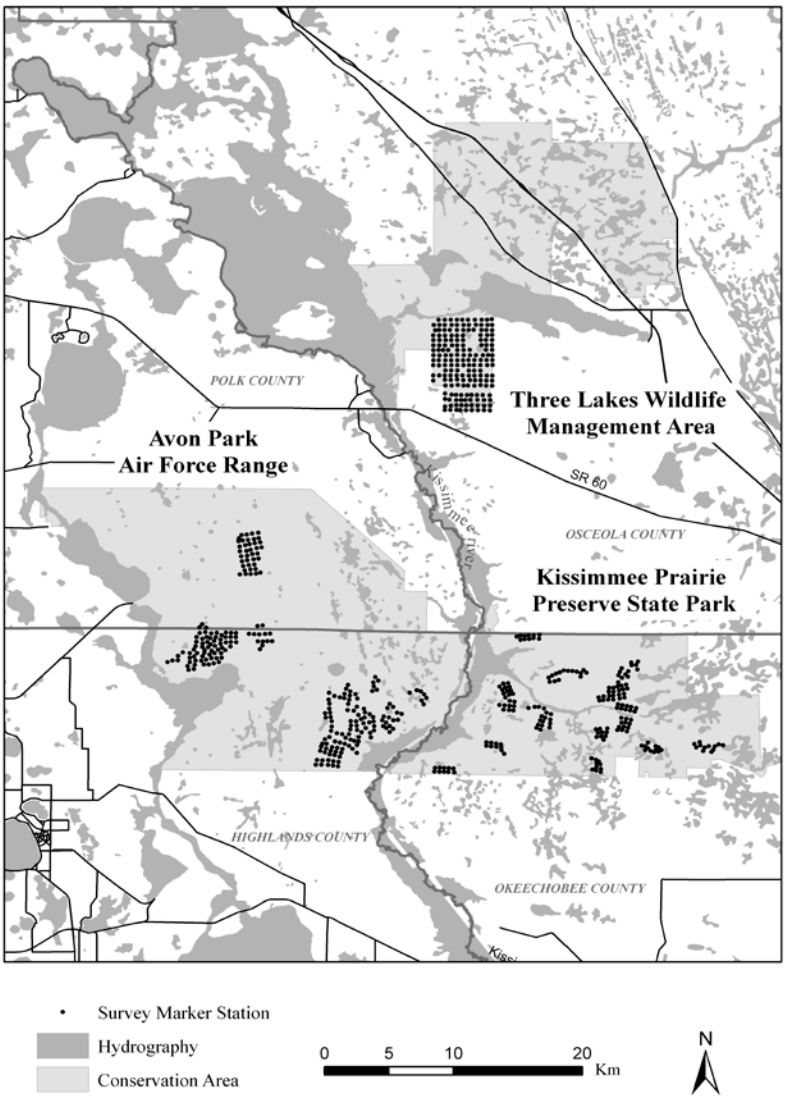


Figure 1. Locations of point count survey stations for Florida grasshopper sparrows on public lands (1991-2008).

Monitoring on Three Lakes Wildlife Management Area in Osceola County – Point count surveys for Florida grasshopper sparrows have been conducted on the TLWMA since 1991. The surveys are conducted each spring (April -June) and consist of a grid of 190 stations spaced 0.25 miles (0.40 km) apart. Each station is surveyed for five minutes three times each spring. All

Florida grasshopper sparrows heard or observed are recorded. Beginning in 2002, 60 stations north of the main population on what is called "the island" were established to determine if a translocation of 18 juvenile sparrows in 2001 and 2002 was successful. In 2009, surveys estimated there were at least 89 different male Florida grasshopper sparrows at the main site. This is a substantial drop compared to the previous three years. As in 2008, zero males were detected on the island. Oaks and cabbage palms that had encroached on the dry prairie as a result of past fire suppression were mulched to ground level, in 2007 and 2008 on an adjacent site to the main site. Eighteen survey stations were added in that area. No birds were detected in 2008; however, one bird was detected in the restored area in 2009. Additional tree removal was conducted in 2009 on 2,281 acres (923 hectares) of the main site as well as on 881 acres (357 hectares) of additional dry prairie. This area was restored in an effort to increase connectivity between sites. Monitoring will continue at the TLWMA in FY 2009-10 and new stations will be added in the restored areas to monitor changes in population due to habitat improvement. In addition to the tree removal, roller chopping was conducted on 438 acres (177 hectares) of the main site, 846 acres (342 hectares) in the area where tree removal was conducted in FY 2007-08, and on 668 acres (270 hectares) on the island during FY 2008-09. Further roller chopping on TLWMA dry prairie will be conducted during FY 2009-10.

**Florida Scrub-Jay** (*Craig Faulhaber, Shane Belson, David Turner, Karl Miller, Nicole Ranalli, Mike McMillian, Travis Blunden, Jim Garrison, Norberto Fernandez and Stuart Cumberbatch*)

The goal of this project is to coordinate range-wide conservation efforts for the State and Federally threatened Florida scrub-jay. Habitat loss and degradation have caused widespread declines throughout the scrub-jay's range. Despite protected status for three quarters of remaining scrubby habitats in Florida, scrub-jay numbers have continued to decline on conservation lands largely due to habitat degradation caused by decades of fire suppression and inadequate habitat management. Conserving this species requires the efforts of multiple local, state, and federal agencies as well as non-governmental organizations and private landowners. The Florida Scrub-Jay Conservation Coordination project assists these efforts by facilitating communication among partners, collecting and distributing information regarding monitoring and management, working with partners to establish priority management actions, and developing standards and guidelines for conservation efforts. Typical habitat management efforts include prescribed burning and mechanical treatments such as roller chopping and cutting of trees that have encroached on scrub-jay habitat to increase open areas.

Conservation Coordination –In FY 2008-09, FWC facilitated communication among partners by organizing and developing four regional working groups focused on management and monitoring scrub-jays and their habitat. In addition to planning meetings for the groups, FWC served as the steering committee chairperson for the Southeast Florida Scrub Ecosystem Working Group. For the Northeast Florida Scrub Working Group, FWC organized a meeting of the Monitoring Committee to coordinate regional scrub-jay banding activities, participated in a Land Management Committee site visit to scrub habitat, and assisted the Education Committee with planning for a Scrub-Jay Festival. Working group meeting participants included representatives from many major public land management entities: U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), Florida Department of Agriculture and Consumer Services (FDACS), Florida Department of Environmental Protection (FDEP), FWC,

Water Management Districts, and county governments, as well as The Nature Conservancy (TNC), universities, the Audubon Society, other nongovernmental organizations, and private landowners.

FWC worked with partners to help establish priority management actions for scrub-jays and their habitat, including site visits to over 20 properties to coordinate with land managers from FDACS, FDEP, FWC, Water Management Districts, several county governments, TNC, and a private landowner. FWC participated in meetings with partners from state and county agencies to discuss prioritization of management activities in Brevard and Levy counties. FWC provided biological opinions on permits and reviews of projects and management plans. FWC provided assistance for the Brevard Zoo's scrub-jay translocation project and organized meetings for partners from several agencies and organizations to discuss appropriate recipient sites and public awareness for this program.

FWC continued to work with the Florida Natural Areas Inventory to develop Scrub Management Guidelines for Peninsular Florida. Additionally, FWC worked with USFWS on the Scrub-Jay Action Plan.

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

Preliminary analyses indicate several populations in the two county study area have recovered on previously unmanaged sites. Plans for the final year of the study include continued counts of juveniles, completion of data analyses, and preparation of the final report for the study.

Jay Watch--Nongame Wildlife Grant – Ms. Tricia Martin, TNC, completed a two-year, volunteer citizen-science study to conduct large-scale monitoring of Florida scrub-jays and biennial vegetation monitoring in the Lake Wales Ridge area in south-central Florida. This study is the continuation of a previous FWC-supported project that examined the use of standardized survey protocols for scrub-jays and established that volunteer surveys were comparable to more intensive surveys conducted by avian biologists. Scientifically rigorous programs to conduct repeated and consistent surveys of Florida scrub-jay populations and monitor population trends and habitat conditions were employed for two years to help assess where land management is needed, and to evaluate the ecological consequences of management actions while informing volunteers about Florida scrub-jays and scrub habitat conservation. The survey information was used to augment the data collected for the Federal five-year review of the status for the species.

The final year of the surveys (2008) had the most volunteer citizen-scientist contributions and expanded the original study area from just along the Lake Wales Ridge to the range-wide distribution of scrub-jays.

Demographics in Suburban Charlotte County Study – FWC continued to study scrub-jay population demographics in suburban Charlotte County. The study focuses on the Deep Creek region, which supports the second largest population of scrub-jays in southwest Florida. A final report being prepared for this project is scheduled for completion in fall 2009. FWC research staff attended interagency meetings on habitat conservation planning efforts in Charlotte County and provided assistance and biological opinions for this area to county, state, and federal agencies, as well as the public.

Salt Lake Wildlife Management Area in Brevard County – As part of FWC's new Wildlife Conservation, Prioritization, and Recovery Program, which focuses on strategic management of imperiled wildlife species on Wildlife Management Areas (WMA), roughly 149 acres of scrub, scrubby flatwoods, and mesic flatwoods were targeted for scrub-jay habitat management. The area supports four family groups with an estimated population of 12 birds. There was no documented recruitment increase in FY 2008-09 and four birds (three from one family and one from another family) disappeared during the spring of the year. In August 2009, one of these birds was found in the northeastern part of the WMA having paired up with a bird that recently had been translocated to the South Lake Conservation Area managed by Brevard County. All four scrub-jay family groups are located near the area boundaries, and each family group has territories that extend onto adjacent private properties.

In FY 2006-07, FWC began a partnership with Brevard Nature Alliance in order to develop a regional strategy for scrub-jay conservation and management through the Adaptive Resource Management program. FWC, with the assistance of David R. Breininger (from Dynamac Corporation at the Kennedy Space Center), banded four scrub-jays as part of the program in FY 2008-09. Monitoring and additional banding efforts are scheduled to continue into FY 2009-10.

In March 2009, there was a large wildfire (2,600 acres) on the adjacent property to the south that also burned parts of Salt Lake WMA. The portions of the WMA that burned are not suitable for scrub-jays; however, a portion of the adjacent property that burned is utilized by one family of scrub-jays that resides at the WMA. In FY 2008-09, scrub-jay habitat management focused on the prescribed-burning of 25 acres (10.1 hectares) and the removal of 1,400 trees within potential scrub-jay habitat. Management activities slated for FY 2009-10 include the continued use of prescribed fire as well as removal of trees in potential scrub-jay habitat.

Arbuckle and Walk-in-the-Water Wildlife Management Areas in Polk County – The Arbuckle and Walk-in-the-Water WMAs in Polk County are part of the Lake Wales Ridge State Forest (LWRSF) and encompass nearly 20,000 acres of various habitat types, including scrub and sandhills. Scrub habitat contains a mix of oak trees, herbaceous plants and bare patches of sand while sandhill habitat contains a mix of vegetation types, including wiregrass and native pine trees. Both are managed through the use of prescribed fire and nearly half of these habitats are potentially suitable for Florida scrub-jays. FDACS is the lead management agency on this area while FWC is a cooperating agency.

Past scrub-jay monitoring and banding has been conducted by Archbold Biological Station (ABS) under contract with FDACS. Monitoring was conducted from February 2003–February 2006. FWC initiated scrub-jay surveys using Jay Watch, TNC's citizen science program, for scrub-jay monitoring and research in July 2008. This was a pilot survey to determine the feasibility of using Jay Watch for long-term population monitoring on Arbuckle

and Walk-in-the-Water WMAs. The entire area was not surveyed; therefore, comparisons to previous years are difficult. However, nine more family groups were observed during FY 2008-09 compared to the numbers seen during the 1992-93 statewide survey in the same area. In FY 2008-09, eight scrub-jay family groups were located at Walk-in-the-Water WMA (17 adults, seven juveniles) and four scrub-jay family groups were located at Arbuckle WMA (eight adults, six juveniles).

In 2002, FDACS initiated a Scrub-Jay Management Plan on the LWRSF. Since this time, more than 2,500 acres at Arbuckle WMA have been treated with fire, mechanical treatment or a combination thereof. More than 1,500 acres at Walk-in-the-Water WMA were treated. FWC assisted in burning approximately 2,700 acres of scrub-jay habitat on Arbuckle WMA.

FWC plans to continue surveying scrub-jays on Arbuckle and Walk-in-the-Water WMAs using the Jay Watch program and protocol. Additional areas on these WMAs will be surveyed by FWC and reported to Jay Watch.

Lake Wales Ridge Wildlife and Environmental Area in Highlands and Polk Counties – FWC monitors Florida scrub-jay populations on select tracts of the Lake Wales Ridge WEA (LWRWEA) in cooperation with ABS and TNC's Jay Watch program. Properties surveyed by ABS included Gould Road, Highland Park Estates, Holmes Avenue, Lake Placid Scrub, and McJunkin. TNC's Jay Watch surveys were conducted from mid-June to the end of July at Gould Road, Holmes Avenue, and the communities of Royce, Clements, Silver Lake, Sunray, and Sun 'n Lake Sebring.

Scrub-jay or scrub-jay family numbers increased on four of the nine (44%) properties surveyed. Numbers on the remaining five properties remained stable. One of the populations most at risk is at the Carter Creek tract. Although this population remained stable at six groups from the previous year, it has declined from 35 groups in the early 1990s and from 14 groups in 2003. At the Holmes Avenue tract, scrub-jay numbers have remained stable. Prescribed burns and/or mechanical treatment are planned for this site during FY 2009-10. Additional opportunities for mechanical treatment projects will be explored at the Sun-n-Lakes North and Leisure Lakes tracts.

Florida scrub-jay monitoring results are used as a tool to guide management actions. FWC has contracted with a private company to burn approximately 1,000 acres (405 hectares) of the Carter Creek tract. Burn units are prioritized to aid existing scrub-jay families and to attract new individuals to the area. To date, 250 acres (101 hectares) have been burned as part of this project.

Subdivided properties (seven within the WEA) pose special management problems and often contain sub-optimal scrub-jay habitat. Ownership of these properties is a checkerboard pattern of private and State property; FWC does not have authority to manage the private lands.

Half Moon Wildlife Management Area in Sumter County – To better track the population, 14 more scrub-jays were color-banded in FY 2008-09 for a total of 111 birds banded since 2001. Reproduction was down this year and only two birds fledged (left the nest) from the eight to ten family groups found on Half Moon WMA. The present population is estimated at 35-40 individuals.

Habitat management focused on growing-season prescribed burning; rollerchopping palmetto; and mowing, cutting, or applying herbicide to overgrown oak trees. Prescribed burns in the 2009 growing season included about 185 acres (75 hectares) of potential or occupied

scrub-jay habitat. Half Moon WMA harbors approximately 500 acres (202 hectares) of potential scrub-jay habitat. In an effort to expand potential habitat, overgrown oaks were cut on three 10-acre plots directly adjoining scrub-jay habitat. Future habitat management will focus on palmetto reduction through rollerchopping, increasing open ground, and cutting overgrown oaks in and surrounding potential scrub-jay habitat.

Camp Blanding Wildlife Management Area in Clay County – A small, remnant population of Florida scrub-jays still exists within Camp Blanding WMA. It is believed this is the most northern extent of scrub-jays in Florida. The population size has varied over the years, with seven or fewer individuals normally counted. A survey of suitable scrub-jay habitat was conducted on March 24, 2009, which included the impact area. One scrub-jay was found in the portion of the cantonment area called the Kingsley Scrub when the area was surveyed. Approximately 50% of this scrub habitat was subject to growing season prescribed burning in 2004.

Cedar Key Scrub Wildlife Management Area in Levy County – FWC assists DEP with monitoring and management of Florida scrub-jays on Cedar Key Scrub WMA. During FY 2008-09, there were five family groups of scrub-jays documented in and around the WMA; four groups within the WMA consisting of nine individuals, and one group in the surrounding area. The monitoring program includes monthly monitoring of birds at specific sites, banding young, and determining the sex of the adults through territorial and nesting behavior.

Approximately 436 acres (177ha) were burned during the dormant & growing seasons to maintain habitat necessary for the scrub-jays.

Mitigation Parks – Annual Florida scrub-jay monitoring at Hickey Creek Mitigation Park Wildlife and Environmental Area (HCWEA) in Lee County was conducted. The scrub-jay population consisted of ten individuals from three family groups, the same number of families from the previous year and a 17% decrease in individuals. FWC also monitored five additional scrub-jay pairs in the surrounding area. Habitat enhancement is a primary management activity at HCWEA and included the prescription burning of 133 acres (54 hectares). Florida scrub-jays have been monitored at Platt Branch Mitigation Park WEA in Highlands County since 1992. During this 16-year period, the population has ranged from six to 12 groups. The annual survey completed by FWC documented 16 individuals from six family groups indicating that the population has remained stable over the past several years. Management efforts continue to focus on maintaining and improving scrub-jay habitat. Some expansion of habitat at the site has been successfully accomplished using prescribed fire and mechanical treatments.

The small population of Florida scrub-jays at Moody Branch Mitigation Park WEA in Manatee County was monitored through coordinated efforts with TNC's Jay Watch Program and through contractual services. Jay Watch volunteers recorded three family groups consisting of 12 individuals during the 2008 breeding season, an increase of one individual over the previous year. Additional monitoring by an FWC contractor prior to the 2009 breeding season documented eight scrub-jays among the three territories. FWC continued efforts to restore and enhance scrub habitat by planting (contractual service) scrub oak acorns on 100 acres (40 hectares) of former agricultural fields at a density of 2,000/acre (5,000/hectares). In addition, 136 acres (55 hectares) of scrub habitat were prescribe-burned by FWC.

**Ivory-Billed Woodpecker** (*Karl Miller*)

The ivory-billed woodpecker is a State and Federally endangered species. FWC continued to attend meetings of the Federal Ivory-billed Woodpecker Recovery Team and assist with editing and re-writing portions of the Federal Recovery Plan. Reports from recent decades of possible ivory-billed woodpecker activity in Florida are being reviewed by FWC and summarized in a manuscript for publication in a peer-reviewed science journal. During winter 2009, FWC provided equipment and logistical assistance to the Cornell Laboratory of Ornithology's Mobile Search Team while it conducted a search for ivory-billed woodpeckers in Big Cypress National Preserve and vicinity (Collier County) and Everglades National Park (Monroe County). No birds were found during this search.

**Red-Cockaded Woodpecker** (*Robin Boughton, Rick Spratt, Norberto Fernandez, Jim Garrison, Ralph Holton, Barbara Almario, Matthew Hortman, Adam Warwick, Michael Baranski, Ross Scott, Valerie Sparling, Wendy Wilsdon, Steve Shattler and Michelle Wilcox*)

Conservation Planning – The red-cockaded woodpecker is a State and Federally endangered species. Statewide conservation planning for the red-cockaded woodpecker continued in FY 2008-09. At the close of the 2009 breeding season, Florida red-cockaded woodpecker populations continued on a track to achieve and in many cases, exceed the year 2020 population goals outlined in the Management Plan. Field visits have confirmed that large red-cockaded woodpecker populations in Florida are well-managed and that fire suppression, reliance on dormant season prescribed fire, and low availability of old-growth pines remain the greatest threats to red-cockaded woodpecker conservation in Florida. By the close of FY 2007-08, most of the conservation actions identified in the FWC management plan were implemented. Progress on the remaining conservation actions in the plan will be ongoing and are outlined below:

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

*Establish and convene a meeting of the Florida red-cockaded woodpecker working groups.* Two red-cockaded woodpecker working groups currently meet to review and discuss items relevant to the Florida Red-cockaded Woodpecker Management Plan .

*Coordinate with U.S. Fish and Wildlife Service (USFWS) to develop a statewide Safe Harbor program for red-cockaded woodpeckers in Florida.* The statewide Red-Cockaded Woodpecker Safe Harbor program is funded by the Conserve Wildlife Tag and was initiated in November 2006 and has had a full-time coordinator to date. By the end of FY 2008-09, nine private properties totaling 22,459 acres were enrolled in the program and committed for habitat management by the landowners. The program is advertised through newsletter and magazine articles and through attendance by the coordinator at landowner workshops. To improve the program, a survey of both enrolled landowners and landowners who declined to enroll was conducted. In spring 2009, funds were allocated to the Safe Harbor program through USFWS Partners in Wildlife grant. These funds will be awarded to landowners enrolled in the Safe Harbor program as cost-share assistance for land management practices that benefit red-cockaded woodpeckers. This has provided an important incentive for landowners to enroll in the program.

The activities above will continue until the species meets its conservation goals. FWC and other WMA managers focus management on restoring and maintaining red-cockaded woodpecker habitat in order to increase the population of red-cockaded woodpeckers and reach population objectives established in the FWC Red-cockaded Woodpecker Management Plan. Additional activities include meetings of the red-cockaded woodpecker working groups, updating of the red-cockaded woodpecker database, and implementation of the statewide Red-cockaded Woodpecker Safe Harbor program.

Citrus Wildlife Management Area in Citrus County – Of 69 active red-cockaded woodpecker clusters, 55 nested and 41 of these were successful in fledging 52 young. Color banding continued with 73 nestlings banded during the 2008 nesting season. While the number of active clusters and nesting groups increased about 5%, unseasonal rains in May contributed to a 16% decrease in the number of successful nests and a 28% decline in fledging success.

One female from the Citrus County population was moved to St. Sebastian State Buffer Preserve in Brevard and Indian River counties and one female was moved to Camp Blanding in Clay County in October 2008 under Federally-supervised translocation projects. These single females paired with single males in the recipient populations.

Habitat management included prescribed burning of 5,438 acres (2,202ha) and hardwood control. Encroaching oak trees were cut and treated with herbicide via contract on 100 acres. Cavity trees were protected from fire by raking and pre-burning.

Goethe State Forest Wildlife Management Area in Levy County – FWC assists Florida Department of Agriculture and Consumer Services (FDACS) with annual monitoring and management of the red-cockaded woodpecker population on Goethe State Forest Wildlife Management Area (WMA). During FY 2008-09, there were 43 active clusters of red-cockaded woodpeckers. The monitoring program includes roost checks, cavity and tree inventories, search for new cavities, cavity tree maintenance, banding of chicks of the year and any un-banded adults that are found, and sexing chicks when fledged.

Twenty-four artificial cavities were inserted for three pairs of red-cockaded woodpeckers that were trans-located from Osceola National Forest. Maintenance of active clusters is a priority, and another 40 were constructed for local population dispersal and augmentation of existing clusters. A 30 foot buffer is created around cavity trees by mowing or burning prior to conducting a prescribed burn on the stand.

Camp Blanding Wildlife Management Area in Clay County – A 2,209 acre (894ha) aerial burn using personnel from FWC and Camp Blanding was conducted on March 3, 2009. The burn included three separate red-cockaded woodpecker clusters and surrounding foraging areas. Six new cavity inserts were installed and three cavity boxes were replaced.

Osceola National Forest in Baker and Columbia Counties – At the conclusion of the reporting period, there were 124 active clusters with 234 adult red-cockaded woodpeckers confirmed. Of the 124 active clusters, 111 are potential breeding groups with 101 nests and 13 are single male clusters. New recruitment clusters (13) were added with four cavity inserts each. Active clusters received 22 cavity inserts. Habitat management activities included prescribed fire on 13,581 acres (5,498ha) in the growing season and 10,657 acres (4315ha) in the dormant seasons. Mechanical reduction of vegetation and mid-story was also utilized.

Blackwater Wildlife Management Area in Okaloosa and Santa Rosa Counties – FDACS and FWC have cooperatively managed the red-cockaded woodpecker population on Blackwater WMA since 1996. The population is monitored using leg bands, banding of nestlings and unmarked adults, fledge checks, translocations, and installation of artificial cavities where appropriate. FDACS has been responsible for reporting the banding of nestlings. FWC assists with banding efforts and translocations while concentrating efforts on habitat enhancement within the clusters. FWC continued the habitat improvement program initiated in 2006 by reducing the amount of hardwood vegetation encroachment in 29 red-cockaded woodpecker clusters.

