FY 2012-13 Progress Report

on activities of the

Florida Fish and Wildlife Conservation Commission

Endangered and Threatened Species Management and Conservation Plan

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FLORIDA'S ENDANGERED AND THREATENED SPECIES MANAGEMENT AND CONSERVATION PLAN FY 2012-13 PROGRESS REPORT

Prepared by Staff of the
Florida Fish and Wildlife Conservation Commission
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EXECUTIVE SUMMARY

This document constitutes the 35th 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]. 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 are also 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. Copies are available from the Division of Habitat and Species Conservation, Species Conservation Planning Section, of the Florida Fish and Wildlife Conservation Commission (FWC), Tallahassee or at http://www.myfwc.com/about/inside-fwc/legislative-affairs/archive-reports/.

This report covers the Fiscal Year (FY) 2012-13, a period from July 1, 2012, to June 30, 2013. It includes a description of FWC's criteria for research and management priorities, statewide policies pertaining to listed species, a funding request for FY 2014-15, a progress report providing a description of agency actions for listed species, and a description of FWC's citizen awareness program as it relates to listed species. The progress report section includes reports of staff activities relating to listed mammals, birds, amphibians, reptiles, fish, and invertebrates. Additionally, this report provides updates on agency actions to provide coordination and assistance, Critical Wildlife Areas (CWA), incentive-based conservation programs, law enforcement activities, and permitting for listed species. Please contact FWC's Listed Species Coordinator or Assistant Listed Species Coordinator if you would like more information concerning this report. Contact information is listed below.

FWC staff would like to express our appreciation to each person who contributed to this report. Special appreciation is expressed to Caly Coffey for her preparation of this report, and Lawson Snyder for his editorial review.

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SUMMARY OF PROTECTED WILDLIFE LISTS

The first Florida Endangered Species List for wildlife was created in 1972 and consisted of 23 species. Listing was expanded in 1973 to include Threatened species, and again in 1979 to include Species of Special Concern. New Threatened species rules approved by the FWC Commissioners went into effect on November 8, 2010, creating the Florida Endangered and Threatened Species List. Species listed through FWC's listing process are now all contained in a single-category called State-designated Threatened (ST). This single-category is designed to eliminate controversy about what a species is called and instead focus attention on what conservation actions are needed to improve the species' status. In addition, all Florida species that are listed under the U.S. Endangered Species Act by the U.S. Department of the Interior's Fish and Wildlife Service (USFWS) or the National Oceanic and Atmospheric Agency's Marine Fisheries Service (NOAA-Fisheries) are now included on the Florida Endangered and Threatened Species List as Federally-designated Endangered (FE), Federally-designated Threatened (FT), Federally-designated Threatened Due to Similarity of Appearance [FT(S/A)], or Federally-designated Nonessential Experimental species (FXN). Florida's Species of Special Concern (SSC) List has been temporarily retained to allow time to assess these species under Florida's listing process to determine whether they should be listed as State-designated Threatened species or removed from the list (see the Threatened Species Management System and Listing Process section on page 1 for details).

The official Florida Endangered and Threatened Species List is kept in Rule 68A-27.003, Florida Administrative Code (F.A.C.). The State-designated Species of Special Concern List is kept in Rule 68A-27.005, F.A.C. Currently, FWC lists 133 fish and wildlife species (**Table 1**) as FE (47), FT (20), FXN (1), FT(S/A) (4), ST (19), or SSC (42). There is no duplication in species listing between the two lists. Collectively, these 133 species are referred to as Florida's listed species. Management and research activities were not conducted on all listed species this year and, therefore, not all species are discussed in detail in this report. A complete listing of Florida's listed wildlife species as of June 30, 2013, is included as Appendix A. Changes to the list may occur throughout the year so Florida's current listed species may be accessed at http://myfwc.com/media/1515251/Threatened_Endangered_Species.pdf. The rules noted above may be viewed at the F.A.C. Website (https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27).

At the Federal level, NOAA-Fisheries is responsible for listing most marine species and the USFWS is responsible for other species. The Federal list of animals and plants is administered by USFWS and published in Chapter 50 of the Code of Federal Regulations: animals in 50 Code of Federal Regulations 17, and plants in 50 Code of Federal Regulations 23. Additional information regarding Federal listings for NOAA-Fisheries and USFWS may be located at http://www.nmfs.noaa.gov/pr/species/index.htm and http://www.fws.gov/endangered/species/us-species.html, respectively. The Florida Department of Agriculture and Consumer Services (FDACS) has a Florida Statewide Endangered and Threatened Plant Conservation Program (http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/Forest-Health/Florida-Statewide-Endangered-and-Threatened-Plant-Conservation-Program) that maintains a list of Florida's Federally-listed plant species. This list may be accessed at http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/Forest-Health/Florida-Statewide-Endangered-and-

Threatened-Plant-Conservation-Program/Florida-s-Federally-Listed-Plant-Species.

Table 1. Summary of Florida's Protected Wildlife list as of June 30, 2013. [Number of species listed by FWC as Federally-designated Endangered **(FE)**, Federally-designated Threatened **(FT)**, Federally-designated Threatened Due to Similarity of Appearance **[FT(S/A)]**, Federally-designated Nonessential Experimental Population **(FXN)**, State-designated Threatened **(ST)**, or State-designated Species of Special Concern **(SSC)**.]

STATUS DESIGNATION	FISH	AMPHIBIANS	REPTILES	BIRDS	MAMMALS	INVERTEBRATES	TOTAL
FE	3	1	4	9	22	8	47
FT	2	1	6	4	1	6	20
FT(S/A)	0	0	1	0	0	3	4
FXN	0	0	0	1	0	0	1
ST	3	0	7	5	3	1	19
SSC	6	4	6	16	6	4	42
TOTAL	**14**	**6**	**24**	**35**	**32**	**22**	**133**

STATUTORY REQUIREMENTS

CRITERIA FOR RESEARCH AND MANAGEMENT PRIORITIES

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 at-risk 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 in 1990 (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 of conservation measures and the amount of effort previously expended on them, which then is used to help in prioritizing agency resources. FWC also maintains a list of Species of Greatest Conservation Need , which uses a set of scientific core criteria and identifies the broad range of Florida's species that are at risk or could become at risk in the future.

In addition to these tools, FWC must also consider available funding sources, legislation, court rulings, grant agreements, and approved management plans when setting priorities for allocating resources for the management and conservation of Florida's State-listed species.

STATEWIDE POLICIES PERTAINING TO LISTED SPECIES

Listing Actions (*Brad Gruver*). – FWC was under a two year listing moratorium while staff completed biological status reviews of 60 State-listed species and began drafting management plans (also known as species action plans) for those 60 species. FWC is no longer under a State listing moratorium as of November 2012. No listing actions have been initiated during FY 2012-13.

Previously completed biological status reports and management plans are available at http://myfwc.com/wildlifehabitats/imperiled/biological-status/ and http://myfwc.com/wildlifehabitats/imperiled/management-plans/.

Threatened Species Management System, the Listing Process, and Management Plans (*Laura Barrett and Brad Gruver*). – Rules implementing a new Threatened Species Management System, including a revised listing process, became effective on November 8, 2010. These rules may be accessed at https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27. Biological status reviews were conducted in fall 2010 for all State-designated Threatened or State-designated Species of Special Concern that had not recently been evaluated. The biological status reviews resulted in updated species listing recommendations that were approved by the FWC Commissioners in June 2011. Management planning for State-designated Threatened species, State-designated Species of Special Concern, and grandfathered species that no longer warrant listing is on going. Final listing rule changes will be approved by the FWC Commission upon each management plan approval.

As of September 2012, there were 61 State-designated Threatened species and State-designated Species of Special Concern. The revised management plan for the gopher tortoise was approved in September 2012. The Panama City crayfish has a draft management plan in development. The remaining 59 state-listed species (plus the Atlantic sturgeon, which was Federally listed in 2012 after development of the management plan was initiated) are included in the new management planning approach for at-risk species. The focus for on-going imperiled species management planning is to utilize an integrated management approach to improve resource utilization and cooperation with partners and provide a long-term strategy for conservation and management of at-risk species. This integrated model includes a multi-species plan that allows FWC to realize synergies, identify potential or real conflicts, recognize opportunities, and achieve efficiencies in a way that single-species management would not allow. Sixty species are included in the first iteration of the Imperiled Species Management Plan, with the goal of eventually incorporating the other existing single-species management plans.

The Imperiled Species Management Plan is being developed in phases. The initial phase is focused on individual or small groups of similar species (e.g., wading birds). This phase summarizes in a species action plan the species conservation actions necessary to address identified threats. These species action plans do not contain all of the elements required in a management plan and instead serve as a compilation of conservation actions that could be taken for the species. FWC has worked throughout 2012 and into fall 2013 with subject matter experts and stakeholders to develop the species action plans. The second phase began in the summer of 2013 and focuses on developing integrated conservation strategies and determining how implementation of the plans will be realized. Integrated conservation strategies (a higher level than species conservation actions) aim to address common threats and needs for multiple species in order to achieve efficiencies and align current and future resources. This work will continue into 2014 and again will incorporate partner and stakeholder input.

The third phase of planning includes the development of the final Imperiled Species Management Plan, along with any associated rule changes. At a minimum, there will be species that require a listing status change that could not be brought forward until the management plan was prepared. In addition to a summary of the species action plans and the integrated conservation strategies, the Imperiled Species Management Plan will describe the Agency's approach to integrated implementation, identify how progress will be monitored, address the ecological, social, and economic impacts of the plan, and include species protection recommendations based on a regulatory and non-regulatory alternatives analysis. FWC will continue to engage and update stakeholders and incorporate their input into the development of the Imperiled Species Management Plan.

REQUIRED LEGISLATION

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

FUNDING REQUEST

Recommended Funding Level (*Charlotte Jerrett*). – The recommended level of funding for FWC's listed species programs in FY 2014-15 is $25,247,486 (**Table 2**). This includes funding to maintain and enhance current programs including, but not limited to the development of species management plans, the implementation of conservation actions, and the continuation of Federal grants designed to assist in development of recovery programs.

Table 2. FWC Endangered and Threatened Species Budget Request for FY 2014-15.

Funding Source	Amount
Nongame Wildlife Trust Fund	**$2,750,733**
Florida Panther Research & Management Trust Fund	**$1,213,845**
Save the Manatee Trust Fund	**$3,581,430**
Marine Resources Conservation Trust Fund	**$6,986,506**
Land Acquisition Trust Fund	**$3,425,400**
State Game Trust Fund	**$548,953**
Conservation and Recreation Lands Trust Fund	**$15,148**
Federal Grants	**$6,724,378**
Grants and Donations Trust Fund	**$1,093**
Total	**$25,247,486**

PROGRESS REPORT

FWC's mission is "managing fish and wildlife resources for their long-term well-being and the benefit of people." Management of listed 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 listed species. Research is also leading to a better understanding of how wildlife managers may alter population processes through management actions, as well as leading to management actions that have aided in species stabilization and conservation. This section briefly describes the progress of ongoing listed species management and research by FWC.

MAMMALS

Beach Mice (*Emily Evans, Jeff Gore, Ryan Pawlikowski, and Melissa Tucker*)

Several subspecies of the old-field mouse, collectively known as beach mice, inhabit coastal dune habitat along the Atlantic Coast and northwest Gulf Coast of Florida. Beach mice also occur along the coast of Alabama. Due to extensive development of their coastal habitat, all but one of the beach mouse subspecies are listed as Endangered or Threatened by the USFWS. In Florida, these include the Choctawhatchee beach mouse, Anastasia Island beach mouse, St. Andrew beach mouse, and Perdido Key beach mouse (all Federally-designated Endangered), and the Southeastern beach mouse (Federally-designated Threatened).

Conservation and Population Monitoring – FWC, Florida's Department of Environmental Protection's (FDEP) Florida Park Service, Gulf Islands National Seashore, and Tyndall Air Force Base continued a long-term monitoring program for beach mice in FY 2012-13 at 11 sites along the northwest Gulf Coast of Florida and Alabama (**Table 3**). At each site, track tubes made of plastic pipe have been placed on the sand at regularly spaced points within the dune habitat. Inside each tube is a paper strip, an inkpad, and seed for bait; mice enter the baited tubes and leave ink tracks on the paper. Monitoring consists primarily of checking the papers for mouse tracks. Each baited tube is considered a track station and stations are checked for mouse tracks at one or two-month intervals. The track data are used to determine the distribution of mice at a site and to compare relative occupancy rates among sites. Therefore, the population of beach mice is monitored indirectly by observing the proportion of stations where mice leave tracks. The percent of stations with tracks is not a precise measure for distinguishing population trends among sites, but it is a useful coarse indicator of population status.

In FY 2012-13, the mean detection rate (percentage of stations with tracks per sampling period) varied from 64% at Deer Lake to 98% at Perdido Key State Park. Two sites had a slightly smaller proportion of stations with tracks in FY 2012-13 compared to the previous year, but the nine other monitored sites had the same or a larger percentage of tracks (**Table 3**). Therefore, relative to substantial declines in past years, in FY 2012-13, all beach mouse populations in northwest Florida were relatively stable across the primary locations where they occur.

Table 3. Mean percentage of track stations with beach mouse tracks in FY 2012-13 at 11 coastal locations in northwest Florida.

Sampling Locations	Subspecies	Number of Stations	Monitoring Interval	Percent of Stations with Tracks
Billy Joe Rish Park (Gulf County)	St. Andrews	21	2 month	79
Deer Lake (Walton County)	Choctawhatchee	16	1 month	64
East Crooked Island (Gulf County)	St. Andrews	42	1 month	89
Grayton Beach (Walton County)	Choctawhatchee	45	1 month	67
Gulf Islands National Seashore (Escambia County)	Perdido Key	80	2 month	90
Perdido Key State Park (Escambia County)	Perdido Key	81	2 month	98
Shell Island East (Federal – Bay County)	Choctawhatchee	30	1 month	94
Shell Island West (State – Bay County)	Choctawhatchee	20	1 month	84
Topsail Hill Preserve (Walton County)	Choctawhatchee	32	1 month	72
Water Sound (Walton County)	Choctawhatchee	4	1 month	75
West Crooked Island (Bay County)	Choctawhatchee	30	1 month	93

The high detection rate for Perdido Key beach mice is particularly encouraging because just a few years ago those beach mouse populations were at perilously low levels and were restricted to the eastern end of the island. Now the mice are found throughout the three large public lands on Perdido Key. The continued presence of beach mice at Grayton Beach State Park in Walton County is also an encouraging finding. In April 2011, 43 Choctawhatchee beach mice were captured at Topsail Hill Preserve State Park and moved to Grayton Beach State Park where they had been absent for several years. Track monitoring in FY 2011-12 indicated the reintroduced mice had established a new population and expanded throughout most of the available habitat. Monitoring during FY 2012-13 indicates that the mice are still present throughout most of the park.

Perdido Key Beach Mouse Genetics – Because Perdido Key beach mice have been reduced to a small number of individuals in past years, there is concern that the population now has little genetic diversity (i.e., the mice are all closely related). If true, this might influence the survival of individuals and reduce the ability of the population to persist after catastrophic events such as hurricanes. During FY 2011-12, FWC collaborated with biologists from the University of Florida to investigate the genetic diversity among beach mice across Perdido Key. Tissue was collected for genetic analysis from 301 mice trapped at Gulf State Park, Perdido Key State Park, Gulf Islands National Seashore, and several public beach access points. Preliminary results from analyses in FY 2012-13 confirmed that genetic diversity varied across the Perdido Key beach mouse population and that diversity was especially low within populations at Perdido Key and

Gulf State parks. This is important information because lack of genetic diversity can be correlated with an inability for a population to persist.

Development Impacts – Because habitat loss is a primary cause for the decline of beach mouse populations, working with land development projects within beach mouse habitat is a critical component of beach mouse conservation. FWC works with the USFWS, developers, local governments, and landowners and managers to identify ways to mitigate the loss of beach mouse habitat while allowing development activities to continue. During FY 2012-13, FWC biologists consulted with landowners and State and Federal agencies regarding development at several sites in beach mouse habitat on both the Atlantic and Gulf coasts. In particular, FWC continued to work with USFWS and the Florida Department of Transportation to identify and mitigate potential impacts to beach mice from a proposed widening of State Road 292 on Perdido Key.

Florida Mouse (*Melissa Tucker*)

The Florida mouse is currently listed in Florida as a State-designated Species of Special Concern. In 2010, a biological status review was conducted by FWC and external experts. It was determined that the species should no longer be listed in Florida. A species action plan for the Florida mouse was initiated in FY 2011-12 and the species will remain a State-designated Species of Special Concern until the management plan is finalized by staff and stakeholders and approved by the FWC Commissioners. The action plan identifies management of conservation lands for Florida mice as an important factor in maintaining or improving this species' status and preventing re-listing.

Florida mice occur primarily in fire-maintained, dry, upland habitats typically defined as scrub and sandhill. The species builds side burrows within larger burrows excavated by gopher tortoises. While frequent prescribed burning is necessary to maintain the scrub and sandhill habitats Florida mice rely on, little is known about the impact on the mouse during and following fire. Although the burrowing behavior of Florida mice likely affords sufficient protection from the direct effects of fire, environmental changes post-fire may influence survival rates, movement patterns, reproduction, health, and other behavioral aspects of the species.

In FY 2011-12, a long-term monitoring project, incorporating both radio telemetry and mark/recapture of live trapped mice, was initiated to estimate the effects of prescribed burning on Florida mice. Bell Ridge Wildlife and Environmental Area (WEA) in Gilchrist County was identified as a suitable site, composed entirely of sandhill habitat containing an established population of Florida mice. In year one of the long-term study, gopher tortoise burrows were marked, and live traps were placed at the burrows. Mice were trapped prior to a prescribed burn to determine a baseline population estimate, then 18 additional mice were trapped and fitted with radio transmitters and tracked for two weeks, both before and immediately following the prescribed fire. Continuing into FY 2012-13, live trapping was conducted post-burn at one month, three months, six months, 12 months, and 18 months. In this first 18 months of ongoing monitoring, 484 Florida mice were captured and ear tagged. Preliminary analysis suggests the mice did experience a small reduction of population size following prescribed burning in the spring of 2012, although a similar reduction was seen during the spring to summer period 18 months post-burn. Movement rates also increased significantly during the three months post-fire, suggesting mice may travel greater distances in search of resources after a burn. One year

post-burn, population levels were similar to those prior to the burn. These results suggest that at least short-term changes to survival rates and movement rates may occur in the months following fire, but these impacts are temporary. Continued monitoring of this population through another prescribed fire cycle will provide important information on the long-term effects of burning on Florida mice.

Eastern Chipmunk (*Chris Winchester*)

The Eastern chipmunk is a State-designated Species of Special Concern. FWC is currently working on a species action plan for the Eastern chipmunk. The species is common throughout much of the eastern U.S., but is rare in Florida. Historical data suggest chipmunks occur only in northwest Florida and may be restricted to upland, oak forest habitat. Data collected by FWC biologists in 1990 found chipmunks in Escambia, Santa Rosa, Okaloosa, Walton, and Holmes counties along the Backwater, Yellow, Escambia, and Choctawhatchee watersheds. The estimated area of chipmunk distribution at that time was 877 square miles, or 1.5 % of Florida. An extensive survey of chipmunk distribution has not been conducted since 1990, and the status of chipmunk distribution in Florida is, therefore, unknown.

In order to evaluate the Eastern chipmunk's population status in Florida and determine management needs, FWC biologists have begun utilizing multiple survey methods, targeting both public and private lands, to evaluate current Eastern chipmunk distribution in Florida. In 2012, a website (https://public.myfwc.com/hsc/chipmunk/getlatlong.aspx) was created where residents of Florida could report eastern chipmunk sightings. The website includes a Google Maps tool for reporting the exact location of the sighting and a comment section for providing detail on the reported sighting. Comments and contact information submitted along with the sighting location are used to verify the sighting. The website address and its purpose were advertised to the public using local media resources. Since its launch in the summer of 2012, 122 chipmunk sightings were reported on the website. Chipmunks were reported in six counties – Escambia, Santa Rosa, Okaloosa, Walton, Holmes, and Jackson.

A letter survey was used to assess chipmunk use of private lands. Four hundred letters were sent out to randomly selected landowners throughout Escambia, Santa Rosa, Okaloosa, Walton, Holmes, Washington, and Bay counties. Letters included a short questionnaire asking whether chipmunks occurred on the recipient's property. Of the 400 letter surveys sent out, 126 were returned with a reply, seven of which (5.5%) reported a chipmunk sighting on the property. Sightings reported via the letter survey occurred in Santa Rosa, Okaloosa, Holmes, Washington, and Escambia counties.

Finally, digital trail cameras were used to survey for Eastern chipmunks on public lands, including Backwater River State Forest, Escambia Water Management Area and the Choctawhatchee Water Management Area, overlapping Escambia, Santa Rosa, Okaloosa, and Holmes counties. Camera surveys focused on patches of upland, oak forest near rivers and streams, specifically targeting what is believed to be preferred Eastern chipmunk habitat. Multiple trail cameras were placed at 53 sites on public land, totaling 208 cameras set for 14 days each (2,912 trap nights – a trap night is a defined as one trap or camera set for one night). Eastern chipmunks were detected on 14 of 53 (26.0%) sites surveyed with cameras. They were observed in the Blackwater River State Forest in Santa Rosa and Okaloosa counties, and the Escambia Water Management Area in Escambia County. No Eastern chipmunks were detected in the Choctawhatchee Water Management Area in Holmes County. Preliminary estimates of

Eastern chipmunk distribution using current data from all three survey methods is 3,452 square miles (6% of the total area in Florida), which is roughly 400% larger than previously estimated with data from 1990.

Preliminary results suggest Eastern chipmunk distribution has not declined in Florida. However, chipmunks were not common, even in suitable habitat. Ongoing research is focused on collecting additional data on distribution, as well as gaining a clearer understanding of chipmunk habitat preferences in Florida.

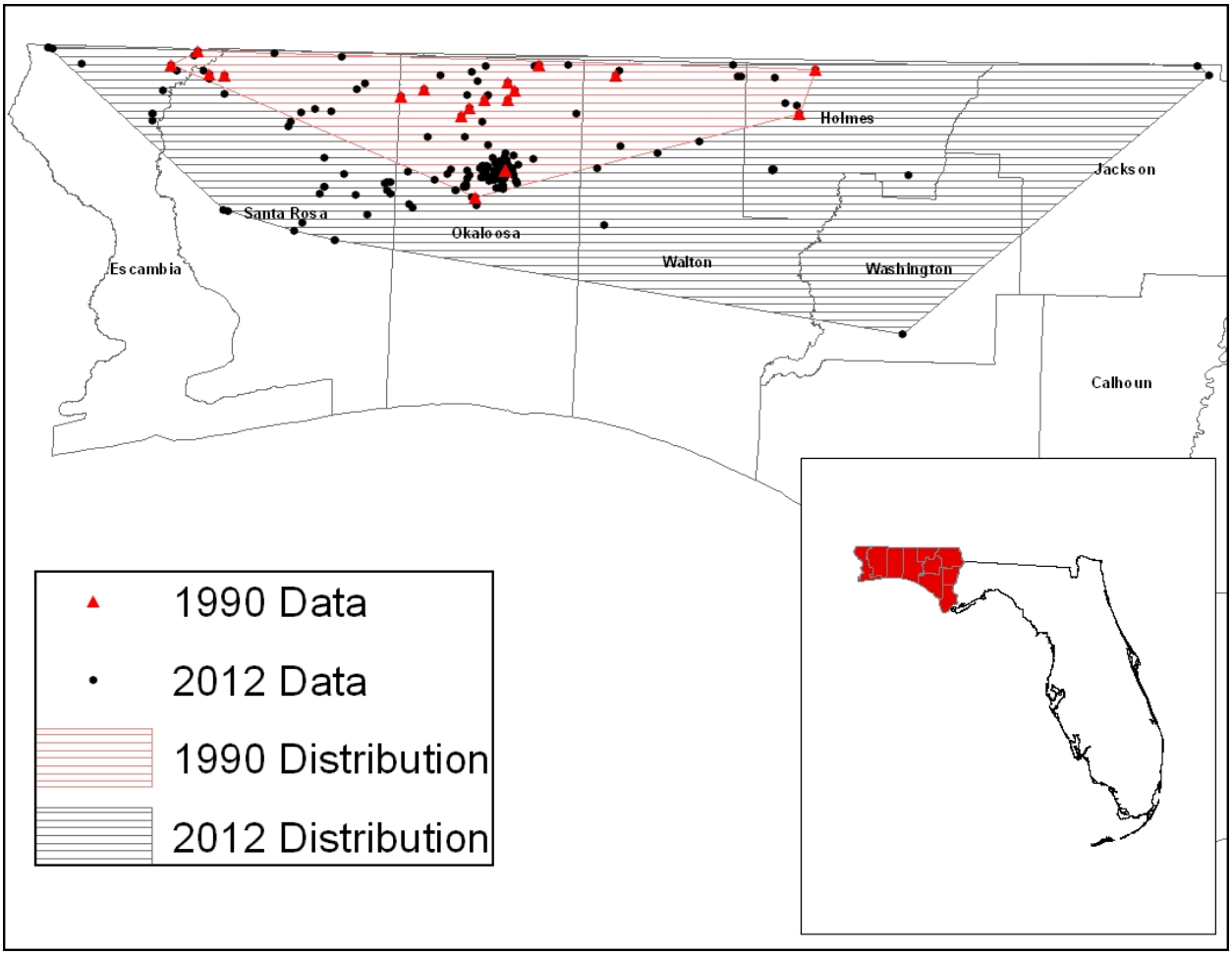


Figure 1. Preliminary estimates of Eastern chipmunk distribution in northwest Florida using data collected in 1990 and 2012.

Everglades Mink (*Chris Winchester*)

The Everglades mink is a State-designated Threatened subspecies. FWC is currently working on a species action plan for the species. The goal of ongoing research is to evaluate multiple survey methods that can be used to detect the Everglades mink and collect data on distribution and habitat needs.

The Everglades mink is one of four subspecies of mink in Florida and is known to occur in the freshwater marshes and wet forests of the Everglades. Historical data describing the Everglades mink's distribution are limited and largely anecdotal. Previous attempts to detect the

Everglades mink in Florida have been unsuccessful, suggesting effective survey methods are lacking. In order to learn more about the Everglades mink's distribution, an effective survey method needs to be developed. To meet this need, FWC biologists evaluated the efficacy of trail cameras and spotlighting as methods for detecting the Everglades mink in Florida. In addition, a website (https://public.myfwc.com/hsc/mink/getlatlong.aspx) was created for the public to report Everglades mink sightings, which can be used to guide survey efforts and supplement field data. The website included a Google Maps tool for reporting the exact location of each Everglades mink sightings and a comments section for providing sighting details, as well the opportunity to attach pictures. Comments, pictures, and contact information submitted with the sighting location were used to evaluate the validity of the sighting. The website address and its purpose were advertised to the public using local media resources. Between June 2012 and July 2013, 124 mink sightings were reported on the website. Sightings occurred throughout the State with nine sightings reported in the Everglades region. Overall, 30% of the sightings were deemed valid based on comments and pictures submitted. Everglades mink sightings reported on the web site were useful in identifying areas in need of more in-depth field surveys and these sightings will supplement field data. As expected, less than 8% of sightings were reported in the Everglades, which is largely a remote wilderness area. Field surveys will be critical in gathering data on mink distribution in the Everglades.

FWC biologists based in northern Florida focused initial mink survey efforts in salt marsh habitat along the Gulf and northern Atlantic coast. Although the Everglades mink does not occur in the areas surveyed, habitat conditions and life history traits of mink occurring along the Gulf and Atlantic coasts are very similar to that of the Everglades mink. Therefore, the relative strength of the survey methods evaluated in this study is expected to be representative of its utility when applied to the study of Everglades mink in the near future.

Spotlight surveys were conducted twice a month between April and June 2013, for four consecutive nights during the new and full moons, overlapping peak high tide conditions. Surveys were conducted one and a half hours prior to peak high tide, and lasted three hours each night. A single night's survey involved traveling along a predetermined route in a 17-foot johnboat at a constant speed, with one observer spotlighting the edge of the salt marsh. Mink were detected by their distinctive, yellow eye-shine, and their location was marked with a Global Positioning System (GPS). Six, 12.4-mile transects were surveyed along the northern Atlantic coast in Nassau and Duval counties in areas between the St. Marys River and the Intracoastal Waterway south of the St. John's River. Mink were detected on three of the six transects surveyed by spotlighting. A total of 22 mink were observed during the 24 survey days, with 18 mink observations made on one transect alone. All mink observations occurred in Nassau County north of the Nassau River. Mink were typically observed floating on rafts of dead marsh grass during the high tide, with one individual observed swimming across a small channel.

Trail camera surveys were conducted on public land in Nassau, Duval, Taylor and Citrus counties, specifically in Crystal River State Park Preserve, Big Bend Wildlife Management Area, Fort Clinch State Park, and Big Talbot State Park. Trail cameras were placed on floating platforms in salt marsh and on trees or wooden stakes along the transition zone between the forest edge and salt marsh. Camera stations were baited with sardines and commercial mink lure and set for 21 days. Camera surveys occurred between June 2012 and April1 2013. Eighty-two trail cameras were set for 21 days each, a total of 1,722 trap nights, resulting in zero mink detections. Recent surveys using trail cameras with more advanced features (Reconyx Hyperfire PC900), have successfully detected mink, suggesting the Bushnell cameras evaluated in this

study do not have the required specifications to effectively detect mink. Ongoing research is focused on evaluating trail cameras with more advanced features, such as faster trigger speed and shorter focal range, for detecting mink in areas with varying water levels.

Spotlighting appears to be a viable method for detecting mink, but may only be effective in areas with high water levels. In areas with moderate or low water levels, mink are easily obscured by tall marsh grass and difficult to detect by spotlighting. The success of trail cameras, however, is not dependent upon water levels and may be more effective in areas that do not experience a significant high tide.

Homosassa Shrew (*Melissa Tucker*)

The Homosassa shrew is currently listed in Florida as a State-designated Species of Special Concern. This shrew was originally thought to have a range limited to a single locality near Homosassa Springs, Citrus County, Florida. In 1991, an analysis of museum specimens redefined the taxonomic status and range of the Homosassa shrew. Based on this study, the subspecies status of the Homosassa shrew was confirmed and the range was expanded to include the northern two-thirds of peninsular Florida. The study stressed that there were a very limited number of specimens from Florida included in the analysis and future work was warranted. In 2010, FWC conducted a status review for the Homosassa shrew and recommended that it remain a State-designated Species of Special Concern until more information could be collected on its distribution, abundance, and taxonomic status. During FY 2012-13, a species action plan was drafted describing the actions needed to fill these data gaps for the Homosassa shrew.

During FY 2012-13, FWC began surveys for Homosassa shrews as outlined in the species action plan. As part of a pilot effort, four conservation properties in north central Florida were initially identified to have multiple habitat types suitable for the Homosassa shrew. Properties in Columbia County included two county owned sites: Alligator Lake County Park and Falling Waters County Park. In Gilchrist County, areas surveyed were FWC-managed Ft. White Wildlife and Environmental Area (WEA) and Bell Ridge Longleaf WEA. Seven sites were surveyed on the four conservation properties, covering hardwood hammock, pineland, hardwood swamp, and mixed hardwood pine habitats. Survey methods included the use of drift fence arrays with pitfall traps and live traps set along natural features such as logs. A total of 693 trap nights were completed at the seven different sites, with no captures of Homosassa shrews. At Bell Ridge Longleaf WEA, three least shrews were captured by drift fence arrays, so it is believed that the drift fence arrays are sufficient to capture shrews, if they are present. Future work will include expanding the survey efforts to additional habitat types and sites, and testing modifications in the materials used to create the drift fence arrays.

Key Largo Cotton Mouse (*Jeff Gore and Dan Greene*)

The Key Largo cotton mouse is a Federally-designated Endangered subspecies endemic to Key Largo, the northernmost island in the archipelago of the Florida Keys. The Key Largo cotton mouse represents the southernmost subspecies of its genus and is restricted to approximately 2,102 acres of tropical hardwood hammock. Habitat destruction on Key Largo in the late 19th century resulted in a loss of two-thirds of the original hardwood hammock habitat, contributing to population declines in many animal species. Because the small, nocturnal cotton mouse is seldom observed, land managers have little information about the status of the

population or how current land management activities affect distribution and abundance. Since 2007, a long-term monitoring plan based on live-trapping mice has been implemented for assessing the population status of the Key Largo cotton mouse. Trapping over 3 years (2009-2011) produced highly variable capture rates and few recaptures. Because of this variation, only coarse estimates of the number of Key Largo cotton mice could be obtained. Nevertheless, estimates indicate that a minimum of 5,000 Key Largo cotton mice remain in the 2,100 acres of public land that the cotton mouse inhabits. Additional trapping is on hold pending further analysis of the trapping data already obtained and the redesign of the monitoring plan in an attempt to provide more precise estimates.

Key Largo Woodrat (*Jeff Gore*)

The Key Largo woodrat (woodrat) is a Federally-designated Endangered subspecies of the eastern woodrat that is endemic to Key Largo, the northernmost island in the Florida Keys. In response to a decline in the woodrat population, some individuals were brought into captivity in 2002 for breeding. When animals raised in captivity were released on Key Largo in 2010-11, few individuals survived, apparently due largely to predation by house cats. To determine if mean survival time of woodrats would increase without cats present, in December 2011, FWC and the USFWS released 15 captive-born woodrats on a small island adjacent to Key Largo that had no cats or other non-native predators. Despite the absence of feral cats, all but one of the woodrats died on the island.

