

FY 2011-12
Progress
Report

on activities of the

Florida Fish and Wildlife Conservation
Commission

Endangered and Threatened
Species Management and
Conservation Plan



Endangered and Threatened Species Management and Conservation Plan
FY 2011-12 Progress Report

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Endangered and Threatened Species Management and Conservation Plan
FY 2011-12 Progress Report

FLORIDA'S ENDANGERED AND THREATENED SPECIES
MANAGEMENT AND CONSERVATION PLAN
FY 2011-12 PROGRESS REPORT

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

This document constitutes the 34th progress report and update of the Florida Endangered and Threatened Species Management and Conservation Plan as required by the Florida Endangered and Threatened Species Act of 1977 [§379.2291(5), Florida Statutes]. The Act required the preparation of an initial plan for submission to the 1978 Florida Legislature, and the annual preparation of a revised and updated plan for management and conservation of Endangered and Threatened species. Species of Special Concern are also included in this report. Species designated as Endangered, Threatened, or Species of Special Concern are collectively referred to as listed species.

The initial plan submitted in March 1978 remains the basic reference document for the annual updates. Subsequent annual reports may be consulted regarding a chronological history of the listed species activities. Copies are available from the Division of Habitat and Species Conservation, Species Conservation Planning Section, of the Florida Fish and Wildlife Conservation Commission (FWC), Tallahassee or at <http://www.myfwc.com/about/inside-fwc/legislative-affairs/archive-reports/>.

This report covers the fiscal year (FY) 2011-12, a period from July 1, 2011 to June 30, 2012. It includes a description of FWC's criteria for research and management priorities, statewide policies pertaining to listed species, a funding request for FY 2013-14, a progress report providing a description of agency actions for listed species, and a description of FWC's citizen awareness program as it relates to listed species. The progress report section includes reports of staff activities relating to listed mammals, birds, amphibians, reptiles, fish, and invertebrates. Additionally, this report provides updates on agency actions to provide coordination and assistance, Critical Wildlife Areas (CWA), incentive-based conservation programs, law enforcement activities, and permitting for listed species. Please contact FWC's Listed Species Coordinator or Assistant Listed Species Coordinator if you would like more information concerning this report. Contact information is listed below.

We would like to express our appreciation to each person who contributed to this report. Special appreciation is expressed to Caly Coffey for her assistance in the preparation of this report, and Keturah Brown, Elsa Haubold, and Lawson Snyder 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. New Threatened species rules approved by the FWC Commissioners went into effect on November 8, 2010, creating the Florida Endangered and Threatened Species List. Species listed through FWC's listing process are now all contained in a single-category called State-designated Threatened. 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 for details).

The official Florida Endangered and Threatened Species List is kept in Rule 68A-27.003, Florida Administrative Code (F.A.C.). The Species of Special Concern List is kept in Rule 68A-27.005 F.A.C. Currently, FWC lists 131 fish and wildlife species (**Table 1**) as FE (46), FT (19), FXN (1), FT(S/A) (1), ST (21), or SSC (43). There is no duplication in species listing between the two lists. Collectively, these 131 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, 2012 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.floridaforestservice.com/forest_management/plant_conservation_index.html) that maintains a list of Florida's Federally listed plant species. This list may be accessed at http://www.floridaforestservice.com/forest_management/plant_conserve_list.html.

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Table 1. Summary of the Florida Endangered and Threatened Species and Species of Special Concern lists as of June 30, 2012. [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 (**FXN**), State-designated Threatened (**ST**), or Species of Special Concern (**SSC**).]

STATUS DESIGNATION	FISH	AMPHIBIANS	REPTILES	BIRDS	MAMMALS	INVERTEBRATES	TOTAL
FE	3	1	4	9	22	7	46
FT	1	1	6	4	1	6	19
FT(S/A)	0	0	1	0	0	0	1
FXN	0	0	0	1	0	0	1
ST	3	0	7	5	4	2	21
SSC	7	4	6	16	6	4	43
TOTAL	14	6	24	35	33	19	131

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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, 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 remains under a State listing moratorium while the current list of species are evaluated. In June 2012, staff recommended and the FWC Commissioners approved reclassifying the Atlantic sturgeon from Species of Special Concern (SSC) to Federally-designated Endangered (FE), reclassifying the Okaloosa darter from FE to Federally-designated Threatened (FT), reclassifying the Miami blue butterfly from State-designated Threatened (ST) to FE, and removing the Florida black bear from the list completely. Staff also recommended and the FWC Commissioners approved listing the cassius blue butterfly, ceraunus blue butterfly, and nickerbean blue butterfly as Federally-designated Threatened Due to Similarity of Appearance [FT(S/A)] to the Miami blue butterfly. These actions were taken due to recent Federal listing actions, and will become effective in September 2012.

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

Threatened Species Management System, the Listing Process, and Management Plans (*Laura Barrett and Brad Gruver*). – Rules implementing a new Threatened Species Management System, including a revised listing process, became effective on November 8, 2010, and may be accessed at <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27>. Florida's new Threatened Species Management System has many improvements. Implementation of the

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revised listing process is expected to provide better conservation for Florida's listed species by, in part, reducing controversy associated with what category a species should be placed. Florida's Endangered and Threatened Species list is now comprised of all Florida species that are Federally-listed, and a separate, single-category State list of species at-risk of extinction in Florida that are not Federally-listed. By maintaining a single State listing category, called State-designated Threatened, the State's efforts are focused on what needs to be done for the species instead of what the species is called. Under the new rules, all species grandfathered into the State's list must be assessed using the new listing process to determine whether they are still at a high risk of extinction. All listed species must have a management plan developed with public input to guide conservation of the species. Under the new rules, duplication of permitting with Federal agencies is eliminated by not requiring State permits in addition to Federal permits for take of listed species.

In November 2010, status reviews were conducted on 61 State listed species that had not been reviewed recently to determine if they should be listed as State-designated Threatened. Based on the status reviews and other information, staff recommended that 40 of the 61 species be listed as State-designated Threatened and that 16 species be removed from State-designated Threatened (3) and Species of Special Concern (13) lists. The Species of Special Concern category will be abolished after all species in the category are determined to be State-designated Threatened or not. Staff listing recommendations were approved by the FWC Commissioners in June 2011. Pursuant to the threatened species rules, FWC was directed to proceed with development of management plans addressing all State-listed species. Listing changes for the recently reviewed species will occur after management plans are approved by the Commissioners.