Apalachicola River Wildlife and Environmental Area in Franklin County – Eight known clusters, three natural and five artificial, were monitored throughout the breeding season. Six of the eight clusters showed signs of activity, and all six active clusters contained nests; two in the natural clusters and four in artificial cavities within the recruitment clusters established in March 2005 and January 2008. Nests within the natural clusters produced four fledglings this past breeding season (two fledglings per nest). Nests in the active recruitment clusters with artificial cavities produced seven total fledglings (three nests with two fledglings and one nest with one fledgling). Although the number of active clusters decreased by one from the previous year, the number of nests remained at six and the number of fledglings produced increased from eight in 2008 to eleven in 2009. Habitat management activities included roller chopping (approximately 270 acres; 109 hectares) and mulching/tree chipping (232 acres; 94 hectares) to reduce the woody midstory growth. In FY 2008-09, following training from USFS, FWC initiated a red-cockaded woodpecker nestling banding program resulting in the banding of five fledglings. This banding program will assist in identification of individuals that disperse to nearby areas on Apalachicola National Forest and Tate's Hell State Forest.

Tate's Hell State Forest in Franklin and Liberty Counties – Prior to the breeding season, FWC mechanically treated 28 clusters, reducing woody vegetation on 57 acres (23 hectares) within cluster boundaries. Clusters are visited to check for red-cockaded woodpecker activity, document active trees, and locate nest trees. Finding nest trees allows staff to band the birds in order to monitor nest success. From March - June 2009, 47 clusters were visited numerous times by Tate's Hell staff.

FWC found 102 of 242 trees were active, meaning red-cockaded woodpeckers will likely nest in those trees. FWC observed all active trees throughout the nesting season to watch for returning adults and listen for chicks calling from the cavity. FWC found 27 nests. These nests were "peeped" (using a special camera designed for use in red-cockaded woodpecker cavities) to confirm the nest and determine the number of eggs or chicks. Prior to FWC beginning management of the Tate's Hell red-cockaded woodpecker population, only 46 fledglings were banded in the previous 14 years of management. In 2009, of the 48 chicks that hatched, FWC banded 40 of them. From June – August, FWC performed sunrise checks in which red-cockaded woodpecker calls were played to keep birds near the cluster until bands could be read. Of the 40 chicks banded, 28 were re-sighted.

J.W. Corbett Wildlife Management Area in Palm Beach County – Activities included determining the number of active clusters, monitoring active clusters for nests, color-banding nestlings, determining fledging success, and installation of artificial cavities. Habitat

management included maintaining a three-year, growing season burn rotation, treatment of 5,000 acres (2,020 hectares) of exotic plant species, mechanical mowing of 91 acres (36 hectares) to control overgrown palmetto and hardwoods and installation of three artificial starts (partial cavity) in areas where few cavities exist.

FWC identified 13 active clusters and nine potential breeding groups during the 2009 nesting season at J.W. Corbett WMA. Seven of the nine groups attempted nesting, with three clusters successfully fledging four birds. This is the second lowest number of fledges in the past decade. The two groups that did not attempt to nest were newly formed this year with two of last year's solitary males pairing up with females translocated from Apalachicola National Forest. Two substantial rain events occurred during the weeks of May 1 to May 18 and June 1 to June 8. These rain events occurred during prime nesting season and resulted in the failure of three nests due to flooding of the cavities. However, the decrease in nesting productivity was offset by an increase in potential breeding groups, which provides a positive long-term outlook for this small population.

Four pairs of birds were translocated from Apalachicola National Forest in the fall of 2008. Of the eight birds, only two females have been observed since the move resulting in a 25% retention rate. The two females paired with solitary males. An additional five pairs from Apalachicola National Forest and two females from Osceola National Forest are to be translocated in the fall of 2009.

Big Cypress National Preserve in South Florida – FWC assisted the National Park Service (NPS) with management and annual monitoring of red-cockaded woodpeckers. Due to limited resources and difficult field conditions, this southern-most population of red-cockaded woodpeckers has never been precisely documented and monitored. Accurate demographic data from this population, the largest in South Florida slash pine habitat, would assist in determining its status in reference to conservation goals.

No artificial cavities were installed during FY 2008-09. FWC monitored 53 out of 87 potential clusters for productivity based on access and cluster activity. This included 39 clusters accessible by all-terrain vehicle and 14 by helicopter. Of 52 potential breeding groups, 41 attempted nesting with 29 successful nests. Thirty-three chicks made it to banding age (six days) and 27 fledged. Unpaired adult birds (helpers) were observed in six of the monitored clusters. Reproduction is more successful in clusters with helpers. An additional 32 clusters were surveyed strictly for activity during the breeding season and 15 were found to be active, bringing the total of active clusters inside the preserve to 69. Thirty adults were banded.

FWC will continue to survey for new cluster locations, the number of monitored clusters, and augment cavity limited clusters. FWC plans to obtain genetic samples from the Lostman's Pine sub-population are in place, as well as to augment additional cavity-limited clusters and increase the number of monitored clusters for the 2010 breeding season.

John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area in Palm Beach County – Red-cockaded woodpeckers were last observed on the John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area (Dupuis) in 1989. FWC, in conjunction with the South Florida Water Management District (SFWMD) and USFWS, developed a plan to reintroduce red-cockaded woodpeckers to the area. Restoration of the woodpecker population at Dupuis will provide an important addition as the only other group of red-cockaded woodpeckers in southeastern Florida is at J.W. Corbett WMA in Palm Beach County. Prior to releasing birds,

FWC biologists coordinated with SFWMD to identify habitat improvement activities critical for reintroduction, which included mechanical clearing of understory, frequent prescribed burning, and installation of artificial cavities. Since 2006, 30 red-cockaded woodpeckers have been translocated from public lands in Florida and Georgia to Dupuis. Of the ten birds released in the fall of 2008, three remained on the area. In 2009, five active clusters produced one female fledgling. In addition, a male bird fledged in 2008 remained in the population as a breeder. At the end of the breeding season, 12 birds were observed in the Dupuis population. FWC will release an additional ten red-cockaded woodpeckers in the fall of 2009.

Additional cavities were installed in one new cluster, bringing the total number of cluster locations to 18. During the next breeding season, clusters will be monitored for nests, nestlings will be banded, and fledging success determined. In addition, habitat management activities to reduce midstory height and enhance red-cockaded woodpecker habitat will continue.

Babcock/Webb and Yucca Pens Unit Wildlife Management Area in Charlotte and Lee Counties – FWC has been actively managing and monitoring red-cockaded woodpeckers on the Babcock/Webb WMA in Charlotte County since 1999, and the Yucca Pens Unit, located in Charlotte and Lee counties since 2005. During FY 2008-09, annual tree cavity surveys revealed 33 active clusters, including one active cluster with three adult red-cockaded woodpeckers in the Yucca Pens Unit.

A total of 78 adult red-cockaded woodpeckers from 33 clusters were tallied during nesting season, yielding an average group size of 2.4. Nineteen fledglings from 2008 were seen this season, including one female translocated from Osceola National Forest. Twenty-one breeding pairs attempted nesting and produced 15 fledglings. The total red-cockaded woodpecker population has increased from 62 to 93 birds in the last ten years.

Platt Branch Mitigation Park Wildlife and Environmental Area in Highlands County – Monitoring of red-cockaded woodpeckers in the Fisheating Creek population in Highlands County has been conducted by FWC on an intensive level since 2002. A total of ten active clusters currently comprise the population within Platt Branch Mitigation Park Wildlife and Environmental Area (WEA) and surrounding properties owned by the Lykes Bros. Corporation, portions of which are protected by a conservation easement.

Surveys in FY 2008-09 revealed five potential breeding pairs prior to nesting season. Nesting resulted in six hatchlings from three clusters, a slight decrease from the previous year. All six hatchlings were banded, fledged and became part of the population.

FWC contracted the mowing of 100 acres (40 hectares) of overgrown potential red-cockaded woodpecker habitat and completed 160 acres (65 hectares) of growing season prescribed burning. Two new artificial cavities were installed.

Three Lakes, Triple N Ranch, and Bull Creek Wildlife Management Areas in Central Florida – The red-cockaded woodpeckers inhabiting Three Lakes, Triple N Ranch, and Bull Creek WMAs are all part of the same Central Florida (Osceola County) metapopulation as determined by the Florida State-wide Red-Cockaded Woodpecker Management Plan.

On Three Lakes WMA, FWC has been intensively monitoring the red-cockaded woodpecker population since 2001. Over the last nine years, the population has stayed relatively stable despite hurricanes in 2004 and droughts in 2007. The number of breeding groups on Three Lakes WMA consisted of 45 in 2008, which is up from 44 in 2007, but still lower than the

pre-hurricane number of 50. This year, 38 of the 48 nesting attempts were successful, 65 nestlings were banded and 53 of those chicks survived to fledge the nest, the highest number since the 2004 hurricanes. FWC installed 33 cavity inserts to augment established clusters and to create three new recruitment clusters. FWC replaced nine old and damaged inserts and cleaned and maintained 27 inserts. Four juvenile red-cockaded woodpeckers were translocated within the forest to try to increase the number of breeding groups. Habitat management activities included prescribed fire on 21,125 acres (8549 hectares), roller chopping on 2,425 acres (981 hectares) and invasive plant control. To protect red-cockaded woodpecker cavity trees during prescribed fires, FWC pre-burned around each tree. A 30-minute presentation about this population was given to a regional red-cockaded woodpecker meeting and ideas were gathered about how to promote population growth in the future.

Bull Creek WMA and Triple N Ranch WMA have been actively managed as a single, small, red-cockaded woodpecker population since 2003 and supported eight breeding groups in FY 2008-09. This number has been steadily increasing since 2005 when FWC began yearly translocations of birds to the property. This year, four of the ten nesting attempts were successful, ten nestlings were banded and five of those chicks survived to fledge the nest, the highest number since monitoring began. FWC installed 16 cavity inserts to augment existing clusters and create two new recruitment clusters. FWC replaced three old and damaged inserts and cleaned and maintained 34 inserts. Four red-cockaded woodpeckers were translocated from Osceola National Forest (Columbia and Baker counties) in 2008. Habitat improvements included prescribed fire on 11,231 acres (4,545 hectares), roller chopping on 380 acres (154 hectares) and invasive plant control on 165 acres (67 hectares). To protect red-cockaded woodpecker cavity trees during prescribed fires, FWC pre-burned around each tree.

**Roseate Tern** (*Ricardo Zambrano*)

The roseate tern is a State and Federally threatened seabird. After the hurricane season of 2005, the roseate terns' main nesting island, Pelican Shoal Critical Wildlife Area in Monroe County, was submerged under one to two feet of water and thus no longer available for roseate terns. In the spring of 2006, FWC biologists attempted to provide the birds with an alternative nesting area. In cooperation with the National Park Service (NPS), biologists placed plastic tern decoys, along with a sound system and speakers broadcasting tern calls, on Long Key at Dry Tortugas National Park. These techniques, known as "social attraction," have been used around the world to attract colonially-nesting birds to nesting areas and to restore seabird colonies. These techniques have been successful for the last three years. In April 2009, FWC and NPS biologists again placed decoys and speakers on Long Key at Dry Tortugas National Park and 27 pairs of roseate terns nested. FWC and NPS will continue using decoys and speakers at Dry Tortugas National Park until it is determined that roseate terns have permanently established themselves there.

During the nesting season, FWC biologists surveyed the Marathon Government Center rooftop colony to conduct nest, egg, juvenile, and adult counts. At one point during the 2009 season, 81 roseate tern nests were counted in this rooftop colony. During observations, birds in this colony appeared to be abandoning and re-nesting at various intervals, so estimating colony size would be difficult based on nest counts alone; it was unclear how many pairs were successful in their nesting attempts for this same reason. Subjectively, however, it was clear that

the Marathon Government Center colony was larger in 2009 than in 2008. Eighty-one chicks were captured, banded, and released onsite during the nesting season.

**Everglades Snail Kite** (*Marsha Ward*)

The Everglades snail kite is a State and Federally endangered species. The Everglades and Francis S. Taylor Wildlife Management Area (WMA) in South Florida, which consists of South Florida Water Management District's Water Conservation Areas 2 and 3, is important habitat for the endangered Everglades snail kite. In recent years, there has been a significant decline in snail kite nesting attempts and successes. There were no successful nests during the 2007 and 2008 breeding seasons, and one successful nest during the 2009 breeding season in the WMA. This decline prompted FWC, USFWS, and the University of West Florida biologists to examine if low apple snail densities are a determining factor. Apple snails are the primary food source for the snail kite, and also provide food for other wildlife such as limpkins, turtles, and fish.

During a collaborative survey effort in April and May 2009, throw traps were deployed a total of 158 times over four locations in southern Water Conservation Area 3A, capturing a total of 27 snails. The majority of snails captured were considered too small to be targeted by snail kites. The adult-sized snail density estimate was < 0.08 snails per square meter, which is approximately half of what is needed for an area to support sustained snail kite foraging. These estimates were consistent with the lack of use by snail kites during the 2009 breeding season and suggest that snail densities have not recovered from the rapid decline seen between 2003 and 2004.

In addition to trapping, biologists also looked for signs of abundant apple snail egg clusters, which are visible on emergent vegetation stems just above the water line. Few clusters were observed. This information will be used in continuing efforts to examine the decline of snail kite nesting success in the WMA.

**Southeastern American Kestrel** (*Karl Miller, Jason Martin, Jim Garrison, Allan Hallman and Jennifer Morse*)

The Southeastern American kestrel is a State threatened non-migratory falcon closely tied to sandhills in the southeastern U.S. This subspecies has undergone a marked range contraction and population decline throughout its range. In July 2008, FWC initiated a long-term effort to develop a regional kestrel conservation partnership within and across agencies by providing standardized data collection protocols to monitor kestrels, establishing a database to manage annual monitoring data, and to establish population targets for Southeastern American Kestrels on FWC's Wildlife Management Areas (WMA). FWC coordinated kestrel monitoring and management across Florida:

- Managed by FWC: Camp Blanding WMA in Putnam County, Fort White Mitigation Park in Gilchrist County, Half Moon WMA in Citrus County, Lake Panasoffkee WMA in Sumter County, Chassahowitzka WMA in Hernando County, Hilochee WMA in Lake County, Lake Wales Ridge Wildlife and Environmental Area (WEA) in Highlands and Polk counties, KICCO WMA in Polk County, Hickory Hammock WMA in Highlands County, Kissimmee

River Public Use Area in Okeechobee County, Crooked Lake WEA in Polk County and Platt Branch WEA in Highlands and Glades counties;

- Managed by Florida Department of Agriculture and Consumer Services (FDACS): Withlacoochee State Forest in Citrus County, Jennings State Forest in Clay County, Twin Rivers State Forest in Madison County, and Indian Lake State Forest in Marion County;
- Managed by Florida Department of Environmental Protection (DEP): Mike Roess Gold Head State Park in Clay County, Ichetucknee State Park in Columbia & Suwannee counties and Rainbow Springs State Park in Marion County;
- Managed by the University of Florida: Ordway-Swisher Biological Station in Putnam County.

Historical kestrel nest-box monitoring data were collected for the properties above and compiled into a database. A standardized monitoring protocol was designed and distributed to site personnel. Population targets for kestrels were established based on the current amount of sandhill habitat available. Nest-boxes were installed by FWC and site personnel in Withlacoochee State Forest (four nest-boxes), Camp Blanding WMA (23 nest-boxes), Jennings State Forest (12 nest-boxes), Ordway-Swisher Biological Station (two nest-boxes), Indian Lake State Forest (three nest-boxes), Fort White Mitigation Park (ten nest-boxes), Rainbow Springs State Park (five nest-boxes), and Halfmoon WMA (six nest-boxes). Fifty-two nest-boxes were maintained and monitored by FWC (including nine installed during FY 2008-09) in Chassahowitzka WMA, Hilochee WMA, Lake Wales Ridge WEA, KICCO WMA, Hickory Hammock WMA, Kissimmee River Public Use Area, Crooked Lake WEA and Platt Branch WEA. Including the 23 new boxes, 56 nest-boxes were cleaned and maintained monthly during February through June at Camp Blanding WMA. Fourteen nest-boxes were verified as having been or were currently being used by kestrels. Other wildlife utilizing the nest-boxes included screech owls, flying squirrels, blue birds, great-crested flycatchers and gray squirrels.

The 12 boxes added during February and March 2009 at Jennings State Forest and the 14 existing boxes were cleaned and maintained.

Chassahowitzka WMA had two active nest-boxes and Lake Wales Ridge WEA had one active nest-box. Eggs were laid in the three nest-boxes used by breeding kestrels but failed to hatch for unknown reasons. The extreme drought early in the year followed by a period of excessive rainfall may have negatively affected the prey availability for breeding adults, resulting in nesting failure. Three nest-boxes were used by eastern bluebirds, 12 by great-crested flycatchers and seven by eastern screech owls.

**Whooping Crane** (*Marty Folk*)

Non-Migratory Population – The whooping crane is Federally endangered and a State species of special concern in Florida. From 1993 to 2004, FWC, in concert with many partnering organizations, released captive-reared whooping cranes (average of 22/year) into Central Florida with the goal of establishing a self-sustaining population. A number of challenges were met and overcome with regard to successful rearing and release techniques; these improved protocols have and will be used for future reintroductions. As the flock matured and became reproductively active, they successfully reproduced but not at the level that was necessary to offset annual mortality. Mortality of older males was also affecting the outlook for the project. During a series of meetings over a year's time, FWC and project partners deliberated

the prospects for future releases. Population models showed a relatively low chance of project success (establishment of a self-sustaining population) given the number of birds that could be released into the wild. In September 2008, the Federal Whooping Crane Recovery Team recommended there be no further releases of whooping cranes into this flock, but that monitoring of the existing birds should be continued to enhance knowledge of whooping cranes. Hence, the primary mission of this project has shifted from establishment of a population to a focus on research. For more information on this decision process, visit FWC's whooping crane web pages at http://research.myfwc.com/features/category_sub.asp?id=5947.

FWC continued to monitor this flock (25 birds at the end of the reporting period) in order to enhance knowledge of reproductive success, mortality, and some behavioral aspects of the birds. Whooping cranes rely on shallow marshes for nesting. A series of droughts over the past ten years has resulted in poor nesting conditions in most years. Lack of water has been a primary factor limiting productivity of the flock. However, even in wet years, the birds did not reproduce at an acceptable level. Marsh water levels were low for this year's breeding season and only three of ten pairs were able to nest. Despite drought, one chick was hatched and raised to a fledgling by its parents. Data on incubation behaviors are being collected at nests via time-lapse video surveillance equipment. Analysis of behavior will allow FWC to determine if some nest failures are associated with inappropriate incubation behavior by the parents. Behavioral data from successful nests will provide baseline information that has application for other reintroductions and also for the raising of cranes in a captive setting.

A second major factor limiting growth of the flock is male mortality. Males are not living past 10 years of age; they should live to 20-30 years. Older males of the flock are given high priority for monitoring to facilitate identification of sources of mortality. It is speculated that males suffer greater mortality, in part, because of their tendency to lead the flocks. As the flock leaders, they may be at greater risk from predation and collisions with power lines because they are the first members of their flock to encounter those challenges. Behavioral data are being collected to support or refute this hypothesis. Knowledge gained from continuing study of this population will help FWC better understand the challenges for this flock, allow staff to describe some basic biology for the species not previously documented, and help guide future reintroductions.

Eastern Migratory Population – A separate reintroduction of migratory whooping cranes is taking place in the eastern U.S. Each year since 2001, whooping cranes have been led by ultra-light aircraft from Wisconsin to Florida. Last winter, for the first time, half of the 2008 group (seven birds) was led to a wintering site at St. Marks National Wildlife Refuge and the other half to the usual wintering site at Chassahowitzka National Wildlife Refuge. The flock was wintered at two sites to avoid another catastrophic loss such as the one that took place in 2006 when 17 of the 18 birds were lost during an intense storm at the Chassahowitzka Refuge. Additional birds are released in Wisconsin that learn the migration route from other cranes. Once these birds learn the migration route from north to south, they subsequently migrate without human assistance and become members of a wild, free-living population, of which there are currently 78 members. Like the non-migratory flock, this flock is encountering reproductive challenges and research is underway to identify the limiting factors. FWC's contributions to the reintroduction of migratory whooping cranes consisted mainly of aerial tracking of birds wintering in Florida and advisory support. For more information on this reintroduction, visit http://www.bringbackthecranes.org/.

**Wood Stork** (*James Rodgers and Morgan Wilbur*)

The wood stork once was a common breeding species throughout the southeastern U.S., but declines in the species range and population occurred during the mid 1900s. The U.S. population was listed as Federally endangered in 1984 and is also State listed as endangered.

Wood Storks within the St. Johns River Water Management District of North and Central Florida – The primary objective of this study was to gather productivity (reproductive success) data for storks nesting within the St. Johns River Water Management District (SJRWMD) to determine if the stork population in the U.S. meets criteria for reclassifying the species. The data collected was compared with the reproductive success of other North and Central Florida stork colonies within and among colonies and years.

The objective of this study was to monitor the nesting of wood storks within the St. Johns River Water Management District (SJRWMD) of Florida and determine what types of wetland habitat surrounding each colony were associated with greater productivity. The average number of birds produced per nest in North and Central Florida was 1.49 fledglings for 11 colonies monitored during 2004-2008. For successful nests only, the average fledging rate was 2.26. The greatest fledging rates tended to be in the northern part of the District. Among years, 2005 had the lowest rate while 2006 had the highest yearly rate. Very successful colonies had fewer nests that produced no birds and more nests that produced two or three fledglings. All colonies exhibited considerable variation in nest numbers among years, especially in 2007 when many colonies were either inactive or exhibited the fewest nests among years. Inactivity for multiple years or colony abandonment was characteristic of several colonies. The types and area of wetlands available to foraging storks varied within three, six, and 19 mile radii around each colony. Amount of rainfall and area of freshwater marsh surrounding a colony were associated with higher fledging rates and larger number of nests.

Follow-up studies are recommended to identify important foraging sites in these preferred habitats around each colony to support the conservation of these wetlands. This project was completed on June 30, 2008 and results can be accessed at http://research.myfwc.com/features/view_article.asp?id=33181.

L. Kirk Edwards Wildlife and Environmental Area in Leon County – Lower Lake Lafayette located within the L. Kirk Edwards Wildlife and Environmental Area (WEA) in Leon County is home to a wood stork colony. In an effort to monitor whether the colony is active or inactive from year to year and determine the approximate number of nests, FWC implemented the first annual fly over of the colony on June 3, 2009. The fly over was done from a helicopter at an altitude of approximately 600 feet (183 m) to avoid disturbing the nesting birds. There was estimated to be 150 wood stork nests in the colony. Conversations with other FWC staff indicated that the colony had been inactive from 2007 through 2008 due to dry conditions and that the colony had contained as many as 300 nests in the past.

**Wading Birds** (*Justin Ellenberger, Alex Pries, Justin Davis, Derek Fussell, Morgan Wilbur, Valerie Sparling, Michael Baranski and Laura Morse*)

Guana River Wildlife Management Area in St. Johns County – FWC began a monitoring effort during FY 2008-09 to document species, spatial distribution, and relative abundance of

wading bird species on the 2,400-acre Guana Lake impoundment within Guana River Wildlife Management Area (WMA). Several State and Federally listed species including limpkin, reddish egret, snowy egret, little blue heron, tricolored heron, white ibis, wood stork, roseate spoonbill, and osprey are known to use Guana Lake either seasonally or throughout the year. Monthly transect surveys were used to quantify these species and other wading birds occurring on the lake. Over time, these surveys will help managers develop a better understanding of how management practices alter habitat structure and availability for this group of birds. In addition to providing habitat for wading bird species, Guana Lake also provides wintering habitat for migratory waterfowl and foraging habitat for migratory shorebirds during the spring/fall months.