In FY 2012-13, FWC conducted an analysis of survival rates of the captive-reared animals. FWC also collaborated with biologists from the University of Florida on a comparative analysis of survival of wild and captive-reared woodrats. That analysis indicated that recruitment of young animals might be limiting population growth more than predation on adults. FWC also continued analysis of movements and behavior of the captive-reared animals released in 2011.

The loss of nearly all the woodrats released onto the island indicates that survival of captive-reared woodrats released into the wild will remain low even if non-native mammals are removed. If captive breeding is to be a useful tool in the conservation of Key Largo woodrat populations, captive-reared animals must learn how to evade predators more effectively. Potentially, this could be accomplished by training animals in zoos to avoid simulated predators or, alternatively, by conducting the captive breeding in outdoor enclosures on Key Largo and releasing captive-born animals as soon as they become adults. Continued removal of non-native predators from woodrat habitat may be necessary regardless of captive breeding and translocation protocols.

Florida Bonneted Bat (*Jennifer Myers and Melissa Tucker*)

The Florida bonneted bat is a State-designated Threatened species and was proposed for listing as a Federal Endangered species by the USFWS in October 2012. FWC initiated development of a species action plan for the Florida bonneted bat in FY 2011-12. Staff continued development of the plan in FY 2012-13 and will continue working with stakeholders to finalize and implement the plan during FY 2013-14. This plan identifies conservation actions that include management, research, monitoring, and outreach.

The Florida bonneted bat is the largest and rarest bat species in Florida. There was only one known colony statewide (in a bat house at a private residence in Ft. Myers) until 2006 when bonneted bats were detected through acoustic surveys by the Florida Bat Conservancy on Babcock Webb Wildlife Management Area (WMA) in Charlotte County. In 2007, FWC installed four roosts, each consisting of one pair of single-chambered bat houses, on the WMA. In December 2008, two roosts were occupied by bonneted bats, tripling the number of known roosts for this species. FWC confirmed that two more bat houses were used by Florida bonneted bats in May 2010, bringing the total confirmed occupied bonneted bat roosts on the WMA to four. During FY 2011-12, four more roosts were installed, each consisting of two single-chambered bat houses. These roosts are checked periodically by FWC to monitor occupancy.

During FY 2012-13, FWC conducted three night-time emergence counts on occupied bonneted bat roosts on the WMA. Emergence counts determine the presence of targeted species and were done in September 2012 (43 bats in two roosts), January 2013 (43 bats in three roosts), and April 2013 (39 bats in three roosts). Also during FY 2012-13, FWC invited conservation partners to join the Florida Bonneted Bat Working Group. Twenty-two people representing 12 organizations met in September 2012, to discuss ongoing research and monitoring, conservation across the species' range, and to assist in conducting emergence counts on occupied roosts at Babcock Webb. Finally, in 2012, a Federally-funded State Wildlife Grant was awarded to University of Florida researchers to develop a survey protocol for the Florida bonneted bat and identify habitats important for roosting and foraging. Grant activities will begin in FY 2013-14.

Gray Bat (*Jeff Gore*)

The gray bat, a Federally-designated Endangered species, is a colonial cave-roosting species that occurs throughout much of the south-central U.S. The gray bat's range-wide population previously suffered severe declines due to disturbance of its cave roosts, but its population now appears to be increasing. In Florida, however, the gray bat roosts only in a few caves in Jackson County where the population is 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. The size of the summer population of gray bats in Florida cannot be easily determined because the bats roost within large colonies of a similar bat species, the Southeastern myotis. Observations made within caves and during counts conducted in the evening as bats exit their roosts are not definitive because of the presence of other species. Regardless, no gray bats have been observed or captured at summer roosts in Florida since 1990.

Gray bats in Florida typically have roosted in winter in two Florida caves and hibernating bats can be readily counted at both sites. However, in recent years few gray bats have been observed during the annual census of the winter roosts conducted by FWC and the Florida Department of Environmental Protection (FDEP). During the most recent winter count on February 5, 2013, biologists found a single suspected gray bat in the primary wintering cave in Florida Caverns State Park in Jackson County. This bat was on a high ceiling and species identification could not be confirmed. Several hundred bats of two other species (Southeastern myotis bat and tri-colored bat) were also present in the cave. The only other site in Florida where gray bats have roosted recently in winter is adjacent to the park. Biologists visited this smaller cave on the same date and found no gray bats. Although thousands of gray bats were

reported formerly in Florida, no more than nine gray bats have been found hibernating in the state in any year since 2002.

White Nose Syndrome is an emerging fungal disease that has killed a multitude of bats from several species, including gray bats. The fungus has largely affected bats in colder regions of North America. It has not been recorded at any time among bats in Florida and is not suspected to be responsible for the decline in the gray bat population here.

Surveys that are more frequent or a more thorough census might provide a better estimate of the number of roosting gray bats, but winter 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. Gray bats occur in much larger numbers in other states including Alabama, Georgia, and Tennessee.

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

FWC continues to engage in research and management efforts to ensure the conservation of the Florida black bear for future generations of Floridians. Conservation efforts have allowed Florida black bear populations to rebound from historic lows in many areas throughout the State. A Florida Black Bear Management Plan was approved by the FWC Commission on June 27, 2012. The plan effectively removed the Florida black bear from the State-designated List of Threatened Species. The ten-year plan was developed with input collected from four public meetings, over 580 comments submitted by the public, and regular meetings with representatives from over 20 stakeholder groups.

As bear populations expand and Florida's human population grows, human-bear conflicts continue to increase in number and intensity. During FY 2012-13, FWC personnel received 6,557calls regarding bears (i.e., sightings, bears in garbage, complaints). Bear-related call volume in FY 2012-13 was the highest on record, exceeding FY 2011-12's calls by 48%. The number of bears killed by vehicles totaled 285 individuals for FY 2012-13, also the highest on record, exceeding FY 2011-12's vehicle-related deaths by 56%.

The Bear Response Contractor Program remains a critical link in assisting the public with human-bear conflicts throughout Florida. The Program was implemented to assist biologists with the bear management tasks of educational outreach, carcass recoveries, and capture efforts as needed. Contracted responders were dispatched by FWC to respond to 556 requests for assistance during FY 2012-13. The majority (51%) of responses were to provide education and outreach to the public in order to prevent human-bear conflicts from continuing in neighborhoods. Responses for carcass retrievals were slightly higher (29%) than assistance with trapping efforts (20%). The program allows FWC to meet rising public demand for service.

FWC runs 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. Sixteen interns from Florida State University participated in the fall 2012 and spring and summer 2013 sessions. These students contributed 3,311 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;

graphically displaying the regional differences in human-bear conflicts; examining statewide bear range changes; analyzing data for upcoming publication about efficacy of bear-resistant trash practices; and analyzing the rate of bear recapture. Interns coordinated public events and volunteer efforts to increase public awareness of bears. The interns allowed FWC to reach out and educate an additional 8,800 people about Florida's largest land mammal in FY 2012-13.

Through partnerships with local governments, businesses, and communities, Bear Program staff have reduced bear access to garbage across the State. Results of those efforts include: shifting waste service pick-up times so residents can more easily take garbage out the morning of pick-up rather than the night before and making bear-resistant equipment such as cans, sheds, and electric fencing more readily available. Through a grant from the Wildlife Foundation of Florida (with funds generated by the Conserve Wildlife license plate), FWC worked with Leon, Orange, Collier, and Volusia counties to increase the availability of bear-resistant containers for trash. In Leon, Orange, and Volusia counties, FWC worked with local government and waste service companies to cost-share the purchase of bear-resistant trashcans for residents. In Collier County, FWC purchased materials to build bear-resistant sheds for residents to store their regular garbage cans. Volunteers donated their time to build and install the sheds, and the county government significantly reduced the cost for permitting the sheds. FWC coordinated internally to provide comments on impacts to bears from proposed residential developments and highway projects.

The Bear Management and Research Program has continued to train law enforcement officers on bear behavior and conflict response. Seventeen bear response trainings for 403 personnel were held in FY 2012-13, and included FWC law enforcement officers, as well as personnel from 19 local, State, and Federal law enforcement, military, and natural resource agencies.

The Bear Management and Research Program held its 4th annual training workshop on July 19 and 20, 2013, for FWC employees who are involved in responding to bear conflicts. The two-day workshop included both presentations and field exercises to ensure staff have the best information and are comfortable with current techniques. In addition to the training, participating staff contribute their knowledge to the Bear Management Handbook. The document captures institutional knowledge on bear management protocols and includes important documentation such as accidental exposure to immobilization drugs and drug dosage charts.

Additional efforts of the Bear Management Program included:

- FWC completed field work for a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida that, through a contract with the University of Kentucky, will estimate the range and abundance of bears in Glades and Highlands counties. Genetic analysis of bear hair samples continues and will be completed during FY 2013-14. This population is small and fragmented and exists on remnant parcels of Florida scrub within a patchwork of public and private ownership. This was the third year of a three-year project.
- FWC continued to study bears on Camp Blanding and surrounding private lands. The work is being conducted through a grant from the Florida National Guard. Camp Blanding is the largest (73,000 acres) parcel of natural bear habitat within the wildlife corridor that extends from Ocala National Forest to Osceola National Forest. An ecologically intact corridor facilitates genetically healthy bear populations and habitat for dispersing sub-adult bears. Goals of the study include identifying ecologically significant

lands in and near Camp Blanding and providing recommendations for habitat management beneficial to bears.

- FWC collaborated with the University of Florida's Department of Wildlife Ecology and Conservation to increase the scope of bear research being conducted on Camp Blanding. The results will be published in a scientific journal.
- FWC concluded a national web-based survey to estimate bear range in North America and submitted a manuscript to a scientific journal for publication. Many populations of bears in North America, including many in Florida, have been expanding in recent years and this information will help guide management decisions across the range. This new range map will replace the previous one completed in 1994.
- Bear Research staff have begun working with U.S. Geological Survey staff at the University of Tennessee to plan an update to bear abundance in Florida using new statistical analyses.

For more information on Florida black bears, please visit http://myfwc.com/wildlifehabitats/managed/bear/.

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

The Florida panther is a Federally-designated Endangered subspecies of the puma (also called cougar or mountain lion) that once roamed across eight southeastern states. 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 size of the panther population and isolated it from other puma populations. When FWC began investigations into the status and distribution of panthers in the early 1970s, there were thought to be fewer than 30 panthers still living in South Florida. This small population size and its geographic isolation from other puma populations made the Florida panther very vulnerable to extinction due to inbreeding. Therefore, FWC, with approval from USFWS, released eight female puma from Texas into areas occupied by Florida panthers in 1995 to improve the health of the panther population by increasing the diversity of the population's genetic composition. These releases mimicked the natural exchange among panthers and other puma subspecies that last occurred in the 19th century. Because of successful pairings between Florida panthers and the Texas pumas, today's population has increased genetic diversity and is comprised of younger individuals than the pre-restoration panther population. Today, the Florida panther population is estimated to be between 100-160 adults in South Florida due in part to these actions. While genetic restoration of the Florida panther was successful with regard to some of its initial objectives, panthers remain isolated and may therefore suffer from inbreeding and loss of genetic variation over time. If this happens, the release of additional pumas in Florida to maintain an appropriate genetic health will be considered and evaluated.

FWC and its partner, Big Cypress National Preserve (BCNP), continue to monitor the panther population and its genetic health. A sample of panthers is captured annually between November and February and fitted with collars containing radio transmitters. These radio-collared panthers are monitored three times a week and their locations are recorded. Since 1981, 224 panthers have been radio-collared, providing essential data for the management and conservation of the population. Radio telemetry data were collected on 32 Florida panthers in FY 2012-13. In addition to monitoring adult panthers by radio telemetry, FWC and BCNP

biologists visit dens of radio-collared female panthers to mark and collect biological samples from newborn kittens. These work-ups included weighing, determining gender, administering de-wormers, marking them with passive integrated transponders (PIT) tags (a chip placed below the skin), and collecting tissue and fecal samples to assess their physical and genetic health. In FY 2012-13, FWC and BCNP biologists visited 12 panther dens and documented 30 kittens (14 males, 16 females). Since 1992, 398 kittens have been handled at dens.

In FY 2012-13, 24 wild Florida panthers were known to have died, including four (one male, three females) radio-collared panthers and 20 (eleven males, eight females, one unknown sex) uncollared panthers. Nineteen of the 24 panthers died after being hit by vehicles, three were killed by other panthers, and two died from undetermined causes. Male panther FP79 died in captivity at Busch Gardens; this panther was removed from the wild in February 2006 due to a sudden change in behavior whereby he began seeking prey only at people's residences and attempts to modify those behaviors failed.

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. FWC is currently involved in several collaborative research projects focusing on issues related to Florida panther conservation and management. Among these are population viability analyses that include both matrix- and individual-based models, testing novel methods of estimating home ranges using GPS data, a scientific review to establish trail camera survey designs to monitor panthers, evaluating the presence and significance of various parasites and environmental contaminants in panthers, and providing assistance to a University of Florida research project that is examining panther predation on cattle in southwest Florida. In the fall of 2011, FWC organized a small, internal working group to discuss available techniques that could potentially provide statistically robust estimates of the panther population size, a task that is notoriously difficult for secretive, wide-ranging and endangered large carnivores like the Florida panther. Subsequent collaborative efforts have identified a promising protocol that may permit statistically robust population estimates using a combination of trail camera surveys and marked panthers. In early 2013, FWC began a contract with the U.S. Forest Service Rocky Mountain Research Station to complete genetic analyses on all panther tissues. Lastly, FWC continues its protocol of disease monitoring and vaccination of all panthers handled.

FWC completed several research projects during FY 2012-13, including: an assessment of the impact of genetic restoration on population persistence, and a genetic assessment of tick-borne diseases in carnivores. FWC continues to assess fine-scale panther movement rates using GPS collar data, a review of the application of varied home range models on large GPS data sets, and a collaborative project with the University of Florida to develop an individually based population viability model.

Human-panther interactions are investigated by FWC in accordance with the Interagency Florida Panther Response Plan (http://www.fws.gov/verobeach/MammalsPDFs/R4FWSPantherEAFinal.pdf?spcode=A008). FWC verified that panthers were responsible for preying upon domestic livestock (called depredations) in 25 separate events during FY 2012-13. These 25 verified panther depredation events occurred in Collier, Hendry, and Lee counties and included 15 calves from commercial livestock operations. Six of the 15 calves were radio-collared as part of a research project conducted by the University of Florida's Institute of Food and Agriculture Sciences. The remaining nine calves were found by landowners. Eight depredations (seven goats/sheep, one

house cat) occurred in Golden Gate Estates east of Naples (Collier County). Golden Gate Estates is approximately 150 square miles in area and borders the Florida Panther National Wildlife Refuge, Picayune Strand State Forest, and the Corkscrew Regional Ecosystem Watershed. Panthers occupy these public lands. Lot sizes range typically from one to five acres and most lots still contain native habitat. Keeping livestock is permitted under local zoning codes. The remaining two depredations were of a goat in eastern Lee County and a house cat in central Hendry County. During depredation investigations, FWC provides assistance and advice to affected residents on how they can reduce the risk of panther attacks on pets and hobby livestock. FWC recommends that hobby animals and pets be secured in barns or pens with roofs or kept indoors. A brochure was produced by FWC that describes these steps. This information is available online at www.floridapanthernet.org.

The public's perception of panthers and support for their conservation varies widely and can be greatly influenced by having experienced some type of interaction with a panther. Education and outreach remains a critical recovery action because conservation efforts will not be achieved without public support. FWC collaborated with Julie Morris (Wildlands Conservation) and Dr. Elizabeth Pienaar (University of Florida) to begin exploring human dimension issues related to panther population expansion during FY 2012-13. Julie Morris was contracted to develop a landowner database, a summary of local government conservation programs with points of contact, and a summary of how planning initiatives may intersect with panther conservation. A contract with Dr. Pienaar will be initiated in FY 2013-14, with a primary focus on identifying incentive programs that may be of interest to private landowners in areas occupied by panthers.

Information and reviews of numerous road and development projects throughout southern Florida were provided by FWC during FY 2012-13. FWC reviews road projects to minimize the disruption of panther habitat and corridors and provides recommendations to reduce the risk of panther-vehicle collisions. Similarly, FWC reviews plans for urban development to minimize the loss of panther habitat and to reduce the likelihood of human-panther interactions.

In FY 2008-09, FWC was contacted by U.S. 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 could be developed that would be less expensive but equally effective. Through Senator Nelson's efforts, $955,000 of Federal funds were secured for this pilot project. The Collier County Department of Transportation Planning worked with the Florida Department of Transportation and FWC to design and build a smaller and less expensive wildlife crossing on a Collier County road. Substantial progress has been made on the project and it should completed by the end of 2013.

FWC launched a new website in August 2012 where the public can report panther sightings and upload pictures or videos of those sightings (www.myfwc.com/panthersightings). As of the end of FY 2012-13, people submitted over 650 records of panther sightings. Most records (88%) did not include evidence that would permit verification by FWC that the animal seen was a panther, but of the 12% that did provide evidence, five percent were verified as panthers and six percent were identified as bobcats. Other sightings included bear, coyotes, dogs, foxes, house cats, an otter, and even a Rhesus macaque (monkey).

An extensive collection of additional panther reports and publications on current panther management and research may be found at the following websites: http://www.floridapanthernet.org/index.php/reports/#.Ut7gSxAo7rc, and http://www.fws.gov/verobeach/ListedSpeciesMammals.html#fp.

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

The Florida manatee (listed by the USFWS as the West Indian manatee) is native to Florida's coastal estuaries and riverine waters and is a Federally-designated Endangered species. Manatees have been protected in Florida since 1892. The manatee is also Federally protected 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 one-third of its funds from the sale of specialty license plates. Conservation efforts are guided by the Florida Manatee Sanctuary Act of 1978 [Section 379-2431(2), F.S.], the Florida Manatee Management Plan approved by the FWC Commissioners in December 2007 (which may be accessed at http://www.myfwc.com/media/415297/Manatee_MgmtPlan.pdf), and the USFWS Florida Manatee Recovery Plan of 2001, which may be accessed at http://ecos.fws.gov/docs/recovery_plan/011030.pdf).

In 2004, FWC and USFWS established the Manatee Forum, a diverse stakeholder group, with the goal of reducing litigation by establishing areas of common ground, identifying problems or conflict, developing potential solutions, and accepting differences through increased communication. During FY 2012-13, the Manatee Forum met twice, once in October and once in May. During the October meeting, presentations on the algal blooms in the Indian River Lagoon and a manatee tracking study in Brevard County were provided. The May meeting included updates on the manatee population model, adult survival rates, and State and Federal actions. FWC believes in the importance of having a stakeholder group focused on manatee issues. The opportunity for information exchange and the discussion of ideas is very valuable to all parties.

Management Activities

FWC and USFWS continue to work closely on manatee issues, particularly human-related threats and habitat enhancement. 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://www.myfwc.com/research/manatee/trust-fund/annual-reports/. Manatee management activities are directed by FWC's Manatee Management Plan and focus on five program areas (manatee outreach efforts are provided in the outreach portion of this report):

Manatee Protection Plans (MPPs) – This work involves the development and implementation of comprehensive county-based MPPs working closely with the counties. These MPPs are approved by FWC's Executive Director with concurrence by the USFWS. During FY 2012-13, FWC collaborated with Duval County to complete revisions to the County's existing plan with hopes of a final draft in late 2013. FWC is assisting Charlotte County in developing and drafting their first MPP; an early draft is expected by fall of 2013.

Protection Zones – FWC develops boat speed and safe haven zones statewide to protect manatees. Extensive work is required involving county governments, stakeholder groups, and

the public in order to develop and authorize the zones. Final rules are approved by the FWC Commissioners. The Flagler County rule, finalized during FY 2011-12, was posted in March 2013. In advance of considering a potential rule for western Pinellas County, FWC completed a data analysis and met with County staff to discuss the analysis. The analysis reviewed numerous variables, including aerial survey data for manatees and boats, manatee mortality rates, water depths, the presence of local boating regulations and state boating safety regulations, local resource protection zones, existing sign posting locations, and locations of existing boat facilities and manatee warm water sites. FWC also met with boating and environmental stakeholders to discuss the data analysis and to learn about local concerns. FWC plans to meet with additional groups to share data evaluation and collect local input.

Permit Reviews – FWC produced 340 final comment letters for proposed permitting projects reviewed during FY 2012-13. These biological opinions provide recommendations to regulatory agencies on ways to reduce impacts to manatees. Several of the permit review efforts focused on maintenance and expansions of Florida ports. Implementation of the boat facility-citing portion of FWC-approved MPPs is accomplished during the permit review process. Distribution of public information about manatees is also accomplished through these comments, as facilities are required to post informational signs on manatees and distribute written materials to boat users.

Manatee Habitat – During FY 2012-13, FWC participated in various intergovernmental groups and task forces regarding minimum flows at springs, invasive aquatic plant control, seagrass monitoring and protection, structure-related mortalities, and other habitat related concerns. The agency worked to ensure the presence of warm water refuges at three power plants on the east coast (Brevard, Palm Beach, and Broward counties) during the conversions to natural gas. This required ensuring that all of the appropriate manatee monitoring plans for the power plant conversions at these three Florida Power and Light plants were carried out. The conversion of the Cape Canaveral plant is complete and it is now generating electricity. At the Florida Power and Light Riviera Energy Center, the conversion is entering its last winter. At the Port Everglades plant, winter 2013 will be the first full winter with an interim heating system.

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

Mortality and Rescue – FWC researchers and law enforcement officers respond to statewide reports of manatee carcasses and injured manatees. Staff is strategically located in five coastal field stations in order to maintain response capabilities on a statewide basis. During FY 2012-13, 865 manatee carcasses were documented in Florida. All but 97 of these carcasses were recovered and examined in order to determine causes of death. Collision with watercraft accounted for 77 of the 865 cases. Other causes of manatee death are those associated with near-term or newborn (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/manatees/search_summary.asp.

NOAA-Fisheries' Working Group on Marine Mammal Unusual Mortality Events declared a Manatee Brevetoxicosis (red tide) Repeat Event for Southwest Florida during winter 2013. Between January and May, 272 red tide-related deaths were preliminarily reported and 18 red tide-related rescues were conducted. These are the highest number of manatee reports ever documented for a single red tide event. In addition, an Unusual Mortality Event was declared by

the working group on the central east coast of Florida. Greater than 100 manatee deaths have been documented in association with this event during FY 2012-13. The cause of this event is currently under investigation.

FWC and cooperators rescued 84 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 State-funded rehabilitation program for critical care treatment and are partially reimbursed by FWC for their costs. As of June 2013, 38 of these rescued manatees were released back into the wild, 15 died, and 31 are still being treated. FWC participated as a contributing organization to multi-agency efforts to release and track rehabilitated manatees that were rescued due to injury, cold stress, or other problems. As part of that partnership, FWC participated in almost every rescue, transports to rehabilitation facilities, pre-release health assessments, and releases of rehabilitated manatees in various parts of the State. The information obtained from manatee rescue, rehabilitation, treatment, and necropsy contributes to manatee conservation efforts by identifying important continuing and emerging threats to the species.

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

The annual statewide manatee synoptic survey [required annually, weather permitting, by section 379.2431(4)(a), F.S.] was not conducted in winter 2013 because of warmer than average weather. Researchers need specific weather conditions to successfully conduct these surveys. Surveys conducted in less than favorable weather conditions produce low counts because many manatees may be missed. For more information about aerial surveys and the synoptic count, please refer to http://myfwc.com/research/manatee/projects/population-monitoring/.

Currently, researchers are developing new aerial survey techniques to support statistically sound estimates of distribution and population size. The on-going analysis will lead to an estimate of manatee abundance for each coast. Staff conducted experiments on the visibility of manatees to estimate the probability that a manatee will be counted given environmental conditions such as water quality or turbidity. This information will help strengthen the rigor of the estimate.

FWC, in cooperation with the U.S. Geological Survey Sirenia Project and Mote Marine Laboratory in Sarasota, 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 important population vital rates.

Significant data gaps still exist in Florida manatee population assessments. In particular, it has been very difficult to estimate vital statistics for manatees in southwest Florida through photo-identification because of factors such as unfavorable photographic conditions and limited animal accessibility. Three demographic parameters are in need of refinement to better model manatee status and recovery: annual reproductive rates, annual gender-specific movement probabilities between FWC's northwest and southwest regions, and gender-specific adult survival rates in FWC's southwest region. Genetic testing offers an additional means of identifying individual manatees; its application could greatly enhance existing monitoring and

assessment studies. During the winters of 2009-10, 2010-11, 2011-12, and 2012-13, FWC conducted genetic sampling surveys with the main objective of collecting manatee skin biopsy samples. Results from these initial field seasons as well as genetic samples from carcasses will help to shed light on the effectiveness of the current study design and optimal sample size. Additionally, FWC is collaborating with the U.S. Geological Survey 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.

Behavioral Ecology – During FY 2012-13, FWC's behavioral ecology program continued to analyze data from a two-year field research project on tagged manatee interactions with motorized watercraft in southwest Florida. This work was in collaboration with researchers at Florida State University, Duke University in North Carolina, and Woods Hole Oceanographic Institution in Massachusetts. A thorough understanding of the behavioral and sensory mechanisms underlying manatee-boat collisions is necessary in order to devise effective methods of avoidance. The goal of the project is to create a combined picture of manatee behavior, acoustics, and vessel trajectories for better understanding of the responses displayed by manatees when approached by boats, and the acoustic cues that may mediate such responses. The research combined manatee-borne electronic tags with boat-based observations and aerial videography. Individual boat encounters were visualized in relation to underwater features (depth, seagrass) using a dynamic 3-D animation application that simultaneously plays the recorded sounds of passing motorboats and ambient noise. The acoustic and behavioral records are being analyzed to assess manatee response in relation to characteristics of approaching boats and sound levels experienced by the manatee. In addition to the Save the Manatee Trust Fund, this project was funded by FWC's Florida Manatee Avoidance Technology Program and the Disney Worldwide Conservation Fund.

Warm-water habitat is of particular interest to FWC and agency partners because the predicted future loss of this habitat is a key, long-term threat to the manatee population. FWC, along with the U.S. Geological Survey, Mote Marine Laboratory, and Florida Power and Light partners, have formulated plans to monitor how manatees will respond to a major change at a traditionally used Florida Power and Light power plant near Titusville in Brevard County. Part of the monitoring plan entails using telemetry to describe fine-scaled movements and habitat use. The 2012-13 winter was the last year of a three year construction period, during which Florida Power and Light provided a temporary warm-water refuge for manatees. Twelve manatees were captured and tagged with global positioning system tracking devices in December 2012 as part of this multi-year telemetry study. Individuals were tracked over the winter period and tags were removed in March 2013. Analyses of tag information and environmental variables are ongoing and available in annual reports to Florida Power and Light.

A multi-agency effort is underway to help managers make better decisions related to the management of warm-water habitat. A model is under development for analysis of management decisions related to this topic.

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

The North Atlantic right whale is a Federally-designated Endangered species in Florida. The only known calving grounds for this species are off the coast of northeast Florida and southeast Georgia. The southeastern U.S. calving season for the North Atlantic right whale is approximately November 15 – April 15. 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 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 as well as natural marks and human-related scars. Over time, population demographics, 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 (http://rwcatalog.neaq.org/Terms.aspx) – 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 to 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. FWC also analyzes ship traffic data to help monitor compliance with vessel speed regulations and conduct risk assessments.

Nineteen cow-calf pairs were documented in the southeastern U.S. during FY 2012-13. An additional cow-calf pair was sighted in January 2013 in the northeastern U.S., bringing the total number of documented calves to 20. Preliminary photo analysis indicates FWC documented 35 individual right whales (excluding calves) during 97 aerial surveys conducted between December 1, 2012, and March 31, 2013. In addition, the teams sighted seven humpback whales.

No entangled right whales were documented in the southeastern U.S. during the 2012-13 calving season; however, the carcass of an entangled juvenile washed ashore in Florida on December 19, 2012. FWC, as well as the Georgia Department of Natural Resources, NOAA-Fisheries, the University of North Carolina-Wilmington, Georgia Aquarium's Conservation Field Station, HUBBS-Seaworld Research Institute, and many others, participated in the carcass recovery and necropsy. The necropsy revealed the whale, a two-year old male, died as a result of chronic entanglement in fixed fishing gear. Preliminary analysis of the gear by NOAA-Fisheries indicated that it was near shore trap/pot gear from the northeastern U.S.

Two whales, a neonate calf and an adult female with a calf, received vessel-related injuries while likely residing in the southeastern U.S. Both cow-calf pairs were sighted off Florida during the calving season.

Biopsy sampling was a collaborative effort with NOAA-Fisheries and the Georgia Department of Natural Resources. During the 2012-13 calving season, 46 right whale biopsy sampling trips were conducted, resulting in samples from 17 calves, one juvenile, and two adult female right whales. Genetic testing will determine individual identification and gender as well as kinship and genetic variability within the population.

BIRDS

Audubon's Crested Caracara (*Brandon Schad*)

Fisheating Creek Wildlife Management Area Crested Caracara Nest Surveys – The Audubon crested caracara is a Federally-designated Threatened species. FWC began Audubon's crested caracara nest surveys on Fisheating Creek WMA during FY 2012-13. The surveys were initiated to comply with USFWS' wildlife monitoring requirements for the restoration of

Cowbone Marsh, a 2,500-acre freshwater marsh system in the Fisheating Creek WMA. During the surveys, five crested caracara nests were located.

Bald Eagle (*Josephine Barnhart, Megan Blomberg, Robin Boughton, Janell Brush, Jake Gipson, Alice Mason, Patrick McElhone, Kristin Rogers, Valerie Sparling, Michelle van Deventer, Morgan Wilbur, and Angela Williams*)

The bald eagle, the national bird, is a listed species success story. Outstanding conservation efforts led to this species being removed from the USFWS Endangered Species List in August 2007 and FWC's Endangered and Threatened Species List in April 2008. FWC has continued reporting work on bald eagles for the five-year post-delisting period described by the USFWS and the FWC Bald Eagle Management Plan. The bald eagle continues to be protected under the Federal Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, as well as FWC's bald eagle rule (Chapter 68A-16.002, F.A.C.). Bald eagle management and monitoring in Florida is funded by the Wildlife Foundation of Florida. FWC continues to issue permits for disturbance to and/or removal of bald eagle nests.

Management Plan Implementation and Permitting – The FWC Commissioners approved a final management plan for the bald eagle in 2008. A public website is maintained to accommodate all current information including the management plan, guidance, permitting information, and locations of nesting territories. This website may be accessed at http://myfwc.com/wildlifehabitats/managed/bald-eagle/.

Staff is beginning the process of conducting the five-year management plan review. FWC will work with the USFWS to develop a single permitting process to avoid duplication and create a more streamlined process. Any substantive changes to FWC policies or guidelines will be made with stakeholder involvement and the FWC Commissioners' approval.

FWC provides assistance to the public and other agencies on minimizing the potential for disturbance to nesting bald eagles that may result from activities near nests, recommending permits when the guidelines cannot be followed, reviewing disturbance and nest removal permit applications, and issuing State bald eagle permits. FWC also engages in educational programs and local government coordination, and assists law enforcement officers responding to public alerts of possible eagle rule violations.

Nesting Surveys – Florida supports one of the largest populations of breeding bald eagles in the lower 48 states. FWC and others have monitored bald eagle nesting territories in Florida since 1972. Population monitoring is ongoing to ensure that the State is achieving the management plan goal of maintaining a stable or increasing population of bald eagles throughout Florida in perpetuity. FWC anticipates that without continued protection of eagle nesting habitats, the number of nesting territories in Florida could decline by 10% or more over the next 24 years, which could trigger a relisting effort. In addition to acquiring current information about the status of eagle nests, surveys enable biologists to characterize the habitat and land-use changes within each nesting territory in Florida. This information may help to identify the factors that affect population changes, movement patterns, habitat changes, and other trends that can be applied in an adaptive management approach to implementing conservation measures.

FY 2012-13 was the fifth year using a survey method based on sampling one-third of the known nesting territories in the State each year. This sub-sample approach allowed FWC to

survey each nesting territory multiple times during the nesting season. The result was an unbiased confidence estimate of statewide productivity. FWC is currently in the process of data analysis. This sub-sample survey protocol is expected to be continued during the FY 2013-14 nesting season.

Results of the FY 2011-12 statewide survey were reported in November 2012 and are available online at http://myfwc.com/wildlifehabitats/managed/bald-eagle/monitoring/. Results from the FY 2012-13 are currently being analyzed. The estimated number of active bald eagle nesting territories in Florida was approximately 1,511. Polk and Osceola counties had the greatest number of active eagle nesting territories, and live pine trees are the most common nesting substrate for eagle nests in Florida. This data indicates that the number of nesting pairs of bald eagles in the state continues to exceed the minimum needed to meet the population goal.

