FY 2013-14 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 2013-14 PROGRESS REPORT

Prepared by Staff of the
Florida Fish and Wildlife Conservation Commission
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January 27, 2015

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EXECUTIVE SUMMARY

This document constitutes the 36th 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 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 Fiscal Year (FY) 2013-14, a period from July 1, 2013, to June 30, 2014. It includes a description of FWC's criteria for research and management priorities, statewide policies pertaining to listed species, a funding request for FY 2015-16, 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 Species Conservation Planning Section Leader 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 and Melissa Tucker for their 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. Updated 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, 2014, 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, 2014.** [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. As of November 2012, FWC is no longer under a State listing moratorium. No listing actions have been initiated during FY 2013-14.

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 the 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 ongoing. Final listing rule changes will be approved by the FWC Commission upon management plan approval.

As of June 30, 2014, 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 (including the Atlantic sturgeon, which was Federally listed in 2012, and the Florida bonneted bat, which was Federally listed in 2014 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 at-risk 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 worked with subject matter experts and stakeholders to develop the species action plans that were completed in November 2013. 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 fall 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.

Threatened and Nongame Species Management recurring funding was provided by the Legislature in FY 2013-14. The funds are intended to conduct activities to improve the status of Florida's threatened and nongame species, focusing on the development and implementation of management plans, research and monitoring programs, and undertaking conservation actions. The funding has allowed staff to conduct work on State-listed species such as the Homosassa shrew, reddish egret, Sherman's fox squirrel, Eastern chipmunk, harlequin darter, Worthington's marsh wren, and the Florida mouse. In addition to research and monitoring projects, habitat management to benefit sandhill species has been conducted at several wildlife management areas (WMAs); volunteer coordinators have been funded to assist with citizen science projects for the

Southeastern American Kestrel and the Florida bonneted bat; and technicians have conducted stewardship activities for shorebirds at Critical Wildlife Areas.

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 2015-16 is $28,434,352 (**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 2015-16.

Funding Source	Amount
Nongame Wildlife Trust Fund	**$3,263,174**
Florida Panther Research & Management Trust Fund	**$1,316,885**
Save the Manatee Trust Fund	**$3,615,503**
Marine Resources Conservation Trust Fund	**$9,191,042**
Land Acquisition Trust Fund	**$1,788,507**
State Game Trust Fund	**$1,237,272**
Conservation and Recreation Lands Trust Fund	**$28,888**
Federal Grants	**$7,817,693**
Grants and Donations Trust Fund	**$175,388**
Total	**$28,434,352**

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 (*Jeff Gore and Ryan Pawlikowski*)

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, as well as impacts from hurricanes and non-native predators, 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, the USFWS, Florida's Department of Environmental Protection's (FDEP) Florida Park Service, Gulf Islands National Seashore, the St. Joe Company, and Tyndall Air Force Base continued a long-term monitoring program for beach mice in FY 2013-14 at 11 sites along the northwest Gulf Coast of Florida (**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. The population of beach mice is monitored indirectly, therefore, 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 based upon the area known to be occupied by mice.

In FY 2013-14, the mean detection rate (percentage of stations with tracks per sampling period) varied from 69% at Deer Lake to 95% at Perdido Key State Park, Gulf Islands National Seashore, and Shell Island East (**Table 3**). Three sites had a slightly smaller proportion of stations with tracks in FY 2013-14 compared to the previous year, but the eight other monitored sites had the same or a larger percentage of tracks. Compared to substantial declines in some

recent years, in FY 2013-14, 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 2013-14 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	80
Deer Lake (Walton County)	Choctawhatchee	16	1 month	77
East Crooked Island (Gulf County)	St. Andrews	42	1 month	92
Grayton Beach (Walton County)	Choctawhatchee	45	1 month	74
Gulf Islands National Seashore (Escambia County)	Perdido Key	80	2 month	95
Perdido Key State Park (Escambia County)	Perdido Key	81	2 month	95
Shell Island East (Bay County)	Choctawhatchee	30	1 month	95
Shell Island West (Bay County)	Choctawhatchee	20	1 month	91
Topsail Hill Preserve (Walton County)	Choctawhatchee	32	1 month	69
Water Sound (Walton County)	Choctawhatchee	4	1 month	89
West Crooked Island (Bay County)	Choctawhatchee	30	1 month	89

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 – Perdido Key beach mice are currently present in most of the available habitat across Perdido Key, but at several times in the past few decades their population was reduced to a very small number of individuals. The past reductions in the number of mice likely removed some genetic variation from the population, and therefore, 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 chances that the population will persist after catastrophic events such as hurricanes. FWC has collaborated with biologists from the University of Florida to investigate the genetic diversity among beach mice

across Perdido Key and in FY 2011-12 collected tissue for genetic analysis from mice trapped across Perdido Key. In FY 2013-14, University of Florida researchers completed the genetic analysis of mice sampled in the previous year, and subsequently University of Florida and FWC researchers completed a draft manuscript describing the study results. Analyses showed, as expected, that mice in the oldest population at Gulf Islands National Seashore were more genetically diverse than mice in the more recently established populations at Gulf State Park and Perdido Key State Park. More important, researchers found strong evidence that mice had been dispersing among the three populations on public lands. This has important conservation implications because it means that restored habitat corridors, particularly the front beach berms, are allowing mice to move between populations on Perdido Key with no human assistance required. Having mice move on their own between populations helps maintain or improve the genetic diversity within each population and it increases the probability that a population will persist or be naturally re-established following a catastrophic decline without human intervention.

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 2013-14, 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. FWC collaborated with University of Florida researchers in initiating a study, funded by the Florida Department of Transportation, to identify potential impacts to beach mice from a proposed widening of State Road 292 on Perdido Key. The study will assess direct mortality associated with road crossings as well as indirect effects that the road has on long-term persistence of the subpopulations on each side of the road.

Florida Mouse (*Kevin Oxenrider and Nicole Ranalli*)

The Florida mouse is currently listed in Florida as a State-designated Species of Special Concern. In 2010, FWC and external experts conducted a biological status review, and it was determined that the species did not meet the criteria for listing. A draft species action plan (http://myfwc.com/media/2738819/Florida-Mouse-Species-Action-Plan-Final-Draft.pdf) for the Florida mouse was completed in November 2013, and the species will remain a State-designated Species of Special Concern until the management plan is finalized and approved by the FWC Commissioners. The action plan identifies management of conservation lands and understanding population genetics as important for maintaining or improving the status of this species and preventing the need for future listing.

Florida mice occur primarily in fire-maintained, dry, upland scrub and sandhill habitats. Frequent prescribed burning is necessary to maintain the scrub and sandhill habitats, but little is known about the impacts of those fires on resident Florida mouse populations. Environmental changes post-fire may influence survival rates, movement patterns, and reproduction of Florida mice.

Since 2012, FWC has been using standard live trapping procedures to estimate the effects of prescribed burning on Florida mice at Bell Ridge Wildlife and Environmental Area (WEA) in

Gilchrist County. To capture Florida mice, Sherman live traps were baited with seed and placed outside selected gopher tortoise burrows during four-day trapping sessions. Mice were trapped prior to a prescribed burn in February 2012 to determine a baseline population estimate, and trapping sessions have been repeated at three to four month intervals since then. A second prescribed burn was done in April 2014. Preliminary results suggest that Florida mice populations increase in size immediately after burn events, but then decline slowly over time. These results suggest that at least short-term changes to demographic rates occur in the months following fire, but these impacts are temporary. A final trapping session is scheduled to take place during November 2014. Complete analyses of the data will be conducted and a final report will be written in 2014.

The need to better understand Florida mouse population genetics was identified in both the Florida mouse species action plan (http://www.myfwc.com/media/2273304/Florida-Mouse-BSR.pdf) and the Gopher Tortoise Management Plan (http://myfwc.com/media/2286685/GT-Management-Plan.pdf). A project was initiated in FY 2013-14 to analyze the genetics of the statewide Florida mouse population. This year, FWC funded the analysis of 226 samples previously collected from 11 locations throughout Florida (**Table 4**). FWC will continue this project in FY 2014-15 by collecting and analyzing samples from additional sites in other parts of the state. Genetic analyses will help to prioritize areas of high conservation value for Florida mice throughout the state and to determine whether any local populations are genetically unique. Further, FWC will fund a study that will determine the ability of enzyme markers to refine estimates of gene flow and population demographic history (e.g., past declines in population size). To continue this work, FWC wrote a State Wildlife Grant pre-proposal during 2014, which was accepted for further development. That funding would allow FWC to study genetic variation across the rest of the statewide Florida mouse population.

Table 4. Sample locations for microsatellite genotyping in Florida mice.

Location	County	Available Samples
Bell Ridge	Gilchrist	20
Ichetucknee State Park	Columbia	20
Watermelon Pond	Alachua	10
Ross Prairie	Marion	20
Half Moon WMA	Sumter	20
Cedar Key Preserve	Levy	12
Etoniah Creek	Putnam	15
Ordway Swisher Biological Station	Putnam	20
Jonathan Dickson State Park	Martin	9
Lake Wales Ridge 1	Highlands/Polk	40
Lake Wales Ridge 2	Highlands/Polk	40
TOTAL		226

Status at the Lake Wales Ridge Wildlife and Environmental Area – The Lake Wales Ridge WEA consists of nineteen tracts in Highlands and Polk counties. All tracts contain habitat suitable for the Florida mouse. The establishment of baseline data for the Florida mouse population on the Lake Wales Ridge WEA is essential in the planning and execution of mechanical and prescribed fire treatments in order to best manage for the species. During FY 2013-14, FWC contracted with the Florida Natural Areas Inventory to conduct Florida mouse

surveys on the WEA tracts, using FWC's Wildlife Conservation, Prioritization, and Recovery Program's Standard Monitoring Protocol for Florida Mouse Occupancy Surveys. Florida Natural Areas Inventory conducted surveys between April 1, 2014, and May 15, 2014. A total of 710 Florida mice were captured at 17 of the 19 WEA tracts. After four nights of trapping, no Florida mice were present at the Lake Blue or Mountain Lake Cutoff tracts in Polk County. Tracts with the highest Florida mouse captures were Carter Creek (121), McJunkin (100), and Lake Placid Scrub (92). The remaining 14 tracts ranged from one Florida mouse capture on Messana to 77 on Highland Park Estates.

Eastern Chipmunk (*Chris Winchester*)

The Eastern chipmunk is a State-designated Species of Special Concern. Chipmunks are common throughout much of the eastern U.S., but are rare in Florida. Historical data suggest chipmunks occur only in northwest Florida and may be restricted to upland, hardwood 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 chipmunk distribution at that time was 877 square miles. An extensive survey of chipmunk distribution has not been conducted since 1990, and the current status of the chipmunk population in Florida is unknown.

In 2010, FWC and external experts conducted a biological status review and it was determined that the species did not meet the criteria to be listed in Florida. The data available for this species were outside the time window in which the assessment should be conducted (the past ten years), however. Therefore, the biological status review group determined that the Eastern chipmunk should be left on the Species of Special Concern list until more current data are collected. A draft species action plan (http://myfwc.com/media/2720103/Eastern-Chipmunk-Species-Action-Plan-Final-Draft.pdf) for the Eastern chipmunk was completed in November 2013, 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 and understanding population genetics as important for maintaining or improving the status of this species.

In order to evaluate the Eastern chipmunk's population status in Florida and determine management needs, FWC biologists are utilizing multiple survey methods, targeting both public and private lands. 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 comments 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, 155 chipmunk sightings have been reported on the website. Chipmunks have been reported in six counties – Escambia, Santa Rosa, Okaloosa, Walton, Holmes, and Jackson.

FWC biologists used a letter survey 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, 126 were returned with a reply, seven of which (5.5%) reported a chipmunk

sighting on the property. Chipmunk sightings were reported in Santa Rosa, Okaloosa, Holmes, Washington, and Escambia counties.

Finally, cameras were used to survey for chipmunks on public and private lands. Public land surveys included the Backwater River State Forest, Escambia River Wildlife Management Area (WMA), and the Choctawhatchee WMA, overlapping Escambia, Santa Rosa, Okaloosa, and Holmes counties. Camera surveys focused on patches of upland, hardwood forest near rivers and streams, specifically targeting suspected chipmunk habitat. Multiple cameras were placed at 53 sites on public land, totaling 208 cameras set for 14 days each (2,912 trap nights, or one camera set for one night). Chipmunks were detected on 14 of 53 (26.0%) sites surveyed with cameras. Detections occurred in Blackwater River State Forest in Santa Rosa and Okaloosa counties, and on the Escambia River WMA in Escambia County. No chipmunks were detected in the Choctawhatchee WMA in Holmes County. Ten privately owned properties were surveyed with camera traps as well, with chipmunks detected on two of the ten properties. An additional 20 private properties were visited; however, landowners would not grant access or were unavailable to request permission for access.

Using the data collected from the various survey methods, FWC biologists estimated the extent of occurrence and area of occupancy of chipmunks in Florida, and developed a predictive habitat model. Chipmunk extent of occurrence in Florida is 2,531 square miles, which is 48% larger than the previous estimate. Chipmunk area of occupancy in Florida is 148 square miles, suggesting chipmunks are uncommon, occupying less than 6% of their extent of occurrence. Based on the predictive habitat model, which statistically relates the geographical distribution of species or communities to their present environment, chipmunks are more likely to occur in more northern and western portions of northwest Florida, and in areas with hardwood forest near streams. Overall, the results suggest chipmunks have not declined in range over the last 25 years in Florida, but do have specific habitat preferences that may limit occupancy within their range.

Everglades Mink (*Jeff Gore and Chris Winchester*)

The Everglades mink is a State-designated Threatened subspecies and one of four subspecies of mink in Florida. This species occurs in the freshwater marshes and wet forests of the Everglades, but historical data describing the Everglades mink's distribution are limited and largely anecdotal. Previous attempts to regularly detect the Everglades mink in Florida have been unsuccessful, suggesting effective survey methods are lacking. In 2010, FWC and external experts conducted a biological status review and it was determined that the species met the criteria to remain listed in Florida as State-designated Threatened. A species action plan (http://www.myfwc.com/media/2273283/Everglades-Mink-BSR.pdf) for the Everglades mink was completed in November 2013. The action plan identifies management of conservation lands and understanding population genetics as important for maintaining or improving the status of this species. 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 have been evaluating the use of cameras and spotlighting as methods for detecting mink in Florida. In addition, in 2012, FWC created a web site (https://public.myfwc.com/hsc/mink/getlatlong.aspx) for the public to report mink sightings and thereby provide an initial view of where mink currently occur. The website includes a Google Maps tool for reporting the exact location of each mink sighting 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 are used to evaluate the validity of the sighting. FWC advertised the website address and its purpose to the public using local media resources. Since June 2012, Florida citizens have reported 281 sightings on the website. Less than 30% of those sightings appear to be valid mink sightings, however; most sighting reports are more consistent with river otters. In addition, less than 10% of all reported sightings are from the Everglades, suggesting mink sightings are relatively rare in South Florida and that more effective survey methods are needed for the Everglades mink.

Researchers in South Carolina have effectively used spotlight surveys to detect mink along the South Carolina coast and FWC biologists conducted spotlight surveys in salt marshes in northeast Florida, where public sightings indicated mink were common. Spotlight surveys were conducted on four consecutive nights, twice a month, between April and June 2013. Each survey involved traveling along a predetermined route along the edge of salt marshes, near high tide, for three hours, with one observer spotlighting. Mink were detected by their distinctive, yellow eye-shine, and their location was marked with a Global Positioning System. FWC staff surveyed six, 12.4-mile transects along the northern Atlantic coast in Nassau and Duval counties in areas between the St. Mary's River and the Intracoastal Waterway south of the St. John's River. Mink detections occurred on three of the six transects surveyed. FWC observed a total of 22 minks during the 24 survey days, with 18 mink observations made on one transect. All mink observations occurred in Nassau County north of the Nassau River, and most mink were observed floating on rafts of dead marsh grass during the high tide.

Although the spotlight surveys were somewhat successful, they were very labor intensive and another survey method was explored. In FY 2013-14, FWC set camera traps to automatically and remotely photograph minks along salt marsh on public land in Nassau, Duval, Taylor, and Citrus counties, and specifically in Crystal River State Park Preserve, Big Bend WMA, Fort Clinch State Park, Big Talbot State Park, and Timucuan Ecological and Historic Preserve. State and county-owned marshland was also surveyed. FWC placed cameras on floating platforms in the salt marsh and on trees or wooden stakes along the transition zone between the forest edge and salt marsh. Camera traps were baited with sardines and commercial mink lure and set for 21 days at 82 locations between June 2012 and April 2013. In a total of 1,722 trap nights, no mink were detected even near sites where the public had reported mink. In a separate study, University of Florida researchers developed a floating bucket camera trap for salt marsh voles, but also detected some mink. FWC utilized that floating bucket design and affixed a camera to the inside bottom of a seven-gallon plastic bucket. The bucket was placed upside down on a floating platform constructed of plywood and insulating foam. A three-by-four-inch rectangle was cut into the side of the bucket at the base of the platform, allowing mink inside the bucket. The mink automatically triggered the camera when they entered the bucket and their image was recorded for subsequent analysis. A total of 274 camera traps were set along small tidal channels within the salt marsh in Duval and Nassau counties and baited with commercial mink lure and sunflower seeds. Camera traps were left in place for a minimum of 14 days each between October 2013 and August 2014. Mink were detected on 50 camera traps.

Spotlighting appears to be a viable method for detecting mink, but may be ineffective in areas with low water levels where mink are easily concealed by tall marsh grass. The success of floating camera traps, however, is not influenced by water level and may be more effective in areas that do not experience a significant high tide. In salt marsh habitat, a floating bucket camera trap is by far the most effective camera trap design for detecting the Everglades mink.

In FY 2013-14, FWC also applied for and received a State Wildlife Grant to expand the mink survey to South Florida in FY 2014-15. The goal of this research is to gather information on the distribution of the Everglades mink in South Florida. Previous results on the effectiveness of camera traps, particularly the bucket design, will be instrumental in conducting this ongoing Everglades mink research.

Homosassa Shrew (*Katherine Teets*)

The Homosassa shrew is currently listed in Florida as a State-designated Species of Special Concern. This subspecies of the Southeastern 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 confirmed the subspecies status of the Homosassa shrew, but expanded the range to include the northern two-thirds of peninsular Florida. However, the study stressed that there was 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 threats. A draft species action plan (http://myfwc.com/media/2738834/Homosassa-Shrew-Species-Action-Plan-Final-Draft.pdf) that describes the actions needed to fill these data gaps for the Homosassa shrew was completed in November 2013.

During FY 2013-14, FWC staff began searching museum records for specimens of the three shrew species that occur in Florida: the North American least shrew, the Southern short-tailed shrew, and the Homosassa shrew. FWC staff also examined shrew observations recorded by the agency, as well as the Florida Natural Areas Inventory and the Florida Park Service. Altogether, FWC obtained records for 87 Homosassa shrews, 302 Southern short-tailed shrews, and 469 North American least shrews. In addition, FWC biologists began collecting owl pellets (remains of prey consumed by owls) that were dissected to find shrew skulls. Agency staff contacted a network of field biologists and asked them to search for pellets below owl nests. To date, FWC has been able to obtain five owl pellets from different locations, but none contained Homosassa shrew skulls.

In FY 2013-14, FWC biologists also continued to conduct surveys using drift fence arrays with pitfall traps. Five public conservation areas were selected for surveys: Fort White WEA in Gilchrist County, Andrews WMA in Levy County, Caravelle Ranch WMA in Putnam and Marion counties, Lafayette Forest WEA in Lafayette County, and Holton Creek WMA in Hamilton County. Drift fence arrays were set up at 17 study sites, across the five areas, in multiple habitat types including floodplain swamp, upland hardwood, xeric hammock, mesic flatwoods, bottomland forest, pine plantation, mixed/successional, dome swamp, and sandhill. This year, FWC added a camera trap in the center of each array. Each camera trap consisted of an inverted, six-gallon plastic bucket that had a motion-activated camera (with a focal distance of six to twelve inches) attached inside to the bottom of the bucket. Four small, semicircular openings were cut from the top edge of the bucket. When placed on the ground, the openings allow shrews (along with other small animals) to enter the bucket, where the camera takes photographs of them when their movements are detected. Surveys were begun late in the year and conducted for a total of 305 trap nights at Holton Creek WMA and Fort White WEA. The surveys produced one captured Homosassa shrew, but no photographs of them (the shrew was in

a pitfall trap, not a camera trap). Trapping for this study will continue at all five conservation areas through July 2015. At that time, data will be analyzed and a final report will be written.

Additionally, in a separate study, drift fence arrays installed at Camp Blanding WMA in Clay County captured two Homosassa shrews.

Sherman's Short-tailed Shrew (*Chris Winchester*)

The Sherman's short-tailed shrew is currently listed in Florida as a Species of Special Concern. In 2010, FWC staff and external experts conducted a biological status review of the Sherman's short-tailed shrew, and it was determined that the species met the criteria to become listed in Florida as State-designated Threatened. The listing change to State-designated Threatened will occur once a management plan is approved by the FWC Commissioners. The Sherman's short-tailed shrew is believed to be restricted to a small region in southwest Florida. The species has not been found in recent years, however, and its current distribution is unknown. Since there are so few specimens available for study, the taxonomic status of Sherman's short-tailed shrew as a distinct species. In order to properly manage for this shrew, more specific and current information on distribution and habitat selection are required. In addition, the current taxonomic designation needs to be confirmed with genetic data. A draft species action plan (http://myfwc.com/media/2738852/Shermans-Short-Tailed-Shrew-Species-Action-Plan-Final-Draft.pdf) for the Sherman's short-tailed shrew was completed in November 2013.

During FY 2013-14, FWC biologists applied for and received a State Wildlife Grant to conduct research to address these issues. Research activities will commence in FY 2014-15 with trapping for shrews throughout potential habitat in or near the species' presumed range. Tissue samples will be collected from any captured animals to help confirm the taxonomic designation of Sherman's short-tailed shrew as a unique species of short-tailed shrews.

Florida Bonneted Bat (*Jennifer Myers*)

The Florida bonneted bat is currently a State-designated Threatened species but was listed as a Federal Endangered species by the U.S. Fish and Wildlife Service (USFWS) in October 2013. The listing change from State-designated Threatened to Federally-designated Endangered will occur as soon as the proposal is brought before and approved by the FWC Commissioners. A final draft species action plan (http://myfwc.com/media/2738262/Florida-Bonneted-Bat-Species-Action-Plan-Final-Draft.pdf), was completed in November 2013. 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.

During FY 2013-14, FWC conducted five night-time simultaneous emergence counts on occupied bonneted bat roosts on the WMA. A simultaneous count indicates that bats were counted at each occupied roost on the same evening. Emergence counts determine the presence of targeted species. Emergence counts were conducted in July 2013 (49 bats in three roosts), November 2013 (approximately 22 bats in two roosts), March 2014 (64 bats in three roosts), April 2014 (46 bats in three roosts on April 21 and 48 bats in five roosts on April 28), and May 2014 (55 bats in six roosts).

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 began in FY 2013-14 and will continue in FY 2014-15. In April 2014, FWC and the University of Florida captured 50 Florida bonneted bats at five roosts on the Babcock Webb WMA. Biological data were collected, and a Passive Integrated Transponder (PIT) tag was inserted into each bat. Each PIT tag is numbered, and will allow researchers to document recapture of the same individual in future trapping events. Most of the bats captured in April 2014 were female, and many were pregnant. FWC staff followed up by monitoring the bat houses weekly to determine when the Florida bonneted bats gave birth. Staff visited three of the houses (those that had pregnant females) biweekly from the end of April through the end of July, and counted approximately 25 pups between the three houses.

Also in FY 2013-14, FWC applied for and received a Conserve Wildlife Tag grant to purchase a PIT tag reader to mount on a bat house. This funding will be used in FY 2014-15 to further explore the use of PIT tag readers on bat houses.

In FY 2012-13, FWC invited conservation partners to join the Agency's 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 WMA. During FY 2013-14, FWC maintained contact with working group members, and began planning a second meeting for FY 2014-15.

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. In recent years, however, few gray bats have been observed during the annual census of the winter roosts conducted by FWC and

FDEP's Florida Park Service. During the most recent winter count on February 13, 2014, biologists found no gray bats in the primary wintering cave in Florida Caverns State Park in Jackson County. As is typical, several hundred bats of two other species (Southeastern myotis and tri-colored bat) were 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 previously wintered in Florida's caves, no more than nine gray bats have been found hibernating in the in any year since 2002. Gray bats also formerly wintered in a cave in southern Alabama and it is possible that the Florida population shifted to that site. During FY 2013-14, an FWC biologist accompanied researchers in Alabama on their annual visit to the cave and no gray bats were seen, however.

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 in the state because the decline started before White Nose Syndrome was first documented in 2006. Nevertheless, FWC researchers took swab samples from several Southeastern myotis bats and tri-colored bats that roosted in Old Indian Cave (Florida Caverns State Park in Jackson County) where the gray bats were formerly present. Tests on those samples by the National Wildlife Health Laboratory found, as expected, no evidence of the fungus that causes White Nose Syndrome.

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. The number of gray bats in Florida remains critically low, and the species may now 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 more northern parts of the range including northern Alabama, northern Georgia, and Tennessee.

Sherman's Fox Squirrel (*Elina Garrison*)

In 2010, FWC convened a biological review group to review the biological status of Sherman's fox squirrels. The biological review group determined that based on the biological assessment, the subspecies did not meet the criteria to be listed; however, they expressed concerns that the available data was insufficient and too outdated to adequately evaluate the species' status. FWC staff, therefore, recommended that the Sherman's fox squirrel be maintained as a Species of Special Concern until information is gathered to address data gaps that will allow the subspecies to be re-evaluated. A draft species action plan that provides the framework for the conservation and management of the Sherman's fox squirrel in Florida was completed in November 2013 (http://myfwc.com/media/2738277/Shermans-Fox-Squirrel-Species-Action-Plan-Final.pdf).

Monitoring of Sherman's fox squirrels in Florida is difficult because of their large home ranges, low species densities, and the difficulty in live-trapping individuals. One of the major threats to the Sherman's fox squirrel is the loss, fragmentation, and degradation of remaining habitat. Identifying and evaluating the extent of the remaining habitat is outlined in the species action plan for the Sherman's fox squirrel (http://www.myfwc.com/media/2273391/Shermans-Fox-Squirrel-BSR.pdf), which includes a need to identify priority habitats and to develop management and monitoring guidelines.

In FY 2013-14, FWC and the University of Florida investigated the habitat use and distribution of fox squirrels in Florida. Camera surveys and vegetation surveys were conducted throughout Central Florida on 16 private and public lands. At all sites, cameras were set in 3x3 grids with 330-foot spacing for seven days. At each camera point, habitat structure around the camera was measured, including canopy density, basal area of pines and oaks, shrub cover, and ground cover. The objective was to assess vegetation structure along a gradient, and to determine how these variables affect habitat use by fox squirrels.

A total of 144 grids consisting of 1,296 camera points were surveyed in 22 land cover types. Fox squirrels were found in seven of the land cover types, with most observations occurring in the sandhills and flatwoods, particularly in areas with reduced shrub and ground cover. In addition, the effects of varying fire frequencies on Sherman's fox squirrels were assessed at Ocala National Forest. Preliminary results suggest that prescribed fire is an integral component of fox squirrel habitat management; most fox squirrel observations occurred in areas experiencing frequent (three years or less burn interval) prescribed fire, followed by areas with moderate (three to five year burn interval) fire frequency. No observations were made in areas where fire suppression exceeded five years. Ongoing research with the joint FWC/University of Florida project will include further analyses of the vegetation data, developing an efficient method to enter and analyze camera data, assessing parasites from road kill fox squirrels, and assessing the risk of mortality due to habitat fragmentation. Ongoing and future work at the University of Florida includes determining overall distribution of fox squirrels in Florida, assessing the physical variation among the four fox squirrel subspecies in Florida, and evaluating the genetic variation of these subspecies, including defining their geographical boundaries.

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. FWC approved a Florida Black Bear Management Plan (http://myfwc.com/media/2612908/bear-management-plan.pdf) 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 2013-14, FWC received 6,737 calls regarding bears (i.e., sightings, bears in garbage, complaints). Bear-related call volume in FY 2013-14 was the highest on record, exceeding FY 2012-13's calls by 3%. The number of bears killed by vehicles totaled 228 individuals for FY 2013-14, which was 25% less than the record number (285) of vehicle-related deaths recorded for FY 2012-13.

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 655 requests for assistance during FY 2013-14. The majority (58%) 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 only slightly higher (22%) 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. Nineteen interns from Florida State University participated in the fall 2013 and spring and summer 2014 sessions. These students contributed 3,800 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; analyzing hotspot areas where bears are being hit by vehicles and proposing installation of additional bear crossing signs; updating education standards within the Florida Black Bear Curriculum Guide; examining average distance of release from capture location; and compiling up-to-date of outcomes of legal cases involving bears. Interns coordinated public events and volunteer efforts to increase public awareness of bears. The interns allowed FWC to reach out and educate an additional 5,700 people about Florida's largest land mammal in FY 2013-14.

Through partnerships with local governments, businesses, and communities, Bear Management 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 counties in central Florida to increase the availability of bear-resistant containers for trash. In Seminole County, FWC worked with local government and waste service companies to provide a credit so residents could get bear-resistant trashcans at a reduced rate. FWC coordinated internally to provide comments on impacts to bears from proposed residential developments and highway projects. In response to increasing conflict situations and four serious attacks over the past year, FWC staff is taking an even more aggressive and proactive approach to conflict bears that linger in urban and suburban areas. These bears may pose a safety risk to residents and FWC is actively working to remove that risk. FWC staff will also continue to educate the public about how to reduce and prevent conflicts with bears. Lastly, we will explore the option of hunting to manage bear populations in order to supplement our direct measures to reduce conflicts.