Carter Tract of Econfina Creek Wildlife Management Area in Washington County – Numerous wetlands and water bodies present on the Carter Tract of Econfina Creek WMA provide excellent nesting habitat for the many species of wading bird found in the Florida Panhandle, most of which are listed. In particular, one rookery has been observed supporting nests for various species of colonial-breeding wading birds. Species of special concern that have used this rookery in previous years include the little blue heron and tricolored heron. In April – July 2009, this rookery was monitored weekly to document the number of individuals present, as well as number of nests and nest success. Little blue herons were documented using the rookery this year. Federally and State listed wood storks have also been documented foraging on area ponds throughout the year. All waterways on the Carter Tract will be surveyed annually for possible wading bird breeding activity. The existing rookery will be monitored monthly during the breeding season (March – July) to document species present, number of birds, and nesting success.

Apalachicola River Wildlife and Environmental Area in Gulf and Franklin Counties – The Apalachicola River Wildlife and Environmental Area (WEA) in Gulf and Franklin counties consists of a matrix of upland, wetland, and riverine habitats that potentially contain several rare or threatened species. The numerous wetlands provide habitat for several listed species of colonial wading birds, including the tricolored heron, little blue heron, snowy egret, white ibis, and wood stork. In order to monitor the relative success of wading bird populations in the area, an annual aerial rookery survey is conducted in the spring of each year. Aerial transects were flown within the lower Apalachicola River basin on April 27, 2009, June 15, 2009, and June 16, 2009. No listed species were located during the course of the survey.

Aucilla Wildlife Management Area in Jefferson and Taylor Counties – Aucilla WMA consists of numerous wetlands that provide habitat for several listed species of colonial wading birds, including the little blue heron, snowy egret, tricolored heron, white ibis, and wood stork. In order to monitor the relative success of wading bird populations in the area, an annual aerial nest colony survey is conducted in the spring of each year. Aerial transects were flown on April 28, 2009 and June 3, 2009. Transects are 0.5 miles apart and are flown at an altitude of 300-400 feet. Of six previously identified wading bird colonies, four were active. No new colonies were found during the aerial survey. One of the two inactive colonies was identified as a new colony in April 2008 and is located approximately 1.5 miles from a colony that was active for several years until 2008 when it was inactive. It is possible this group of birds moved due to dry conditions. In 2009, the old colony was active again and the colony discovered in 2008 was not. Another colony that was inactive in 2008 due to dry conditions was active again in 2009. The

wading bird colonies are typically mixed with listed species and non-listed species such as yellow-crowned night-herons. A yellow-crowned night-heron colony was documented while traversing the Western Sloughs on foot.

John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area and J.W. Corbett Wildlife Management Area in Palm Beach County – The 2500 acre marsh on the John G. and Susan H. Dupuis, Jr. WEA provides good habitat for many species of wading birds. Monthly roadside visual surveys conducted since 1996 have documented non-listed great blue herons, great egrets and tricolored herons , as well as listed species such as little blue herons, snowy egrets, white ibis, and wood storks. The marsh and other wetland areas at Dupuis will be surveyed monthly to document wading bird feeding and breeding activity. Aerial wading bird rookery surveys were conducted by helicopter at J.W. Corbett WMA in Palm Beach County, but presumably due to drought conditions during the breeding season no sites were active this year.

Florida's State Wildlife Grants Program – Dr. Dale Gawlik, Florida Atlantic University, is evaluating the environmental conditions needed for the successful conservation of wading bird populations within the Everglades ecosystem. Wading bird populations have declined by 70% in South Florida since the 1930's. More specifically, the numbers of wood stork and white ibis nests in the Everglades have decreased by 78% and 87%, respectively. These declines are a consequence of altered water quantity, movement, distribution, and quality that affect the birds' ability to search and find food and hence reproduce. The project examines these relationships using information from aerial wading bird surveys conducted during breeding season, long-term nest counts, a water depth model, and wetland vegetation and prey distributions. Results will be applied in the development of a GIS tool for predicting habitat suitability for selected wading birds in response to habitat conditions. Ultimately, the study will aid managers in conservation of wading bird populations while restoring the Everglades. Additionally, the results can be used in other restoration programs.

**Marsh Birds** (*Michael Baranski and Pam Boody*)

Surveys were conducted according to the National Marshbird Monitoring Program Protocol using a call/playback method. Species detected during surveys were ranked according to abundance estimates.

J.W. Corbett Wildlife Management Area in Palm Beach County – FWC conducted presence/absence surveys of marsh birds that consisted of four routes set up along roads/trails where wetlands were present. Each route comprised eleven points approximately 2460 ft (750m) apart and was surveyed three times from March – June. The limpkin (species of special concern) and the sandhill crane (State threatened species) accounted for 18% of all marsh birds detected during the surveys. Marsh bird species are water dependent and were almost completely absent from the area during April surveys due to drought conditions.

Jones/Hungryland Wildlife and Environmental Area in Martin and Palm Beach Counties – Marsh bird surveys consisted of three routes set up along roads and trails where wetlands were present. Each route contained 13 survey points and was surveyed four times from March – July. Abundance estimates are as follows according to highest detection rates: common moorhen,

pied-billed grebe, limpkin, sandhill crane, least bittern, and purple gallinule. Limpkins were commonly detected throughout the survey. Species absent from surveys included king rail and black rail. Marsh bird species are water dependent and were almost completely absent from the area during April surveys due to drought conditions.

**Shorebirds** (*Laura Morse*)

Florida's wildlife habitats are facing unprecedented challenges ranging from climate change to a rapidly expanding human population. Nowhere are these challenges more concentrated than along the state's coastline. Survival of Florida's vulnerable seabirds and shorebirds (e.g. snowy plover, least tern, roseate tern, black skimmer, American oystercatcher) are dependent on community-based conservation that recognizes both the economic and wildlife values of coastal habitats. This type of conservation cannot be accomplished by any one agency and requires the skills, experience and resources only a broad spectrum of partners can marshal.

Realizing this, FWC initiated a conservation approach for shorebirds and seabirds, which relies extensively upon partnership development and support. This project, which began in 2007, is funded by Florida's Wildlife Legacy Initiative (Federal State Wildlife Grants program). FWC staff members helped cultivate numerous local and regional partnerships to improve "on the ground" conservation through cooperative efforts between key agencies, organizations, and individuals involved with the management, monitoring, and stewardship of shorebirds and seabirds. In addition, a statewide partnership network titled the Florida Shorebird Alliance (FSA) was created to facilitate information exchange between partners, improve coordination statewide, and add more consistency to monitoring and management of Florida's shorebirds and seabirds.

By the end of the 2008 nesting season, partners within the network had contributed over 5,400 individual observations since 2005 to FWC's online shorebird/seabird database and from these reports over 170,000 nests were recorded. These data provide critical information on the occurrence and concentration of nesting shorebirds and seabirds in Florida, and also indicate that the network's coverage (i.e. level and extent of monitoring) is steadily increasing. Expanded coverage will continue to improve conservation planning and enable managers to be more effective and responsive at key nesting sites for shorebirds and seabirds.

Nongame Wildlife Grant – Julie Wraithmell, Audubon of Florida, is working with FWC and other partners to address the numerous declining populations of shore-dependent birds including the least tern (State threatened), black skimmer (species of special concern), American oystercatcher (species of special concern), and piping plover (State and Federally threatened). Audubon is working with the coordinator to build a volunteer monitoring network and expand shorebird and seabird monitoring throughout Florida's coastal counties. Audubon is recruiting, training and deploying a corps of at least 50 regular volunteers to monitor the numbers and locations of breeding, migratory and wintering shorebirds in coastal areas in Nassau, Duval, St. Johns and Flagler counties. Northeast Florida is known to present substantial challenges to these birds despite significant public ownership of coastal natural areas. The volunteer corps will help identify and prioritize potential habitats, identify threats to and management needs of resources, and assist land managers in the implementation of shore-dependent bird protections, such as stewarding colonies from disturbance on busy, warm-weather weekends. The work will better inform the on-the-ground management of shore-dependent birds on public coastal lands in

northeast Florida and coastal management decisions. Current funding is being provided through the State Wildlife Grants Program, however, after development of a successful program Audubon will coordinate with FWC to export it to other regions of the state using alternative sources of funding.

**Gopher Frogs** (*Kevin Enge, Sharon Hester and Gabriel Miller*)

The gopher frog is a species of special concern in Florida. During dipnet surveys for the striped newt, which has been proposed for Federal listing, gopher frog tadpoles were found in 36 ponds in Ocala National Forest in northeast Florida, two ponds in Seminole State Forest in northeast Florida, one pond in Osceola National Forest in north-central Florida (first occurrence recorded from there), and one pond in Jennings State Forest in north-central Florida. These represented the first gopher frog records from Osceola National Forest (only the second record from Baker County; the previous record was from 1921) and Seminole State Forest. Five gopher frog tadpoles rescued from a drying pond were donated to the Jacksonville Zoo, which had obtained an educational permit to exhibit them. FWC conducted reptile and amphibian surveys on five different management units of Big Bend WMA. FWC also completed a one-year drift-fence survey on the Hickory Mound Unit (November 2007 – November 2008) within two habitat types (mesic hammock and hydric hammock) and a four-month survey on the Spring Creek Unit (April – July 2009) in wet flatwoods, sandhill, and scrubby flatwoods. On the Spring Creek Unit, the drift-fence survey documented the gopher frog at one sandhill site, and a five-month frog-call survey found two gopher frog breeding ponds.

**Bog Frog and Okaloosa Darter** (*Stuart Cumberbatch, Barbara Almario and Jeffrey* Wilcox)

Nongame Wildlife Grant – Dr. James Austin, University of Florida, completed the second year of a four-year genetic study on Florida bog frogs (species of special concern) and Okaloosa darters (State and Federally endangered species). Genetic methods are being used to determine the status of the frogs and darters by examining then comparing the current location of the populations and the collected genetic information with maps developed to predict the presence or absence of the species. Despite some logistical delays during the year, preliminary data analyses and outlines for planned or ongoing analyses have yielded baseline genetic information for both species. Researchers are using the data to develop methods to examine population structure and connectivity along and between drainages where samples were collected.

Yellow River and Escribano Point Wildlife Management Areas in Santa Rosa and Okaloosa Counties – FWC began call surveys for the Florida bog frog on the recently acquired Yellow River and Escribano Point Wildlife Management Areas (WMA) in 2009. On Yellow River WMA, FWC surveyed ten points distributed along three creeks in May, June and July. On Escribano Point, FWC surveyed five points in May. Survey protocols are similar to those used by the U.S. Geological Survey North American Amphibian Monitoring Program. FWC documented bog frogs at one survey point in May and June of 2009 on Yellow River WMA. No bog frogs were documented on Escribano Point this year.

**Eastern Indigo Snake** (*Kevin Enge*)

Conservation and Management – The Eastern indigo snake is a State and Federally threatened species. Reports of indigo snakes on conservation lands were solicited from a variety of sources. A summary of the information revealed that indigos have been sighted on approximately 120 conservation lands since 2000, including two sightings from the Panhandle. FWC participated in site visits with U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (Corps), and South Florida Water Management District (SFWMD) to various Comprehensive Everglades Restoration Program (CERP) sites to ascertain their suitability for indigo snakes and for potential tracking studies. Tracking studies would involve implanting radio transmitters in indigo snakes and tracking them to determine their movements and habitat use before the CERP sites are flooded, and their movements and eventual fate after flooding. FWC reviewed USFWS's revised indigo snake recovery plan, provided USFWS with minimum and ideal site criteria for selecting suitable CERP sites for possible indigo snake telemetry studies, and provided a map showing indigo occurrence in the Everglades agricultural area based on conversations with snake hunters. FWC also provided assistance to Project Orianne, a privately funded indigo snake conservation initiative that contributed approximately $3.5 million to indigo snake conservation in the southeastern U.S. in 2008.

Research – FWC facilitated and participated in surveys by Project Orianne for indigo snakes using a trained Labrador retriever that can detect live snakes, shed snake skins, and snake feces. During trial runs in Georgia and Florida, the dog successfully detected approximately 90% of caged indigo snakes hidden above ground and in gopher tortoise burrows. Field trials with the dog looking for free-ranging indigo snakes at Merritt Island National Wildlife Refuge in northeast Florida, Chassahowitzka WMA in southwest Florida and Citrus WMA in north-central Florida in January 2009 were less successful. FWC and Project Orianne unsuccessfully searched for indigo snakes around gopher tortoise colonies at Pine Log State Forest in northwest Florida in December 2008. FWC collaborated on papers that summarized prey records for indigo snakes and examined growth rates from a mark-recapture study conducted in southeastern Georgia.

**Flatwoods Salamander** (*Bill Turner, Morgan Wilbur, Fred Robinette, Barbara Almario, Matthew Hortman and Norberto Fernandez*)

Flatwoods Salamander Taxonomic Change and Endangered Species Act Designation by U.S. Fish and Wildlife Service – The U.S. Fish and Wildlife Service (USFWS) officially sub-divided the flatwoods salamander into two species. Flatwoods salamanders in the population west of the Apalachicola River are now reticulated flatwoods salamanders and populations to the east are now frosted flatwoods salamanders. USFWS designated the reticulated flatwoods salamander as endangered, while the frosted flatwoods salamander will remain threatened. This taxonomic change has been widely accepted by the scientific community.

Aucilla Wildlife Management Area in Jefferson and Taylor Counties – Aucilla Wildlife Management Area (WMA) contains thousands of small, isolated wetlands. Historically, these ephemeral (short-lived) wetlands were fire-maintained natural communities with fire frequencies that varied according to the periods of time during which the sites are wet. The edges of these wetlands had a higher fire frequency than the interior. These ephemeral wetlands were critical

breeding habitat for the frosted flatwoods salamander. Past land management practices have severely degraded ephemeral wetlands across the WMA. Disturbances include rutting from logging activity, deposition of logging debris (i.e. windrows and push piles) and fire suppression. In an effort to restore ephemeral wetlands, FWC has attempted to burn them when conditions are favorable with mixed results. It is difficult to predict when a fire will carry through these shrub-dominated basins.

Through the WCPR workshop process, Strategic Management Areas (SMA) were identified for the flatwoods salamander. Approximately 93 acres (37.64 hectares) of ephemeral wetlands were identified within the SMA. In June 2009, work began to remove the invasive shrubs from the entire basin of treeless wetlands. The size of the wetlands within the project area ranged from 0.10 acres to 5 acres (0.04 hectares to 2.02 hectares). The goal of the project is to prevent re-sprouting of the undesirable hardwood vegetation, break up the organic layer and expose a substrate of mineral soil to be colonized by herbaceous vegetation. Herbaceous vegetation has been observed colonizing wetlands within days after treatment. The project is approximately 50% complete. Recent wet weather has inundated the wetlands and work has been suspended until they dry out again. In addition to restoring breeding habitat for flatwoods salamanders this project is expected to enhance habitat for wading birds and wood ducks.

Pine Log and Point Washington Wildlife Management Areas in Bay, Washington and Walton Counties – Sampling of potential breeding ponds at Pine Log and Point Washington WMAs continued from November 2008 – April 2009 in an effort to reconfirm the two known sites and possibly document new breeding populations. FY 2008-09's reticulated flatwoods salamander breeding season was again disrupted by drought conditions that continue to plague this portion of the Panhandle. Only two of the 234 ponds (118 classified as potential breeding sites) on Point Washington WMA and only one of the 44 ponds (31 classified as potential breeding sites) normally monitored on Pine Log WMA held enough water to be sampled with minnow traps and dip nets during winter and spring.

Because there was not enough rainfall to fill the ponds during the salamander breeding season, the focus this year was on drift-fence trapping (use of a fence to help guide a species into a trap by placing the trap against the fence) of adults. Drift fences were employed on 14 ponds classified as likely flatwoods salamander habitat on Point Washington and 13 ponds on Pine Log. Trapping occurred predominantly ahead of rain fronts, for a total of 282 fence-nights on Point Washington and 194 fence-nights on Pine Log. No flatwoods salamanders were captured.

FWC continued to work with Florida Department of Agriculture and Consumer Services (FDACS) to improve potential breeding pond habitat through prescribed fire, mowing and chopping. On the eastern section of Point Washington WMA, FWC in recent years had provided recommendations for mitigation practices, (mowing, burning or combinations of such), based on pond suitability criteria. These recommendations continued to be employed. The Management Plan for the Flatwoods Salamander on Pine Log State Forest (2002) and Management Recommendations for the Flatwoods Salamander on Point Washington State Forest (2005), developed by FWC, will continue to help guide conservation action for the species. The recent taxonomic change has elevated the conservation priority of these salamanders and highlights the need for more active management to avoid extinction. Moreover, this year the species received critical habitat designation by USFWS.

It has been suggested that successful management of habitat used by larval flatwoods salamanders requires control of woody vegetation and stimulation of herbaceous vegetation

within and around potential breeding ponds. This spring following the breeding season and with the historic confirmed pond on Pine Log WMA dry, larger woody shrubs were mechanically removed by hand to encourage herbaceous growth. This was followed in the summer by a growing season prescribed burn that further inhibited encroaching hardwood shrubs.

Considerations for the water hydrology and siltation of potential breeding ponds will be undertaken when forestry activity is conducted. With the nearly complete widening of U.S. Highway 79, which bisects Pine Log WMA, plans are to monitor how hydrology on the forest is affected. Several ponds ranked as "potential breeding ponds" touch the footprint of this widened highway.

Blackwater Wildlife Management Area in Okaloosa and Santa Rosa Counties – FWC has surveyed for reticulated flatwoods salamanders over the past several years. As of April 2009, there were no confirmed flatwoods salamander breeding ponds on the WMA. A three-year sampling protocol designed to survey and monitor 118 pond sites throughout the WMA was implemented in early 2007. Priority ponds are sampled annually, while potential breeding sites are sampled on a three-year cycle. Additionally, FWC located and sampled two new ponds, which were added to the potential breeding site sampling rotation.

Property containing a known flatwoods salamander breeding site and managed as the Yellow River WMA was recently incorporated in the Blackwater River State Forest. FWC samples this pond twice a year. In 2009, FWC located two more potential flatwoods salamander breeding ponds on Yellow River WMA. These ponds will also be sampled twice annually. FWC documented locations of several other ponds that should be sampled after surrounding habitat is improved. FWC will begin proactive management of this area in cooperation with the FDACS.

Apalachicola River Wildlife and Environmental Area in Franklin County – Pond surveys conducted in January 2009 were a follow-up and continuation of previous monitoring efforts initiated in 2002 – 2003. To date, no flatwoods salamanders, larvae or adults, have been found, although confirmed breeding populations have been located on Apalachicola National Forest (ANF). Habitat management activities included prescribed fire, mechanical treatments (i.e. mowing, gyro-tracing and roller chopping in the adjacent uplands) and restoring historic hydrologic function and water flow patterns.

Goethe Wildlife Management Area in Levy County – FWC currently assists the FDACS in attempts to document frosted flatwoods salamander populations. Surveys of potential breeding ponds were conducted but no flatwoods salamanders have not been documented in any surveys to date.

**American Crocodile** (*Lindsey Hord and Blair Hayman*)

The American crocodile is currently a State and Federally listed threatened species. Documented nests have increased from 20 in 1975 when it was Federally listed as endangered, to 120 in 2009. Crocodile occurrences have been documented as far north as Indian River Shores (Indian River County) on the east coast and Ellenton (Manatee County) on the west coast.

With the increasing crocodile population (estimated between 1,500 and 2,000 non-hatchlings), a commensurate increase in crocodile-human conflicts has been documented. FWC

manages these conflicts under a plan developed in May 2005 including FWC and crocodile experts from U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS), and the University of Florida. The plan provides guidance for dealing with all crocodile-human interactions and promotes public safety while recognizing the conservation needs of a listed species. FWC received over 80 complaints in FY 2008-09, slightly less than the number received in FY 2007-08. Most of these complaints were resolved through telephone calls and site visits. Ten animals were captured. Of these, eight were male and two were female. The males averaged 9.45 feet (2.88 m) in length, with the largest one being 11.32 feet (3.45 m) in length. The females averaged 6 feet (1.83 m) in length. Of the captured animals, six were translocated to canals in close proximity to the Southern Glades Wildlife and Environmental Area (WEA) and four were released at or near their capture location.

FWC was involved in the recovery of three carcasses. One of these was a headless, tailless carcass of a male crocodile at least 6 feet (1.83 m) in total length prior to death. This animal is believed to have previously frequented the University of Miami campus. The carcass was turned over to FWC Law Enforcement for investigation in conjunction with USFWS and the University of Miami Police Department. The investigation led to the identification of two suspects whose trials will be conducted during FY 2009-10. The carcass of an 11.25 feet (3.43 m) male crocodile was found floating in a canal; the cause of death appeared to be a wound from a spear or firearm. The third carcass was that of an 11.33 feet (3.45 m) male. This animal appeared to have died as a result of a vehicle collision, and was an animal about which complaints had been received in the past that resulted in it being relocated twice before.

**Alligator Snapping Turtle** (*Kim Sash*)

The alligator snapping turtle is a species of special concern in Florida. Because alligator snapping turtles are late to mature (10-15 years on average) and few hatchlings survive to adulthood, a monitoring program was established on the Apalachicola River Basin in September 2008. At that time, harvesting of alligator snapping turtles was legal and new regulations for banning their harvest had been proposed. Goals of the monitoring project include: documenting reproduction, recapturing marked individuals, and producing a population estimate. Two weeks of trapping were conducted and used as a training period to refine methods. Three hoop traps were set in various sloughs off the Apalachicola and Brothers Rivers. In total, five alligator snapping turtles were captured and marked. Basic biologic data was recorded on each individual including weight, sex, length and the general condition of the animal. The largest turtle was 62 pounds (28.1 kg) and the smallest was 0.5 pounds (0.23 kg). The average weight of turtles captured was 40 pounds (18.1 kg). Three of the turtles were females and two were males; all were healthy and in good condition. The monitoring program on the Apalachicola River Basin will continue into FY 2009-10.

**Gopher Tortoise** (*Deborah Burr, Joan Berish, Paul Moler, Shane Belson, Paige Martin, Jim Garrison, Allan Hallman, Scotland Talley, Fred Robinette, Barbara Almario, Justin Davis and Donald Lee Francis*)

Management – The gopher tortoise is a State threatened species. The Gopher Tortoise Management Plan was approved in September 2007. The overarching conservation goal of the management plan is to restore and maintain secure, viable populations of gopher tortoises

throughout the species' current range in Florida by addressing habitat loss. Specific objectives include increasing the amount of protected habitat; conducting appropriate vegetation management to maintain gopher tortoise habitat (e.g. prescribed burning); restocking tortoises to protected, managed, suitable habitats where densities are low; and decreasing tortoise mortality on lands proposed for development. Each objective provides benchmarks and measurements against which progress toward the plan's goal can be assessed.

A suite of conservation actions are proposed for the plan's first five-year cycle. The extensive series of conservation actions outlined in the plan fall under the following broad categories: permitting, local government coordination, law enforcement, habitat preservation and management, population and disease management, landowner incentives, monitoring and research, and public awareness.

FY 2007-08 marked a pivotal point in gopher tortoise permitting. The Gopher Tortoise Permitting Guidelines were approved by FWC's Commission in April 2008, with revisions approved in April 2009. FWC's new online gopher tortoise permitting system was launched in April 2009.