Nesting surveys for bald eagles were conducted in January and February 2013 on the Apalachicola River Wildlife and Environmental Area (ARWEA), Box-R WMA, and St. Vincent Island National Wildlife Refuge in Gulf and Franklin counties to monitor the relative success of nesting eagles. All nests were recorded as either active or inactive and the number of eggs, nestlings, fledglings, and adults was recorded for each nest. During the January 2013 aerial survey, 30 nests were visited with 21 actively being used. Eggs were found at three nests, nestlings were found at six nests, and seven nests were being incubated by an adult eagle. A total of 20 adult eagles were observed at 18 nests. During the February 2013 aerial survey, 31 nests were visited, and 16 were actively being used. Nestlings were found at one nest and fledglings were found at ten nests. Adults were found at six nests. Two potential new nests were found during FY 2012-13 surveying. There were 22 active nests during the FY 2012-13 bald eagle nesting survey, a decrease of two nests compared to FY 2011-12.

Nesting surveys for bald eagles were conducted on January 15, 2013 on the Aucilla WMA in Jefferson and Taylor counties, and the L. Kirk Edwards WEA in Leon County. Two nests were monitored on Aucilla WMA. These nests were first documented in FY 2009-10 while flying systematic transects within potential eagle nest habitat. Both of these nests were monitored and determined to be active from 2010-2012. On January 15, 2013, only one of these nests was determined to be active with an adult eagle observed on the nest. The other was determined to be abandoned as the nest structure appeared to have not been maintained since the previous year. One eagle nest located on private property adjacent to Aucilla WMA was also monitored and determined to be active as an adult eagle was observed on the nest. While there are no eagle nests located directly on L. Kirk Edwards WEA, there is one on private property adjacent to the WEA. This nest was monitored and an adult eagle was observed at the nest tree.

Nesting surveys for bald eagles were conducted in January and March 2013, as well as ground surveys throughout the breeding season at John G. and Susan H. Dupuis, Jr. WEA (Dupuis) and J. W. Corbett WMA (Corbett) in Palm Beach County. The initial helicopter surveys determined active nests and later surveys monitored success. Volunteers with Audubon's Eaglewatch program assisted with ground surveys. The status of nests (active or inactive) and number of young were recorded. Three active nests monitored at Dupuis produced three fledglings. Two active nests at Corbett produced four fledglings.

Everglade Snail Kite (*Zach Welch*)

The Everglade snail kite is a Federally-designated Endangered species. The Everglades and Francis S. Taylor WMA in South Florida, consisting of South Florida Water Management

District's Water Conservation Areas 2 and 3, is located in Broward and Miami-Dade counties, and is important habitat for the snail kite. In recent years, there have been significant declines in snail kite nesting attempts and successes.

The Florida Cooperative Fish and Wildlife Research Unit at the University of Florida has been conducting snail kite monitoring since 1992. This monitoring is designed to provide information about population size, survival, movement, and reproductive success of the snail kite throughout its range in Florida.

A snail kite population decline that has occurred over the past decade was primarily caused by low levels of reproduction and too few young surviving to breeding age. The primary focus of management efforts in the past several years has therefore been to increase nesting success and juvenile survival through a suite of habitat management and conservation activities. Research from 2010 to 2012 provided managers with information about how to reduce nest failures in lake habitats and what habitat characteristics were associated with higher feeding rates. Nesting sites in primary lake habitats are managed annually to reduce predator access by isolating nest patches from shorelines and working with water managers to maintain flooded conditions under nests throughout the nesting season. Invasive and exotic plant management is closely coordinated around nesting habitats to eliminate potential disturbances from management activities and to improve nesting and foraging habitats through proactive plant management. Snail kite nesting locations are marked with warning signs if they occur in places with high levels of recreational use or near residential areas, and tourism, angling, and hunting activities are coordinated to reduce disturbances. Foraging perches are also distributed around nesting sites where large exotic snails have invaded, providing more stable platforms for young kites learning to feed themselves and to eat large snails.

Large-scale habitat management activities involve multiple agencies. FWC works closely with partners to improve Everglades' habitats, lake watersheds, and regulation schedules, and to improve connectivity between large water bodies. The first meeting of the Snail Kite Coordinating Committee, a network of snail kite researchers from various organizations, took place in May 2012. It will serve as a venue to speed up information transfer between the various entities involved in kite management or research, and will help provide direction for future activities related to improving snail kite populations.

Florida Grasshopper Sparrow (*Tina Hannon, Karl Miller, and Erin Ragheb*)

The Florida grasshopper sparrow is a Federally-designated Endangered species endemic to the dry prairie plant communities of Florida. Florida's dry prairie is a distinct region of the State characterized by flat, open expanses dominated by fire-dependent grasses, saw palmetto, and low shrubs. Following a status survey conducted by FWC, 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 of more than 50 breeding pairs each. Although the Florida grasshopper sparrow is known to exist at seven locations, only two populations meet recovery criteria: Three Lakes WMA in Osceola County and Kissimmee Prairie Preserve State Park in Okeechobee County, both of which are State lands. Only three populations of grasshopper sparrows persist on Florida's public lands; these include the Three Lakes WMA, Kissimmee Prairie Preserve State Park, and Avon Park Air Force Range (Federal land) in Highlands County.

Florida grasshopper sparrows on protected public lands are monitored by annual point count surveys, a standard method used to assess the relative abundance of bird populations. Results from point count surveys on public lands indicate a decline in the abundance of Florida grasshopper sparrows at all populations.

Monitoring on Three Lakes Wildlife Management Area in Osceola County – Point count surveys for the Florida grasshopper sparrow have been conducted on the Three Lakes WMA since 1991. The surveys are conducted each spring (April-June) and consist of a grid of 190 stations spaced 0.25 miles apart. Each station is surveyed for five minutes, three times each spring and all grasshopper sparrows heard or observed are recorded. Beginning in 2002, 60 stations were established north of the main population on what is called "the island" to determine if translocations of 18 juvenile sparrows in 2001 and 2002 were successful. In 2013, surveys estimated there were at least 67 different male grasshopper sparrows at the main site, up from 59 detected in 2012. No males were detected on the island in 2013. Tree removal, in which oaks and cabbage palms that have encroached on the dry prairie as a result of past fire suppression, was conducted in 2007 and 2008 on an adjacent site to the main site and 18 survey stations were added to that area in 2008. One grasshopper sparrow was observed in the area in 2012 and again in 2013. The six-year declining trend of detected males is of great concern to FWC. Monitoring will continue on the WMA in FY 2013-14. In FY 2012-13, in an effort to restore and maintain the dry prairie, oak trees and cabbage palms were mulched on 534 acres of the prairie, oaks re-sprouting within previous removal areas were sprayed with herbicide to prevent re-encroachment into these areas, and oaks outside of historic hammocks were cut down by WMA staff. In addition, an interagency working group is focusing on increasing monitoring efforts on all three properties where grasshopper sparrows are found in an attempt to determine causes for their declines.

The Florida grasshopper sparrow population on Three Lakes WMA is considered crucial to the persistence of the subspecies. However, unless the population trend improves, Florida grasshopper sparrows will become extinct from Three Lakes WMA. Annual point count surveys will continue in order to monitor the population. Future monitoring should incorporate covariates of abundance (e.g., land management history and rainfall) during the collection of data and in their analysis for use in adaptive management to recover this population. The current prairie burn regime at two to three-year intervals maintains suitable habitat for Florida grasshopper sparrows and should be continued. The population decline on Three Lakes WMA occurred over the entire area; except for the decrease in occurrence on the south end of the area, other possible causes for the decline are unknown.

Information on spatial changes in sparrow occurrence and abundance may be useful in the design of research projects to identify possible causes of the decline (e.g., locations of study plots) and in the interpretation of study results (e.g., fire ant densities, sparrow reproductive success, and sparrow response to experimental habitat manipulations). Possible demographic reasons for the Florida grasshopper sparrow population decline need to be identified to implement recovery efforts. Demographic and movement information is needed for Florida grasshopper sparrows in relation to habitat features and land management activities. The hypothesis that reproductive failure is a major component of the population decline should be examined. Baseline information is needed on the prevalence and intensity of diseases and parasites of Florida grasshopper sparrows. Three Lakes WMA may contain the only population of Florida grasshopper sparrows with a sufficient number of birds to study.

Demographic and Disease Assessment at Three Lakes Wildlife Management Area in Osceola County – The first season of Florida grasshopper sparrow demographic research by FWC was conducted during FY 2012-13. This project has been a cooperative effort involving staff and support from FWC, USFWS, the University of Central Florida, and Tall Timbers Research Station. The FWC research team has been working especially closely with USFWS staff from the Vero Beach office and other members of the Florida Grasshopper Sparrow Working Group, which is composed of managers of properties the sparrows occupy, researchers, Federal and State wildlife agencies, and Audubon.

This season, 42 male, five female, and ten juvenile grasshopper sparrows have been captured and color-banded. Six (of seven) adult males banded in 2012 by Jim Cox from Tall Timbers have been re-sighted this season for a total of 63 color-banded birds on the property in 2013. The re-sighting of six males banded last year is encouraging, as it indicates higher than anticipated adult survival rates. The search and capture of un-banded birds will continue throughout late summer and fall. This is the first attempt to band the entire population at Three Lakes WMA in order to generate robust annual survival and detection probability estimates using mark-recapture methods.

Interesting dispersal events among the banded population have been observed. One male banded on the WMA during spring 2013 was detected on another property 15 miles to the south. Landscape-level dispersal events such as this one have only been recorded a few times in the past. In addition, several long movements (.3-1.5 miles) have been observed within the study area. Careful documentation of these movements will be useful when trying to understand habitat preferences (particularly after prescribed burning events) as well as metapopulation dynamics.

Fifteen Florida grasshopper sparrow nests were located and monitored this season. Of these, seven survived to fledge young and eight failed due to predation. No nests failed due to flooding or abandonment.

There was no evidence of fire ant predation on any Florida grasshopper sparrow nests or on any of the 37 nests from other ground nesting species located within the study area. Conducting research on nest predators using video surveillance systems on ground-nesting birds is a priority for next season.

Fecal samples from 16 birds have been collected and analyzed for the presence of disease organisms. Seven of these samples were tested for intestinal parasites and all were negative. Nine samples were tested for the presence of salmonella, and five for acid-fast bacteria (such as avian tuberculosis). These samples were also negative for disease.

Florida Scrub-Jay (*Nancy Dwyer, Craig Faulhaber, Norberto Fernandez, Jim Garrison, Karl Miller, Dwight Myers, Nicole Ranalli, Brandon Schad, Steve Shattler, and David Turner*)

The Florida scrub-jay is a Federally-designated Threatened species that is endemic to Florida. Habitat loss and degradation have caused widespread declines throughout the scrub-jay's range. Scrub-jay populations are thought to have declined by as much as 90% since the late 1800s due to habitat loss and degradation. Three-quarters of remaining scrubby habitats are protected through land under public or private ownership that is dedicated for conservation. Despite this, 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 – During FY 2012-13, the Florida Scrub-jay Conservation Coordination Project continued to facilitate communication and information exchange among partners by continuing to organize regional working groups and workshops focused on management and monitoring for scrub-jays and their habitat. The working group and workshop attendees included representatives from all major public land management entities as well as non-governmental organizations, university staff, and private landowners. These working groups provide an excellent opportunity for participants to network, share ideas and experiences, and learn about new developments.

In FY 2012-13, staff organized two working group meetings in southeast Florida that combined field trips and presentations. FWC also organized workshops in northeast and southwest Florida to address specific conservation challenges, and assisted with a land management field trip in northeast Florida to enhance the effectiveness of management actions on conservation lands. Staff led a discussion on management needs of rare species at a working group meeting in south-central Florida, presented information on scrub-jays and habitat management at a field trip organized by the University of Florida's Forest Stewardship Program, and organized a workshop on scrub-jay management for the Florida Chapter of The Wildlife Society.

FWC facilitates the sharing of information by maintaining the Florida Scrub-Jay SharePoint Site (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. Project staff responded to questions about scrub-jays and their habitat from both partners and stakeholders.

FWC works with partners to help establish priority management and monitoring actions for scrub-jays and their habitat, providing advice and assistance regarding appropriate monitoring methods for scrub-jays. Activities in FY 2012-13 included FWC continuing to participate in a partnership with the U.S. Forest Service to conduct monitoring in Ocala National Forest, which contains the largest scrub-jay population. Additionally, staff assisted Audubon of Florida with planning, volunteer training, and data analysis for Audubon's Jay Watch citizen science monitoring program.

FWC staff visited 18 tracts of land to discuss land management with managers and biologists from local, state, and federal government agencies during FY 2012-13. Additionally, the agency assisted stakeholders planning habitat restoration projects in Polk and Volusia counties. FWC continued to advise USFWS on priority locations and management actions for scrub-jays. Staff also collaborated with USFWS to review and rank proposals for a scrub-jay habitat restoration grant program, and partnered with colleagues on a habitat restoration proposal for another grant program. The agency worked with the Brevard Zoo and other partners to relocate three families of scrub-jays from degraded land to a managed conservation area in Brevard County and began revising the agency's Scrub Management Guidelines to help land

managers determine the best ways to restore and manage scrub-jay habitat. Finally, FWC staff served on the Florida Scrub-Jay Recovery Team, which is improving and updating the Federal Recovery Plan for the species. The Recovery Plan, which has not been updated since 1990, will provide an important "road map" for scrub-jay conservation.

Ocala National Forest in Central Florida – The status and trend of scrub-jays in this crucial population remain uncertain because of unique challenges stemming from forest management practices and monitoring limitations. Harvest rotations for sand pines sustain the scrub-jay population by continually creating openings in the scrub but also limiting the potential carrying capacity for the region. The sheer size of the Ocala National Forest (more than 300,000 acres) limits the applicability of traditional color-banding and monitoring methods used with scrub-jays elsewhere in the State. During FY 2010-11, FWC developed a new monitoring protocol for monitoring scrub-jay populations in harvested stands in the Ocala National Forest.

During June and July 2013, FWC continued to implement this monitoring program in partnership with Federal agencies. FWC recruited, trained, and supervised a team of 22 individuals from FWC, the U.S. Forest Service, USFWS, the University of Florida, and the public to conduct post-reproductive monitoring. Thirty-one stands of zero to 14-year-old sand pine scrub were surveyed. Fifteen of those stands were chosen as "focal stands" for intensive study of Florida scrub-jays, where territories were delineated and nests were located and monitored. Within focal stands, 15 of 38 (39%) scrub-jay nests were successful in fledging at least one young. Staff is currently analyzing monitoring data to determine the current density and productivity of scrub-jays in sand pine scrub at Ocala National Forest. Two research projects were initiated with graduate students at the University of Florida this year, both of which will focus on how scrub-jay behavior is determined by patch dynamics. The project will continue during FY 2013-14, with additional analysis of habitat parameters that may affect scrub-jay productivity.

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

Past scrub-jay monitoring and banding was conducted by Archbold Biological Station under contract with FDACS from February 2003–February 2006. FWC initiated scrub-jay monitoring in 2008 using a pilot survey by Jay Watch, formerly The Nature Conservancy's citizen science program and now managed by Audubon of Florida. FWC continued monitoring scrub-jays on these areas through FY 2012-13.

During FY 2012-13, 11 scrub-jay groups were located on Arbuckle WMA. Seven groups were found in the previous fiscal year surveys, with an additional two groups found outside of the area surveyed by Jay Watch. The mean group size decreased from 5.22 in 2011 to 3.27 in FY 2012-13, and the number of juveniles per group decreased from 2.56 to 1.64. The total number of scrub-jays remained at 36. Since a mean family group size of three birds and the

mean number of juveniles per group of one is considered a normal population, the current groups appear to be relatively stable.

During FY 2012-13, eight scrub-jay groups were located on Walk-in-the-Water WMA by FWC, the same number of groups that were found in the previous fiscal year surveys. The mean group size remained at 3.75 and the number of juveniles per group decreased slightly from 1.63 to 1.62. The total number of scrub-jays increased slightly from 30 in FY 2011-12 to 31 in FY 2012-13. Since a mean family group of three birds and the mean number of juveniles per group of one is considered a normal population, the current groups appear to be relatively stable.

In 2002, FDACS initiated a Scrub-Jay Management Plan on the Lake Wales Ridge State Forest. Since then, more than 2,500 acres at Arbuckle WMA have been treated with prescribed fire, mechanical treatments, or a combination thereof, and more than 4,400 acres have been treated at Walk-in-the-Water WMA to benefit scrub-jays. Approximately 80 acres of scrub-jay habitat was burned on these areas during FY 2011-12; approximately 336 acres were burned during FY 2012-13.

FWC plans to continue monitoring scrub-jays on Arbuckle and Walk-in-the-Water WMAs using the Jay Watch Program and protocol, which may be accessed at http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/volunteer/jay-watch-volunteer-to-monitor-florida-scrub-jays.xml.

Cedar Key Scrub Wildlife Management Area in Levy County – FWC currently assists the lead-managing agency, the Florida Department of Environmental Protection (FDEP), in the monitoring and management of Florida scrub-jays on the Cedar Key Scrub WMA. There are typically five family groups of scrub-jays documented in and around Cedar Key Scrub WMA, four within the WMA and one outside the WMA. The monitoring program includes monthly monitoring of birds at specific sites, along a route set up by The Nature Conservancy's Jay Watch program, banding chicks-of-the-year (chicks born that year), and sexing the adults through territorial and nesting behavior. During FY 2012-13 monitoring efforts, no birds were seen or heard though some jays were noted after the survey was completed. More intensive monitoring of the area is being planned for FY 2013-14.

Fisheating Creek Wildlife Management Area in Glades County – FWC continued to conduct surveys for Florida scrub jays on Fisheating Creek WMA during FY 2012-13 using methods developed by The Nature Conservancy's Jay Watch program. One adult Florida scrub-jay was observed during the surveys.

Half Moon Wildlife Management Area in Sumter County – FWC continued to monitor Florida scrub-jays on the 9,500-acre Half Moon WMA during FY 2012-13. Individuals are color banded to better track the population. Although seven juveniles were observed from the 2012 breeding season, only four were banded, along with three new adults. Only two juveniles were found in summer 2013 out of four known groups. The present population is estimated at 12, a substantial drop from previous years when about 30 scrub-jays used the area.

Habitat management has focused on growing-season prescribed burning; roller-chopping palmetto; and mowing, cutting, or applying herbicide to overgrown oak trees. Half Moon WMA likely harbors a maximum of 500 acres of potential scrub-jay habitat, which consists of scrubby and mesic flatwoods. This may be marginal habitat as no true scrub exists in the area. In FY 2012-13, approximately 220 acres of potential scrub-jay habitat were burned. Habitat

management will continue with saw palmetto reduction through roller-chopping, increasing open ground, and cutting overgrown oaks in and surrounding potential habitat.

Salt Lake Wildlife Management Area in Brevard County – FWC continued to monitor the Florida scrub-jay population on the Salt Lake WMA in Brevard County. During FY 2012-13, twelve individuals in four family groups were recorded at Salt Lake WMA. There was no documented recruitment in FY 2012-13. This is a decline from nineteen individuals in six groups in FY 2011-12. All of the scrub-jay family groups are located in proximity to the Salt Lake WMA boundaries and each family group has territories that extend onto adjacent public and private properties. Monitoring efforts are scheduled to continue into FY 2013-14.

During FY 2012-13, approximately 268 acres of scrub, scrubby flatwoods, and mesic flatwoods in need of management were identified and prescribed fire was applied. Management activities slated for FY 2013-14 include the continued use of mosaic prescribed fire on approximately ten acres of potential scrub-jay habitat.

Mitigation Parks – The goal of mitigation parks is to provide an off-site alternative for resolving certain wildlife resource conflicts. Most mitigation park facilities are developed in cooperation with other local, State, and Federal agencies, usually following the signing and execution of a Memorandum of Understanding. The Memorandum's function is to establish an orderly process for administering monetary transactions and to provide a process for land acquisition and management. The responsibility for the management of lands acquired through the mitigation park program rests with FWC. These parks are managed primarily to enhance listed species populations, particularly those animals for which State and Federal approvals are required prior to their being impacted by new land development. All mitigation parks are designated by FWC as WEAs.

Annual monitoring of Florida scrub-jays during FY 2012-13 occurred at three mitigation parks. Moody Branch WEA in Manatee County was monitored using a private contractor. Four groups comprised of ten total birds were recorded on site. There was an overall decrease of two birds from the previous year. Management actions at Moody Branch WEA included 28 acres of prescribed burns and 22 acres of heavy woods mowed to control palmetto and hardwood encroachment.

Scrub-jay monitoring at Hickey Creek WEA in Lee County revealed two groups of scrub-jays consisting of four individuals, with no juveniles being observed after the nesting season. Two additional birds were observed just off the site in a residential area. The population decreased three birds from the previous year.

The Platt Branch WEA in Highlands County has a scrub-jay population that consists of 15 individuals among six groups, which is up one each from the previous year. Three juveniles were identified post-nesting season. New territory that formed two years ago has persisted and one former territory became reoccupied. Management efforts included burning 482 acres and roller chopping 11 acres at Platt Branch WEA, much of this within areas used by scrub-jays.

Lake Wales Ridge Wildlife and Environmental Area in Highlands and Polk Counties – The Lake Wales Ridge WEA consists of nineteen tracts in Highlands and Polk counties, twelve of which contain known groups of Florida scrub-jays. FWC monitors scrub-jay populations on select tracts on the Lake Wales Ridge WEA in cooperation with Archbold Biological Station and The Florida Audubon Society's Jay Watch program. During FY 2012-13, tracts surveyed by

Archbold Biological Station included Gould Road, Highland Park Estates, Leisure Lakes, Holmes Avenue, Lake Placid Scrub, Royce Unit, and McJunkin. Jay Watch volunteers and FWC surveyed at Clements, Royce Unit, Silver Lake, Sun 'n Lakes and Holmes Avenue. In addition to yearly surveys, during February 2013, FWC banded eight scrub-jays at Highland Park Estates and Royce Unit in order to more precisely monitor groups.

According to Archbold Biological Station results, the number of scrub-jay groups decreased at Lake Placid Scrub, McJunkin, and Highland Park Estates, and increased at the four remaining tracts when compared to the previous survey that was completed at each area. The number of juveniles per group decreased on all tracts surveyed by Archbold Biological Station. Silver Lake and Sun 'n Lakes were surveyed by Jay Watch and showed an increase in the number of groups (eight to ten groups), while the number of juveniles per group remained relatively stable.

Six of the WEA tracts containing scrub-jays are platted subdivisions. These sites (Carter Creek, Henscratch, Leisure Lakes, Holmes Avenue, Sun 'n Lake, and Highland Park Estates) contain a checkerboard pattern of State and private lands, which limits FWC's ability to employ necessary habitat management actions on State-owned property. One of the populations most at-risk occurs at the Carter Creek tract. This population has steadily declined from 14 groups in 2003 to six groups in 2007 to only two groups through the end of FY 2012-13. This downward trend is mirrored at the remaining five subdivision sites and will likely lead to local extirpation if current management constraints (i.e. inability to burn) persist.

Controlled burns during FY 2012-13 included roughly 317 acres of potential or occupied scrub-jay habitat in 14 separate management units. This acreage included 105 acres adjacent to current groups of scrub-jays at the Carter Creek tract. Additionally, 15 acres of sand pines were cut down in currently occupied scrub-jay habitat at the Lake Placid Scrub tract. Controlled burns and chainsaw work to reduce canopy heights are planned for FY 2013-14 to improve habitat suitability for existing scrub-jays and to attract new individuals.

Limpkin (*Morgan Wilbur*)

The limpkin is a State-designated Species of Special Concern in Florida. In 2013, FWC initiated testing of a methodology to detect trends in abundance and changes in occupancy of limpkins utilizing the Wacissa River spring run. Three replicates were conducted in late February, early April, and late May. Survey stations were located every 1,312 feet along the river. At each survey station, observers listened and scanned all habitats for a two-minute passive period. The number of individual limpkins seen or heard was recorded, along with sex and age class if possible. After the two-minute passive period, 30 seconds of recorded limpkin calls were played. Following playback of the recorded call, observers listened and scanned for another two-minute passive period and recorded all individual limpkins. During the 2013 survey, 11 to 13 individual limpkins were observed and four pairs were observed. Additionally, one active nest was found. The majority of these limpkins were detected during the early April period.

Marsh Birds (*Pam Boody*)

Marsh bird surveys were conducted on John C. and Mariana Jones/Hungryland WEA in southern Martin and northern Palm Beach counties during FY 2012-13. Surveys were conducted

March through April of 2013 using the Arizona Cooperative Fish and Wildlife Research Unit Standardized North American Marsh Bird Monitoring Protocols. The call/playback method was used for the following focal species: black rail, least bittern, king rail, purple gallinule, common moorhen, pie-billed grebe, and limpkin (State-designated Species of Special Concern). All focal species except the black rail were detected within the survey period.

Peregrine Falcon (*Robin Boughton*)

The peregrine falcon was delisted by the USFWS in 1999. Following a biological status review, the Florida Peregrine Falcon Management Plan was developed and then approved at the June 2009 FWC Commission meeting. The peregrine falcon was subsequently removed from the State's Endangered and Threatened Species List. The State Management Plan may be accessed at http://myfwc.com/media/1355287/5A4PeregrinePlan_final.pdf. FWC will continue reporting work on peregrine falcons for the five-year post-delisting period established by the USFWS (through 2015). Peregrine falcons do not breed in Florida and are only present as migrants or uncommon winter residents. The conservation actions (detailed below) in the Management Plan are to manage and continue to acquire habitat for the peregrine falcon, and to conduct a migration count.

- *Habitat Management* – Ongoing land management practices on WMAs and other public lands that benefit other species also benefit peregrine falcons.
- *Habitat Acquisition* – Coastal properties are of particular importance to both migrating and overwintering peregrine falcons. The narrowness of the Middle Keys serves to concentrate migrating peregrine falcons and therefore, preservation of roosting and foraging habitat in this area is essential. Important parcels have been identified for acquisition including Boot Key, Lower Matecumbe, and other large, relatively undeveloped parcels in the Middle Keys.
- *Monitoring* – In 2010, 2011, and 2012, the Florida Keys Hawkwatch, a private citizen group, began to organize volunteers to continue a long-term monitoring program. The organization plans to continue the monitoring program in fall of 2013.
- *Falconry* – FWC issues permits to allow take of two peregrine falcons for falconry each year. The number of peregrine falcons allowed by USFWS to be captured for falconry in the Atlantic Flyway (of which Florida is a member state) is 12. Florida currently receives an allocation of two each year.

Red-cockaded Woodpecker (*Diana Alix, Barbara Almario, Robin Boughton, Steve Brinkley, Mary Dowdell, Norberto Fernandez, Jim Garrison, Patrick McElhone, Paul Miles, Evan Ohr, Steve Shattler, Valerie Sparling, and Andrew van Lanen*)

Conservation Planning – The red-cockaded woodpecker is a Federally-designated Endangered species. At the close of FY 2006-07, implementation of most of the conservation actions identified in Florida's Red-cockaded Woodpecker Management Plan was complete, however, progress on the remaining conservation actions in the plan are ongoing and are outlined below:

- *Establish and convene a meeting of the Florida red-cockaded woodpecker working groups.* One red-cockaded woodpecker working group currently meets. Agenda items

relevant to the Florida Red-cockaded Woodpecker Management Plan have been incorporated into working group meetings and will continue as needed in the future.

- *Coordinate with USFWS to develop a statewide Safe Harbor program for red-cockaded woodpeckers in Florida.* The statewide Red-cockaded Woodpecker Safe Harbor program (http://myfwc.com/conservation/terrestrial/safe-harbor/) was initiated in November 2006 through an agreement between USFWS and FWC under the Federal Endangered Species Act. Since red-cockaded woodpeckers are protected under the Endangered Species Act, landowners have a legal obligation to protect the birds and their habitat. Safe Harbor agreements make sense whenever landowners are interested in restoring or enhancing habitats that may benefit this species but are concerned about incurring additional regulatory restrictions on the use of their land. An agreement effectively freezes a landowner's Endangered Species Act responsibilities as long as the owner agrees to restore, enhance, or create habitat that benefits red-cockaded woodpeckers. The program, maintained by FWC staff, continues to enroll landowners. By the end of FY 2012-13, there were 16 signed agreements that comprised 19 different properties in the program with a total of 94,500 acres committed for habitat management by the landowners.

At the close of the 2013 red-cockaded woodpecker breeding season, Florida red-cockaded woodpecker populations continued on a track to achieve and in many cases, exceed the year 2020 population and metapopulation goals outlined in Florida's Red-cockaded Woodpecker Management Plan. Field visits to red-cockaded woodpecker populations have confirmed that large populations in Florida are well-managed and that fire suppression, reliance on dormant season prescribed fire, and low availability of old-growth pines remain the greatest threats to red-cockaded woodpecker recovery in Florida.

Meetings of the red-cockaded woodpecker working groups and implementation of the statewide Red-cockaded Woodpecker Safe Harbor program will continue until the species meets its conservation goals.

Babcock/Webb and Yucca Pens Unit Wildlife Management Area in Charlotte and Lee Counties – Population monitoring for red-cockaded woodpeckers on Babcock/Webb WMA began in 1999. Color banding of all adults and nestlings has been conducted by FWC since 2002. The annual tree cavity survey in 2013 revealed 38 active red-cockaded woodpecker clusters. Two new recruitment clusters were installed to improve connectivity between groups. Annual roost checks confirmed 28 potential breeding pairs and 10 solitary bird clusters. All twenty-eight potential breeding pairs attempted nesting; nine groups failed, and 22 nestlings were banded from 19 breeding pairs. FWC completed controlled burns on 23,917 acres and roller chopped an additional 903 acres during FY 2012-13.

Blackwater Wildlife Management Area in Okaloosa and Santa Rosa Counties – The FDACS and FWC have cooperatively managed the red-cockaded woodpecker population on Blackwater WMA since 1996. During FY 2012-13, FWC assisted an FDACS biologist with banding nestlings and unmarked adults, re-sighting leg bands, fledge checks, translocations, and installation of artificial cavities where needed. FDACS has been responsible for reporting the banding of nestlings to the USFWS and FWC. During FY 2012-13, there were 94 active clusters, 90 potential breeding groups, and 81 nests. FWC continued a habitat improvement program initiated in 2006 by assisting FDACS with habitat management activities within red-cockaded woodpecker clusters.

Camp Blanding Wildlife Management Area in Clay County – At Camp Blanding WMA, FWC assists with habitat improvement and restoration for the red-cockaded woodpecker population. A total of 21 red-cockaded woodpecker clusters and surrounding foraging areas were cooperatively burned by Camp Blanding Forestry and FWC personnel during FY 2012-13. Two aerial burns totaling 3,609 acres were conducted. Fourteen artificial cavity inserts were installed or replaced during FY 2012-13.

Citrus Wildlife Management Area in Citrus County – FWC, in cooperation with FDACS, continued to monitor the red-cockaded woodpecker population on the 49,317-acre Citrus WMA tract of the Withlacoochee State Forest. Of the 71 active clusters in 2013, 62 nested, and 51 were successful in fledging 74 young. The number of potential breeding groups on the area has leveled off at 65.

Color banding continued with 86 nestlings banded during the 2013 nesting season. At least one other fledgling and five adults remain un-banded.

Habitat management on Citrus WMA included prescribed burns on 12,262 acres, hardwood control, protecting cavity trees from fire, and installing artificial cavity inserts. About 30% of the clusters received fire in the past year. Encroaching hardwoods were cut and treated with herbicide in at least 21 clusters. Staff and volunteers protected, by mechanical means, 497 cavity trees from fire in 33 clusters. Twenty-four inserts were replaced in clusters needing them, while six new inserts were installed in established clusters to provide cavities for fledglings.

Intensive monitoring and habitat management for this population has allowed it to donate young-of-the-year to smaller populations. In November 2012, seven subadults from Citrus WMA, which is the farthest south of any donor population, were translocated to Croom and Platt Branch WMAs. In October 2013, eight sub-adults will be moved to Bull Creek and Triple N WMAs in south-central Florida.

Croom Wildlife Management Area in Hernando and Sumter Counties – FDACS monitors the red-cockaded woodpecker population on Croom WMA. During FY 2012-13, FWC assisted FDACS with monitoring at Croom WMA by checking and grading trees in seven red-cockaded woodpecker clusters and performing roost checks in two clusters.

J. W. Corbett Wildlife Management Area in Palm Beach County – J.W. Corbett WMA is owned and managed by FWC, and all monitoring and management of the red-cockaded woodpecker is conducted by FWC. During FY 2012-13, habitat management included maintaining a three-year, growing-season burn rotation within red-cockaded woodpecker habitat. Habitat restoration within red-cockaded woodpecker habitat included treating 15,388 acres of exotic plant species. Ten artificial red-cockaded woodpecker cavities were installed including the creation of one new recruitment cluster.

There were 16 active clusters and 15 potential breeding groups during the 2013 nesting season. Fourteen out of 15 potential breeding groups attempted nesting, with ten clusters successfully fledging ten birds.

Corbett WMA received three pairs of birds from Camp Blanding WMA in the fall of 2012. Of six birds, three have been observed since the move, resulting in a 50% retention rate. Corbett WMA is scheduled to receive three pairs of birds from Osceola National Forest in the fall of 2013.

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

FWC has been intensively monitoring the red-cockaded woodpecker population on Three Lakes WMA since 2001. The population decreased after the 2004 hurricanes but has returned to its pre-hurricane numbers. The number of potential breeding groups remained stable in 2013. During the 2013 breeding season, 30 of the 48 nesting attempts were successful with 40 chicks (including 28 of 36 banded nestlings) surviving to fledge the nest. Thirty-six insert boxes were cleaned and maintained in 2013. Habitat management activities that enhance red-cockaded woodpecker habitat included prescribed fire on 21,164 acres, mechanical treatment (including roller chopping and mowing) on 616 acres, and exotic plant treatment. To protect red-cockaded woodpecker cavity trees during prescribed fires, FWC pre-burned around each tree.