Three of the 64 species (the Miami blue butterfly, gopher tortoise, and Florida black bear) already have approved management plans. One other species (the Panama City crayfish) has a draft management plan in development. Staff began work in December 2010 on the process to develop management plans for the remaining 60 species. In the first half of 2011, FWC began management plan creation by developing goals and objectives for each of the 60 species.

In the second half of 2011, staff engaged stakeholders to review the developed goals and objectives and solicit feedback on the desired level of interaction during the development of management plans. Additionally, beginning in the fall of 2011, FWC's Management Plan Coordinator and Stakeholder Coordinator began working with staff in developing species-focused conservation actions and expanded species-focused stakeholder lists. Due to the scale of this project – never before has the agency attempted to generate this many species plans at once – a new approach to at-risk species management planning has been developed. The result will be improved implementation for the benefit of not only at-risk species, but also of other species identified as having a conservation need as well. FWC will continue in the development of species management plans and will continue to engage and incorporate stakeholder input in FY 2012-13.

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.

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FWC'S INVOLVEMENT IN THE RECOVERY EFFORTS FROM THE DEEPWATER
HORIZON OIL SPILL (*Elsa Haubold*)

During FY 2011-12, FWC continued to support recovery efforts from the Deepwater Horizon oil spill. FWC worked with Florida Department of Environmental Protection (FDEP), county governments, water management districts, and several Federal agencies in the following areas during the State of Florida's emergency response to the BP Deepwater Horizon oil spill: reconnaissance, scientific support, Natural Resources Damage Assessment sampling and early restoration planning, and wildlife response.

Staff, working with the USFWS and the U.S. Coast Guard, developed a draft oiled wildlife response plan for Florida in the event another oil spill threatens Florida's coast. This plan should be finalized in early FY 2012-13 and incorporated into U.S. Coast Guard Oil Spill Contingency Plans.

FWC staff continue to be involved in Natural Resource Damage Assessment projects and in staffing the response from the Regional Command Center and Joint Information Center in New Orleans, Louisiana. Under Natural Resource Damage Assessment, FWC staff are assessing the effects of the oil spill and engaging in discussions as a Florida Co-Trustee (with FDEP as the Trustee) to determine early restoration projects that might be implemented in Florida. Natural Resource Damage Assessment work is expected to continue for several years. More information about Florida's ongoing participation in the recovery from the Deepwater Horizon Spill may be found at <http://www.dep.state.fl.us/deepwaterhorizon/>.

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FUNDING REQUEST

Recommended Funding Level (*Charlotte Jerrett*). – The recommended level of funding for FWC’s listed species programs in FY 2013-14 is \$25,247,486 (**Table 2**). This includes funding for current programs including but not limited to the development of species management plans and implementation of conservation actions and continuation of awards from Federal grants designed to assist in development of recovery programs.

Table 2. FWC Endangered and Threatened Species Budget Request for FY 2013-14.

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

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PROGRESS REPORT

FWC's mission is "managing fish and wildlife resources for their long-term well-being and the benefit of people." Management of listed species includes surveying and monitoring of species, habitat improvement and restoration, development and implementation of management plans, conservation planning, agency commenting on potential impacts to species, and citizen awareness. Research is a systematic means of generating the scientific information necessary to support and guide management of listed species. Research is also leading to a better understanding of how wildlife managers may alter population processes through management actions, as well as leading to management actions that have aided in species stabilization and conservation. This section briefly describes the progress of ongoing listed species management and research by FWC.

MAMMALS

Beach Mice (*Emily Evans, Jeff Gore, Dan Greene, Alex Kropp, and Melissa Tucker*)

Several subspecies of the old-field mouse, collectively known as beach mice, inhabit coastal dune habitat along the Atlantic Coast and northwest Gulf Coast of Florida. Due to the extensive development of their coastal habitat, all but one of the beach mouse subspecies are Federally-designated as Endangered or Threatened, including: Choctawhatchee beach mouse, Anastasia Island beach mouse, St. Andrews beach mouse, and Perdido Key beach mouse (all Federally-designated Endangered), and the Southeastern beach mouse (Federally-designated Threatened).

Conservation and Population Monitoring – FWC, Florida's Department of Environmental Protection's (FDEP) Florida Park Service, Gulf Islands National Seashore, and Tyndall Air Force Base continued a long-term monitoring program for beach mice in FY 2011-12 at 11 locations along the northwest Gulf Coast of Florida and Alabama (**Table 3**). At each site, track tubes made of plastic pipe have been placed on the sand at the regularly-spaced stations within the dune habitat. Inside each tube is a paper strip, an ink pad, 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. Stations are checked for mouse tracks at one or two-month intervals and the track data are used to determine the distribution of mice at a site and to compare relative occupancy rates among sites.

In FY 2011-12, the mean detection rate (percentage of tubes with tracks per sampling period) varied from 26% at Deer Lake to 98% at Perdido Key State Park. All sites had mouse tracks present at some stations each sampling period. The high detection rate for Perdido Key beach mice is particularly encouraging news because beach mouse populations were at perilously low levels just a few years ago and were restricted to the eastern end of the island. Now the mice are found throughout public lands on Perdido Key. Detection rates for beach mice were higher in FY 2011-12 than in the prior year at all locations except Billy Joe Rish Park, East Crooked Island, and Deer Lake State Park. In order to better monitor the small beach mouse population near Deer Lake in Walton County, FWC, in coordination with the St. Joe Company, established track stations in FY 2011-12 in the dunes at Water Sound, a residential property adjacent to Deer

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Lake State Park. Track stations were monitored at Camp Helen and St. Andrews State Parks in previous years, but no tracks were detected, and those stations were removed in September 2011.

Table 3. Mean percentage of track stations with beach mouse tracks in FY 2011-12 at 11 coastal locations in northwest Florida.