Aside from reducing the use of paper, this new system has enhanced communication between permit applicants and FWC by sending notices and requests for additional information online. Expedited review and issuance of gopher tortoise permits can be attributed to the system. By June 30, 2009, 190 permits had been issued via the online system. Other technological enhancements to the online permitting system include an eLearning course for homeowners who want to relocate tortoises, and a Google Maps permit locator tool.

Coordination within FWC and with other state and federal agencies has progressed substantially this past year. An interagency working group was formed to address restocking tortoises onto State public lands where populations have been depleted. FWC also continues to coordinate with public and non-profit organizations to encourage and provide incentives for gopher tortoise conservation on private lands.

Utilizing mostly contracted vendors, habitat management priorities for gopher tortoises were initiated and included prescribed fire or prescribed fire preparation activities benefiting over 42,000 acres of gopher tortoise habitat on public and private lands. FWC is using mapping tools such as Geographic Information Systems (GIS) to help identify areas that may require direct habitat management. This assessment tool is also utilized to determine the acreages of potential tortoise habitat throughout Florida.

FWC's Law Enforcement is essential to protecting and conserving gopher tortoises. A training manual for law enforcement recruits is under development, which will help inform FWC officers so that they can best address wildlife complaints related to gopher tortoises.

FWC continues to work with stakeholders throughout the implementation of the Gopher Tortoise Management Plan. The continued interest and participation of stakeholders in the implementation of the management plan is important to the long-term conservation of the species.

FWC is working with local government representatives to assist in the development of policies, ordinances, and land development codes that encourage protection of gopher tortoise habitat at the local level. All of these efforts are critical to the success of the management plan and the overall conservation goal for gopher tortoises in Florida.

Lastly, an educator's curriculum that follows Project WILD standards and meets Sunshine State Standards for K-12 schools in Florida will be presented at an upcoming annual educator's conference.

Wildlife Management Area and Wildlife and Environmental Area Activities – In 2008, the South Florida Water Management District (SFWMD) contracted to use a tracked vehicle with a mulching head to shred upland habitat at the CREW Wildlife Environmental Area (WEA) in Lee and Collier counties. The project served a dual purpose of increasing firebreak width and opening habitat for gopher tortoise foraging and burrow construction. Land to be mulched was surveyed for tortoise burrows. To protect tortoises, a circle of vegetation 20 yards in diameter was left intact around each burrow that appeared to be active or in "usable" condition. Approximately ten acres of pine uplands were mulched during this project. Mulching was completed during the summer growing season. There was little re-sprouting during the non-growing season (winter) and growth the following spring included more herbaceous plants for tortoises to eat.

FWC provided assistance to Camp Blanding Joint Training Center personnel regarding relocation of gopher tortoises from a site selected for development of an ammunition supply facility on Camp Blanding Wildlife Management Area (WMA) in Clay County.

Activities to enhance habitat for gopher tortoises on Jennings State Forest WMA in Clay and Duval counties consisted of two projects contracted out to private vendors. The first treated 125 acres of sandhill habitat. The goal was to mechanically cut down and immediately treat with herbicide all turkey oaks greater than four inches in diameter at breast height in order to stimulate regeneration of ground cover plant species and restore wiregrass. The second project treated 144 acres of sandhill habitat. The goal was to remove all sand pine trees in the designated area to within 3" of ground level in order to stimulate regeneration of ground cover plant species and restore wiregrass.

FWC provided assistance to Florida Department of Agriculture and Consumer Services (FDACS) and Suwannee River Water Management District (SRWMD) by surveying gopher tortoise burrows on the Twin Rivers State Forest in Suwannee and Hamilton counties. Surveys were conducted on a 1,105-acre portion of the Ellaville Tract and a 193 acres (78 hectares) portion of the Blue Springs Tract. The surveys resulted in an estimate of 2.38 tortoises per acre on the Ellaville Tract and 2.21 tortoises per acre on the Blue Springs tract. These estimates confirmed that gopher tortoise habitat on Twin Rivers State Forest is currently occupied by a robust population. These surveys provided the FDACS and SRWMD with a population status assessment to inform land management decisions on the two tracts.

FWC contracted for heavy mowing of shrubs and hardwood tree species in the understory of the mature pine forest on the Blue Springs Tract of Twin Rivers State Forest in Hamilton County in order to stimulate growth of ground cover plant species and facilitate prescribed burning. The total area treated was 400 acres (162 hectares).

FWC has been surveying, monitoring, and assessing the status of the gopher tortoise on Point Washington WMA in Walton County since 1993. FWC has also been conducting gopher tortoise surveys on Pine Log WMA in Bay and Washington counties each spring since 2004 Aerial photographs were used to identify suitable gopher tortoise habitat and identified sandhills were systematically surveyed for the presence of gopher tortoise burrows. Point Washington WMA's sandhill habitat is grouped into 33 clusters, and Pine Log WMA is grouped into 14 clusters. Clusters were primarily delineated for devising management options. Burrows are classified as active, possibly active, inactive, or abandoned. Using burrow widths, the burrows are further grouped into size class categories. Burrow locations are recorded using GPS units, and the data points are downloaded into ArcGIS® mapping software. Data collected each year provides practical comparative information used to determine population trends and demography

of the gopher tortoise populations within the WMAs. Working in cooperation with the FDACS, the lead management agency, habitat improvements are being prescribed and implemented. Prescribed fire continues to be the preferred management strategy, although herbicide has proven to be an effective tool on some sandhill habitat to control encroaching scrub oaks where prescribed fire is ineffective. Sand pine removal is an additional high priority objective in restoring these areas for gopher tortoise repatriation.

FWC continued a multi-year comprehensive burrow survey of the gopher tortoise population, designed to evaluate the entire 200,000 acres (80,937 hectares) of Blackwater WMA. The purpose of the survey was to provide FDACS, the lead land manager on the area, with habitat improvement recommendations. Burrow activity was defined by FDACS compartments, so that habitat improvement recommendations could be more easily translated into management actions. As of August 2009, FWC have surveyed three management units and found over 2,000 burrows.

Gopher tortoise surveys and monitoring continued between May and June 2009 on the Carter Tract of Econfina Creek WMA in Washington and Bay Counties. The 2,100-acre tract contains about 1,200 acres (486 hectares) of sandhill uplands. The monitoring protocol established for Point Washington WMA in Walton County was followed. Surveys yielded 270 total burrows, with 45 (15%) classified as active or possibly active. Habitat improvement activities since 2007 include prescribed burning, scrub oak reduction, removal of sand pine and slash pine plantations, and planting of longleaf pine and wiregrass. Surveys will be conducted annually between May and October. Future work will provide comparative data on tortoise population trends within the Carter Tract following land management and mitigation strategies.

Mitigation Park Program – FWC's Mitigation Park Program began as a pilot initiative in 1988. It was developed with the primary goal of improving the biological effectiveness of listed species habitat protection efforts required for new land developments by state and federal regulations. The program increases the biological value of mitigation by consolidating habitat protection areas into larger tracts, implementing listed species habitat management plans, and providing for permanent management by endowing each facility with a dedicated funding source. Primary management emphasis at mitigations parks is gopher tortoise habitat enhancement and restoration. To date, 14 mitigation parks totaling 15,320 acres (6,200 hectares) have been established in Duval, Clay, Hamilton, Gilchrist, Lafayette, Alachua, Hernando, Orange, Osceola, Polk, Hillsborough, Manatee, Highlands, and Lee counties.

In North Florida during FY 2008-09, growing season controlled burns were used to maintain and enhance 1,406 acres (569 hectares) of sandhill habitat at Suwannee Ridge WEA in Hamilton County and 764 acres (309 hectares) of sandhills at Fort White WEA in Gilchrist County. Dormant season controlled burns were completed on 166 acres (67 hectares) of sandhill habitat at Branan Field WEA in Duval and Clay counties.

In north-central Florida, at Bell Ridge Longleaf WEA in Gilchrist County, chainsaw crews were used to reduce the small oak mid-story on 340 acres (138 hectares) of sandhill habitat. An additional 65 acres (26 hectares) of small oaks were treated with Velpar-L herbicide. At Watermelon Pond WEA in Alachua County, exotic pasture grasses were treated with herbicides on 84 acres (34 hectares) of pasture and 34 acres (14 hectares) of pine plantation as a first step toward the reintroduction of native ground cover species to these areas. These restoration actions will enhance habitat conditions by improving habitat structure and promoting the conservation of native herbaceous ground cover species.

In Central Florida, 290 acres (117 hectares) of mesic and scrubby flatwoods at Split Oak Forest WEA in Orange and Osceola counties received growing season controlled burns, and another 27 acres (11 hectares) of flatwoods were mowed to improve habitat structure and fuel conditions. At Crooked Lake WEA in Polk County, exotic plant infestations on 150 acres (61 hectares) were treated using mowing and subsequent herbicide applications. In addition, mechanical treatments were applied to 100 acres (40 hectares) of overgrown pine flatwoods and scrub. At Bullfrog Creek WEA in Hillsborough County, growing season controlled burns were completed on 473 acres (191 hectares) of mesic flatwoods. Palmettos were mowed on 100 acres (40 hectares) of pinelands to improve fuel conditions for subsequent controlled burns. At Moody Branch WEA in Manatee County, dormant season controlled burns were applied to 136 acres (55 hectares) of scrub and scrubby flatwoods, successfully removing high fuel loads in gopher tortoise habitats.

In south-central Florida, growing season controlled burns were conducted on 160 acres (65 hectares) of pine flatwoods at Platt Branch WEA in Highlands County and saw palmetto mowing was completed on another 100 acres (40 hectares) of flatwoods habitat. At Hickey Creek Mitigation Park WEA in Lee County, 108 acres (44 hectares) of mesic and scrubby flatwoods received mechanical treatments to remove excessive understory and canopy hardwoods. These treatments will be followed by controlled burning.

Research – Although a number of short-term studies have been conducted on gopher tortoises during the last several decades, information regarding long-term population changes and habitat use is lacking. The gopher tortoise has declined throughout Florida, in large measure due to conversion of upland habitats to a variety of human uses. As tortoises are displaced by land development in peninsular Florida, there is a strong temptation to relocate those tortoises to areas of the Panhandle providing suitable habitat but supporting few, if any, tortoises. This raises a number of concerns regarding transmission of diseases and genetic disruption of resident tortoise populations. An early genetic assessment of tortoise populations in Florida identified three genetic groups: Panhandle, Brooksville Ridge, and Peninsula (other than Brooksville Ridge). A later study using more sophisticated genetic tools identified additional genetic subdivisions within peninsular populations, but included only one sample from the panhandle (Wakulla County). A current FWC study gathering data on the genetics of Panhandle tortoise populations will be combined with previously published data to provide a more complete picture of the genetic structure of Florida gopher tortoise populations.

A total of 41 blood samples were collected in FY 2008-09. Samples were collected from 36 tortoises trapped in Bay (Pine Log State Forest), Gadsden (Joe Budd Wildlife Management Area), Liberty (The Nature Conservancy's Apalachicola Bluffs and Ravines Preserve), Okaloosa (Blackwater Wildlife Management Area and Eglin Air Force Base), and Washington (The Nature Conservancy's Rock Hill Preserve) counties. In addition to those samples, blood or tissue was collected from three road-killed tortoises in Columbia, Madison, and Washington counties, one tortoise from Lafayette County, and one tortoise provided by a wildlife rehabilitator in Washington County. Genetic analyses are being conducted by Dr. Colleen Sinclair of Towson University.

Since the gopher tortoise is a slow-growing species estimated to live 40-60 years, short-term studies provide only a snapshot of the changes in a particular tortoise population. Additionally, the ways in which gopher tortoises distribute their burrows across a landscape over time, and especially how they respond to changes in their habitat, are poorly understood. To

help fill this information gap, a follow-up study was conducted on a planted pine site near Cross Creek, Florida. Previous multi-year surveys were conducted on this site during the 1980's and a single-year follow-up survey was undertaken in 1992. Recent beneficial management included a 2008 pine thinning and a winter 2009 prescribed burn. Gopher tortoise burrows were located during spring 2009, and tortoises were captured in bucket traps or wire traps during May and June. Unseasonably heavy rains during May flooded portions of the study site and made trapping tortoises a challenge. Fifty-two tortoises were captured on the study site. Seventeen tortoises had been previously marked, including a male that had been initially marked as a mature adult in 1982. Most marked individuals were in the same approximate location as during earlier surveys, despite the forestry-related habitat changes over time.

Studies initiated in FY 2008-09 include research on the use of temporary enclosures; genetics of Panhandle tortoises; population dynamics of wild tortoises; and the effect of cattle grazing on gopher tortoise stocking capacity. A much anticipated manuscript on Upper Respiratory Tract Disease has been submitted and is currently under review for publication. These studies will further provide insight on gopher tortoise relocation and, as a result, increase the success of tortoise relocations throughout Florida.

**Marine Turtles** (*Robbin Trindell, Anne Meylan, Allen Foley, Blair Witherington and Beth Brost*)

Management Activities – There are five species of marine turtles that are State and Federally protected in Florida: loggerhead (State and Federally threatened), green (State and Federally endangered), leatherback (State and Federally endangered), hawksbill (State and Federally endangered), and Kemp's ridley (State and Federally endangered) sea turtle. FWC continued to work with stakeholders throughout Florida to implement the State's responsibilities under the Marine Turtle Protection Act [§ 379.2431 (1), F.S.] and U.S. Fish and Wildlife Service's (USFWS) recovery plans for five species of marine turtle. FWC worked closely with the Federal government, State regulatory agencies, volunteer conservation groups, and local governments on the protection of threatened and endangered marine turtles and their critical nesting beaches, developmental habitat, and foraging habitat along Florida's coast. FWC continues to provide expertise for requests to conduct human activities that could affect marine turtles and their nesting and foraging habitats.

FWC reviewed approximately 212 projects and issued formal comment letters to Florida Department of Environmental Protection (FDEP), Water Management Districts, and the State Clearing House. Projects reviewed included Coastal Construction Control Line applications, Environmental Resource Permit applications, and Joint Coastal Permit applications. FWC participated with local governments, other state and federal agencies, and stakeholders in over 100 meetings on these projects and other issues involving marine turtles. FWC conducted more than 60 site inspections at the invitation of local governments and property owners related to environmental commenting responsibilities, including approximately 50 lighting inspections. FWC also participated in three administrative hearings.

FWC participated in more than 160 conference calls on marine turtle conservation issues and the development of two Habitat Conservation Plans (HCP) – the Walton County HCP and the statewide beaches HCP (in cooperation with the FDEP). The beaches of Walton County have been identified as important nesting habitat for sea turtles and over-wintering habitat for piping plovers. The County is seeking an incidental take permit because take of these species is

likely to occur as a result of shoreline protection activities initiated under the County's emergency authorization. An HCP is a statutory requirement of the incidental take permit process and must accompany an application for an incidental take permit. The Statewide Beaches Habitat Conservation Plan will assist the State of Florida in addressing potential impacts to Federally listed species related to the State of Florida's Coastal Construction Control Line permitting program. Examples of these activities include coastal development, coastal armoring, beach cleaning and raking, construction of dune walkovers and boardwalks, and beach berm and dune restoration. The HCP will help to address the conservation needs of State and Federally listed species, while coordinating and streamlining the regulatory requirements of Federal, State, county, and local municipal agencies.

FWC reviewed and approved approximately 189 applications for conservation activities with marine turtles, including nesting beach surveys, stranding and salvage work, research, public turtle walks, rehabilitation at captive facilities and informational displays. FWC also made presentations at six beach survey training workshops statewide. FWC authorized captive facilities to hold marine turtles for rehabilitation, for public awareness, or for research in Florida. FWC coordinated transfer and release of marine turtles during rehabilitation, supervised public marine turtle releases and conducted four facility inspections.

Currently FWC is administering three grants, including $416,000 from USFWS for Walton County's Habitat Conservation Plan; $47,292 from the National Fish and Wildlife Foundation for lighting improvements in areas impacted by the 2004 hurricanes; and $87,000 from the FDEP Coastal Zone Management Program for improvements in coastal armoring designs to minimize impacts to marine turtles and their nesting habitat. All requirements of a fourth grant from the Sea Turtle License Plate Program, used to purchase items such as LED flashlights and *Share the Beach* brochures for informational workshops, were completed. FWC was awarded another grant of approximately $25,000 by the National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA-Fisheries) to assist captive facilities in obtaining medical supplies for the treatment of injured and sick marine turtles. Grant management includes oversight of contracts to local governments and vendors as necessary.

FWC was invited to participate as an expert for USFWS and U.S. Army Corps of Engineers' (Corps) team on the Programmatic Biological Opinion for beach restoration and served on the following teams, working groups, and committees: Archie Carr Sea Turtle Refuge Working Group; FDEP's Turtle Friendly Berm Technical Advisory Group, Hard Bottom Technical Committee; Florida Department of Transportation's (FDOT) Emergency Response Contact List; NOAA-Fisheries' 2004 Hurricane Recovery Funds team; and the FDOT's Regional Endangered Species Team. FWC was also invited to present on marine turtle monitoring and permit conditions for beach nourishment to the Beach Management Committee created by the Legislature. The Beach Management Committee was formed during FY 2008-09 to review the effectiveness of Florida's beach management program.

For more information on FWC's Marine Turtle Protection Program, visit http://www.myfwc.com/seaturtle.

Research – FWC coordinated the Florida portion of the Sea Turtle Stranding and Salvage Network (STSSN), an 18-state program administered by the NOAA-Fisheries. The STSSN is responsible for gathering data on dead, sick, or injured (i.e., stranded) sea turtles. Documentation of stranded sea turtles provides information on mortality levels and is an important component of monitoring the status of sea turtle populations. Mortality factors for sea

turtles are also identified and monitored through the work of the STSSN.

A total of 1,592 dead or debilitated sea turtles were documented: 751 loggerheads, 678 green turtles, 68 Kemp's ridley, 39 hawksbills, eight leatherbacks, and an additional 48 sea turtles not identified to species. FWC reviewed and edited all submitted reporting forms, responded to or coordinated the response to approximately 1,300 reports of dead or debilitated sea turtles, transported 163 sick or injured sea turtles to rehabilitation facilities, and conducted necropsies on 162 carcasses. Florida stranding updates were provided weekly to NOAA-Fisheries for incorporation into the Sea Turtle-Shrimp Fishery Management Report. These reports are essential in identifying and characterizing any unusual sea turtle mortality events as soon as possible.

The population-monitoring program involves 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 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, assess data collection error rates, analyzes data trends, and serves as a clearinghouse for information on marine turtle populations and habitats. Two overlapping monitoring programs, the Statewide Nesting Beach Survey (SNBS) Program, initiated in 1979, and the Index Nesting Beach Survey (INBS) Program, started in 1989, have different objectives.

The SNBS Program 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 2008, 197 survey areas were monitored, comprising 817 miles (1,315 km) of beaches. Statewide, the program documented 61,457 loggerhead nests, 9,228 green turtle nests, 727 leatherback nests, four hawksbill nests and 13 Kemp's ridley nests.

The INBS Program collects more detailed data from a smaller set of index beaches. Surveyors identify each sea turtle track to species, identify the tracks as a nest or abandoned attempt, and locate nests within an approximate half-mile beach zone. Nests and nesting attempts have been monitored for 20 years at 478 index beach zones surveyed daily during each 109-day season (May – August), an effort that currently provides more than five million records in the INBS database total. Annual survey or training, on-site verification, and consistency of the methods used during the 20 years of the program and among the 246 miles (396 km) of index beaches, make the resulting database a representative assessment of sea turtle nesting. The program provides a reliable way to detect changes in the abundance of Florida sea turtles. In 2008, the program documented trends in nesting for loggerheads (declining), green turtles (increasing), and leatherbacks (increasing).

Most research on marine turtles has been conducted on the nesting beach although turtles spend only a small fraction of their lives there. Conservation efforts depend on a broad knowledge of population biology, life history, ecology, and migrations. Ongoing projects in the Western Florida Current, the eastern Gulf of Mexico, Florida Bay, and the Key West National Wildlife Refuge involve capturing live animals at sea. Studies target four species of marine turtles and several life history stages, and address population structure (including gender ratios), growth rates, genetic identity (to which nesting population do turtles belong), life history, health,

diet, habitat preferences, and migrations. FWC research on the first few months of a sea turtle's life is critical to understanding and managing threats to sea turtles as they leave Florida waters and circulate throughout the North Atlantic.

In June 2009, 94 loggerheads were captured during an eight-day sampling session in Florida Bay. All animals were measured and tagged. Fifty of these turtles were also brought back to a nearby land base for an endoscopic examination to determine gender. Forty of the turtles had been previously marked, providing data on growth and residency in Florida Bay. This project has been conducted continuously since 1990. Some individual turtles have now been captured numerous times over as many as thirteen years.

FWC studies the abundance, distribution, behavior, and diet of recent hatchlings and small juvenile sea turtles in open-ocean habitat off Florida's coasts. These turtles live in surface waters and occupy a pelagic stage (occupy deep ocean water) in sea turtle development that precedes a time when as larger immature and adult sea turtles, they will live primarily along the bottom of more shallow, coastal areas. 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. FWC 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. Twenty-seven sampling trips were conducted between May 2008 and August 2009. This effort continues a study in which 398 miles (635 km) of search transects were sampled between 2004 and 2009. On these search transects, a total of 487 turtles were observed: 336 loggerheads, 85 green turtles, 59 Kemp's ridley, and seven hawksbills. Survey locations included Gulf of Mexico waters offshore from Pensacola, Apalachicola, and Sarasota, and Atlantic waters offshore from Sebastian Inlet. Additional benthic-stage sea turtles recorded during this effort included 105 loggerheads, four green turtles, two Kemp's ridley, and two hawksbills between 2005 and 2008. Dead neonate sea turtles were recovered following storm events on Atlantic beaches. Of these, 181 loggerheads and 93 green turtles were necropsied and examined for their gut contents. A high proportion, approximately 92%, of these young turtles had ingested plastics or tar.

FWC served on several scientific advisory committees and governing boards including the U.S. Loggerhead Conservation Team, the Loggerhead Expert Working Group, the Carr Refuge Working Group, the Loggerhead Biological Review Team, the National Academies/National Research Council Committee to Review Sea Turtle Population Assessment Methods, USFWS International Working Group for the Conservation of the Northwest Atlantic Loggerhead Populations, university graduate committees, editorial boards, and the International Union for the Conservation of Nature's Marine Turtle Specialist Group. FWC reviewed all research-related proposals submitted for consideration by the small grants program of the Florida Sea Turtle License Plate.

For more information on the Marine Turtle Research Program, visit http://research.myfwc.com/features/category_main.asp?id=1289.

**Smalltooth Sawfish** (*Phil Stevens, Gregg Poulakis and Jeffrey Wilcox*)

Smalltooth sawfish is a Federally endangered species and were once common in the coastal and estuarine waters of the southeastern U.S., but during the 20th century they became rare throughout their North American range. Sawfish used to be found in the U.S. along the entire Gulf Coast, around Florida, up to North Carolina, but they are currently found only in

Florida from Charlotte Harbor in Charlotte County to the Florida Keys in Monroe County. This decline is attributed to two main factors: (1) bycatch in commercial and recreational fisheries, and (2) life history parameters that include late maturity and production of small numbers of young.

Conservation efforts directed toward smalltooth sawfish in the U.S. 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 based on large-scale declines in occurrence and a gross reduction of historical range. Despite the special concern for this fish, there is a lack of scientific information, making the implementation of conservation plans for this species difficult.

In November 2004, FWC initiated a long-term monitoring program specifically designed to collect data on the life history, biology, and ecology of the smalltooth sawfish. During FY 2008-09, two complementary sampling methods were used to collect smalltooth sawfish in the Charlotte Harbor estuarine system, which is located on the southwest Gulf coast of Florida. Monthly, directed sampling that targeted sawfish hotspots was conducted using a 600 foot (183 m) seine in the Caloosahatchee River in Lee County and in the Peace River in Charlotte County.