The Herky Huffman/Bull Creek and Triple N Ranch WMAs have been actively managed as a single, small, red-cockaded woodpecker population since 2003; they supported ten potential breeding groups in FY 2012-13. This number has been steadily increasing since 2005 when FWC began yearly translocations of birds to the property. In October 2012, six individuals were translocated to Triple N Ranch. Three of the translocated individuals remain on the area including a female who nested and successfully fledged a chick. During FY 2012-13, six of the eight nesting attempts were successful and eleven nestlings were banded. Six of the eleven chicks survived to fledge the nest. Habitat improvements by FWC that aid red-cockaded woodpeckers included prescribed fire on 13,134 acres, roller chopping on 1,527 acres, and invasive plant control on 229 acres. To protect red-cockaded woodpecker cavity trees during prescribed fires, FWC pre-burned around each tree.

Babcock Ranch Preserve in Charlotte County – Monitoring efforts by FWC (and cooperating volunteers) at the Babcock Ranch Preserve in Charlotte County began in 2012. The annual tree survey conducted during FY 2012-13 found 118 cavity trees on site including several new trees. Three recruitment clusters were installed in accordance with the Red-cockaded Woodpecker Management Plan. There were nine active clusters with potential breeding pairs. At least five clusters nested and fledged young. Prescribed fires were conducted on 16,954 acres of the Babcock Ranch Preserve.

Big Cypress National Preserve in South Florida – Big Cypress National Preserve (BCNP) in Collier County supports the largest, southern-most population of red-cockaded woodpeckers. This population continues to be documented and monitored cooperatively by the National Park Service and FWC.

Annual monitoring continued in the fall of 2012, with tree and cavity surveys to determine cluster status and activity. Also during fall 2012, FWC completed the third and fourth red-cockaded woodpecker translocations from BCNP to Lostman's Pines sub-population in BCNP in Monroe County and Picayune Strand State Forest in Collier County. No red-cockaded woodpecker were translocated into the population due to the successful red-cockaded woodpeckers present on property. During the spring of 2013, 14 artificial cavities were installed in three cavity-limited clusters and 17 adult red-cockaded woodpeckers were banded by FWC.

New clusters were discovered throughout the year, bringing the total number of known red-cockaded woodpecker clusters in BCNP to 105.

Monitoring continued into the summer with nest checks, nestling banding, fledge checks, and roost checks. FWC monitored 32 of 105 potential clusters for productivity based on access and cluster activity. Out of 29 potential breeding groups, 22 groups attempted nesting with 17 of those successfully hatching chicks. Twenty-seven chicks made it to banding age (seven to ten days old) and 12 of those fledged with five still unknown. Helper birds were observed in eight of the monitored clusters. Additional clusters were surveyed for signs of activity during the breeding season and at least 92 were active.

FWC will continue to survey BCNP for new cluster locations and continue to augment cavity-limited clusters. FWC has fall 2013 translocation plans in place, and will be working with cooperating agencies to continue translocations from BCNP. FWC also plans to augment additional cavity-limited clusters and continue to closely monitor clusters for the 2013 breeding season.

Goethe State Forest in Levy County – FWC currently assists FDACS in monitoring and managing the red-cockaded woodpecker population on the Goethe State Forest. During FY 2012-13, there were 67 active clusters of red-cockaded woodpeckers, which produced 45 chicks. The annual monitoring program includes roost checks, cavity and tree inventories, search for new cavities, cavity tree maintenance, the banding of chicks-of-the-year and any un-banded adults that are found, and sexing the chicks when fledged.

Tate's Hell State Forest in Franklin and Liberty Counties – FWC conducts inventory and monitoring projects for red-cockaded woodpeckers on Tate's Hell State Forest. The primary objective is to provide for the long-term perpetuation of red-cockaded woodpeckers, accomplished by searching for unknown clusters (colonies), monitoring reproductive success, supervising mechanical treatments in clusters, and determining timber and fire management impacts.

During FY 2012-13, FWC mechanically cleared 90 acres to reduce the hardwood midstory surrounding 18 clusters. FWC also assisted FDACS on eight burns, including 7,629 acres of compartments that contain red-cockaded woodpecker clusters and foraging habitat. From March-June 2013, 57 clusters were monitored for red-cockaded woodpecker activity. FWC documented 40 active clusters. One new active cluster was discovered on May 31, 2013. Trees used by red-cockaded woodpeckers for roosting and nesting within each cluster were surveyed for nests. 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. Thirty-seven potential breeding groups occupied the 40 active clusters, and 36 (92.3%) of those attempted to nest, up from 78.3% in 2012. Eleven (30.5%) nest attempts failed. FWC banded 53 nestlings.

Apalachicola River Wildlife and Environmental Area in Franklin County – Both natural and artificial clusters within ARWEA in Franklin County were monitored throughout the breeding season. ARWEA has a relatively small, but growing, population of red-cockaded woodpeckers. In December 2012, improvements in habitat conditions allowed FWC to create an additional recruitment cluster. FWC monitored three natural and eight artificial clusters in the Franklin County portion of ARWEA throughout the breeding season.

During FY 2012-13, eight of the eleven clusters showed signs of activity; however, pairs in only four of those active clusters attempted nesting. Eight nestlings were banded in 2013, down from 19 banded in 2012. Six of the eight nestlings fledged (75% survival rate). One artificial cluster was depredated. Management activities to enhance foraging habitat included 913 acres of prescribed burning that encompassed two clusters. In addition, approximately 98 acres adjacent to two clusters were roller chopped to remove mid- and understory hardwood growth.

John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area in Palm Beach County – Since 2006, 71 red-cockaded woodpecker have been captured and translocated from public lands in Florida and Georgia to Dupuis WEA. Of the ten birds translocated from Fort Stewart, Georgia in the fall of 2012, five remained on the area. In 2013, ten potential breeding groups produced ten fledglings.

As part of the area's red-cockaded woodpecker management plan, an additional ten woodpeckers will be translocated this fall from Osceola National Forest. Old cavities were replaced and new cavities installed to bring the total number of cluster locations to 27. During the next breeding season, clusters will continue to be monitored for nests, nestlings will be banded, and fledging success determined. In addition, habitat management activities to reduce mid-story height and enhance red-cockaded woodpecker habitat will continue.

Restoration of this woodpecker species at Dupuis WEA will provide an important additional population in southeastern Florida as part of the Federal Red-cockaded Woodpecker Recovery Plan. The only other group of red-cockaded woodpeckers in southeastern Florida is at Corbett WMA.

Platt Branch Mitigation Park Wildlife and Environmental Area in Highlands County – FWC continued the monitoring of red-cockaded woodpeckers in the Platt Branch WEA and Fisheating Creek population in Highlands and Glades counties during FY 2012-13. The populations within Platt Branch WEA and on adjacent private properties, portions of which are protected by conservation easements, comprised six active clusters at the beginning of FY 2012-13, which was a reduction of one active cluster from FY 2011-12. The population trend has been a slow decline for several years. For this reason, permission was granted by the USFWS for the first inter-population translocation of red-cockaded woodpeckers to Platt Branch WEA, which took place in November 2012. Four recruitment clusters were established at Platt Branch. One juvenile male/female pair along with a juvenile female for mate provisioning, was translocated in November 2012. Monitoring in the 2013 breeding season revealed 100% retention of these birds into the population.

Surveys in FY 2012-13 following the translocation revealed five potential breeding pairs, which is up by two over FY 2011-12, with an additional two solitary males prior to nesting season. Nesting success was monitored during the spring of 2013, with five pairs nesting, which was up three pair from FY 2011-12. All five pairs produced one nestling each that was banded and four successfully fledged (up one from the previous year). This initial translocation was very important in beginning the stabilization of the population and resulted in two new breeding pairs that were both successful. Two additional recruitment clusters will be established in the future, and Platt Branch WEA will be receiving two pairs of red-cockaded woodpeckers in FY 2013-14

FWC completed controlled burns on 482 acres of suitable habitat during FY 2012-13. An additional 11 acres of flatwoods was roller chopped and exotic treatments were done on 5.5 acres. Mechanical fuel reduction (i.e. roller chopping) was completed around all active clusters within Platt Branch.

Roseate Tern (*Ricardo Zambrano*)

The roseate tern is a Federally-designated Threatened seabird. In Florida, this species is only found in extreme South Florida and in a limited number of colonies. After the hurricane season of 2005, the roseate tern's main nesting island, Pelican Shoal Critical Wildlife Area in the Keys, was submerged under one to two feet of water and thus no longer available as a nesting site for roseate terns.

In the spring of 2006, FWC biologists attempted to attract the birds displaced from Pelican Shoal to an alternative nesting area. In cooperation with the National Park Service, 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. The decoys and call broadcasting equipment were not placed at the Dry Tortugas after 2010 in order to determine if the terns would nest there on their own. Only twelve nests were recorded in 2011. Although no nest counts were conducted in 2012, 43 nests were recorded in 2013. Sixty-three nests were recorded subsequently during a second round of nesting at the Dry Tortugas National Park in 2013. FWC biologists also surveyed four gravel roofs in 2013 that contained roseate tern nesting colonies. A total of 190 nests were recorded between the four roofs. It is believed that strong rain storms that left standing water on the roofs caused these four roof colonies to mostly fail. Only 16 nests hatched chicks on the roof colonies. The total roseate tern population for Florida is estimated to be 233 pairs based on peak nest numbers during the first wave of nests. In 2013, a sample of 102 chicks was captured, banded, and released at the rooftop colonies in the Florida Keys and the ground colony at the Dry Tortugas National Park.

Shorebirds (*Naomi Avissar, Janell Brush, Nancy Douglass, and Amy Schwarzer*)

Two species of shorebirds in Florida are currently listed as State-designated Threatened (snowy plover and least tern) and two species are currently listed as State-designated Species of Special Concern (black skimmer and American oystercatcher). Biological status reviews conducted in 2011 determined that all four species of shorebird should be listed as State-designated Threatened. A species action plan for listed shorebirds was initiated in FY 2011-12 by staff, who will continue working with stakeholders to finalize the plan for FWC Commissioner approval. Once the plan is approved, the black skimmer and American oystercatcher will also be listed as State-designated Threatened.

Survival of Florida's vulnerable seabirds and shorebirds (e.g. snowy plover, least tern, roseate tern, black skimmer, and 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, in 2007, FWC initiated a conservation approach for shorebirds and seabirds, which relies extensively upon

partnership development and support. This project, the Florida Shorebirds Partnership Coordination, is funded through Florida's Wildlife Legacy Initiative (Congressional State Wildlife Grants program). FWC helped cultivate numerous local and regional partnerships to improve conservation through cooperative efforts between key agencies, organizations, and individuals involved with the management, monitoring, and stewardship of shorebirds and seabirds.

A statewide partnership network entitled the Florida Shorebird Alliance was created in 2009 to facilitate information exchange between partners, improve coordination statewide, and add more consistency to monitoring and management of Florida's shorebirds and seabirds. The Florida Shorebird Alliance is organized into regional partnerships that work locally to ensure important shorebird and seabird sites are surveyed and monitored. To date, ten active regional partnerships coordinate monitoring and protection across Florida. The Florida Shorebird Alliance also publishes a newsletter and maintains an email list-serve of 1,189 contacts.

The Florida Shorebird Alliance website may be accessed at www.flshorebirdalliance.org. This website functions as an online resource for information and materials on Florida's shorebirds and seabirds, and as a tool to improve the level of coordination and information sharing between the various regional partnerships.

Florida Shorebird Database –The Florida Shorebird Database, launched in spring 2011, was created to serve as the central repository for data collected on shorebirds and seabirds in Florida. The Database is an online tool with a data entry interface that allows users to submit and manage observations. FWC and partners developed the Database and an accompanying protocol for monitoring beach-nesting shorebirds and seabirds. To date, 444 registered users from throughout the State are entering locations and nesting data on these birds. These data are now available online to anyone, thereby allowing researchers, managers, conservationists, and permit reviewers to use information to help conserve shorebirds and seabirds. The Database may be accessed at: www.flshorebirddatabase.org.

American Oystercatcher – During FY 2012-13, FWC researchers conducted surveys in three areas in order to document breeding success and movement patterns: the Florida Barge Canal on the Nature Coast, and the Tolomato and Matanzas rivers in northeast Florida. In these areas, researchers followed 41 pairs and 53 nests. While spring tides washed out many early nests, there was moderate hatch success later in the season, particularly on the Tolomato River. Pairs from all monitored areas fledged a total of ten chicks. FWC researchers and partners also banded seven adults and ten chicks during the season as part of an effort to understand adult and juvenile movements during and after the breeding season.

Southeastern American Kestrel (*Barbara Almario, Norberto Fernandez, Jim Garrison, Allan Hallman, Anni Mitchell, Karl Miller, and Jennifer Myers*)

The Southeastern American kestrel is a State-designated Threatened species. A species action plan for the Southeastern American kestrel was initiated in FY 2011-12. Staff will continue working with stakeholders to finalize the plan for approval by the FWC Commissioners.

The Southeastern American kestrel is a non-migratory falcon closely tied to sandhills in the southeastern U.S. This subspecies has undergone a range reduction and population decline

throughout its range in recent decades. In July 2008, FWC initiated a long-term effort to develop a regional Southeastern American Kestrel conservation partnership within and across agencies by: 1) identifying suitable but unoccupied kestrel habitat; 2) establishing population targets for kestrels on FWC's WMAs and other public lands; 3) building and installing new nest boxes and repairing old nest boxes; 4) providing standardized data collection protocols to monitor kestrels and establishing a database to manage annual monitoring data on public lands; 5) monitoring nest boxes during the breeding season; 6) educating biologists, land managers, bird watchers, and others through talks, web sites, and printed media; and 7) conducting additional research on kestrel breeding habitat requirements.

During FY 2012-13, FWC coordinated kestrel monitoring with partners – Florida Department of Environmental Protection, FDACS, private citizens, and local Audubon Society chapters. Nearly 500 nest boxes were monitored during the spring and summer of 2013. Nest boxes were located in 11 counties in north-central Florida (Alachua, Citrus, Clay, Columbia, Gilchrist, Hernando, Levy, Madison, Marion, Sumter, and Suwannee) and four counties in south-central Florida (Glades, Highlands, Lake, and Polk). Fewer than 34% of the nest boxes were occupied, which represents a gradual but steady decline in occupancy in recent years. The three public lands with the most Southeastern American kestrel nest boxes were Camp Blanding WMA in Clay County (50 nest boxes), Mike Roess Gold Head Branch State Park in Clay County (18 nest boxes), and Withlacoochee State Forest in Citrus County (18 nest boxes). The longest-running nest-box monitoring program for Southeastern American kestrels in Florida is located at Ichetucknee Springs State Park in Columbia and Suwannee counties. Ichetucknee Springs State Park maintains 13 nest boxes and two to four have consistently been used by kestrels each year since the 1990s. FWC also participated in the launching of the Peregrine Fund's "American Kestrel Partnership" to promote nest boxes for American Kestrels and to coordinate research and monitoring needs at the regional and continental level.

In FY 2012-13, 54 Southeastern American kestrel nest boxes were maintained and monitored by FWC on FWC-managed lands in southwest Florida. Two of the 54 boxes were installed during FY 2012-13; the remainder were installed during previous fiscal years. FWC-managed lands with kestrel nest boxes include: Chassahowitzka WMA, Perry Oldenburg Mitigation Park WEA, Janet Butterfield Brooks WEA, and Chinsegut WEA, which are all in Hernando County; Hilochee WMA in Lake and Polk counties; Lake Wales Ridge WEA in Highlands and Polk counties; Kissimmee Island Cow Company WMA in Polk County; Hickory Hammock WMA in Highlands County; Kissimmee River Public Use Area in Highlands and Okeechobee counties; Crooked Lake WEA in Polk County; and Platt Branch WEA in Highlands and Glades counties. Nest boxes were maintained and monitored by FWC during the spring breeding season. Nine nest boxes were used by breeding kestrels. Chassahowitzka WMA had three active boxes, Perry Oldenburg WEA had two active boxes, Janet Butterfield Brooks WEA had one active box, Lake Wales Ridge WEA had two active boxes, and Crooked Lake WEA had one active box. Nine boxes were used by Eastern screech owls, two by Eastern bluebirds, one by a Northern flicker, one by a great-crested flycatcher, and one was occupied by bees. The remaining boxes were not used.

During FY 2012-13, 81 Southeastern American kestrel nest boxes were maintained and monitored by FWC on FWC-managed lands in north-central Florida. On Camp Blanding WMA in Clay County, 50 nest boxes were cleaned and surveyed. All boxes were then checked for usage and maintained monthly during June. Six nest boxes were verified as having been or as currently being used by kestrels. Other wildlife utilizing the nest boxes in order of occurrence

were: southern flying squirrels, great crested flycatchers, screech owls, Eastern bluebirds, and Sherman's fox squirrels. On Jennings State Forest WMA in Clay and Duval counties, 26 existing boxes were cleaned and maintained in February 2012. FWC conducted two visits during nesting season (April to June). No kestrel activity was noted. Other animals utilizing boxes were southern flying squirrels, gray squirrels, great-crested flycatchers, Eastern bluebirds, and Sherman's fox squirrels (four young were observed). On Twin Rivers State Forest WMA in Madison County, five nest boxes were cleaned and surveyed in March, April, and May 2013. No kestrel eggs were identified. The boxes were used by southern flying squirrels and great-crested flycatchers throughout the nesting season. Active kestrel pairs were frequently seen hunting in the vicinity of the five nest boxes. There are many natural cavities in the vicinity of the boxes and two pairs of kestrels were observed using these cavities for nesting. Three fledges from two natural nests were observed. On Watermelon Pond WEA in Alachua County, nine kestrel boxes were cleaned and maintained during FY 2012-13. One of the nine boxes was used for kestrel nesting, holding a total of four eggs, which subsequently failed.

In March 2009, FWC worked with a local Eagle Scout candidate and his crew to build and install ten kestrel nest boxes within open fields and wildlife openings throughout Blackwater WMA in Okaloosa and Santa Rosa counties. Additional boxes have been installed since 2009, along with predator guards, to encourage use by kestrels. Occupancy by kestrels has increased over time with one box used in 2009, two boxes in 2010 and 2011, and four in 2012.

During FY 2012-13, FWC continued to monitor kestrel nest boxes on Blackwater WMA. Seven kestrel nest boxes were installed and two boxes were abandoned, increasing the total number of boxes monitored to 21. In January 2013, FWC recorded evidence of use and removed remaining nesting material from the previous year. In April, FWC observed seven boxes occupied by kestrels. A later check in June found five live chicks and seven eggs, two of which likely fledged successfully. Monitoring and maintenance of kestrel boxes will continue during FY 2013-14.

Wading Birds (*Pam Boody, Justin Davis, Paul McElhone, Paul Miles, Valerie Sparling, and Morgan Wilbur*)

Seven species of wading bird in Florida are currently listed as State-designated Species of Special Concern – the snowy egret, little blue heron, tricolored heron, roseate spoonbill, reddish egret, limpkin, and white ibis. Biological status reviews determined that four (little blue heron, reddish egret, roseate spoonbill, and tricolored heron) should be listed as State-designated Threatened, but the other three should not (snowy egret, limpkin, and white ibis). A species action plan for these species was initiated in FY 2011-12; the species' status will not change until the plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

<u>Aucilla Wildlife Management Area in Jefferson and Taylor Counties</u> – 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 25 and May 29, 2013. Transects were 0.5 miles apart and flown at an altitude of 300-400 feet and an air speed of approximately 40-50 knots. Of six previously identified wading bird colonies, three were active. Of the six colonies, no more than five have ever been active at the

same time. No new colonies were found during the aerial survey. Aucilla WMA experienced drought conditions during the previous two nesting seasons. As such, many of the wetlands where colonies are located were dry or nearly dry and only one colony was active during each of these two years. The wading bird colonies are typically mixed with listed species and non-listed species including great egret, little blue heron, snowy egret and yellow-crowned night-heron.

Fitzhugh Carter Tract of Econfina Creek Wildlife Management Area in Washington County – Numerous water bodies and associated wetlands on the Fitzhugh Carter Tract of Econfina Creek WMA (Carter Tract) provide excellent nesting and foraging habitat for the many species of wading birds found in the Florida Panhandle, most of which are listed or at-risk. In particular, one wading bird colony has been observed supporting nests for various species of colonial-breeding wading birds. State-designated Species of Special Concern that have used this colony in previous years include the little blue heron and tricolored heron. The colony is monitored annually April–July to document species use, number of adult birds present, and number of chicks produced (**Table 4**). Adult use and chick production of the rookery does not seem to follow any discernible trend to date, although data show little blue herons use this colony more frequently than tricolored herons. Multiple incidental observations of white ibis, a State-designated Species of Special Concern, are made annually on area water bodies. Wood storks, a Federally-designated Endangered species, are also occasionally observed using area water bodies, although they are not necessarily documented every year. Increases in wood stork observations tend to coincide with drought conditions, which concentrate prey as water levels recede. The wading bird colony at the Carter Tract will continue to be monitored annually during the nesting season (April-July) and incidental observations of at-risk wading bird species throughout the property will also be documented.

Table 4. Annual little blue heron and tricolored heron use of the Little Deep Edge Pond wading bird colony, Fitzhugh Carter Tract of Econfina Creek WMA, Washington County, FL.

Year	Little Blue Heron			Tricolored Heron		
	Adults	Nests	Chicks	Adults	Nests	Chicks
2008	8	3	0	2	unknown	0
2009	1	0	0	0	0	0
2010	0	0	0	0	0	0
2011	20	14	34	1	1	1
2012	7	4	6	0	0	0
2013	5	3	4	0	0	0

J.W. Corbett Wildlife Management Area in Palm Beach County – Aerial wading bird surveys were conducted for active rookeries on J.W. Corbett during FY 2012-13. Both previously known rookeries were confirmed to be active, and nests of snowy egrets, white ibis, and great egrets were observed. Marshbird surveys were conducted for two weeks along multiple transects. Florida sandhill cranes, limpkins, least bitterns, and pied-billed grebes were detected.

Apalachicola River Wildlife and Environmental Area and Box-R Wildlife Management Area in Gulf and Franklin Counties – ARWEA and Box-R WMA consist of a matrix of upland,

wetland, and riverine habitats that potentially contain several rare or at-risk species. The numerous wetlands on these areas provide habitat for several species of colonial wading birds, including the great blue heron, tricolored heron, little blue heron, great egret, snowy egret, white ibis, and wood stork. In order to monitor the relative success of wading bird populations in the area, an annual aerial colony survey (within the lower Apalachicola River basin) is conducted in the spring of each year. Wading bird surveys began on ARWEA and Box-R WMA in 1988, and have been flown every year since 1993.

Aerial surveys were completed within the lower Apalachicola River basin on April 24, 2013, and May 30, 2013. There were six nesting colonies located during aerial surveys, the same number as FY 2011-12. Species found nesting in the colonies included great blue heron, little blue heron, great egret, snowy egret, anhinga, and wood stork. Wood storks have been found nesting in the same general rookery in nine out of 22 years of conducting aerial surveys.

John C. and Mariana Jones/Hungryland Wildlife and Environmental Area in Martin and Palm Beach Counties – An annual aerial nest survey was conducted during FY 2012-13 on the John C. and Mariana Jones/Hungryland WEA in southern Martin and northern Palm Beach counties. The nest survey was flown in May to document habitat use, solitary locations, and colony nest locations. Fifteen sandhill crane nests were observed during the survey; four of the 15 sandhill crane nests observed were within one half mile of the area boundary. Two small nest colonies were observed: one nest colony was observed supporting one great blue heron nest, one anhinga nest, three great egret nests, and 13 snowy egret nests; the other nest colony was observed supporting one great blue heron nest, two great egret nests, and 16 snowy egret nests.

John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area in Palm Beach County – The 2,500-acre marsh on the John G. and Susan H. Dupuis, Jr. WEA provides good habitat for many species of wading birds in Florida. Monthly roadside visual surveys have been conducted since 1996 to monitor wading bird presence. The most common wading birds observed have been great egrets, great blue herons, and little blue herons. Numerous other wading birds have been seen feeding on the area, including tricolored herons, snowy egrets, white ibis, and wood storks. The marsh and other wetland areas at Dupuis will continue to be surveyed monthly to document wading bird activity.

Whooping Crane (*Marty Folk*)

Non-Migratory Population – Whooping cranes in Florida are a Federally-designated Nonessential Experimental Population. Non-migratory whooping cranes are no longer being released in Florida. Low productivity and high mortality limit the likelihood of achieving a self-sustaining population. FWC's intensive monitoring of the remaining birds ended in June 2012 and at that time the population was estimated at 18 birds. FWC continued to monitor and study the remaining birds when there was an opportunity, however. Research projects are primarily focused on behaviors of the birds during the breeding season. Findings from the research will 1) allow a better understanding of the challenges for whooping cranes in Florida, 2) provide knowledge regarding the basic biology of these species, and 3) provide information of value for future reintroductions of whooping cranes.

Eastern Migratory Population – A separate reintroduction of migratory whooping cranes is taking place in the Eastern U.S. These birds breed in Wisconsin and migrate to Florida (and other southeastern states) in the winter. There are currently 101 birds in this population. Like the non-migratory flock, the migratory flock is encountering reproductive challenges and research is underway to identify the limiting factors. FWC's involvement with this project is primarily an advisory role, with some field monitoring.

Wood Stork (*Josh Agee and Morgan Wilbur*)

The wood stork, a Federally-designated Endangered species in Florida, was once a common breeding species throughout the southeastern U.S., but declines in the range and population occurred during the mid 1900s. The U.S. population was listed as Endangered by USFWS in 1984.

L. Kirk Edwards Wildlife and Environmental Area in Leon County – Lower Lake Lafayette located within the L. Kirk Edwards WEA in Leon County is home to the Chaires 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 conducts an annual aerial survey of the colony. The survey, first implemented in June 2009, was conducted in late April 2013 from a helicopter at an altitude of approximately 600 feet to avoid disturbing the nesting birds. After a prolonged drought that extended through the 2012 nesting season, the Chaires wood stork colony was inactive (zero nests), as there was no water in Lake Lafayette or under the nest colony. Rainfall brought the lake to more normal levels for the 2013 nesting season and an estimated 200 wood stork nests were observed on April 25, 2013. Two additional wood stork colonies (Ochlockonee North and Ochlockonee South) that occur on private property in western Leon County were also monitored in April 2013. There were no nests observed at the location of the Ochlockonee North colony and approximately 150 nests were observed at the Ochlockonee South colony.

Little Gator Creek Wildlife and Environmental Area in Pasco County (*Josh Agee*) – Little Gator Creek WEA in Pasco County has a ten-acre wading bird nesting colony. FWC uses water control structures and pumps to manage water levels in the basin marsh that contains the colony. This maintains suitable conditions for wood stork and wading bird nesting, and allows the colony to persist, even during drought years. Wood storks have nested intermittently in the colony for several years, including the last three.

During FY 2011-12, a monitoring protocol was developed and implemented on Little Gator Creek WEA to monitor water levels within the colony and assess wood stork nesting success. Using this protocol, FWC conducted weekly site visits during the breeding season from January to May 2013. Wood storks were first observed nesting in early February, with approximately 35 nests counted. By early March, it appeared that the wood storks had abandoned the colony. Reasons for abandonment were unclear; however, the area did experience unusually cold weather during that time. Subsequent monitoring revealed no re-nesting, and monitoring was stopped on May 10.

Other Listed Bird Species (*Jean McCollom and Brandon Schad*)

Okaloacoochee Slough Wildlife Management Area in Collier and Hendry County – On September 15, 2012, the North American migration count was conducted and seven listed species were recorded on Okaloacoochee Slough WMA. One Federally-designated Endangered species (wood stork), one Federally-designated Threatened species (crested caracara), one State-designated Threatened species (Florida sandhill crane), and four State-designated Species of Special Concern (white ibis, little blue heron, snowy egret, and tricolored heron) were seen. This is the sixth year the count has been conducted on the WMA.

Fisheating Creek Wildlife Management Area in Glades and Highlands Counties – FWC began migratory bird surveys on Fisheating Creek WMA during FY 2012-13. The surveys were initiated to comply with the USFWS wildlife monitoring requirements for the Cowbone Marsh restoration project. During the point counts several listed species were observed including Audubon's crested caracara, Florida sandhill crane, and wood stork.

AMPHIBIANS

Flatwoods Salamander (*Barbara Almario, Charlene Hopkins, Patrick McElhone, and Fred Robinette*)

A taxonomic change in 2007 divided flatwoods salamanders into reticulated flatwoods salamanders (the population west of the Apalachicola River) and frosted flatwoods salamanders (the population east of the Apalachicola River). Reticulated flatwoods salamanders are listed as Federally-designated Endangered and frosted flatwoods salamanders are listed as Federally-designated Threatened.

Pine Log and Point Washington Wildlife Management Areas in Bay, Washington, and Walton Counties – FWC sampled potential breeding ponds on Point Washington (Walton County) and Pine Log (Bay and Washington counties) WMAs from November 2012 to April 2013 in an effort to re-confirm the two known reticulated flatwoods salamander breeding sites and document any new breeding populations.

Ponds were mapped and ranked as "confirmed," "highly likely," "potential," "unlikely," or "unsuitable," based primarily on the ability to hold water long enough to support amphibian larvae, and the presence of wiregrass or other grasses at the edge of the pond.

Methods used to survey ponds in FY 2012-13 included drift fences set parallel to pond edges, minnow traps set in ponds, and dipnetting ponds. Drift fences were employed on 17 ponds classified as "confirmed," "highly likely," or "potential" flatwoods salamander habitat: nine fences on nine ponds at Point Washington and nine fences on eight ponds at Pine Log. Traps along the fences were set ahead of rain fronts, for a total of 161 fence-nights on Point Washington and 226 fence-nights on Pine Log.

FWC also sampled potential ponds at Point Washington and Pine Log using a combination of dipnetting and minnow traps between January 2013 and April 2013. At Point Washington, 97 ponds were each dipnetted twice, and at Pine Log, 27 ponds were each dipnetted twice. Minnow traps were used in three "highly likely" ponds, five "potential" ponds, and one "unlikely" pond at Point Washington, and two "potential" ponds and one "unlikely" pond at Pine

Log. In each pond, 5-20 minnow traps were set around the edge and wherever grass grew in the water. These traps were left in each pond for two nights.

Using drift fence, dipnetting, and minnow trap methods, 24 amphibian and reptile species at Point Washington and 23 species at Pine Log were captured and recorded. No flatwoods salamanders were captured in FY 2012-13.

The 2007 taxonomic change has elevated the conservation priority of these salamanders and highlights the need for more active management to avoid extinction. FWC continues to work with FDACS locally to improve potential breeding pond habitat through prescribed fire, mowing, thinning, and chopping.

Blackwater and Yellow River Wildlife Management Areas in Okaloosa and Santa Rosa Counties – FWC has surveyed for reticulated flatwoods salamanders within Blackwater WMA since 2001. In 2007, a three-year sampling protocol was implemented to survey and monitor 123 pond sites throughout the WMA. Priority ponds are sampled annually, while potential breeding sites are sampled on a three-year cycle. As of April 2013, there were no confirmed flatwoods salamander breeding ponds on Blackwater WMA.

Yellow River WMA contains a known flatwoods salamander breeding site and three potential breeding ponds that are sampled by FWC twice a year. Since 2010 FWC, FDACS, and USFWS have collaborated in the restoration of the historic flatwoods salamander pond. Previous management practices implemented to improve habitat for the species included removal of undesirable woody vegetation from the pond basin, herbicide along the pond margins to control resprouting vegetation, thinning of the adjacent slash pine plantation, and establishment of firelines to facilitate burning the pond independently from the upland pine plantation.

In February and March 2013, FDACS conducted a prescribed burn in the surrounding pine plantation to maintain firelines that will enable the area to be burned regularly in the future. In June 2013, FDACS attempted to reduce debris piles within the historic flatwoods salamander pond by lighting a prescribed fire through the basin, which burned a substantial portion of the pond. FWC will continue to collaborate with FDACS to manage and improve habitat around all potential flatwoods salamander breeding ponds. Since monitoring by FWC began in 2009, reticulated flatwoods salamanders have not been found on Yellow River WMA.

Florida Bog Frog (*Barbara Almario and John Himes*)

The Florida bog frog is currently listed in Florida as a State-designated Species of Special Concern and is only found in western Florida in shallow ponds or creeks. A biological status review determined that the Florida bog frog should be listed as State-designated Threatened. A species action plan for the Florida bog frog was initiated in FY 2011-12; the species' status will not change until the plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

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 Ravines Tract and the Escribano Point Parcels of Yellow River WMA in 2009 and continued those surveys during FY 2012-13. Ten points were established along three creeks in Yellow River Ravines and six points in Escribano Point with surveys conducted once in May, June, and July. Bog frog calling surveys follow a similar protocol to those used by the U.S.

Geological Survey North American Amphibian Monitoring Program. FWC confirmed the presence of bog frogs at one survey point in Yellow River Ravines, with approximately three individuals calling during all survey periods in 2013. Since surveys began in 2009, Florida bog frogs have not been detected on Escribano Point Parcels, but eight other frog species were heard calling in 2013.