Sampling Locations	Subspecies	Number of Stations	Monitoring Interval	Percent of Stations with Tracks
Billy Joe Rish Park (Gulf County)	St. Andrews	21	2 month	79
Deer Lake (Walton County)	Choctawhatchee	16	1 month	26
East Crooked Island (Gulf County)	St. Andrews	42	1 month	85
Grayton Beach (Walton County)	Choctawhatchee	45	1 month	59
Gulf Islands National Seashore (Escambia County)	Perdido Key	80	2 month	95
Perdido Key State Park (Escambia County)	Perdido Key	81	2 month	98
Shell Island East (Federal – Bay County)	Choctawhatchee	30	1 month	95
Shell Island West (State – Bay County)	Choctawhatchee	20	1 month	73
Topsail Hill Preserve (Walton County)	Choctawhatchee	32	1 month	65
Water Sound (Walton County)	Choctawhatchee	4	1 month	65
West Crooked Island (Bay County)	Choctawhatchee	30	1 month	86

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. In November 2011, FWC set live traps in the Park and captured a new, unmarked beach mouse at Grayton Beach, which confirmed that mice in the new population were reproducing.

Over the past year, FWC has continued work on a project to differentiate beach mice and house mice using measurements of footprints. Throughout FY 2010-11 and FY 2011-12, biologists collected and measured tracks from captured St. Andrews, Choctawhatchee, Perdido Key, and Anastasia Island beach mice. By comparing measurements of the length and width of tracks between species, researchers hope to be able to distinguish consistently between beach mouse and house mouse prints left on papers in track tubes so that managers can know when house mice are present at a site.

Perdido Key Beach Mouse Captive Breeding – Prior to landfall of Hurricane Ivan in 2004, eight beach mice were taken from Perdido Key State Park (Escambia County) and transferred to a holding facility at the University of South Carolina. In 2007, the original eight mice and their descendants were moved to three Florida zoos; the Brevard Zoo in Brevard

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County, The Teaching Zoo at Santa Fe Community College in Alachua County, and Palm Beach Zoo in Palm Beach County. The zoos continued to support captive colonies of Perdido Key beach mice in FY 2011-12 and provided opportunities for the public to view the mice and to learn about their biology, status in the wild, and conservation efforts. The captive population continues to provide a source of beach mice to augment the wild population, if needed, and they were used in 2010 to re-establish a wild population at the west end of Perdido Key. During FY 2011-12, FWC, in conjunction with the Alabama Department of Conservation and Natural Resources, monitored the status of this new population with track tubes set throughout Gulf State Park, Alabama. Biologists captured 80 Perdido Key beach mice at Gulf State Park, which is slightly more than the 73 mice captured the previous year.

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

Anastasia Island Beach Mouse Population Monitoring – During FY 2011-12, FWC, FDEP, the National Park Service, and St. Johns County Habitat Conservation staff completed a monitoring project for Anastasia Island beach mice on Anastasia Island in St. Johns County using track tubes and live trapping. The study area extended from the southern half of Anastasia State Park to the southern end of Fort Matanzas National Monument, and included approximately ten miles (16 kilometers) of coastal dune habitat between the two locations. At Anastasia State Park, ten track stations were monitored for four months out of a full nine-month survey during FY 2011-12. Nine out of ten stations detected mice (one tube missing) during the full nine-month survey. At Fort Matanzas, 31 track stations were monitored for four months out of a full nine-month survey during FY 2011-12. During the full nine-month survey, 30 of 31 tubes were utilized (one tube was stolen/lost). On St. Johns County lands between Anastasia State Park and Fort Matanzas National Monument, live traps were set along a seven-mile stretch of beach. Trap lines were .5 mile (0.8 kilometers) in length and were established every other .5 mile. A total of 37 Anastasia Island Beach Mice were caught in 237 trap nights during the entire survey (two juveniles, six subadults, 29 adults). At least one Anastasia Island beach mouse was caught on every trap line except the southern-most trap line (bad weather and stolen traps are likely the cause). This study confirms that Anastasia Island beach mice are still present on St. Johns County lands. It had been more than twenty years since the last major beach mouse trapping effort was conducted in this area (1989-1991). No house mice were captured during trapping.

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, and local governments to identify ways to mitigate the loss of beach mouse habitat while allowing

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development to continue. During FY 2011-12, 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.

Florida Mouse (*Jesse Boulerice, Travis Blunden, and Scotland Talley*)

The Florida mouse is currently listed in Florida as a Species of Special Concern. In 2010, a biological status review was conducted by FWC and external experts. It was determined that the species should no longer be listed in Florida. A management plan for the Florida mouse was initiated in FY 2011-12 and the species will remain a Species of Special Concern until the management plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

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

A long-term monitoring project, incorporating both radio telemetry and mark/recapture of live trapped mice, was initiated to estimate the effects of prescribed burning on the species. Bell Ridge Wildlife and Environmental Area in Gilchrist County was identified as a suitable site, comprised entirely of sandhill habitat containing an established population of Florida mice. Mice were trapped at gopher tortoise burrows, and 18 mice were fitted with radio transmitters and tracked for two weeks, both before and immediately following a prescribed fire. Mechanical limitations of the telemetry equipment reduced ability to detect all animals over the full tracking period; however, daytime burrow locations were detected for at least 12 of the 18 animals. At the end of the tracking period, mice were recaptured and two of the transmitters that were recovered were found to be damaged. The average number of burrows used was estimated at 1.5 per mouse based on telemetry data, and this was supported by the live trapping. In addition, live trapping was conducted pre-burn, one month, and three-and-a-half months post-burn. In the first five months of ongoing monitoring, 256 Florida mice were captured and ear tagged. Preliminary analysis suggests the mice did experience a small reduction of population size following prescribed burning. Movement rates also increased significantly post-fire, suggesting mice may travel greater distances in search of resources after a burn. Additionally, average weights were approximately 20% greater for mice 3.5 months after burning; weight gains may be linked to a spike in reproduction or to better foraging in areas of re-growth. These results suggest that at least short-term changes to survival rates and movement rates may occur in the months following fire. Continued monitoring of this population will provide important information on the long-term effects of burning on Florida mice.

Monitoring and Genetic Sample Collection on Belmore State Forest and Jennings State Forest Wildlife Management Areas, and Branan Field and Watermelon Pond Wildlife and Environmental Areas – A pilot study to assess the effectiveness of the proposed Florida mouse monitoring protocol was initiated on four areas in FWC's North-Central region. As FWC was planning this trapping effort, Dr. Jim Austin from the University of Florida requested FWC

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cooperation in obtaining tissue samples for genetic analysis as part of a statewide genetic survey. Dr. Austin provided instructions and materials for collecting ear clippings for the genetic analysis.