Thirty-eight smalltooth sawfish were captured and released, including six recaptures. A variety of data were taken on all sawfish (*e.g.*, lengths, rostral tooth counts), and each new animal was tagged and released. Total lengths ranged from 2.2 to 5.7 feet (671–1750 mm); all of these sawfish were immature. In addition, acoustic tags used by researchers to track fish movements were fitted to most of the sawfish. These tags remain with the sawfish for life and a tag reader can be carried by researchers to detect recaptures. Manual hydrophones are used for determining short-term, fine-scale movements and automated hydrophones listen for acoustic tags at moored stations 24 hours a day. Data obtained will help define activity space, home range, and the abiotic preferences of this species. This is a collaborative effort between FWC and other scientists.

One FWC staff is a member of the Smalltooth Sawfish Recovery Implementation Team. This group includes members with federal, state, academic, and non-profit affiliations and was assembled by the National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA-Fisheries) to implement the conservation plan for this species. Data from FWC's sampling are provided to the team as needed.

Information received via awareness efforts and research is compiled and archived as part of the National Sawfish Encounter Database. This database has been used by the Smalltooth Sawfish Recovery and Implementation Teams in a variety of ways, including proposal of critical habitat for the species. When citizens provide information on sawfish, FWC takes the opportunity to inform responders about the smalltooth sawfish and FWC's role in its protection.

FWC continued coordination with the National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA-Fisheries) in development of mutually-acceptable commenting recommendations and constraints, for appending to each Incidental Take permit issued by NOAA-Fisheries. Once mutually approved, this input will be included in NOAA-Fisheries' permits for projects occurring in Federally-designated smalltooth sawfish Critical Habitats or other Endangered Species Act, Chapter 7 consultations referent to smalltooth sawfish. Development of these consensus commenting recommendations will save time for both agencies and facilitate the speedy processing of such permits.

For more information on FWC's Smalltooth Sawfish Research and Monitoring program, please visit http://research/MyFWC.com/sawfish.

**Atlantic, Shortnose and Gulf Sturgeon** (*Jeffrey Wilcox and Stuart Cumberbatch*)

Atlantic Sturgeon Activities – The Atlantic sturgeon is a State species of special concern. The St. Marys River once supported a thriving commercial fishery for Atlantic sturgeon. There has been no report of a sturgeon being seen in the river in the past 50 years. FWC has been collaborating with multiple agencies to survey the river and develop a fishery restoration plan to return Atlantic sturgeon to the system. FWC continued collaboration with the Georgia Department of Natural Resources (GDNR), U.S. Fish and Wildlife Service (USFWS), the St. John's River Water Management District (SJRWMD), and National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA-Fisheries), as a primary member of the St. Marys Fishery Restoration Committee (SMFRC). FWC drafted the St. Marys River Fishery Management Plan for Atlantic sturgeon for the SMFRC based on an assumption that shortnose and Atlantic sturgeons no longer occur in this system. Staff represented FWC on the Atlantic States Marine Fisheries Commission (ASMFC) Sturgeon Technical Committee. NOAA-Fisheries continued funding for the University of Georgia to conduct year two of an estuarine/riverine survey to confirm the presence of shortnose and Atlantic sturgeons in the St. Marys River. Year one of this assay was initiated in FY 2008-09 once NOAA-Fisheries issued the necessary shortnose sturgeon collecting permit. In coordination with Florida Department of Environmental Protection (FDEP), the Georgia Environmental Protection Department, the U.S. Environmental Protection Agency (EPA) and the SJRWMD, the SMFRC continues to compile all agencies' water quality, flows and levels, point source discharges, reports of limestone outcroppings for spawning, and toxicity studies to attempt to characterize the entire length of the St. Marys River.

Gulf Sturgeon Activities – The Gulf sturgeon is a Federally threatened and State species of special concern. Between November 13, 2000 and January 1, 2001, 46 sturgeon were released into six separate habitat types in both reaches of the Hillsborough River at the head of Tampa Bay. During FY 2008-09, one severely decayed carcass from FWC's experimental stocking of Gulf sturgeon juveniles into the Hillsborough River near Tampa Bay was recovered, but tag recovery and identification was not possible. It is presumed by this time that all radio tags have reached the end of their battery life and are no longer transmitting, so only incidental live-capture or reported mortalities will reveal the future fate of the remaining released fish.

FWC continued to monitor the proposed Wiregrass Reservoir initiative in Dothan, Alabama, due to the potential impacts of damming the Little Choctawhatchee River on water quality entering the Choctawhatchee River, with its critical habitat designation for Gulf sturgeon and its importance to the remaining alligator gar in Florida.

Nongame Wildlife Grant – Dr. William Pine, University of Florida, completed his three-year study to reconstruct the historical population size of Gulf sturgeon in Florida. Using 20 years of sampling data along with historical landings from the late 19$^{th}$ and early 20$^{th}$ century, the researchers sought to address whether declines in the Gulf sturgeon population were caused by impacts to recruitment due to alteration of essential habitat, or intensive harvesting. To help answer these questions, population models were developed, using information from commercial landings and data from previously conducted studies, to assess the trends of the Suwannee River and Apalachicola River populations of Gulf sturgeon.

The final report that is currently being prepared will present the results from the refined models and will discuss the historical populations, and current estimated abundance, recruitment, and mortality of Gulf sturgeon in the Apalachicola and Suwannee rivers.

Shortnose Sturgeon Activities – The shortnose sturgeon is a State and Federally endangered species. The Florida Department of Agriculture and Consumer Services' (FDACS) Sturgeon Production Working Group reports the current and future status of sturgeon aquaculture in Florida. Several non-native species continue to be cultured, per FDACS Best Management Practices (BMP), but the group favors FDACS pursuing a second attempt at getting a legal exemption to the NOAA-Fisheries "no culture for foodstock" policy position for shortnose sturgeon. NOAA-Fisheries is lead agency on the endangered shortnose sturgeon and their position is that culture in Florida would increase the likelihood of poaching of this species in other states to sustain such a market for roe and meat; therefore, they denied the exemption. The Working Group believes that the best sturgeon species (both biologically and economically) to culture in Florida, considering the State's environmental constraints, will be the shortnose sturgeon, should FDACS pursue and obtain an exemption.

**Other Imperiled Fish** (*John R. Knight and Jeffrey Wilcox*)

During FY 2008-09 River Monitoring, a project funded under the Federal Wallop-Breaux Sport Fish Restoration Program, was initiated to monitor the status and trends of Florida's sportfish populations and associated fish communities. While imperiled fishes were not specifically targeted, collections and/or observations were made during this reporting period. All information gathered is critical for developing proper conservation and management strategies to protect Florida's sportfish populations and associated communities. Aside from research conducted to monitor sportfish species such as the shoal and Suwannee bass, there is no species-directed research investigating population trends and/or status of imperiled freshwater fishes in Florida.

Blackmouth Shiner – State listed as endangered in Florida, the blackmouth shiner was not encountered during FY 2008-09. Sampling was conducted within the known range of the species (Blackwater and Yellow River watersheds) in the Florida Panhandle. This species is difficult to monitor and warrants an alternative monitoring strategy to properly assess the population status and trend of the species. Known locations of blackmouth shiners have not been recently sampled and no new blackmouth shiners populations have been discovered since 2003.

Bluenose Shiner – State listed as a species of special concern, the bluenose shiner was collected from multiple locations. The species was collected from a single location from the Choctawhatchee River, at four locations from Holmes Creek (a tributary to the Choctawhatchee), and at least two locations from the Yellow River (data enumeration in progress). Sampling techniques used for Florida's River Monitoring project appear to be sufficient for collecting the species. Therefore, a population status and trend assessment may be possible in the future.

Saltmarsh Topminnow – State listed as a species of special concern, the saltmarsh topminnow is only known to occur in the Escambia River watershed in northwest Florida. The species was not collected by FWC during FY 2008-2009. Euryhaline species (species that tolerate varying levels of salinity) such as saltmarsh topminnows are rarely encountered in

freshwater habitats and sampling efforts were not confined to freshwater habitats. Additional research is needed to properly assess the status of the species in Florida

Shoal Bass – State listed as a species of special concern, the shoal bass is only known to occur in the Apalachicola River watershed in northwest Florida. The species was collected from the Chipola River (a tributary to the Apalachicola) during the previous year. Currently, FWC is working to determine age, growth, and exploitation rates for the species, as well as develop a population assessment. Shoal bass populations from the Chipola River appear locally abundant and secure, although fragmented from its source population (in Georgia and Alabama) due to Woodruff Dam. The dam represents a barrier to gene flow, making this species susceptible to catastrophic events, since no other significant population exists in Florida. Continued monitoring is needed to ensure persistence of the species in Florida.

Suwannee Bass – State listed as a species of special concern, the Suwannee bass is known to occur in the Ochlockonee, Wakulla, and Suwannee River watersheds in north-central Florida. This species was collected from the Withlacoochee River during the previous year (a tributary to the Suwannee River). Research is currently being conducted to investigate age, growth, and catch rates for the species from this river. A total of 141 individuals were collected during sampling. This species was present in all but one of 30 samples collected. Suwannee bass appear to be locally abundant and secure in the Suwannee River watershed, although continued monitoring is needed due to the species' highly endemic nature (restricted or peculiar to a specific area), making this species also susceptible to catastrophic events.

Crystal Darter – State listed as threatened, the crystal darter is only known to occur in the upper section of Escambia River system near Century, Florida. This species has not been collected in Florida since 2004 despite extensive sampling conducted within the assumed range. The status and population trend of the species is currently unknown, warranting a need for an alternative monitoring strategy for the species. Concurring with previous research, the species' classification needs to be re-evaluated.

Harlequin Darter – State listed as a species of special concern, the harlequin darter is only known to occur in the Escambia River watershed in northwest Florida. While restricted in range, the species is regularly collected from both tributaries and mainstream Escambia River when suitable habitats are present (submerged woody debris). Recent sampling efforts now indicate that the species is distributed throughout the Escambia River watershed. Due to this species' endemic nature, additional long-term monitoring is still needed to determine population trends for the species.

Tessellated Darter – State listed as a species of special concern, tessellated darters are only known to occur in the Ocklawaha River watershed (a tributary to the St. Johns River) in north-central Florida. Sampling conducted from this river did not yield any individuals. The species has not been collected in Florida since 2004, therefore the population status and trend of tessellated darters is unknown. Additional long-term monitoring is needed to properly assess the status of the species in Florida.

Commenting – FWC provided comment on numerous developments of regional impact, environmental resource permits, and joint coastal permit applications (housing developments, highway and bridges, beach renourishment, power plants, dredge and fill activities, dam removal, etc.) impacting State listed species. Many of the proposed activities had the potential to negatively affect State listed fishes by increased sediment loading, habitat alteration, water quality degradation, and/or direct take. FWC commented on activities involving: bluenose shiner, saltmarsh topminnow, Gulf sturgeon, Okaloosa darter, Southern tessellated darter, mangrove rivulus, and smalltooth sawfish.

**Miami Blue Butterfly** (*Ricardo Zambrano*)

The Miami blue butterfly is a State endangered species. 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. Currently, it is only found at two sites in extreme South Florida.

Staff developed a species management plan that was approved by the Commission in 2003. During FY 2008-2009, staff mostly worked on addressing Conservation Strategy #3 in the Management Plan. This strategy is to "Conduct scientific research to facilitate management actions." Most of the other conservation strategies in the management plan have been met or are in progress so FWC is closer to the Management Plan goal, which is to "Secure a stable or increasing population of Miami blues at a level that does not meet the criteria defining an endangered species."

Staff has partnered with several government agencies, nongovernmental organizations, and the University of Florida to protect and conserve this species. FWC has coordinated closely with the University of Florida, the National Park Service (NPS), and the Florida Department of Environmental Protection (DEP) for ongoing captive propagation and reintroduction efforts on the Miami blue butterfly. FWC, through the State Wildlife Grants program, is currently funding the University of Florida to conduct Miami blue butterfly population surveys and to examine their diversity at the Key West National Wildlife Refuge. FWC is assisting in the fieldwork for this study. FWC has a representative on the Florida Coordinating Council on Mosquito Control and on the Council's Imperiled Species Subcommittee. One of the main objectives of the Subcommittee has been to resolve issues and concerns between Mosquito Control districts and the release of Miami blue butterflies. FWC has also been coordinating with the DEP and the U.S. Department of Agriculture's Wildlife Services to remove non-native green iguanas from Bahia Honda State Park in Key West. Iguanas have caused a lot of damage to the butterfly's host plant that it relies on for food and shelter. To date over 70 iguanas have been removed from the park.

The Miami Blue Butterfly Management Plan can be viewed at http://myfwc.com/imperiledspecies/plans.htm.

**Panama City Crayfish** (*David Cook, Brad Gruver, John Himes and Tom Ostertag*)

The Panama City crayfish is a State species of special concern. The historic range of the Panama City crayfish is restricted to 51 square miles of the Bay County peninsula that includes Panama City and Lynn Haven. Urbanization and the alteration of natural wetlands (e.g. pine flatwoods prone to seasonal flooding) have eliminated the crayfish from most of the western and

central parts of its range. The species is now most commonly found in disturbed wetlands and roadside ditches that are vulnerable to continued habitat degradation. In accordance with the listing process (68A-27.0012 F.A.C.), a draft management plan for the Panama City crayfish was submitted to FWC Commissioners for consideration at its June 2007 meeting in Melbourne. At its December 2007 meeting, FWC Commissioners directed staff to suspend further listing action on the Panama City crayfish until the listing process has been revised. Therefore, completion and approval of the draft Panama City crayfish management plan is pending. The draft is available on FWC's website at http://myfwc.com/docs/WildlifeHabitats/Revised_Draft_PCC_Plan.pdf.

Highlights of the draft management plan include: (1) conservation objectives and strategies that, if achieved, will cause the Panama City crayfish to no longer meet the criteria for listing; (2) the inclusion of best management practices (BMPs) developed through considerable stakeholder input that enable road maintenance, development, silviculture, and other activities to proceed without the need for an incidental take permit if BMPs are followed; (3) a rule establishing a no-cost permit for crayfish recreational harvest that will enable FWC to collect information on the possible impact of this activity on the species; and (4) an implementation strategy and schedule.

Regional FWC staff addressed questions involving developments and other activities with possible impact to the Panama City crayfish, and made site visits to evaluate potential crayfish presence or habitat. In particular, FWC reviewed a number of Environmental Resource Permit applications. FWC consulted with the Florida Department of Environmental Protection (DEP), to whom the applications had been submitted and environmental consultants to provide guidance on proposed development projects and to prevent unauthorized taking of Panama City crayfish. Additional consultation and guidance was provided to Panama City and Bay County officials as needed. In conjunction with U.S. Fish and Wildlife Service (USFWS) and Biological Research Associates, FWC also evaluated a number of sites as conservation easements within the range of the Panama City crayfish, three of which were determined to provide suitable habitat. Arrangements are currently underway to relocate Panama City crayfish to these sites in an effort to increase the species' area of occupancy. Lastly, in conjunction with USFWS and ECO Consulting Group, LLC, regional staff is currently working to establish a mitigation bank to serve as an additional site to relocate Panama City crayfish.

Finalization of a Candidate Conservation Agreement with Assurances between FWC, USFWS, and the St. Joe Company is presently on hold due to the downturn in the economy. If approved and implemented, this incentive-based conservation agreement will establish a nearly 2000-acre "Panama City Crayfish Conservation Area" in the eastern part of the Panama City crayfish range, and guide habitat restoration and management activities that will enhance the long-term survival of the species.

**Florida Cave Crayfish** (*Kevin Enge and Paul Moler*)

Florida is home to 14 recognized species of cave crayfish (more than any other state). Because of common adaptations to a cave environment, many of these species are confusingly similar in appearance. This project uses genetic tools to assess the relationships among the recognized species and to identify the true diversity within the cave crayfishes of Florida. In order to identify those surface species from which the cave species have been derived, representative samples of surface species have also been collected. Although the project is not

specifically designed to address listed species, collections have included two State species of special concern – the Santa Fe Cave crayfish (also known as the Sims Sink crayfish) and the Black Creek crayfish.

Santa Fe Cave crayfish were caught in minnow traps set in The Nature Conservancy's Sims Sink Preserve in Suwannee County. A single leg or claw was collected for genetic analysis from seven of the 30 crayfish captured, and the crayfish were released otherwise unharmed.

The Black Creek crayfish is known to occur throughout the Black Creek drainage in Clay County. It has also been reported from Riley's Creek in Duval County, the only record from east of the Saint Johns River. Collections for this project have identified two additional localities east of the Saint Johns River, Corklan Branch and Big Davis Creek, both tributaries of Julington Creek in Duval County.

**Freshwater Mussels** (*Ted Hoehn*)

Mortality reconnaissance surveys for the purple bankclimber mussel (Federally threatened) and the fat three-ridge mussel (Federally endangered) were conducted through the summer of 2008 and spring of 2009. Significant mortality of purple bankclimber mussels was observed at River Mile 105 at Race Shoals in Gadsden County during the summer of 2008. Qualitative observations at Race Shoals showed an 80-90% loss of purple bankclimber individuals based upon the number of dead tagged specimens, large amounts of fresh shell material, and limited number of observed live mussels. Quantitative surveys of Race Shoals have been hampered due to a return to higher river flows.

FWC initiated age determinations of fat three-ridge mussels with the assistance of U.S. Fish and Wildlife Service (USFWS) staff from Panama City. Thin sections were cut from off the shells to conduct aging via growth ring analysis, similar to aging a tree. Split samples were sent to Dr. Wendell Haag at Mississippi State University for confirmation of growth ring analysis.

**Habitat Modeling** (*Beth Stys*)

Building upon the listed species potential habitat mapping work FWC did for the "Wildlife Habitat Conservation Needs in Florida" report, FWC developed Strategic Habitat Conservation Areas for 16 Federally listed species. Strategic Habitat Conservation Areas (SHCA) depict important habitat areas not currently protected. These FWC maps are based on potential habitat maps created for individual species, the results of Population Viability Analyses (PVA), and expert opinion.

FWC updated the Integrated Wildlife Habitat Ranking System (IWHRS) over the last year to keep the project up to date with available datasets. The IWHRS is a GIS assessment tool that ranks the Florida landscape based upon the habitat needs of listed and rare wildlife species as a way to identify ecologically significant lands in the state, and to assess the potential impacts of land development projects. The IWHRS incorporates a wide variety of land cover and wildlife species data and presents it in an easy to understand classification structure. The IWHRS was originally developed in 2001, and revised in 2007, 2008 and 2009.

**Wildlife Conservation Prioritization and Recovery** (*Dan Sullivan*)

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

During FY 2008-09, FWC completed five workshops covering six WMAs. The areas that were covered by a workshop include Half Moon WMA in Sumter County, Salt Lake WMA in Brevard County, Jones/Hungryland WEA in Martin and Palm Beach Counties, Chassahowitzka WMA in Hernando County, Apalachicola River WEA in Franklin and Gulf Counties, and Box-R WMA in Franklin and Gulf Counties. The Strategy for the Aucilla WMA in Jefferson and Taylor Counties was completed during this fiscal year, as were the Strategies for Half Moon WMA, Salt Lake WMA and Jones/Hungryland WEA. Strategies for Chassahowitzka WMA, Apalachicola River WEA and Box-R WMA will be completed during FY 2009-10.

The Program will continue to assess the changing needs of wildlife at the statewide level. Area-specific strategies are updated in conjunction with required updates to management plans.

**Coordination and Assistance** (*Brad Gruver, Erin Leone, Richard Kiltie, Kristin Rogers, Terry Gilbert and Joseph Walsh*)

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

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

The Imperiled Species Website is available at http://myfwc.com/imperiledspecies. Information was added, updated, or removed from the Website as necessary. The Website includes, among other things, copies of previous legislative reports, the updated list of imperiled

wildlife, information on listed species permits, listed species management plans, and the current status of the revisions to FWC's listing process.

Internal Project Support – Statistical and data management support for numerous FWC projects focused on threatened and endangered species and species of special concern. FWC contributed to: population trend analysis, monitoring, or assessment of American alligators, bald eagles, Florida scrub-jays, Southeastern American kestrels, round tailed muskrats, striped newts, gopher tortoises and beach mice; habitat selection and diet assessment for Florida panthers, impact of Florida panther genetic improvements, and feline leukemia virus (FLV) incidence in Florida panthers; habitat selection of Suwannee bass; movement patterns of juvenile American alligators, cannibalism rates, and egg viability; gopher tortoise respiratory disease incidence; indigo snake biology; whooping crane reproduction; and sea turtle stranding trends.

Reviews and Assistance for Transportation Projects – FWC performed a total of 59 reviews of highway projects in support of Florida Department of Transportation's (FDOT) Efficient Transportation Decision Making Process from July 1, 2008 through June 30, 2009. Each review included a biological assessment of the direct and indirect effects of the transportation project on imperiled bird, mammal, amphibian, and reptile species and their habitats. Recommendations were provided to the FDOT's seven Districts and the Turnpike Enterprise on methods to avoid, minimize, or mitigate these effects on listed species.

FWC also provided assistance through more than 305 phone calls, 460 e-mails, and 25 inter-agency coordination meetings statewide with State and Federal representatives of the Florida Department of Environmental Protection (FDEP), Florida Department of Agriculture and Consumer Services (FDACS), U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA-Fisheries), U.S. Army Corps of Engineers (Corps), Water Management Districts, and the Florida Department of Transportation (FDOT). This assistance was designed to reduce the adverse effects of specific highway projects on listed fish and wildlife species. Recommendations were related to road design issues, locations and design of Florida black bear and Florida panther wildlife underpasses, wildlife species occurrence information and field survey methodologies, wetland and upland habitat restoration strategies and techniques, and suitability evaluations of a moderate number of land parcels for mitigation through public land acquisition.

Land Use Planning Activities – FWC provided assistance to public and private land use planning activities that had the potential to impact imperiled wildlife species and their habitats. Assistance was provided both formally and informally through numerous letters, emails, and meetings. The content of consultations was based on established best management practices, species management guidelines, and GIS analysis. FWC assisted the FDEP and the five water management districts with Environmental Resource Permits and coordinated all reviews for FWC imperiled wildlife permits. FWC responded to 87 requests for assistance with formal consultation letters and to eight with informal consultations. Another 74 requests were reviewed but were deemed to have addressed wildlife issues appropriately and received no formal comments.

**Critical Wildlife Areas** (*Terry J. Doonan*)

Critical Wildlife Areas (CWAs) are established by FWC under rule 68A-19.005 F.A.C. to protect concentrations of listed and other important wildlife species from human disturbance during critical periods of their life cycles, such as nesting or maternity seasons. For each CWA, the boundaries and periods of time when portions of the area may be posted as closed to entry by people are defined in the CWA establishment order. FWC's regional species conservation biologists are responsible for evaluating needs for potential CWAs, producing or revising establishment orders for consideration by the Commission, and coordinating necessary management and monitoring activities for the wildlife populations using those areas each year. Management and monitoring activities are conducted with active participation of FWC law enforcement personnel and multiple partners including other State and Federal agencies, local governments, and nongovernmental organizations.

Managed areas within CWA boundaries are usually marked with posts and signs to identify the area, increase public awareness, and reduce disturbance to the fragile wildlife resources that are present there.

Active CWAs were monitored by FWC biologists and staff of management partners. Protection and monitoring efforts for listed species of shorebirds and seabirds at some CWAs have been improved through the work of partnership networks, which are organized through public awareness efforts by FWC and the activities of other member groups. FWC provides species expertise, assistance and available management and informational materials when partnering with other groups in these efforts.