During FY 2013-14, FWC responded to the two most serious incidents of bears harming people in Florida history. On December 2, 2013, a Longwood woman was seriously injured on the face and head by a black bear. The Bear Management Program captured six bears in seven days, euthanized two adult bears that fit the description of the bear involved in the incident, and released three bears back into the wild once it was determined they were not involved in the incident. An analysis of DNA found on the victim matched an adult female that was captured on scene, and that bear was placed in permanent captivity. On April 12, 2014, a Lake Mary woman was seriously injured on the head by a black bear. FWC responded and discovered several bears in the neighborhood had clearly lost all of their natural fear of people. FWC captured and euthanized seven bears over the course of two days, all of which showed behavioral signs that are considered a threat to public safety. One of the adult female bears that was captured and euthanized matched the DNA found on the victim. FWC charged a neighbor living near the victim with illegally feeding bears, which likely caused the lack of fear bears were exhibiting toward people. In both the Longwood and Lake Mary incidences, FWC communicated with the

public, collected evidence, removed potential public safety threats, determined what exactly happened, and provided an informed opinion on why the incidents occurred. In both cases, the people were injured when the bears perceived them as a threat to their young (Longwood) or food (Lake Mary). FWC provided daily updates to the media during both incidents. Agency staff also responded to hundreds of phone calls, emails, and letters from the public in response to these two incidents in order to explain what happened and the agency response.

The Bear Management Program has continued to train law enforcement officers on bear behavior and conflict response. Thirteen bear response trainings for 222 personnel were held in FY 2013-14, 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 5th annual training workshop on July 24 and 25, 2014, 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 contributed 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.

In order to raise awareness about increased black bear activity that occurs every fall and provide advice on how to avoid conflicts, the Bear Management Program and Office of Community Relations coordinated a media event in three different locations on October 4, 2014. FWC teamed up with the Tallahassee Museum of Natural Science (Leon County), the CARE center in Citra (Marion County), and the Naples Zoo (Collier County), all of which have captive black bears, to allow the media to film the bears trying to access bear-resistant trashcans. . The event was very well attended, with four media outlets in Tallahassee, five in Citra, and three in Naples (Collier County). At each event, the bears demonstrated that bear resistant trashcans keep them out of the garbage, which greatly increased the size of the audience FWC was able to reach.

FWC staff continued to serve on the State Road 40 wildlife crossings committee to advise the Florida Department of Transportation during project development and environmental manual phase of construction.

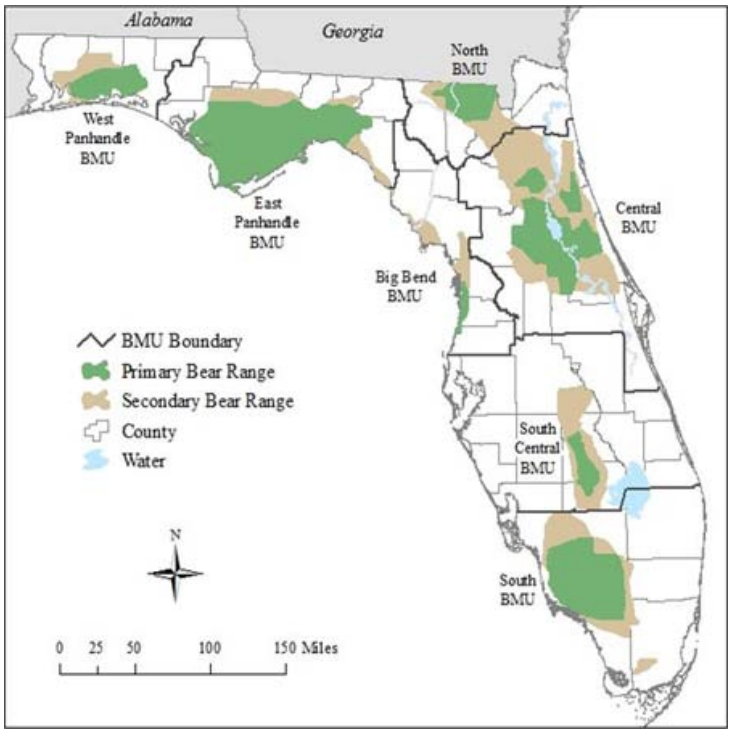
The Bear Research Program completed the field portions of a study of bears in Camp Blanding and surrounding private lands funded through a grant from the Florida National Guard. An estimated 100,000 locations are being analyzed to provide Camp Blanding environmental staff with information detailing bear movements and habitat use on the facility. The Bear Research Program is collaborating with the University of Florida's Department of Wildlife Ecology and Conservation to produce these results.

FWC staff provided a scientific journal with updates to the geographic distribution of the American black bear in North America. This is the first update of the bear's range in North America since 1994.

The Bear Research Program began field work on a two-year study to estimate the number of black bears in Florida during FY 2013-14. Staff focused on bear populations in and around Osceola and Ocala National Forests and in Flagler and Volusia counties. Bear detection sites were constructed on Federal, State, county, and privately-owned lands. Results from this year's work are expected in June 2015.

The Bear Management and Research Program received a budget increase for FY 2013-14

of nearly $385,000 in funds to implement the 2012 Florida Black Bear Management Plan. One important element prescribed in the Plan was to set up seven Bear Management Units and Bear Stakeholder Groups across the state. By splitting up the state into different Bear Management Units, FWC can manage bears based on the local characteristics of both the bear and human populations, which vary dramatically across Florida. There are seven bear management units in Florida: West Panhandle (Escambia, Holmes, Okaloosa, Santa Rosa, and Walton counties); East Panhandle (Bay, Calhoun, Franklin, Gadsden, Gulf, Jackson, Jefferson, Leon, Liberty, Madison, Taylor, Wakulla, and Washington counties); Big Bend (Citrus, Dixie, Gilchrist, Hernando, Lafayette, Levy, and Pasco counties); North (Baker, Columbia, Duval, Hamilton, Nassau, Suwannee, and Union counties); Central (Alachua, Bradford, Brevard, Clay, Flagler, Lake, Marion, Orange, Putnam, Seminole, St. Johns, Sumter, and Volusia counties); South-Central (Charlotte, De Soto, Glades, Hardee, Highlands, Hillsborough, Indian River, Manatee, Martin, Okeechobee, Osceola, Pinellas, Polk, Sarasota, and St Lucie counties); and South (Broward, Collier, Hendry, Lee, Miami-Dade, Monroe, and Palm Beach counties).



Seven Bear Management Units in Florida

The Bear Management Program hired a Stakeholder Coordinator in September 2013 to promote the Bear Stakeholder Groups and gather input from the residents by holding public workshops. During FY 2013-14, FWC held 19 public workshops with 753 participants attending in four of the seven Bear Management Units. Two of the Bear Stakeholder Groups have already started meeting and are scheduled to meet every three months. Another important element prescribed in the Plan is to update the population estimates and range of bears in Florida. The legislative budget request approval allowed the Bear Research Program to start the multi-year process of collecting and analyzing data on bears that will ultimately result in a new estimate of bear population abundance in 2016, and a range update in 2015.

The Bear Management and Research Programs received an additional budget increase for

FY 2014-15 of $560,000 to address human-bear conflicts and decrease the amount of time it will take to determine the current bear population in Florida. The increase in funds will allow the Bear Management and Research Programs to hire four additional employees to respond to requests from the public for assistance with human-bear conflicts and conduct important bear research. Funds will also be used to hire additional private trapping contractors to help the public with conflicts, and purchase equipment that can be loaned to the public that will deter bears from their homes.

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, in 1995, FWC, with the approval of the USFWS, began a genetic restoration plan by temporarily bringing in eight female pumas from Texas to 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. Today, the Florida panther population is estimated to be between 100-180 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, 232 panthers have been radio-collared, providing essential data for the management and conservation of the population. Radio telemetry data were collected on 41 Florida panthers in FY 2013-14. 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, for tracking and identifying individual panthers), and collecting tissue and fecal samples to assess their physical and genetic health. In FY 2013-14, FWC and BCNP biologists visited 12 panther dens and documented 30 kittens (16 males, 14 females). Since 1992, 428 kittens have been handled at dens.

In FY 2013-14, 26 wild Florida panthers were known to have died, including four (three males, one female) radio-collared panthers and 22 (13 males, six females, three unknown sex)

uncollared panthers. Twenty of the 26 panthers died after being hit by vehicles, two were killed by other panthers, one died from undetermined causes, one died of pneumonia, one died of peritonitis, and one was shot illegally. In addition to these mortalities, FWC found a neonate kitten that was near death due to hypothermia at its natal den. This kitten was removed permanently from the wild and will be kept at the Homosassa Springs State Wildlife Park.

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 a population viability analysis that involves individual-based models, testing novel methods of estimating home ranges using GPS data, evaluating the presence and significance of various parasites and environmental contaminants in panthers, assessing fine-scale panther movement rates using GPS collar data, 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 two promising protocols that may permit statistically robust population estimates using either a combination of trail camera surveys and marked panthers or information from panther road mortalities and telemetry monitoring. A camera survey utilizing the previously identified study design and analytical technique was initiated in the spring of 2014. The technique that incorporates road mortality data and telemetry locations has been applied to data collected by FWC from 2000-2012, and a manuscript has been submitted to a peer-reviewed journal. Lastly, FWC continues its protocol of disease monitoring and vaccination of all panthers handled as well as monitoring the genetic health of the population via DNA analyses contracted to the U.S. Forest Service Rocky Mountain Research Station.

FWC assisted with the completion of several collaborative research projects during FY 2013-14, including: identifying a technique to strategically locate wildlife crossing structures for Florida panthers; an assessment of the impact of genetic restoration on the cranial morphology of Florida panthers; delineating a technique that uses multiple data sources (i.e., trail camera photographs and telemetry locations) to produce a statistically defensible density estimate for panthers; and the identification of the potential impacts of certain viral agents on the panther population.

Human-panther interactions are investigated by FWC in accordance with the Interagency Florida Panther Response Plan (http://www.floridapanthernet.org/images/field_notes/EA_for_the_Panther_Response_Plan_FINAL_PUBLISHED.pdf). FWC verified that panthers were responsible for preying upon domestic animals (called depredations) in 37 separate events during FY 2013-14. In some cases, multiple animals were killed or injured during a single event. These 37 verified panther depredation events all occurred in Collier and Hendry counties, and the majority of depredations occurred in Golden Gate Estates east of Naples (Collier County). Golden Gate Estates is approximately 150 square miles in area and borders public lands located in the Florida Panther National Wildlife Refuge, Picayune Strand State Forest, and the Corkscrew Regional Ecosystem Watershed. Panthers occupy these public lands. Lot sizes in Golden Gate Estates typically range from one to five acres, and most lots still contain native habitat. Keeping livestock is permitted under local

zoning codes. During depredation investigations, FWC provides assistance and advice to affected residents on how they can reduce the risk of panther attacks on pets and livestock. A brochure was produced by FWC that describes these steps and this information is also available online at: http://www.floridapanthernet.org/images/field_notes/LivingWithPanthers.pdf . FWC, as a member of the Interagency Florida Panther Response Team, also documented five panther encounters. An encounter is defined as an unexpected direct meeting or a series of meetings over a short period between a human and a panther. Four encounters involved a single observation and one involved multiple observations over a five-day period at a private business located within BCNP. The Florida Panther Interagency Response Team developed an Action Plan to trap and examine the panther seen near a private business. If the panther was found to be healthy, it would have been relocated but the panther left the area on its own before it was captured.

In order to increase capacity within FWC to deal with human-panther issues statewide, FWC panther biologists developed a Florida Panther Road Show and presented it at seven locations throughout Florida. Although the target audience was within FWC, people from other agencies attended these training sessions as well, including staff from local sheriff's departments, USFWS, county departments of parks and recreation, Florida Department of Environmental Protection (FDEP), and Water Management Districts. Training included basic information on panther biology and life history, how to identify panther signs, how to investigate possible panther depredations, and FWC's responsibilities under the Florida Panther Response Plan.

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 are critical recovery actions because conservation efforts will not be achieved without public support. To that end, FWC has contracted Dr. Elizabeth Pienaar (University of Florida) to begin exploring human dimension issues related to panther population expansion. The primary objective of this research is to integrate natural sciences and economics to investigate how and why different types of landowners respond to different panther habitat conservation incentives. Conserving panther habitat on private lands is essential for advancing panther recovery throughout its range. This work will provide insights into which incentives (financial incentives, regulatory relief, and/or technical assistance) landowners prefer and the potential costs of implementing these incentives. A combination of interviews and surveys will be used to collect the information needed to determine the minimum incentives required to attain conservation of panther habitat on private, non-urban lands. Based on this information, insights on how to structure one or more trial incentive programs that may be implemented will be provided to the FWC and the USFWS.

Information and reviews of numerous road and development projects throughout southern Florida were provided by FWC during FY 2013-14. 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.

FWC launched a new website in August 2012 where the public can report panther sightings and upload pictures or videos of those sightings: http://www.myfwc.com/panthersightings. As of the end of FY 2013-14, people submitted over 1,500 records of panther sightings. Most records (82%) did not include evidence that would permit verification by FWC that the animal seen was a panther. Of the 275 records that included photographs (out of over 950 submitted records), 44% were verified as panthers and 28% were

identified as bobcats. Other purported sightings of panthers were determined to be other animals such as bears, coyotes, dogs, foxes, house cats, otters, and a monkey (Rhesus macaque).

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 and http://www.fws.gov/verobeach/ListedSpeciesMammals.html#fp.

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

The Florida manatee is a Federally-designated Endangered species (listed by the USFWS as the West Indian manatee). Manatees have been protected in Florida since 1892. The manatee is also Federally protected under the Marine Mammal Protection 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; the other two-thirds comes from vessel registrations. 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 2013-14, 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, a manatee tracking study in Brevard County, a study of manatee response to vessel traffic, and updates on the red tide and east coast manatee mortality events were provided. The May meeting included updates on Florida seagrass, manatee genetics, warm water habitat, and a structured decision making model developed to assist in prioritizing habitat restoration projects. 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 involved.

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 Citizen's Awareness section 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 2013-14, FWC, in collaboration with Duval County and the USFWS, completed a revised draft

of the County's existing plan. The plan is currently going through the public comment process and it is expected to be finalized in 2014. FWC continues to assist Charlotte County in developing and drafting their first plan; a draft is expected by spring of 2015. FWC has also provided Miami-Dade County with an informal review of their current plan and suggested several modifications to their plan. FWC will continue to work with the County and the USFWS to complete a revision of the plan by the end of 2015.

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. In advance of considering a potential rule for western Pinellas County, FWC completed a data analysis and met with County staff to discuss the results. The analysis reviewed numerous variables, including aerial survey data for manatees and boats, manatee mortality information, water depths, seagrass distribution, the presence of local boating regulations and State boating safety regulations, local resource protection zones, existing sign posting locations, manatee warm-water sites, and locations of existing boat facilities. FWC developed a proposal of potential speed zones where data suggests they may be warranted. The proposal of potential speed zones was provided to Pinellas County staff and the Local Rule Review Committee for their review and comment. FWC also met with local government representatives and boating and environmental stakeholders to discuss the data analysis and to learn about local concerns. FWC will be developing a draft proposed rule for review by the FWC Commission at a fall 2014 Commission meeting.

Permit Reviews – FWC produced 286 final comment letters for proposed permitting projects reviewed during FY 2013-14. 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 completed through these comments, as facilities are required to post informational signs about manatees and distribute written materials to boat users.

Manatee Habitat – During FY 2013-14, 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 of these plants to natural gas. This required coordination with Florida Power and Light to confirm that all manatee monitoring plans were implemented during the conversions of these three power plants. The conversions of the Cape Canaveral (Brevard County) and Riviera Beach (Palm Beach County) plants are complete and both plants are now generating electricity. At the Port Everglades plant (Broward County), the conversion process and manatee monitoring will continue through the winter of 2014. FWC is also working with the Southwest Florida Water Management District and the USFWS on a shoreline stabilization project at Three Sisters Spring, which is an important manatee warm-water refuge in Crystal River, Florida. This project is expected to be completed by the fall of 2016.

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 2013-14, 382 manatee carcasses were documented in Florida. All but 13 of these carcasses were recovered and examined in order to determine causes of death. Collision with watercraft accounted for 71 of the 382 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.

FWC and cooperators rescued 81 sick or injured manatees under the Federally-permitted statewide rescue program. Three oceanaria (Lowry Park Zoo in Tampa, Miami Seaquarium, and Sea World in Orlando) participate in the State-funded rehabilitation program for critical care treatment and are partially reimbursed by FWC for their costs. As of June 2014, 35 of these rescued manatees were released back into the wild, 16 died, and 30 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, transport to rehabilitation facilities, pre-release health assessment, and release 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 conducted in winter 2014, and 4,824 manatees were counted by a team of 20 observers from nine organizations. Currently, researchers are developing new aerial survey techniques to support statistically sound estimates of distribution and population size. This information will help strengthen the rigor of the estimate from the annual statewide manatee synoptic survey. For more information about aerial surveys and the synoptic count, please refer to http://myfwc.com/research/manatee/projects/population-monitoring/.

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. FWC continues to analyze data and make modifications to the sampling strategy in order to assess the potential of this technique. During the winters of 2009-10, 2010-11, 2011-12, 2012-13, and 2013-14, 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 2013-14, 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 3D 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. Manatees are now being monitored at the original site. Twelve manatees were captured and tagged with global positioning system tracking devices in December 2013 as part of this multi-year telemetry study. Individuals were tracked over the winter period, and tags were recovered in March 2014. 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 preliminary model was developed for analysis of management decisions and a report related to this topic was completed.

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. During the calving season, FWC collaborates with Federal, State, and non-governmental partners to carryout field research (primarily aerial surveys), biopsy sampling, disentanglement, and stranding events. Most of this work is supported by funds from the National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA-Fisheries) and is aimed at monitoring the seasonal presence of right whales, mitigating vessel-whale collisions, and assessing population dynamics. 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. Photographs are used to identify individual right whales based on the callosity (a natural growth of cornified skin) pattern on their head as well as human-related scars. Over time, population demographics, reproductive success, mortality, and trends in health and scarring are monitored, in part, through this photo-identification research. FWC has also worked closely with partners to compile years of southeastern U.S. 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 calving area 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.

FWC conducted 91 aerial surveys and 12 vessel cruises in the southeastern U.S. during the 2013-14 calving season. Through collaborative efforts with NOAA-Fisheries, the Georgia Department of Natural Resources, the Sea to Shore Alliance, and volunteer sighting networks, 52 unique right whales, including ten newborn calves, were documented, and fourteen right whales (including eight calves) as well as two humpback whales were biopsy sampled. Additionally, FWC received 45 confirmed humpback whales sightings (including duplicate sightings of some individual whales). Most of these sightings occurred in coastal waters off northeast Florida between December 2013 and March 2014.

No right whale carcasses were detected during this calving season, but one calf loss was documented through photo-identification. FWC documented and assessed new injuries on three right whales. The injuries were likely caused by entanglement prior to the whales' migration to the calving area; these whales were not carrying any fishing gear. Lastly, one entangled whale was documented this winter. During a two-day operation, FWC assessed, tagged, and partially disentangled a four year-old whale in collaboration with partner agencies and organizations. Heavy fishing rope removed from the whale was examined by FWC and then transferred to NOAA-Fisheries along with a gear report. The rope is not consistent with that used in the southeastern U.S. and the whale likely migrated with the gear attached.

BIRDS

Audubon's Crested Caracara (*Dawn Dodds, Jason Huckabee, Jean McCollom, and Andrew West*)

The Audubon crested caracara is a Federally-designated Threatened species. During FY 2013-14, FWC began Audubon's crested caracara nest surveys. The surveys were conducted from January to March. During the surveys, two crested caracara nests were located at Dinner Island Ranch Wildlife Management Area (WMA) in Hendry County, and one was located at Okaloacoochee Slough WMA in Collier and Hendry counties. No nest presence was detected on Spirit-of-the-Wild WMA in Hendry County. Nesting surveys were also initiated on Fisheating Creek WMA in Glades County to comply with the USFWS's wildlife monitoring requirements for the Cowbone Marsh Restoration Project. The Cowbone Marsh is a freshwater marsh system within Fisheating Creek WMA. The Restoration Project requires that known nesting sites are protected and habitat is maintained in suitable condition in areas where crested caracara nests are known to occur. During the surveys, five crested caracara nests were located.

Bald Eagle (*Donald Lee Francis, Catherine Ricketts, Valerie Sparling, Michelle van Deventer, Andrew West, and Morgan Wilbur*)

The bald eagle, the national bird, is a listed species success story. Outstanding conservation efforts led to this species being removed from the USFWS's 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 (http://myfwc.com/media/427567/Eagle_Plan_April_2008.pdf), and will continue to report on activities until the Management Plan is revised. The bald eagle continues to be protected under the Federal Bald and Golden Eagle Protection Act and the Federal 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 issues permits (http://myfwc.com/license/wildlife/protected-wildlife/eagle-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/.

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. 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.

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 23 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 2013-14 was the sixth year using a survey method based on sampling one-third of the known nesting territories in the state each year. This sub-sample approach allows FWC to survey each nesting territory multiple times during the nesting season. The result is an unbiased confidence estimate of statewide productivity. This sub-sample survey protocol is expected to be continued during the FY 2014-15 nesting season.

Results of the FY 2012-13 statewide survey were reported in February 2014 and are available online at http://myfwc.com/wildlifehabitats/managed/bald-eagle/monitoring/. The 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. The estimated number of active bald eagle nesting territories in Florida was approximately 1,487. This is down slightly from 1,511 in 2012. The number of young produced this year was estimated at 1,340. Polk and Osceola counties had the greatest number of active bald eagle nesting territories, and live pine trees are the most common nesting substrate for bald eagle nests in Florida. Results from the FY 2013-14 survey are currently being analyzed.

Since 1996, staff at the Apalachicola River WEA has conducted bald eagle nesting surveys across Apalachicola River WEA, Box-R WMA, and St. Vincent Island National Wildlife Refuge in Gulf and Franklin counties. The purpose of this monitoring is to track changes in the number and distribution of nests over time and identify areas in which to apply protective measures during land management activities. Each year, FWC visits all bald eagle nests documented the previous year and searches for new nests. Surveyors collect data on the numbers of adults, eggs, nestlings, and fledglings present; nest tree species and status (alive or dead); and GPS coordinates for previously undocumented nests. Helicopter flight surveys occur twice during the season, typically between December and February, with approximately four weeks between surveys. If a nest has collapsed or is unused for several years in a row, FWC removes the nest from future surveys. During the December 2013 survey, 18 of 33 nests (54%) were active. Adult eagles were present at all 18 active nests with a total of 23 adults observed. One nest contained a single egg and 14 additional nests contained an adult that was either incubating or sitting on an unseen nestling. No nestlings or fledglings were seen during the December flight. Adults were observed near two of the inactive nests (two adults at each nest). One new nest was documented, and three nests were considered for removal from future surveys (two badly deteriorated, one destroyed). During the February 2014 survey, more than two-thirds of the 35 nests visited (68%) were active. Adult eagles were present at 21 of the active nests with a total of 27 adults observed. One nest contained an adult that was either incubating or sitting on an unseen nestling. A total of 28 nestlings were seen: eight nests had a single nestling each, and ten nests contained two nestlings each. No eggs were observed, nor were any fledglings. In total, 80% of known bald eagle nests (28 out of 35) were active during the 2013-14 breeding season compared to 71% of nests (22 out of 31) active during last year's breeding season. At least two nests potentially fledged and FWC found three new active nests.

Nesting surveys for bald eagles were conducted on January 11, 2014, 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 bald eagle nesting habitat. Both of these nests were monitored and determined to be active from 2010-2012. In 2013, only one of these nests was active with an adult eagle observed on the nest. FWC determined that the other nest was abandoned as it did not appear to be maintained. On January 11, 2014, there was still one active eagle nest in which two eggs were observed. The nest tree was dead, however, likely due to a lightning strike, and 2014 is likely the last year that this nest will be active. Transects were flown over the Wacissa River basin at an altitude of 400 feet in an effort to locate additional nests; however, none were documented. One bald eagle nest located on private property adjacent to Aucilla WMA was also monitored and determined to be active as an adult eagle was observed at the nest tree and a second adult in a nearby tree. While there are no bald 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 bald eagle and one chick were observed at the nest.

Bald eagles have been observed frequently for many years on Joe Budd WMA in southeastern Gadsden County. However, FWC could not locate nests from the ground during FY 2013-14. In order to more accurately assess bald eagle nesting on the area, a helicopter aerial survey was conducted on Joe Budd WMA and adjacent Lake Talquin in February 2014. Two previously unknown nests were documented during this survey. Two adult bald eagles were observed on one nest while the other nest was inactive. The location of the inactive nest is near where FWC observed bald eagles the previous late winter and early spring. No eggs or young were documented in either nest during the aerial survey. The active nest is inaccessible from the ground so a follow-up assessment was not possible. Prior to this survey, there was only one record of a bald eagle nest on Joe Budd WMA, which was destroyed by a storm in 2003.

Nesting surveys for bald eagles were conducted in January and March 2014, and ground surveys were conducted 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. Five active nests monitored at Dupuis produced three fledglings. Three active nests at Corbett produced three fledglings.

Everglade Snail Kite (*Zach Welch*)

The Everglade snail kite is a Federally-designated Endangered species. The Everglades and Francis S. Taylor Wildlife Management Area (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.

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 the 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 grasshopper sparrow to Federally Threatened when ten protected locations contain stable, self-sustaining populations of more than 50 breeding pairs each.

The Florida grasshopper sparrow exists at no more than five locations, including: the Three Lakes Wildlife Management Area (WMA) and the Kissimmee Prairie Preserve State Park in Osceola County, the Avon Park Air Force Range (Federal land) in Highlands and Polk counties, and two parcels of privately owned land in Osceola County. Florida grasshopper sparrows existing on protected public lands are monitored by annual point count surveys, a standard method used to assess the relative abundance of bird populations. Kissimmee Prairie Preserve State Park and Avon park Air Force Range populations are currently near extirpation. The population on the Three Lakes WMA has also witnessed a decline over the last several years, but continues to function with active reproduction being observed. Population levels on private lands are currently unknown but are being assessed by FWC and the USFWS.

Monitoring on Three Lakes Wildlife Management Area in Osceola County – Point count surveys for Florida grasshopper sparrow have been conducted on the Three Lakes WMA since FY 1990-91. The surveys are conducted each spring (April-June) and consist of a grid of 190 stations spaced 0.25 miles apart. Of the 190 stations, 24 are located in unsuitable habitat and are not surveyed annually. Each station is surveyed for five minutes, three times each spring, and all Florida grasshopper sparrows heard or observed are recorded. In FY 2013-14, surveys estimated there were at least 56 different male Florida grasshopper sparrows at the main site, down from 67

detected in FY 2012-13. The declining trend of detected males is of great concern to FWC. Monitoring will continue on the Three Lakes WMA in FY 2014-15.

In an effort to restore and maintain the dry prairie, oak trees and cabbage palms were mulched on 573 acres of the prairie, oaks resprouting within previous tree removal areas were sprayed with herbicide to prevent re-encroachment into these areas, and oaks outside of historic mesic hammocks are being cut down by WMA staff. In addition, an interagency working group, a graduate student from the University of Maryland, Baltimore County, and FWC are conducting intensive research in an attempt to determine the primary causes for the Florida grasshopper sparrow's decline.

Effects of Fire Management on Demographic Rates at Three Lakes Wildlife Management Area in Osceola County – The second season of Florida grasshopper sparrow demographic research by FWC was conducted during FY 2013-14 and the beginning of FY 2014-15 (March-August 2014). This project has been a cooperative effort involving FWC, USFWS, Tall Timbers Research Station, and the Florida Grasshopper Sparrow Working Group.

Different fire treatments were assigned to management units within Three Lakes WMA to better understand the role of fire interval and seasonality on Florida grasshopper sparrow demographics. Units were burned in either the dormant or the growing seasons starting in February 2013 and continuing in 2014. By tracking the population's use of these units, FWC will assess territory preference, between- and within-season movement, nest timing and placement, and nest survival rates as they relate to the different burn regimes.

As part of a continued effort to color-band the entire male population, 29 male and ten juvenile Florida grasshopper sparrows were captured and color-banded in 2014. In addition to these new captures, 36 of 49 adult males (73%) and two of five adult females (40%) banded during the 2012 or 2013 seasons were resighted at least once between March and August 2014. Three of ten birds (one male and two females) banded as fledglings during the 2013 season also were resighted in 2014. Together, the number of color-banded individuals known to exist at Three Lakes WMA in 2014 was 66 adult males, four adult females, and ten fledglings of unknown sex. All known adult males were color-banded by the end of the 2014 breeding season, but most females and first-year birds remain unbanded because they are difficult to locate and capture. The high apparent annual survival of adult males (more than 73%) is encouraging for the future recovery of the sparrow, but formal analyses will be conducted at the end of the study in FY 2015-16 to generate robust survival estimates within and between breeding seasons.