In cooperation with FDACS, Blackwater WMA staff is overseeing a habitat restoration project aimed to restore bog frog habitat along Garnier Creek in the Yellow River WMA and to assess anticipated changes in bog frog populations using an experimental approach. Five 8,611 square foot experimental restoration units were established in February 2013 along the creek by hand-cutting woody vegetation and immediately stump-treating with herbicide. Night call surveys were conducted twice a month in May, June, and July 2013. In June 2013, a single male frog was heard calling and was found located within the experimental area closest to the known occurrence of bog frogs along Garnier Creek. Another frog was observed calling outside an experimental area further south on the creek in July 2013. Surveys will continue along Garnier Creek into FY 2013-14 to continue evaluating habitat restoration impacts on the species.

In July 2013, FWC surveyed Julian Mill Creek north of road Y21 on Yellow River WMA to assess areas for potential Florida bog frog habitat enhancement. Historically, bog frogs occurred in the creek along the powerline. Initial surveying suggested possible treatment adjacent to the historic site where vegetation is dense. To evaluate bog frog presence, a point was established in July 2013 along the powerline of Julian Mill Creek to be monitored during night call surveys in subsequent years. No bog frogs were heard during this first monitoring period. In spring 2014, frog data loggers may be deployed to determine current bog frog distribution along the creek to better facilitate appropriate management practices. In addition, the evaluation of areas for potential bog frog habitat enhancement along Julian Mill Creek will continue into FY 2013-14.

Gopher Frogs (*Mike Blondin and Kevin Enge*)

The gopher frog is currently listed in Florida as a State-designated Species of Special Concern. However, due to the results of a biological status review conducted in 2011, this species will be removed from Florida's Endangered and Threatened Species List once a management plan has been approved. A species action plan for the gopher frog was initiated in FY 2011-12 and is still being worked on by staff.

The gopher frog is an "explosive breeder" (all or most of the population congregates to breed during a short period) that travels during heavy rainfall events from burrows in surrounding uplands (sometimes from more than a mile away) to temporary wetlands lacking predatory fish. Breeding often occurs from October through April, after tropical storms, hurricanes, or winter cold fronts, but breeding may occur any month of the year. Tadpoles remain in ponds for three to seven months before transforming into frogs and leaving ponds in search of burrows in which to live.

During FY 2012-13, heavy winter, spring, and summer rainfall over much of the State alleviated drought conditions that had prevented effective dipnet surveys in FY 2011-12. The Ocala National Forest, however, which has the most known breeding ponds, did not receive much rainfall, and many of its wetlands remained dry or mostly dry. One hundred and sixty-one ponds on 39 public lands and ten ponds on private lands in Calhoun, Jackson, Suwannee, Gilchrist, and Highlands counties were sampled for gopher frog tadpoles as part of a State

Wildlife Grant entitled "Survey of Winter-breeding Amphibian Species in the Peninsula" (**Table 5**). In preparation for a State Wildlife Grant that will start looking at the genetics of gopher frog populations throughout the state in FY 2013-14, 418 genetic samples (tadpole tail tips) were collected (**Table 5**). Gopher frog tadpoles were found in 32 ponds. Notable findings include the first breeding ponds ever discovered in Longleaf Flatwoods Reserve in Alachua County and Bluefield Ranch in St. Lucie County, as well as three ponds discovered in Apalachicola National Forest that were the first in Liberty County. A new breeding pond was also discovered in Jennings State Forest in Clay County and on private lands in both Calhoun and Highlands counties. A photograph of a large tadpole collected from a private pond in Suwannee County was stored electronically in the Florida Museum of Natural History, and it represents the first verified specimen from this county.

Supplies were purchased in preparation for a study that will start looking at the effects of translocation of gopher frogs on their movements, survival, and reproduction in FY 2013-14. Gopher frogs, which typically live in gopher tortoise burrows, are often moved along with tortoises from sites that are being developed.

Hilochee Wildlife Management Area in Lake and Polk counties – During FY 2012-13, FWC conducted gopher frog call surveys on Hilochee WMA in Lake and Polk counties. Twenty ponds were surveyed using FWC's Wildlife Conservation, Prioritization, and Recovery Program Standard Monitoring Protocol for Gopher Frog Call Surveys. Gopher frogs were not detected during this survey. Per the Species Management Strategy for Hilochee WMA, these surveys will be repeated in two to five years.

Pine Barrens Treefrog (*Paul Moler*)

The Pine Barrens treefrog is currently listed in Florida as a State-designated Species of Special Concern. However, the species will be removed from Florida's Endangered and Threatened Species List once a management plan has been approved by the FWC Commissioners. A species action plan for the Pine Barrens treefrog was initiated in FY 2011-12 and is still being worked on by staff. This species occurs only in Santa Rosa, Okaloosa, Walton, and Holmes counties. The Florida population was Federally-designated as Endangered in 1977 and removed from Federal listing in 1983 after State surveys found the species to be much more common and widespread than known at the time of Federal listing. Pine Barrens treefrogs breed in acidic wetland habitats. Night-time surveys are conducted by listening for calling males at breeding sites. Although calling activity may extend from March through September, conditions are reliably suitable for conducting surveys only from May to August. The current project is intended to revisit breeding sites identified in the 1978−1981 surveys to assess the current status of the species. The project was originally scheduled to begin in FY 2010-11 but was delayed for two years because of prolonged drought in the Panhandle. Surveys were initiated in May 2013. The area remained dry through May, but survey conditions greatly improved with heavy rains in June. In addition to revisiting historical breeding sites, a study is being conducted on Blackwater WMA in Okaloosa and Santa Rosa counties using four observers from FWC to independently survey 70 known or potential breeding sites to better understand detection variability at occupied sites. Surveys will continue through FY 2013-14.

Striped Newt (*Kevin Enge and Allan Hallman*)

The striped newt is a candidate for listing as Federally-designated Threatened. This species lives in dry upland habitats, particularly sandhill and scrub, and travels to temporary wetlands to breed. Striped newts often use the same wetlands as breeding gopher frogs, and larval or adult newts can be found by dipnetting. The striped newt has a more limited distribution than the gopher frog; 85 of the ponds sampled for gopher frogs were within its range (**Table 5**). Newts were found in only seven ponds, but new breeding ponds were found on Camp Blanding Military Reservation in Clay County (a large borrow pit), Jennings State Forest in Clay County (a large dome swamp), and Guana River WMA in St. Johns County (a depression marsh). The latter pond is located at least 3.2 miles from the other two known ponds and represents a new population. Genetic samples and two whole specimens were collected from Guana River WMA and sent to researchers at the University of Notre Dame for an environmental DNA study.

Table 5. Survey of winter-breeding amphibian species in Peninsular Florida during FY 2012-13

Area	No. Ponds Surveyed	No. Gopher Frog Ponds	No. Gopher Samples	No. Striped Newt Ponds
Northwest Region				
Apalachee WMA	2	0	0	0
Apalachicola National Forest	7	5	70	0
Blackwater River State Forest	5	0	0	0
Calhoun Co. (private)	2	1	3	0
Econfina Creek WMA	9	0	0	0
Eglin Air Force Base	7	2	60	0
Jackson Co. (private)	2	0	0	0
Pine Log State Forest	5	0	0	0
Point Washington State Forest	1	0	0	0
North Central Region				
Camp Blanding Military Reservation	3	2	30	1
Fort White Mitigation Park WEA	2	1	8	0
Gilchrist Co. (private)	1	1	2	0
Goethe State Forest	1	0	0	0
Holton Creek Conservation Area	1	0	0	0
Jennings State Forest	5	3	27	3
Julington Durbin Peninsula	3	0	0	0
Lochloosa Wildlife Conservation Area	9	0	0	0
Longleaf Flatwoods Reserve	4	1	16	0
Lower Suwannee NWR	3	0	0	0
Osceola National Forest	1	0	0	0
Pumpkin Hill Creek Preserve State Park	5	0	0	0
Suwannee Co. (private)	3	1	7	0
Suwannee River Mitigation Park WEA	2	0	0	0
Woods Ferry Conservation Area	1	0	0	0

Yellow Jacket Conservation Area	2	0	0	0
Northeast Region				
Bull Creek WMA	1	0	0	0
Econfina Creek State Forest	1	0	0	0
Guana River WMA	6	0	0	3
Kissimmee Prairie Preserve State Park	5	0	0	0
Ocala National Forest	16	4	40	0
Rock Springs Run State Reserve	3	1	21	0
Seminole State Forest	12	5	37	0
Triple N Ranch	1	0	0	0
Southwest Region				
Bell Creek Preserve	1	0	0	0
Bull Creek Mitigation Park WEA	1	0	0	0
Conner Preserve	2	0	0	0
Croom WMA	1	1	30	0
Duette Preserve	3	0	0	0
Highlands Co. (private)	2	2	31	0
Lake Manatee Lower Watershed	1	1	7	0
Moody Branch Mitigation Park WEA	1	0	0	0
Platt Branch Mitigation Park WEA	2	0	0	0
Rhodine Scrub	1	0	0	0
South Region				
Bluefield Ranch	9	1	3	0
Jonathan Dickinson State Park	7	3	26	0
Total	**161**	**32**	**418**	**7**

REPTILES

American Crocodile (*Lindsey Hord*)

The American crocodile is currently a Federally-designated Threatened species in Florida. The population has experienced tremendous growth since 1975, when the species was listed as Endangered under the Federal Endangered Species Act. Crocodile sightings have been documented as far north as Cocoa Beach in Brevard County on the east coast and Lake Tarpon in Pinellas 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 on a case-by-case basis with human safety being the highest priority, while also recognizing the needs of a recovering species. During FY 2012-13, FWC received 212 complaints regarding the American crocodile. Most of these complaints were resolved by educating the public through telephone calls and site visits.

FWC has crocodile response agents who respond to crocodile calls, some of which require translocation of the captured crocodile. Seven non-hatchling crocodiles (four males, three females) were captured in FY 2012-13. Three of those animals, two males and one female, were captured and translocated twice within the fiscal year. Males ranged from 5.1 to 12.0 feet in length, for an average of 9.3 feet. Females ranged from 5.9 to 8.7 feet in length, for an

average of 7.1 feet. Five captured crocodiles were translocated to a site deemed suitable by FWC. The smallest male (5.1 feet) died before it could be released. One captured animal, a male measuring 9.5 feet, was captured for the third time and was removed from the wild and placed in captivity.

FWC was involved in the recovery of five American crocodile carcasses (three females, one male, and one unknown) during FY 2012-13. The females ranged from 3.6 to 8.7 feet in length, for an average of 5.4 feet. The cause of death for the two smaller animals was attributed to wounds inflicted by automobile traffic. The larger female was shot and the incident is currently under investigation. The male died as a result of fighting with other crocodiles, after being captured and translocated for the second time; it was found dead at its capture site. The animal of unknown sex was found floating and a cause of death could not be determined.

Six American crocodiles (three females, two males, one undetermined) were captured and removed from human-interaction situations and released near their capture site. Those situations ranged from a 1.0-foot-long hatchling in a swimming pool on Lower Matecumbe Key, to a 6.2-foot-long female in the swimming pond of a Dade County Park. Twenty-seven American crocodiles eggs were recovered from a nest in a flower box along the road at a private residence in Islamorada. None of the eggs were later determined to be viable. It has been determined that the nest was laid by the female that was subsequently shot and killed by a person or persons yet to be determined. Twenty-five eggs were recovered from the back yard of a private residence in Coral Gables. None of those eggs were determined to be viable either.

Alligator Snapping Turtle (*Kevin Enge*)

The alligator snapping turtle is the largest freshwater turtle species in North America. In Florida, this species can be found from the Suwannee River drainage westward through the panhandle. FWC turtle regulations prohibit the harvest of this species in Florida; possession of a captive alligator snapping turtle requires an FWC permit. The alligator snapping turtle is currently listed in Florida as a State-designated Species of Special Concern. However, the species will be removed from FWC's Endangered and Threatened Species List once a management plan designed to prevent the species from becoming listed again has been approved by the FWC Commissioners. A species action plan for the alligator snapping turtle was initiated in FY 2011-12 and is still being worked on by staff.

<u>Population Status and Distribution of the Alligator Snapping Turtle in the Suwannee River</u> – Differences in genetics and the bone structure of shells and skulls of alligator snapping turtles from the Suwannee River drainage compared to those from other drainages suggest that they may represent a new species. A Conserve Wildlife Tag grant received during FY 2010-11 funded a study to determine the population status and distribution of alligator snapping turtles in the Suwannee River. Twelve three-mile stretches of the river from White Springs to the Gulf of Mexico have been trapped, yielding 161 alligator snapping turtles (29 were recaptures) in 742 trap nights. Turtles were captured at 11 of the 12 trapping sites, but only one turtle was captured in the two estuary sites. Trapping was most productive in the middle reaches of the river, where there is input from springs and the river changes from being a blackwater stream to more calcareous (calcium rich limestone). Adult males comprised 61%, adult females 27%, and immature animals (less than nine inches straight-line carapace length) 12% of the population. Thirty-three of 81 (41%) adult males weighed more than 100 pounds, with the heaviest having a

mass of 126 pounds and a carapace length of 25.7 inches. Significantly more males than females were trapped. Three of 25 turtles X-rayed had ingested fish hooks (all from the Branford site); one of these turtles contained three hooks. Another turtle had a hook embedded in its neck. Sonic telemetry is being conducted on tagged turtles in two stretches of the river to determine their movements and habitat use. Turtles are primarily tracked using a manual tracking unit in a boat. Some turtles remained in a relatively small area of the river, whereas other turtles moved long distances (some turtles were never relocated after being tagged). During high water levels in portions of the river, some turtles made daily movements from the river channel into the flooded forest.

FWC staff collaborated with other scientists in describing populations in the Suwannee River and the Apalachicola/Ochlockonee rivers as two new species, the Suwannee (*Macrochelys suwanniensis*) and Apalachicola (*M. apalachicolae*) alligator snapping turtles. The manuscript has not yet been accepted for publication. These new species were described based on differences in genetics and the bone structure of shells and skulls of turtles from the different river drainages.

Distributional Survey of the Alligator Snapping Turtle – A trapping study is being conducted in seven rivers between the Ochlockonee and Suwannee rivers to determine whether the species is present in this apparent distributional gap. Trapping in the St. Marks, Aucilla, and Econfina rivers yielded no alligator snappers, but severe drought conditions followed by heavy flooding have precluded trapping of other rivers in the Big Bend region. Trapping in FY 2012-13 was restricted to the Oklawaha River, from which there are two museum records of alligator snapping turtles, although the Oklawaha is generally thought to be outside the natural distribution. No alligator snapping turtles were captured in the single trapping session in August 2012. Genetic samples are also being collected throughout the species' range in Florida. Blood samples have been collected from 43 turtles, including 15 from the Suwannee River drainage, 15 from the Central drainages (Ochlockonee, Apalachicola, and Econfina), 12 from the Western drainages (Yellow, Blackwater, East, and Perdido), and one from the St. Johns River, where the species is not thought to occur naturally.

Barbour's Map Turtle (*Patrick McElhone*)

The Barbour's map turtle is an endemic species and is currently listed in Florida as a State-designated Species of Special Concern because of its limited range and vulnerability to habitat modifications and other human disturbances. A biological status review determined that the Barbour's map turtle should be listed as a State-designated Threatened species. A species action plan for the Barbour's map turtle was initiated in FY 2011-12; the species' status will not change until the plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

The Apalachicola River Wildlife and Environmental Area (ARWEA) in Gulf and Franklin counties encompasses the Apalachicola River basin and is home to the Barbour's map turtle. Approximately 36 miles of river are surveyed for basking Barbour's map turtles in late summer; the survey route includes sections of the Apalachicola, Brothers, and Chipola rivers. Surveys were conducted on September 20, 21, and 25 of 2012, and a total of 874 turtles were recorded, with 604 of those being on the Chipola River. This is a 5.6% decrease from the 2011 survey, which recorded 923 turtles. Approximately 14 additional river miles were surveyed

along the lower Apalachicola, St. Marks, and East rivers. A total of 43 Barbour's map turtles were recorded. These river sections are considered less suitable habitat due to the greater influence of tidal salt water.

The Chipola River section was surveyed again on October 25, 2012, to determine the influence of water temperature on basking Barbour's map turtle detections. A total of 1,010 turtles were recorded during this survey. Water temperature was about 10°F colder in October (68°F) versus September (78.5°F), but air temperature was in the lower 80s °F during both surveys. The lower water temperature along with warm air temperatures likely led to the higher basking rate (turtles must bask in order to maintain their body temperature). This is the likely factor attributable to the decrease in total turtles counted in 2012 versus 2011 (when surveys were also conducted in late October). FWC will delay future map turtle basking surveys to October of each year when Barbour's map turtles are more likely to be detected basking. Annual surveys conducted by FWC will continue to monitor the population and assess the threats facing the Barbour's map turtle.

Gopher Tortoise (*Barbara Almario, Shane Belson, Deborah Burr, Allan Hallman, Charlene Hopkins, Donna Jones, Allie Perryman, Sarah Power, Fred Robinette, and Mallory Wilkins*)

Management – The gopher tortoise is a State-designated Threatened species in Florida. FWC published its first Gopher Tortoise Management Plan in 2007. The first five-year revision of the plan was approved by the FWC Commissioners in September 2012. The revised 2012 Gopher Tortoise Management Plan (http://myfwc.com/media/2286685/GT-Management-Plan.pdf) is intended to guide the continued conservation of the gopher tortoise in Florida through 2022. The plan places an emphasis on landowner incentives, habitat management, and maintaining the gopher tortoise as a keystone species through commensal species conservation. FWC continues to coordinate with the stakeholder Gopher Tortoise Technical Assistance Group on gopher tortoise conservation issues. The continued participation of stakeholders is vital to the long-term conservation of the species.

The Gopher Tortoise Permitting Guidelines were revised to ensure consistency with the new management plan, and they were approved by the FWC Commissioners in April 2013. The permitting guidelines are available at http://www.myfwc.com/media/1410274/GTPermittingGuidelines.pdf. FWC has continued to work with stakeholders to discuss and explore possible solutions to challenges encountered with gopher tortoise permitting and conservation issues.

Through the recipient site permit program (a program in which landowners may use their lands with suitable habitat to receive gopher tortoises from development sites), approximately 10,007 acres of gopher tortoise habitat have been protected through permanent conservation easements. Under these permits, private landowners can accept gopher tortoises relocated off development sites, and assess a monetary charge to the developer for accepting the tortoise(s). In exchange, the recipient site landowners agree to manage and protect the habitat in perpetuity. Currently, thirty-four recipient sites with an available capacity of 22,153 tortoises are permitted. An additional six recipient site permit applications are currently under review with potential available capacity for an additional 10,916 tortoises on 3,985 acres of gopher tortoise habitat. During FY 2012-13, 6,081 tortoises were authorized for relocation by FWC-issued permits.

During FY 2012-13, FWC continued with efforts to identify solutions for waif tortoises. Waif tortoises are gopher tortoises that have been removed from the wild (either unauthorized or

due to injury) and for which no locale information is known. One solution includes identifying willing landowners to care for them on their property as a "waif tortoise recipient site". The location of waif tortoise recipient sites was provided during four local workshops held throughout the State. New guidelines for waif tortoises were developed and added to the revised Gopher Tortoise Permitting Guidelines in April 2013. FWC continues to coordinate with State and local partners to explore options for restoring gopher tortoise populations on depleted public lands using waif tortoises. Under an agreement with the South Carolina Department of Natural Resources, more than 50 healthy waif tortoises were relocated to the Aiken Gopher Tortoise Heritage Preserve in South Carolina where the population has been depleted due to prior habitat neglect (under previous ownership). Annual monitoring reports are submitted to monitor the relocated tortoises, which have shown positive results so far.

FWC continues to work closely with public and non-profit organizations to identify and provide incentives for gopher tortoise conservation on private lands. Staff regularly participates in workshops that promote conservation opportunities and habitat management incentives for private landowners to benefit wildlife on their property. In addition, FWC continues to use Geographic Information Systems (GIS) to help identify high quality gopher tortoise habitat throughout Florida. FWC is working with the Conservation Cooperative Blueprint program to develop a model program "Payment for Ecosystem Services" for private landowners who want to conserve gopher tortoises and gopher tortoise habitat on their property. An initial pilot program is being implemented in southwest Florida. Outreach to landowners with suitable gopher tortoise habitat and an interest in participating in the program has begun.

During FY 2012-13, $133,728 in funding assistance was provided to assist gopher tortoise habitat management activities that benefited more than 1,917 acres under local government ownership. Through coordination with public and non-government organizations, including The Nature Conservancy's Fire Strike Team program and contracted vendors, approximately 28,000 acres of gopher tortoise habitat were conserved through prescribed fire and other habitat management activities on both public and private lands during FY 2012-13.

To enhance the protection and conservation of gopher tortoises and gopher tortoise habitat statewide, program staff conducts training for FWC Law Enforcement officer recruits. This additional training will help FWC officers address wildlife complaints related to gopher tortoises in an effective and consistent manner statewide.

Wildlife Management Area (WMA) and Wildlife and Environmental Area (WEA) Activities – FWC has annually surveyed, monitored, and assessed the status of the gopher tortoise on Point Washington WMA (Walton County) since 1993, and on Pine Log WMA (Bay and Washington counties) since 2004. Aerial photos were used to identify suitable gopher tortoise habitat, primarily sandhill areas, and divide the habitat into clusters for management purposes. Point Washington's sandhill habitat is grouped into 33 clusters surveyed on a three-year schedule, so that approximately 1/3 of the area is surveyed each year. Pine Log is grouped into 15 clusters and the entire area is surveyed annually.

FWC systematically searches these sandhill clusters for gopher tortoise burrows each summer on foot or using all-terrain vehicles. Burrow locations are recorded using Global Positioning System (GPS) units, and the data points are downloaded into a Geographic Information System (GIS). Burrows are classified as "active", "possibly active", "inactive", or "abandoned." Using burrow widths, the burrows are further grouped into categories that correspond to approximate sizes and ages of the tortoises. Data collected each year provides

practical comparative information used to determine population trends and demography of the gopher tortoise populations on Point Washington and Pine Log. During the 2013 survey season, 91 "active" and "possibly active" burrows were found on Pine Log, and six were found on the eastern section of Point Washington. These numbers fall within the usual range for the past several years, suggesting that activity level has remained fairly steady. Working in cooperation with FDACS, the lead management agency, habitat improvements are being prescribed and implemented. Prescribed fire continues to be the preferred management tool, although herbicide has been effective in controlling encroaching scrub oaks on sandhill habitat where prescribed fire is impractical or ineffective. As recommended by FWC, local FDACS staff has removed the majority of sand pine plantings from Pine Log, and replanted several of the resulting clearcuts in longleaf pine. With re-growth of herbaceous groundcover, these areas are well on their way to becoming suitable habitat for gopher tortoises.

During FY 2012-13, FWC continued a multi-year comprehensive burrow survey designed to evaluate the entire 200,000 acres of Blackwater WMA (Okaloosa and Santa Rosa counties). The purpose of the survey was to provide FDACS, the lead land manager on the area, with habitat improvement recommendations. Transects of suitable habitat are traversed by foot or all-terrain vehicle with each burrow encountered assigned a unique identification number. In addition, the location, status (active, possibly active, inactive, and abandoned), orientation, and width of burrows are recorded.

During FY 2012-13, FWC surveyed approximately 1,990 acres of suitable gopher tortoise habitat and located 193 burrows. To date over 80,000 acres of habitat have been surveyed and 2,952 burrows have been located. Only 17% of gopher tortoise burrows have been classified as abandoned where no tortoise activity was observed. Once the entire forest has been surveyed, FWC intends to subsample gopher tortoise populations and habitats within each unit on Blackwater with the intent to assess whether forest management efforts have impacted gopher tortoise population sizes, distributions, and recruitment.

Surveys and monitoring continued during May 2013 on the Fitzhugh Carter Tract of Econfina Creek WMA. The 2,155-acre tract contains approximately 1,200 acres of sandhill uplands. For logistical and accounting purposes, gopher tortoise burrows on the area are grouped into six clusters and monitoring protocol follows that established for Point Washington WMA. The 2013 surveys yielded 512 total burrows; 40 more burrows than were documented in 2012 (**Table 6**). Twenty-three percent of burrows were classified as "active" or "possibly active". While the number of active burrows did decline from 2012 to 2013, the number of possibly active burrows increased from 28 to 38. Gopher tortoise burrow surveys on the Carter Tract have revealed a continuous cycle of burrow creation and abandonment over time. Habitat improvement including removal of sand pine and slash pine plantations and planting of longleaf pine and wiregrass were implemented in 2007. Restoration activities designed to continue to improve and maintain habitat include prescribed burning, scrub oak reduction, herbicide application, and planting of native groundcover (i.e. wiregrass, toothache grass, etc.). These improvements focus on retaining the open overstory and herbaceous understory that are indicative of the longleaf-wiregrass ecosystem and will allow for future expansion of gopher tortoise populations on the Carter Tract. Surveys will continue to be conducted annually on the area May – July. Future work will provide comparative data on tortoise population trends within the Carter Tract following land management and mitigation strategies.

Table 6. Gopher tortoise burrow count and status by year at the Fitzhugh Carter Tract of Econfina Creek WMA, Washington County, FL.

	Year							
Burrow Status	2005/06	2007	2008	2009	2010	2011	2012	2013
Active	53	12	26	17	73	76	92	85
Possibly Active	12	1	9	28	23	47	28	38
Inactive	95	64	40	49	64	99	83	85
Abandoned	34	131	193	161	184	206	269	304
Total	194	208	268	255	344	428	472	512

Mitigation Park Program – FWC's Mitigation Park Program was developed in 1998 with the primary goal of improving the biological effectiveness of listed species habitat protection efforts required for new land developments. The program increased 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 mitigation parks is gopher tortoise habitat enhancement and restoration. Fourteen mitigation parks totaling 15,320 acres have been established in Duval/Clay, Hamilton, Gilchrist, Lafayette, Alachua, Hernando, Orange/Osceola, Polk, Hillsborough, Manatee, Highlands, and Lee counties.

During FY 2012-13 in north-central Florida, habitat management at Watermelon Pond WEA in Alachua County included wiregrass seeding on 37 acres and herbicide treatment to 133 acres of pasture grasses for ongoing ground cover restoration to benefit gopher tortoises. Growing season controlled burns were used to maintain sandhill habitat on 357 acres at Fort White WEA in Gilchrist County, 269 acres at Branan Field in Duval County, and 502 acres at Lafayette Forest WEA in Lafayette County. Sandhill habitat enhancement accomplished by reducing midstory hardwoods was completed on 200 acres at Fort White WEA, 150 acres at Lafayette Forest WEA, and 150 at Suwannee Ridge WEA in Hamilton County.

In Central Florida, habitat management at Split Oak Forest WEA (Orange and Osceola counties) included growing season controlled burns on 586 acres of gopher tortoise habitat. At Crooked Lake WEA (Polk County), exotic plants were surveyed and treated on 182 acres. Perry Oldenburg WEA (Hernando County) received 21 acres of controlled burning and 37 acres of exotic plant control. Gopher tortoise management at Janet Butterfield Brooks WEA (Hernando County) included 47 acres of controlled burning and exotic plant survey/control on 320 acres. Bullfrog Creek WEA (Hillsborough County) received 20 acres of exotic plant survey and treatment.

In south-central Florida at Platt Branch WEA (Highlands County), controlled burns were completed on 482 acres and 11 acres of uplands were mechanically treated to improve habitat structure. At Moody Branch WEA (Manatee County), 230 acres of habitat were prescription burned, 32 acres were treated for exotic plants, 87 acres of pastures were mowed to control weedy species, and 22 acres of forested habitat were mowed to control palmetto and hardwood encroachment.

Habitat Restoration Projects – FWC continued to monitor gopher tortoise habitat restoration projects conducted in FY 2011-12 in Belmore State Forest, Jennings State Forest, and Ralph E. Simmons State Forest WMA in Clay, Duval, and Nassau counties. Photo points were

established prior to initial herbicide treatments, and monitoring on each site is conducted at least once a year, preferably during the summer months.

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

FWC continues to maintain robust management and research programs for the five species of sea turtles that occur along Florida's coast. The Agency provided expertise on sea turtles to USFWS and the U.S. Army Corps of Engineers team on the programmatic biological opinion for beach restoration, as well as projects being constructed under the Federal Flood Control Coastal Emergency Act. FWC served on numerous teams, scientific advisory committees, governing boards, working groups, and committees during FY 2012-13, including: Archie Carr Sea Turtle Refuge Working Group, the Sea Turtle Hospital Rehabilitation Workshop, FDEP Beach Management Agreement for Palm Beach Island, the Florida Sea Turtle License Plate grants committee, NOAA-Fisheries Loggerhead Critical Habitat Team, the USFWS International Working Group for the Conservation of the Northwest Atlantic Loggerhead Populations, the steering committee for FDEP's Beaches Habitat Conservation Plan, university graduate committees, 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.

Management Activities – During FY 2012-13, FWC continued to work closely with the Federal government, State regulatory agencies, volunteer conservation groups, and local governments to implement the State's responsibilities in accordance with the Marine Turtle Protection Act [Section 379.2431(1), Florida Statutes] and the USFWS' Recovery Plans for five species of sea turtle (also known as marine turtles): the loggerhead (Federally-designated Threatened), green, leatherback, hawksbill, and Kemp's ridley (all Federally-designated Endangered). FWC efforts to ensure protection of Endangered and Threatened sea turtles, their nests, hatchlings, and habitats emphasizes a cooperative approach with the diversity of stakeholders who depend on Florida's beaches, reefs, and coastal areas for their livelihood and recreation. Public education concerning sea turtle biology and important conservation issues such as wildlife friendly lighting, the threats from marine debris, and the importance of protecting nesting beaches and in-water habitats, as well as partnering with State, local, and Federal agencies, continues to be the major focus of FWC's sea turtle management efforts.

During FY 2012-13, FWC continued to provide scientific and logistical support to ongoing response efforts for the Deepwater Horizon oil spill to ensure protection of sea turtle nests during ongoing cleanup activities in Escambia, Okaloosa, Santa Rosa, and Walton counties. FWC and FDEP are jointly overseeing an early restoration project, Restoring the Night Sky, to offset impacts to sea turtle nesting habitat due to response injury that occurred during the Deep Water Horizon Event.

FWC provided comments to DEP, Water Management Districts, and the State Clearing House on many projects during FY 2012-13. Projects reviewed included coastal construction control line applications, environmental resource permit applications, and joint coastal permit applications, as well as for Federal documents including environmental assessments, environmental impact statements, and biological opinions. FWC participated in meetings and conference calls on these projects and on other issues involving sea turtles with local governments, other State and Federal agencies, and stakeholders. FWC also participated in the

development of the Florida Statewide Beaches Habitat Conservation Plan (in cooperation with FDEP). More than 90 site inspections were conducted as part of FWC's environmental commenting responsibilities, including lighting inspections conducted at the invitation of local governments and property owners.

No rule making activity for sea turtles occurred during FY 2012-13.

Approximately 360 applications for conservation activities with sea turtles, including nesting beach surveys, stranding and salvage work, research, public turtle walks, rehabilitation at captive facilities, and educational displays were reviewed and approved by FWC during FY 2012-13.

FWC issued 24 authorizations to hold sea turtles for rehabilitation, educational display, or research. Agency staff coordinated transfer and release of sea turtles undergoing rehabilitation and supervised public sea turtle releases; this included 67 sea turtles that stranded in New England as part of a prolonged cold-stunning event and were transferred to Florida to undergo rehabilitation and subsequent release. FWC coordinated the review and approval of approximately 54 requests for monitoring and 30 research proposals involving Federally Threatened and Endangered sea turtles. Twenty-five authorizations for educational turtle walks were issued, allowing approximately 350 public walks from June through July on the southeast coast and the southwest coast.

Currently, FWC is administering two grants that involve sea turtles, including $416,000 from USFWS for Walton County's Habitat Conservation Plan, and a second grant from the National Fish and Wildlife Foundation to the Wildlife Foundation of Florida to develop a mobile sea turtle response unit for quick response to catastrophic events such as cold stuns. Grant management includes oversight of contracts to local governments and vendors as necessary.

For more information on FWC's Sea Turtle Management Program, please visit http://myfwc.com/wildlifehabitats/managed/sea-turtles/protection/.

Research Activities – FWC coordinated the Florida portion of the Sea Turtle Stranding and Salvage Network (STSSN), an 18-state program administered by NOAA-Fisheries. The Network 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. The Network also identifies and monitors mortality factors for sea turtles.

During FY 2012-13, a total of 1,779 dead or debilitated sea turtles were documented (764 green turtles, 715 loggerheads, 239 Kemp's ridleys, 27 hawksbills, 11 leatherbacks, and 23 sea turtles not identified by species). FWC responded to 1,537 reports, through FWC's Wildlife Alert Hotline, regarding sea turtle concerns (primarily reports of dead, sick, or injured sea turtles), transported 304 sick or injured sea turtles to rehabilitation facilities, and conducted necropsies on 152 carcasses. Florida sea turtle stranding data were regularly entered into the Network's on-line database for use by NOAA-Fisheries, as well as FWC law enforcement and protected species personnel. FWC also continually worked to quickly identify and characterize any unusual sea turtle mortality events.

Population monitoring involves collection of nesting and habitat information throughout the geographic range of sea 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. Assessments of nesting abundance and reproductive output is coordinated through a network of State, Federal, and volunteer permit holders who

monitor sea turtle reproduction on Florida's beaches. Agency staff establishes scientifically sound monitoring designs, provides training, resolves data collection problems, assesses data collection error rates, analyzes data trends, and serves as a clearinghouse for information on sea turtle populations and habitats.