Seventeen of the 20 established CWAs supported populations of important wildlife species during FY 2008-09 (Table 4). Almost all the active CWAs supported listed species, the most notable of which included: Alafia Banks in Hillsborough County (several wading bird species, American oystercatchers and brown pelicans); ABC Islands in Collier County (several wading bird species and brown pelicans); St. George Causeway in Franklin County (least terns); Big Marco Pass in Collier County (least terns, black skimmers, snowy plovers and wintering piping plovers); Fort George Inlet in Duval County (least terns and black skimmers); Myakka River in Sarasota County (wood storks), and Gerome's Cave in Jackson County (Southeastern myotis bats). Pelican Shoal in Monroe County had been the main nesting site in the U.S. for roseate terns, but was unavailable again this year because of severe erosion from hurricanes in previous years. Results show that CWA management is important for effective conservation of many species and is expected to be an ongoing priority for FWC.

Table 4. Critical Wildlife Areas (CWAs) that were established statewide in Florida in FY 2008-09, with relevant information about each.

| FWC Region<br>CWA name | County | Closure period | Primary taxa | Status[a] | Area within the established CWA boundary |
|---|---|---|---|---|---|
| **Southwest** | | | | | |
| Alafia Banks | Hillsborough | 1 Dec. to 1 Sept. | Herons, egrets, ibis, pelicans, spoonbills, oystercatchers, cormorants | 9,000 nests | 75 acres (30 hectares) |
| Little Estero Island | Lee | 1 April to 1 Sept. | Least terns, Wilson's plovers, snowy plovers | 54 nests | 25 acres (10 ha) |
| Anclote River Islands | Pasco/ Pinellas | 1 Feb. to 1 Sept. | Herons, egrets pelicans | Inactive[b] | 5 acres (2 ha) |
| Myakka River | Sarasota | 1 March to 1 Nov. | Wood storks, egrets, herons, anhingas | 175 nests | 1 acres (0.4 ha) |
| **North Central** | | | | | |
| Amelia Island | Nassau | 1 April to 1 Sept. | Least terns | 25 nests | 10 acres (4 ha) |
| Bird Islands | Duval | 1 April to 1 Sept. | Black skimmers, gull-billed terns, least terns, American oystercatchers | 50 nests | 2 acres (0.8 ha) |
| Fort George Inlet | Duval | 1 April to 1 Sept. | Royal terns, black skimmers, gull-billed terns, sandwich terns, laughing gulls | >500, ~20, 0, 5, >3,000 nests | 10 acres (4 ha) |
| **Northwest** | | | | | |
| Tyndall | Bay | Year-round | Least terns, black skimmers, snowy plovers, Wilson's plovers, American oystercatchers, piping plovers | 59, 0, 47, 27, 5 nests | 10 acres (4 ha) |
| Alligator Point | Franklin | 1 April to 1 Sept. | Least terns, black skimmers, snowy plovers, Wilson's plovers, American oystercatchers | 0, 0, 1, 5, 4 nests | 145 acres (59 ha) |
| St. George Causeway | Franklin | 1 April to 31 Aug. | Least terns, laughing gulls, royal terns, sandwich terns, American oystercatchers, black skimmers | 137, 3,747, 835, 128, 0, 0 nests | 32 acres (13 ha) |
| Gerome's Cave | Jackson | 1 March to 1 Sept. | Southeastern myotis bats | 15,000 individuals | 2 acres (0.8 ha) |
| **South** | | | | | |
| Deerfield Island Park | Broward | Year-round | Gopher tortoise | 7 individuals | 56 acres (23 ha) |
| ABC Islands | Collier | Year-round | Herons, egrets | 323 nests | 75 acres (30 ha) |
| Big Marco Pass | Collier | Year-round | Least terns, black skimmers, snowy plovers, Wilson's plovers, wintering shorebirds[c] | 185 tern, 138 skimmer, 2 Wilson's plover nests | 60 acres (24 ha) |
| Caxambas Pass | Collier | 1 April to 1 Sept. | Least terns, wintering shorebirds[c] | 170 nests | 1 acres (0.4 ha) |
| Rookery Island | Collier | Year-round | Herons, egrets, pelicans | Inactive | 5 acres (2 ha) |
| Bill Sadowski | Dade | Year-round | Shorebirds, herons, & egrets (foraging); blue herons | 1,000 individuals; 5 blue heron nests | 700 acres (283 ha) |
| Pelican Shoal | Monroe | 1 April to 1 Sept. | Roseate terns, bridled terns | Inactive | 1 acres (0.4 ha) |
| **Northeast** | | | | | |
| Jennings Cave | Marion | 15 Feb. to 31 Aug. | Southeastern myotis bats | Inactive | 1.9 acres (0.8 ha) |
| Matanzas Inlet | St. Johns | 1 April to 1 Sept. | Least terns, Wilson's plovers, willets | 209 tern, 4 plover nests | 28 acres (11 ha) |

[a]Counts or estimates of peak numbers of individuals and/or successful nests at each site during the closed period in FY 2008-09.
[b]Inactive means the site was either not used, or not available for use, by wildlife during FY 2008-09.
[c]Monitoring to count or estimate numbers of wintering shorebirds was not conducted.

**Florida's Incentive-Based Conservation Programs** (*Chris C. Wynn*)

In cooperation with U.S. Fish and Wildlife Service (USFWS), FWC has been working to implement the Landowner Assistance Program (LAP) since October 2003. Florida's LAP is a vital, natural resource-driven tool used to promote stewardship on private lands while also playing a fundamental role in the conservation of imperiled species. Florida's LAP is a voluntary cost-share program designed to provide assistance and financial support to private landowners interested in improving habitat conditions on their properties to benefit listed species. The Program's focal area approach ensures that Federally-funded dollars are being distributed in the most efficient and equitable manner possible on properties with the greatest potential benefits for listed species (Figure 2).

FWC biologists visited 32 private landowners and obligated $135,101 at a 50% cost-share rate to conduct practices across 12,154 acres (4,919 hectares) to directly benefit listed species. Some of the management practices that have been funded include prescribed fire, longleaf pine restoration, mechanical vegetation enhancement (mowing and disking), chemical vegetation enhancement (site preparation and control of invasive plants), and native grass and shrub restoration (Table 5).

Restored and conserved habitats include pine flatwoods, 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, gopher frog, Eastern indigo snake, Florida pine snake, white ibis, wood stork, little blue heron, red-cockaded woodpecker, sandhill crane, Southeastern American kestrel, crested caracara, Sherman's fox squirrel, and gopher tortoise.

In order to enlist private landowners in conserving imperiled species, funding for incentive based programs such as LAP must continue and be secured in the future. Please visit the LAP Website at www.myfwc.com/lap for more information.

Table 5. Habitat management techniques cost-shared during FY 2008-09 through LAP.

| **Habitat Management Techniques** | **Acres** | **Hectares** | **Dollars Obligated by LAP** |
|---|---|---|---|
| Prescribed Fire | 10,277 | 4,159 | $65,501 |
| Longleaf Restoration | 144 | 58 | $11,862 |
| Mechanical Vegetation Enhancement | 372 | 151 | $10,684 |
| Chemical Vegetation Enhancement | 592 | 240 | $23,253 |
| Native Grass Restoration | 57 | 23 | $3,285 |
| Native Shrub Restoration | 712 | 288 | $20,516 |
| **TOTAL** | 12,154 | 4,919 | $135,101 |

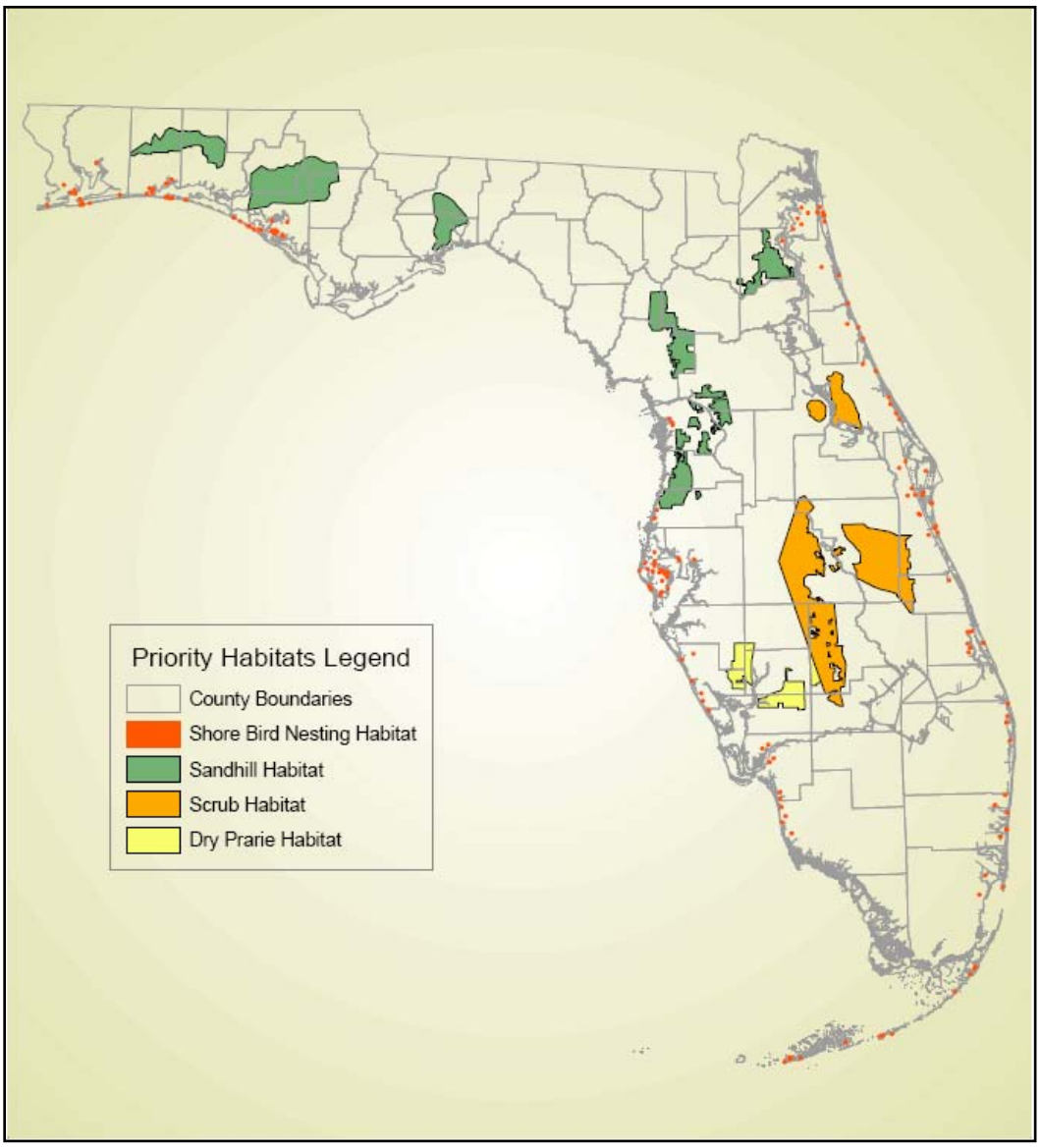


Figure 2. Landowner Assistance Program Focal Areas

**Law Enforcement** (*Captain Rob Beaton and Lt. Colonel Mike Wiwi*)

FWC's Division of Law Enforcement continued statewide enforcement activities to protect specific endangered and threatened species during the year. These special programs consisted of the following:

- Regular patrols of the Florida panther reduced-speed zones in Lee and Collier counties to protect panther and prey species, and provide public safety.
- Regular patrols in Monroe County as part of a multi-agency task force enforcing the Key deer speed zone on Big Pine Key.
- Patrol efforts targeting coastal nesting areas of marine turtles to reduce nest destruction and unlawful egg removal or theft.
- Patrol efforts targeting coastal nesting areas of birds to reduce nest disturbance, nest

destruction and incidental take.

- Enhanced statewide enforcement efforts directed towards utilizing radar and the Manatee Cam surveillance technology to ensure compliance with boat speed zones and to prevent manatee vessel strikes and manatee harassment. More than 50,000 water patrol hours were dedicated to manatee enforcement resulting in 1,346 citations, and over 2,763 warnings.

FWC's Division of Law Enforcement issued 38 additional citations separate from manatee, involving endangered, threatened, and species of special concern. The majority of these were for illegal take or possession of gopher tortoises.

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

**Permitting and Assistance** (*Angela T. Williams*)

FWC provided Federal agencies, other State agencies, environmental consultants, and regional and local regulatory authorities with assistance and guidance regarding protected and listed fish, bird and land dwelling species on managed lands and lands slated for development. Many of these entities in addition to researchers, landowners, and educational facilities utilized this assistance and guidance when applying for scientific collecting, captive possession, nest removal, wildlife relocation and incidental take permits for protected and listed species.

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 protected or listed species such as (1) life history and other biological information, (2) locality and occurrence data, (3) listing status, and (4) solutions to nuisance situations (i.e., public awareness on the species behavior and habitat requirements and suggestions for coexisting with the species).

Permits to handle or affect protected and listed species throughout the state are issued in accordance with Rules 68A-9, 68A-12, 68A-16, 68A-25 and 68A-27, F.A.C. Some permits required permit holders to carry out an approved site or species-specific management plan. Others required permit holders to follow FWC species guidelines, policies or management plans for the Florida burrowing owl, osprey, gopher tortoise, bald eagle, reticulated and frosted flatwoods salamanders, peregrine falcon, red-cockaded woodpecker, and Miami blue butterfly. Scientific permits (bird banding, voucher, salvage, collection of wildlife specimen and biological samples, possession) were conditioned on an approved research proposal. The permit review process usually involves coordination between FWC offices, environmental consultants, other State agencies, Federal agencies, and regional and local regulatory entities.

FWC assistance efforts resulted in thousands of telephone calls and hundreds of formal letters and emails. Additionally, 607 protected and listed species scientific collection, captive possession, wildlife relocation, nest removal, disturbance and incidental take permits, and 156 permit amendments were issued.

Overall, FWC provided science-based and regulatory guidance to ensure that the permitted activities would result in a net conservation benefit for the involved species.

Additional information including guidelines, policies, and applications is available on the Protected Species Permitting Website at http://myfwc.com/License/Permits_ProtectedWildlife.htm.

**Coastal Wildlife Conservation Initiative** (*Tom Ostertag*)

The Coastal Wildlife Conservation Initiative (CWCI) is a multi-agency effort (Florida Department of Environmental Protection, Department of Community Affairs, and the Institute of Food and Agriculture Services at the University of Florida) that began in May 2007 to address coastal issues that affect wildlife and habitat while considering human needs. Many species of wildlife are dependent on coastal systems including 17 that are State or Federally listed such as five species of marine turtles, five species of beach mice, and many shorebird species. Development of individual species management plans by FWC staff, partners and stakeholders is time intensive, and could potentially create conflicting recommendations for different species. The needs of wildlife and human actions are often in conflict as a result of Florida's growing population and the importance of coastal habitats to our economy. Additionally, emerging issues, such as global warming, habitat loss, and increasing disturbance in coastal areas, make addressing the coastal zone a priority. The CWCI will coordinate with on-going FWC efforts such as Florida's Wildlife Legacy Initiative, Cooperative Conservation Blueprint, Wildlife 2060, the Saltwater Hatchery and Habitat Initiative and the Climate Change Team to maximize our conservation efforts.

The CWCI will provide a mechanism to develop and coordinate links between existing programs and identify gaps where additional actions are needed. We often use the analogy of the tool shed: there are many important tools in the form of existing programs, but currently our 'shed' isn't organized in a way that allows landowners, managers, and agencies to survey all of the tools, and select the ones that they can best use to protect wildlife.

FWC has constitutional authority for managing wildlife in Florida. However, many regulatory and land management programs are housed within other state agencies, counties, and municipal governments. A successful CWCI will work to engage these groups in partnership in development and implementation of the Initiative. The goal is to develop an interactive process that agencies can use to address emerging issues, coordinate on existing issues, and provide greater consistency statewide to protect wildlife and human needs. The CWCI is currently focused on developing its framework and engaging partners. Addressing the specific issues will be part of the interactive process that includes identifying those issues and developing the necessary tools to address them.

The CWCI has worked on projects addressing issues such as beach driving, beach raking, posting in navigable waters, and the removal of beach wrack (seaweed line that is washed up on the beach that provides critical ecosystem services). A grant from the Wildlife Legacy Initiative (Federal State Wildlife Grants) was secured to hire a position to assist in coordinating the functions of CWCI.

## CITIZENS AWARENESS PROGRAM

Introduction (*Compiled by Judy Gillan. Information contributed by Wendy Quigley, Bonnie Abellera, Stan Kirkland, Karen Parker, David Telesco, Mike Orlando, Walter McCown, Barbara Almario, Tom Shupe, Andrea Boliek, Kristin Wood, Rebecca Brown, Ann Morrow, Ulgonda Kirkpatrick, Tera Meeks, Deborah Burr, Gabby Ferraro, Lori Haynes, Henry Cabbage, Wendy Dial, Carol Pratt, Mark Lotz, Harry Dutton, Kelly Broderick and Judy Gillan*).--Citizen awareness programs were conducted by FWC staff throughout the agency. The following text summarizes these efforts.

Media Relations – FWC issued 58 statewide news releases concerning 14 listed species, including the peregrine falcon (while the species was still listed), American alligator, bats, Florida manatee, coral reefs, osprey, Florida panther, American crocodile, Florida black bear, sea turtles, Gulf sturgeon and gopher tortoise. Some releases focused more broadly on marine mammals, nesting shorebirds or simply protected birds, and in one case the imperiled species listing process. Statewide news releases reach nearly 200 Florida newspapers and approximately 400 broadcast media, wire services, magazines, newsletters, freelance writers and untold individuals.

FWC staff distributed another 32 press releases and media alerts regionally on listed species including Florida panther, Florida black bear, Florida manatee, whooping crane, osprey, American crocodile, American alligator, sea turtles and Gulf sturgeon.

In addition to statewide and regional news releases, FWC responded to 803 media inquiries about listed species and participated in six radio and 12 television interviews about the American alligator, American crocodile and Florida panther. FWC provided assistance to production companies regarding North Atlantic right whales and Florida manatees.

Information Requests – "Ask FWC", the agency's electronic knowledge base system is now used to handle most of the routine imperiled species questions that come into the agency. This service provides the individual with an automatic response to their question and a link to FWC's imperiled species pages at http://myfwc.com/imperiledspecies/ for more information. Nearly 700 questions were answered through Ask FWC about American alligator, Florida manatee, Florida panther, sea turtles, Florida black bear, gopher tortoise, burrowing owl, Audubon's crested caracara, Southeastern American kestrel, osprey, whooping crane, brown pelican, wood stork, bald eagle, Sherman's fox squirrel, Key largo wood rat, Pine Barrens tree frog, American crocodile and Eastern indigo snake.

In addition, the Chinsegut Nature Center in Hernando County, Florida, answered an additional 20 telephone questions about gopher tortoises, sandhill cranes, whooping cranes, bald eagles, Florida scrub-jays and red-cockaded woodpeckers.

Manatee programs focused on continuing to provide information to various user groups including schools, children, boaters, tourists, marina owners, and law enforcement entities. A total of 150 phone or mailed requests for information were received and completed. Of these, 85 were requests for bulk orders of materials to be distributed through the requestor's organization.

Public information concerning marine turtle biology and important conservation issues such as turtle-friendly lighting, the threats from marine debris, and the importance of protecting nesting beaches continues to be a major focus of FWC's outreach efforts.

FWC responded to many requests for informational materials and provided copies of brochures, posters, rack cards and other information.

School-based Programs and Presentations – Several FWC researchers participated in the Pinellas County Great American Teach-In, in November 2008. Four participants spoke with students about manatees and one participant spoke with students about sea turtles.

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

FWC responded to 27 requests for informational materials concerning sea turtles as well as responding to requests for marine turtle decals (~20) and nesting signs (20). FWC created a colorful decal featuring a photograph of a loggerhead sea turtle at the water's surface. This decal, number 18 of a series, was distributed to local tax collectors offices across Florida. Funds from the sale of this decal support FWC's marine turtle program.

Educator Learning Kits – FWC has curriculum kits targeting teachers of middle to high school-aged students to teach them about Florida manatee and sea turtles. The kits provide lesson plans and activities, bones and biofacts, and different types of media to supplement the learning including books, videos, slideshows and computer activities. Efforts are underway to redesign the curriculum kits.

FWC Web Sites – FWC's Website, http://www.MyFWC.com, contains many pages about specific listed species such as Florida manatee, sea turtles, Florida panther, gopher tortoise, bald eagle, American crocodile, American alligator, Florida black bear, North Atlantic right whale and listed fish.

FWC hosts PantherNet on its main Website, http://www.MyFWC.com/panther, where teachers, students, and the public can get comprehensive information about the Florida panther. This year, PantherNet was completely revised with a new look including greater user ease and functionality. A section called *Field Notes* is published on PantherNet and it contains periodic entries of information from FWC biologists on panther births, deaths, capture activities, and other material of interest. Brochures, activities and annual reports are also posted and available for downloads.

New this year is a Website dedicated to bald eagles, http://myfwc.com/WILDLIFEHABITATS/Eagle_Index.htm, that includes the current management plan and permitting information. Another new Website promotes gopher tortoise conservation in Florida, http://MyFWC.com/GopherTortoise. The gopher tortoise Website provides easy access to information on the gopher tortoise management plan and permitting guidelines, answers to frequently asked questions, and informational publications. In addition, the Website provides access to the new gopher tortoise permitting site where individuals and organizations may apply for any of the available gopher tortoise permits online. The new online permitting system will help facilitate issuance of gopher tortoise permits and help reduce paper waste.

Public awareness efforts related to the American alligator include an Alligator Management Program Website, http://www.myfwc.com/WildlifeHabitats/Alligator_index.htm, where visitors can download the "Living with Alligators" brochure and a PowerPoint presentation.

Awareness efforts related to American crocodiles included the Crocodile Website, http://www.MyFWC.com/crocodile, where visitors can find information and download the "Living with Crocodiles" brochure.

*Wildlife 2060*: *What's at stake for Florida* is a new Website at http://www.myfwc.com/CONSERVATION/FWC2060_index.htm, that addresses the potential future impacts of Florida's continued human growth and development, and helps everyone understand what this means for Florida's fish and wildlife. Species discussed are Florida scrub-jay, Florida panther, Florida black bear, sea turtles, Florida manatee, corals, gopher tortoise, burrowing owl, wood stork and bald eagle.

FWC maintained the Scrub-Jay Website, http://share2.myfwc.com/scrubjay/default.aspx, a clearinghouse of information on upcoming events, working groups, funding opportunities, and options for habitat management and scrub-jay monitoring. FWC also continued to update a comprehensive scrub-jay bibliography.

The Manatee Mortality Database Web search, housed on FWC's Website at http://research.myfwc.com/manatees/, provides internet users a way to search for data on Florida manatee mortalities in Florida. The summary report allows users to search manatee mortality data by Florida county, probable cause of death, and month and year, while also providing more detailed information including sex, size and region in which the death occurred. A report is also provided that covers preliminary mortality data that is not included in the Web search option.

The reports are updated monthly or more often if needed. Web visitors can subscribe to receive a notification e-mail when the database has been updated or new or updated tables have been posted. During FY 2008-09, the number of subscribers to this service was approximately 1023. Twenty-eight messages with updates to the database were sent to subscribers.

Manatee Decal Program – During 2008-09, 86 students competed for the chance to have their artwork selected for the 2009-10 Manatee Decal. Each year, tax collectors participate by selling decals for $5 each at the tax collection sites around the State. Manatee staff coordinated the manatee decal art contest, administered the interoffice electronic vote for final selection and handled all of the other tasks needed for the contest and decal design along with purchasing ribbons for the students and planning a press event. The winning artwork was selected in February and the finished manatee decals were sent to the tax collector sites in June for sale during FY 2009-10. FWC distributed surplus decals from previous years to various locations to use for special events or participant awards.