Maintaining a population of color-banded birds has allowed researchers to collect valuable data on dispersal. One male banded on Three Lakes WMA in April 2013 was detected on another property 15 miles to the south in May 2013. This bird was observed again at Three Lakes WMA in May 2014 where it remained for the duration of the season. Landscape-level dispersal events such as this one have only been recorded a few times in the past. Understanding that these birds are capable of moving between study areas emphasizes the need for the preservation of suitable habitat in the larger landscape, even on properties where no Florida grasshopper sparrows remain. In addition, frequent movements of territorial males across management unit boundaries have been observed within the study area. Careful documentation of these movements will be used to understand habitat management preferences (particularly after prescribed burning events).

FWC located and monitored 43 Florida grasshopper sparrow nests this season, which exceeds the previous record for a single site and year of any study for the subspecies. Of these

nests, one remains active, 15 survived to fledge young, 25 were depredated, one failed to hatch, and one had an unknown fate. More information on the predator community was obtained through a concurrent nest camera study of surrogate grassland bird species (see below). Future analyses will estimate robust rates of nest survival across different management treatments.

Disease Sampling of Adult Male Florida Grasshopper Sparrows at Three Lakes Wildlife Management Area in Osceola County – Fecal samples from eight birds were collected and analyzed for the presence of salmonella and acid-fast bacteria (such as avian tuberculosis). All of the samples were negative for these diseases. During banding, Florida grasshopper sparrows were also examined for exoparasites (such as ticks, feather mites, or lice). Of the 49 individuals banded or recaptured this season where parasite load was recorded, 23 (47%) had feather parasite eggs or adults, five (10%) had at least one tick attached, three (6%) had both feather parasites and ticks, two (4%) had unspecified exoparasites, and the remaining 16 (33%) individuals had no observed exoparasites.

Surveillance of Grassland Bird Nests using Video Systems – Funding through the USFWS was provided to construct eight nest camera systems, which were placed at the entrances of 22 ground-nests for species that breed in the same habitat as the Florida grasshopper sparrow (seven Bachman's sparrow, ten Eastern meadowlark, three common nighthawk, and two common ground dove). Eleven nests successfully fledged young, one was abandoned from unknown causes, one was flooded, two are still being reviewed, and four had an unknown fate because of camera failure or the chicks (common nighthawks) moved out of camera range and were not relocated. One of the remaining three nests was depredated by a nine-banded armadillo and the remaining two were depredated by Eastern spotted skunks. Nestlings at one Bachman's sparrow nest left prematurely in response to the presence of a snake but were not observed being depredated. Additional funding from the USFWS is pending and would be used to extend this project to FY 2014-15 and to increase the sample size.

Florida Sandhill Crane (*Tim Dellinger*)

The Florida sandhill crane is non-migratory and confined to Florida and adjacent parts of southern Georgia, primarily the Okefenokee Swamp. This species is a State-designated Threatened subspecies due to population decline throughout its range in recent decades. Furthermore, the Florida sandhill crane subspecies was petitioned for Federal listing as Endangered by the Center for Biological Diversity in 2010. In 2010, a biological assessment of the Florida sandhill crane determined that the species met criteria for listing as State-designated Threatened. A draft species action plan (http://myfwc.com/media/2738849/Florida-Sandhill-Crane-Species-Action-Plan-Final-Draft.pdf) was completed in November 2013 with the goal of increasing the number of Florida sandhill cranes.

Monitoring and Management Protocol Development – In FY 2013-14, FWC began range-wide road surveys to measure the regional productivity of Florida sandhill cranes. Based on their range and available habitat, 12 routes totaling roughly 640 miles were established through 16 counties. These routes were surveyed twice during the fall. In 2013, 371 adults, 37 young, and 11 birds of undetermined age were counted. Osceola and Okeechobee routes were

regional crane strongholds, accounting for 52% of observed adults and 65% of young. Surveys will continue in 2014.

Habitat Management to Improve Productivity – In 2013, FWC began a study to examine whether habitat manipulation of dry prairie can enhance crane productivity. The study area is in Osceola County and consists of marshes surrounded by dry prairie on Three Lakes Wildlife Management Area (WMA) and marshes surrounded by improved pasture on an adjacent private ranch. The Three Lakes WMA study site has suitable marshes for cranes to breed; these marshes, however, are surrounded by unsuitable habitat consisting of a dense ring of palmetto. The dry prairie also consists of sparse to dense palmetto.

FWC collected baseline nesting and productivity data in FY 2012-13 and FY 2013-14 via aerial surveys. In 2014, there were 18 nest attempts, ten on a private ranch and eight on Three Lakes dry prairie; no chicks survived to fledging age (approximately 60 days). In FY 2014-15, palmetto on roughly half the Three Lakes WMA study site will be roller-chopped and then burned, and the nesting behavior and productivity of cranes will be assessed again.

Florida Scrub-Jay (*Nancy Dwyer, Craig Faulhaber, Norberto Fernandez, Allan Hallman, Karl Miller, Dwight Myers, Nicole Ranalli, 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. 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 2013-14, the Florida Scrub-jay Conservation Coordination Project continued to work with partners to enhance range-wide conservation efforts for this threatened species. Project activities included providing assistance regarding priority conservation actions, organizing regional working groups, and developing management plans and guidelines to enhance efforts to conserve scrub-jays.

FWC provided assistance for project planning, habitat management, restoration, monitoring, and translocations in FY 2013-14. Agency staff visited 12 tracts of land to discuss land management with managers and biologists from local, State, and Federal government agencies. Additionally, the agency assisted stakeholders with planning habitat restoration projects in Polk and Sarasota counties. FWC continued to work with the USFWS on priority locations and management actions for scrub-jays, provided comments on projects, and participated in an adaptive management workshop in Brevard County. The agency worked with

the Brevard Zoo and other partners to relocate two families of scrub-jays from degraded land to a managed conservation area in Brevard County. FWC also provided assistance regarding appropriate monitoring methods for scrub-jays. Activities in FY 2013-14 included continuation of a partnership with the U.S. Forest Service to conduct monitoring in Ocala National Forest, which contains the largest scrub-jay population in the State. FWC also served on the Advisory Group for Audubon of Florida's Jay Watch citizen science monitoring program, and helped train State agency staff and volunteers through an advanced Jay Watch training session.

FWC continued to facilitate communication and information exchange among partners via regional working groups and workshops focused on conservation of 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 provided an excellent opportunity for participants to network, share ideas and experiences, and learn about new developments.

In FY 2013-14, FWC organized two working group meetings in southeast Florida that combined field trips and presentations. FWC also organized two working group workshops in northeast Florida and one workshop in southwest Florida focused on planning and implementation of prescribed fire. Agency staff assisted with a land management field trip in west-central Florida to enhance the effectiveness of management actions on conservation lands. In cooperation with the Florida Natural Resources Leadership Institute, FWC organized a workshop of land managers and species experts that focused on ways to balance the needs of different species in scrub-jay habitat.

FWC continued to develop management plans and guidelines to assist partners with scrub-jay conservation efforts in FY 2013-14. FWC served on the Florida Scrub-Jay Recovery Team, which is improving and updating the Federal Recovery Plan for the species. The Federal Recovery Plan, which has not been updated since 1990, will provide an important "road map" for scrub-jay conservation. As part of this effort, FWC participated in Recovery Team meetings, organized and facilitated meetings with stakeholders, and drafted and reviewed sections of the draft Recovery Plan. FWC also continued revising the agency's Scrub Management Guidelines to help land managers determine the best ways to restore and manage scrub-jay habitat.

FWC facilitates the sharing of information by maintaining the Florida Scrub-Jay SharePoint Site (https://fsjconservation.wordpress.com), a clearinghouse of information on upcoming events, working groups, funding opportunities, and options for habitat management and scrub-jay monitoring. FWC staff responded to questions about scrub-jays and their habitat from both partners and stakeholders.

Ocala National Forest in Central Florida – The status and trend of Florida scrub-jays in this crucial population remain uncertain because of unique challenges stemming from forest management practices. 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 region (more than 300,000 acres) limits the applicability of traditional color-banding and monitoring methods used with scrub-jays elsewhere in the state.

During 2011, FWC and partners developed and implemented an annual monitoring protocol for tracking scrub-jay population density and productivity in harvested stands in the Ocala National Forest. During FY 2012-13 and FY 2013-14, FWC recruited, trained, and supervised a team of 20 individuals from FWC, the U.S. Forest Service, the USFWS, and the University of Florida to conduct post-reproductive monitoring during June and July 2013.

Thirty-two stands of 0-14-year-old sand pine scrub were surveyed a minimum of three times, and scrub-jay family group territories were delineated. Mean family group density was 3.49 family groups per 100 acres. Mean family group density was 4.23 family groups per 100 acres within the subset of stands that provided the best habitat conditions (two to ten-year-old stands). Data indicate that Florida scrub-jays in this system occur at relatively high densities with low productivity (less than one hatch-year bird per family group).

During FY 2013-14, FWC recruited, trained, and supervised a team of 21 individuals from partner agencies to continue annual post-reproductive monitoring. That data will be tabulated during FY 2014-15 and analyzed in the context of temporal changes in stand age and other habitat and landscape parameters.

Arbuckle and Walk-in-the-Water Wildlife Management Areas in Polk County – The Arbuckle Wildlife Management Area (WMA) and the 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. The Florida Department of Agriculture and Consumer Services (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 to February 2006. FWC initiated scrub-jay monitoring in 2008 using a pilot survey by Jay Watch (http://fl.audubon.org/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 2013-14.

During FY 2013-14, 14 scrub-jay groups were located on Arbuckle WMA. The mean group size decreased from 3.27 in FY 2012-13 to 2.86 in FY 2013-14. Surveys were conducted later than normal, and the number of juveniles per group could not be determined. The total number of scrub-jays increased from 36 to 40. Although the number of juveniles per group could not be determined, a mean family group size of three birds and the fact that more individuals were seen indicate that the groups appear to be relatively stable.

During FY 2013-14, five scrub-jay groups were located on Walk-in-the-Water WMA. This is a decrease from eight groups in the previous fiscal year survey. The mean group size decreased from 3.75 in FY 2012-13 to 3.4 in FY 2013-14. The number of juveniles per group decreased from 1.62 to 0.60. The total number of scrub-jays decreased from 31 in FY 2012-13 to 17 in FY 2013-14. Although the mean group size was over three, the loss of three groups and fewer juveniles may be an indication of a decreasing population.

FWC will continue scrub-jay monitoring on these WMAs using the Jay Watch protocol in FY 2014-15.

FDACS conducts habitat management activities on both WMAs, and FWC assists with habitat management activities as needed. During FY 2013-14, approximately 400 acres of Florida scrub-jay habitat were managed on these areas using prescribed fire.

In FY 2013-14, FWC and FDACS applied for and received grant funding from The Nature Conservancy to enhance Florida scrub-jay habitat on Walk-in-the-Water WMA. Grant funding was used to hire a contractor to treat 27 acres, and FDACS and FWC treated an additional 34 acres to match the grant funding. The objective was to reduce the density and

height of oak species using mechanical equipment (chainsaws, gyrotrac) and herbicide. Project activities, including additional herbicide treatments, will take place in FY 2014-15, and the project area will be prescribed burned when conditions are suitable.

FWC plans to continue monitoring scrub-jays on Arbuckle and Walk-in-the-Water WMAs using the Jay Watch Program and protocol.

Camp Blanding Wildlife Management Area in Clay County – FWC's role at Camp Blanding WMA is to assist with habitat improvement and restoration for the Florida scrub-jay. Historically, two locations around Camp Blanding (Kingsley Lake scrub site and Lowry Lake scrub site) have had up to four scrub-jays present. One scrub-jay was observed in 2011 at the Lowry Lake scrub site, however, two surveys conducted in August and December 2013 yielded no observations for scrub-jays on Camp Blanding. Camp Blanding is considered the northern-most population of the Florida scrub-jay.

Cedar Key Scrub Wildlife Management Area in Levy County – FWC currently assists the lead managing agency, 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, and sexing the adults through territorial and nesting behavior. During FY 2013-14 monitoring efforts, only one bird was observed on the area.

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 2013-14. Individuals are color banded to better track the population. Although seven adults were banded in the past year, only one of those was resighted. No juveniles were found in summer 2014 out of four known groups, and only five birds total could be found. The present population is estimated to be less than ten, the lowest since monitoring began in 1992. In previous years, up to 40 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 moist flatwoods. This may be marginal habitat; no true scrub exists in the area. In FY 2013-14, approximately 160 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 2013-14, nine individuals in four family groups were recorded at Salt Lake WMA. There was no documented recruitment in FY 2013-14. This is a decline from twelve individuals in four groups in FY 2012-13. 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 2014-15.

During FY 2013-14, approximately 12 acres of scrub and scrubby flatwoods in need of management were identified and prescribed fire was applied. Management activities slated for

FY 2014-15 include the continued use of prescribed fire on approximately nineteen acres of potential scrub-jay habitat.

Mitigation Parks – The goal of the mitigation park program 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 Wildlife and Environmental Areas (WEA).

Annual monitoring of Florida scrub-jays during FY 2013-14 occurred at three mitigation parks. Moody Branch WEA in Manatee County was monitored using a private contractor. Five groups comprising 12 total birds were recorded, which is an increase of two from the previous year. At Moody Branch WEA, 53 acres of Florida scrub-jay habitat were burned, 32 acres were treated for exotic plants, 229 acres of pastures were mowed to control weedy species, 20 acres of forested habitat were mowed to control palmetto and hardwood encroachment, and two acres of sand pines were cut.

Scrub-jay monitoring at Hickey Creek WEA in Lee County revealed one group of scrub-jays consisting of two 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 by two birds from the previous year. Management actions included 152 acres of prescribed burning and 38 acres of mechanical treatments to reduce mature oaks.

The Platt Branch WEA in Highlands County has a scrub-jay population that consists of six groups with 14 individuals, which is down one from the previous year. Two juveniles were identified post-nesting season. Management efforts included prescribed fire on 194 acres, much of which was within areas used by Florida scrub-jays.

Lake Wales Ridge Wildlife and Environmental Area in Highlands and Polk Counties – The Lake Wales Ridge Wildlife and Environmental Area (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 2013-14, tracts surveyed by Archbold Biological Station included Lake Placid Scrub, McJunkin, Leisure Lakes, Gould Road, Carter Creek, Henscratch, and Silver Lake tracts. Jay Watch volunteers and FWC staff surveyed at Royce Unit, Clements, and Highland Park Estates.

The number of scrub-jay groups decreased at McJunkin, remained constant at Carter Creek and Leisure Lakes, and increased at the Lake Placid Scrub, Silver Lake, Gould Road, and Henscratch Subdivision when compared to previous surveys. The number of juveniles per group increased at Lake Placid Scrub, McJunkin, Henscratch Subdivision, and Gould, but showed a slight decline at Carter Creek, Silver Lake, and Sun 'n Lakes. The number of groups at the Clements and the Royce Unit (surveyed by Jay Watch) increased from nine to eleven but

decreased from eight to six at Highland Park Estates. The number of juveniles per group remained relatively stable at the three locations.

Six of the Lake Wales Ridge 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 (i.e. prescribed burning) 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 in 2013. 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 2013-14 included roughly 150 acres of occupied scrub-jay habitat in four separate management units at the Royce Unit, Carter Creek, and Silver Lake tracts. Additionally, 20 acres of sand pines were felled using chainsaws in currently occupied scrub-jay habitat at the Lake Placid Scrub tract, and 60 acres of live and dead sand pines were mowed using a gyro-track mulching machine at the Carter Creek tract, adjacent to currently occupied groups of scrub-jays. Controlled burns and chainsaw work to reduce canopy heights are planned for FY 2014-15, 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 2010, a biological status review was completed and resulted in a determination that the limpkin no longer qualified for listing in Florida. A draft species action plan (http://myfwc.com/media/2718855/Limpkin-Species-Action-Plan-Final-Draft.pdf) was completed in November 2013. The species' listing status will not change until a management plan has been approved by the FWC Commissioners.

In 2013, FWC initiated testing of new methodology to detect trends in abundance and changes in occupancy of limpkins utilizing the Wacissa River spring run in Jefferson County. A total of 40 survey stations are located every 1,312 feet along the river. At each survey station, observers listen and scan all habitats for a two-minute time period. Surveyors record the number of individual limpkins seen or heard, along with sex and age class, if possible. After the two-minute passive period, staff play 30 seconds of recorded limpkin calls and record all new individual limpkins. Following playback of the recorded call, observers listen and scan for another two-minute passive period and record all new individual limpkins. Three replicates were conducted in 2014, one on March 14 and two on April 21 (one during the day and one at night). Due to weather and time constraints, only the first replicate was completed on all 40 survey stations. The second replicate was conducted on stations 1-30, and the third replicate was only conducted on stations 1-19. A total of one to three individual limpkins were observed during the survey. Only one individual limpkin was detected during each replicate with a maximum distance of 1.7 miles between observations. During the 2013 survey, 11 to 13 individual limpkins were observed, with four observed pairs. The majority of these limpkins were detected during the early April period.

Marsh Birds (*Pamela Boody, Paul Miles, Catherine Ricketts, and Amy Schwarzer*)

John C. and Mariana Jones/Hungryland Wildlife and Environmental Area – Marsh bird surveys were conducted on the John C. and Mariana Jones/Hungryland Wildlife and Environmental Area (WEA) located in southern Martin and northern Palm Beach counties during FY 2013-14. The Management Plan for Hungryland WEA calls for monitoring of limpkins, a State-designated Species of Special Concern, to establish a baseline and track relative abundance over time. Surveys were conducted using a call/playback method for the following focal species: black rail, least bittern, king rail, purple gallinule, common moorhen, pie-billed grebe, and limpkin. Three transects were surveyed three times each during March and April. Each transect consisted of 13 points and was located along roads and trails where wetlands are present. The black rail was the only focal species not detected during the surveys. Detections of Florida sandhill crane, a State-designated Threatened species, and Everglade snail kite, a Federally-designated Endangered species, were also recorded.

John G. and Susan H. DuPuis, Jr. Wildlife and Environmental Area – The 2,500-acre marsh on the John G. and Susan H. DuPuis, Jr. WEA in Martin and Palm Beach counties 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 (a State-designated Species of Special Concern). Numerous other wading birds have been seen feeding on the area, including tricolored herons, snowy egrets, and white ibis (all three are State-designated Species of Special Concern), as well as wood storks (a Federally-designated Endangered species). The marsh and other wetland areas at DuPuis WEA will continue to be surveyed monthly in FY 2014-15 to document wading bird activity.

Apalachicola River Wildlife and Environmental Area – Since the spring of 2012, FWC has conducted marsh bird surveys at the Apalachicola River WEA in Gulf and Franklin counties. Following the Standardized North American Marsh Bird Monitoring Protocols using the call-playback method, FWC surveyed three routes on each of three separate occasions between April and May. For the WEA, this survey focuses on the following species: black rail, least bittern, king rail, clapper rail, common moorhen, purple gallinule, American coot, pied-billed grebe, and limpkin (a State-designated Species of Special Concern). FWC also records all other bird species detected during each survey. Although no limpkins were detected in 2014, Marian's marsh wren (another State-designated Species of Special Concern) was observed on all three survey routes. Additionally, one of the WEA's focal species, the brown-headed nuthatch, was heard once each year during the 2012 and 2013 surveys, and twice during the 2014 surveys.

Worthington's Marsh Wren and MacGillivray's Seaside Sparrow in Northeast Florida – Worthington's marsh wren and MacGillivray's seaside sparrow are two subspecies of salt marsh songbirds that occur in northeast Florida. Worthington's marsh wren is a State-designated Threatened subspecies, while MacGillivray's seaside sparrow is currently undergoing review for Federal listing. Historically, both subspecies occurred from Nassau County south to Volusia County. Both subspecies have undergone considerable range contraction in the last 50 years, however, and their narrow coastal distribution makes them especially vulnerable to habitat loss

and fragmentation. The two subspecies overlap in their habitat requirements and can therefore be surveyed together.

In FY 2013-14, FWC initiated a research project to assess the distribution, abundance, and habitat associations of these subspecies. Initial surveys conducted in May-June 2014 showed that the distribution of both subspecies was limited to the salt marshes in Nassau County and the portion of Duval County north of the St. John's River. These results are similar to surveys conducted by FWC in 2000-2001, suggesting that while a historical range contraction did occur, the distribution of these birds has remained stable over the last decade. Abundance estimates are not yet available, as the analysis is ongoing. While densities of both subspecies north of the St. John's River varied from point to point, birds were detected at 35 count points (56% of the northern points surveyed). A second year of surveys will be conducted during summer of 2015, and an additional project examining reproductive success of both subspecies will begin.

Osprey (*Tim Dellinger*)

Most North American ospreys breed throughout temperate areas and winter in the tropics. The subpopulation resident in southern Florida has unique characteristics that set it apart from the majority of the subspecies, however. Monroe County ospreys, as well as some individuals living in Collier, Lee, and Miami-Dade counties, are non-migratory, and their timing of nesting does not overlap with the rest of the North American population. Furthermore, while most osprey populations in North America are common, widespread, or increasing, the southern coastal population has been in a steady decline since the 1970's. FWC listed the Monroe County population as a State-designated Species of Special Concern in 1987. A biological status review of the Monroe County population of osprey in 2010 found that the species did not meet Florida listing criteria, but reviewers felt that more information was needed to properly assess the species' status in Florida. The species was kept as a State-designated Species of Special Concern until that information can be provided. A draft species action plan (http://myfwc.com/media/2720115/Osprey-Species-Action-Plan-Final-Draft.pdf) was completed in November 2013. The species action plan details the actions necessary to improve the conservation status of the osprey in Monroe County.

Genetics and Conservation – In FY 2013–14, FWC began a study to determine if the southern coastal osprey population is a distinct subspecies using population genetic methods. In February 2014, FWC began collecting feather samples from ospreys; samples consisted of either shed feathers from below nests and/or plucked contour feathers from nestlings. Coordinates of feather collection sites were recorded, as well as age of chick and nest initiation when possible. Osprey feathers were collected from 182 locations through July 2014. Collaborators at Virginia Commonwealth University will use mitochondrial and nuclear DNA analyses to determine the relatedness of osprey in these populations. Based on results from this project, FWC will make recommendations regarding whether to include the southern population of osprey on the State's Endangered and Threatened Species list.

Assessing Florida Osprey Diets – In conjunction with FWC's genetic project, some of the feathers collected will be used in an analysis to assess the diet of ospreys. The feathers' chemical structures will provide information as to what prey species are being consumed at the

various sample locales. This study may provide insight into potential causes of declines of south Florida osprey populations.

Peregrine Falcon (*Craig Faulhaber*)

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 Wildlife Management Areas (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, the Florida Keys Hawkwatch, a private citizen group, began to organize volunteers to continue a long-term monitoring program. The organization monitored peregrine falcons from 2011-2013 and plans to continue the monitoring program in fall of 2014.
- *Falconry* – FWC issues permits to allow take of two peregrine falcons for falconry each year. The number of peregrine falcons the USFWS allows 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, Caly Coffey, Mary Dowdell, Craig Faulhaber, Norberto Fernandez, Allan Hallman, Paul Miles, Catherine Ricketts, Ross Scott, Steve Shattler, 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 (http://myfwc.com/media/214360/RCW.pdf) 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 effectively freeze 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 2013-14, 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 2014 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. Fire suppression, reliance on dormant season prescribed fire, and low availability of old-growth pines for nesting 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 Wildlife Management Area (WMA), including the Yucca Pens Unit, began in 1999. Color banding of all adults and nestlings has been conducted by FWC since 2002. Activities in FY 2013-14 included cavity surveys, roost checks, installation of recruitment clusters, banding, and habitat management. The annual tree cavity survey conducted in 2013 revealed 39 active red-cockaded woodpecker clusters. Three new recruitment clusters were installed to improve connectivity between groups. Annual roost checks confirmed 29 potential breeding pairs and ten solitary bird clusters. Twenty-seven potential breeding pairs attempted nesting; nine groups failed, and 34 nestlings were banded from 25 breeding pairs. FWC completed controlled burns on 14,048 acres, with 35% conducted during the growing season. Roller chopping was used to treat an additional 505 acres during FY 2013-14. FWC planted 203 acres of pines and treated 1,957 acres of exotic plants.

Blackwater Wildlife Management Area in Okaloosa and Santa Rosa Counties – The Florida Department of Agriculture and Consumer Services (FDACS) and FWC have cooperatively managed the red-cockaded woodpecker population on Blackwater WMA since 1996. FWC assists the FDACS biologist with banding nestlings and unmarked adults, re-sighting leg bands, fledge checks, translocations, and installation of artificial cavities, where needed. FDACS is responsible for reporting the banding of nestlings to the USFWS and FWC. During FY 2013-14, there were 101 active clusters, 94 potential breeding groups, and 118 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. The area within nine red-cockaded woodpecker clusters and surrounding foraging areas were cooperatively burned by Camp Blanding Forestry and FWC personnel during FY 2013-14. Staff conducted four aerial burns, totaling 7,350 acres. Six artificial cavity inserts were installed or replaced during FY 2013-14.

Citrus Wildlife Management Area in Citrus County – During FY 2013-14, FWC, in cooperation with FDACS, continued to manage and monitor red-cockaded woodpeckers on the 49,317-acre Citrus WMA tract of the Withlacoochee State Forest. Of the 72 active clusters in 2014, 64 nested and 51were successful in fledging 104 young, the highest number ever observed. The number of potential breeding groups on the area has leveled off at 66. Color banding continued with 109 nestlings banded during the 2014 nesting season.

Habitat management on Citrus WMA included prescribed burns on 23,965 acres, hardwood control, protecting cavity trees from fire, and installing or replacing artificial cavity inserts. About 64% of the clusters received fire in the past year. Encroaching hardwoods were cut and treated with herbicide in at least 16 clusters. Using mechanical techniques, FWC staff and volunteers protected over 400 cavity trees from fire in 40 clusters. Fourteen inserts were replaced in clusters needing them, while 11 new inserts were installed in established clusters to provide cavities for fledglings.

Intensive monitoring and habitat management for this population has allowed it to serve as a donor to smaller populations. In October 2013, eight young-of-the-year were moved to Bull Creek and Triple N WMAs in south-central Florida, and 63% of those birds remained on the areas through the breeding season. Another four pairs will be moved in October to augment smaller populations to the south.

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 2013-14, FWC determined the number of active clusters, monitored active clusters for nests, color-banded nestlings and adults, and determined fledging success. Artificial cavities were installed, replaced, and maintained in existing clusters. One new recruitment cluster was installed in order to accommodate translocated birds in the fall.

During FY 2013-14, habitat management included burning 4,420 acres and maintaining a three-year growing-season burn rotation within occupied red-cockaded woodpecker habitat. Habitat restoration within red-cockaded woodpecker habitat included treating 29,847 acres of exotic plant species. A total of 18 artificial red-cockaded woodpecker cavities were installed, including the creation of one new recruitment cluster.

During the 2014 nesting season, there were 16 active clusters and 15 potential breeding groups. Twelve out of 15 potential breeding groups attempted nesting, and 12 clusters successfully fledged 16 birds. Corbett WMA received three pairs of birds from Osceola National Forest (north Florida) in the fall of 2013. Of six birds, three have been observed since the move, resulting in a 50% retention rate.

Three Lakes, Triple N Ranch, and Herky Huffman/Bull Creek Wildlife Management Areas in Osceola County – The red-cockaded woodpeckers inhabiting the Three Lakes, Triple N Ranch, and Herky Huffman/Bull Creek WMAs are 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 the Three Lakes WMA since 2001. The number of potential breeding groups slightly increased in FY 2013-14. During the FY 2013-14 breeding season, 63 red-cockaded woodpecker nestlings were banded, 36 of the 47 nesting attempts were successful, and 48 chicks survived to fledge the nest. Two new cavity insert boxes were installed, and four cavity insert boxes were replaced in order to augment existing nesting and roosting cavities. A total of 153 insert boxes were cleaned and maintained in FY 2013-14. Habitat management activities that enhance red-cockaded woodpecker habitat included prescribed fire on 9,874 acres, mechanical treatment (including rollerchopping and mowing) on 168 acres, and exotic plant treatment. FWC pre-burned around cavity trees in an effort to protect them during prescribed fires.

The Herky Huffman/Bull Creek and Triple N Ranch WMAs have been actively managed as a single, small, red-cockaded woodpecker population since FY 2002-03; these properties supported 12 potential breeding groups during the FY 2013-14 breeding season. The number of potential breeding groups has been increasing since FY 2004-05, when FWC began yearly translocations of birds to the properties. In October 2013, eight individuals were translocated to Triple N Ranch and Herky Huffman/Bull Creek WMAs. Five of the translocated individuals remain in the area, including a female that has since moved to the Three Lakes WMA. During FY 2013-14, eight of the ten nesting attempts were successful and 15 nestlings were banded. Eleven of the 15 chicks survived to fledge the nest. Six cavity insert boxes were replaced in order to augment existing nesting and roosting cavities. Ninety-four cavity insert boxes were cleaned and maintained in FY 2013-14. Habitat improvements by FWC included prescribed fire on 10,340 acres, rollerchopping and mowing on 1,952 acres, and invasive plant control on 574 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. 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 19,000 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 2013, with tree and cavity surveys conducted in order to determine cluster status and activity. FWC also completed the fifth and sixth red-cockaded woodpecker translocations from BCNP to Lostman's Pines sub-population in BCNP in Monroe County during fall 2013. No red-cockaded woodpeckers were translocated into the BCNP population from other locations during FY 2013-14 because a successful number of red-cockaded woodpeckers were already present on the property.