Trapping was conducted in February and March on Belmore Wildlife Management Area (WMA), Branan Field Wildlife and Environmental Area (WEA), Jennings WMA, and Watermelon Pond WEA. No Florida mice were captured on Branan Field WEA in 160 trap-nights of effort. On Belmore WMA, six Florida mice were captured in 160 trap-nights and five ear clips were collected. Watermelon Pond WEA yielded 65 Florida mice in 220 trap-nights and ten ear clips were collected. On Jennings WMA, two Florida mice were captured in 280 trap-nights and one ear clip was collected. Other species captured included cotton mice, cotton rats, old field mice, and Eastern woodrats.

Half Moon Wildlife Management Area in Sumter County – During FY 2011-12, small mammals were trapped and marked at three different locations. Two were located within a scrubby flatwoods community and the other in a groundcover restoration site. Florida mice were captured in all locations. With four nights of trapping, the two scrubby flatwoods areas had 35 and 36 individual Florida mice, while the ground cover restoration site yielded five.

Tissue samples of 45 Florida mice were taken in Half Moon WMA for genetic analysis as a part of a statewide University of Florida genetic survey. Other species captured included cotton mice, cotton rats, old field mice, and golden mice.

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

The Key Largo cotton mouse is a Federally-designated Endangered subspecies endemic to Key Largo, the northernmost island in the archipelago of the Florida Keys. The Key Largo cotton mouse represents the southernmost subspecies of its genus and is restricted to approximately 2,102 acres (851 hectares) of tropical hardwood hammock. Habitat destruction on Key Largo in the late 19th century resulted in a loss of two-thirds of the original hardwood hammock habitat, contributing to population declines in many animal species. Because the small, nocturnal cotton mouse is seldom observed, land managers have little information about the status of the population or how current land management activities affect distribution and abundance. Since 2007, a long-term monitoring plan based on live-trapping mice has been implemented for assessing the population status of the Key Largo cotton mouse. In December 2011, FWC biologists, in conjunction with the U.S. Fish and Wildlife Service (USFWS) and Florida Department of Environmental Protection (FDEP) set live traps for cotton mice at 12 locations in North Key Largo. During five nights of trapping, 100 individual mice were captured among 235 total captures (some of the mice were captured multiple times). Cotton mice were captured at all trapping locations and the sex ratio of captured mice was 1.38 males:1 female (58 males:42 females). Skewed ratios are not uncommon among captured mice, but the ratio may reflect differences in trappability between the sexes rather than different ratios in the population.

Based upon the number of individual mice trapped at each location (i.e., the minimum number known alive), the average density of mice was 7.7 mice per acre (19 mice per hectare). Models that show recaptures estimated a slightly higher density of 9.3 mice per acre (23 mice per hectare). However, these models produce more precise estimates when most animals are caught multiple times; during FY 2011-12, 37 mice (37%) were captured only once over the five-night trapping period, and 22 mice (22%) were only captured twice. Nevertheless, trapping results

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indicate that the population of Key Largo cotton mice has not declined in size in recent years and likely still exceeds 10,000 individuals across north Key Largo. Because cotton mouse populations fluctuate in size between both seasons and years, multiple years of surveys will be needed to determine the range of variation in population size that cotton mice experience seasonally and annually.

Key Largo Woodrat (*Jeff Gore*)

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

All animals were fitted with radio collars with mortality sensors, monitored several days each week, and trapped monthly. Animals gained weight and moved among nest sites, but no reproduction was observed. Seven of the released animals were believed to be dead within 14 days, and by eight weeks, only five animals remained. Three animals survived to 16 weeks, and only one woodrat was alive when monitoring stopped at 19 weeks. The available evidence suggests that native birds of prey likely killed most or all of the woodrats.

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

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

The Florida bonneted bat is a State-designated Threatened species. A management plan for the Florida bonneted bat was initiated in FY 2011-12 by staff who will continue working with stakeholders to finalize the plan for FWC Commissioner approval.

The Florida bonneted bat is the largest and rarest bat species in Florida. There was only one known colony statewide (in a bat box 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

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four. During FY 2011-12, four more roosts were installed, each consisting of two single-chambered bat houses. These roosts were checked periodically by FWC to monitor occupancy. Also during FY 2011-12, three emergence counts were conducted on occupied bonneted bat roosts on the WMA; 42 bats were counted during these emergence counts.

During FY 2011-12, a graduate student from Florida Gulf Coast University's Department of Marine and Ecological Sciences continued a research project that began exploring habitat influences on selection of artificial bat houses by Florida bonneted bats on Babcock Webb WMA in FY 2010-11. The purpose of this research is to compare habitat surrounding occupied and unoccupied bat houses at four spatial scales: roost, local (within 33 feet or ten meters of roosts), stand (within 36-197 feet or 11-60 meters of roosts), and landscape (within 16 miles or 25 kilometers of roosts). FWC assisted in reviewing the research proposal, and assisted with access to the WMA periodically during data collection. During FY 2010-11, project planning and data collection were the primary activities. This research concluded during FY 2011-12 and results will be reported in FY 2012-13.

Gray Bat (*Jeff Gore*)

The gray bat, a Federally-designated Endangered species, is a colonial cave-roosting species that occurs throughout much of the south-central U.S. The gray bat's range-wide population previously suffered severe declines due to disturbance of its cave roosts, but its population now appears to be increasing. In Florida, however, the gray bat roosts only in a few caves in Jackson County where the population is declining in spite of the fact that the roost caves are protected.

Gray bats occupy different caves in summer and winter based upon temperature, and some bats migrate out of Florida during winter. The size of the summer population of gray bats in Florida cannot be easily determined because the bats roost within large colonies of a similar bat species, the Southeastern myotis. Observations made within caves and during counts conducted in the evening as bats exit their roosts are not definitive because of the presence of other species. Regardless, no gray bats have been observed or captured at summer roosts in Florida since 1990.

Gray bats in Florida typically have roosted in winter in two Florida caves and hibernating bats can be readily counted at both sites. However, in recent years few gray bats have been observed during the annual census of the winter roosts conducted by FWC and the Florida Department of Environmental Protection (FDEP). During the most recent winter count on January 31, 2012, biologists found no gray bats in the primary wintering cave in Florida Caverns State Park, but two other species of bats were present. Gray bats were also absent from a nearby smaller cave which is the only other site in Florida where gray bats recently have roosted. Although thousands of gray bats were believed to have been present formerly in Florida, no more than nine gray bats have been found hibernating in the state in any year since 2002.