Community Meetings and Presentations – FWC gave 120 presentations on listed species to various audiences including community groups, homeowners groups, local law enforcement personnel, state park staff, conservation groups, college classes, K-12 students, clubs and camps. Species discussed included Florida manatee, Florida black bear, Florida panther, American alligator, sea turtles, Eastern indigo snake, whooping crane, Southeastern American kestrel, listed shorebirds and gopher tortoise. Approximately 12,300 people were reached through these presentations.

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

The Wild Treasures of Brevard County informative program was available to county residents and visitors who use 16 libraries in Brevard County, Florida. The focus for the series is to provide informational materials, presentations or displays about Florida manatees, sea turtles, Florida black bear, Florida panther, gopher tortoises and North Atlantic right whales, with emphasis on species awareness, habitat conservation, and actions people can take to recreate and live compatibly with these species. During FY 2008-09, FWC updated Florida panther and Florida manatee PowerPoint presentations for use in Brevard County. FWC coordinated the Wild Treasures of Brevard County program and scheduled 67 programs, displays, or presentations during the year.

The information from the displays potentially reached thousands of people in the county (at least 3,000 per library/month when displays are scheduled). Supporting materials include posters, bookmarks, laminated information cards, books, and activity sheets. *Florida Wildlife* magazines are distributed and when available, videos or DVDs and other support materials are provided. Thirty presenters from local Brevard County environmental agencies agreed to participate with the Wild Treasures program. Feedback following visitation showed that attendees better understood the species and the efforts needed for conservation or habitat protection after participating in the program.

FWC's Chinsegut Nature Center in Hernando County, Florida, hosted three presentations to just over 70 attendees about Audubon's crested caracara, Florida black bear and shorebirds including the snowy plover.

A new traveling exhibit trailer was created that includes information about gopher tortoise, Eastern indigo snake and sandhill crane.

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

Information on FWC's smalltooth sawfish research and the status of the species was presented at a variety of venues, including scientific presentations for the Tampa Bay Regional Planning Council, the Charlotte Harbor National Estuary Program, and the Florida Institute of Technology, as well as general presentations for fishing groups (eight presentations throughout southwest Florida) and local school classes (two presentations). Over 450 people attended these presentations.

Upon request, FWC conducted informational presentations concerning marine turtles, lights, and other impacts to schools and meetings of local conservation groups, homeowners associations and other interested groups.

Three platform presentations were given at the 11$^{th}$ North American Crane Workshop in Wisconsin, September 24-28, 2008: "Status of non-migratory whooping cranes in Florida", "Video surveillance of nesting whooping cranes", and "Leg problems and power line interactions in the Florida resident flock of whooping cranes." Another presentation was provided for the St. Lucie Audubon Society on January 8, 2009, titled, "Whooping cranes, overview of the species and current status."

FWC engaged in public awareness opportunities, including a presentation on scrub-jays and habitat management for the Alachua Audubon Society.

FWC spoke on the management and population status of red-cockaded woodpeckers at the Audubon of the Everglades September meeting, at Palm Beach Community College's Wildlife Management course, at the annual Big Cypress Interpretive Meeting in October 2008, and to the Everglades Foundation in August 2009.

Each October, FWC sets up an interactive wildlife exhibit at the Munson Heritage Festival located within the Blackwater River State Forest in Okaloosa County. Audiences learn about wildlife and how habitat management protects the red-cockaded woodpecker, the gopher tortoise and other rare species found in the area. A popular display is the Florida black bear exhibit, where people learn the life history of the black bear and ways to reduce human-bear conflicts. FWC sets up similar displays for the annual Beaches to Woodlands tour-Coastal Encounters Festival and the annual Forestry Conclave and Lumberjack Festival held at Pensacola Junior College, Milton campus.

Workshops and Training – Manatee research staff participated in two law enforcement training activities in conjunction with Marine Animal Rescue Society for manatee responders. One training session occurred in Miami with 75 participants and the other occurred in Boynton Beach with 60 participants. In addition, manatee research staff participated in two veterinarian-related training programs reaching 60 people. Staff also conducted a training session for 30 volunteers who assist with Florida manatee-related activities with FWC's field labs. A training program focusing on reducing manatee mortality and injury in locks was conducted in conjunction with U.S. Army Corps of Engineers (Corps) for 18 volunteers.

Sea turtle research staff conducted 16 sea turtle stranding and salvage training workshops with a total of 371 participants. In addition, researchers conducted seven sea turtle nesting beach survey training workshops for 778 attendees who document sea turtle nesting activity on Florida's beaches.

FWC hosted the 2009 Marine Turtle Permit Holder Workshop in Tampa for over 300 marine turtle permit holders, volunteers, local government, state and federal agency staff. This two-day event included approximately 15 presentations by agency management and research staff, conservation organizations, and local governments as well as summaries of Marine Turtle Grant projects. At the request of local governments, FWC participated in six public workshops hosted in the Panhandle and southeast Florida regarding sea turtles.

Through a Marine Turtle Lighting course, which was developed jointly with USFWS, FWC was able to provide information on sea turtles and lights to a variety of entities across peninsular and panhandle Florida. Ten workshops were presented to an audience of 228 individuals. Participants included local government, code enforcement, private property owners, state agencies, marine turtle permit holders, county employees, lighting consultants, insurance companies, and interested citizens. These workshops were hosted by different organizations around the state, including Franklin, Walton, Sarasota, Palm Beach, Broward, Volusia, Monroe and Brevard counties.

Bear management staff conducted five Florida black bear aversive conditioning workshops with a total of 95 participants from Okaloosa County Sheriff's Office, Tyndall Air Force Base (AFB), Eglin AFB and Hurlbert Field.

Project WILD (Wildlife in Learning Design) is an interdisciplinary conservation and environmental education program emphasizing wildlife that includes Aquatic WILD, which emphasizes aquatic wildlife and aquatic ecosystems. Flying WILD, sponsored by the National Council for Environmental Education, encourages schools to work closely with conservation organizations, community groups, and businesses involved with birds to implement school bird festivals and bird conservation projects. FWC and volunteer facilitators provided approximately 60 one-day Project WILD, Aquatic WILD, Flying WILD and Florida Black Bear Curriculum Guide workshops to 1,385 educators. Species covered include the Florida panther, Florida black

bear, Florida manatee, American alligator, American crocodile, gopher tortoise, sea turtles, bald eagle, brown pelican, burrowing owl, Florida scrub-jay, great blue heron, great egret, little blue heron, osprey, peregrine falcon, roseate spoonbill, snowy egret, tricolored heron, white ibis and wood stork.

In addition, 38 educators participated in the annual Project WILD Call of the WILD Training and Recognition event. Information was presented on Florida black bear ecology, behavior, and ways to reduce attractants.

FWC presented a series of eight regional workshops for local governments. The workshop series was intended to disseminate information and establish contacts to improve implementation of FWC programs at the local level. The workshops which were held in eight counties (Alachua, Charlotte, Hillsborough, Indian River, Lake, Leon, Okaloosa, and Volusia counties), were attended by nearly 300 representatives from 33 counties, 17 cities, 12 non-profit organizations, two regional planning councils, six other state agencies, ten public citizens, and 25 private consultants. Each of the workshops presented information on the Gopher Tortoise Management Plan and Permitting Guidelines, Bald Eagle Management Plan, Red-Cockaded Woodpecker Safe Harbor program, Florida scrub-jay, Wildlife Legacy program, Cooperative Conservation Blueprint, Wildlife 2060 Report, Habitat Conservation Plans and Florida Bird Conservation Initiative.

FWC gave a scrub-jay presentation for Local Government Workshops

Fairs, Festivals and Special Events – In 2009, 466,271 people attended the Florida State Fair in Tampa. According to State Fair Authority marketing surveys, typically 80% of fair-goers visit FWC's exhibit. FWC's exhibit included a live Florida black bear and Florida panther. The agency took this opportunity to inform the public about living with wildlife, the species' history and to promote the sale of FWC license tags, which funds the species' programs.

The 10th annual Umatilla Black Bear Festival was held March 28, 2009 in Umatilla, Florida. FWC assisted with festival organization and provided interactive exhibits and presentations focusing on human-bear conflicts. Approximately 4,000 people attended the festival.

The 1st annual Forgotten Coast Black Bear Festival was held Saturday, October 18, 2008, in Carrabelle, FL. FWC provided interactive exhibits focusing on human-bear conflicts. More than 500 people attended the festival.

MarineQuest is an annual open house of FWC's Fish and Wildlife Research Institute (FWRI) and is held in St. Petersburg. MarineQuest 2009 was held on April 23-25. The event hosted 1,729 students, chaperones, and teachers during the School Daze program and over 3,800 visitors during the general open house. Indoor and outdoor displays discussed several listed species, including the Florida manatee, North Atlantic right whale and sea turtles. Displays featured hands-on activities as well as printed materials and information with FWC biologists on hand to answer questions. Several displays featured artifacts including Florida manatee bones and turtle shells. Two public talks focusing on listed species were presented as part of the MarineQuest auditorium program. "Flesh and blood: An inside look at the Florida manatee" had 58 attendees; "Tracking sea turtles using satellites" had 69 attendees.

Chinsegut Nature Center in Hernando County, Florida, held the annual Bird and Wildlife Festival in April 2009, which included two offsite burrowing owl field trips; festival attendance was 395.

The Reptile and Amphibian Festival in October included a gopher tortoise hike, two

gopher tortoise burrow-cam talks, and two alligator talks. Additionally, FWC and the Gopher Tortoise Council had an exhibit during the festival. Festival attendance was 651 people.

In recognition of Florida's official mammal, Governor Crist declared March 21st, 2009, as "Save the Florida Panther Day," which was celebrated at Florida Panther National Wildlife Refuge.

FWC celebrated a successful effort to designate the loggerhead sea turtle as Florida's saltwater reptile.

FWC set up a booth with scrub-jay information at the Lake County Earth Day Celebration.

Publications, Signs and Exhibits – FWC's *Florida Wildlife* magazine contained 17 feature stories on listed species including Florida black bear, American crocodile, burrowing owl, limpkin, brown pelican, sandhill crane, Apalachicola River mussels, gopher tortoise, flatwoods salamander, North Atlantic right whale, kites, ivory-billed woodpecker and red-cockaded woodpecker. The magazine included another 55 short articles featuring Miami blue butterfly, Florida manatee, Sherman's fox squirrel, queen conch, burrowing owl, loggerhead sea turtle, Florida scrub-jay, peregrine falcon, Key deer, Audubon's crested caracara, bald eagle, mottled duck, Pine Barrens tree frog, Florida panther, whooping crane and black skimmer.

Three papers on panther epidemiology, hematology and transmammary infections were published in the *Journal of Wildlife Diseases* and *Journal of Parasitology*.

The Gopher Tortoise Management Plan includes key information and activities that were implemented in FY 2008-09. FWC's Gopher Tortoise Team worked closely with stakeholders on the development of brochures. The "Living with Gopher Tortoises" and "Before You Build" brochures are available on the Website and at each of FWC's regional offices. Additionally, three one-page "fact" sheets have been developed that contain information on the rules and regulations, available permit options, and safety information for horse owners when gopher tortoise burrows are present. FWC worked with a young author and conservationist, Zander Strodes, who wrote a gopher tortoise activity book for kids, to reprint the activity book. In addition, an educator's program including a PowerPoint presentation and activity handouts was completed and will be presented at the annual Call of the WILD and League of Environmental Educator events in FY 2009-10.

FWC adopted a final management plan and delisted the bald eagle in April 2008. Public awareness plays a significant role in the implementation of the bald eagle management plan. A public Website was developed in FY 2008-09 and is updated periodically to accommodate the current management plan and permitting information. All public notices pertaining to permitting and the management plan also are posted to the site as well as downloads for new publications at http://myfwc.com/WILDLIFEHABITATS/Eagle_Index.htm.

The Bald Eagle Handbook was created and provides information to government agencies, private landowners, consultants and the public concerning new regulations, permit options, and the management plan guidelines. A Bald Eagle Management Plan fact sheet was created and is intended to provide general information and highlight some key points about the management plan. "Florida's Bald Eagle: Triumph of a Legendary Species", is a tri-fold, color brochure that describes the basics of the management plan, permitting framework, State rule, and species biology and conservation status.

FWC has provided bald eagle management plan and regulation information to multiple media sources throughout FY-2008-09. There have been more than a dozen articles relating to the management plan, the eagle's conservation, the new State rule, and other topics.

The Sea Stats series of brochures provided information on some of FWC's areas of marine research including fish, Florida manatee, and North Atlantic right whales. Printing and distribution of the Manatees Sea Stats was on hold while the brochure was under review. FWC staff distributed 1,506 copies of the Sea Turtles Sea Stats and 907 copies of the North Atlantic Right Whales Sea Stats. In addition, these products are available for downloading via FWC's Website at http://research.myfwc.com/.

An updated version of the Boating and Angling Guide to Tampa Bay was produced in FY 2008-09 and includes information related to Florida manatee protection. FWC distributed 6474 copies of the Tampa Bay guide during the year.

Save the Manatee Trust Fund Report -- Florida law [§370.12(4)(b), F.S.] requires that each year, by December 1, FWC provide a report to the President of the Florida Senate and the Speaker of the Florida House of Representatives on expenditures from the Save the Manatee Trust Fund (Trust Fund). This report provides brief summaries of accomplishments and descriptions of research projects and conservation and enforcement activities. The Trust Fund report is posted on FWC's Website in PDF format at http://research.myfwc.com/features/view_article.asp?id=31532. The Trust Fund receives money from sales of manatee license plates and decals, boat registration fees, and voluntary donations. It is the primary funding source for the State's manatee-related research and conservation management activities.

Manatee staff coordinated the translation of the Manatee Treasure brochure to Spanish and secured funding from the Tampa Electric Company Manatee Viewing Center and the Marine Animal Rescue Society, along with State funds from the Save the Manatee Trust Fund to print 30,000 copies. Another 10,000 copies of the Manatee Treasure brochure (English) were printed. Manatee staff completed an update of the manatee coloring/activity book and printed 30,000 copies. Text for a marina brochure was completed and will be printed at a future date. Manatee staff worked with Lee County Recreation Department on their grant to print manatee coloring activity books, mini posters and Treasure brochures. FWC received some of the publications for distribution. FWC graphics staff created drawings of Florida panther, gopher tortoise and imperiled species license plates.

A new manatee informational sign for placement at boat facilities was developed and is currently available.

FWC reprinted 10,000 copies of "A Guide to Living in Panther Country" brochures and provided shipments to Florida Panther National Wildlife Refuge and Big Cypress National Preserve. Panther awareness and safety signs measuring approximately 3 feet x 5 feet were fabricated in FY2007-2008 and were installed in FY 2008-09 on five FWC Wildlife Management Areas (WMA).

FWC and Great Outdoors Media Company produced a 15-minute DVD called *Living with Florida's Black Bear*, which was completed in June 2009. A distribution plan will be created, copies will be made and distribution will be initiated in FY 2009-10. FWC revised and reprinted 30,000 copies of "A Guide to Living in Bear Country" as well as the very popular children's activity booklet called "Bears and You."

The Community Relations Office produced a newspaper piece called "Featured Creature," reaching approximately 280,000 readers in key areas such as Jacksonville Beach,

Tampa Bay area, and Kissimmee. This year, one "Featured Creature" was about butterflies with a large sidebar on the Miami blue butterfly. "Featured Creature" is sent quarterly to approximately 150 weekly newspapers. In addition, the editors have access to a "Featured Creature" section of the Website that contains all the articles and photographs for individual downloading.

Since 1998, FWC has published a two-page feature in *Florida Monthly* Magazine called "Watching Wildlife." *Florida Monthly* magazine, formerly known as *Florida Living*, is Florida's only statewide monthly lifestyle magazine with an average paid circulation of 228,855 per month. An additional 2,391 copies are mailed each month to state and local government officials and leaders within the private sector. Six articles on listed species were featured this year: limpkin and Gulf sturgeon in August 2008, October 2008, bald eagle in November 2008, Audubon's crested caracara in February 2009, Key deer in March 2009 and ivory-billed woodpecker in May 2009.

Two WMA recreation guides were reprinted including information and photos on the roseate spoonbill in reprint of the Guana River WMA (St. Johns County) Recreation Guide (8,000 copies printed) and information and photos on Florida black bear and gopher tortoise in reprint of Chassahowitzka WMA (Hernando County) Guide (4,000 copies printed). Gulf sturgeon is mentioned in the rack card on Andrews WMA in Levy County (15,000 copies).

FWC's WMAs and Wildlife and Environmental Areas (WEA) have interpretive signs that contain information about listed species. Signs with photos and specific information include: Chinsegut WEA in Hernando County - gopher tortoise, includes photos of burrow commensals: Eastern indigo snake, gopher frog and Florida mouse; Florida black bear at Aucilla WMA in Jefferson and Taylor counties. Signs with photos only include: wood stork at Guana River WMA in St. Johns County; osprey at Big Bend WMA, Spring Creek Unit in Taylor County; bald eagle at Big Bend WMA, Dallus Creek Unit in Taylor County. Signs that mention a listed species include: bald eagle, osprey, gopher tortoise and Florida scrub-jay on Lake Wales Ridge WEA in Highlands and Polk counties. Sign reprints include white ibis at Chinsegut WEA in Hernando County; snowy egret at Big Bend WMA, Hickory Mound Unit in Taylor County; Crested caracara at Dinner Island WMA in Hendry County; and roseate spoonbill at Spirit-of-the-Wild WMA in Hendry County.

The "Living with Alligators" brochure is available in hard copy, and during FY 2008-09, FWC distributed approximately 50,000 copies. FWC also shared materials such as "All About Alligators" coloring books (approximately 24,000) and magnets with the "Nuisance Alligator Hotline" phone number (approximately 2,000).

"Living with Crocodiles" brochures were distributed to over 1,000 people and a limited number of "Caution" signs were posted in areas where human/crocodile interactions have taken place.

To date, 87 permanent smalltooth sawfish informational signs have been posted at popular boat ramps and fishing piers statewide. In addition, over 70 laminated posters, which contain a request that catches or observations of sawfish be reported to FWC, have been maintained at boat ramps and tackle shops. FWC also publishes information about the smalltooth sawfish and the "sawfish hotline" in its official Saltwater Fishing Regulations publication in print and online. The 950,000 copies of this document are distributed statewide in English and Spanish to maximize fisher access to them (*e.g.*, bait shops, FWC informational events).

Public awareness regarding Gulf sturgeon was continued by both Northwest (Panama

City) and North Central (Lake City) regional offices and affiliated law enforcement units in the North Florida rivers inhabited by Gulf sturgeon. Boating ramps were posted with "jumping sturgeon" warning signs and "GO SLOW (Sturgeon Leap Out of the Water)" decals are being distributed to lessen the likelihood of a citizen being struck accidently by a jumping sturgeon. In FY 2008-09, only three sturgeon strike incidents were reported (two on the Suwannee and one on the Choctawhatchee rivers) with no major injuries. Due to the popularity of the signs, FWC's Wildlife Foundation has made these signs available to the public at cost-recovery pricing.

FWC made a fact sheet concerning scrub-jays and avian diseases and published an article on scrub-jay management for USFWS's Atlantic Coast Joint Venture newsletter.

Volunteer Opportunities – Volunteers play an important role in FWC's research programs. During FY 2008-09, 85 regular service volunteers contributed a total of 5975 hours to listed species-related projects and an additional 97 occasional service volunteers contributed a total of 348 hours on alligator, black bear, crayfish, beach mouse, Key Largo woodrat, Key Largo cotton mouse, marine mammal, sea turtle, panther, or wood stork research.

## APPENDIX A. LISTED WILDLIFE SPECIES AS OF JUNE 30, 2009

| Common Name | Scientific Name | Status |
|---|---|---|
| FISH | | |
| | | |
| Atlantic sturgeon (Gulf sturgeon) | *Acipenser oxyrinchus* (*Acipenser oxyrinchus desotoi*) | SSC (1) |
| blackmouth shiner | *Notropis melanostomus* | E |
| bluenose shiner | *Pteronotropis welaka* | SSC (1,2) |
| crystal darter | *Crystallaria asprella* | T |
| harlequin darter | *Etheostoma histrio* | SSC (1) |
| key blenny | *Starksia starcki* | SSC (1) |
| key silverside | *Menidia conchorum* | T |
| Lake Eustis pupfish | *Cyprinodon variegatus hubbsi* | SSC (1) |
| Okaloosa darter | *Etheostoma okalossae* | E |
| rivulus (mangrove rivulus) | *Rivulus marmoratus* | SSC (1) |
| saltmarsh topminnow | *Fundulus jenkinsi* | SSC (1) |
| shortnose sturgeon | *Acipenser brevirostrum* | E |
| shoal bass | *Micropterus cataractae* | SSC (1,2) |
| Suwannee bass | *Micropterus notius* | SSC (1) |
| Southern tessellated darter (tessellated johnny darter) | *Etheostoma olmstedi Maculaticeps* | SSC (1) |
| | | |
| AMPHIBIANS | | |
| | | |
| flatwoods salamander | *Ambystoma cingulatum* | SSC |
| Florida bog frog | *Rana okaloosae* | SSC (2) |
| Georgia blind salamander | *Haideotriton wallacei* | SSC (1,2) |
| gopher frog | *Rana capito* | SSC |
| pine barrens treefrog | *Hyla andersonii* | SSC (1) |
| | | |
| REPTILES | | |
| | | |
| alligator snapping turtle | *Macroclemys temminckii* | SSC (1) |
| American alligator | *Alligator mississippiensis* | SSC (1,3) |
| American crocodile | *Crocodylus acutus* | E |
| Atlantic salt marsh water snake (Atlantic salt marsh snake) | *Nerodia clarkii taeniata* | T |
| Barbour's map turtle | *Graptemys barbouri* | SSC (1,2) |
| bluetail mole skink | *Eumeces egregius lividus* | T |
| Eastern indigo snake | *Drymarchon corais couperi* | T |
| Florida brown snake | *Storeria dekayi victa* | T1 |

APPENDIX A. Continued

| Common Name | Scientific Name | Status |
|---|---|---|
| Florida Key mole skink | *Eumeces egregius egregius* | SSC (1) |
| Florida pine snake | *Pituophis melanoleucus…mugitus* | SSC (2) |
| Florida ribbon snake | *Thamnophis sauritus sackeni* | T[1] |
| gopher tortoise | *Gopherus polyphemus* | T |
| green seaturtle (green sea turtle) | *Chelonia mydas* | E |
| hawksbill seaturtle (hawksbill sea turtle) | *Eretmochelys imbricata* | E |
| Kemp's ridley seaturtle (Kemp's ridley sea turtle) | *Lepidochelys kempii* | E |
| leatherback seaturtle (leatherback sea turtle) | *Dermochelys coriacea* | E |
| loggerhead seaturtle (loggerhead sea turtle) | *Caretta caretta* | T |
| key ringneck snake | *Diadophis punctatus acricus* | T |
| red rat snake | *Elaphe guttata* | SSC[1] (1) |
| rim rock crowned snake | *Tantilla oolitica* | T |
| sand skink | *Neoseps reynoldsi* | T |
| short-tailed snake | *Stilosoma extenuatum* | T |
| striped mud turtle | *Kinosternon baurii* | E[1] |
| Suwannee cooter | *Pseudemys concinna Suwanniensis* | SSC (1,2) |
| | | |
| BIRDS | | |
| | | |
| American oystercatcher | *Haematopus palliates* | SSC (1,2) |
| Bachman's warbler | *Vermivora bachmanii* | E |
| black skimmer | *Rynchops niger* | SSC (1) |
| brown pelican | *Pelecanus occidentalis* | SSC (1) |
| burrowing owl (Florida burrowing owl) | *Athene cunicularia* (*Athene cunicularia floridana*) | SSC (1) |
| Cape Sable seaside sparrow | *Ammodramus maritimus Mirabilis* | E |
| crested caracara (Audubon's crested caracara) | *Caracara cheriway* (*Polyborus plancus audubonii*) | T |
| Florida grasshopper sparrow | *Ammodramus savannarum Floridanus* | E |
| Florida sandhill crane | *Grus canadensis pratensis* | T |
| Florida scrub-jay | *Aphelocoma coerulescens* | T |
| ivory-billed woodpecker | *Campephilus principalis* | E |
| Kirtland's warbler | *Dendroica kirtlandii* | E |