During the spring of 2014, 20 artificial cavities were installed in three cavity-limited clusters, and ten additional artificial cavities were replaced due to regular wear and tear. Twelve

adult red-cockaded woodpeckers were banded by FWC. New clusters were discovered and recruitment clusters were installed throughout the year, bringing the total number of known red-cockaded woodpecker clusters in BCNP to 110. One hundred and four clusters were checked by the FWC.

For the seventh year, monitoring of nest checks, nestling bandings, fledge checks, and roost checks continued into the summer. FWC monitored 26 of 110 potential clusters for productivity based on access and cluster activity. Out of 26 potential breeding groups, 23 groups attempted nesting with 13 of those successfully hatching chicks. Seventeen chicks made it to banding age (seven to ten days old), and 11 of those fledged, with six of the birds' status still unknown. Helper birds were observed in five of the monitored clusters. Additional clusters were surveyed for signs of activity during the breeding season. There are at least 90 active clusters within BCNP.

FWC will continue to survey BCNP for new cluster locations and will continue to augment cavity-limited clusters. Translocation plans are in place for fall 2014, and FWC staff will be working with cooperating agencies to continue documented success of translocations from BCNP. FWC also plans to augment additional cavity-limited clusters and to continue to closely monitor clusters for the 2015 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 WMA. During FY 2013-14, there were 60 active clusters of red-cockaded woodpeckers; 51 nested producing 74 chicks. The high number of chicks produced was due to several clusters re-nesting and producing two clutches. This phenomena was observed in several populations around the state this year. 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 annual inventory and monitoring projects for red-cockaded woodpeckers on Tate's Hell State Forest in Franklin and Liberty counties. The primary objective is to provide for the long-term perpetuation of red-cockaded woodpeckers, accomplished by prescribed burning, searching for unknown red-cockaded woodpecker clusters, monitoring reproductive success, supervising mechanical treatments in clusters, and determining timber and fire management impacts. During FY 2013-14, FWC mechanically cleared 41 acres to reduce the hardwood midstory surrounding three clusters. FWC assisted FDACS on ten burns of the 56,600-acre burn plan. Due to wetter than normal conditions during the fiscal year, only 2,602 acres of compartments that contain red-cockaded woodpecker clusters and foraging habitat were burned. Thirty artificial cavities were installed in November 2013. Five cavity-limited clusters were augmented and three new recruitment clusters were created, one of which became active and produced two chicks in spring 2014. From March through early July 2014, 60 clusters were monitored for red-cockaded woodpecker activity. FWC documented 38 active clusters. Active trees within each cluster were then surveyed for nests. These trees 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-two (84.2%) of the active clusters were documented with eggs, down from 92.3% in 2013. Four (12.5%) nest attempts failed. Six clusters were recorded as active but did not produce eggs or chicks. FWC banded 52 of 58 nestlings.

Apalachicola River Wildlife and Environmental Area in Franklin County – Both natural and artificial clusters within Apalachicola River Wildlife and Environmental Area (WEA) in Franklin County were monitored throughout the breeding season. Apalachicola River WEA has a relatively small, but growing population of red-cockaded woodpeckers. During FY 2013-14, FWC cleared vegetation around nest cavity trees (i.e., trees with freshly flowing sap) in five out of eleven clusters, in preparation for upcoming prescribed burns, which will improve nesting and foraging habitat. FWC also monitored all 11 existing clusters during the 2014 breeding season to document reproductive success.

In 2014, there were nine clusters showing signs of red-cockaded woodpecker activity at nest cavity trees. Eggs were laid in seven clusters, and nestlings successfully hatched at five of these clusters. FWC banded ten nestlings; two more than were banded in 2013. All ten of these nestlings fledged (five females, two males, and three unknown) compared to six that successfully fledged in 2013.

Platt Branch Mitigation Park Wildlife and Environmental Area in Highlands County – FWC continued the monitoring of red-cockaded woodpeckers within Platt Branch WEA and on adjacent private properties, portions of which are protected by conservation easements, consisting of five active clusters in FY 2013-14. Four red-cockaded woodpeckers were translocated in 2013 from Ft. Benning, Florida, with 75% staying within the population and one new breeding pair forming. Two new recruitment clusters were established at the WEA in 2013. There were three potential breeding groups and one solitary group during the 2014 breeding season, and one group adjacent to the WEA. Nesting success was monitored during the spring of 2014, with four pairs nesting. Two pairs produced two nestlings each that were banded; two nestlings successfully fledged. Two initial translocations have been important in beginning the stabilization of the population.

FWC completed controlled burns on 194 acres of suitable habitat during FY 2013-14. Exotic plant treatments were done on three acres. Mechanical fuel reduction (i.e. roller chopping) was completed around all active clusters within the WEA.

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, their main stronghold and ground colony in the Florida 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, no nest counts were conducted in 2012, and 63 nests were recorded in 2013. Seven roseate tern nests were recorded by the National Park Service in June 2014. FWC also surveyed four gravel roofs in 2014 that contained roseate tern nesting

colonies. A total of 178 nests were recorded between the four roofs. The total roseate tern population for Florida is estimated to be 178 pairs based on highest nest numbers during the first wave of nests in May. This year, 166 chicks hatched of which a sample of 158 chicks were captured, banded, and released at the roof colonies in the Florida Keys and the ground colony at the Dry Tortugas National Park.

Shorebirds (*Naomi Avissar, Janell Brush, Bobbi Carpenter, 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 draft species action plan (http://myfwc.com/media/2720106/Imperiled-Beach-Nesting-Birds-Species-Action-Plan-Final-Draft.pdf) for listed shorebirds was completed in November 2013. Development of a comprehensive listed species management plan is ongoing. If 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 provide. Realizing this, in 2007, FWC initiated a conservation approach for shorebirds and seabirds that relies extensively upon partnership development and support. This project, the Florida Shorebirds Partnership Coordination, was initially 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, twelve active regional partnerships coordinate monitoring and protection across Florida. The Florida Shorebird Alliance also publishes a newsletter and maintains an email list-serve of 1,357 contacts. The project is currently being supported by a National Fish and Wildlife Foundation grant, and FWC is seeking grant funds to continue work into the future.

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 survey data. FWC and partners developed the Database and an accompanying protocol for monitoring beach-nesting shorebirds and seabirds. To date, 607 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 2013-14, FWC researchers monitored breeding success and movement patterns for oystercatchers at the Cross Florida Barge Canal Spoil Islands and Cedar Key along the Nature Coast, and the Tolomato and Matanzas rivers in northeast Florida. In these areas, researchers documented and monitored 42 nesting pairs. In the absence of early season storms and nest overwash, which often contribute to nest failure, nesting pairs on the Tolomato River had a very successful year. FWC documented 18 breeding pairs that produced 21 fledglings, compared to six fledglings in 2013 and four fledglings in 2012. FWC researchers and partners also banded 12 chicks on the Tolomato River during the season as part of a long-term study on juvenile movements and survival.

Southeastern American Kestrel (*Barbara Almario, Norberto Fernandez, Allan Hallman, Randy Havens, Nathan Lambert, Karl Miller, Anni Mitchell, Jennifer Myers, and Johnathan S. Roberts*)

The Southeastern American kestrel is a State-designated Threatened species. A draft species action plan (http://myfwc.com/media/2738858/Southeastern-American-Kestrel-Species-Action-Plan-Final-Draft.pdf) for the Southeastern American kestrel was completed in November 2013.

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 Wildlife Management Areas (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.

In FY 2013-14, 160 Southeastern American kestrel nest boxes were maintained and monitored by FWC staff on FWC-managed lands. These areas included: Chassahowitzka WMA, Perry Oldenburg Wildlife and Environmental Area (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; Crooked Lake WEA in Polk County; Platt Branch WEA in Highlands and Glades counties; the Tide Swamp Unit of Big Bend WMA in Taylor County; Camp Blanding WMA in Clay County; Jennings Forest WMA in Clay and Duval counties; Twin Rivers State Forest WMA in Madison County; Watermelon Pond WEA in Alachua County; Fort White WEA in Gilchrist County; and Bell Ridge Longleaf WEA in

Gilchrist County. An additional 19 kestrel nest boxes on the Snipe Island and Spring Creek Units of Big Bend WMA were installed. Nest boxes were maintained and monitored by FWC during the spring breeding season. Thirty-three nest boxes were used by breeding kestrels. Camp Blanding had ten active boxes. Blackwater WMA had seven active boxes. Chassahowitzka WMA, Lake Wales Ridge WEA, and Twin River State Forest WMA each had three active boxes. Bell Ridge WEA had two active boxes. Perry Oldenburg WEA, Janet Butterfield Brooks WEA, Chinsegut WEA, Crooked Lake WEA, and Watermelon Pond WEA each had one active box. Other species using boxes included Eastern screech owls, great-crested flycatchers, Southern flying squirrels, Sherman's fox squirrels, grey squirrels, Eastern bluebirds, red-bellied woodpeckers, tufted titmouse, and honey bees.

Wading Birds (*Dawn Dodds, Donald Lee Francis, Jason Huckabee, Jean McCollom, Patrick McElhone, Paul Miles, Catherine Ricketts, 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 draft species action plan (http://myfwc.com/media/2738289/Wading-Birds-Species-Action-Plan-Final-Draft.pdf) for these species was completed in November 2013; the species' status will not change until the plan is approved by the FWC Commissioners.

Aucilla Wildlife Management Area in Jefferson and Taylor Counties – Aucilla Wildlife Management Area (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 number and distribution of nests over time and identify areas that should be protected during land management activities, FWC conducts an aerial survey of nesting colonies in the spring of each year. FWC flew aerial transects on April 18, 2014. 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. During the late May survey period, the typical systematic transects were not flown. Instead, ponds that appeared to be suitable nesting habitat were identified remotely by examining aerial and light detection and ranging imagery. During this process, 47 potential nesting ponds were identified and flyovers of each pond were conducted on May 20, 2014. No additional wading bird nest colonies were located. 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 in Washington County provide excellent nesting and foraging habitat for the many species of wading birds found in the Florida panhandle, several of which are listed or at-risk. In particular, Little Deep Edge Pond rookery has been observed supporting nests for various species of colonial-breeding wading birds. State-designated Species of Special Concern

that have used this rookery in previous years include the little blue heron and tricolored heron. The rookery is monitored annually from April until July to document species use, number of adult birds present, and number of chicks produced (**Table 5**). Neither adult use nor chick production 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, another 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 rookery at the Carter Tract will continue to be monitored annually during the nesting season (April-July), and incidental observations of listed and at-risk wading bird species throughout the property will also be documented.

Table 5. Annual little blue heron and tricolored heron use of the Little Deep Edge Pond wading bird rookery, 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
2014	14	6	6	0	0	0

Dinner Island Ranch, Okaloacoochee Slough, and Spirit-of-the-Wild Wildlife Management Areas in Hendry and Collier Counties – Aerial transects spaced .62 miles apart were flown over the WMAs once a month for three months during the Spring of 2014. Nineteen foraging aggregations and nine roosting locations were recorded on the Okaloacoochee State Forest portion of Okaloacoochee Slough WMA and Dinner Island Ranch WMA. No observations were made on Spirit-of-the-Wild WMA. No nesting colonies were found.

Joe Budd Wildlife Management Area in Gadsden County – Joe Budd WMA in Gadsden County consists primarily of uplands with well-defined creek drainages, providing relatively poor habitat for wading birds, although wood storks are occasionally observed foraging on the area. Lake Talquin and the Ochlockonee River, however, constitute virtually the entire southern border of Joe Budd WMA and contain good wading bird habitat along the edges and shallower areas. Consequently, wading birds were included as a focal species group in the Species Management Strategy developed as a result of the Wildlife Conservation Prioritization and Recovery workshop completed during FY 2013-14. In order to provide baseline data, an aerial helicopter survey was conducted on May 20, 2014. Efforts were concentrated along the shoreline and backwater areas of Lake Talquin, adjacent to Joe Budd, especially where it is joined by the Ochlockonee and the Little Rivers. A total of six small colonies were documented.

Four of these were made up of great blue herons, with the largest colony containing approximately ten nests. One colony of anhingas, with about 30 nests with young present, and another nearby colony of double-crested cormorants, with about the same number of nests, were observed at the mouth of the Little River. No listed wading bird species were observed during this aerial survey. It is likely that the wood storks that occasionally utilize the area are coming from the Ochlockonee colony, which is approximately five miles from Joe Budd WMA.

J.W. Corbett Wildlife Management Area in Palm Beach County – Wading bird rookeries on J.W. Corbett WMA were surveyed for activity during FY 2013-14. Both previously known rookeries were confirmed to be active, and nests of snowy egrets, white ibis, little blue herons, (all State-designated Species of Special Concern) and great egrets were observed. Surveys were conducted March through April of 2013 using a call/playback method for the following focal species: black rail, least bittern, king rail, purple gallinule, common moorhen, pie-billed grebe, and limpkin (a State-designated Species of Special Concern). All focal species were detected except for the black rail.

Apalachicola River Wildlife and Environmental Area and Box-R Wildlife Management Area in Gulf and Franklin Counties – The wetland habitats of the Apalachicola River WEA, Box-R WMA, and Tate's Hell State Forest provide nesting sites for multiple 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 number and distribution of nests over time and identify areas in which to apply protective measures during land management activities, FWC conducts an aerial nesting colony survey within the lower Apalachicola River Basin in the spring of each year. Wading bird surveys began on Apalachicola River WEA 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 22, May 28, and May 29, 2014. FWC detected five nesting colonies, one fewer than the six detected in both 2013 and in 2012. Little blue herons were found at two sites (approximately 70 nests total); great blue herons at three sites (approximately 18 nests total); great egrets at two sites (approximately 17 nests total); snowy egrets at one site (approximately 30 nests); and wood storks at one site (approximately 40 nests).

Impact of Hydrilla on Foraging in Central Florida – Four species of wading birds (little blue heron, reddish egret, roseate spoonbill, and tricolored heron) are currently listed as State-designated Threatened species in Florida. Although the recent biological status review determined limpkins should not be listed as Threatened and should be removed from the State-designated Species of Special Concern list, the authors of the review cautioned that limpkins may be close to meeting listing criteria and that more information is needed.

In FY 2013-14, FWC began a study with the goal of determining how an infestation of hydrilla affects feeding behavior of limpkins, great egrets, and little blue herons in the shallow areas near the shore of Central Florida lakes. FWC identified survey points 3,281 feet apart in the area close to the shoreline of lakes Tohopekaliga, Kissimmee, Cypress, Jackson, and Lawne. Using airboats to access the survey points, FWC conducted ten minute surveys for the three species of wading birds. Due to the tendancy of limpkins to flush out of sight because of airboat noise, a limpkin playback was used during the first minute of the survey. Hydrilla was quantified in the immediate area of the survey point the day of the survey. Data resulting from

this study will provide lake managers with goals for managing hydrilla that also will provide suitable foraging habitat for limpkins and other wading birds. These goals will allow for efficient control of hydrilla, reduced use of herbicides, and reduced costs and staff time for lake management programs directed toward hydrilla.

Whooping Crane (*Tim Dellinger*)

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. However, FWC continues to monitor the remaining birds when there is an opportunity.

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 96 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 consists only of occasional opportunistic field monitoring.

Wood Stork (*Josh Agee, Tim Dellinger, and Morgan Wilbur*)

The wood stork was listed as Federally Endangered in 1984 due to declines in range and population size that occurred during the mid 1900s. As a result of a population increase, range expansion, and minimization or removal of threats, wood storks were down-listed to Federally Threatened in June 2014.

Monitoring in Central and South Florida – In 2008, FWC began aerial monitoring of two Central and South Florida stork colonies in the process of radio-tracking whooping cranes; FWC now surveys 28 colonies annually. The colonies are located in cypress swamps and on islands in lakes, borrow pits, rivers, lagoons, and bays in eight counties from Orange to Charlotte. Surveys occur from late April to early May, from a fixed-wing aircraft, typically 600-1000 feet above ground level. In recent years, FWC counted approximately 2,900 nests, an estimated 20% of the U.S. nesting population. In April 2014, however, the count was down to approximately 1,600 nests within the colonies.

L. Kirk Edwards Wildlife and Environmental Area in Leon County – Lower Lake Lafayette, located within the L. Kirk Edwards Wildlife and Environmental Area (WEA) in Leon County, is home to 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 2014 from a helicopter at an altitude of approximately 600 feet to avoid disturbing the nesting birds. The colony was inactive (zero nests) in 2012, as there was no water in Lake Lafayette or under the nest colony due to prolonged drought. Rainfall brought the lake to more normal levels for the 2013 nesting season, and an estimated 200 wood stork nests were

observed in 2013. In 2014, the Chaires colony was active with 70-100 nests observed. Two additional wood stork colonies (Ochlockonee North and Ochlockonee South) that occur on private property in western Leon County were also monitored in May 2014. There were no nests observed at the location of the Ochlockonee North colony, and approximately 170-200 nests were observed at the Ochlockonee South colony.

Little Gator Creek Wildlife and Environmental Area in Pasco County – 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 three of the last five.

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 (January to April) in FY 2013-14. Wood storks were not observed nesting in the colony during this survey period. This was the second consecutive year of unsuccessful nesting in the WEA.

Other Listed Bird Species (*Traci Castellón, Jean McCollom, and Andrew West*)

Fisheating Creek Wildlife Management Area in Glades and Highlands Counties – FWC conducted migratory bird surveys on Fisheating Creek Wildlife Management Area (WMA) during FY 2013-14. The surveys were initiated to comply with the USFWS wildlife monitoring requirements for the Cowbone Marsh restoration project. During the surveys, several listed species were observed, including Audubon's crested caracara (Federally-designated Threatened), Florida sandhill crane (State-designated Threatened), and wood stork (Federally-designated Endangered).

Okaloacoochee Slough Wildlife Management Area in Hendry and Collier Counties – Two annual day-long bird surveys were conducted on Okaloacoochee Slough WMA in Collier and Hendry counties, by a team of biologists and volunteers. Surveys were conducted on the entire approximately 35,000-acre WMA, including both FWC and Florida Department of Agriculture and Consumer Services' (FDACS) managed properties.

On September 21, 2013, the North American migration count was conducted, and five listed species were recorded on the WMA. One Federally-designated Threatened species (one crested caracara) and four State-designated Species of Special Concern (144 white ibis, 21 little blue heron, four snowy egret, and seven tricolored heron) were seen. This is the seventh year the count has been conducted on the WMA; though the count is no longer being tabulated nationally, FWC is continuing the count in conjunction with the local Audubon Society chapter.

On January 8, 2014, an annual mock National Audubon Christmas bird count was conducted (not official only because too few people participate) for the eighth time since 2004. Six listed species were recorded on Okaloacoochee Slough WMA. One Federally-designated Endangered species (five wood stork), one State-designated Threatened species (12 Florida sandhill crane), and four State-designated Species of Special Concern (413 white ibis, 222 little blue heron, 12 snowy egret, and 71 tricolored heron) were seen. Part of this count included a large wading bird roost that has been monitored 25 times since 2002, where this year over 500

birds were counted coming into the roost at sunset, including eight species, and also including over 400 white ibis and over 200 little blue herons.

Beach-nesting Bird Stewardship Coordination at Three Rooker Bar – Three Rooker Bar is a small island (approximately 1.4 miles long) located within the Anclote Key Preserve State Park in Pinellas County. The island is considered an idyllic destination that is heavily visited by boaters. Despite its small size and intensive use by recreationists, Three Rooker Bar is a critically important breeding site for thousands of birds, including several at-risk beach-nesting birds and one wading bird species, including the least tern and snowy plover (State-designated Threatened); and the black skimmer, American oystercatcher, and white ibis (State-designated Species of Special Concern). Florida's Department of Environmental Protection's (FDEP) Florida Park Service attempts to minimize human disturbance to nesting birds by closing the island to dogs and posting the most importing nesting areas as closed to human access. High levels of non-compliance, however, especially dog-related violations, threaten to overwhelm the Park Services' ability to adequately protect nesting birds. To assist Park Service staff, teams of dedicated volunteers assist with bird stewardship on weekends and holidays throughout the nesting season, guarding posted nesting sites against human intrusion, and providing outreach and education. Lack of reliable transportation to the island, however, which is accessible only by boat, was a serious challenge that hindered the stewardship program. To address this need, FWC partnered with the American Bird Conservancy to hire technicians who coordinated stewardship activities at Three Rooker Bar, and ferried volunteers to the island using an FWC boat. This project supported actions outlined in FWC's Imperiled Beach-Nesting Bird Species Action Plan (http://myfwc.com/media/2720106/Imperiled-Beach-Nesting-Birds-Species-Action-Plan-Final-Draft.pdf) to implement seasonal restrictions on public recreation in important beach-nesting bird habitats, and to maintain and expand the bird stewardship program. The project strengthened regional Florida Shorebird Alliance partnerships and greatly enhanced success of stewardship efforts at this critically important site.

During the 2014 nesting season, FWC staff, Park Service personnel, and volunteers contributed more than 123 person-days as bird stewards at Three Rooker Bar, protecting nesting areas from intrusion, reducing dog-related impacts, and conducting outreach that educated approximately 12,300 beachgoers over the course of the season. Many thousands of birds nested at Three Rooker Bar this season. Among the at-risk or listed species, there were approximately160 least tern, 140 black skimmer, 500 white ibis, one American oystercatcher, and at least one successful snowy plover nest documented at the island.

AMPHIBIANS

Flatwoods Salamander (*Barbara Almario, Justin Davis, Kevin Enge, Pierson Hill, Charlene Hopkins, Patrick McElhone, Amy Raybuck, Catherin Ricketts, and Fred Robinette*)

A taxonomic change in 2007 divided the flatwoods salamander species into the reticulated flatwoods salamander (population west of the Apalachicola River) and the frosted flatwoods salamander (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. Flatwoods salamanders are also listed as a

Species of Greatest Conservation Need by Florida's Wildlife Legacy Initiative, and have been scored as a species with high extinction vulnerability.

During FY 2013-14, FWC collaborated with the U.S. Geological Survey (USGS), The Nature Conservancy (TNC), the U.S. Forest Service (USFS), and the USFWS on surveys of all known breeding ponds of the frosted flatwoods salamander in Apalachicola National Forest in Liberty and Franklin counties; Flint Rock Wildlife Management Area (WMA) in Wakulla and Jefferson counties; and St. Marks National Wildlife Refuge in Wakulla County as part of the State Wildlife Grant "Survey of Winter-breeding Amphibian Species." FWC gave three presentations on past surveys for flatwoods salamanders and on the natural history, conservation, and management of the species at two multi-agency meetings and a meeting of zoo professionals. Heavy winter and spring rains filled breeding ponds, creating favorable conditions for surveys, although larger wetlands with longer hydroperiods in Apalachicola National Forest apparently were not used for breeding, because they did not dry down in fall (salamanders lay their eggs in dry pond basins, and the eggs hatch when the ponds fill). FWC discovered 45 breeding ponds at St. Marks National Wildlife Refuge during 2002-04, but found larvae in only three of 20 known breeding ponds surveyed in 2013-14, suggesting populations have declined in the past ten years. In Apalachicola National Forest (Liberty County), FWC found larvae in 11 of 74 ponds surveyed, 60 of which were known breeding ponds. FWC unsuccessfully conducted dipnet surveys for flatwoods salamanders on public lands within the potential range of the two species: Apalachicola River Wildlife and Environmental Area (WEA) in Franklin County; Aucilla WMA in Jefferson County; Balu Forest in Alachua County; Caravelle Ranch WMA in Putnam County; Cary State Forest in Duval County; Etoniah Creek State Forest in Putnam County; Goethe State Forest in Levy County; Jennings State Forest in Clay County; Lafayette Forest Mitigation Park WEA in Lafayette County; Newnans Lake Conservation Area in Alachua County; Nokuse Plantation in Walton County; Osceola National Forest in Baker County; Raiford WMA in Bradford County; Tarkiln Bayou Preserve State Park in Escambia County; and Tate's Hell State Forest in Franklin County. An adult reticulated flatwoods salamander was observed at night in the only known breeding pond in Garcon Point WMA in Santa Rosa County.

Apalachicola River Wildlife and Environmental Area in Franklin County – In Franklin County, numerous ephemeral ponds dot the landscape of the Apalachicola River WEA. Before the land was acquired by the State, these ponds were degraded by agricultural and timber practices such as bedding, ditching, and fire exclusion. Since State acquisition, FWC has worked to restore habitat for the frosted flatwoods salamander, with the goal that individuals could eventually migrate from known populations within the Apalachicola National Forest, just to the north of Apalachicola River WEA. In 2003, FWC made an initial assessment of these ephemeral ponds' suitability as salamander habitat considering the pond itself, the ecotone around the edge of the pond, the upland habitat surrounding the pond, and the overall hydrology of the site. Based off this survey, 49 ponds were targeted for restoration during 2010-11, to encourage grassy species to dominate; flatwoods salamanders require grassy vegetation along pond edges. This restoration, in combination with ongoing mechanical treatments and prescribed fire in the uplands adjacent to ponds, will continue to improve the likelihood that salamanders can return to Apalachicola River WEA.

In winter 2012, Apalachicola River WEA staff completed the first survey of the newly restored ephemeral ponds. This survey involved dip netting each pond and recording all species of amphibians, fish, and crayfish, and the survey is scheduled to occur every other winter. The

second survey occurred in winter of 2014. So far, staff has not detected frosted flatwoods salamanders; however, during the 2014 survey, ornate chorus frog tadpoles were found at three ponds, indicating that the habitat improvement efforts for amphibian species are beginning to show positive results. Ornate chorus frogs were not documented on Apalachicola River WEA prior to this survey.

Eglin Air Force Base in Okaloosa, Santa Rosa, and Walton Counties – Surveys since 1990 indicate that 20 of the 22 documented reticulated flatwoods salamander populations occur in Florida (the other two occur in southern Georgia). Of those 20, nine occur, in part, on public land, with four of these on U.S. Department of Defense lands: Eglin Air Force Base, Hurlburt Field, and Navy Outlying Landing Field Holley.

Ephemeral wetlands serve as breeding and larval habitat for reticulated flatwoods salamanders, as well as a variety of other rare plant and wildlife species. These systems have degraded over time due to a shift away from natural fire regimes, however. Fire suppression during the growing season leads to an increase in woody vegetation, resulting in premature drying of breeding wetlands and a decline in herbaceous vegetation, which provides cover for larvae. To restore degraded wet flatwoods habitat, woody vegetation is removed from the site and cut stumps are treated with herbicide to minimize resprouting. Ideally, prescribed fire is then used to prevent regeneration of woody vegetation, maintain an open canopy, and foster native herbaceous groundcover.

Wetland habitats on Eglin and Hurlburt Field are ecologically connected. Proposed restoration sites are part of a large wetland complex that includes 14 known breeding wetlands on Eglin and 13 known breeding wetlands on Hurlburt Field (a total of 27 breeding wetlands that constitute a single population). Successful restoration of this wetland complex will ensure connectivity of the most extensive habitat known for this species anywhere in its geographic range. In 2010, FWC coordinated with the U.S. Department of Defense and Virginia Tech University to restore approximately 28 acres of wetland habitat on Eglin through woody vegetation removal and herbicide treatment. In 2011 and 2012, these areas were retreated with herbicide to control woody vegetation resprouting. Unfortunately, habitat restoration activities planned for FY 2013-14 (i.e., herbicide retreatment of approximately 42 acres on Eglin and restoration of approximately 44 acres on Hurlburt Field) were postponed due to excessive rainfall. These efforts will recommence in FY 2014-15.

Pine Log and Point Washington Wildlife Management Areas in Bay, Washington, and Walton Counties – The taxonomic change has elevated the conservation priority of these salamanders and highlights the need for more active management to avoid extinction. In 2009, the species received critical habitat designation by USFWS. FWC continues to work with the Florida Department of Agriculture and Consumer Services (FDACS) locally to improve potential breeding pond habitat through prescribed fire, mowing, thinning, and roller chopping. FWC sampled potential amphibian breeding ponds on Pine Log (Bay and Washington counties) and Point Washington (Walton County) WMAs, from October 2013 through May 2014, in an effort to reconfirm the two known reticulated flatwoods salamander breeding sites and document any new breeding populations.

Mapped ponds continue to be updated categorically 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 2013-14 included drift fences set parallel to pond edges, minnow traps set in ponds, and dip net surveys within ponds. Drift fences were employed on 17 ponds classified as "confirmed," "highly likely," or "potential" flatwoods salamander habitat: nine fences on nine ponds at Pine Log WMA and eight fences on eight ponds at Point Washington WMA. Traps along the fences were set ahead of rain fronts, for a total of 79 fence-nights on Pine Log WMA and 53 fence-nights on Point Washington WMA.

From January through April 2014, FWC sampled potential ponds at Pine Log and Point Washington WMAs using a combination of dip netting and minnow traps. At Pine Log WMA, 55 potential breeding ponds were sampled via dip netting. Forty-nine of the Pine Log WMA ponds were revisited later that spring. On Point Washington WMA, 118 ponds were sampled and 85 of these ponds were resurveyed later in the spring. Minnow traps were deployed on Point Washington WMA at a "highly likely" pond and two "potential" breeding ponds. In each pond, 18-22 minnow traps were set around the edge and wherever grass grew in the water. These traps were left in each pond for two nights. No flatwoods salamanders were captured in FY 2013-14.

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 126 ponds throughout the WMA. Potential breeding ponds are sampled annually, while less suitable sites are sampled on a three-year cycle. As of May 2014, there were no confirmed flatwoods salamander breeding ponds on Blackwater WMA.

Yellow River Ravines WMA was acquired in 2008 and 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 two pond basins, herbicide application along pond margins to control resprouting vegetation, thinning of adjacent slash pine plantation, establishing firelines in the surrounding uplands, and implementing prescribed burns within uplands and pond basins. FWC will continue to collaborate with FDACS to manage and improve habitat around all potential flatwoods salamander breeding ponds.