White Nose Syndrome is an emerging fungal disease that has killed a multitude of bats from several species, including gray bats. The fungus has largely affected bats in colder regions of North America. It has not been recorded at any time among bats in Florida.

Surveys that are more frequent or a more thorough census might provide a better estimate of the number of roosting gray bats, but winter surveys are limited to once annually to minimize disturbance of the hibernating bats. Despite the apparent fluctuation, the number of gray bats in Florida remains critically low and the species may soon be absent from the state. Since the roost

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caves are protected, factors other than disturbance of roosts may be responsible for the decline. Gray bats occur in much larger numbers in other states including Alabama, Georgia, and Tennessee.

Southeastern Bat Diversity Network Bat Blitz (*Melissa Tucker*)

Since 2001, the Southeastern Bat Diversity Network (SBDN) has been sponsoring bat blitzes annually. A bat blitz is a multi-day survey effort hosted by State or Federal agencies to provide data on bat diversity and habitat use to land management agencies. The short, but intense, survey effort allows for a substantial amount of data to be collected over a very short period of time.

FWC, in conjunction with the University of Florida, the Apalachicola National Forest and the Florida Bat Working Group, hosted the 11th Annual Southeastern Bat Diversity Network Bat Blitz in northwest Florida in 2012. Ninety participants (including wildlife biologists, managers, researchers, educators, and students) representing 30 different agencies and organizations were divided into teams to conduct net surveys for bats. Survey sites were located in a region of the Florida Panhandle that stretches 50 miles (80 kilometers) east to west, and 40 miles (65 kilometers) north to south. This region encompasses parts of Calhoun, Leon, Liberty, and Wakulla counties. Within this region, approximately 150 potential survey sites were identified in areas suspected to be used by foraging bats (over ponds, streams, and rivers where bats may feed; or along densely forested roads that may serve as bat travel corridors). During the blitz, 31 of these sites were surveyed over the course of three nights by the teams of biologists. Nine to 11 sites were surveyed each night. Sites were located on Federal, State, and private lands including the Apalachicola National Forest, Joe Budd Wildlife Management Area, Torreya State Park, Wakulla Springs State Park, Apalachicola Bluffs and Ravines Preserve (owned by The Nature Conservancy), and St. Marks National Wildlife Refuge.

A total of 245 bats were captured during the three night blitz, with an average of 91 bats per night, and eight bats per site. The maximum number of bats caught at any one site was 57 (predominantly the Southeastern bat, near a bridge in Wakulla Springs State Park), followed by 42 (predominantly the Brazilian free-tailed bat, at a bridge functioning as a roost site in Apalachicola National Forest). Only three of the 31 sites sampled had zero capture success. Eight species were captured: Rafinesque's big-eared bat, big brown bat, red bat, Seminole bat, Southeastern bat, evening bat, tricolored bat, and Brazilian free-tailed bat. The most widespread species (those caught at the greatest number of sites) were the red bat, Seminole bat, evening bat, and southeastern bat. The four remaining species, tricolored bat, big brown bat, Brazilian free-tailed bat, and Rafinesque's big eared bat, were relatively uncommon. No State or Federally listed bat species were captured during the bat blitz, but listed species were not expected as they had not been previously documented in the areas sampled.

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

During FY 2011-12, the Florida black bear was listed as State-designated Threatened. Conservation efforts have allowed Florida black bear populations to rebound from historic lows in many areas throughout the state, however, in 2010, a biological status review showed that the Florida black bear was no longer at a high risk of extinction and should no longer be listed in Florida. Consequently, the Commission directed staff to develop a management plan for bears

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that, upon approval, would remove the bear from the State-designated Threatened Species list. FWC will, nevertheless, continue to engage in research and management efforts to ensure the conservation of the Florida black bear for future generations of Floridians.

Three drafts of a Florida Bear Management Plan (Plan), each subsequently improved by public input, were released for public comment during FY 2011-12. The final draft Plan, rule changes, and a summary of comments received were approved by the FWC Commissioners on June 27, 2012. FWC collected 580 total comments on the Plan via mail, email, online, stakeholder group meetings, and from public workshops. FWC also received more than 5,000 letters via email about the Plan from Florida members of the Humane Society of the United States. The rule changes became effective on August 23, 2012. One rule (68A-27.003, F.A.C.) removed the Florida black bear from the list of State-designated Threatened Species, while a new rule (68A-4.009) made it illegal to injure or harm a bear and maintained FWC's review of land use changes for black bears.

As bear populations expand and Florida's human population grows, human-bear conflicts continue to increase in number and intensity.

- During FY 2011-12, FWC received 4,437 calls regarding bears (i.e., sightings, bears in garbage, complaints).
- The number of bears killed by vehicles totaled 183 individuals for the fiscal year.

The Bear Response Program uses contractors to assist FWC biologists as needed with bear management tasks including education, carcass recoveries, and capture efforts. During FY 2011-12, contracted responders were dispatched by FWC to respond to 382 requests for assistance. The majority of responses (65%) provided education to the public in order to prevent human-bear conflicts from continuing in neighborhoods. Twenty-percent of the responses were to retrieve bear carcasses. Fourteen-percent of responses were to assist with trapping efforts. 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. Twenty interns from Florida State University participated in the fall 2011 and spring and summer 2012 sessions. These students contributed 3,678 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; examining the relationship between human population density, urbanization zones, and frequency of bear sightings; and developing a survey of public attitudes and knowledge about Florida's bears. Interns coordinated public events and volunteer efforts to increase public awareness of bears.

Through partnerships with local governments, businesses and communities, Bear Program staff has 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 was able to purchase reinforced dumpster lids for the City of Fort Walton Beach and bear-resistant metal garbage containers for Gulf Coast University and Okaloosa County Parks. In addition,

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FWC worked with Okaloosa County Commissioners and Waste Management, Inc. to get 100 bear-resistant residential cans out to the public who are experiencing human-bear conflicts. Waste Management, Inc. purchased the cans and FWC provided incentives for residents so they could try the new cans out for the first six months without incurring any additional costs.

The Bear Management and Research Program has continued to train law enforcement officers on bear behavior and conflict response. Eleven bear response trainings for 219 personnel were held and included FWC law enforcement officers and personnel from 13 local, State, and Federal law enforcement, military, and natural resource agencies. Since the trainings started in 2007, a total of 26 permits have been issued to haze bears to assist FWC with conflict response.