APPENDIX A. Continued

| Common Name | Scientific Name | Status |
|---|---|---|
| least tern | *Sterna antillarum* | T |
| limpkin | *Aramus guarauna* | SSC (1) |
| little blue heron | *Egretta caerulea* | SSC (1,4) |
| Marian's marsh wren | *Cistothorus palustris marianae* | SSC (1) |
| osprey | *Pandion haliaetus* | SSC[2] (1,2) |
| piping plover | *Charadrius melodus* | T |
| red-cockaded woodpecker | *Picoides borealis* | SSC |
| reddish egret | *Egretta rufescens* | SSC (1,4) |
| roseate spoonbill | *Platalea ajaja* | SSC (1,4) |
| roseate tern | *Sterna dougalli* (*Sterna dougallii dougallii*) | T |
| Scott's seaside sparrow | *Ammodramus maritimus Peninsulae* | SSC (1) |
| snail kite (Everglades snail kite) | *Rostrhamus sociabilis Plumbeus* | E |
| snowy egret | *Egretta thula* | SSC (1) |
| snowy plover (Cuban snowy plover) | *Charadrius alexandrinus* | T |
| Southeastern American kestrel | *Falco sparverius paulus* | T |
| tricolored heron | *Egretta tricolor* | SSC (1,4) |
| Wakulla seaside sparrow | *Ammodramus maritimus Juncicolus* | SSC (1) |
| white-crowned pigeon | *Columba leucocephala* | T |
| white ibis | *Eudocimus albus* | SSC (2) |
| whooping crane | *Grus Americana* | SSC (5) |
| wood stork | *Mycteria Americana* | E |
| Worthington's marsh wren | *Cistothorus palustris griseus* | SSC (1) |
| | | |
| MAMMALS | | |
| | | |
| Anastasia Island beach mouse | *Peromyscus polionotus Phasma* | E |
| Big Cypress fox squirrel | *Sciurus niger avicennia* | T |
| Choctawhatchee beach mouse | *Peromyscus polionotus Allophrys* | E |
| Eastern chipmunk | *Tamias striatus* | SSC (1) |
| Everglades mink | *Mustela vison evergladensis* | T |
| fin whale (finback whale) | *Balaenoptera physalus* | E |
| Florida black bear | *Ursus americanus floridanus* | T3 |

APPENDIX A. Continued

| Common Name | Scientific Name | Status |
|---|---|---|
| Florida manatee (West Indian manatee) | *Trichechus manatus latirostris (Trichechus manatus)* | E |
| Florida mastiff bat | *Eumops glaucinus floridanus* | E |
| Florida mouse | *Podomys floridanus* | SSC (1) |
| Florida panther | *Puma concolor coryi* (*Puma* [*=Felis*] *concolor coryi*) | E |
| Florida saltmarsh vole (Florida salt marsh vole) | *Microtus pennsylvanicus dukecampbelli* | E |
| gray bat | *Myotis grisescens* | E |
| Homosassa shrew | *Sorex longirostris eionis* | SSC (2) |
| humpback whale | *Megaptera novaeangliae* | E |
| Indiana bat | *Myotis sodalist* | E |
| key deer | *Odocoileus virginianus clavium* | E |
| Key Largo Cotton Mouse | *Peromyscus gossypinus Allapaticola* | E |
| Key Largo woodrat | *Neotoma floridana smalli* | E |
| Lower Keys marsh rabbit | *Sylvilagus palustris hefneri* | E |
| North Atlantic right whale (right whale) | *Eubalaena glacialis* (*Balaena glacialis* [*incl. australis*]) | E |
| Perdido Key beach mouse | *Peromyscus polionotus Trissyllepsis* | E |
| Sanibel Island rice rat | *Oryzomys palustris sanibeli* | SSC (1,2) |
| sei whale | *Balaenoptera borealis* | E |
| Sherman's fox squirrel | *Sciurus niger shermani* | SSC (1,2) |
| Sherman's short-tailed shrew | *Blarina carolonensis [=brevicauda] shermani* | SSC (2) |
| silver rice rat (rice rat, lower FL Keys) | *Oryzomys argentatus* (*Oryzomys palustris natator*) | E |
| Southeastern beach mouse | *Peromyscus polionotus Niveiventris* | T |
| sperm whale | *Physeter macrocephalus* | E |
| St. Andrews beach mouse | *Peromyscus polionotus Peninsularis* | E |
| | | |
| INVERTEBRATES | | |
| | | |
| CORALS | | |
| | | |
| pillar coral | *Dendrogyra cylindrus* | E |
| | | |

APPENDIX A. Continued

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

Species Removed from FWC's Imperiled Species List During 2008-09

The peregrine falcon's (*Falco peregrinus*) management plan was approved by the Commission and the species was removed from the Imperiled Species List in June 2009.

APPENDIX A. Continued

## KEY TO ABBREVIATIONS AND NOTATIONS

### LIST ABBREVIATIONS

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

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

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

(FWC)

[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.

## APPENDIX B. LIST OF ACRONYMS USED IN THIS REPORT

| Term | Acronym |
|---|---|
| Apalachicola National Forest | ANF |
| Archbold Biological Station | ABS |
| Atlantic States Marine Fisheries Commission | ASMFC |
| Avon Park Air Force Range | APAFR |
| Best Management Practices | BMP |
| Big Cypress National Preserve | BCNP |
| Biological Review Panel | BRP |
| Coastal Wildlife Conservation Initiative | CWCI |
| Code of Federal Regulations | CFR |
| Comprehensive Everglades Restoration Project | CERP |
| Critical Wildlife Area | CWA |
| Environmental Assessment | EA |
| Environmental Impact Statement | EIS |
| Feline Leukemia Virus | FLV |
| Florida Administrative Code | FAC |
| Florida Department of Environmental Protection | FDEP |
| Florida Department of Transportation | FDOT |
| Florida Division of Agriculture and Consumer Services | FDACS |
| Florida Fish and Wildlife Conservation Commission | FWC |
| Fiscal Year | FY |
| Fish and Wildlife Research Institute | FWRI |
| Geographic Information System | GIS |
| Georgia Department of Natural Resources | GDNR |
| Global Positioning System | GPS |
| Habitat Conservation Plan | HCP |
| Hickey Creek Mitigation Park Wildlife and Environmental Area | HCWEA |
| Index Nesting Beach Survey Program | INBS |
| Integrated Wildlife Habitat Ranking System | IWHRS |
| Kissimmee Prairie Preserve State Park | KPPSP |
| Landowner Assistance Program | LAP |
| Lake Wales Ridge State Forest | LWRSF |
| Lake Wales Ridge Wildlife and Environmental Area | LWRWEA |
| Manatee Protection Plans | MPP |
| Moody Branch Mitigation Park Wildlife and Environmental Area | MBWEA |
| National Environmental Policy Act | NEPA |
| National Oceanic and Atmospheric Agency's Marine Fisheries Service | NOAA-Fisheries |
| National Park Service | NPS |
| Population Viability Analysis | PVA |
| Save the Manatee Trust Fund | STMTF |
| Sea Turtle Stranding and Salvage Network | STSSN |
| South Florida Water Management District | SFWMD |

APPENDIX B. Continued

| Term | Acronym |
|---|---|
| Species of special concern | SSC |
| St. John's River Water Management District | SJRWMD |
| St. Marys Fishery Restoration Committee | SMFRC |
| Strategic Habitat Conservation Area | SHCA |
| Statewide Nesting Beach Survey Program | SNBS |
| Strategic Management Area | SMA |
| Suwannee River Water Management District | SRWMD |
| The Nature Conservancy | TNC |
| Three Lakes Wildlife Management Area | TLWMA |
| U.S. Army Corps of Engineers | Corps |
| U.S. Environmental Protection Agency | EPA |
| U.S. Fish and Wildlife Service | USFWS |
| U.S. Forest Service | USFS |
| U.S. Geological Survey | USGS |
| Wildlife Conservation Prioritization and Recovery | WCPR |
| Wildlife and Environmental Area | WEA |
| Wildlife Management Area | WMA |

APPENDIX C. FWC PUBLICATIONS DURING FY 2008-09.

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APPENDIX C. Continued

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

| **Common Name** | **Scientific Name** |
|---|---|
| FISH | |
| Alligator gar | *Atractosteus spatula* |
| Smalltooth sawfish | *Pristis pectinata* |
| AMPHIBIANS | |
| Striped newt | *Notophthalmus perstriatus* |
| REPTILES | |
| None | |
| BIRDS | |
| Anhinga | *Anhinga anhinga* |
| Bald eagle | *Haliaeetus leucocephalus* |
| Black rail | *Laterallus jamaicensis* |
| Common moorhen | *Gallinula chloropus* |
| Eastern bluebird | *Sialia sialis* |
| Eastern screech owl | *Otus asio* |
| Florida mottled duck | *Anas fulvigula* |
| Great blue heron | *Ardea herodias* |
| Great-crested flycatcher | *Myiarchus crinitus* |
| Great egret | *Ardea alba* |
| King rail | *Rallus elegans* |
| Least bittern | *Ixobrychus exilis* |
| Peregrine falcon | *Falco peregrinus* |
| Pied-billed grebe | *Podilymbus podiceps* |
| Purple gallinule | *Porphyrula martinica* |
| White ibis | *Eudocimus albus* |
| Yellow-crowned night-herons | *Nyctanassa violacea* |
| MAMMALS | |
| Flying squirrel | *Glaucomys volans* |
| Gray squirrel | *Sciurus carlinensis* |
| Old-field mouse | *Peromyscus polionotus* |
| Puma | *Puma concolor stanleyana* |
| Southeastern myotis bat | *Myotis austroriparius* |

APPENDIX D. Continued

| **Common Name** | **Scientific Name** |
|---|---|
| INVERTEBRATES | |
| Apple snail | *Pomacea paludosa* |
| Purple bankclimber mussel | *Elliptoideus sloatianus* |
| Fat three-ridge mussel | *Amblema neislerii* |
| PLANTS | |
| Cabbage palm | *Sabal palmetto* |
| Oak trees | *Quercus* spp. |
| Saw palmetto | *Serenoa repens* |

# APPENDIX E. GLOSSARY OF TERMS

## DEFINITIONS

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

**Artificial start -** A partial cavity created by drilling an entrance tunnel into the tree and then wallowing out a fist sized cavity at the back of that tunnel.

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

**Cavity** – A hollow or hole occupied by an organism.

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

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

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

**Commission** – The seven member board of FWC that meet five times each year to hear staff reports, consider rule proposals and conduct other Commission business.

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

**Colony** –A distinguishable localized population within a species.

**Depredation event** - When domestic livestock or pets are preyed upon by a panther.

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

**Ecotone** – A transitional zone between two communities containing the characteristic species of each.

**Endangered species** – As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is so few or depleted in number or so restricted in range or habitat due to any man-made or natural factors that it is in imminent danger of extinction, or extirpation from Florida.

**Endemic** – Restricted or peculiar to a certain area or region.

**Ephemeral** – Lasting a very short time.

APPENDIX E. Continued

**Euryhaline** – Describes organisms that tolerate varying levels of salinity.

**Extirpation** – To remove.

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

**Fledged** – To leave the nest.

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

**Geographic Information System (GIS) -** Captures, stores, analyzes, manages, and presents data that is linked to a location.

**Habitat** – A natural environment where a species lives and grows.

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

**Hydrophone -** Used for determining short-term, fine-scale movements and to listen for acoustic tags at moored stations.

**Intraspecific** – Occurring within a species or involving members of one species.

**Life History –** All of the changes experienced by a species, from its birth to its death.

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

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

**Necropsy** – The examination of a body after death.

**Nestling** – A young bird that has not abandoned the nest.

**Pelagic** – An organism that lives in deep ocean water.

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

**Productivity** – The ability to produce; fertility.

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

APPENDIX E. Continued

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

**Resin well** – A wound in a pine tree's cambium, created and maintained by red-cockaded woodpeckers for the purpose of resin production. These wells are maintained to keep sap flowing out of the tree, and prevents snakes from climbing the trees and ultimately from eating birds that are in the cavity. By maintaining resin wells, the birds keep the tree from forming a scab over the well.

**Rookery** – A colony of breeding animals.

**Roosts** – A place where species such as bats, and often multiple individuals sleep or reside.

**Species of special concern** - As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is facing a moderate risk of extinction, or extirpation from Florida, in the future.

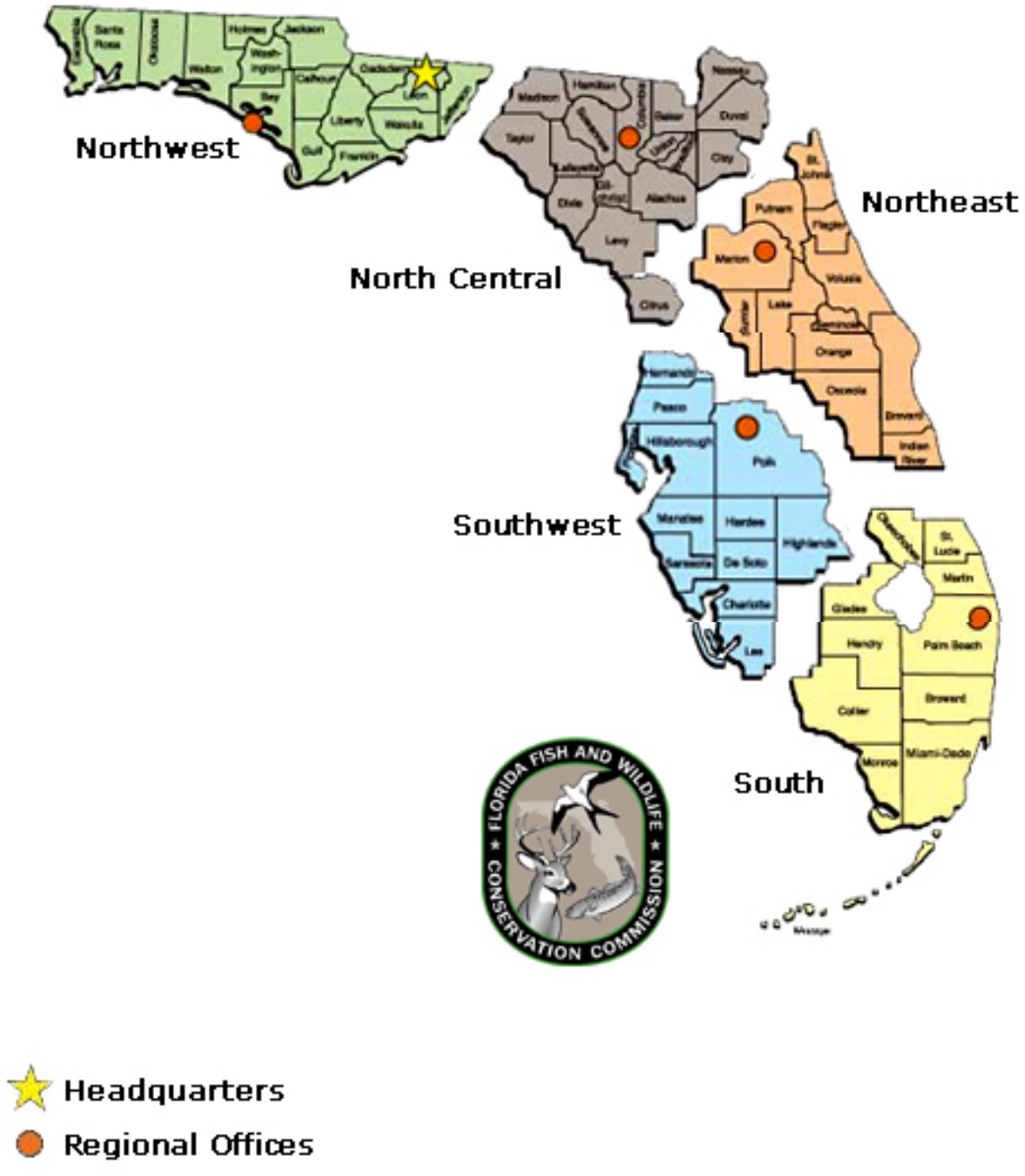
**Telemetry** – Recording of information about a species and transmitting it to an observer

**Threatened species** - As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is facing a very high risk of extinction, or extirpation from Florida, in the future.

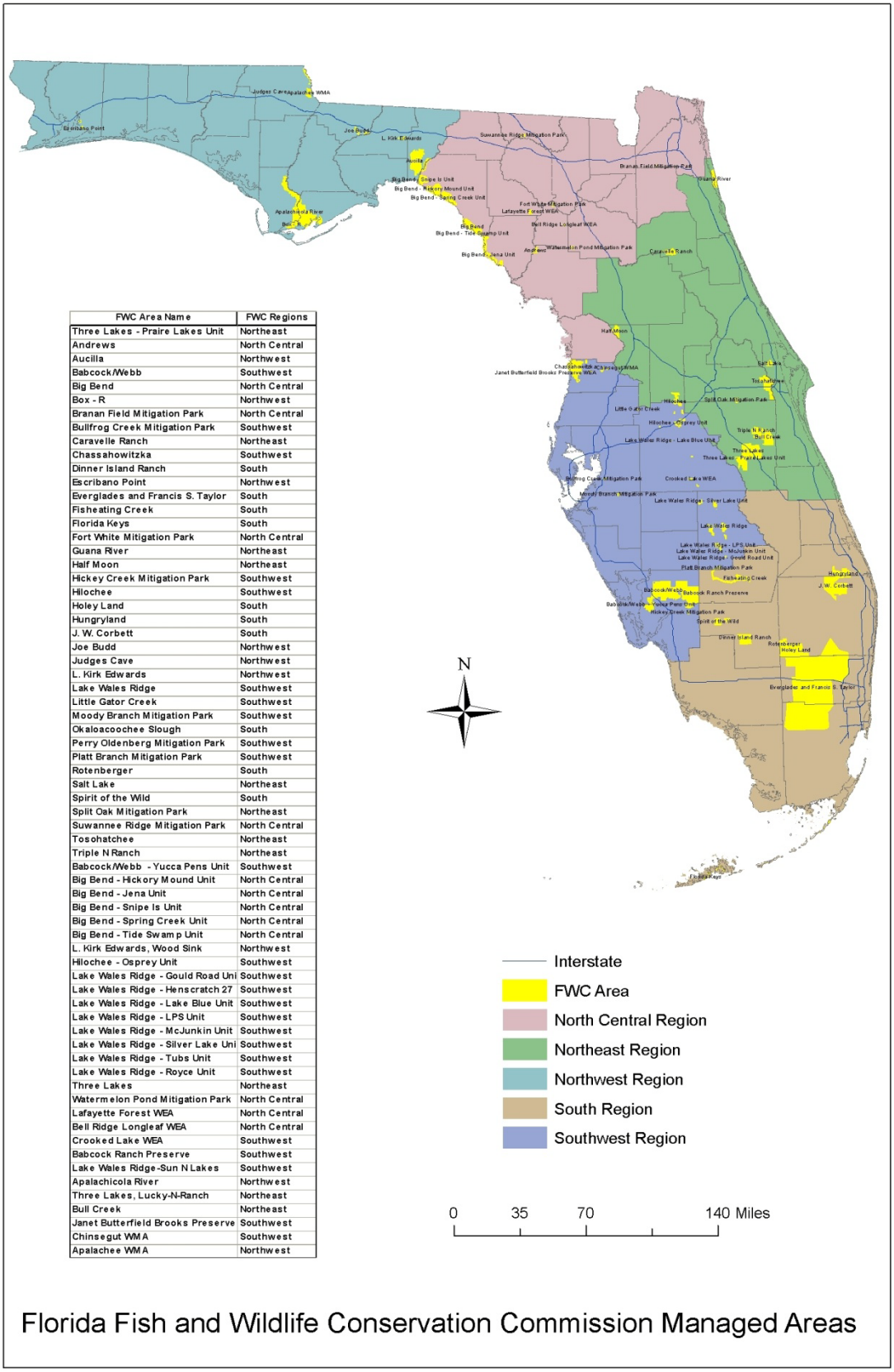
**Transect** - A path along which one records and counts occurrences of species, vegetation, and other relevant factors of a study.

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

APPENDIX F. MAP OF FWC'S REGIONS



# APPENDIX G. MAP OF FWC'S MANAGED AREAS




| FWC Area Name | FWC Regions |
|---|---|
| Three Lakes - Praire Lakes Unit | Northeast |
| Andrews | North Central |
| Aucilla | Northwest |
| Babcock/Webb | Southwest |
| Big Bend | North Central |
| Box - R | Northwest |
| Branan Field Mitigation Park | North Central |
| Bullfrog Creek Mitigation Park | Southwest |
| Caravelle Ranch | Northeast |
| Chassahowitzka | Southwest |
| Dinner Island Ranch | South |
| Escribano Point | Northwest |
| Everglades and Francis S. Taylor | South |
| Fisheating Creek | South |
| Florida Keys | South |
| Fort White Mitigation Park | North Central |
| Guana River | Northeast |
| Half Moon | Northeast |
| Hickey Creek Mitigation Park | Southwest |
| Hilochee | Southwest |
| Holey Land | South |
| Hungryland | South |
| J. W. Corbett | South |
| Joe Budd | Northwest |
| Judges Cave | Northwest |
| L. Kirk Edwards | Northwest |
| Lake Wales Ridge | Southwest |
| Little Gator Creek | Southwest |
| Moody Branch Mitigation Park | Southwest |
| Okaloacoochee Slough | South |
| Perry Oldenberg Mitigation Park | Southwest |
| Platt Branch Mitigation Park | Southwest |
| Rotenberger | South |
| Salt Lake | Northeast |
| Spirit of the Wild | South |
| Split Oak Mitigation Park | Northeast |
| Suwannee Ridge Mitigation Park | North Central |
| Tosohatchee | Northeast |
| Triple N Ranch | Northeast |
| Babcock/Webb - Yucca Pens Unit | Southwest |
| Big Bend - Hickory Mound Unit | North Central |
| Big Bend - Jena Unit | North Central |
| Big Bend - Snipe Is Unit | North Central |
| Big Bend - Spring Creek Unit | North Central |
| Big Bend - Tide Swamp Unit | North Central |
| L. Kirk Edwards, Wood Sink | Northwest |
| Hilochee - Osprey Unit | Southwest |
| Lake Wales Ridge - Gould Road Uni | Southwest |
| Lake Wales Ridge - Henscratch 27 | Southwest |
| Lake Wales Ridge - Lake Blue Unit | Southwest |
| Lake Wales Ridge - LPS Unit | Southwest |
| Lake Wales Ridge - McJunkin Unit | Southwest |
| Lake Wales Ridge - Silver Lake Uni | Southwest |
| Lake Wales Ridge - Tubs Unit | Southwest |
| Lake Wales Ridge - Royce Unit | Southwest |
| Three Lakes | Northeast |
| Watermelon Pond Mitigation Park | North Central |
| Lafayette Forest WEA | North Central |
| Bell Ridge Longleaf WEA | North Central |
| Crooked Lake WEA | Southwest |
| Babcock Ranch Preserve | Southwest |
| Lake Wales Ridge-Sun N Lakes | Southwest |
| Apalachicola River | Northwest |
| Three Lakes, Lucky-N-Ranch | Northeast |
| Bull Creek | Northeast |
| Janet Butterfield Brooks Preserve | Southwest |
| Chinsegut WMA | Southwest |
| Apalachee WMA | Northwest |

Florida Fish and Wildlife Conservation Commission Managed Areas