In January 2014, FWC, FDACS, and USFWS met to discuss continued habitat enhancement of the flatwoods salamander wetland complex. Approximately 80% of midstory hardwoods will be removed from a third pond basin in the future to encourage herbaceous growth. Following thinning, herbicide will be applied to stumps to prohibit regrowth. Flooding made conditions unsuitable for these restoration efforts during late spring/early summer 2014. Habitat enhancement will be attempted in late summer/early fall, prior to the salamander breeding season, as long as ponds remain dry. Since monitoring by FWC began in 2009, reticulated flatwoods salamanders have not been found on Yellow River WMA.

Striped Newt (*Kevin Enge, Anna Farmer, Allan Hallman, Randy Havens, and Johnathan S. Roberts*)

The striped newt is a Federal candidate for listing as Threatened. This species lives in dry upland habitats, particularly sandhill and scrub, and temporarily travels to wetlands to breed. Striped newts often breed in the same wetlands as gopher frogs, and larval or adult newts can be found by dipnetting. The striped newt has a more limited distribution than the gopher frog; 230 of the 308 ponds dipnetted for gopher frogs were within the known range of the striped newt. FWC surveyed 29 public or conservation lands within the known range of the species. Striped newts were found in 29 ponds on eight public lands (**Table 6**). Two breeding ponds were discovered in the Spring Creek Unit of Big Bend Wildlife Management Area (WMA) in Taylor County, which represent the first records from what was considered a 78-mile distributional gap between genetically distinct eastern and western populations. A breeding pond discovered at Triple N Ranch in Osceola County represents a new county record and extends the range of the species 35 miles south/south-east of a historical site in Orange County. In addition, three new breeding ponds were found in Camp Blanding Military Reservation and six new breeding ponds were found in Jennings State Forest, both of which are located in Clay County. In June 2014, FWC surveyed 17 historical newt ponds in the Leon County portion of Apalachicola National Forest, where natural populations apparently no longer occur; a reintroduction effort is underway by the Coastal Plains Institute using offspring of animals collected in southwestern Georgia. No striped newts were found, which corroborated an unsuccessful survey of the same ponds in May 2014 by the Coastal Plains Institute. In May and June, multiple observers conducted an occupancy modeling study in 11 conservation lands. During FY 2013-14, FWC collected 386 genetic samples (tail tips) from 29 ponds for possible future analysis.

Table 6. Florida Amphibian Pond Surveys

Area	No. Ponds Surveyed	No. Gopher Frog Ponds	No. Gopher Samples	No. Striped Newt Ponds
Northwest Region				
Apalachicola National Forest	28	4	20	0
Blackwater River State Forest	2	0	0	0
Calhoun Co. (private)	2	0	0	0
Dixie Plantation	10	0	0	0
Econfina Creek WMA	4	0	0	0
Eglin Air Force Base	7	3	10	0
Jackson Co. (private)	2	0	0	0
St. Marks National Wildlife Refuge	17	0	0	0
North Central Region				
Big Bend WMA, Spring Creek Unit	11	4	28	2
Big Bend WMA, Tide Swamp Unit	4	0	0	0
Camp Blanding Military Reservation	30	18	212	5
Cary State Forest	8	3	33	0
Cedar Key Scrub State Reserve	6	0	0	0
Citrus WMA	6	0	0	0
Fort White Mitigation Park WEA	3	1	26	0

Goethe State Forest	3	2	28	0
Holton Creek Conservation Area	1	0	0	0
Jennings State Forest	27	9	111	12
Lochloosa Wildlife Conservation Area	7	0	0	0
Osceola National Forest	1	0	0	0
Phifer Flatwoods	3	1	0	0
Pumpkin Hill Creek Preserve State Park	5	0	0	0
Suwannee Ridge Mitigation Park WEA	1	0	0	0
Watermelon Pond – Gladman Tract	1	1	5	0
Watermelon Pond – Metzger Tract	1	1	0	0
Northeast Region				
Buck Lake Conservation Area	1	0	0	0
Bull Creek WMA	6	0	0	0
Charles H. Bronson State Forest	1	1	0	0
Cross Florida Greenway	1	1	2	0
Etoniah Creek State Forest	5	4	40	0
Faver-Dykes State Park	7	0	0	1
Guana River WMA	6	0	0	1
Half Moon WMA	11	1	4	0
Halpata Tastanaki Preserve	2	1	30	0
Little Big Econ State Forest	1	1	24	0
Marion Co. (private)	1	0	0	0
Ocala National Forest	15	11	221	4
Ordway-Swisher Biological Station	17	1	1	3
Rock Springs Run State Reserve	2	0	0	0
Ross Prairie State Forest	2	1	6	0
St. Sebastian River Preserve State Park	6	5	92	0
Split Oak Forest Mitigation Park WEA	2	0	0	0
Three Lakes WMA	3	0	0	0
Triple N Ranch	4	1	13	1
Wekiva Springs State Park	3	0	0	0
Southwest Region				
Annutteliga Hammock	3	2	41	0
Chassahowitzka WMA	1	1	30	0
Croom WMA	8	4	78	0
Disney Wilderness Preserve	9	2	3	0
Green Swamp West	2	2	34	0
Hardee Co. (private)	1	0	0	0
Lake Wales Ridge State Forest, Walk-in-the-Water Tract	2	1	0	0
Lake Wales Ridge WEA, Carter Creek Unit	1	0	0	0
Manatee Co. (private)	2	0	0	0
Mosaic Fertilizer's Wellfield	1	1	15	0

Total	316	88	1,107	29

Spring Creek Unit of Big Bend Wildlife Management Area in Taylor County – A dipnetting survey was conducted on several ephemeral wetland locations on the Spring Creek Unit of the Big Bend WMA in February 2014. The survey resulted in the collection of a female and two males, from which tail tips were taken for genetic sampling. Striped newts were collected from two separate ponds on the Spring Creek Unit, and both ponds are now included in the burn rotation for the coming fiscal year. This is a very significant find for the striped newt in Florida. There was an apparent hiatus in the species' distribution in Florida, with 92 miles separating the closest pond in the western range (St. Marks National Wildlife Refuge in Wakulla County in 1978) and the closest pond in the eastern range (Thomas Farm in Gilchrist County in 1973). On Big Bend WMA, striped newts were found in a pond located 43 miles east of the Wakulla County record and 52 miles west of the Gilchrist County record.

Jennings Wildlife Management Area in Clay and Duval Counties – FWC conducted two surveys for striped newts on Jennings WMA in Clay and Duval counties. Striped newts were detected in the eleven known ponds and tail clippings were taken for genetic analysis by FWC.

Florida Bog Frog (*Barbara Almario, Justin Davis, Kathleen Mahoney, Amy Raybuck, and Matt Smith*)

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 draft species action plan (http://myfwc.com/media/2738259/Florida-Bog-Frog-Species-Action-Plan-Final-Draft.pdf) for the Florida bog frog was completed in FY 2013-14; 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 nighttime call surveys for the Florida bog frog on the Yellow River Ravines and Escribano Point tracts of Yellow River Wildlife Management Area (WMA) in 2009. Call surveys have taken place annually since 2009 and continued during FY 2013-14. Nighttime call surveys follow a protocol similar to that used by the U.S. Geological Survey North American Amphibian Monitoring Program. Ten survey points were initially established along three creeks (Garnier, Julian Mill, and Burnt Grocery) within Yellow River Ravine and six points within Escribano Point, with surveys conducted once in May, June, and July. Bog frogs have been documented at the Garnier Creek power line right-of-way every year since surveys began in 2009. In May 2014, a bog frog was heard calling from the right-of-way at Julian Mill Creek for the first time since the 1980s. Since surveys began in 2009, Florida bog frogs have not been detected on Escribano Point. Heavy rains precluded access to some survey points within Escribano Point during 2014.

During the winter of FY 2012-13, FWC, in cooperation with the Florida Department of Agriculture and Consumer Services (FDACS), initiated restoration on one acre of habitat along Garnier Creek. Using an experimental approach, five 0.2-acre treatment plots were established along Garnier Creek by hand-cutting woody vegetation and immediately stump-treating with

herbicide. Treatment plots were paired with five reference plots of equal size that did not receive treatment. In April 2014, the treatment plots were retreated with herbicide to prevent regeneration of woody vegetation. Nighttime call surveys were conducted within the experimental plots twice a month in May, June, and July of 2013 and 2014. In June of 2013, a bog frog was heard calling from within the experimental plot (Plot 1) closest to the power line right-of-way where bog frogs had been previously documented. Dip-net and visual surveys conducted during summer and fall of 2013 documented a bog frog egg mass and bog frog tadpoles in the same plot. In July 2013 a bog frog was heard calling outside an experimental plot (Plot 3) further south along the creek. In June 2014 a bog frog was heard calling just north of Plot 1. Call surveys will continue in May, June, and July of 2015 to further evaluate habitat restoration impacts on the species.

Frog loggers, which record frog calls, were deployed in June 2014 in each of the treatment plots on Garnier Creek and at various locations along the length of Julian Mill Creek, including the power line right-of-way. Frog loggers will remain deployed through August 2014 and should increase the effectiveness of detecting bog frogs. Frog loggers may be deployed in subsequent years depending upon availability of equipment. Data collected will help measure bog frog response to restoration efforts along Garnier Creek, provide baseline data for Julian Mill Creek, and help to identify the most suitable areas for future habitat restoration efforts.

Gopher Frog (*Kevin Enge, Anna Farmer, Randy Havens, and Matthew Koenig*)

The gopher frog is currently listed in Florida as a State-designated Species of Special Concern. This species will be removed from Florida's Endangered and Threatened Species List once the draft species action plan (http://myfwc.com/media/2738828/Gopher-Frog-Draft-Species-Action-Plan-Final-Draft.pdf) has been approved by the FWC Commissioners.

The gopher frog is an "explosive breeder" (all or most of a population congregates to breed during a short period of time) 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, or 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 2013-14, heavy rainfall in the northern peninsula and panhandle contributed to successful reproduction at many sites. The Ocala National Forest, which has the most known breeding ponds, however, remained dry or mostly dry, as did ponds in parts of the southern half of the peninsula. In some cases, excessive flooding of wetlands compromised the ability to dipnet effectively for tadpoles, which was the primary method of documenting breeding ponds. Of the 88 gopher frog breeding ponds documented (**Table 6**), 77 ponds were found by dipnetting for tadpoles; seven new ponds were found incidentally by automated data recorders ("frogloggers") deployed at wetlands to detect calling ornate chorus frogs; three ponds were found by hearing frogs calling at night; and one pond was found by observing a frog in a burrow next to a dry pond that was the only one in the vicinity. FWC surveyed 308 ponds on 48 public or conservation lands, and eight ponds on private lands in Calhoun, Hardee, Jackson, Manatee, and Marion counties as part of a State Wildlife Grant entitled "Survey of Winter-breeding Amphibian Species in the Peninsula" (**Table 6**). Notable findings include the first breeding ponds known from Annutteliga Hammock in Hernando County (two ponds); Cary State Forest in

Duval County (three ponds); Charles H. Bronson State Forest in Orange County (one pond); Disney Wilderness Preserve in Polk County (two ponds); Little Big Econ State Forest in Seminole County (one pond); Phifer Flatwoods in Alachua County (one pond); and the Gladman (one pond) and Metzger (one pond) tracts of Watermelon Pond in Alachua County. Thirty new breeding ponds were discovered in Apalachicola National Forest in Leon County (one pond); Spring Creek Unit of Big Bend Wildlife Management Area (WMA) in Taylor County (four ponds); Croom WMA in Hernando and Sumter counties (four ponds); Jennings State Forest in Clay County (four ponds); Camp Blanding Military Reservation in Clay County (eight ponds); Etoniah Creek State Forest in Putnam County (two ponds); Goethe State Forest in Levy County (one pond); Ordway-Swisher Biological Station in Putnam County (one pond); Ocala National Forest in Marion County (three ponds); Half Moon WMA in Sumter County (one pond); and St. Sebastian River Preserve State Park in Brevard County (one pond).

As part of a State Wildlife Grant looking at the genetics of gopher frog populations throughout the state, FWC collected 1,107 samples (primarily tadpole tail tips) (**Table 6**) from 71 ponds in 30 populations during FY 2013-14. FWC sent 1,428 samples (some were collected earlier) to Dr. Stacey Lance at the Savannah River Ecology Laboratory for analysis of microsatellite DNA; DNA has been extracted from 846 samples and about half of these have been genotyped. A breeding pond within three miles of another suitable-looking pond was considered part of the same population, unless the intervening habitat was unsuitable or a major barrier to gopher frog movements (e.g., river or interstate highway) was present.

A study was conducted to look at the effects of translocation of gopher frogs on their movements, survival, and reproduction. Gopher frogs are often moved, along with gopher tortoises, from sites that are being developed. To capture animals for this study, staff trapped and conducted nighttime visual surveys of gopher tortoise and small mammal burrows in Jennings State Forest and Camp Blanding Military Reservation from August through February. Efforts were also made to trap animals at breeding ponds at three wetlands in Camp Blanding from February to March. The movements of six gopher frogs were tracked in Jennings State Forest from August through May, but a sufficient number of large adult animals could not be captured to conduct the translocation portion of the study.

Spring Creek Unit of Big Bend Wildlife Management Area in Taylor County – A dipnetting survey was conducted on several ephemeral wetland locations on the Spring Creek Unit of the Big Bend WMA, in Taylor County, in early June 2014. The survey resulted in the collection of 23 gopher frog larvae, from which tail tips were taken for genetic sampling. Gopher frogs were collected from two separate ponds on the Spring Creek Unit, and both ponds are now included in the burn rotation for FY 2014-15.

Chassahowitzka Wildlife Management Area in Hernando County – During FY 2013-14, FWC conducted a gopher frog call survey on Chassahowitzka WMA in Hernando County. Ten 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 the WMA, this survey will be repeated for three years.

Pine Barrens Treefrog (*Kevin Enge and Paul Moler*)

The Pine Barrens treefrog is currently listed in Florida as a State-designated Species of Special Concern. The species will be removed from Florida's Endangered and Threatened Species List once the draft species action plan (http://myfwc.com/media/2718858/Pine-Barrens-Treefrog-Species-Action-Plan-Final-Draft.pdf) is approved by the FWC Commissioners. In Florida, this species occurs only in Santa Rosa, Okaloosa, Walton, and Holmes counties. The Florida population was Federally-designated as Endangered in 1977, but was 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 seepage habitats. Night-time surveys are conducted by listening for calling males at breeding sites. A current project involves revisiting breeding sites identified in the 1978−1981 surveys to assess the current status of the species. As part of an occupancy modeling study to better understand detection variability at occupied sites, four FWC observers conducted surveys for calling frogs in June to July 2013, and again in mid-April to May 2014, at 31 historical and 39 potential breeding sites in Blackwater River State Forest in Okaloosa and Santa Rosa counties. During the Blackwater surveys, 27 new breeding sites were found. Surveys of historical sites will continue through FY 2014-15.

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 2013-14, FWC received 181 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 capture of the crocodile. Twenty-four non-hatchling crocodiles were captured in FY 2013-14. Eighteen of those crocodiles (eight males, ten females) were captured and translocated, or removed from the wild. Two of those animals, both males, were captured and translocated twice within the fiscal year. Animals ranged from 4.0 to 10.2 feet in length. Sixteen captured crocodiles were translocated to a site deemed suitable by FWC. Two captured animals, both females, 6.5 and 8.7 feet, were captured for the third time and were removed from the wild and placed in captivity. Six crocodiles (four females, two males) were captured and removed from human-interaction situations and released at another site. Those animals ranged in size from 4.2 to 9.5 feet in length. Thirty-nine crocodile eggs were recovered from a nest in a residential yard in Islamorada. They were placed in a commercial incubator and eleven hatchlings were born in mid-July. The hatchlings will be released once they are deemed ready.

FWC was involved in the recovery of fourteen American crocodile carcasses (eight females, four males, and two unknown) during FY 2013-14. The animals ranged from 3.0 to 10.8 feet in length. The cause of death for most of the animals was attributed to wounds inflicted by automobile traffic. Several died of unknown causes and were recovered in an advanced stage of decomposition. One animal died of apparent gunshot wounds and the incident is under investigation.

Alligator Snapping Turtle (*Kevin Enge, Eric Suarez, and Travis Thomas*)

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 the draft species action plan (http://myfwc.com/media/2720085/Alligator-Snapping-Turtle-Species-Action-Plan-Final-Draft.pdf) has been approved by the FWC Commissioners.

FWC staff co-authored a paper describing two new species, the Suwannee (*Macrochelys suwanniensis*) and Apalachicola (*Macrochelys apalachicolae*) alligator snapping turtles. Differentiation is based on genetics and the morphology of skulls and shells. Florida is the only state with all three species.

Population Status and Distribution of the Suwannee Alligator Snapping Turtle – 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 were trapped using 12 large hoop net traps baited with fish parts set in late afternoon and checked the next morning. During 742 trap nights from July 2011 through August 2013, 132 individuals were captured and 29 were recaptures. Trapped alligator snapping turtles were measured, weighed, and marked before being released. Trapping was most productive in the middle section of the river, and only one alligator snapping turtle was captured at the two estuarine sites. Upper and lower reaches of the river had an equal sex ratio, whereas males outnumbered females more than four to one in the three middle reaches, which also had significantly more large male alligator snapping turtles. Overall, juveniles comprised 21%, adult females 17%, and adult males 61% of the sample. Thirty-three of 81 (41%) adult males weighed at least 100 pounds, and the largest weighed 126 pounds. Compared to other studies on alligator snapping turtles, this study is the only one with a sex ratio biased towards males and with a preponderance of large adult males, possibly because commercial harvest was limited in the Suwannee River.

Mark-recapture data were used to derive an estimate of population abundance for each ecological reach of the river except for the estuary. FWC estimates approximately 867 adult alligator snapping turtles inhabit the Suwannee River (not including its tributaries) between White Springs and the estuary. Estimated population densities ranged from one adult/1.6 miles in the reach farthest upstream to one adult/1.4 miles in one of the middle reaches. Populations are apparently secure in the Suwannee River, because harvest is now prohibited and development is restricted along the river.

Three of 25 radiographed alligator snapping turtles had ingested fish hooks, and one turtle contained three hooks. The impact of these hooks and attached fishing line (which might have been bush hooks hung from overhanging branches to catch catfish) on alligator snapping turtle survival is unknown.

FWC used sonic telemetry of 20 alligator snapping turtles at one site in the upper reach and one site in the middle reach to determine minimum and adjusted linear home ranges and microhabitat use. Home range size did not differ significantly between sexes or reaches, although males had much larger mean minimum linear home ranges (13,077 feet) than females (6,762 feet); adjusted linear home ranges, which eliminates the outlier locations, was more similar between sexes. FWC collected habitat samples at 815 alligator snapping turtle locations and at randomly selected locations. Alligator snapping turtles primarily used woody debris, which was the most available cover, but undercut banks were preferentially selected. During low water levels, woody debris in the river channel became more important. During high water levels, alligator snapping turtles often foraged in inundated floodplains, and some alligator snapping turtles continued moving between the floodplain and river channel after water levels fell and they had to travel over land. Turtles were sedentary during the day and became active at night, exhibiting year-round activity.

Status Survey of the Apalachicola Alligator Snapping Turtle – USFWS was petitioned to list the alligator snapping turtle as Threatened and, as a result, provided a grant to Georgia to determine its status. FWC did not request money because a study was already underway in the Suwannee River and some trapping data were available from rivers in the Panhandle. When the Apalachicola alligator snapping turtle was described as a separate species, however, FWC decided a study was warranted in the three rivers that comprise its range in Florida: the Apalachicola, Ochlockonee, and Choctawhatchee rivers. FWC trapped all nine sites (three per river) once and caught 24 alligator snapping turtles in 36 trap nights in the Apalachicola River and 17 alligator snapping turtles in 28 trap nights in the Ochlockonee River. Although no alligator snapping turtles were trapped in 35 trap nights in the Choctawhatchee River, one young alligator snapping turtle was observed and photographed during map turtle surveys; this was the first county record for Holmes County. Trapping efforts were delayed because of flooding and will continue in FY 2014-15.

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. No alligator snapping turtles were captured in seven trap nights in the Aucilla River, 12 trap nights in the Steinhatchee River, and seven trap nights in the Wakulla River. Including trapping data from FY 2012-13, FWC captured no alligator snapping turtles in 48 trap nights in these three rivers, plus the Econfina and St. Marks rivers. The Fenholloway River still needs to be trapped, but trapping the Wacissa River is probably unnecessary because it connects to the Aucilla River, which has had 18 trap nights. There are two historical records from the Ocklawaha River in Marion County, which would presumably represent an introduced population. FWC caught no turtles in 12 trap nights in the Ocklawaha River.

Barbour's Map Turtle (*Pierson Hill, Jonathan Mays, and Catherine Ricketts*)

The Barbour's map turtle is currently listed in Florida as a State-designated Species of Special Concern because of its limited range and vulnerability to habitat modification and other human disturbances. A biological status review determined that the Barbour's map turtle should be listed as State-designated threatened. A draft species action plan (http://myfwc.com/media/2738250/Barbours-Map-Turtle-Species-Action-Plan-Final-Draft.pdf) for the Barbour's map turtle was completed in November 2013. The species' status will not change until the plan is approved by the FWC Commissioners. The USFWS was petitioned to list it as Federally Threatened, and FWC received a USFWS grant to determine its status.

This species naturally occurs in the Panhandle in the Apalachicola and Choctawhatchee river drainages, but the origin of the population in the Ochlockonee River is unknown. An introduced population has been reported by a local reptile enthusiast in the Ocklawaha River in Marion County. The Barbour's map turtle is typically found in limestone-bottomed streams and rivers with ample basking sites consisting of snags and fallen trees. Females have enlarged heads and attain a shell length of 6-12.6 inches, which is almost twice that of males.

From April through June, a two-person team (one assigned to each river bank) used binoculars from kayaks to conduct basking surveys in four rivers. A total of 263 miles of rivers were surveyed: 42 miles of the Apalachicola, 38 miles of the Chipola (a tributary of the Apalachicola), 93 miles of the Choctawhatchee, 65 miles of the Ochlockonee, and 25 miles of the Ocklawaha. These surveys recorded 3,636 Barbour's map turtles, primarily in the Apalachicola and Choctawhatchee rivers. Sixty-six Barbour's map turtles were observed in the Ochlockonee River, but none were observed in the Ocklawaha River. The species' range was extended approximately six miles downstream on the Choctawhatchee and about 12 miles both upstream and downstream on the Ochlockonee, including a new county record from Wakulla County. Basking surveys in the lower Apalachicola and Chipola rives will be completed in FY 2014-15.

FWC staff of the Apalachicola River Wildlife and Environmental Area (WEA) in Gulf and Franklin counties conduct surveys for basking Barbour's map turtles in the fall of each year. The survey routes cover approximately 36 miles along sections of the Apalachicola, Brothers, and Chipola rivers. The fall 2013 surveys were completed on October 16, 17, and 23. A total of 1,141 Barbour's map turtles were counted across those three survey dates, which is the highest number observed since 2009 and a 30% increase in turtles recorded compared to 2012, when staff counted 874 turtles. The Chipola River section continues to have the most turtles counted, with 920 seen in 2013; however, this number is lower than the 1,010 counted in 2012.

Gopher Tortoise (*Barbara Almario, Deborah Burr, Jenny Ketterlin Eckles, Norberto Fernandez, Donald Lee Francis, Allan Hallman, Randy Havens, Kelly Irick, Donna Jones, Jacob Kline, Nathan Lambert, Aubrey Martin, Tessie Offner, Allie Perryman, Johnathan S. Roberts, Fred Robinette, Steve Shattler, and Wade Ulrey*)

Management – The gopher tortoise is a State-designated Threatened species in Florida. Gopher tortoises are keystone species that support the structure and functions of an ecosystem, as their burrows are home to over 350 other species. In order to conserve the species and its habitat, FWC published its first Gopher Tortoise Management Plan in 2007. 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.

Increased efforts have been made to engage Florida residents in gopher tortoise conservation. The Gopher Tortoise Conservation Program now offers three types of volunteer opportunities for Florida residents to help protect and conserve the gopher tortoise. These volunteer opportunities include gopher tortoise mortality data collection, waif gopher tortoise (see explanation below) transportation, and silt fence installation. With the help of citizen scientists and volunteers, FWC is working to fill several data gaps and identify areas in need of increased conservation. The program has utilized student interns who have contributed approximately 450 hours over the past fiscal year to help implement actions in the management plan.

A new Smartphone application, the "Florida Gopher Tortoise" is available on both iPhone™ and Android™. Citizens can use the app to learn more about the biology and life history of the species, test their gopher tortoise knowledge with a quiz, and submit photos of gopher tortoises to FWC. These photos will be used in an online interactive map that displays where gopher tortoises have been seen in Florida.

FWC has continued to work with stakeholders to discuss and explore possible solutions to challenges encountered with gopher tortoise permitting and conservation issues. Constant discussion on implementing new improvements to the guidelines occurs with help from the stakeholders. Through the recipient site permit program (a voluntary program in which landowners may use their lands with suitable habitat to receive gopher tortoises from development sites), approximately 11,115 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 for gopher tortoises in perpetuity. Currently, 37 recipient sites with an available capacity of 23,418 tortoises are permitted. An additional two recipient site permit applications are currently under review with potential available capacity for an additional 6,700 tortoises on 3,292 acres of gopher tortoise habitat. During FY 2013-14, 3,554 tortoises were authorized for relocation by FWC-issued permits.

Following recommendations from a scientific study looking at viability of gopher tortoise populations and survivorship of hatchlings and juveniles on improved pasture, FWC and stakeholders have identified additional conservation measures for recipient sites with improved pasture. FWC has entered into a memorandum of agreement and formed a partnership with Nokuse Plantation, the St. Joe Company, St. Joe Foundation, and the Humane Society of the United States to promote humane relocation of gopher tortoises from previously permitted incidental take sites.

During FY 2013-14, 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." Two waif sites in Polk County and the City of Palatka were established during FY 2013-14, and a

total of 12 tortoises have found permanent homes at these locations. Under a current memorandum of agreement with the South Carolina Department of Natural Resources, there is also an ongoing effort to restock gopher tortoises where they are currently depleted from public lands in South Carolina through the waif program; 20 tortoises were relocated to this site during FY 2013-14.

FWC continues to work closely with public and non-profit organizations to identify and provide incentives for gopher tortoise conservation on private lands. FWC regularly participates in workshops that promote conservation opportunities and habitat management incentives for private landowners to benefit wildlife on their property. To further the ability of land managers and researchers in identifying illness and better assesses health status, the *Handbook on Gopher Tortoise (Gopherus polyphemus) Health Evaluation Procedures for Use by Land Managers and Researchers* (http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA501295) has been linked on the FWC website. In addition, FWC continues to use Geographic Information Systems (GIS) to help identify high quality gopher tortoise habitat throughout Florida. Outreach to landowners with suitable gopher tortoise habitat and a potential interest in conservation-based incentives for wildlife has begun. The Payment for Ecosystem Services incentive program was implemented during FY 2013-14. The initial five contracts were completed and 6,047 acres have been conserved, which resulted in $60,470 in payments to landowners. In order to better understand gopher tortoise population distribution and trends in Florida, a new surveying technique, Line Transect Distance Sampling, was adopted by range-wide partners, including the southeastern states. Under a three-year contract (funded in part by a Federal grant) with the Joseph W. Jones Ecological Research Center, 25 select public conservation lands in Florida will be surveyed using this standardized technique, and agency staff will be trained.

During FY 2013-14, $148,723 in funding assistance was provided to assist gopher tortoise habitat management activities that benefited more than 1,604 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 40,139 acres of gopher tortoise habitat were conserved through prescribed fire and other habitat management activities on both public and private lands during FY 2013-14.

To enhance the protection and conservation of gopher tortoises and gopher tortoise habitat statewide, FWC 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. The team has also completed revisions to the Law Enforcement Training Manual and distributed them around the State.

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 Pine Log WMA (Bay and Washington counties) since 2004 and Point Washington WMA (Walton County) since 1993. Aerial photos were used to identify suitable gopher tortoise habitat, primarily sandhill areas, and divide the habitat into clusters for management purposes. Pine Log is grouped into 15 clusters, and the entire area is surveyed annually. 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.

FWC systematically searches these sandhill clusters for gopher tortoise burrows each summer. Burrow locations are recorded using Global Positioning System (GPS) units, and the

data points are downloaded into GIS. Burrows are classified as "active," "possibly active," "inactive," or "abandoned". Using burrow widths, the burrows are further grouped into categories, which 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 Pine Log and Point Washington WMAs.

Overlapping two fiscal years, the 2013 survey season (May-August 2013) documented 91 "active" and "possibly active" burrows on Pine Log WMA. Six "active" burrows were found on the eastern section of Point Washington. These numbers fall within the usual range for the past several years for corresponding clusters. This likely suggests that tortoise activity has remained relatively steady on both Pine Log and Point Washington WMAs in recent years. Surveys for 2014 were not conducted during May and June as in previous years, due to staffing issues.