The Bear Management and Research Program held its third annual training workshop July 31 through August 1, 2012 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. This year, staff assisted in marking and collecting data on five orphaned cubs being rehabilitated for release into the wild at Homosassa Springs State Wildlife Park. 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.

Additional efforts of the Bear Management Program included:

- Wildlife management areas critical to bear conservation were identified in areas where FWC is the lead agency. Wildlife management areas can play a critical role in conserving small or fragmented populations of bears and FWC is working to develop regional habitat management plans to benefit bears.
- FWC established a partnership with Georgia Department of Natural Resources to improve cooperation for management of shared bear populations.
- FWC distributed a manual of management information on saw palmetto to land managers in Florida. Although saw palmetto is an important food source for bears, management strategies for other species often seek to reduce its presence.
- FWC secured a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida to continue a contract with the University of Kentucky to estimate the range and abundance of bears in Glades and Highlands counties. This population is small and fragmented and exists on remnant parcels of Florida scrub within a patchwork of public and private ownership. This was the third year of a three-year project.
- FWC continued to study bears on Camp Blanding and surrounding private lands. The work is being conducted through a grant from the Florida National Guard. Camp Blanding is the largest (73,000 acres/29,542 hectares) parcel of natural bear habitat within the wildlife corridor that extends from the Ocala National Forest to the Osceola National Forest. An ecologically intact corridor facilitates genetically healthy bear populations and habitat for dispersing sub-adult bears. Goals of the study include identifying ecologically significant lands in and near Camp Blanding and providing recommendations for habitat management beneficial to bears.
- FWC partnered with the University of Florida's Department of Wildlife Ecology and Conservation to increase the scope of bear research being conducted on Camp Blanding. FWC also contracted with the University of Florida's Department of Statistics to review

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available data on bear abundance in Florida.

- FWC concluded a national web-based survey to estimate bear range in North America, and submitted a manuscript detailing the information gathered to a scientific journal for publication. Many populations of bears in North America, including many in Florida, have been expanding in recent years, and this information will help guide management decisions across the range. A new range map created from this data will replace the previous one completed in 1994.
- FWC provided comments on impacts to bears from proposed residential developments and highway projects.

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

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

The Florida panther is a Federally-designated Endangered subspecies of the puma (also called cougar or mountain lion) that once roamed across eight southeastern states. Unregulated harvest of panthers through the mid-1900s and, more recently, habitat loss and fragmentation due to the growth of the human population reduced the size of the panther population and isolated it from other puma populations. When FWC began investigations into the status and distribution of panthers in the early 1970s, there were thought to be fewer than 30 panthers still living in South Florida. This small population size and its geographic isolation from other puma populations made the Florida panther very vulnerable to extinction due to inbreeding. Therefore, FWC released eight female puma from Texas into areas occupied by Florida panthers in 1995 to improve the health of the panther population by increasing the diversity of the population's genetic composition. As a result of successful pairings between Florida panthers and the Texas puma females, today's population has increased genetic diversity and is comprised of younger individuals than the pre-restoration panther population. Panther survival rates improved as genetic diversity increased both for adults and kittens, and adult females had higher survival rates than adult males. Of the eight female Texas puma that were introduced into the Florida panther population, five died and the other three were removed from the population in 2002 and 2003 to avoid including too much of their DNA in the Florida panther population. These three puma were placed in captivity. Today, the Florida panther population is estimated to be between 100-160 adults and sub-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, 216 panthers have been radio-collared, providing essential data for the management and conservation of the population. Radio telemetry data were collected on 40 Florida panthers in FY 2011-12. In addition to monitoring adults and sub-adult panthers by radio telemetry, FWC

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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 transponder chip placed below the skin), and collecting tissue and fecal samples to assess their physical and genetic health. In FY 2011-12, FWC and BCNP biologists visited 11 panther dens and documented 27 kittens (17 males, ten females). Since 1992, 368 kittens have been handled at dens.

In FY 2011-12, 21 wild Florida panthers were known to have died, including seven (six males, one female) radio-collared panthers and 14 (ten males, four females) uncollared panthers. Ten of the 21 panthers died after being hit by vehicles, six were killed by other panthers, two died from undetermined causes, one died from blunt force trauma likely caused by a vehicle, one was shot illegally, and a 12-day-old kitten died of malnutrition.

Research continues to be an important part of Florida panther conservation. Research plans are vetted with FWC's partners to ensure that the research and monitoring efforts are well-designed, coordinated, and meet priority needs. FWC is currently involved in several collaborative research projects focusing on issues related to Florida panther conservation and management. Among these are population viability analyses that include both matrix- and individual-based models, testing novel methods of estimating home ranges using GPS data, a scientific review to establish trail camera survey designs to monitor panthers, evaluating the presence and significance of various parasites and environmental contaminants in panthers, and providing assistance to a University of Florida research project that is examining panther predation on cattle in southwest Florida. In the fall of 2011, FWC organized a small, internal working group to discuss available techniques that could potentially provide statistically robust estimates of the panther population size, a task that is notoriously difficult for secretive, wide-ranging and Endangered large carnivores like the Florida panther. FWC is currently testing some of the techniques that were identified at that meeting and should have some preliminary results by the end of FY 2012-13. Analyses are nearing completion on an FWC study that assesses movement rates, road-crossing patterns, and distances traveled by panthers using data collected with GPS collars. Lastly, FWC continues its protocol of monitoring for infection and vaccination of all panthers handled.

FWC completed several research projects during FY 2011-12 including: estimates of adult and sub-adult survival, evaluation of female panther reproductive performance, and a review of tick-borne diseases in carnivores. FWC continues to assess fine-scale panther movement rates using GPS collar data and to collaborate with the University of Florida on a demographic model. Agency staff served as lead or co-authors of six peer-reviewed publications during the fiscal year and one abstract presented at the Southeastern Deer Study Group meeting in February 2012.

Human-panther interactions are investigated by FWC in accordance with the Interagency Florida Panther Response Plan (<http://www.fws.gov/verobeach/MammalsPDFs/R4FWSPantherEAFinal.pdf?spcode=A008>). FWC verified that panthers were responsible for preying upon domestic livestock (called depredations) in 14 separate events during FY 2011-12. All of the verified depredation losses this past year occurred in Collier County and the majority occurred in Golden Gate Estates east of Naples. Golden Gate Estates is approximately 150 square miles (388.5 square kilometers) in area and borders the Florida Panther National Wildlife Refuge, Picayune Strand State Forest, and the Corkscrew Regional Ecosystem Watershed. These public lands are occupied by panthers.