Two overlapping monitoring programs, the Statewide Nesting Beach Survey Program (initiated in 1979) and the Index Nesting Beach Survey Program (initiated in 1989), have different objectives. The Statewide Nesting Beach Survey Program provides nearly complete survey coverage of the State's nesting beaches to acquire 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 2012, 205 survey areas were monitored, comprising 820 miles of beaches. In 2012, 98,601 loggerhead nests; 9,617 green turtle nests, 1,712 leatherback nests, 12 Kemp's ridley nests, and one hawksbill nest were documented statewide.

The Index Nesting Beach Survey Program collects data that are more detailed 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 23 years at 478 index beach zones surveyed daily during each 109-day season (May–August), an effort that has resulted in more than six million records in the Index Nesting Beach Survey Program database. Annual survey or training, on-site verification, and consistency of the methods used during the 24 years of the program and among the 246 miles 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 2012, trends in nesting for loggerheads (stable or increasing), green turtles (increasing), and leatherbacks (increasing) were documented.

Most research on sea 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 sea turtles (loggerhead, green, hawksbill, and Kemp's ridley), addressing population structure (including gender ratios), growth rates, genetic identity (nesting populations to which turtles belong), life history, health, diet, habitat preferences, and migrations. 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 March 2013, 21 adult-sized loggerheads were captured during a six-day sampling session in Florida Bay. This work was conducted as part of a study to determine the reproductive status, breeding behavior and periodicity, reproductive migration routes, and internesting behavior of adult loggerheads. After capture, these turtles were transported to the nearby Keys Marine Laboratory where their reproductive status was evaluated with ultrasound and laparoscopy. Of these turtles, 14 were female and seven were male. Three of the females and five of the males were determined to be preparing to breed in 2013. Seven of these turtles (two of the females and all five of the males) were outfitted with a GPS-linked satellite transmitter to track their subsequent movements in an effort to discern their reproductive behavior. All turtles were released shortly after capture. Additionally, one of the reproductively inactive males was also outfitted with a GPS-linked satellite transmitter to document its behavior for comparison to that of the reproductively active males. The reproductively inactive male was

released and tracked for 212 days (March 5–October 3). The inactive male stayed in Florida Bay (within three miles of the study site) for the entire tracking period, except during a brief excursion into the Atlantic (15 miles south of the study site) during March 30–April 2. While in the Atlantic, dive data indicated that this turtle spent almost all of its time at or near the ocean bottom.

In June 2013, 97 loggerheads and one Kemp's ridley were captured during a nine-day sampling session in Florida Bay as part of a project that has been conducted continuously in the Bay since 1990. The primary elements of this study include assessments of relative and absolute abundances, health assessments and monitoring of fibropapillomatosis (a condition most likely caused by a herpes type virus that causes growths or tumors on the skin), studies of growth, determinations of sex ratios and genetic identities, and studies of residency and movements. All captured turtles were measured and tagged. Three of the immature loggerheads were outfitted with a GPS-linked satellite transmitter to track their subsequent movements in an effort to characterize habitat use. Forty of the turtles had been previously marked, providing data on growth and residency in Florida Bay. All turtles were released shortly after capture. Some individual turtles have now been captured numerous times over periods as long as seventeen 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 sea turtles live in surface waters and occupy a pelagic stage (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 were to measure relationships between open-ocean habitat and pelagic sea 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, sea turtle behavior, sea turtles' relationships to floating objects and other organisms, sea turtle weights and measures, and evidence of ingested plastics and tar. Seven sampling trips were conducted during FY 2012-13. This effort is a continued study in which approximately 612 miles of search transects were sampled between 2005 and 2013. On these search transects, a total of 839 sea turtles were observed: 585 loggerheads, 137 green turtles, 91 Kemp's ridley, 19 leatherbacks, and seven hawksbills. Survey locations included Gulf of Mexico waters offshore from Pensacola, Apalachicola, and Sarasota, and Atlantic waters offshore from Sebastian Inlet.

FWC served on several scientific advisory committees and governing boards during FY 2012-13, including the Carr Refuge Working Group, the USFWS/NOAA-Fisheries Loggerhead Critical Habitat Team, the USFWS International Working Group for the Conservation of the Northwest Atlantic Loggerhead Populations, FDEP Beaches Habitat Conservation Plan steering committee, university graduate committees, and the International Union for the Conservation of Nature's Marine Turtle Specialist Group. FWC reviewed all research proposals submitted for consideration by the small grants program of the Florida Sea Turtle License Plate.

For more information on the Sea Turtle Research Program, please visit http://myfwc.com/research/wildlife/sea-turtles/.

At-Risk Snake Surveys (*Charlene Hopkins and Fred Robinette*)

Surveys on Pine Log and Point Washington Wildlife Management Areas (*Charlene Hopkins and Fred Robinette*) – Point Washington WMA in Walton County and Pine Log WMA

in Bay and Washington Counties are within the range of large upland at-risk snake species, such as the Eastern indigo snake (Federally-designated Threatened) and the Florida pine snake (State-designated Species of Special Concern). Additionally, the WMAs are within the range of two snake species that were recently petitioned for Federal listing: the Eastern diamond-backed rattlesnake and Southern hognose snake.

In an effort to document presence of these species, seven box-style snake traps were installed: four at Point Washington and three at Pine Log. To maximize the number of reptile and amphibian species each trap could potentially intercept, the traps were placed near borders between multiple habitats. The traps were used between September 2012 and April 2013.

During FY 2012-13 there were 225 individuals of 20 species trapped at Point Washington and 127 individuals of 17 species trapped at Pine Log. At Point Washington, 24 snakes of seven species were trapped, including one Eastern diamond-backed rattlesnake, and at Pine Log, 25 snakes of five species were trapped.

Surveying for at-risk snakes was first begun in FY 2012-13 at Point Washington and in FY 2011-12 at Pine Log. FWC plans to use the results of the surveys to develop management recommendations for the at-risk snake species on these two WMAs.

Eastern Indigo Snake (*Kevin Enge and Allan Hallman*)

The Eastern indigo snake is Federally-designated as Threatened. This species once occurred throughout Florida but has experienced significant population declines in some areas, particularly the Panhandle and heavily populated areas. In 2008, FWC started compiling historic and recent sightings of indigo snakes to determine its current status in Florida. FWC collaborated with The Orianne Society (a privately-funded organization to conserve indigo snakes) and the Georgia Department of Natural Resources to determine the historical and current distribution of the indigo snake throughout its range. A manuscript submitted to *Herpetological Conservation and Biology* was accepted for publication. FWC is collaborating with Mark Endries from USFWS to publish a manuscript on potential habitat models for the indigo snake in Florida. FWC and USFWS staff met with The Orianne Society to discuss a strategy for obtaining enough snakes with diverse genetic makeup for their captive breeding program. The goal is to produce snakes that are the most suitable for future reintroduction programs in different areas. FWC helped The Orianne Society collect genetic samples and live snakes for a study on the effects of landscape composition and fragmentation on indigo snake population connectivity in south-central Florida. FWC also reviewed portions of USFWS's Eastern Indigo Snake Recovery Plan that is being developed.

Jennings Wildlife Management Area in Clay and Duval Counties – FWC conducted one search for indigo snakes. FWC surveyed three sites that had recent prescribed fires. The search did not detect any indigo snakes.

Florida Pine Snake and Short-tailed Snake (*Kevin Enge*)

The Florida pine snake is currently listed in Florida as a State-designated Species of Special Concern, but it will be listed as State-designated Threatened once a management plan has been approved. A species action plan for the Florida pine snake was initiated in FY 2011-12 and is still being worked on by staff. The short-tailed snake, which is only found in Florida, is

currently listed as State-designated Threatened and will remain so. USFWS has been petitioned to list both species as Federally-designated Threatened. However, 12-month findings will not be completed on either until USFWS completes findings on several current candidate species. The short-tailed snake is restricted to sandhill and scrub habitats, and the Florida pine snake is found in these two habitats as well as other well-drained habitats with an open canopy or no canopy of trees. The Florida pine snake is large (up to 7 ½ feet), whereas the short-tailed snake is small (less than two feet) and extremely slender. Both species are seldom seen because they spend much of their time underground.

In preparation for a USFWS grant to determine the current status of the Florida pine snake, Southern hognose snake, and Eastern diamondback rattlesnake, fliers with color photos of these snakes were created to solicit sightings from the public. In addition, email messages were sent to land managers, biologists, and snake enthusiasts asking for records. A draft webpage (Rare Snake Registry) was developed (http://myfwc.com/news/news-releases/2013/august/14/snake-sightings/). Existing records were compiled and mapped, and road survey routes to detect these snake species were selected in areas without sightings or with no sightings since 2000. New records were entered into a database, and photos received were electronically stored in the Florida Museum of Natural History.

FISH

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

Atlantic Sturgeon Activities – The Atlantic sturgeon was Federally-listed as an Endangered species in 2012. FWC has continued collaboration with the Georgia Department of Natural Resources, USFWS, the St. Johns River Water Management District, U.S. Geological Service (USGS), and NOAA-Fisheries, as members of the St. Marys River Fisheries Restoration Committee. FWC continues to lead the revision of a fisheries management plan for the St. Marys and St. Johns rivers to return Atlantic sturgeon, among other species, to sustainable populations within the system. King's Bay Naval Base has agreed to fund tagging and monitoring the movements of the juvenile Atlantic sturgeon population in the St. Mary's estuary to determine whether they are year-round residents or transients from the Altamaha or Satilla rivers, once permitting is arranged. This determination may impact Endangered Species Act-Section 7 consultations for the St. Marys River. Long-term monitoring of water quality has been initiated by USFWS staff. Side-scan sonar surveys of the river have been initiated by USFWS and USGS to identify potential habitat restoration sites and spawning or holding sites for Atlantic sturgeon. FWC has developed an Atlantic sturgeon species action plan to help guide habitat restoration and population recovery in Florida.

Gulf Sturgeon Activities – The Gulf sturgeon is a Federally-designated Threatened species. FWC helped USGS occasionally track sturgeon in the Suwannee River during FY 2012-13.

Shortnose Sturgeon Activities – The shortnose sturgeon is a Federally-designated Endangered species. No shortnose sturgeon were caught or reported in Florida during FY 2012-13.

Other Listed Fish (*Kate Harriger and John R. Knight*)

Federal Wallop-Breaux Sport Fish Restoration Program – During FY 2012-13, FWC conducted research funded through the Federal Wallop-Breaux Sport Fish Restoration Program to monitor the status and trends of Florida's riverine sport fish populations and associated fish communities. While listed fishes were not specifically targeted during sampling, several species were collected. All information gathered during monitoring efforts contributes valuable information for developing proper conservation and management strategies to protect listed fishes in Florida.

Alternative sampling methods and species-specific research is needed to more appropriately determine the status and trends of Florida's listed fishes. Since FY 2011-12, FWC has been drafting species action plans to address species-specific conservation needs for listed fishes in Florida. Species-directed sampling projects have been initiated for the harlequin darter and southern tessellated darter. The goal of these projects is to design and establish sampling techniques to determine current population status and trends of the species in Florida.

Blackmouth Shiner – The Blackmouth shiner is currently listed in Florida as State-designated Threatened. A species action plan is currently being drafted for this species. The blackmouth shiner occurs in the Blackwater and Yellow river watersheds in northwest Florida. Blackmouth shiners were not collected during FY 2012-13 and sampling was not conducted within the presumed range of the species. No new blackmouth shiner populations have been discovered since 2003. This species is difficult to monitor using existing standard sampling protocols, therefore, a species-specific monitoring strategy is needed before a proper population status and trend assessment can be conducted.

Bluenose Shiner – The bluenose shiner is currently listed in Florida as a State-designated Species of Special Concern. A species action plan is currently being drafted for this species. The bluenose shiner occurs in several watersheds throughout Florida. During FY 2012-13, 48 bluenose shiners were collected; 25 were collected from Holmes Creek (Choctawhatchee River watershed), 20 were collected from Rock Springs Run (Upper St. Johns River watershed), and three were collected from Alexander Springs (Upper St. Johns River watershed). Sampling techniques used for Florida's River Monitoring project appear to be sufficient for collecting the species, but species-directed sampling is necessary to determine population status and trends for the species.

Crystal Darter – The crystal darter is currently listed in Florida as State-designated Threatened. A species action plan is currently being drafted for this species. The crystal darter is only known to occur in the upper section of the Escambia River system near Century, Florida. Crystal darters were not collected during FY 2012-13. The most recent crystal darter collections from the Escambia River were from 2011, 2009 and 2004, despite extensive sampling being conducted within the known range of the species. The status and population trend of the species is currently unknown, warranting a need for an alternative monitoring strategy for the species.

Harlequin Darter – The harlequin darter is currently listed in Florida as a State-designated Species of Special Concern. FWC is currently drafting a species action plan for the species. The harlequin darter is only known to occur in the Escambia River watershed. While restricted in range, the species is regularly collected from both tributaries and mainstream Escambia River

when suitable habitats (submerged woody debris) are present. Recent sampling indicated that the species is widely distributed throughout the Escambia watershed. Three harlequin darters were collected from the mainstream Escambia River during FY 2012-13. FWC has initiated species-directed sampling using visual survey methods from tributaries to Escambia River. Preliminary results indicated that these techniques may be sufficient to determine the population status and trends of this species. Sampling will continue during FY 2013-14.

Saltmarsh Topminnow – The saltmarsh topminnow is currently listed in Florida as a State-designated Species of Special Concern. A species action plan is currently being drafted for this species. Saltmarsh topminnows occur in the estuarine reaches of northwest Florida Rivers from Perdido to the Yellow River. No saltmarsh topminnows were collected during FY 2012-13. Euryhaline species (species that tolerate varying levels of salinity) such as saltmarsh topminnows, are only occasionally encountered during monitoring efforts when sampling is conducted in brackish waters. Additional research is needed to properly assess the status of the species in Florida.

Southern Tessellated Darter – The Southern tessellated darter is currently listed as a State-designated Species of Special Concern. A species action plan is currently being drafted for this species. Southern tessellated darters are only known to occur in the Ocklawaha River watershed (a tributary to the St. Johns River) in north-central Florida. During targeted sampling in FY 2012-13, five Southern tessellated darters were collected from Orange Creek (tributary to the Ocklawaha River) and three were collected from Little Orange Creek (tributary to the Ocklawaha River). While the Orange Creek collections were made at locations where this species has been historically collected, the Little Orange Creek collections were made at two new locations. Information on the population status and trends of Southern tessellated darters is still unknown, but species directed sampling will provide information important in determining the status of the species.

Commenting – FWC provided comments on numerous developments of regional impact, environmental resource permits, joint coastal permit applications, deadhead logging, housing developments, highways and bridges, beach renourishment, power plants, dredge and fill activities, dam removal, and other projects impacting State-listed species. Many of the proposed activities had the potential to negatively affect State-listed fishes by increased sediment loading, water quality degradation, habitat alteration, and/or indirect lethal take. Species potentially impacted included: Atlantic sturgeon, bluenose shiner, blackmouth shiner, Gulf sturgeon, harlequin darter, Okaloosa darter, Southern tessellated darter, saltmarsh topminnow, and smalltooth sawfish.

Smalltooth Sawfish (*Gregg Poulakis and Phil Stevens*)

The smalltooth sawfish is a Federally-designated Endangered species that was once common in the coastal and estuarine waters of the southeastern U.S., but during the 20th century it became rare throughout its North American range. 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. Smalltooth sawfish in Florida

are currently found only from Charlotte Harbor (Charlotte County) to the Florida Keys (Monroe County).

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 Federal protection under the Endangered Species Act in 2003. These conservation measures were enacted on the basis of large scale declines in occurrence and a gross reduction of historical range. Despite the special concern for this fish, there was a lack of scientific information, making the implementation of conservation plans for this species difficult.

In November 2004, FWC initiated long-term monitoring specifically designed to collect data on the life history, biology, and ecology of the smalltooth sawfish. During FY 2012–13, two complimentary sampling methods were used to collect smalltooth sawfish in the Charlotte Harbor estuarine system, which is located on the southwest Gulf Coast of Florida. Monthly sampling that targeted smalltooth sawfish was conducted in the Caloosahatchee River (Lee County) and in upper Charlotte Harbor (Charlotte County) using a multi-gear approach.

Thirty-eight smalltooth sawfish were captured and released alive. A variety of data were taken on all captured sawfish (*e.g.*, lengths, rostral tooth counts), and each new animal was tagged and released. Total lengths ranged from about two and a half to six feet; all of these sawfish were immature. Captured sawfish were tagged with a colored tag embossed with FWC's tagging hotline phone number, a PIT (Passive Integrated Transponder) tag (similar to electronic tags used for dogs and cats), and an acoustic tag, and were released at the site of capture. PIT tags remain with the sawfish for life, and the PIT tag reader is carried by researchers to detect recaptures. The acoustic tags are used by researchers to track sawfish movements using hydrophones (underwater listening devices that determine short-term, fine-scale movements, and to listen for acoustic tags at moored stations). Data obtained have been used to define activity space, home range, and the abiotic (non-living chemical and physical factors in the environment) preferences of this species while it resides in the nurseries. This is part of a collaborative effort between FWC and other scientists.

FWC is a member of the Smalltooth Sawfish Recovery Plan Implementation Team. This group includes Federal, State, academic, and non-profit organization members and was assembled by NOAA-Fisheries to develop and implement the Federal Recovery Plan for this species. Sampling data are provided to the team as needed.

Information received via awareness efforts (*e.g.*, calls to FWC sawfish hotline from poster and permanent sign distribution) 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 designation of juvenile 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. For more information on FWC's Smalltooth Sawfish Research and Monitoring, including access to publications on specific topics, please visit http://research.MyFWC.com/sawfish.

INVERTEBRATES

Panama City Crayfish (*David Cook, John Himes, Tom Ostertag, and Amy Raybuck*)

The Panama City crayfish is a State-designated Species of Special Concern that will become State-designated Threatened once a management plan for the species is finalized and

approved by the FWC Commissioners. 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 alteration of natural wetlands (e.g., pine flatwoods prone to seasonal flooding) have eliminated this 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. The present draft management plan, dated May 2007, is available at http://myfwc.com/media/1355365/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 (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 best management practices 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.

During FY 2012-13, FWC 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, a number of environmental resource and wetland dredge and fill permit applications were reviewed. FWC consulted with FDEP and the U.S. Army Corp of Engineers (to whom the applications had been submitted), and with environmental consultants, to provide guidance on proposed development projects and to prevent unauthorized taking of Panama City crayfish. FWC also led habitat restoration activities (e.g., prescribed burning, and removal and chemical treatment of invasive vegetation) for the Panama City crayfish on a conservation easement in Gulf County, and continues restoring Panama City crayfish habitat on additional conservation easements. Future efforts may include relocating Panama City crayfish to areas of suitable, but unoccupied habitat within the range of the species in order to increase its area of occupancy.

Extensive surveys conducted in FY 2011-12 sampled previously recorded crayfish sites on Gulf Power rights-of-way, public road edges, and other areas, and searched for previously undocumented sites throughout the species' historic range. In April 2013, the St. Joe Company signed a license agreement granting FWC access to St. Joe lands for Panama City crayfish surveys. Those lands have not been surveyed for about ten years. From April-July 2013, FWC led a multi-party effort to survey St. Joe properties. Of the 148 "undeveloped" St. Joe parcels within the historic range of the Panama City crayfish (determined by GIS analysis), 53 parcels were surveyed in FY 2012-13. Surveys confirmed the presence of Panama City crayfish on 31 of these parcels. When comparing these data to surveys conducted 10 years ago, FWC determined 21 properties had continued presence of Panama City crayfish. Moreover, even though many of the wetlands visited were found to be overgrown, the FY 2012-13 surveys documented presence for the first time on ten additional St. Joe parcels.

Completion of a proposed Candidate Conservation Agreement with Assurances between FWC, USFWS, and the St. Joe Company has been deferred indefinitely. If work resumes on the development of the Agreement, and it is approved and implemented, this incentive-based conservation agreement would guide habitat restoration and management activities for the Panama City crayfish in the eastern part of its range, thereby enhancing the long-term survival prospects of the species. Concurrently, FWC is consulting with USFWS and FDEP to establish a conservation banking system that would promote the long-term conservation and management of

Panama City crayfish populations throughout the species' historic range, providing a streamlined permitting framework while affording private landowners a financial incentive for their conservation efforts (i.e., perpetual easements and long-term habitat management).

In February 2013, FWC convened a meeting of stakeholders to discuss ways to move forward with Panama City crayfish habitat conservation and mitigation options that are needed to complete the draft Panama City Crayfish Management Plan. Stakeholders at the meeting included the St. Joe Company, Bay County, environmental consultants, and an independent crayfish biologist. Discussions from that meeting and follow-up meetings with consultants and St. Joe led to an ongoing effort to draft a request for proposals to contract for the development of a Panama City crayfish habitat assessment tool and a framework for establishing a conservation banking mechanism.

Miami Blue Butterfly (*David Cook and Ricardo Zambrano*)

The Miami blue butterfly was State-designated Threatened until April 2012 when the USFWS formally listed the Miami blue butterfly as Federally Endangered. The butterfly historically ranged from Hillsborough County to the Dry Tortugas on the Gulf Coast and from Merritt Island (Brevard County) to the Florida Keys on the Atlantic Coast. Currently, it is found only at two sites in the Key West National Wildlife Refuge in extreme south Florida.

Over the last decade, FWC has partnered with several government agencies, non-governmental 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, and FDEP for previous captive propagation and reintroduction efforts. A Conserve Wildlife Tag grant from the Wildlife Foundation of Florida supported captive propagation and reintroductions during 2005 and 2006, including the release of over 1,100 captive raised Miami blue butterflies in Biscayne National Park and Dagny Johnson Key Largo Hammocks Botanical State Park. FWC, through the State Wildlife Grants program, provided funding to the University of Florida to conduct Miami blue butterfly population surveys and to examine their genetic diversity at Key West National Wildlife Refuge. The agency also assisted in the fieldwork for that study.

During FY 2012-13, progress on implementing the 2010 Miami Blue Butterfly Management Plan (which may be accessed at http://myfwc.com/media/1349003/MiamiBlueButterflyManagementPlanRevised.pdf) continued to be severely limited due to the 2010 loss of both the wild population at FDEP's Bahia Honda State Park and the captive population at the University of Florida. Planned research to use captive-raised Miami blue butterflies to develop techniques to successfully reintroduce the species has been postponed until a new captive population can be established, and until it can be determined that the remaining wild populations in Key West National Wildlife Refuge are robust enough to support collection from the wild. FWC is working closely with USFWS to coordinate ongoing and future conservation efforts for Miami blue butterfly populations on the wildlife refuge, and to assist with drafting a Federal recovery plan. A biologist contracted by USFWS has been (1) conducting regular surveys of the Key West National Wildlife Refuge Miami blue populations, (2) refining survey and monitoring techniques, and (3) developing a model to predict when high adult numbers are likely to be observed. Peak population estimates are between 450 and 600 Miami blue butterflies. FWC will continue to support USFWS research efforts on Key West National Wildlife Refuge and its consideration of the feasibility of

establishing a new captive Miami blue butterfly population. Surveys for Miami blue butterflies elsewhere in the historic range will continue with assistance from FWC.

Schaus Swallowtail Butterfly (*David Cook and Ricardo Zambrano*)

The Schaus swallowtail butterfly (Schaus) is Federally-designated as Endangered. At an Imperiled Butterfly Work Group meeting in 2010, lepidopterists (moth/butterfly biologists) and members of the North American Butterfly Association presented information and data from long-term surveys that indicated Schaus numbers at Biscayne National Park (Miami-Dade County) and North Key Largo (Monroe County) were very low. The Work Group decided more information was needed to determine whether this species had declined. It was determined that comprehensive and intensive surveys of all areas potentially occupied by Schaus should be conducted. FWC, with assistance from the Miami Blue chapter of the North American Butterfly Association and the National Park Service, took the lead in coordinating those efforts in 2011. Those surveys resulted in only 35 Schaus seen at Biscayne National Park and six seen on North Key Largo.

In 2012, the USFWS contracted the University of Florida's Maguire Center for Lepidoptera Research to conduct surveys. The 2012 Schaus swallowtail butterfly survey effort yielded a total of only four verified sightings of adults (one female and three males), all on Elliott Key in Biscayne National Park. This precipitous decline, down from the 41 sighted in 2011, prompted concern that the species may be in imminent danger of extinction. By the end of the 2012 flight season, an emergency permit was approved to allow the capture of up to three females to attempt captive propagation. However, no further Schaus were seen or captured in 2012.

In 2013, between 40 and 50 Schaus swallowtail butterfly surveys were conducted April 22–June 16. Groups participating in the surveys included FWC, National Park Service, the University of Florida, North American Butterfly Association, Eco-Cognizant, and Florida International University. A total of 31 Schaus were sighted, all on Elliott Key. According to a protocol approved the previous year, three female Schaus were captured and held in captivity until eggs were deposited. This effort yielded 100 eggs, which were taken to the University of Florida's Maguire Center for Lepidoptera Research for captive rearing in a "head start" program to augment the numbers flying in 2014. Seventy-two of the eggs hatched, and the captive larvae, augmented by additional larvae collected under USFWS authorization, yielded 70 pupae from six founder lines. In the wild, Schaus typically remain as pupae until spring rains trigger their emergence to begin that year's flight season. However, in order to maximize the number of Schaus available for release in the spring, 17 of the pupae will be treated with water sprinkling in September 2013 to artificially trigger early emergence. The resulting adults will be paired as mates to produce many more eggs that will be reared to pupae. This effort should result in several hundred Schaus to be released in spring 2014. FWC provided funds to help purchase the wild lime host plants needed to support this captive rearing.

WILDLIFE CONSERVATION, PRIORITIZATION, AND RECOVERY (*Dan Sullivan*)

FWC is taking a pro-active, science-based approach to evaluating management needs of at-risk species on FWC-managed lands. FWC is implementing this approach through the Wildlife Conservation Prioritization and Recovery Program. The program integrates

conservation planning, Population Viability Analysis (PVA) results, and geospatial analytical techniques to model potential habitat to help FWC determine where to affect focal species conservation. Using this information, FWC determines where species conservation can be affected on each wildlife management area (WMA) or wildlife and environmental area (WEA) FWC integrates the outcome of the landscape level assessment with area-specific and expert knowledge to produce species management strategies. Strategies are particular to each WMA/WEA and outline the role of the area(s) 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 provisions for monitoring to verify progress towards meeting the objectives. Implementing this program ensures FWC is efficiently meeting the needs of Florida's at-risk species on lands managed by the agency.

During FY 2012-13, FWC completed two workshops covering two WMAs. The areas covered by a workshop included: Fred C. Babcock-Cecil M. Webb WMA (Charlotte and Lee counties) and the Andrews WMA (Levy County). FWC initiated the drafting of strategies that are the output from these workshops. These strategies are anticipated to be completed during FY 2013-14.

During FY 2012-13, FWC finalized six strategies covering five WMAs and seven WEAs. Properties covered by these completed strategies include: Everglades and Francis S. Taylor WMA (Dade, Broward, and Palm Beach counties); Rotenberger WMA and Holey Land WMA (Palm Beach County); Herky Huffman/Bull Creek WMA and Triple N Ranch WMA (Osceola County); Chinsegut WEA, Perry Oldenburg WEA, and Janet Butterfield Brooks WEA (Hernando County); Little Gator Creek WEA (Pasco County); Bell Ridge Longleaf WEA (Gilchrist County); Branan Field WEA (Duval and Clay Counties); and Watermelon Pond WEA (Alachua County).

The Program will continue to assess the changing needs of wildlife at the statewide level. FWC plans to update Strategies on a regular basis in conjunction with required updates to each area's management plan.

COORDINATION AND ASSISTANCE (*Caly Coffey, Jennifer Goff, Brad Gruver, Richard Kiltie, Erin Leone, Twanisha Presley, and Kristin Rogers*)

Coordination – Listed species coordination during FY 2012-13 included overseeing, monitoring, facilitating, and otherwise organizing activities associated with listed species. It also included ensuring adherence to Federal and State reporting and documentation requirements and guidelines; implementing or facilitating protection through coordination of assistance, regulatory measures and permit review; providing or facilitating consultation and assistance to private interests; and interacting with State and Federal agencies, conservation organizations, and others regarding a wide range of listed species matters. Funding for coordination was jointly provided by USFWS and NOAA-Fisheries through Section 6 of the Federal Endangered Species Act of 1973, Florida's 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 authorities through telephone calls, e-mails, written correspondence, and agency commenting. Section 6 Cooperative Agreements with USFWS and NOAA-Fisheries were administered, including preparing emergency handling reports, preparing and executing Section 6 grants, and developing the renewal packets for the

Cooperative Agreements. During FY 2012-13, FWC revised the Section 6 Cooperative Agreement with USFWS. In addition to renewing the agencies commitments to cooperate in the conservation of Federally-listed species, the revised agreement provides a framework for FWC to issue conservation and incidental take permits, under specific guidelines, for Federally-listed species. The intent is to 1) reduce unnecessary permit duplication and inconsistency; 2) result in more predictable outcomes; 3) compress permitting timeframes; and 4) create conservation/mitigation measures that are less haphazard and more effective in conserving listed species. The revised agreement became effective May 14, 2012.

FWC's Listed Species Website, http://myfwc.com/wildlifehabitats/imperiled/, includes, among other things, copies of previous legislative reports, the current list of listed wildlife, information on listed species permits, and listed species management plans. During FY 2012-13, the site was maintained and information was added, updated, or removed as necessary.

Project Support – FWC provided statistical and data management support for numerous projects focused on Endangered and Threatened Species, and Species of Special Concern during FY 2012-13. The Agency contributed population trend analysis, monitoring, or assessment of marsh birds, wading birds, American alligators, Florida black bears, Florida panthers, bald eagles, Florida scrub jays, Southeastern American kestrels, green sea turtles, Kemp's ridley sea turtles, leatherback sea turtles, Alligator snapping turtles, striped mud turtles, pine barrens treefrogs, short-tailed snakes, Florida pine snakes, winter breeding reptiles and amphibians, snook, and red drum, as well as analyzing loggerhead turtle nesting trends.

Reviews and Assistance for Transportation Projects – FWC performed a total of 75 reviews of highway projects during FY 2012-13, which included projects reviewed through the Florida Department of Transportation's Efficient Transportation Decision Making Process and assistance letters outside of the Process. Each review included a biological assessment of the direct and indirect effects of the transportation project on listed bird, mammal, amphibian, and reptile species and their habitats. Recommendations were provided to the Florida Department of Transportation's seven districts and the Turnpike Enterprise on methods to avoid, minimize, or mitigate these effects on listed 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. This assistance was designed to reduce the adverse effects of specific highway projects on listed fish and wildlife species.

Land Use Planning Activities – FWC provided 611 written assistance letters for public and private land and water use planning activities that had the potential to impact listed fish and wildlife species and their habitats during FY 2012-13. The types of projects reviewed and commented on included: developments of regional impact, county comprehensive plan evaluation and appraisal reports, proposed amendments and sector plans, regional visioning projects, various State and Federal permit applications, environmental assessments, and environmental impact statements, and power plant site applications and ten-year plan reviews. The content of consultations was based on established best management practices, species management guidelines, and GIS analysis. In addition, FWC contributed to the development of comprehensive habitat-based management plans, and coordinated landscape-level planning with

local, State, and Federal agencies to provide benefits to species and habitats of greatest conservation need.

CRITICAL WILDLIFE AREAS (*Carol Rizkalla*)

Critical Wildlife Areas (CWAs) are established by FWC under rule 68A-14.001 of the Florida Administrative Code, 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 and the CWA Coordinator are responsible for evaluating needs for potential CWAs, producing or revising establishment orders, and coordinating necessary management and monitoring activities for the wildlife populations using those areas each year. Management and monitoring activities are conducted with multiple partners including other State and Federal agencies, local governments, and non-governmental organizations.

Managed areas within CWA boundaries are defined with posts and signs (posted) to identify the area, increase public awareness, and reduce disturbance to the fragile wildlife resources that are present there. During FY 2012-13, all active and potentially active CWAs that could be posted were posted with appropriate signage as necessary.

Active CWAs were monitored in FY 2012-13 by FWC biologists, technicians, and management partners. Monitoring protocols varied among sites, depending on the species present, but usually involved either direct counts or estimates of adults, nests, or young. 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 efforts by FWC and the activities of other member groups. FWC provides species expertise, assistance, and available management and educational materials when partnering with other groups in these efforts.

Fourteen of the 22 established CWAs supported populations of listed and other important wildlife species during FY 2012-13 (**Table 7**). The most notable and active CWAs that supported listed species included: Alafia Bank in Hillsborough County (several wading bird species, American oystercatchers and brown pelicans); ABC Islands in Collier County (little blue herons, snowy egrets, and reddish egrets); St. George Causeway in Franklin County (least terns, royal terns, and American oystercatchers); Big Marco Pass in Collier County (least terns, black skimmers, and wintering piping plovers); and Fort George Inlet in Duval County (royal terns). Results show that CWA management is important for effective conservation of many species. For that reason, this project is expected to be an ongoing priority for FWC.