Working in cooperation with the Florida Department of Agriculture and Consumer Services (FDACS), the lead management agency for these two WMAs, habitat improvements continue to be prescribed and implemented. Prescribed fire continues to be the preferred strategy for improving and maintaining habitat on Pine Log and Point Washington WMAs. Herbicide has been an effective tool to control hardwood encroachment on sandhills where fire is impractical. Sand pine removal has been an additional high-priority objective in improving the suitability of these areas for gopher tortoise habitation. Habitat management guidelines recommended to FDACS are intended to produce favorable habitat conditions in and around existing gopher tortoise clusters, improve recruitment, increase the population, and allow for expansion of existing clusters into adjacent habitat. Forest management practices that most nearly mimic the dynamics of natural systems optimally support gopher tortoise populations, and many of these practices are used by FDACS to manage for the overall health of wildlife on these two WMAs.

During FY 2013-14, 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 is to provide FDACS, the lead land manager on the area, with habitat improvement recommendations. Transects of suitable habitat with each burrow encountered are assigned a unique identification number. In addition, the location, status (active, possibly active, inactive, or abandoned), orientation, and width of burrows are recorded. During FY 2013-14, FWC surveyed approximately 3,090 acres of suitable gopher tortoise habitat and located 385 burrows. To date over 83,000 acres of habitat have been surveyed with 3,337 burrows located. Only 16% of gopher tortoise burrows have been classified as abandoned, where no tortoise activity was observed. Once the entire WMA has been surveyed, FWC intends to subsample gopher tortoise populations and habitats within each unit on Blackwater WMA with the intent to assess whether forest management efforts have impacted gopher tortoise population sizes, distributions, and recruitment.

Joe Budd WMA was one of the first management areas in Florida to prohibit the taking of gopher tortoises in the early 1980's. Consequently, tortoises have become quite abundant in suitable habitat and are frequently observed by area staff. No formal survey of abundance other than a brief assessment of suitability to receive relocated tortoises in 2007 has been conducted, however. For this reason, Joe Budd WMA was included in a group of 33 State conservation lands to be surveyed by the Joseph W. Jones Ecological Research Center. A pilot survey was conducted on 26 areas, including Joe Budd WMA, during FY 2013-14 to assess the amount of effort needed for a complete survey. Out of these 26 areas where pilot surveys have been completed, Joe Budd WMA ranked third in initial gopher tortoise abundance.

Gopher tortoise surveys and monitoring continued from May to July 2014 on the Fitzhugh Carter Tract of Econfina Creek WMA (Carter Tract in Washington County). The 2,155-acre tract contains approximately 1,200 acres of sandhill uplands. Gopher tortoise burrows on the area are grouped into six clusters, and monitoring protocol follows that established for Pine Log and Point Washington WMAs. The 2014 surveys yielded 552 total burrows - 40 more burrows than were documented in 2013 (**Table 7**). Twenty-three percent of burrows were classified as "active" or "possibly active". The number of "active" burrows increased from 2013 to 2014, while the number of "possibly active" burrows decreased from 2013 to 2014. 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, and planting of longleaf pine and wiregrass, was 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 from May to July. Future work will provide comparative data on tortoise population trends within the Carter Tract following land management and mitigation strategies.

Table 7. 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	2014
Active	53	12	26	17	73	76	92	85	102
Possibly Active	12	1	9	28	23	47	28	38	28
Inactive	95	64	40	49	64	99	83	85	40
Abandoned	34	131	193	161	184	206	269	304	382
Total	194	208	268	255	344	428	472	512	552

Mitigation Park Program – FWC's Mitigation Park Program was developed in 1998 with the primary goal of providing 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 Wildlife and Environmental Areas (WEA). 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 2013-14 in north-central Florida, FWC conducted gopher tortoise management and monitoring on various WEAs in the region. Agency staff conducted a survey

of gopher tortoise burrows on the Bell Ridge Longleaf WEA in Gilchrist County in May 2014. The survey estimate of 2.27 tortoises per acre is similar to the last survey conducted in 2006, and indicates a stable gopher tortoise population on the area. Growing season prescribed fire was used to maintain and enhance 720 acres of gopher tortoise habitat on Bell Ridge WEA. Dormant season prescribed fire was used on Fort White WEA to maintain and enhance 316 acres of gopher tortoise habitat. Growing season prescribed fire was used to maintain and enhance 653 acres of gopher tortoise habitat. A habitat restoration project to plant longleaf pine and wiregrass seedlings on Fort White WEA was completed in early 2014. This restoration included 60 acres. Wiregrass was planted at a density of 830 stems/acre and longleaf pine was planted at a density of 400 stems/acre. An herbicide application was used to control resprouting hardwoods and to prevent over shading of native groundcover while promoting the growth of desirable species through reduced competition. This restoration effort replaces some of the missing components of the natural community. A restored natural community will provide long-term ecological benefits to the gopher tortoise population. Growing season prescribed fire was used on Lafayette Forest WEA in Lafayette County to maintain and enhance 622 acres of gopher tortoise habitat. A mid-story reduction project (using hydraulically powered cutting heads on skid steer tractors) was used to remove the laurel oak dominated mid-story on 100 acres of degraded gopher tortoise habitat at Lafayette Forest WEA. It is expected that this management action will allow these acres to be maintained with prescribed fire and provide long-term ecological benefits to the gopher tortoise population. A timber-thinning project was conducted to reduce canopy closure of overgrown pine plantations and improve degraded gopher tortoise habitat on 275 acres. These improvements focus on retaining an open overstory and herbaceous understory that are indicative of high quality gopher tortoise habitat and will allow for future expansion of gopher tortoise populations on Lafayette Forest WEA. Dormant season prescribed fire was used on Suwannee Ridge WEA in Hamilton County to maintain and enhance 1,428 acres of gopher tortoise habitat. Dormant season prescribed fire was used on Watermelon Pond WEA in Alachua County to maintain and enhance 91 acres of gopher tortoise habitat. Growing season prescribed fire was used to maintain and enhance 355 acres of gopher tortoise habitat. A habitat restoration project to restore native ground cover on 133 acres of improved pasture was initiated. An herbicide treatment was applied as the first step, and future activities will include additional herbicide treatments and planting of a native herbaceous seed mix. After ground cover establishment, longleaf pine seedlings will be planted.

During FY 2013-14, gopher tortoise surveys were conducted on Perry Oldenburg WEA in Hernando County and Hickey Creek WEA in Lee County. The survey at Perry Oldenburg WEA estimated a tortoise density of 1.29 tortoises per acre, which is up from previous surveys. At Hickey Creek WEA, the survey estimated a density of 0.97 tortoises per acre, which is consistent with previous surveys.

In southwest Florida, at Crooked Lake WEA in Polk County, prescribed burning was conducted on 378 acres. Perry Oldenburg WEA in Hernando County received 160 acres of controlled burning and 100 acres of exotic plant control, as well as two acres of mechanical vegetation treatments. Gopher tortoise habitat management at Janet Butterfield Brooks WEA in Hernando County included 47 acres of exotic plant survey/control and 19 acres of mechanical treatment. Bullfrog Creek WEA in Hillsborough County had 322 acres burned, 65 acres of pasture mowed, and 44 acres mechanically treated.

In south-central Florida, at Platt Branch WEA in Highlands County, controlled burns were completed on 194 acres with 11 acres mechanically treated. At Moody Branch WEA in

Manatee County, 53 acres of gopher tortoise habitat were burned, 32 acres were treated for exotic plants, 229 acres of pastures were mowed to control weedy species, 20 acres of forested habitat were mowed to control palmetto and hardwood encroachment, and two acres of sand pines were cut. At Hickey Creek WEA, 152 acres were prescribed burned and 38 acres were mechanically treated.

Habitat Restoration Projects – FWC continued to monitor gopher tortoise habitat restoration projects during FY 2013-14. The Lake Wales Ridge WEA consists of nineteen tracts in Highlands and Polk counties. All tracts contain habitat suitable for the gopher tortoise, and gopher tortoises have been observed on all tracts of the WEA.

During FY 2013-14, FWC obtained a grant from the Disney Worldwide Conservation Fund to restore gopher tortoise habitat on 20 acres of degraded scrub vegetation at the Royce Unit tract of the Lake Wales Ridge WEA in Highlands County. Permanent photopoint locations were established in the restoration area to document vegetation changes over time. Restoration began during FY 2013-14 with hand-pulling of invasive exotic plants and planting of acorns and saw palmetto fruits by staff with the help of Ridge Ranger volunteers. Volunteers also planted acorns and other native plants in pots that will be transplanted into the restoration site during FY 2014-15. Further control of exotic species through herbicide and hand-pulling, an initial survey for presence of gopher tortoises, and another round of acorn planting is also planned for FY 2014-15.

During FY 2013-14, a field survey was conducted on Big Bend WMA in Taylor County to locate, flag, and record GPS coordinates of gopher tortoise burrows prior to conducting site preparation activities for seeding 78 acres of a sandhill restoration site (restored from off-site sand pine which had been clearcut in 2006) with wiregrass. The 78 acres were subsequently seeded with a wiregrass seed blend in FY 2013-14. The goal of these restoration activities is to re-establish native ground cover in order to increase habitat suitability for gopher tortoises and other sandhill endemic species. FWC continued to monitor gopher tortoise habitat restoration projects conducted in FY 2013-14 on Belmore State Forest, Jennings State Forest, and Ralph E. Simmons State Forest WMAs 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.

Exotic Species Impacts – The Argentine black and white tegu is a large-bodied, non-native lizard with established breeding populations in Hillsborough and Polk counties. In 2006, tegus were discovered to inhabit natural areas in Hillsborough County that are also home to gopher tortoises. There is limited information regarding general biology and life history about wild tegus in Florida. Since tegus have a varied diet and are known to use burrows, there are concerns regarding their possible impacts to gopher tortoise populations in this area. FWC has been assessing this population over the past year through survey and trapping efforts.

FWC partnered with land managers from Hillsborough County Parks and Recreation and the Southwest Florida Water Management District to determine locations for surveys and trapping during the 2014 tegu breeding and nesting season (February through June). FWC also worked with private landowners who reported tegus on their property through the agency's Exotic Species Hotline (888-IVE-GOT1) or on www.IveGot1.org. Live traps (aka box traps) were deployed on county and private lands where tegus were known to be present and were baited with raw chicken eggs and, occasionally, fruit. Motion and infrared sensing remote

camera traps were deployed at gopher tortoise burrows or live-traps. Surveys for tegu tracks in the sand were conducted on track plots that were established on sandy fire lanes in Balm Boyette Scrub Preserve in Hillsborough County. All tegus trapped during this project were humanely euthanized, weighed, measured, and frozen for future diet analyses.

From February 2014 through June 2014, 57 live traps and eight camera traps were deployed. Twenty-four tegus were removed during that time, and 18 necropsies were performed. Track plots were surveyed 210 times resulting in the detection of 78 tegu tracks. The track data were used to determine the distribution and presence of tegus at a site. Tegus were detected utilizing gopher tortoise burrows, sometimes at the same time as a gopher tortoise. The presence of a tegu appeared to cause the tortoise to halt its activities until the tegu had left. Cursory results from diet analyses confirm that tegus are eating a wide variety of native plants and animals in these areas such as beautyberry, grasshoppers, beetles, and toads.

Live and camera trapping was ongoing for the remainder of the tegu active season and will begin again in February 2015. Track data will be compared to a similar study conducted in 2011 to evaluate and determine trends. Initial diet analyses and observations of tegus with gopher tortoises support the idea that these non-native lizards could locally impact gopher tortoises and other listed species. Increased monitoring efforts are needed to determine the extent of these impacts, as well as to determine how wide-spread tegus are in this area. Trapping and removal efforts are needed in order to reduce impacts caused by tegus and to control the current tegu population.

A brochure about tegus in Florida is available online at http://www.myfwc.com/media/2380549/Tegu-brochure.pdf.

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

FWC continues to maintain management and research programs to foster the recovery of the five species of sea turtles that occur along Florida's coast: the loggerhead (Federally-designated Threatened), green, leatherback, hawksbill, and Kemp's ridley sea turtle (all Federally-designated Endangered). The agency interacts frequently with a diversity of stakeholders in State and Federal agencies, local governments, conservation organizations, citizens, and academic programs, including working with the Florida Department of Environmental Protection (FDEP), the Water Management Districts, the USFWS, and the U.S. Army Corps of Engineers during environmental commenting. Agency staff served on several scientific advisory committees, governing boards, working groups, and committees during FY 2013-14, including: the Archie Carr Sea Turtle Refuge Working Group; FDEP Beach Management Agreement for Palm Beach Island; the Florida Sea Turtle License Plate Grants Committee; the Federal Loggerhead Critical Habitat Team; the USFWS International Working Group for the Conservation of the Northwest Atlantic Loggerhead Populations; the steering committee and working group 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 proposals submitted to the small grants program of the Florida Sea Turtle License Plate.

Management Activities – During FY 2013-14, 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 the five species of sea turtle (also known as marine turtles. 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 about sea turtle biology and important conservation issues such as wildlife friendly lighting, threats from marine debris, and 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 February 2014, FWC hosted the 18th Annual Marine Turtle Permit Holder Workshop in Deerfield Beach, Florida. Over 450 permit holders and volunteers, along with local government, State agency and Federal agency staff attended this meeting, which is co-hosted by the Sea Turtle Conservancy.

FWC worked with 25 businesses from Florida, California, Illinois, North Carolina, Hawaii, New York, Missouri, Texas, Michigan, Alabama, New Jersey, and Canada to identify lighting options that are appropriate for use adjacent to Florida's sea turtle nesting beach. A total of 40 fixtures and bulbs were assessed and listed on FWC's website so that beachfront property owners, local governments, and beach businesses have access to options that provide human safety while limiting impacts to nesting and hatchling sea turtles for lighting along the beach. FWC also worked with representatives from Ace Hardware, Lowes, and Home Depot on the development of fixtures and bulbs appropriate for use adjacent to sea turtle nesting beaches.

During FY 2013-14, FWC and FDEP jointly oversaw an early restoration project, Restoring the Night Sky, to offset impacts to sea turtle nesting habitat due to injury response that occurred during the Deep Water Horizon Event. This project included reducing light sources on and around Florida's Panhandle conservation lands and assisting local governments in their efforts to reduce the impact of beachfront lighting on sea turtles, their nests, and nesting beaches. Another project component focuses on developing effective methods to educate residents and visitors in Florida's coastal Panhandle counties about Florida's sea turtles and how they can help protect nesting females, nests, hatchlings and nesting habitat.

FWC reviewed several hundred applications as requested by FDEP, water management districts, and the State Clearing House during FY 2013-14, to ensure consistency of approved activities with State statutes requiring protection of marine turtles, their nests, and nesting habitat. Projects reviewed included coastal construction control line applications, environmental resource permit applications, joint coastal permit applications, and Federal documents submitted to the State Clearing House. 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 diverse stakeholders. FWC also participated in the development of the Florida Statewide Beaches Habitat Conservation Plan (in cooperation with FDEP). Agency staff conducted over a hundred site inspections as part of FWC's environmental commenting responsibilities, including lighting inspections conducted at the invitation of local governments and property owners.

During 2014, Florida Administrative Code Rule 68E-1.004, the Marine Turtle Permit Rule, was amended to allow applicants to submit all required forms and renewals electronically.

FWC reviewed and approved approximately 300 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 during FY 2013-14. The

agency issued 28 authorizations to hold sea turtles for rehabilitation, educational display, or research. Agency staff coordinated all transfers and releases of sea turtles undergoing rehabilitation and supervised public sea turtle releases. FWC coordinated the review and approval of requests for monitoring associated with FDEP-authorized activities and oversaw review and approval of 23 research proposals involving Federally Endangered and Threatened sea turtles. Twenty-four authorizations for educational turtle walks were issued, allowing approximately 370 public walks from June through July, on the southeast coast and the southwest coast.

Currently, FWC is administering a $416,000 grant from USFWS for Walton County's Incidental Take Permit and Habitat Conservation Plan. Grant management includes contract oversight and review and approval of deliverables.

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

Research Activities – FWC coordinated the Florida portion of the Sea Turtle Stranding and Salvage Network (Network), an 18-state program administered by the National Oceanic and Atmospheric Agency's National Marine Fisheries Service (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 2013-14, a total of 1,720 dead or debilitated sea turtles were documented (835 green turtles, 649 loggerheads, 181 Kemp's ridleys, 24 hawksbills, 11 leatherbacks, one olive ridley, and 19 sea turtles not identified by species). FWC responded to 1,830 reports regarding sea turtle concerns (primarily reports of dead, sick, or injured sea turtles), transported 78 sick or injured sea turtles to rehabilitation facilities, and conducted necropsies on 73 carcasses. Sixteen training workshops, involving 416 participants, were held around the state to teach volunteers how to document stranded sea turtles. Florida sea turtle stranding data were regularly uploaded to the Network's on-line database for use by various entities such as NOAA-Fisheries, FWC law enforcement, and protected species management personnel. FWC also continually worked to quickly identify and characterize any unusual sea turtle mortality events.

The population-monitoring program 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 are coordinated through a network of State, Federal, and volunteer permit holders who monitor sea turtle reproduction on Florida's beaches. FWC establishes scientifically sound monitoring designs, provides training, resolves data collection problems, assesses data collection error rates, analyzes data trends, and serves as a clearinghouse for information on sea turtle populations and habitats. During FY 2013-14, six workshops were presented around the state to 1,053 participants providing training on how to conduct nest surveys.

Two 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 sea turtles and nesting beach habitats, and to identify important areas for land acquisition or enhanced protection. In 2013, 209 survey areas were monitored, comprising 810 miles of beaches. Statewide, in 2013, the program documented 77,975 loggerhead nests, 36,195 green turtle nests, 896 leatherback nests, one hawksbill nest, and four Kemp's ridley nests. A Statewide Atlas of Sea Turtle Nesting Occurrence and Density is now available on the FWC website at: http://myfwc.com/research/wildlife/sea-turtles/nesting/nesting-atlas/. This resource provides a summary of the geographic distribution of sea turtle nest occurrence and nest density throughout the state during the last five years.

The Index Nesting Beach Survey Program collects more detailed data from a smaller set of index beaches. Surveyors identify each sea turtle track to species, identify the tracks as a nest or abandoned attempt, and locate nests within an approximate half-mile beach zone. Nests and nesting attempts have been monitored for 24 years at 478 index beach zones, surveyed daily during each 109-day season (May-August). These efforts currently provide 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 25 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 2013, the program documented increasing trends in nesting for loggerheads, green turtle, and leatherbacks.

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) and several life history stages, and address population structure (including gender ratios), growth rates, genetic identity (to which nesting population do turtles belong), life history, health, diet, habitat preferences, and migrations. FWC research on the first few months of a sea turtle's life is critical to understanding and managing threats to sea turtles as they leave Florida waters and circulate throughout the North Atlantic.

In June 2014, 50 loggerheads and two Kemp's ridley turtles were captured during an annual eight-day sampling session in Florida Bay. This work was conducted as part of a study of sea turtles in Florida Bay. The primary elements of this study include assessments of relative and absolute abundances, health assessments and monitoring of fibropapillomatosis (a disease specific to turtles), studies of growth, determinations of sex ratios and genetic identities, and studies of residency and movements. All captured turtles were measured and tagged. Nine of the loggerheads had been previously marked, providing data on growth and residency in Florida Bay. All turtles were released shortly after capture. This project has been conducted continuously since 1990. Some individual turtles have now been captured numerous times over periods as long as eighteen 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. This stage precedes the stage when they will live primarily along the bottom of more shallow, coastal areas. Study objectives 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, their relationships to floating objects and other organisms, sea turtle weights and measures, and evidence of ingested plastics and tar. Some results from the current three-year project were presented at the International Sea Turtle Symposium in April 2014. No sampling trips were conducted during FY 2013-14. The offshore work was planned to have been conducted by chartering large fishing vessels from ports in Texas and Louisiana; however, the vessel owners refused to make chartering contracts with FWC. After consulting with NOAA-Fisheries grant managers in 2013, an FWC research vessel was prepared to conduct offshore trips rather than chartering a large fishing vessel. No offshore trips were completed in 2013, however, because the FWC research vessel was not ready for use until after the sampling window for that year (late summer/early fall).

FWC is developing a new effort designed to research the distribution and habitat associations of larger juvenile and adult loggerheads that inhabit the West Florida Shelf, offshore of west-central Florida. Based on satellite telemetry studies, FWC found that the West Florida Shelf is an important residence area for adult female loggerheads that nest on Florida beaches. Loggerheads in this area may co-occur with commercially important fish species, which highlights the importance of deep reef and hardbottom habitats in the northern Gulf of Mexico.

In addition to conducting in-water studies, FWC also maintains an electronic inventory of in-water sea turtle research and monitoring projects. FWC maintains this database in close collaboration with the sea turtle research community. The database currently serves State and Federal conservation managers by providing information on in-water sea turtle research and a connection to the researchers responsible for conducting the work. FWC hosted a workshop at the recent International Symposium on Sea Turtle Biology and Conservation, which brought together marine conservation managers and researchers regarding sea turtle information needs.

FWC served on several scientific advisory committees and governing boards during FY 2013-14, 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 and sea turtle expert working group, 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 (*Fred Robinette*)

Surveys on Pine Log and Point Washington Wildlife Management Areas – Pine Log Wildlife Management Area (WMA) in Bay and Washington counties and Point Washington WMA in Walton County are within the range of several upland, at-risk snake species, such as the Federally-designated Threatened Eastern indigo snake and the State-designated Species of Special Concern Florida pine snake. Additionally, the WMAs are within the range of two snake species that were recently petitioned for Federal listing; the Eastern diamondback rattlesnake and Southern hognose snake.

In an effort to document presence of these species, eleven box-style snake traps were installed; four at Pine Log WMA and seven at Point Washington WMA. 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 July 2013 and mid-January 2014. Large snake traps deployed on Pine Log WMA yielded captures of 161 individuals representing 18 different wildlife species; the seven large snake traps used on Point Washington WMA resulted in captures of 526 individuals representing 31 species. At Pine Log WMA, 24 snakes of four species were captured. Snake traps on Point Washington yielded captures of 44 snakes of seven species. This included the capture/release of an eastern diamond-backed rattlesnake.

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 the species' 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. FWC is collaborating with Mark Endries (USFWS) to publish a manuscript on potential habitat models for the indigo snake in Florida. FWC met with USFWS in March to discuss indigo snake survey guidelines for sites scheduled for development.

Jennings Wildlife Management Area in Clay and Duval Counties – FWC conducted one search for indigo snakes on Jennings WMA during FY 2013-14. The search did not detect any indigo snakes. Florida Department of Agriculture and Consumer Services (FDACS) and FWC have this species on an incidental observation list. If observed, information will be recorded.

Camp Blanding Wildlife Management Area in Clay County – FWC and Camp Blanding environmental staff are monitoring the areas for indigo snakes. While no formal search was conducted during FY 2013-14, any incidental sightings were to be recorded and reported to the environmental staff; no observations were recorded for the reporting period.

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

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 the draft species action plan (http://myfwc.com/media/2738822/Florida-Pine-Snake-Species-Action-Plan-Final-Draft.pdf) is approved by the FWC Commissioners. The short-tailed snake, which is only found in Florida, is currently listed as State-designated Threatened and will remain so after the draft species action plan (http://myfwc.com/media/2738855/Short-Tailed-Snake-Species-Action-Plan-Final-Draft.pdf) is approved by the FWC Commissioners. The USFWS has been petitioned to list both species as Threatened. 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.

FWC received a USFWS grant during FY 2013-14, to determine the current status of the Florida pine snake, Southern hognose snake, and Eastern diamondback rattlesnake. FWC compiled 2,273 records of these three species and the short-tailed snake from museum, Florida Natural Areas Inventory, and FWC survey databases before beginning this project. These records were mapped to identify road survey routes in areas without sightings or with no sightings since 2000, particularly of the Southern hognose snake. FWC also solicited sightings of these species from the public, land managers, biologists, and snake enthusiasts. The FWC website allowed people to enter their observations on the Rare Snake Registry (https://public.myfwc.com/fwri/raresnakes/UserHome.aspx?id=) and Eastern Diamondback Rattlesnake Registry (https://public.myfwc.com/FWRI/DRS/Getlatlong.aspx?id=DRS). In FY 2013-14, and additional 1,318 records were added: 90 Southern hognose, 44 short-tailed, 231 Florida pine, and 953 Eastern diamondback rattlesnake. Photos received and dead specimens collected were vouchered in the Florida Museum of Natural History. From September to November, 2013, FWC staff drove over 10,000 miles and recorded 170 snakes of 20 species, including three Southern hognose snakes, one Florida pine snake, and 12 Eastern diamondback rattlesnakes. From April to June, 2014, FWC staff drove a total of 6,575 miles and recorded 129 snakes of 20 species, including one Southern hognose snake, one Florida pine snake, and seven Eastern diamondback rattlesnakes. FWC installed two drift-fence arrays each in sandhill habitat at Camp Blanding Military Reservation in Clay County, Ocala National Forest in Marion County, St. Marks National Wildlife Refuge in Wakulla County, and Suwannee Ridge Mitigation Park WEA in Hamilton County. There are no recent records of Southern hognose snakes from these areas. Each array had four fences totaling 400 feet, one center box snake trap, eight funnel traps, and eight pitfall traps. Traps were open from April 1 through June 30 and captured over 4,000 amphibians and reptiles representing 51 species, including eight Florida pine snakes at Suwannee Ridge WEA, and three Florida pine snakes and one short-tailed snake at the Ocala National Forest.

There is no information on short-tailed snake reproduction. A female captured in early April and several males are being maintained in captivity in an attempt to collect information on breeding season, clutch size (number of eggs), egg size, and hatchling size. The snakes are being fed Florida crowned snakes, their primary prey.

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

Atlantic Sturgeon Activities – The Atlantic sturgeon was Federally-listed as an Endangered species in 2012. FWC has developed an Atlantic sturgeon species action plan (http://myfwc.com/media/2720088/Atlantic-Sturgeon-Species-Action-Plan-Final-Draft.pdf) to help guide habitat restoration and population recovery in Florida. This plan has been reviewed and edited by NOAA-Fisheries.

Side-scan sonar surveys of sections of the St. Marys River have been conducted by USFWS and the U.S. Geological Service (USGS) to identify potential habitat restoration sites, and spawning or holding sites for Atlantic sturgeon. One Atlantic sturgeon was caught and released at the Jacksonville Beach Pier, and two carcasses washed up at Fort Clinch State Park in Florida during FY 2013-14.

Gulf Sturgeon Activities – The Gulf sturgeon is a Federally-designated Threatened species. FWC helped USGS track Gulf sturgeon in the Suwannee and Ochlockonee Rivers during FY 2013-14. USGS caught, tagged, weighed, and fin-clipped approximately 450 Gulf sturgeon in the Suwannee River during FY 2013-14. There were no recorded human injuries from leaping sturgeon in the Suwannee River for 2013.

Shortnose Sturgeon Activities – The shortnose sturgeon is a Federally-designated Endangered species. No shortnose sturgeon were caught or reported in Florida during FY 2013-14.

Smalltooth Sawfish (*Gregg Poulakis and Philip 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 primarily 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 2013-14, sampling for smalltooth sawfish was performed 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.

During FY 2013-14, 41 (including seven recaptures) 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 the National Oceanic and Atmospheric Administration's National Marine Fisheries

Service (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 the 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 and NOAA-Fisheries 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.

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

Federal Wallop-Breaux Sport Fish Restoration Program – During FY 2013-14, 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. During FY 2013-14, FWC released species action plans to address species-specific conservation needs for six 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 draft species action plan (http://myfwc.com/media/2738810/Blackmouth-Shiner-Species-Action-Plan-Final-Draft.pdf) for this species was completed in November 2013. The blackmouth shiner occurs in the Blackwater and Yellow river watersheds in northwest Florida. Blackmouth shiners were not collected during FY 2013-14, 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 draft species action plan (http://myfwc.com/media/2738813/Bluenose-Shiner-Species-Action-Plan-Final-Draft.pdf) for this species was completed in November 2013. The bluenose shiner occurs in several watersheds throughout Florida. During FY 2013-14, 25 bluenose shiners were collected; 16 were collected from Holmes Creek (Choctawhatchee River watershed), six were collected from the Wekiva River (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 bluenose shiners, but species-directed

sampling is necessary to determine population status and trends for this species.

Crystal Darter – The crystal darter is currently listed in Florida as State-designated Threatened. A draft species action plan (http://myfwc.com/media/2720100/Crystal-Darter-Species-Action-Plan-Final-Draft.pdf) for this species was completed in November 2013. 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 2013-14. 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 for crystal darters is currently unknown, warranting a need for an alternative monitoring strategy for this species.

Harlequin Darter – The harlequin darter is currently listed in Florida as a State-designated Species of Special Concern. A draft species action plan (http://myfwc.com/media/2738831/Harlequin-Darter-Species-Action-Plan-Final-Draft.pdf) for this species was completed in November 2013. 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 sections of the Escambia River when suitable habitats (submerged woody debris) are present. Twenty-one harlequin darters were collected from the mainstream Escambia River during FY 2013-14. Species-directed sampling was continued during FY 2013-14. Twenty-one harlequin darters were collected and tagged in Big Escambia Creek during visual surveys. Additional research is needed to determine the most effective technique for assessing the population status and trends of this species.

Saltmarsh Topminnow – The saltmarsh topminnow is currently listed in Florida as a State-designated Species of Special Concern. A draft species action plan (http://myfwc.com/media/2738846/Saltmarsh-Topminnow-Species-Action-Plan-Final-Draft.pdf) for this species was completed in November 2013. Saltmarsh topminnows occur in the estuarine reaches of northwest Florida rivers from the Perdido to the Yellow River. No saltmarsh topminnows were collected during FY 2013-14. 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 draft species action plan (http://myfwc.com/media/2738280/Southern-Tessellated-Darter-Species-Action-Plan-Final-Draft.pdf) for this species was completed in November 2013. Southern tessellated darters are only known to occur in the Ocklawaha River watershed (a tributary to the St. Johns River) in north-central Florida. Southern tessellated darters were not collected during FY 2013-14 due to poor survey conditions. During the previous fiscal year, a total of eight Southern tessellated darters were collected from Orange Creek and Little Orange Creek (tributaries to the Ocklawaha River). 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 during FY 2013-14. 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.