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Lot sizes range typically from one to five acres (.4-2 hectares) 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 hobby livestock. FWC recommends that hobby animals and pets be secured in barns or pens with roofs or kept indoors. A brochure was produced by FWC that describes these steps and this information is also available online at: www.floridapanther.net.org.

Information and reviews of numerous road and development projects were provided by FWC throughout southern Florida. Three proposed major road projects fall within important panther habitat and FWC has been providing guidance on minimizing or avoiding panther impacts.

In FY 2008-09, FWC was contacted by U.S. Senator Bill Nelson's office in response to constituent concerns with the high number of Florida panthers hit and killed by cars and trucks. FWC provided the Senator's staff with information on the impacts of roadways and traffic on panthers and other wildlife. Wildlife crossings are the most effective solution to alleviating panther deaths on roads, but they are also expensive. The last two wildlife crossings, completed a few years ago, cost an estimated \$4.5 million each. FWC discussed with Senator Nelson's staff the idea that a new panther crossing design could be developed that would be less expensive but equally effective. Through Senator Nelson's efforts, \$955,000 of Federal funds were secured for this pilot project. The Collier County Department of Transportation Planning is working with the Florida Department of Transportation and FWC to design and build a smaller and less expensive wildlife crossing on a Collier County road. The project is scheduled to be completed by the end of 2013.

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

Sherman's Fox Squirrel (*Jim Garrison*)

The Sherman's fox squirrel is currently listed in Florida as a Species of Special Concern. A biological status review was conducted by FWC and external experts in 2010 to determine if the species should be listed as State-designated Threatened. It was determined that there was not enough information to conduct the review. FWC has placed a high priority on gathering data to fill gaps in information needed to conduct the review and better understand the status of the species so that the species may be reevaluated. The species will remain a Species of Special Concern until more data is gathered and another status review can be completed. A lack of basic population and natural history information has been identified by the biological status review team as an essential research need for the Sherman's fox squirrel.

During FY 2011-12, FWC assisted the University of Florida with a cooperative study testing several methods for estimating populations of the Sherman's fox squirrel on Camp Blanding Wildlife Management Area (WMA). Methods tested included infrared triggered cameras, wooden box traps, and walking survey transects. FWC built 20 box traps and assisted with camera set up and walking transects. This study is ongoing and results will be reported in the future.

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A management plan for the Sherman's fox squirrel was initiated in FY 2011-12 by staff who will continue working with stakeholders to finalize the plan for FWC Commissioner approval.

Sherman's Short-tailed Shrew (*Melissa Tucker*)

The Sherman's short-tailed shrew is currently listed in Florida as a Species of Special Concern. This shrew species has a range limited to the western portion of Lee and Collier counties. The first specimen of this species was captured in the 1950s in Lee County north of the Caloosahatchee River, and this area has since undergone extensive development. Additional attempts have been made to capture Sherman's short-tailed shrews, with the most recent survey effort yielding a confirmed capture in 1955. Because the Sherman's short-tailed shrew has a very small range and because this species has not been confirmed in many years, it is highly vulnerable to extinction. As a first step toward implementing conservation actions to protect the species, in 2011 and 2012, FWC conducted surveys to document the species' continued existence.

In 2012, eight conservation properties containing suitable habitat for the Sherman's short-tailed shrew were surveyed in Lee, Collier, southern Charlotte, and western Hendry counties. Two of these properties had not been previously surveyed in 2011. Properties in Lee County included County-owned and managed sites (Old Bridge Preserve and Six Mile Cypress Slough Preserve), a County-owned and FWC-managed site (Hickey's Creek Wildlife and Environmental Area), and a South Florida Water Management District owned and FWC managed site (CREW Wildlife Management Area). Properties in Collier County included a Florida Department of Agriculture and Consumer Services' (FDACS) Florida Forest Service property (Picayune Strand State Forest), and a Florida Department of Environmental Protection (FDEP) property (Collier Seminole State Park). The properties surveyed in Charlotte and Hendry counties were managed by FWC (Babcock-Webb Wildlife Management Area and Spirit of the Wild Wildlife Management Area, respectively). At the eight properties, 18 sites were surveyed, representing seven habitat types. The surveys were conducted using pitfall traps along drift fences and live traps set near natural landscape features such as fallen logs. A minimum of ten traps were set for five consecutive days at each site, for a total trapping effort of 930 trap nights in 2012. No Sherman's short-tailed shrews were captured during the trapping efforts. Previous survey efforts through the 1990s included approximately 5,300 trap nights. The current survey effort of 2,100 trap nights in 2011 and 2012 contributes substantially to this overall effort. Over the two year period, 35 individual sites were surveyed on 14 conservation properties, spanning nine habitat types identified in literature as shrew habitat. Even without captures, the information gained is beneficial because it allows FWC to document effort and use that information to develop future surveys. Without these efforts and documentation, it is impossible to assess the likelihood that Sherman's short-tailed shrew is extinct.

As required by FWC's threatened species rules, a management plan for the Sherman's short-tailed shrew was initiated in FY 2011-12 by staff who will continue working with stakeholders to finalize the plan for FWC Commissioner approval.