A Florida Coastal Management Program grant from FDEP allowed a CWA Coordinator to be hired during FY 2011-12. During FY 2012-13, the grant allowed the Coordinator in partnership with FDEP to develop a website (http://myfwc.com/conservation/terrestrial/cwa/) for CWAs, identify CWAs needing re-establishment or dis-establishment, work with partners to propose new CWAs, and to work with the Coastal Wildlife Conservation Initiative to implement vegetation management at CWAs. In February 2013, the FWC Commission approved delegating authority to the Executive Director for minor re-establishments and dis-establishments. Major re-establishments and new establishments will continue to be presented to all FWC Commissioners.

Table 7. Critical wildlife areas (CWAs) in Florida during FY 2012-13, with relevant information about each.

FWC Region CWA name	County	Closure period	Primary taxa	Status[a]	Managed Area within Boundary
Southwest					
Alafia Bank	Hillsborough	1 Dec. to 1 Sept.	Great blue heron, great egret, snowy egret, little blue heron, willet, tricolored heron, reddish egret, cattle egret, black-crowned night heron, yellow-crowned night heron, white ibis, glossy ibis, brown pelican, roseate spoonbill, American oystercatcher, cormorant	25, 85, 35, 50, 3, 170, 25, 175, 40, 30, 3800, 125, 350, 235, 8, 70 nests	16 acres (ac)
Little Estero Island	Lee	1 April to 1 Sept.	Least tern, Wilson's plover, snowy plover, American oystercatcher	10, 4, 1, 1 nests	6 ac
Myakka River	Sarasota	1 March to 1 Nov.	Wood stork, great egret, great blue heron, cattle egret, anhinga, snowy egret, little blue heron	69, 39, 1, 2, 30, 0, 1 nests	1 ac
Anclote River Islands	Pasco/Pinellas	1 Feb. to 1 Sept.	Herons, egrets, brown pelican	Inactive[b]	5 ac
Red Lake	Sarasota	1 June to 31 Aug.	Herons, egrets, brown pelican	Inactive	34 ac
McGill Island	Manatee	15 April to 1 June	Herons, egrets, brown pelican	Inactive	50 ac
North Central					
Amelia Island	Nassau	1 April to 1 Sept.	Least tern, black skimmer, Wilson's plover, American oystercatcher, willet	76, 0, 6, 0, 4 nests	10 ac
Bird Islands	Duval	1 April to 1 Sept.	Black skimmer, gull-billed tern, least tern, American oystercatcher, Wilson's plover	Inactive	6 ac
Fort George Inlet	Duval	1 April to 1 Sept.	Royal tern, black skimmer, Wilson's plover, laughing gull, gull-billed tern, sandwich tern, American oystercatcher	2950, 16, 4, 1800,4, 35, 1 nests	10 ac
Northwest					
Tyndall	Bay	Year-round	Least tern, black skimmer, snowy plover, Wilson's plover, American oystercatcher, willet, piping plover[c]	21, 0, 44, 23, 1, 2 nests	200 ac
Alligator Point	Franklin	1 April to 1 Sept.	Snowy plover, Wilson's plover, American oystercatcher, least tern, willet	0, 1, 2, 9, 0 nests	66 ac
St. George Causeway	Franklin	1 April to 31 Aug.	Least tern, Caspian tern, gull-billed tern, royal tern, sandwich tern, American oystercatcher, black skimmer, brown pelican	0, 59, 4, 700, 250, 3, 20, 109 nests	32 ac
Gerome's Cave	Jackson	1 March to 1 Sept.	Southeastern myotis bat	~1000 individuals	2 ac
South					
Deerfield Island Park	Broward	Year-round	Gopher tortoise	7 individuals	56 ac
ABC Islands	Collier	Year-round	Brown pelican, little blue heron, great blue heron, tri-colored heron, great egret, reddish egret, snowy egret, cattle egret	32, 1, 10, 15, 106, 4, 10, 15 nests	75 ac
Big Marco Pass	Collier	Year-round	Least tern, black skimmer, snowy plover, Wilson's plover, wintering shorebirds[c]	435, 598, 0, 10 nests	30 ac
Caxambas Pass	Collier	1 April to 1 Sept.	Least tern, black skimmer, Wilson's plover, wintering shorebirds[c]	Inactive	1 ac
Rookery Island	Collier	Year-round	Herons, egrets, brown pelican	Inactive	1 ac
Bill Sadowski	Dade	Year-round	Foraging shorebirds and wading birds	~1000 individuals	700 ac
Pelican Shoal	Monroe	1 April to 1 Sept.	Roseate tern, bridled tern	Inactive	1 ac
Northeast					
Jennings Cave	Marion	15 Feb to 31 Aug	Southeastern myotis bat	Inactive	1.9 ac
Matanzas Inlet	St. Johns	1 April to 1 Sept.	Least tern, Wilson's plover, willet	8, 1, 0 nests	28 ac

[a]Counts or estimates of peak numbers of individuals and/or nest attempts at each site during the closed period in FY 2012-13.
[b]Inactive means the site was either not used, or not available for use, by wildlife during FY 2012-13.
[c]Monitoring to count or estimate numbers of wintering shorebirds was not conducted.

FLORIDA'S LAND OWNER ASSISTANCE PROGRAM (*Joe Prenger*)

FWC has been administering the Landowner Assistance Program (LAP), in cooperation with USFWS, since October 2003. Florida's LAP promotes stewardship on private lands while also playing a fundamental role in the conservation of listed species. Florida's LAP is a voluntary program designed to provide wildlife-related assistance with land-use planning and habitat management to private landowners, as well as financial support to those interested in improving habitat conditions on their property for the benefit of listed species. The Program's emphasis is on priority habitats located primarily in focal areas, thus ensuring that Federal dollars are being targeted in the most efficient and equitable manner to properties with the greatest potential benefits for listed species.

During FY 2012-13, FWC's LAP assisted more than 769 landowners, including providing evaluations of effects from proposed agricultural practices to listed species on 404 projects. Many of the landowners also received financial assistance through State or Federal cost-share or easement programs such as the U.S. Farm Bill and USFWS Partners for Fish and Wildlife Programs. LAP staff worked in cooperation with the U.S. Department of Agriculture's Natural Resources Conservation Service, USFWS, FDACS, the University of Florida's Institute of Food and Agriculture Sciences, Florida Natural Areas Inventory, and various other conservation organizations, to assist Florida's private landowners. While private landowners represent the majority assisted by LAP staff during FY 2012-13, public conservation land managers including the U.S. Department of Defense and county governments received assistance with development or review of management plans for their conservation lands.

For more information, please visit the LAP Website at http://myfwc.com/conservation/special-initiatives/lap/.

LAW ENFORCEMENT (*Lieutenant Chuck Mincy*)

FWC's Division of Law Enforcement continued statewide enforcement activities to protect specific Endangered and Threatened species during FY 2012-13. These activities included:

- Regular patrols of the Florida panther reduced-speed zones in Lee and Collier counties to protect panther and prey species, and to 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 sea turtles, to reduce nest destruction and unlawful egg removal or theft;
- Patrol efforts directed toward the enforcement of specific gear requirements (i.e., Turtle Excluder Devices) to protect sea turtles from becoming entrapped in shrimp trawl nets;
- Patrol efforts targeting coastal nesting areas of protected shore birds to reduce nest disturbance, nest destruction, and incidental take;
- Investigations by the Internet Crimes Unit targeting the unlawful sale and possession of protected species on the internet; and
- Enhanced statewide enforcement efforts directed towards utilizing radar and the Manatee Cam surveillance technology to ensure compliance with boat speed zones to prevent manatee

vessel strikes and manatee harassment. More than 109,817 water patrol hours were dedicated to manatee enforcement, resulting in 2,217 citations and over 2,793 warnings.

The Division of Law Enforcement issued 13 additional citations and ten warnings separate from manatee citations, involving Endangered species, Threatened species, and Species of Special Concern.

The Division of Law Enforcement continues to partner with other governmental agencies and citizen groups to work through issues concerning the Florida panther in southwest Florida. Law Enforcement also assisted in increasing public awareness of black bears, gopher tortoises, Perdido Key beach mice, sea turtles, and other species.

PERMITTING AND ASSISTANCE (*Angela T. Williams*)

During FY 2012-13, FWC provided Federal agencies, other State agencies, environmental consultants, and regional and local regulatory authorities with assistance and guidance regarding projects that impact protected and listed fish, bird, and land dwelling species on managed Federal, State, and private lands, and lands slated for development. Many of these entities, as well as 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: 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., education on the species behavior and habitat requirements and suggestions for coexisting with the species).

Some permits require permit holders to carry out an approved site or species-specific management plan. Others require permit holders to follow FWC species guidelines, policies, or management plans for the Florida burrowing owl, osprey, gopher tortoise, bald eagle, and peregrine falcon. Scientific permits are generally conditioned on an approved research proposal. The permit review process usually involves coordination between FWC, environmental consultants, other State agencies, Federal agencies, and regional and local regulatory entities.

FWC made thousands of telephone calls, sent thousands of emails, and hundreds of formal letters in conjunction with these assistance efforts. An estimated 252 protected and listed species scientific collection, captive possession, translocation, wildlife relocation, nest removal, disturbance, and incidental take permits (and permit amendments) were issued during FY 2012-13. No agreements for permitting Federally-listed species have been approved through FY 2012-13.

Overall, FWC provided science-based and regulatory guidance to ensure that permitted activities would either result in a net conservation benefit or prove not to be detrimental for the involved species. Additional information regarding species guidelines, policies, and permit applications may be accessed at http://myfwc.com/license/wildlife/protected-wildlife/. Applications for scientific collecting, migratory bird nest relocation, and non-resident falconry permits may be accessed via the online permitting system at http://myfwc.com/license/wildlife/protected-wildlife/#howToApply.

COASTAL WILDLIFE CONSERVATION INITIATIVE (*Blair Hayman*)

Many species of wildlife are dependent on coastal ecosystems, including 17 State or Federally listed species and more than 100 at-risk species. Coastal habitats are among those identified in Florida's Wildlife Action Plan as having the highest relative threats statewide. Habitat loss and degradation due to development, and commercial and recreational activities have led to declining wildlife populations and natural coastal ecosystems. The Wildlife Action Plan is part of a nationwide framework for proactively conserving fish and wildlife including their habitats. The Coastal Wildlife Conservation Initiative (CWCI) is an FWC-led, multi-agency (FDEP, Florida Department of Economic Opportunity, and the University of Florida Institute of Food and Agriculture Services) strategy that began in May 2007. The goal of the CWCI is to initiate a statewide, cooperative process to provide for greater consistency and coordination in protecting coastal wildlife populations, conserving and managing coastal ecosystems, and achieving balance between these efforts and human use of coastal areas. The CWCI's comprehensive approach focuses on wildlife and their habitat needs as well as socio-economic issues. Through this interactive process, agencies can improve coordination on coastal issues, address emerging issues, and work towards greater consistency statewide in the conservation of wildlife. The people of Florida will benefit from this process through improved efficiency of State and local agencies in meeting missions for coastal management and conservation.

A full-time coordinator, funded through a State Wildlife Grant and a Florida Coastal Management Program grant, is responsible for creating the partnership network, developing and implementing the framework for a policy team, a standing team, and working groups, and coordinating actions between these groups and FWC in addressing coastal issues. Engaging potential partners and stakeholders at the local level is an important component in achieving a cohesive partnership. After initial regional outreach forums to introduce the CWCI, efforts were made (and are ongoing) to assemble working groups in each of FWC's regions to focus on wildlife, habitat, and human interests in coastal areas. Working groups have currently been established in the Southwest, Indian River, Tampa Bay, Northeast, Upper Southeast, Western Panhandle, and Nature Coast regions (collectively including Sarasota, Charlotte, Lee, Collier, Volusia, Brevard, Indian River, Pinellas, Hillsborough, Manatee, Nassau, Duval, St. Johns, Flagler, St. Lucie, Martin, Palm Beach, Escambia, Santa Rosa, Okaloosa, Levy, Citrus, Hernando, and Pasco counties), with four additional groups slated to be added. Priorities include a campaign on the importance of wrack (marine vegetation that washes up on the shore and is used as a source of food for many species) in beach habitats, and management of vegetation at Critical Wildlife Areas to better suit nesting seabirds and shorebirds. Working groups identify regional priority projects and collaborate on a variety of efforts for conservation of coastal wildlife. For example, the working groups have developed a training module for best practices for beach driving by municipal governments, "best practices" for recreational crabbers to reduce by-catch of diamondback terrapins and other species, and a "Beach Hero" outreach effort to promote wildlife-friendly behavior. Team members and the coordinator participate in other working groups to lend expertise and to strategize on how the CWCI and its partnership may assist with achievement of goals focusing on coastal conservation issues.

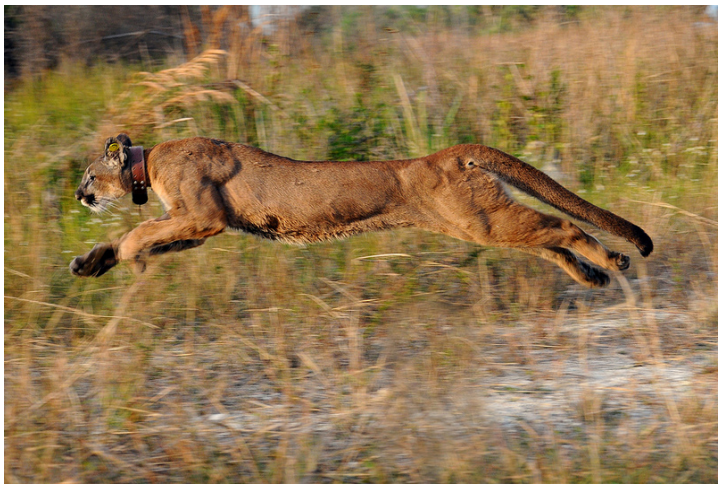
CITIZEN AWARENESS PROGRAM

Compiled and edited by *Diane Hirth*

Contributors: *Bonnie Abellera, Barbara Almario, Naomi Avissar, Scott Ball, Deborah Burr, Nancy Douglass, Craig Faulhaber, Judy Gillan, Annemarie Hammond, Lori Haynes, Diane Hirth, Donna Jones, Cavell Kyser, Darrell Land, Connie Lord, Ann Morrow, Gary Morse, Alexandra Perryman, Wendy Quigley, Jess Rodriguez, Liz Sparks, Sharon Tatem, David Telesco, Alicia Wellman, and Andy Wraithmell.*

Introduction – Section 379.2291(5), Florida Statutes, requires FWC to provide a revised and updated plan for management and conservation of Endangered and Threatened species, including a description of relevant educational programs. Though FWC has no formal education program, staff regularly provide information to and interact with the public about listed species by conducting citizen awareness programs throughout the agency to fulfill the statutory requirement. The following summarizes these efforts for listed species from July 1, 2012, to June 30, 2013.

Highlights – FWC engaged in major efforts promoting citizen awareness of listed or at-risk species in FY 2012-13, often done in partnership with other public agencies and private organizations. Examples are:



Panther pair rescued as kittens are rehabilitated and released back into the wild. FWC released two Endangered Florida panthers in 2013, a brother and sister rescued as five-month-olds after their mother was found dead in 2011. The kittens were raised with minimal human contact at the White Oak Conservation Center in northeast Florida. The female panther was released January 31 in Picayune Strand State Forest in southwest Florida. She later was documented to have given birth to a female kitten. When the male panther was released April 3 at the Rotenberger Wildlife Management Area in South Florida, there was a large presence of invited media (http://myfwc.com/news/news-releases/2013/april/03/panther-released/). Floridians' purchase of the panther license plate supports such conservation efforts. The YouTube video (http://www.youtube.com/watch?v=ieWYTNmujcU&feature=c4-overview&list=UUkDj8yIrlrHB1hkU93uEZQg) on the panthers' release received more than 11,300 views.

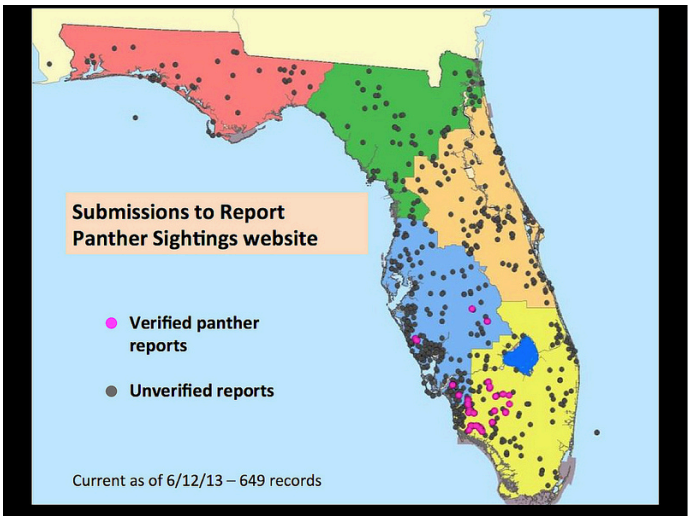
Introduction of FWC's Imperiled Species Management Plan with draft action plans for 60 species. A series of five news releases beginning in December 2012 and continuing through May 2013 offered the public an opportunity to understand FWC's new conservation model of creating a single Imperiled Species Management Plan. This Plan will include both species action plans and integrated conservation strategies benefiting multiple species. The public was offered the opportunity to read the draft species action plans and offer comments (http://www.myfwc.com/wildlifehabitats/imperiled/).
A MyFWC Flickr photo gallery also showcased imperiled species in the plan (http://www.flickr.com/photos/myfwcmedia/sets/72157632659454856/).

Celebrating conservation of Florida's Endangered and Threatened species. In the week leading up to Endangered Species Day on May 17, 2013, FWC celebrated Florida's successes in conserving Endangered and Threatened species such as the Florida panther, bald eagle, Key deer, loggerhead turtle, manatee, and brown pelican. More than 73,000 people viewed the MyFWC Facebook posts sharing the species' conservation histories, current status, and on-going challenges. This year was the 40th anniversary of the Endangered Species Act, signed by President Nixon in 1973. At that time, there were as few as 20 to 30 Florida panthers, just 88 active bald eagle nests in Florida, and brown pelicans were Endangered. Today, the panther population contains 100 to 160 adults, more than 1,500 active bald eagle nests were reported during the 2011-12 nesting season, and the brown pelican is due to be removed from Florida's list of Endangered and Threatened species while still being conserved under an FWC species action plan.

Our nation's symbol soars in Florida. On July 3, 2012, a statewide news release and a press conference at the Audubon Center for Birds of Prey in Maitland announced Florida is one of the top spots in the lower 48 states for bald eagles to nest and raise their young. FWC estimated there are 1,457 active bald eagle nests in Florida, a nine-percent increase since 2008, based on the agency's 2011 aerial survey. Once an Endangered species in the continental U.S., the bald eagle is now a conservation success in Florida where its population has soared from just 88 active nests in 1973. Information was provided on the volunteer EagleWatch program, as well as how to report new eagle nest locations. The release's mention of the online FWC Bald Eagle Nest Locator (https://public.myfwc.com/FWRI/EagleNests/nestlocator.aspx) was a motivation for people to get outdoors on July 4 – or any other time – to look for bald eagles. The news release and press conference resulted in strong statewide media coverage from 20 newspapers, television stations, and online publications. On July 4, there also were 7,455 visitors to the MyFWC Facebook post regarding Florida's success with

bald eagles. The news release won the 2nd place award in the news release category in the 2012 national competition of the Association of Conservation Information.

New website invites public reports of panther sightings. In August 2012, FWC launched a new website (www.MyFWC.com/PantherSightings) to encourage people to report when and where they saw a Florida panther or its tracks. Since then, the public has reported hundreds of sightings of panthers, which will help FWC plan and manage for the expected expansion of the panther's range in Florida. FWC also introduced the new "E-Z guide to identify panther tracks" available at (www.PantherNet.org). Only 12 percent of the reports so far have included a photograph and could be evaluated by FWC biologists. The majority were confirmed as panthers. When it was not a panther, most often the reported animal or tracks belonged to a bobcat. Verified panther reports were largely confined to southwest Florida, the well-documented breeding range for this Endangered species, though a few verified sightings were in south central Florida.



Reducing bear access to garbage. Through partnerships with local governments, businesses and communities, FWC bear program staff has reduced Florida black bear access to garbage across the State. Results of those efforts include: making bear-resistant equipment like garbage cans, sheds, and electric fencing more readily available and shifting waste service pick-up times so residents can take garbage out the morning of pick-up rather than the night before. Through a grant from funds generated by the Conserve Wildlife license plate, FWC worked with Leon, Orange, Collier, and Volusia counties to increase the availability of bear-resistant containers for trash. In Leon, Orange, and Volusia counties, FWC worked with local government and waste service companies to cost-share the purchase of bear-resistant trash cans for residents. In Collier County, FWC purchased materials to build bear-resistant sheds for residents to store their regular garbage cans. Volunteers donated their time to build and install the sheds, and Collier County significantly reduced the cost of permitting the sheds.

Media Relations – FWC news releases reach substantial regional, statewide, and national audiences:

Daily newspapers	566
Weekly newspapers	447
Magazines	388
Online publications	357
Radio	335
TV	400
Organizations, public agencies	400

During FY 2012-13, FWC issued 38 news releases on Endangered and Threatened species. FWC news releases are posted online and archived at MyFWC.com/News. A selection of news releases from July to December 2012 follows:

- New manatee, sea turtle decals: an affordable way to support conservation – July 16, 2012
- FWC researchers witness spawning of rare coral in Florida – August 7, 2012
- FWC asks public to share Florida panther sightings, photos on website – August 15, 2012
- FWC updates gopher tortoise conservation plan, adds burrow inhabitants – September 5, 2012
- FWC charts next steps for expanded Florida panther population range – September 5, 2012
- Bears very active now – September 17, 2012
- Strong 2012 nesting season for Florida loggerheads – October 19, 2012
- Biologists boost red-cockaded woodpecker population in South Florida – October 29, 2012
- As weather cools, Florida manatees move to warmer waters – November 15, 2012
- FWC defines new conservation model for 60 species – December 6, 2012
- Florida scrub-jays in Palm Bay to get new lease on life – December 11, 2012

In FWC's regions (northwest, northeast, north-central, south, and southwest), a public information coordinator communicated with media regarding listed species. Staff at FWC's Fish and Wildlife Institute also answered media inquiries, fielding 243 calls in FY 2012-13 on subjects ranging from whooping cranes to brown pelicans, manatees and corals.

Social Media – FWC's use of social media and its social media audience grew significantly during FY 2012-13:

Platform	July 2012	July 2013	Increase	
Facebook "Likes"	10,500	23,000	219%	(Added 12,500 "Likes")
Twitter Followers*	5,800	10,400	179%	(Added 4,600 Followers)
YouTube Views*	175,000	941,000	538%	(Added 766,000 Views)
Flickr Hits	192,000	1,241,000	646%	(Added 1,049,000 Hits)
Instagram	0 (Account born 1/13)	699	N/A	(Added 699 Followers)

(* FWC has two Twitter accounts and two YouTube accounts. These accounts were combined for each respective platform.)

Additionally, FWC launched a research-specific Facebook page in FY 2012-13 and continued its research-focused Flickr site. FWC's Great Florida Birding and Wildlife Trail is also active in social media (https://www.facebook.com/floridabirdingtrail).

- **Manatee Awareness Month in November 2012 was celebrated with a full month of social media on MyFWC Facebook and Twitter.** Messaging focused on manatees' biology, appropriate behavior for people around slow-swimming manatees, and where people can go to view them. The public also shared their favorite manatee photos.
- **FWC news releases regularly feature a Flickr photo gallery**, including "Biologists boost red-cockaded woodpecker population in south Florida" on October 29, 2012, which had 24 photos illustrating preparation and release of red-cockaded woodpeckers re-located to South Florida.

- **The Great Florida Birding & Wildlife Trail featured at-risk species on Facebook and Twitter, reaching more than 20,000 people**. Most popular was the roseate spoonbill with 5,200 views. In May, Facebook posts reminded beachgoers to watch for beach-nesting birds such as snowy plover and its well-camouflaged eggs and chicks. The posts attracted 5,100 views.

- **The "I'm a panther kitten. Hear me MEOW!" photos on MyFWC Flickr in June 2013 attracted 14,700 people.** They saw photos of a kitten documented to have been the offspring of a panther rescued as a kitten, rehabilitated, and then released in 2013.
- **A YouTube video spotlighted FWC's three-year research project attempting to save the Endangered Florida grasshopper sparrow from extinction.** It shows the scrub habitat at Three Lakes WMA in Osceola County critical to the small songbird's survival (https://www.youtube.com/watch?v=c-UX2_QCPzI). Another video of a 620-pound black bear, the largest ever captured in Florida, drew a big audience of nearly 486,000 views (https://www.youtube.com/watch?v=WMgIIZrvxjU).
- **The public and media often get to observe the release of Florida manatees rehabilitated after being treated for injuries or illness, such as the ill effects of exposure to red tide.** Photos were posted on Flickr (http://www.flickr.com/photos/myfwcmedia/sets/72157634103426855/). Floridians' purchases of "Save the Manatee" license tags support such conservation efforts.

GovDelivery and Websites – The public's instinct in today's world is to go to the Internet for information on Florida's listed species.

- **FWC GovDelivery was initiated in June 2013, allowing people to sign up for emails or text updates on FWC topics of their choice.** MyFWC.com visitors click on the GovDelivery "red envelope" icon to get started. GovDelivery has been used successfully by other State of Florida agencies and many states. It is expected to broaden FWC outreach to the public. GovDelivery subscribers can decide what area of the State they're interested in, and how often they want to receive information.
- **The Florida panther was highlighted as species of the month in October 2012 on the homepage of MyFWC.com during FY 2012-13.** MyFWC.com is comprehensive and user-friendly with listed species information posted at http://www.myfwc.com/wildlifehabitats/**.** Ask FWC provides 64 Q&A's on key species.
- **Empowering citizen science via Internet.** FWC invites the public to act as "citizen scientists" sharing their wildlife observations. People can post locations and photos of their sightings online. This is a cost-effective strategy that provides FWC researchers and managers with important data. Examples include an upcoming black bear sightings web survey, and existing online sighting sites for mink (https://public.myfwc.com/hsc/mink/getlatlong.aspx) and upland snakes (https://public.myfwc.com/fwri/raresnakes/UserHome.aspx?id=).

- **The Florida Shorebird Database, www.flshorebirddatabase.org, is the central repository for data collected on Florida's shorebirds and seabirds, providing real-time information to resolve situations where birds are at risk.** Anyone interested in conserving shorebirds and seabirds can access this data, and the number of registered users has expanded to 444. Additionally, the Florida Shorebird Alliance (www.flshorebirdalliance.org) website features the "Wrack Line" newsletter and has about 1,200 partners.

- **Research spotlights on the Web included what's being discovered about the "Dinosaur of Turtles," the Suwannee River alligator snapping turtle.** This one included a video that drew more than 17,300 views **(**http://MyFWC.com/research/about/outreach/research-spotlight/alligator-snapper/).
- **The Manatee Mortality Search database,** (http://research.MyFWC.com/manatees/), provides Internet users a way to search for data on manatee mortalities in Florida.

Fairs, Festivals and Events – FWC staff go to places where kids, families, retirees, and tourists are

having fun in order to share the excitement and importance of conserving Florida wildlife, including Endangered and Threatened species.

- **Another successful run at the 2013 Florida State Fair.** FWC's exhibit is always popular at the fair, and its 2013 edition was no exception. During the 12-day run at Tampa's fairgrounds, an estimated 200,000 visitors saw FWC's exhibit focusing on wildlife research, management, and law enforcement. Visitors had an up-close look at live fish and wildlife, including a black bear and panther. Throughout the exhibit, there were short video and written messages about wildlife research programs, outdoor recreation, Florida Youth Conservation Centers, and large-scale conservation, and restoration efforts. A video was shown of the 100-day, 1,000 mile Florida Wildlife Corridor Expedition in 2012 that had FWC as one of its partners.

- **MarineQuest, the annual open house of FWC's Fish and Wildlife Research Institute on October 25-27, 2012, hosted more than 1,900 students in grades 4-8 and their teachers during "School Daze" and another 6,500 visitors during the general open house.** Students toured lab stations managed by FWC scientists. Exhibits with hands-on displays and activities drew students into the world of marine science and the fascinating things that FWC scientists discover. Displays spotlighted listed species such as the Florida manatee, Florida panther, North Atlantic right whale, sea turtles, alligator, and corals. Researchers displayed a live 100-pound alligator snapping turtle, and visitors participated in a simulated rescue of a sick or injured manatee.

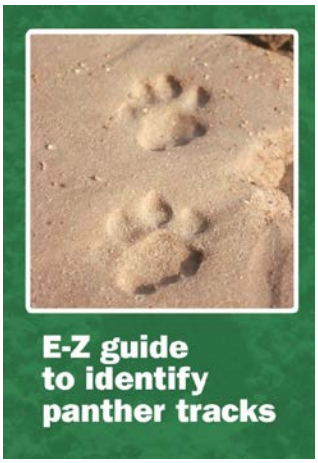
- **The 1st annual Nature Coast Birding & Wildlife Festival took place from March 21 to 24, 2013** at FWC's Chinsegut WEA in Hernando County. FWC staff led walks to find red-cockaded woodpeckers, Florida scrub-jays, Southeastern American kestrels, Florida sandhill cranes, burrowing owls, and gopher tortoises. About 450 people attended the event.
- **The 2nd Florida Panther Festival** on November 10, 2012, brought more than 2,000 people to North Collier Regional Park in Collier County. The theme was safe coexistence of people and panthers. The festival included guided field trips, "Ask a Panther Expert", and family-oriented education and entertainment.
- **The 4th annual Right Whale Festival on Nov. 17, 2012,** celebrated the North Atlantic right whales' annual return to their only known calving area in the southeastern U.S. FWC participated with partners at the Jacksonville Beach event (Duval County). Approximately 1,000 attendees learned how to identify this species and about efforts to disentangle large whales from fishing gear.
- **A celebration of wildlife conservation was held at Florida's Capitol in March 2013.** The day was chilly, but about 200 schoolchildren were excited to see the displays and ask FWC staff questions.

- **The 4th annual Florida Scrub-Jay Festival celebrated the only bird unique to Florida.** It occurred at Jonathan Dickinson State Park in Martin County, which has the largest amount of protected scrub-jay habitat in southeast Florida. The March 2, 2013, event included guided walks, presentations, children's activities, and a panel of experts answering questions. About 500 to700 people attended, with FWC as one of many partners.
- **Munson Heritage Festival** – Each October, FWC sets up an interactive wildlife exhibit at the Munson Community Heritage Festival located within the Blackwater River State Forest in Santa Rosa 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 (Santa Rosa County) and the annual Forestry Conclave and Lumberjack Festival held at Pensacola Junior College, Milton campus. A smaller version of this display as well as a hands-on native wildlife display is also presented to visiting school groups at the Blackwater Fisheries Research and Development Center in Holt (Okaloosa County) and various recreation areas on the WMA. For the past three years, area staff has collaborated with FDACS to develop and staff an exhibit at Camp Conservation during the Chautauqua Assembly in DeFuniak Springs. FWC also works with local area schools to present in-school field trips designed to teach school children about nature, science, and the outdoors during limited budgetary times.

Publications, Exhibits, and Signs – Sharing compelling stories and critical information about Florida wildlife in writing and pictures is an inviting challenge.

- **"A boater's guide to living with Florida Manatees"** outlines ways for boaters to spot and avoid harm to these large, slow swimming Endangered mammals. Watercraft collisions are the largest cause of human-related manatee mortality in Florida. The new brochure is online at: http://www.myfwc.com/media/2559124/Manatee-Marina-Brochure.pdf.
- **The 2012-13 editions of manatee and sea turtle decals** supported conservation of these endangered and threatened species by allowing people to make a $5 donation per decal. The decals are distributed to local tax collectors offices across Florida for sale to the public. FWC graphic artists created the decals.

- **The new "E-Z guide to identify panther tracks" was developed by FWC and a private contractor** who is a long-time partner of the panther program. The guide assists people in distinguishing panther tracks from those of other species. It is resource for people sharing information and photos with the panther sightings website and for reporting possible panther depredations of livestock. The guide may be accessed at http://www.floridapanthernet.org/.



- **FWC staff authored *Florida Monthly Magazine* articles on the least tern in August 2012 and Florida scrub-jay in February 2013.** This statewide lifestyle magazine showcased each bird in a two-page feature with photos and natural history information.
- **Updated recreation guides for two FWC WMAs included photos and life history facts on the red-cockaded woodpecker** (featured at Babcock-Webb WMA in Charlotte and Lee counties), limpkin, and Florida black bear (featured at Aucilla WMA in Jefferson and Taylor counties).
- **Interpretive signs depicting American alligator, Florida black bear, gopher tortoise, Sherman's fox squirrel, and white ibis** were developed and installed at FWC's Caravelle Ranch WMA in Putnam County.
- **A new "Safe Roads for People and Gopher Tortoises" placard developed by an intern in the gopher tortoise program provides guidance on how drivers can avoid injuring or killing this threatened species** and will be distributed at rest areas and welcome centers. Other new materials included a Gopher Tortoise Commensal Species fact sheet and a Gopher Tortoise Field Trip Guide with outdoor activities for school-age children.
- **More than 20 award-winning Boating and Angling Guides include information about listed species and their habitats that may be encountered along Florida's coasts**. Each guide contains conservation tips such as how to help manatees, sea turtles, right whales, or corals. In FY 2012-13, FWC distributed more than 19,000 guides, also available at MyFWC.com/BoatingGuides.