INVERTEBRATES

Panama City Crayfish **(***David Cook, Justin Davis, Tom Ostertag, and Amy Raybuck*)

The Panama City crayfish is a small freshwater crustacean found exclusively within an estimated 51-square-mile portion of central Bay County in the Florida Panhandle. The Panama City crayfish is a State-designated Species of Special Concern that will become State-designated Threatened once the draft management plan (http://myfwc.com/media/1355365/Revised_Draft_PCC_Plan.pdf) for the species is finalized and approved by the FWC Commissioners.

Historically, Panama City crayfish occurred in wet pine flatwoods with an open, herbaceous understory. Development and incompatible silviculture practices have resulted in habitat loss and degradation. During FY 2013-14, FWC addressed questions involving development, construction, and other land-use conversion and maintenance activities within the historic range of the species, and made site visits to evaluate the species' presence and potential habitat. FWC consulted with the Florida Department of Environmental Protection (FDEP), U.S. Army Corps of Engineers, USFWS, environmental consultants, and public and private landowners to provide guidance on proposed projects, to prevent the unauthorized take of the species, and to assist with mitigation measures when take was unavoidable.

Extensive Panama City crayfish surveys were conducted in FY 2011-12 and FY 2012-13 on Gulf Power right-of-ways, public road edges, St. Joe Company lands, and other areas to confirm the species' occurrences, and to search for previously undocumented sites throughout the species' historic range. In FY 2013-14, 24 additional sites were surveyed for Panama City crayfish. Surveys confirmed the species' presence at 13 of 24 sites.

Restoring Panama City crayfish habitat on properties held under wetland conservation easements reduces the need for protection under the Endangered Species Act and moves the species towards recovery goals proposed in the State's draft management plan. To restore degraded wet flatwoods habitat, woody vegetation is removed from the site, and cut stumps are treated with herbicide to minimize re-sprouting. Ideally, prescribed fire is then used to prevent regeneration of woody vegetation, maintain an open canopy, and foster native herbaceous groundcover. Habitat restoration activities planned for FY 2013-14 were postponed due to excessive rainfall. These efforts will recommence in FY 2014-15. Future plans for Panama City crayfish conservation include maintaining 43 acres of previously restored wetlands, restoring an additional seven acres of wetlands, finalizing landowner agreements on two conservation easements (totaling approximately 71 acres), and translocating Panama City crayfish to properties where they have not been documented. Sites targeted for management expand the

species' area of occupancy, thereby improving the resiliency of this species within its small historic range in Bay County.

In FY 2013-14, a Panama City crayfish project coordinator was hired to facilitate and oversee restoration activities on multiple conservation easements within the Panama City crayfish's range. Coordinator tasks included conducting site inspections; developing scopes of work; researching the status of FDEP permits, property deeds, and conservation easements; writing draft agreements; and establishing contact with appropriate parties for access and permissions. A draft Panama City crayfish translocation protocol was drafted and an interagency crayfish training workshop was hosted in Panama City at the USFWS office in April. Experts presented information on crayfish found in and around Bay County, with emphasis on the Panama City crayfish. The training focused on crayfish biology, identification, and threats to local species. Live specimens were present to underscore identification differences among species. Participants included FWC, USFWS, Florida Park Service biologists, a Gulf Power representative, and an independent crayfish biologist. In addition, Threatened and Non-Game Species Management funding enabled the City of Lynn Haven to conduct maintenance of existing drainage in a city-owned right-of-way to restore the original hydrology of the drainage basin and improve conditions within a Panama City crayfish restoration area.

In November 2013, the St. Joe Company announced an agreement to sell the majority of its North Florida timberland holdings to the Utah-based company AgReserves, which stated it intends to continue to use the land for agricultural purposes. This land transaction is potentially significant to the conservation of the Panama City crayfish because the majority of the species' known localities occur on St. Joe lands, however, only a portion of the St. Joe lands within the Panama City crayfish range has changed ownership. During FY 2014-15, FWC will reach out to both the new landowner and St. Joe to discuss options for Panama City crayfish conservation on their lands.

FWC continues to consult with USFWS 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). These habitat conservation and mitigation options are needed to complete the draft Panama City crayfish management plan.

Miami Blue Butterfly (*David Cook, Mary Truglio, and Ricardo Zambrano*)

The Miami blue butterfly was State-designated Threatened until April 2012 when it was listed as Federally Endangered by the USFWS. 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 in two populations in the Key West National Wildlife Refuge (NWR) 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. During FY 2013-14, progress on implementing the 2010 Miami Blue Butterfly Management Plan continued to be severely limited due to the 2010 loss of both the wild population at the Florida Department of Environmental Protection's (FDEP) Bahia Honda State Park (due to inclement weather and predation by non-native iguanas) and the captive population (due to inclement weather that affected their food supply also) 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 NWR are robust enough to support collection from the wild. A biologist from North Carolina State University was contracted by USFWS through December 2013 to (1) conduct regular surveys of the Key West NWR Miami blue populations, (2) refine survey and monitoring techniques, and (3) develop a model to predict when high adult numbers are likely to be observed. Peak population estimates were between 450 and 600 Miami blue butterflies, and were associated with the amount of precipitation, and resulting growth of the black bean host plant over the preceding two months.

In FY 2014-15, FWC will continue to support USFWS conservation efforts on Key West NWR 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. In addition, FWC expects to participate on the newly-forming Miami blue recovery team to help USFWS draft a formal recovery plan. This plan will be partly based on the 2010 FWC plan and on contributions from the Imperiled Butterflies of Florida Work Group, which provided a forum for identifying threats to the Miami blue and recommending conservation actions to address them.

The Miami Blue Butterfly Management Plan may be accessed at (http://myfwc.com/media/1349003/MiamiBlueButterflyManagementPlanRevised.pdf.

Schaus Swallowtail Butterfly (*David Cook, Mary Truglio, and Ricardo Zambrano*)

The Schaus swallowtail butterfly (Schaus) is Federally-designated as Endangered. The species has historically been most commonly seen at Biscayne National Park (Miami-Dade County) and North Key Largo (Monroe County), but its numbers in recent years have shown a dramatic decline. Surveys conducted by FWC, the North American Butterfly Association, and the National Park Service in 2011 yielded 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, and that year there were only four verified Schaus adults sightings, 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 by USFWS to allow the capture of up to three females to attempt captive propagation. However, no further Schaus were seen or captured in 2012.

During 2013 surveys, a total of 31 Schaus were sighted, all on Elliott Key. According to a protocol approved by USFWS the previous year, three female Schaus were captured and held in captivity until eggs were deposited ("first round of captive breeding"). This effort yielded 100 eggs, which were taken to the University of Florida 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 five additional larvae collected in 2013 under USFWS authorization, yielded 70 pupae from seven founder lines. In the wild, Schaus typically remain as pupae until spring rains trigger their emergence to begin that year's flight season. In order to maximize the number of Schaus available for potential release in the spring, however, 22 of the pupae were treated with water sprinkling in March 2014 to artificially trigger early emergence. The resulting adults were paired as mates and resulted in 996 Schaus larvae ("second round of captive breeding"). FWC

provided funds to help purchase the wild lime host plants needed to support these captive rearing efforts.

In February 2014, FWC led pre-planning meetings for the 2014 Schaus flight season through the Imperiled Butterfly Work Group, which is composed of several agencies and organizations dedicated to the protection and recovery of at-risk butterflies. In spring 2014, 308 larvae (from the second round) plus 46 adult Schaus (from the first round) were released on Elliott Key. Larvae were released along accessible trails and placed on new torchwood growth when available, and were subsequently monitored. Released adults were individually marked with a number and the letter "R" to designate them as releases. During the surveys conducted by the University of Florida and associates from May 9 until June 27, 2014, a total of 413 adults were counted on Elliott Key, and of those 233 were captured and marked. Dr. Jaret Daniels, the University of Florida lead researcher for the project, proposed, "The numbers are likely up due to the increased rains last year and nearly 50 adults released this spring; it is also possible that the late rains this year (heavy rain starting in mid-June) could have triggered additional adult emergences even of some of the more than 300 larvae released that undoubtedly survived to pupation."

Due to the intensive efforts on Elliott Key, surveys were not conducted by the University of Florida on other islands in Biscayne National Park in 2014. Florida Department of Environmental Protection staff coordinated surveys on North Key Largo in 2014, however, where three Schaus sightings were reported. A total of 688 pupae remain at the University of Florida, with an additional round of captive rearing and releases planned for late summer 2014.

WILDLIFE CONSERVATION, PRIORITIZATION, AND RECOVERY (*Scott Cooney*)

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 on FWC-lead areas. Using this information, FWC determines where focal 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 2013-14, FWC completed five workshops covering two WMAs and five WEAs. The areas covered by a workshop included: Joe Budd WMA (Gadsden County), Three Lakes WMA (Osceola County), Florida Keys WEA (Monroe County), Lafayette Forest WEA (Lafayette County), Bullfrog Creek Mitigation Park WEA (Hillsborough County), Moody Branch Mitigation Park WEA (Manatee County), and the Crooked Lake Mitigation Park WEA (Polk County). FWC initiated the drafting of strategies that are the output from these workshops. A majority of these Strategies are anticipated to be completed during FY 2014-15.

During FY 2013-14, FWC finalized three strategies covering three WMAs. Properties covered by these completed strategies include: Andrews WMA (Levy County), Fred C. Babcock-Cecil M. Webb WMA (Charlotte and Lee counties), and Joe Budd WMA (Gadsden 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 2013-14 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, emails, 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 2011-12, FWC revised the Section 6 Cooperative Agreement with USFWS. 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 species, information on listed species permits, and listed species management plans. During FY 2013-14, 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 2013-14. 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 85 reviews of highway projects during FY 2013-14, 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 740 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 2013-14. 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, environmental impact statements, 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 the participation of FWC law enforcement personnel and multiple partners including other State and Federal agencies, local governments, and nongovernmental organizations.

Managed areas within CWA boundaries are 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 2013-14, CWAs were posted with appropriate signage as necessary.

Active CWAs were monitored in FY 2013-14 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 2013-14 (**Table 8**). 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.

During FY 2013-14, three technicians were funded through Threatened and Nongame Species Management funding. The CWA Coordinator continued to work with the Coastal Wildlife Conservation Initiative to implement vegetation management at CWAs. Bird Island Critical Wildlife Area in Martin County was approved by the FWC Commission, the first new establishment in more than 20 years. The island provides a nesting site for at least 17 wading and shorebird species.

Seasonal Staffing for Critical Wildlife Areas – At-risk beach nesting bird populations are declining due to significant habitat modification, disturbance by humans, severe weather events, and elevated predation levels. Coastal habitats critical to these populations have been significantly impacted by development, coastal engineering, non-native vegetation, human activities such as beach driving, recreational activity, mechanical raking, and increased presence of domestic and non-native animals. CWAs are sites that FWC has established and can post as "closed to trespass" to protect birds during their critical life periods. Monitoring of nesting bird populations at CWAs help FWC understand the role of these areas in managing for at-risk beach nesting bird populations, and providing outreach to the public helps the public better understand the needs of these populations and why conservation measures are necessary. During FY 2013-14, funding was received to hire three technicians for CWAs across the State during the nesting season. With the presence of a local technician, FWC is able to respond to conflicts in a timely manner. Technicians maintained posted areas, monitored nesting, and provided outreach to the public.

Table 8. Critical wildlife areas (CWAs) in Florida during FY 2013-14, 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	50, 100, 30, 45, 4, 110, 15, 280, 20, 40, 4650, 75, 190, 170, 8, 140 nests	16 acres (ac) (6.5 hectares [ha])
Little Estero Island	Lee	1 April to 1 Sept.	Least tern, Wilson's plover, snowy plover, American oystercatcher	22, 10, 0, 1 nests	6 ac (2.4 ha)
Myakka River	Sarasota	1 March to 1 Nov.	Wood stork, great egret, great blue heron, cattle egret, anhinga, snowy egret, little blue heron	30, 29, 2, 2, 12, 0, 0 nests	1 ac (0.4 ha)
Anclote River Islands	Pasco/Pinellas	1 Feb. to 1 Sept.	Herons, egrets, brown pelican	Inactive[b]	5 ac (2 ha)
Red Lake	Sarasota	1 June to 31 Aug.	Herons, egrets, brown pelican	Inactive	34 ac (13.8 ha)
McGill Island	Manatee	15 April to 1 June	Herons, egrets, brown pelican	Inactive	50 ac (20.2 ha)
North Central					
Amelia Island	Nassau	1 April to 1 Sept.	Least tern, black skimmer, Wilson's plover, American oystercatcher, willet	45, 0, 0, 0, 0 nests	10 ac (4 ha)
Bird Islands	Duval	1 April to 1 Sept.	Black skimmer, gull-billed tern, least tern, American oystercatcher, Wilson's plover	Inactive	6 ac (2.4 ha)
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	2200, 1, 4, 1600, 0, 75, 2 nests	10 ac (4 ha)
Northwest					
Tyndall	Bay	Year-round	Least tern, black skimmer, snowy plover, Wilson's plover, American oystercatcher, willet, piping plover[c]	11, 0, 63, 28, 1, 5 nests	200 ac (81 ha)
Alligator Point	Franklin	1 April to 1 Sept.	Snowy plover, Wilson's plover, American oystercatcher, least tern, willet	4, 3, 4, 11, 0 nests	66 ac (26.7 ha)
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	13, 90, 11, 712, 415, 8, 55, 280 nests	32 ac (13 ha)
Gerome's Cave	Jackson	1 March to 1 Sept.	Southeastern myotis bat	~1000 individuals	2 ac (0.8 ha)
South					
Deerfield Island Park	Broward	Year-round	Gopher tortoise	7 individuals	56 ac (23 ha)
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 (30 ha)
Big Marco Pass	Collier	Year-round	Least tern, black skimmer, snowy plover, Wilson's plover, wintering shorebirds[c]	540, 620, 0, 6 nests	30 ac (12 ha)
Caxambas Pass	Collier	1 April to 1 Sept.	Least tern, black skimmer, Wilson's plover, wintering shorebirds[c]	Inactive	1 ac (0.4 ha)
Rookery Island	Collier	Year-round	Herons, egrets, brown pelican	Inactive	1 ac (0.4 ha)
Bill Sadowski	Dade	Year-round	Foraging shorebirds and wading birds	~1000 individuals	700 ac (283 ha)
Pelican Shoal	Monroe	1 April to 1 Sept.	Roseate tern, bridled tern	Inactive	1 ac (0.4 ha)
Northeast					
Jennings Cave	Marion	15 Feb to 31 Aug	Southeastern myotis bat	Inactive	1.9 ac (0.8 ha)
Matanzas Inlet	St. Johns	1 April to 1 Sept.	Least tern, Wilson's plover, willet	0, 1, 0 nests	28 ac (11 ha)

[a]Counts or estimates of peak numbers of individuals and/or nest attempts at each site during the closed period in FY 2013-14.
[b]Inactive means the site was either not used, or not available for use, by wildlife during FY 2013-14.
[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 2013-14, FWC's LAP assisted more than 423 landowners, including providing evaluations of effects from proposed agricultural practices to listed species on 316 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 2013-14, 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 2013-14. 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 shorebirds 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 104,456 water patrol hours were dedicated to manatee enforcement, resulting in 1,341 citations and over 2,759 warnings.

The Division of Law Enforcement issued 13 additional citations and 14 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 2013-14, 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 200 protected and listed species scientific collection, captive possession, translocation, wildlife relocation, nest removal, disturbance, incidental take permits, and permit amendments were issued during FY 2013-14. No agreements for permitting Federally-listed species, except those that already have permitting agreements in place, have been approved through FY 2013-14.

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 [Florida Department of Environmental Protection (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 is responsible for creating and maintaining the partnership network, developing and implementing the framework for 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 five 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 and cover for many species) in beach habitats, an outreach approach to reduce impacts to shorebirds from mechanical beach cleaning at important nesting beaches, 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. FWC participates 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, Craig Faulhaber, Judy Gillan, Necia Godzisz, Lori Haynes, Stan Kirkland, Cavell Kyser, Darrell Land, Connie Lord, Mark Lotz, Anne Morrow, Joe Murphy, Bill Parken, Karen Parker, Jessica Pernell, Alexandra Perryman, Nicole Ranalli, Kelly Richmond, Jess Rodriguez, Sharon Tatum, Dave Telesco, Jessica Therriault, 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. The following summarizes these efforts for listed species from July 1, 2013, to June 30, 2014.

Highlights – FWC engaged in major efforts promoting citizen awareness of listed or at-risk species in FY 2013-14, often done in partnership with other public agencies and private organizations. Examples are:

Decals celebrate 500th anniversary of La Florida – The FWC manatee and sea turtle decals released on July 1, 2013, highlighted the history of iconic species seen by Spanish explorers when they landed in 1513 on the shores of what they christened "La Florida." With a $5 donation, people can obtain the decals from their local tax collector's offices or at www.myfwc.com. The decals are redesigned annually, and in FY 2012-13, each decal raised more than $50,000 for manatee and sea turtle conservation efforts.

Helping protect gopher tortoises – A new two and a half minute video, "Help the FWC Protect Gopher Tortoises," was produced and posted on YouTube in April 2014. The video may be viewed at https://www.youtube.com/watch?v=td6F_rU6I3k. A new Florida Gopher Tortoise Smartphone app also became available. People downloading the free app are encouraged to use it to report locations of gopher tortoises and their burrows. The app also has

information and a fun quiz about this State-designated Threatened species. The app is available on both IPhone and Android.

Hungry bears outsmarted by bear-resistant trashcans – On October 4, 2013, FWC invited media to news conferences in Tallahassee, Orlando, and Naples to watch black bears in captivity trying to open bear-resistant trashcans containing food. The bears were not able to break into the bear-resistant cans. It was an effective demonstration of how to securely store garbage in order to reduce human-bear conflicts in Florida. Bears bulk up in the fall and eat extra calories to prepare for winter, so the media events were timed to deliver that message.

Public sightings of panthers and bears reported online – The opportunity for the public to report their sightings of Florida black bears at www.myfwc.com/bearsightings went live October 4, 2013. Meanwhile, reporting of panther sightings at www.myfwc.com/panthersightings continued, moving into its second year in FY 2013-14. There were a total of 2,257 Florida black bear sighting reports as of June 2014, with more than 500 of those reports including uploaded photographs. A total of 1,537 Florida panther sightings also were reported as of June 2014, of which 275 (out of 330 submitted with photos) have been verified as panthers based on photos of the animal or its footprints. This includes the first verification of a panther near the Green Swamp north of Interstate 4 in Central Florida. When someone sees a panther or black bear and reports it to FWC, the agency's biologists may use that sighting to help research and manage those species.

Cold-stunned sea turtles rescued, rehabilitated, and released – FWC and partners released about 50 sea turtles into the Gulf of Mexico off Cape San Blas on January 14, 2014, after the animals were rescued earlier from cold water temperatures. The Federally-designated Endangered sea turtles, mostly green turtles but also some Kemp's ridleys, had been cold-stunned and many would have died without human intervention. Most of the sea turtles were found in St. Joseph Bay in Gulf County, while others were rescued near Crooked Island and in Big Lagoon in Escambia County. The sea turtles were rehabilitated at Gulf World Marine Park in Panama City before release. An excited audience of vacationers from all over the U.S. and Canada, as well as local residents, lined the sandy beach where the turtles were carried by FWC staff down to the water. Media were invited to the event, and the FWC issued a release: http://myfwc.com/news/news-releases/2014/january/14/sea-turtles/.

Panther Kitten Rescued, Another Panther Released Back into Wild – A panther kitten, only a week old when rescued by FWC and partners in January 2014, was put on public view at the Ellie Schiller Homosassa Springs Wildlife State Park in Citrus County by the end of FY 2013-14. Biologists from FWC and the Conservancy of Southwest Florida discovered the kitten while conducting research. At the time, the one-pound male had a dangerously low body temperature and was unresponsive. The kitten was transported to the Animal Specialty Hospital of Florida in Naples, where veterinarians performed life-saving measures. He then spent time in rehabilitation at Tampa's Lowry Zoo, before being moved to the State park. Since this panther was so young at the time of rescue, he did not learn survival skills from his mother and cannot be released into the wild. Meanwhile, a female panther rescued in May 2013 that had suffered a broken leg, presumably from being hit by a vehicle, had her injuries surgically repaired and was taken to White Oak Conservation Center in Yulee for rehabilitation. She was released March 10, 2014, on a private ranch, with media invited to the event: http://myfwc.com/news/news-releases/2014/march/10/panther-released/

Project Acorn – Without an army of squirrels to do the job, collecting thousands of acorns is quite a chore. So how can it be done? FWC enlisted the help of hundreds of citizen-scientist volunteers. About 1,000 volunteers gathered, potted, and planted thousands of acorns to help restore scrub habitat at FWC's Lake Wales Ridge Wildlife and Environmental Area (WEA) in Highlands and Polk counties (http://myfwc.com/viewing/recreation/wmas/lead/lake-wales-ridge). "Project Acorn" began with a $25,000 grant from the Disney Worldwide Conservation Fund. Then Lake Wales Ridge WEA staff enlisted Ridge Rangers, their established volunteer corps, to collect acorns. Also recruited to help were community groups like a Junior ROTC class. When children and adults stopped by the Project Acorn booth at local festivals, they were invited to pot acorns and learn about the value of scrub habitat for at-risk species such as the gopher tortoise, Florida scrub-jay, Eastern indigo snake, and Florida mouse. The seedlings planted in summer 2014 will grow into scrub oak species. While 90% of the state's scrub habitat was lost over the last century, thanks to this project, 20 acres of scrub at the Lake Wales Ridge WEA will be restored. Project Acorn was featured in Florida Wildlife magazine (http://www.floridawildlifemagazine.com/project-acorn.html).

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

Daily newspapers	1,594
Weekly newspapers	1,507
Magazines	1,413
Online publications	1,445
Radio	1,324
TV	1,414

Numbers reflect individual reporters, editors, and producers receiving FWC news releases via email.

During FY 2013-14, FWC issued 56 news releases on Endangered and Threatened species. FWC news releases are posted online at www.myfwc.com/news. A selection of news releases from July to December 2013 follows:

- FWC, partners release seven rehabilitated manatees rescued during recent red tide, July 9, 2013
- FWC asks public to report sightings of rare snakes, August 14, 2013
- Panther sightings reported throughout Florida, August 15, 2013
- Fish and Wildlife Research Institute to host 19th annual MarineQuest open house, September 18, 2013
- As bears bulk up in fall, FWC asks public to share bear sightings, stash trash, October 4, 2013
- FWC to hold three public meetings for input on managing bears in northwest Florida., October 8, 2013
- Green sea turtles nest at unprecedented pace in Florida this year, October 30, 2013
- Watch out for manatees migrating to warmer waters, November 1, 2013
- Securing trash can reduce bear activity in Lake Wales Ridge, November 6, 2013
- Spread holiday cheer with manatee, sea turtle decals, December 4, 2013
- Collier County is panther country; take precautions, December 13, 2013
- FWC identifies bear that injured Longwood woman, December 17, 2013
- FWC, partners offer reward for information about suspicious panther death, December 18, 2013
- FWC continues panther relocation efforts, December 27, 2013

FWC communicates regularly with media on listed species. For instance, a June 13, 2014, regional press release, **Boaters urged to go slow due to leaping sturgeon,** encouraged boaters on the Choctawhatchee River to slow down and be ready to react because of the growing Gulf sturgeon population and its habit of leaping out of the water. There have been injuries and near-collisions on northwest Florida rivers due to the leaping Gulf sturgeon, a Federally-designated Threatened species.

Social Media – The MyFWC Facebook (https://www.facebook.com/MyFWC) site reached nearly 50,000 "Likes" as of June 30, 2014, more than double the number from a year ago. The newer FWC Fish and Wildlife Research Institute Facebook (https://www.facebook.com/FWCResearch) site reached nearly 5,000 "Likes," and the FWC's Great Florida Birding Trail Facebook (https://www.facebook.com/floridabirdingtrail) site has nearly 6,000 "Likes." Overall, FWC's use of social media and its social media audiences grew significantly during FY 2013-14, including:

- Flickr photo views reached close to 5 million
- YouTube video views reached nearly 1.3 million
- Twitter followers grew to more than 16,000
- Instagram followers reached more than 4,000

(FWC uses two Twitter, two YouTube, and two Flickr accounts to highlight imperiled species, so numbers were combined.)

Among the stories of at-risk species featured on FWC social media:

A Florida Mouse video posted in November 2013 on YouTube highlights two years of research on this listed species, including trapping and tagging hundreds of mice to determine population and movements before and after prescribed burns in their preferred sandhill habitat: https://www.youtube.com/watch?v=bWtJPTyzP_g&list=UUkDj8yIrlrHB1hkU93uEZQg.
The Florida mouse video also was featured on the home page of www.myfwc.com.

North Atlantic right whale 2013-14 calving season was documented in 68 photos posted on the MyFWC Research Flickr site (https://www.flickr.com/photos/myfwc/sets/72157638124753984/), highlighting the annual birth ritual of mother and calf right whales, a Federally-designated Endangered species. Photo captions identify locations and sighting of specific whales and marks left by entanglements with fishing gear. The only known calving areas for these large whales are the coastal waters of northeast Florida and southeast Georgia.

Sea turtle nesting season begins – More than 75,000 people read the MyFWC Facebook post in March providing the news that more sea turtles nest on Florida's sandy beaches than on any other U.S. coastline. Green sea turtles grabbed the gold in last year's nesting Olympics, when this Federally-designated Endangered species set a record of more than 36,000 nests in Florida. March was the official start of the 2014 sea turtle nesting season, which runs through October and even later in the year for green turtles. People can help by removing chairs, canopies, and other items from the beach at night, because they block the movement of turtles and their hatchlings. In addition, the public should turn off or shield lights on the beach to prevent hatchlings from getting confused and going toward land instead of the salt water where they belong.

Destination Conservation – "Destination Conservation" Facebook posts emphasize the critical role of habitat in species' survival. A post on June 17, 2014, noted that in 2012, only four Schaus' swallowtail butterflies were found on a single island in Biscayne National Park. Recently over 1,000 Schaus' swallowtail butterflies and larvae were released into their natural habitat. Making this possible is a captive breeding program for this Federally-designated Endangered butterfly at the University of Florida's McGuire Center for Lepidoptera, plus support from multiple agencies including FWC.

The Great Florida Birding & Wildlife Trail Facebook site is packed with photos and information on imperiled bird species, including the Southeastern American kestrel, roseate spoonbill, Florida scrub-jay, Florida grasshopper sparrow, Florida burrowing owl, wood stork, black skimmer, and crested caracara, https://www.facebook.com/MyGFBT/.

Endangered Species Day – On May 16, 2014, FWC used Facebook to talk about getting excited about the species you know and also the species you want to know better, like the Eastern indigo snake. This is the longest native snake in North America, reaching a length of more than eight feet. This nonvenomous Federally-designated Threatened species has been documented to be living in 46 Florida counties since the year 2000. People were reminded that the things they do every day can make a difference in the survival of Florida's 133 Endangered and Threatened species and the places where they live.

GovDelivery and Websites – The public in today's world goes to the Internet for information on Florida's listed species. FWC began using the GovDelivery digital

communications platform in June 2013, enabling people to sign up for emails or text updates on topics of their choice, including news on managed species such as the Florida panther, gopher tortoise, manatee, and black bear. My FWC website visitors can click on the "red envelope" icon to get started. GovDelivery significantly broadened FWC's citizen awareness with 725,466 subscribers as of June 30, 2014.

Become a Fish and Wildlife Citizen Scientist – FWC now has a one-stop destination, http://myfwc.com/get-involved/citizen-science/, for people interested in participating in wildlife conservation. There are opportunities here for the public to report sightings on species such as bald eagle, bear, Eastern chipmunk, Florida shorebirds, fox squirrels, gopher tortoise, panther, rare birds, rare snakes, right whales, sea turtles, whooping cranes, and wood stork nesting colonies.

This citizen science portal, initiated in spring 2014, starts with: "Help expand our knowledge of what is happening with Florida's fish and wildlife by getting involved as a citizen scientist and assisting FWC with research and management efforts. There are plenty of opportunities to help out and you are not required to be a biologist or have special training. Just share what you see and experience when you are participating in outdoor activities such as hiking, hunting, biking, bird watching, fishing, boating, photography, or even just sitting in a backyard or on a park bench. The information you provide is valuable, giving our staff an enhanced, up-to-date picture of the status of Florida's fish and wildlife. It can also be fun and educational for you." More than 5,000 visitors came to these pages in FY 2013-14.

Florida Shorebird Alliance – Florida's network of shorebird and seabird conservation partners has grown to 1,357 members and 12 local partnerships. The alliance's website, www.flshorebirdalliance.org, features resources, opportunities for partners and volunteers, and the "Wrack Line" newsletter. Florida Shorebird Alliance partners promote citizen awareness of shorebirds by volunteering as Bird Stewards on the beach, participating in outreach and training, and contributing to print, TV, and social media articles.

Great Florida Birding and Wildlife Trail – People love the birds they see and learn about on http://floridabirdingtrail.com, which received 58,000 visits in FY 2013-14. Most popular was the Florida burrowing owl, whose website received 5,100 visits.

Fairs, Festivals and Events – FWC staff show up at 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.

Florida Black Bear and Wildlife Conservation Festival – The Bear Management and Bear Research program staff partnered with the Umatilla Florida Chamber of Commerce, Lake County, U.S. Forest Service, Wildlife Foundation of Florida, Defenders of Wildlife, and private business sponsors to present the 15th annual Florida Black Bear and Wildlife Conservation Festival in Umatilla on October 12, 2013, drawing an estimated 5,000 attendees. While keeping the primary message of living safely with Florida black bears, FWC and its festival partners now incorporate other native wildlife species in the festival. There was a "Come Be a Bear" activity for kids, FWC's popular wildlife exhibit trailer, a freshwater fishing simulator, and archery demonstrations. FWC coordinated wildlife talks about bears, coyotes, panthers, and reptiles. FWC bear biologists led tours into nearby Ocala National Forest, which houses the state's largest bear subpopulation. The Agency also created a new festival website, flyers, posters, and signage. Live tweets broadened the festival's reach.

MarineQuest – FWC's Fish and Wildlife Research Institute annual open house was held October 18-20, 2013. More than 2,000 students in grades 4-8 and their teachers attended, as well as 7,500 additional visitors. Students toured lab stations managed by FWC scientists. Hands-on displays and activities drew students into the world of marine science and the fascinating things that scientists discover. Displays spotlighted listed species such as the manatee, panther, North Atlantic right whale, sea turtles, and corals. Researchers displayed a live, 100-pound alligator snapping turtle and visitors participated in the simulated rescue of a manatee.

Munson Community Heritage Festival – Each October, FWC sets up an interactive wildlife exhibit at the Munson Community Heritage Festival in the Blackwater River State Forest in Santa Rosa County. Blackwater Wildlife Management Area staff talk about the importance of habitat management to the survival of species such as the red-cockaded woodpecker and gopher tortoise; the Florida black bear exhibit included information about the bear's life history and how to reduce human-bear conflicts.

Third Annual Florida Panther Festival – More than 2,000 people attended the Florida Panther Festival in Naples on November 15-16, 2013. FWC panther and bear biologists talked about living with Florida panthers and black bears, and there was a "Living with Wildlife"

pavilion where people learned how to peacefully coexist with Florida's wildlife. There were other displays and information from local parks, recreational areas, and environmental organizations, as well as opportunities to go on interactive field trips. Information about the festival may be accessed at http://www.floridapantherfestival.com/.

2014 Manatee Festival – FWC staff attended this January 26, 2014, festival, which attracted more than 10,000 visitors and was near Blue Springs State Park in Volusia County, a popular spot to see Florida manatees. FWC educated the public about native wildlife in Florida and answered questions. FWC's Northeast Region's Wildlife Exhibit trailer was there, so festival attendees could find out more about Florida wildlife.

Florida State Fair – This year's State Fair in Tampa, which ran from February 6-17, 2014, was a wonderful opportunity for FWC staff to interact with citizens by providing information and answering questions about Florida wildlife. At the State Fair, FWC did live tweets during part of the festival to engage its broader Twitter audience in the conversation about wildlife.

Florida Scrub-Jay Festival – Only one bird species, the Florida scrub-jay, makes its home exclusively in the Sunshine State. This songbird, with its bright blue headdress, wings, and tail, and bold, curious behavior, depends on scrub habitat for survival. Children and adults learned more about Florida scrub-jays and explored the ecosystem where they live on February 8, 2014, at the 5th annual Florida Scrub-Jay Festival in Volusia County. FWC's press release about this event can be accessed at http://myfwc.com/news/news-releases/2014/january/29/scrub-jay-fest/.

Outdoor Night with the Orlando Magic – This March 30, 2014, event was FWC's first partnership with the Orlando Magic, an NBA team. About 500 to 1,000 people had a chance to learn about Florida's native wildlife while experiencing hands-on activities such as Safari-in-a-Box, Animal Olympics, and FWC's Florida Wildlife Exhibit. They also could discover outdoor programs such as the Florida Youth Conservation Centers Network. FWC encourages young people and families to participate in outdoor experiences and hopes the Orlando Magic event motivated the public to care for the fish and wildlife resources unique to Florida. FWC's press release about this event may be accessed at http://myfwc.com/news/news-releases/2014/march/11/magic/.

Gopher Tortoise Conservation Program – Program staff and volunteers hosted and/or participated in 19 outreach events including: five local government workshops, one Authorized

Gopher Tortoise Agent workshop, three Law Enforcement training events, and ten other outreach events including wildlife festivals, presentations to the Wakulla County and Leon County Senior Centers, presentations to Riversink Elementary School, the Creating the Next Generation that Cares event, The FWC Outdoor Experience, and the Taylor County 4-H event.

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

Wildlife Management Area Recreation Guide and Driving Tour – An updated recreation guide and a driving tour booklet were completed for the Chassahowitzka Wildlife Management Area in Hernando County. Both feature the Florida black bear and gopher tortoise, with information on their biology and behavior, along with photos.

Florida Paddling Trails Association Newsletter – This quarterly newsletter with a statewide membership circulation of 1,500 featured an FWC article on the snowy egret that included a photo and information on the species.

New Gopher Tortoise Outreach Materials – In addition to a new Smartphone application, new outreach materials were created and distributed during FY 2013-14. These materials include the *Gopher Tortoise Rehabilitation Release Guidelines*, the *Help the FWC Protect Gopher Tortoises* video, *A Landowners Guide to Managing Gopher Tortoise Habitat* brochure, and five gopher tortoise educational banners. Approximately 6,745 of *A Guide to Living with Gopher Tortoises* were distributed to local governments, schools, nature centers, and Florida residents. The poster *Got Gophers, Get Permits* is continuously distributed to planning councils, county and city building departments, and local permitting offices. More than 2,800 *Safe Roads* placards have been distributed and are available at Florida Visitor Centers, State parks, highway rest stops, and local parks. All publications are also available to download at www.myfwc.com/gophertortoise and at each of FWC's Regional Offices.

Volunteer Opportunities and Training – Volunteers contributed greatly to the success of the State's conservation efforts in FY 2013-14. They received the bonus of working in some of Florida's most beautiful wild areas.

Chick-proofing rooftops for nesting shorebirds – Prior to shorebird nesting season, volunteers modified rooftops of businesses in Brevard County to make them chick-proof for the least terns and black skimmers that nest there. Hardware cloth fencing was installed along the perimeter of rooftops, and drain holes were covered, to prevent chicks from falling off the rooftop or becoming injured. Three rooftops with historical nesting records were modified.

Volunteers with the Northeast Region Volunteer Program also surveyed beaches and rooftops for shorebird and seabird nesting activity in both St. Johns and Brevard counties from March to June 2014, following Florida Shorebird Alliance protocols. Volunteers also posted signs in nesting areas and acted as beach stewards to protect least tern colonies from disturbance caused by beachgoers in St. Johns County. In FY 2013-14, 11 volunteers contributed 261 hours towards shorebird/seabird conservation.

Red-cockaded Woodpecker Monitoring, Habitat Enhancement – Volunteers with the Northeast Region Volunteer Program monitored a subset population of the Federally-designated Endangered red-cockaded woodpecker in the Ocala National Forest during FY 2013-14. Volunteers monitored nests at 24 clusters. As a result, biologists with the U.S. Forest Service banded juveniles for intra-population translocation, which involves moving red-cockaded woodpeckers from the northern part of the Florida population, which is at or near carrying capacity, into the southern population. Volunteers also monitored juveniles after fledging and will continue to determine survivability of banded young and locate their cavity trees prior to translocation in the fall and winter. Furthermore, volunteers collected cavity tree resource information for the cavity tree census. Ten volunteers contributed 256 hours towards this project. FWC's North Central Volunteer Program has been instrumental in preserving and expanding the number of red-cockaded woodpecker clusters in the Citrus Wildlife Management Area within Withlacoochee State Forest. Volunteers are essential to the work of enhancing and protecting the habitat in and around red-cockaded woodpecker clusters by preparing them for prescribed fires conducted by the Florida Department of Agriculture and Consumer Services' Florida Forest Service. Volunteers also monitor clusters and assist with translocations where red-cockaded woodpeckers from the Citrus population restock populations throughout Florida as well as the southeastern United States. FWC manages 75 active red-cockaded woodpecker nest clusters in the Citrus WMA. During FY 2013-14, ten volunteers, contributing 525 hours, assisted staff with habitat enhancement at active nest clusters.

Southeastern American Kestrel Nest Box Monitoring – The State-designated Threatened Southeastern American kestrel, the smallest falcon in the U.S., is found year-round throughout Florida. FWC manages a nest box program to augment kestrel populations and provide nesting opportunities. Volunteers monitored 30 nest boxes on seven properties in Marion, Sumter, and Citrus counties during the 2014 breeding season (April-July), with the number of eggs/nestlings recorded for all nests. Ten volunteers contributed a total of 196 hours to complete the 2014 monitoring survey, with two of 30 boxes documented as being actively used. Volunteers also monitored kestrel nest boxes in Hernando and Dixie

counties and expanded their reach this year to the Big Bend WMA in Dixie County. The nest status and number of eggs/nestlings were recorded for all nests. Eight volunteers, contributing 84 volunteer hours, monitored 23 nest boxes on FWC-managed land and other public properties in Hernando County. Fourteen of the 23 nest boxes were observed to be actively used. In total, volunteers in Hernando and Dixie counties donated 114 hours towards monitoring kestrel nest boxes. Additionally, volunteers began monitoring kestrel nest boxes in FWC's southwest region. Volunteers monitored 19 nest boxes on seven public properties in Polk and Highlands counties. Four volunteers contributed a total of 82 hours during the 2014 nesting season. Two of the 19 boxes monitored were active.

Wading Birds Nest Monitoring – Volunteers from the Southwest Region Volunteer Program monitored wading bird nests on Lake Somerset in Lakeland. Volunteer monitoring was in response to resident concerns about localized airplanes and disturbance disrupting the nesting of birds on the lake. Thirteen volunteers monitored many nests, including 34 wood stork nests, 14 little blue heron nests, five roseate spoonbill nests, and five tricolored heron nests. Volunteers recorded nest status, number of eggs/nestlings, adult behavior, and disturbance. Volunteers contributed 114 hours once a week during the nesting season from March through June.

Florida Scrub-Jay Monitoring – Volunteers with the Northeast Region Volunteer Program assisted FWC and partners with Florida scrub-jay population surveys on public and private lands around the state for the Jay Watch Program coordinated by Audubon of Florida. Volunteers monitored family groups to determine group size, monitored species' movements to define habitat use, and in some areas, banded scrub-jays. Thirty-nine volunteers worked cooperatively with FWC for a total of 411 hours at sites such as Halpata Tastanaki Preserve and Ross Prairie State Forest in Marion County, and the Ocala National Forest.

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.

Bear Management Unit Public Workshops – In June, FWC initiated the first of three public workshops in South Florida to discuss management of Florida black bears and how people can get involved in working with the agency on bear issues. FWC's press release about the workshops may be accessed at http://myfwc.com/news/news-releases/2014/june/12/bear-workshops/. Under FWC's Florida Black Bear Management Plan,

approved in 2012, seven bear management units will be established to allow FWC to manage bears based on the characteristics of bears, people, and habitat in different parts of Florida. The four bear management units established so far are the South Bear Management Unit, Central Bear Management Unit, Eastern Panhandle Bear Management Unit, and West Panhandle Bear Management Unit. Each contains a separate subpopulation of Florida black bears. During the 19 bear management unit public workshops conducted in FY 2013-14, FWC listened carefully to local citizens and heard diverse perspectives regarding bear conservation in their area. Interested individuals were invited to sign up to be members of their local Bear Stakeholder Group. So far, two Bear Stakeholder Groups have been formed and meet quarterly to discuss bear management issues.

Panther Teamwork and Outreach – USFWS's Florida Panther Recovery Implementation Team, of which FWC is a member, held a May 2014 forum where the concept was introduced of paying private landowners whose properties provide valuable habitat for the Florida panther. The idea of a Payment for Ecosystem Services for landowners in southwest Florida, where most Florida panthers and all known breeding females live, was discussed, along with other options. Ranchers often face the loss of calves to panthers. About 100 people attended the meeting at the Archbold Biological Station in Highlands County. Additionally, FWC's new panther specialist was a guest speaker on Big Lake Now radio show on WAFC in Clewiston, which reaches towns such as LaBelle, Lake Placid, Okeechobee, and surrounding rural and agricultural areas. The topics covered were panther ecology, distribution, depredation issues, and reimbursement programs, and landowner incentives for people owning property south and north of the Caloosahatchee River.

Gopher Tortoise Workshops – In summer 2014, FWC held four regional workshops, providing an overview of the Gopher Tortoise Management Plan and focusing on ways FWC and local governments can coordinate on protecting the State-designated Threatened gopher tortoise and its burrows. Twenty-five people attended the first workshop, in Leon County, including representatives of county, State, and Federal agencies, the military, private environmental consultants, and local residents. Afterwards, participants were invited on a site visit to St. Marks Headwater, a county-owned and managed site, to further discuss gopher tortoise habitat management. Other workshops were held in Seminole, Polk, and Martin counties.

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

Project WILD – Florida teachers of students from prekindergarten through 12th grade are provided with the tools, training, and resources needed to engage and excite students in learning about wildlife and conservation through FWC's Project WILD. Teachers get involved with Project WILD through a series of workshops to help them present active, hands-on lessons about Florida wildlife, including at-risk species, and where the animals live.

Project WILD staff and 54 Florida Project WILD volunteers trained 1,657 educators in FY 2013-14, by facilitating 82 educator workshops (which included 35 Project and Aquatic WILD; 26 Growing Up WILD; six Flying WILD; three Science and Civics; seven Schoolyard Wildlife; and four Florida Black Bear workshops). A new Project WILD brochure also was developed.

Teachers Go to Plant Camp – For five days in June 2014, teachers from around the state received intensive hands-on training from biologists and others involved in plant management on how to identify invasive plants and understand their impact on Florida's fish and wildlife habitats, including habitats for Endangered and Threatened species. Now in its ninth year, Plant Camp is co-sponsored by FWC and the University of Florida/Institute of Food and Agricultural Science's Center for Aquatic and Invasive Plants. The teachers, who come from elementary, middle, and high schools, go on hikes, explore lakes, and experience nature first-hand. They leave Plant Camp with tools for sharing what they have learned with their students and fellow educators.

All materials and curriculum provided are aligned with Florida Standards. The goal of Plant Camp is to help teachers educate the next generation about conservation of Florida's fish, wildlife, and habitats. Since 2006, nearly 250 teachers have attended Plant Camp and reached out to an additional 1,200 teachers and more than 25,000 students.

APPENDIX A. LISTED WILDLIFE SPECIES IN FLORIDA AS OF JUNE 30, 2014

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
National Wildlife Refuge	NWR
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 2013-14.

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/.

Arendt, M, Schwenter, J., Witherington, B.E., Meylan, A., Saba, V. 2013. Historical versus contemporary climate forcing on the annual nesting variability of loggerhead sea turtles in the Northwest Atlantic Ocean. PLOS One 8(12):e81097.doi:10.1371/journal.pone 0081097. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0081097

Barrett, M.A., Telesco, D.J., Barrett, S.E., Widness, K.M., and Leone, E.H. 2014. Testing bear-resistant trash cans in residential areas of Florida. Southeastern Naturalist, 13(1): 26-39.

Enge, K. M., Douglass, N.J., Gore, J.A., Hovis, J.A., Meyer, K.D., Wallace, G.E., and Farmer, A.L. 2014. Rare vertebrate survey of the Fisheating Creek area, Glades County, Florida. Florida Scientist 77:15–42.

Enge, K. M., and Enloe, C.M. 2013. Geographic distribution: *Lithobates capito* (gopher frog). Herpetological Review 44:621.

Enge, K. M., Mays, J.D., and Blush, J.C. 2014. Geographic distribution: *Notophthalmus perstriatus* (striped newt). Herpetological Review 45:275.

Enge, K. M., Stevenson, D.J., Elliott, M.J., and Bauder, J. 2013. The historical and current distribution of the eastern indigo snake (*Drymarchon couperi*). Herpetological Conservation and Biology 8:288–307.

Enge, K. M., Thomas, T.M., and Suarez, E. 2014. Population status, distribution, and movements of the alligator snapping turtle in the Suwannee River, Florida. Final Report, Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Wildlife Research Laboratory, Gainesville, Florida, USA. 47pp.

Foley, A., Schroeder, B., Hardy, R., MacPherson, S., and Nicholas, M. 2014. Long-term behavior in foraging areas of adult female loggerhead sea turtles (Caretta caretta) from three Florida rookeries. Marine Biology.

APPENDIX C. Continued

Foley, A., Schroeder, B., Hardy, R., MacPherson, S., Nicholas, M., and Coyne, M. 2013. Postnesting migratory behavior of loggerhead sea turtles (*Caretta caretta*) from three Florida rookeries. Endangered Species Research 21:129–142.

Hirama, S. 2014. *Lepidochelys kempii* (Kemp's Ridley seaturtle) Atlantic nesting. Herpetological Review. 45(2): 316-318.

Mays, J. D., and Enge, K.M. 2014. Geographic distribution: *Notophthalmus perstriatus* (striped newt). Herpetological Review 45:275.

Meylan, A, Arenas, A., Zurita, J., Harrison, E. Gray, J., Meylan, PA. 2014. Green turtles tagged in developmental habitat in Bermuda nest in Mexico and Costa Rica. Marine Turtle Newsletter: 141: 15-17.

Nero, R., Cook, M., Coleman, A., Solangi, M., and Hardy, R. 2013. Using an ocean model to predict likely drift tracks of sea turtle carcasses in the north central Gulf of Mexico. Endangered Species Research 21:191–203.

Poulakis, G. R., Stevens, P.W., Timmers, A.A., Stafford, C.J., and Simpfendorfer, C.A. 2013. Movements of juvenile endangered Smalltooth Sawfish, *Pristis pectinata*, in an estuarine river system: use of non-main-stem river habitats and lagged responses to freshwater inflow-related changes. Environmental Biology of Fishes 96:763–778. doi: 10.1007/s10641-012-0070-x

Roberts, K., Collins, J., Paxton, C., Hardy, R., Downs, J. 2014. Weather patterns associated with green turtle hypothermic stunning events in St. Joseph Bay and Mosquito Lagoon, Florida. Physical Geography 35(2):134–150.

Thomas, T.M., Granatosky, M.C., Bourque, J.R., Krysko, K.L., Moler, P.E., Gamble, T., Suarez, E., Leone, E., Enge, K.M., Roman, J. 2014. Taxonomic assessment of Alligator Snapping Turtles (Chelydridae: *Macrochelys*), with the description of two new species from the southeastern United States. Zootaxa, 3786(2): 141-165.

Waters, J. D., Coelho, R., Fernandez-Carvalho, J., Timmers, A.A., Wiley, T.R., Seitz, J.C., McDavitt, M.T., Burgess, G.H., and Poulakis, G.R. 2014. Use of encounter data to model spatio-temporal distribution patterns of endangered Smalltooth Sawfish, *Pristis pectinata*, in the western Atlantic. Aquatic Conservation: Marine and Freshwater Ecosystems doi: 10.1002/aqc.2461

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

Common Name	**Scientific Name**
AMPHIBIANS	
Ornate Chorus Frog	*Pseudacris ornata*
Striped Newt	*Notophthalmus perstriatus*
REPTILES	
Argentine black and white tegu	*Salvator merianae*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Florida Crowned Snake	*Tantilla relicta*
Southern Hognose Snake	*Heterodon simus*
BIRDS	
Anhinga	*Anhinga anhinga*
Bachman's sparrow	*Peucaea aestivalis*
Bald eagle	*Haliaeetus leucocephalus*
Black rail	*Laterallus jamaicensis*
Brown-headed nuthatch	*Sitta pusilla*
Cattle egret	*Bubulcus ibis*
Common ground dove	*Columbina passerina*
Common moorhen	*Gallinula chloropus*
Common nighthawk	*Chordeiles minor*
Eastern bluebird	*Sialia sialis*
Eastern meadowlark	*Sturnella magna*
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*
Red-bellied woodpecker	*Melanerpes carolinus*
Royal tern	*Sterna maxima*
Tufted titmouse	*Baeolophus bicolor*
Yellow-crowned night-heron	*Nyctanassa violacea*

APPENDIX D. Continued

MAMMALS

Cotton mice	*Peromyscus gossypinus*
Cotton rats	*Sigmodon hispidus*
Eastern gray squirrels	*Sciurus carolinensis*
Eastern spotted skunk	*Spilogale putorius*
Eastern woodrat	*Neotoma floridana*
Evening bat	*Nycticeius humeralis*
House cat	*Felis catus*
Least shrew	*Cryptotis parva*
Nine-banded armadillo	*Dasypus novemcinctus*
Old-field mouse	*Peromyscus polionotus*
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.

Area of Occupancy – The area within its `extent of occurrence` which is occupied by a taxon, excluding cases of vagrancy. In some cases the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon.

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.

Extent of Occurrence – The area contained within the shortest continuous imaginary boundary, which can be drawn to encompass all the known, inferred, or projected sites of present occurrence of a taxon, excluding cases of vagrancy.

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

APPENDIX E. Continued

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.

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.

Helper bird – Usually a previous male offspring of either the breeding male or both breeders. Helpers participate in territory defense, constructing and maintaining nest and roost cavities, incubating eggs, feeding and brooding nestlings, removing fecal sacs from the nest cavity, and feeding fledglings.

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

Keystone species – A species that plays a unique and crucial role in the structure of an ecosystem and the way it functions. Without their existence, the ecosystem would be dramatically different or cease to exist altogether.

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.

APPENDIX E. Continued

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.

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.

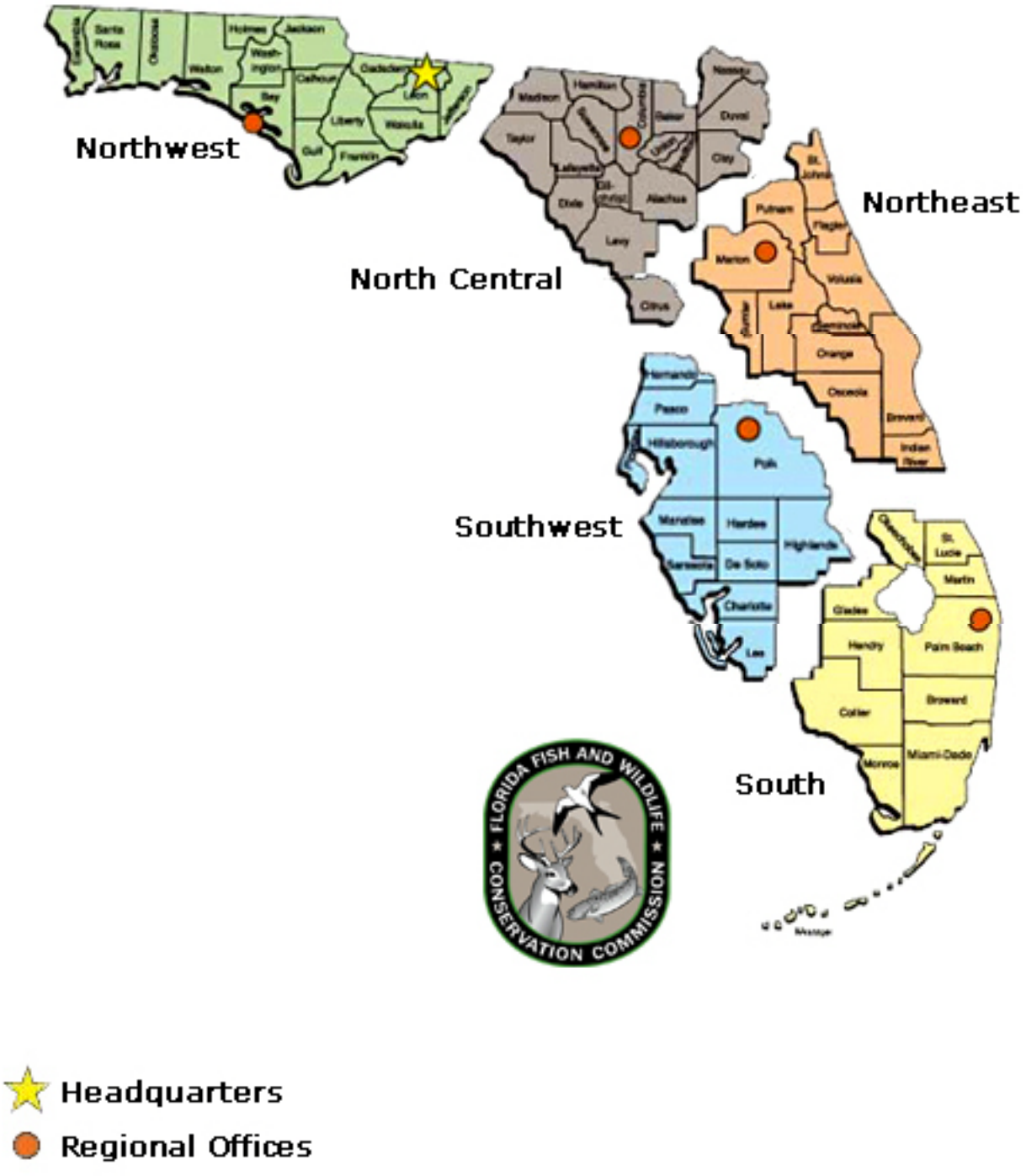
Transect – A path along which one records and counts occurrences of species, vegetation, and other relevant factors of a study.

APPENDIX E. Continued

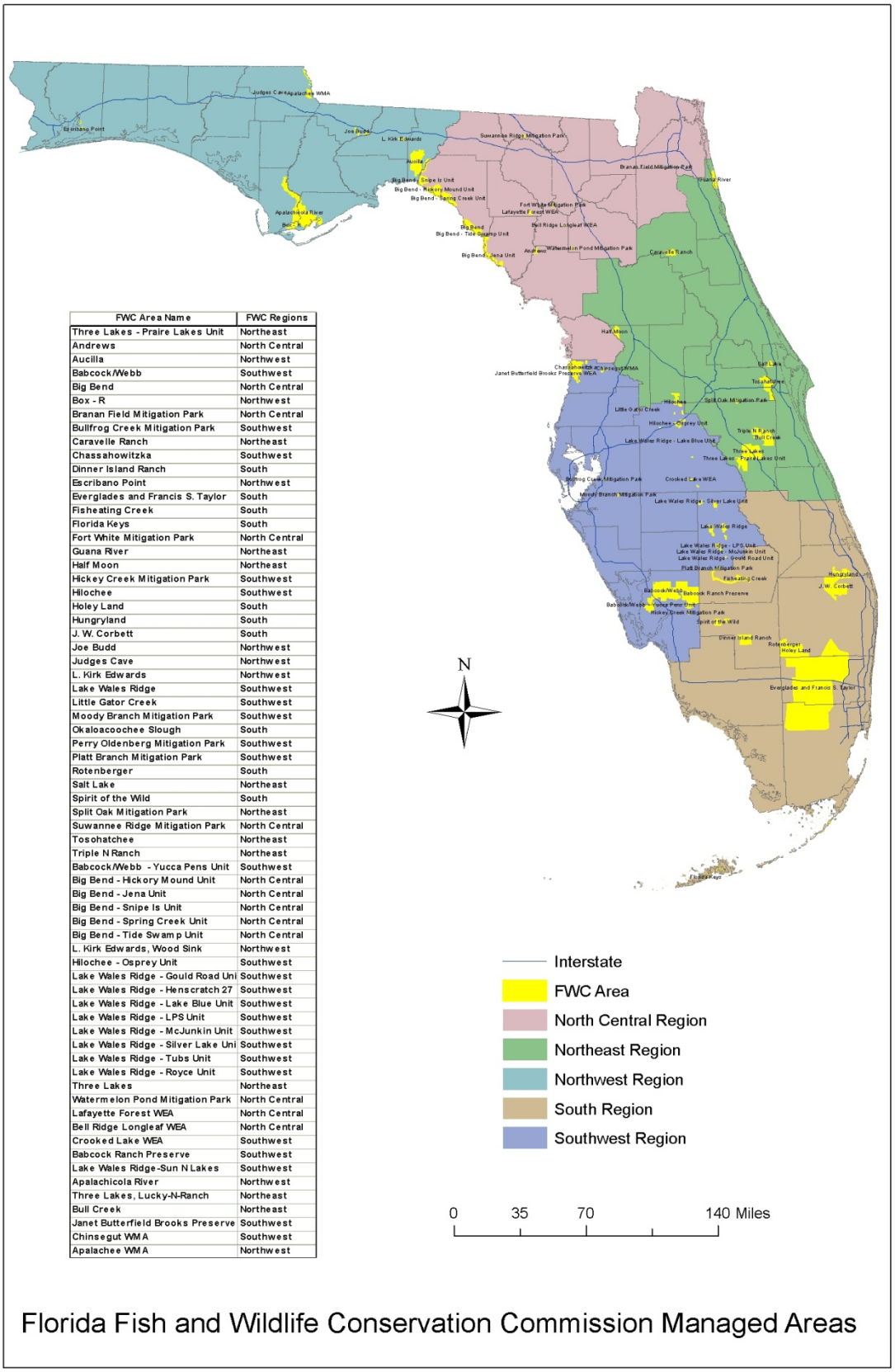
Translocation – Capture, transport, and release or introduction or reintroduction of wildlife.

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