- **The 2013 Florida Land Steward Calendar provides habitat management tips for conserving wildlife, including listed species, on private lands.** It highlights examples of private landowners and managers using these best practices. FWC is one of many partners sponsoring the calendar.

Volunteer Opportunities and Training –

Volunteers contributed greatly to the success of the State's conservation efforts in FY 2012-13. Volunteers received the bonus of working in some of Florida's most beautiful wild areas.

- **Monitoring Southeastern American kestrels.** FWC manages a nest box program to augment kestrel populations and provide nesting opportunities for this threatened species. Volunteers with the Northeast Region Volunteer Program monitored 18 nest boxes on five properties in Marion, Sumter, and Citrus counties during the 2013 breeding season (April–July). Nest status and number of eggs/nestlings were recorded. Volunteers also recorded pertinent information such as behavior and other species present. Six volunteers contributed a total of 60 hours. Another group, volunteers with the Brooksville Ridge Volunteer Program (Hernando, Citrus, Sumter, and Levy counties), had eight volunteers monitoring 21 nest boxes on ten properties in Hernando County during the breeding season. As a result of the 96 volunteer hours they contributed, 11 of the 21 nest boxes visited were recorded as being active.

- **Boosting awareness about reducing conflicts with Florida black bears**. Volunteers canvassed communities to reduce bear conflicts and encourage compliance with rules regarding not feeding of bears and proper methods for securing bear attractants such as garbage, pet food, and bird seed. Volunteers worked in small teams with FWC staff to share information with neighborhood associations and individual homeowners in regions where human-bear conflicts are common. They educated homeowners, passed out information, and answered questions about bears. FWC staff and a team of 16 bear volunteers canvassed 13 neighborhoods and 1,254 homes in northwest Florida, contributing 131 hours.
- **Protecting snail kite nesting habitat on Lake Tohopekaliga ("Lake Toho") in Osceola County.** FWC is working with local partners to protect the Endangered snail kite on Lake Toho. Volunteers with the Northeast Region Volunteer Program assisted FWC staff by installing signs marking protective buffers around snail kite nesting habitat on Lake Toho. Volunteers also assisted with an outreach event on snail kites for the public. Six volunteers contributed 21 hours.
- **FWC's Ridge Rangers recruited volunteers to clear invasive plants from five spots along the Lake Wales Ridge on Sept. 29, 2012, which is National Public Lands Day.** The volunteers received a free pass to any state park as a thank you. The Ridge Rangers themselves are volunteers who restore wildlife habitat along Lake Wales Ridge, an ancient

sand ridge with a unique ecosystem of plants and wildlife, including the Federally-designated Threatened Florida scrub-jay.

- **Monitoring Florida scrub-jays.** Volunteers with the Northeast Region Volunteer Program assisted FWC staff and partners with Florida scrub-jay population surveys on public and private lands around the State for the Jay Watch Program. Volunteers monitored family groups to determine group and territory size. Twenty-eight volunteers worked with staff at five sites for a total of 276 hours. Volunteers also participated in surveying the population in the Ocala National Forest in Central Florida following the Jay Watch protocol. Four volunteers contributed 90 hours monitoring this scrub-jay population. Additionally, volunteers with the Brooksville Ridge Volunteer Program and Northeast Region Volunteer Program assisted FWC staff at the Half Moon WMA in Sumter County to improve Florida scrub-jay habitat by planting native scrub oaks on 22 acres, planting wiregrass plugs on 33 acres, and participating in other land management activities. Volunteers provided 207 hours on habitat enhancement and 124 hours on population monitoring at Half Moon.

- **Counting gopher tortoise burrows**. The Brooksville Ridge Volunteer Program partnered with the Hernando County Environmentally Sensitive Lands Division and Suwannee River Water Management District to perform gopher tortoise burrow surveys. As a result of volunteer effort, Hernando County awarded a site improvement grant to help with land management efforts at Lake Townsend. Eight volunteers contributed more than 100 hours on five properties.
- **Helping least terns in a city**. FWC partnered with the City of Tallahassee and volunteers to improve nesting habitat for the Threatened least tern in an urban lake setting. In 2012, volunteers from Apalachee Audubon Society, Florida State University, Lincoln High School Naval ROTC, and FWC contributed 235 volunteer hours of hard physical labor preparing the site and transporting sand with wheelbarrows and hand tools. Basic wildlife viewing skills also were shared. In 2013, two volunteers contributed 10.5 hours towards maintaining and monitoring the site to report breeding behavior during nesting season.

- **Watching red-cockaded woodpeckers.** FWC manages 75 active red-cockaded woodpecker nest clusters in the Citrus WMA in Citrus and Hernando counties. Thirteen volunteers with the Brooksville Ridge Volunteer Program assisted staff with habitat enhancement at 70 nest clusters, putting in 428 volunteer hours. Habitat enhancement included prescribed fire preparation, oak thinning, and repairs on nest inserts. Fourteen volunteers also gave 504 hours to check on active nest clusters.

- **Training on surveys and strandings of sea turtles.** To ensure the large network of volunteers conducting sea turtle nesting beach surveys have the information they need to perform the task, FWC research staff conducted six training workshops for 917 attendees in Bay, Collier, Flagler, Monroe, Sarasota, St. Johns, and St. Lucie counties. Researchers also held 14 sea turtle stranding workshops to share information with almost 450 stakeholders about stranding data collection and stranding procedures. The workshops covered the State's coastlines, including Brevard, Broward, Charlotte, Dade, Martin, Monroe, Palm Beach, Pinellas, St. Johns, and Volusia counties.

Community Meetings, Workshops, and Presentations – FWC interacts with communities, including homeowners, private landowners, businesses, and stakeholders on an array of issues involving living with Florida's listed species.

- **FWC's Bear Management Program conducted extensive outreach to help people learn about bears**, including suggestions for living successfully in bear country. Bear staff participated in 135 public presentations, meetings, and events to offer information to 16,878 people about Florida black bears and ways to minimize conflicts with them. The public received more than 10,000 bear-related materials.
- **Manatee staff coordinated with other agencies and organizations as part of the ongoing investigation of recent manatee deaths associated with an unknown cause in the Indian River Lagoon.** Researchers presented at meetings of the Indian River Lagoon National Estuary Program and the St. Johns Water Management District Governing Board.

- **The 2013 Marine Turtle Permit Holders Workshop was held at SeaWorld in Orlando and co-hosted by FWC and the Sea Turtle Conservancy.** More than 400 Marine Turtle Permit Holders and volunteers, plus staff from public agencies, attended this two-day event.

Activities included presentations by FWC sea turtle management and research staff, conservation organizations and local governments, and summaries of sea turtle grant projects. About 2,500 marine turtle permit holders and volunteers regularly patrolled Florida's sandy beaches in FY 2012-13, protecting nesting sea turtles, their eggs and hatchlings, and collecting data. Additionally workshops were conducted in Brevard and Walton counties to provide information on how outdoor lighting at the beach can disorient and misdirect sea turtle hatchlings. Options were presented for wildlife friendly lighting.

- **The "Got Gophers, Get Permits" poster was distributed to planning councils, county and city building departments, and local permitting offices.** In addition, 5,430 of the English version of "A guide to living with gopher tortoises" brochure plus 235 of the Spanish version were distributed to individuals, nonprofit groups, government entities, and at meetings and conferences. More than 619 copies of the "Before you build" brochure were handed out, as well as more than 500 fact sheets containing information on gopher tortoise laws, permitting, and recipient sites. All materials are available at MyFWC.com/GopherTortoise.

School-based Programs and Presentations – Students, teachers, and schools offer wonderful opportunities to learn and talk about Florida's amazing and diverse wildlife.

- **To boost the interactivity and fun of its educational programs, FWC developed a simulation of a gopher tortoise burrow that allows children to crawl through a 13-foot, half-moon shaped tunnel.** A variety of the species that share and depend upon the gopher tortoise's burrow is found along the way. Additionally, more than 1,800 copies of a children's activity book on gopher tortoises were distributed to educational centers and museums, including many of FWC's Florida Youth Conservation Centers. The facilitator's training and companion teacher's curriculum, *Encounters with Gopher Tortoises: Protection and Natural History* has been distributed to more than 50 educators and made available at the Florida Association of Science Teachers annual conference. This curriculum DVD is available upon request to teachers throughout Florida and meets Florida's Sunshine Standards for education.

- **FWC's Bear Internship Program for college students develops future conservation professionals and expands the abilities of the agency to address bear-related topics.** Students gain credit through their universities for their experience, while acquiring training in the profession of wildlife management and research. Sixteen interns from Florida State University participated in the fall 2012 and spring and summer 2013 sessions. They contributed 3,311 hours of time to a wide range of bear topics including: a follow-up study on citizens who have contacted FWC about bear problems, graphically displaying the regional differences in human-bear conflicts, examining statewide bear range changes,

analyzing data for upcoming publication about efficacy of bear-resistant trash practices, as well as analyzing the rate of bear recapture. Interns also coordinated public events and volunteer efforts to increase public awareness of bears, allowing staff to educate an additional 8,800 people about Florida's largest land mammal.

- **Project WILD provides prekindergarten through 12th grade educators with the tools and training to engage students in active hands-on learning about wildlife and conservation through a series of workshops.** Project WILD staff and 60 Florida Project WILD volunteers contributed 1,381 hours facilitating workshops. They trained 1,519 educators and facilitated 83 educator workshops
- **Sea turtle researchers continue to share sea turtle satellite transmitter data that is part of teacher plans and educational curriculum via www.seaturtles.org and www.conserveturtles.org.** In addition, sea turtle biologists presented to school audiences, including 180 students at Hobe Sound Elementary as part of an Earth Day celebration and 100 students at Ridgevale High School.
- **Marine mammal researchers presented about manatees and right whales to more than 900 students.** For example, staff reached 300 students participating in the Mayport Elementary Career Day.
- **Senior Lifelong Learning Lunch programs on manatees and sea turtles** were conducted in Leon County for 120 senior citizens.

APPENDIX A. LISTED WILDLIFE SPECIES IN FLORIDA AS OF JUNE 30, 2013

VERTEBRATES

FISH

Common Name	Scientific Name	Status
Atlantic sturgeon	*Acipenser oxyrinchus*	FE
Blackmouth shiner	*Notropis melanostomus*	ST
Bluenose shiner	*Pteronotropis welaka*	SSC
Crystal darter	*Crystallaria asprella*	ST
Gulf sturgeon	*Acipenser oxyrinchus [=oxyrhynchus] desotoi*	FT
Harlequin darter	*Etheostoma histrio*	SSC
Key silverside	*Menidia conchorum*	ST
Lake Eustis pupfish	*Cyprinodon hubbsi*	SSC
Okaloosa darter	*Etheostoma okalossae*	FT
Rivulus	*Rivulus marmoratus*	SSC
Saltmarsh topminnow	*Fundulus jenkinsi*	SSC
Shortnose sturgeon	*Acipenser brevirostrum*	FE
Smalltooth sawfish	*Pristis pectinate*	FE
Southern tessellated darter	*Etheostoma olmstedi maculaticeps*	SSC

AMPHIBIANS

Common Name	Scientific Name	Status
Florida bog frog	*Lithobates okaloosae*	SSC
Frosted flatwoods salamander	*Ambystoma cingulatum*	FT
Georgia blind salamander	*Haideotriton wallacei*	SSC
Gopher frog	*Lithobates capito*	SSC
Pine barrens treefrog	*Hyla andersonii*	SSC
Reticulated flatwoods salamander	*Ambystoma bishopi*	FE

REPTILES

Common Name	Scientific Name	Status
Alligator snapping turtle	*Macrochelys temminckii*	SSC
American alligator	*Alligator mississippiensis*	FT(S/A)
American crocodile	*Crocodylus acutus*	FT
Atlantic salt marsh snake	*Nerodia clarkii taeniata*	FT
Barbour's map turtle	*Graptemys barbouri*	SSC
Bluetail mole skink	*Eumeces egregius lividus*	FT
Eastern indigo snake	*Drymarchon corais couperi*	FT

Common Name	Scientific Name	Status
Florida brownsnake[1]	*Storeria victa*	ST
Florida Keys mole skink	*Eumeces egregius egregius*	SSC
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC
Gopher tortoise	*Gopherus polyphemus*	ST
Green sea turtle	*Chelonia mydas*	FE
Hawksbill sea turtle	*Eretmochelys imbricata*	FE
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE
Key ringneck snake	*Diadophis punctatus acricus*	ST
Leatherback sea turtle	*Dermochelys coriacea*	FE
Loggerhead sea turtle	*Caretta caretta*	FT
Peninsula ribbon snake[1]	*Thamnophis sauritus sackenii*	ST
Red rat snake[1]	*Elaphe guttata*	SSC
Rim rock crowned snake	*Tantilla oolitica*	ST
Sand skink	*Neoseps reynoldsi*	FT
Short-tailed snake	*Stilosoma extenuatum*	ST
Striped mud turtle[1]	*Kinosternon baurii*	ST
Suwannee cooter	*Pseudemys suwanniensis*	SSC

BIRDS

Common Name	Scientific Name	Status
American oystercatcher	*Haematopus palliatus*	SSC
Audubon's crested caracara	*Polyborus plancus audubonii*	FT
Bachman's wood warbler	*Vermivora bachmanii*	FE
Black skimmer	*Rynchops niger*	SSC
Brown pelican	*Pelecanus occidentalis*	SSC
Burrowing owl	*Athene cunicularia*	SSC
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	FE
Eskimo curlew	*Numenius borealis*	FE
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	FE
Florida grasshopper sparrow	*Ammodramus savannarum floridanus*	FE
Florida sandhill crane	*Grus canadensis pratensis*	ST
Florida scrub-jay	*Aphelocoma coerulescens*	FT
Ivory-billed woodpecker	*Campephilus principalis*	FE
Kirtland's wood warbler (Kirtland's warbler)	*Dendroica kirtlandii* (*Setophaga kirtlandii*)	FE

Common Name	Scientific Name	Status
Least tern	*Sterna antillarum*	ST
Limpkin	*Aramus guarauna*	SSC
Little blue heron	*Egretta caerulea*	SSC
Marian's marsh wren	*Cistothorus palustris marianae*	SSC
Osprey[2]	*Pandion haliaetus*	SSC
Piping plover	*Charadrius melodus*	FT
Red-cockaded woodpecker	*Picoides borealis*	FE
Reddish egret	*Egretta rufescens*	SSC
Roseate spoonbill	*Platalea ajaja*	SSC
Roseate tern	*Sterna dougallii dougallii*	FT
Scott's seaside sparrow	*Ammodramus maritimus peninsulae*	SSC
Snowy egret	*Egretta thula*	SSC
Snowy plover	*Charadrius nivosus* (*Charadrius alexandrinus*)	ST
Southeastern American kestrel	*Falco sparverius paulus*	ST
Tricolored heron	*Egretta tricolor*	SSC
Wakulla seaside sparrow	*Ammodramus maritimus juncicola*	SSC
White-crowned pigeon	*Patagioenas leucocephala*	ST
Whooping crane	*Grus americana*	FXN
White ibis	*Eudocimus albus*	SSC
Worthington's marsh wren	*Cistothorus palustris griseus*	SSC
Wood stork	*Mycteria americana*	FE

MAMMALS

Common Name	Scientific Name	Status
Anastasia Island beach mouse	*Peromyscus polionotus phasma*	FE
Big Cypress fox squirrel	*Sciurus niger avicennia*	ST
Caribbean monk seal	*Monachus tropicalis*	FE
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	FE
Eastern chipmunk	*Tamias striatus*	SSC
Everglades mink	*Neovison vison evergladensis*	ST
Finback whale	*Balaenoptera physalus*	FE
Florida bonneted (mastiff) bat	*Eumops [=glaucinus] floridanus*	ST
Florida mouse	*Podomys floridanus*	SSC
Florida panther	*Puma [=Felis] concolor coryi*	FE

Common Name	Scientific Name	Status
Florida salt marsh vole	*Microtus pennsylvanicus dukecampbelli*	FE
Gray bat	*Myotis grisescens*	FE
Gray wolf	*Canis lupus*	FE
Homosassa shrew	*Sorex longirostris eonis*	SSC
Humpback whale	*Megaptera novaeangliae*	FE
Indiana bat	*Myotis sodalis*	FE
Key deer	*Odocoileus virginianus clavium*	FE
Key Largo cotton mouse	*Peromyscus gossypinus allapaticola*	FE
Key Largo woodrat	*Neotoma floridana smalli*	FE
Lower Keys rabbit	*Sylvilagus palustris hefneri*	FE
North Atlantic right whale	*Eubalaena glacialis*	FE
Perdido Key beach mouse	*Peromyscus polionotus trissyllepsis*	FE
Red wolf	*Canis rufus*	FE
Rice rat	*Oryzomys palustris natator*	FE[1]
Sanibel Island rice rat	*Oryzomys palustris sanibeli*	SSC
Sei whale	*Balaenoptera borealis*	FE
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Sherman's short-tailed shrew	*Blarina [=carolinensis] shermani*	SSC
Southeastern beach mouse	*Peromyscus polionotus niveiventris*	FT
Sperm whale	*Physeter catodon [=macrocephalus]*	FE
St. Andrew beach mouse	*Peromyscus polionotus peninsularis*	FE
West Indian manatee (Florida manatee)	*Trichechus manatus* (*Trichechus manatus latirostris*)	FE

INVERTEBRATES

CORALS

Common Name	Scientific Name	Status
Elkhorn coral	*Acropora palmate*	FT
Pillar coral	*Dendrogyra cylindricus*	ST
Staghorn coral	*Acropora cervicornis*	FT

CRUSTACEANS

Common Name	Scientific Name	Status
Black Creek crayfish (Spotted royal crayfish)	*Procambarus pictus*	SSC
Panama City crayfish	*Procambarus econfinae*	SSC
Santa Fe Cave crayfish	*Procambarus erythrops*	SSC
Squirrel Chimney Cave shrimp	*Palaemonetes cummingi*	FT

INSECTS

Common Name	Scientific Name	Status
American burying beetle	*Nicrophorus americanus*	FE
Cassius blue butterfly	*Leptotes cassius theonus*	FT(S/A)
Ceraunus blue butterfly	*Hemiargus ceraunus antibubastus*	FT(S/A)
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	FE
Nickerbean blue butterfly	*Cyclargus ammon*	FT(S/A)
Schaus' swallowtail butterfly	*Heraclides aristodemus ponceanus*	FE

MOLLUSKS

Common Name	Scientific Name	Status
Chipola slabshell (mussel)	*Elliptio chiplolaensis*	FT
Fat threeridge (mussel)	*Amblema neislerii*	FE
Florida treesnail	*Liguus fasciatus*	SSC
Gulf moccasinshell (mussel)	*Medionidus penicillatus*	FE
Ochlockonee moccasinshell (mussel)	*Medionidus simpsonianus*	FE
Oval pigtoe (mussel)	*Pleurobema pyriforme*	FE
Purple bankclimber (mussel)	*Elliptoideus sloatianus*	FT
Shinyrayed pocketbook (mussel)	*Lampsilis subangulata*	FE
Stock Island tree snail	*Orthalicus reses [not incl. nesodryas]*	FT

APPENDIX A. Continued

KEY TO ABBREVIATIONS AND NOTATIONS

LIST ABBREVIATIONS

FWC =	Florida Fish and Wildlife Conservation Commission
FE =	Federally-designated Endangered
FT =	Federally-designated Threatened
FXN =	Federally-designated Threatened Non-essential Experimental Population
FT(S/A) =	Federally-designated Threatened Species Due to Similarity of Appearance
ST =	State-designated Threatened
SSC =	State-designated Species of Special Concern

LIST NOTATIONS

[1] Lower Keys population only.

[2] Monroe County population only.

APPENDIX B. LIST OF ACRONYMS USED IN THIS REPORT

Term	Acronym
Apalachicola River Wildlife and Environmental Area	ARWEA
Big Cypress National Preserve	BCNP
Critical Wildlife Area	CWA
Coastal Wildlife Conservation Initiative	CWCI
Deoxyribonucleic acid	DNA
Florida Department of Environmental Protection	FDEP
Florida Department of Agriculture and Consumer Services	FDACS
Florida Fish and Wildlife Conservation Commission	FWC
Fiscal Year	FY
Geographic Information System	GIS
Global Positioning System	GPS
Landowner Assistance Program	LAP
Manatee Protection Plans	MPP
National Oceanic and Atmospheric Agency's Marine Fisheries Service	NOAA-Fisheries
Passive Integrated Transponder	PIT
U.S. Fish and Wildlife Service	USFWS
Wildlife and Environmental Area	WEA
Wildlife Management Area	WMA

APPENDIX C. FWC PUBLICATIONS DURING FY 2012-13.

FWC strives to produce high-quality publications and has been doing so since the Florida State Board of Conservation's first publication in 1948. That first paper in an Education Series dealt with red tide, which is still a topic of research at FWC's Fish and Wildlife Research Institute (Institute). Since then, more than 1,000 published works have documented the findings of Institute scientists. These contributions have appeared in various scientific journals or as publications of the Institute. The publications and reprint issues are exchanged with libraries throughout the world. While supplies last, the Institute sends single copies of the publications in print, at no cost, to individuals who request them. Many publications are also made available for download from the Institute website http://myfwc.com/research/publications/scientific/new/.

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

Common Name	**Scientific Name**
AMPHIBIANS	
Striped Newt	*Notophthalmus perstriatus*
REPTILES	
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Southern Hognose Snake	*Heterodon simus*
BIRDS	
Anhinga	*Anhinga anhinga*
Bald eagle	*Haliaeetus leucocephalus*
Black rail	*Laterallus jamaicensis*
Cattle egret	*Bubulcus ibis*
Common moorhen	*Gallinula chloropus*
Eastern bluebird	*Sialia sialis*
Eastern screech owl	*Otus asio*
Glossy ibis	*Plegadis falcinellus*
Great blue heron	*Ardea herodias*
Great-crested flycatchers	*Myiarchus crinitus*
Great egret	*Ardea alba*
King rail	*Rallus elegans*
Least bittern	*Ixobrychus exilis*
Northern flicker	*Colaptes auratus*
Peregrine falcon	*Falco peregrinus*
Purple gallinule	*Porphyrula martinica*
Pie-billed grebe	*Podilymbus podiceps*
Royal tern	*Sterna maxima*
Yellow-crowned night-heron	*Nyctanassa violacea*
MAMMALS	
Cotton mice	*Peromyscus gossypinus*
Cotton rats	*Sigmodon hispidus*
Eastern gray squirrels	*Sciurus carolinensis*
Eastern woodrat	*Neotoma floridana*
Evening bat	*Nycticeius humeralis*
House cat	*Felis catus*
Least shrew	*Cryptotis parva*
Old-field mouse	*Peromyscus polionotus*

APPENDIX D. Continued

Puma	*Puma concolor stanleyana*
Southern flying squirrel	*Glaucomys volans*
Southeastern myotis bat	*Myotis austroriparius*
Tri-colored bat	*Perimyotis subflavus*

PLANTS

Cabbage palm	*Sabal palmetto*
Longleaf pine	*Pinues palustris*
Oak trees	*Quercus* spp.
Sand pine	*Pinus clausa*
Saw palmetto	*Serenoa repens*
Seagrass	Order: Alismatales
Scrub oak	*Quercus* spp.
Slash pine	*Pinus ellioti*
Torpedograss	*Panicum repens*
Turkey oak	*Quercus laevis*
Wiregrass	*Aristida stricta*

APPENDIX E. GLOSSARY OF TERMS

DEFINITIONS

Abiotic – The non-living chemical and physical factors in the environment.

Anthropogenic – Resulting from human influence on nature.

Benthic – The lowest level of the ocean that includes the sediment surface and some sub-surface layers.

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.

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

Colony – A distinguishable localized population within a species.

Depredation – When domestic livestock or pets are preyed upon by a panther or other wildlife.

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

Ephemeral – Lasting a very short time.

Extirpation – Cease to exist in a given area.

Federally-designated Endangered species – Species of fish or wild animal life, subspecies or isolated populations of species or subspecies, whether vertebrate or invertebrate, that are native to Florida and are classified as Endangered under FWC Commission rule by virtue of designation by the U.S. Departments of Interior or Commerce as Endangered under the Federal Endangered Species Act.

Federally-designated Threatened species - Species of fish or wild animal life, subspecies or isolated populations of species or subspecies, whether vertebrate or invertebrate, that are native to Florida and are classified as Threatened under FWC Commission rule by virtue of designation by the U.S. Departments of Interior or Commerce as Threatened under the Federal Endangered Species Act.

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.

APPENDIX E. Continued

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

Genetic Introgression – Adding new genes to a population.

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.

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

Listed species – Species included on the Florida Endangered and Threatened Species list or the Species of Special Concern list. Prior to November 10, 2010, listed species were those species designated as Endangered, Threatened, or Species of Special Concern.

Metapopulation – A group of spatially separated populations of the same species that interact at some level.

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.

Nonessential Experimental Population – A population of a species that is designated under the Endangered Species Act to restore a species outside the species' current range but within its historical range, but is not essential to the survival of the species. A population designated as experimental is treated as Federally-designated Threatened regardless of the species' designation elsewhere in its range.

Pelagic – Deep ocean water.

Productivity – The ability to produce; fertility.

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

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

Rookery – A colony of breeding animals.

APPENDIX E. Continued

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

Safe haven – an area of water [established by §379.2431(2)(o) Florida Statute] that manatees may rest, feed, reproduce, give birth, or nurse in while remaining undisturbed by human activity.

State-designated Species of Special Concern – As designated by the FWC Commissioners, 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.

State-designated Threatened species – As designated by the FWC Commission, species of fish or wild animal life, subspecies, or isolated population of a species or subspecies, whether vertebrate or invertebrate, that are native to Florida and are classified as Threatened due to a reduction in population size, a severely fragmented and/or declind geographic range, a population size that numbers fewer than 10,000 mature individuals, a small and/or restricted population, and/or a quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years

Stock – A group of marine mammals of the same species or smaller taxa in a common spatial arrangement that interbreed when mature.

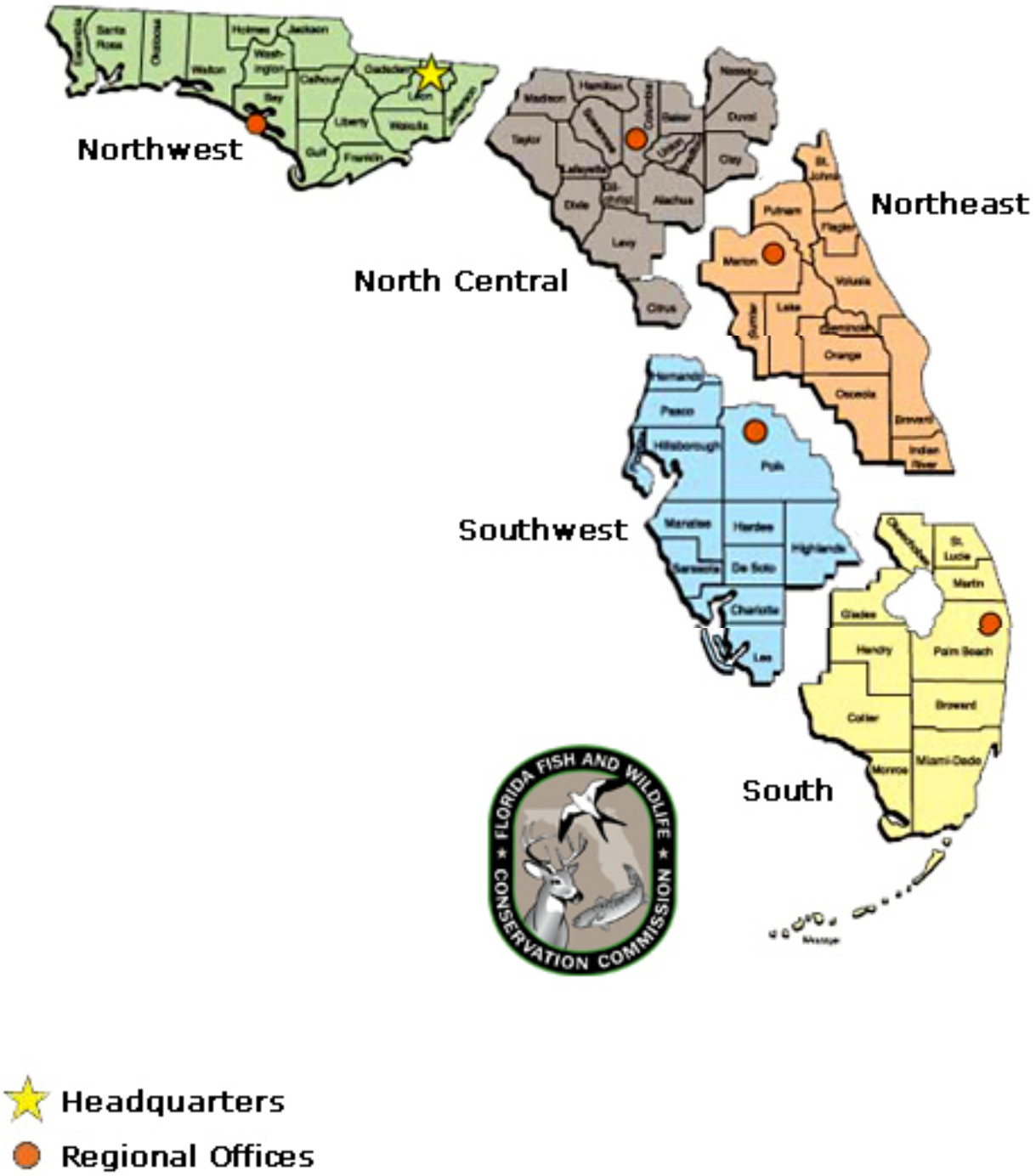
Telemetry – Transmission of data through technology (such as radio collars attached to panthers) from a species to an observer.

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

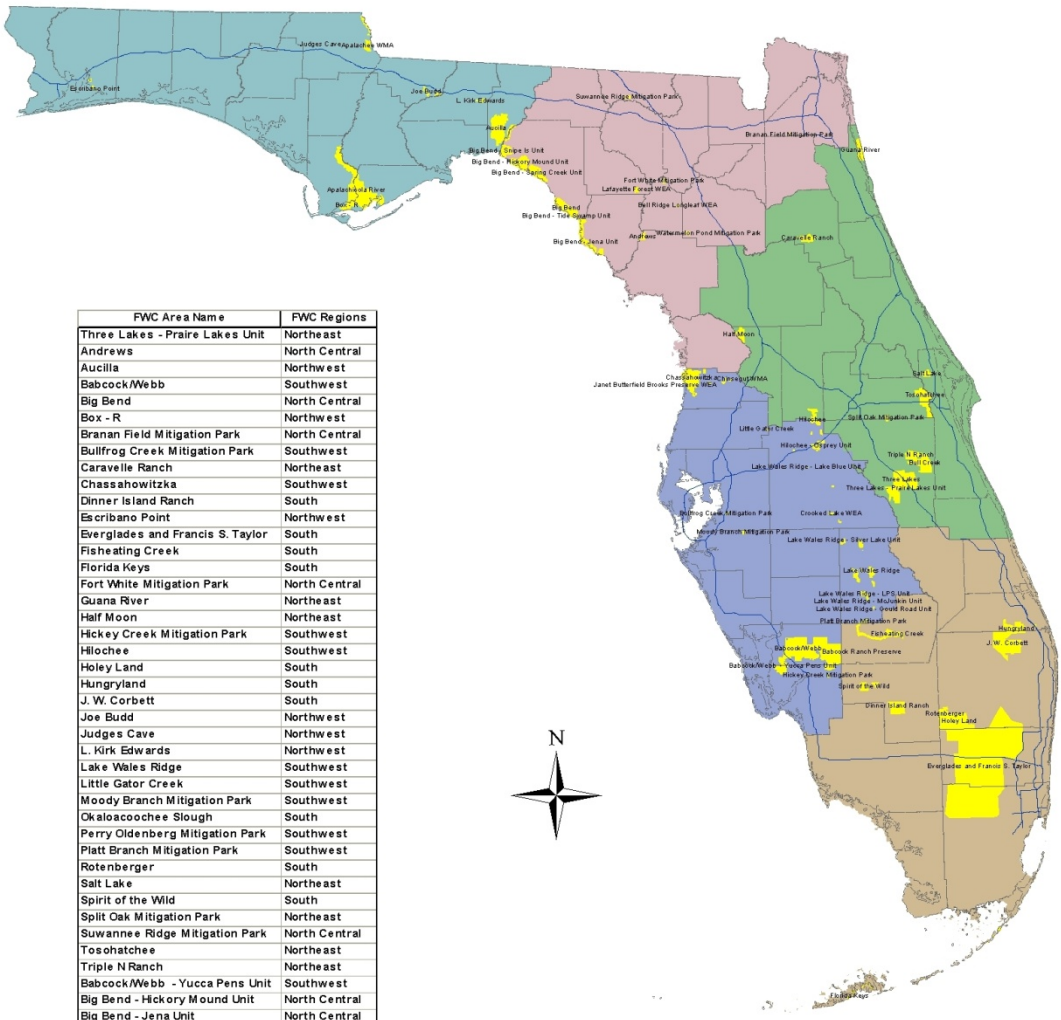
Translocation – Capture, transport, and release or introduction or reintroduction of wildlife.

Waif gopher tortoise – a gopher tortoise that has been removed from the wild, but is not associated with a permitted relocation effort and is generally from an unknown location.

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