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

The Florida manatee (listed by the USFWS as the West Indian manatee) is native to

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Florida's coastal estuaries and riverine waters and is a Federally-designated Endangered species. Manatees have been protected in Florida since 1892. The manatee is also Federally protected under the Marine Mammal Protection Act and the Endangered Species Act. Florida's efforts to conserve the manatee are funded primarily by the Save the Manatee Trust Fund that derives approximately one-third of its funds from the sale of specialty license plates. Conservation efforts are guided by the Florida Manatee Sanctuary Act of 1978 [section 379.2431(2), F.S.], the Florida Manatee Management Plan approved by the FWC Commissioners in December 2007 (which may be accessed at http://www.myfwc.com/media/415297/Manatee_MgmtPlan.pdf), and the USFWS Florida Manatee Recovery Plan of 2001 (which may be accessed at http://ecos.fws.gov/docs/recovery_plan/011030.pdf)

In 2004, FWC and the USFWS established the Manatee Forum, a diverse stakeholder group with the goal of reducing litigation by establishing areas of common ground, identifying problems or conflicts, developing potential solutions, and accepting differences through increased communication. During FY 2011-12, the Manatee Forum met twice, once in October and once in April. During the October meeting, research updates were provided and the April meeting focused on state and federal agency actions, and legislative updates from the forum members. FWC believes in the importance of having a stakeholder group focused on manatee issues. The opportunity for information exchange and the discussion of ideas is very valuable to all parties

Management Activities

FWC and the 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://myfwc.com/media/2444942/11-12-SaveTheManateeTrustFundReport.pdf>. Manatee management activities are directed by FWC's Manatee Management Plan and focus on five program areas:

Manatee Protection Plans (MPPs) – This work involves the development and implementation of comprehensive county-based MPPs working closely with the counties. These MPPs are approved by FWC's Executive Director with concurrence by the USFWS. During FY 2011-12, FWC partnered with Duval County to complete revisions to the County's existing plan with hopes of a final draft in late 2012. The Sarasota County revised MPP was approved in October 2011. FWC is also assisting Charlotte County in developing and drafting their first MPP.

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. In September 2011, the FWC Commissioners approved rule amendments to the existing Broward County manatee protection rule. The rule amendments were filed for adoption in October 2011. A proposed rule for coastal Flagler County was considered by the FWC Commissioners in November 2011 and published in February 2012. In May 2012, the FWC Commissioners conducted the final public hearing and approved the rule as proposed. The rule was filed for adoption in late May 2012.

Permit Reviews – FWC produced 397 final comment letters for proposed permitting projects reviewed during FY 2011-12. These biological opinions provide recommendations to

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regulatory agencies on ways to reduce impacts to manatees. Several of the permit review efforts focused on maintenance and expansions of Florida ports. Implementation of the boat facility-citing portion of FWC approved MPPs is accomplished during the permit review process. Distribution of public information about manatees is also accomplished through these comments, as facilities are required to post informational signs about manatees and distribute written materials to boat users. FWC is continuing to work on several efforts to streamline reviews of permits in cooperation with State permitting agencies.

Manatee Habitat – During FY 2011-12, FWC participated in various intergovernmental groups and task forces regarding minimum flows at springs, invasive aquatic plant control, seagrass monitoring and protection, and other habitat related concerns. The Agency worked to address the potential loss of warm water manatee habitat provided by power plant discharges by ensuring all of the appropriate monitoring plans for power plant conversions in Palm Beach, Brevard, and Broward counties were carried out. In addition, FWC, working with The Nature Conservancy and FDEP, completed the restoration project at Fanning Springs to improve manatee access in January 2012.

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 2011-12, 358 manatee carcasses were documented in Florida. All but 11 of these carcasses were recovered and examined in order to determine causes of death. Collision with watercraft accounted for 93 of the 358 cases (26%). Other causes of manatee death include near-term or newborn (perinatal) issues, cold stress, and natural causes. 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 82 sick or injured manatees under the Federally-permitted statewide rescue program. Three oceanarias (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 2012, 50 of these rescued manatees were released back into the wild, 16 died, and 16 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 pre-release health assessments and releases of rehabilitated manatees in various parts of the state. The information obtained during manatee rehabilitation, treatment, and necropsy assists in reducing manatee mortality by identifying significant threats to the species.

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

The annual statewide manatee synoptic survey [required annually, weather permitting, by section 379.2431(4)(a), F.S.] was not conducted in winter 2012 because of warmer than average

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weather. Researchers need specific weather conditions to successfully conduct these surveys. Surveys conducted in less than favorable weather conditions produce low counts because many manatees cannot be seen. For more information about aerial surveys and the synoptic count, please refer to <http://myfwc.com/research/manatee/projects/population-monitoring/>.

Aerial surveys were conducted in Martin and St. Lucie counties twice monthly through the year to evaluate distribution and habitat use in the region. Currently, researchers are developing new aerial survey techniques to provide statistically sound estimates of distribution and population size. New methods and resultant data will contribute to models that incorporate information about how well observers detect manatees from the air and will relate environmental variables to the number of animals counted by observers. During 2012, surveys were conducted on Florida's east coast and analyses are underway. The assessment will help FWC to determine if more testing is needed or if the newer methods may be implemented. Details are described in the "Monitoring Activities" and "Ongoing and Future Research" sections of the Manatee Management Plan (pages 84-114) that may be accessed at http://myfwc.com/media/214332/Manatee_Mgmt_Plan.pdf.

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. The Manatee Management Plan identifies the need for optimal genetic tissue-sampling protocols for free-swimming manatees in order to implement a robust genetic identification program for the above-described monitoring applications. FWC successfully tested a new method to collect skin samples from free-swimming manatees in the winter of 2008. During the winters of 2009-10, 2010-11, and 2011-12, FWC conducted genetic sampling surveys with the main objective of collecting manatee skin biopsy samples. Results 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 2011-12, 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 a better understanding of the responses displayed by

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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. FWC and Florida State University reviewed more than 4,000 vessel paths calculated with data from a laser rangefinder and are developing the analytical techniques to identify behavioral changes from the sensor data to reconstruct manatee movement paths underwater. Individual boat encounters are being visualized in relation to underwater features (depth, seagrass) using a dynamic 3-D animation application. 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 & 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 2011-12 winter was the second year of a three year construction period, during which Florida Power & Light provided a temporary warm-water refuge for manatees. Ten manatees were captured and tagged with global positioning system tracking devices in December 2011 as part of this multi-year telemetry study. Individuals were tracked over the winter period and tags were removed in March 2012. Analyses of tag information and environmental variables are ongoing.

A multi-agency effort is underway to help managers make better decisions related to the management of warm-water habitat.

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 calving season for the North Atlantic right whale is approximately November 15 – April 15. FWC conducted aerial surveys to monitor seasonal presence of right whales, mitigate vessel-whale collisions, and assess population dynamics. Most of this work was supported by funds from National Oceanic and Atmospheric Agency's Marine Fisheries Service (NOAA-Fisheries). Photographs taken by aerial observers are used to identify individual right whales based on the callosity (a natural growth of cornified skin) pattern on their head as well as natural marks and human-related scars. Over time, population demographics, reproductive success, mortality, and trends in health are monitored, in part, through this photo-identification research. FWC is one of a handful of major contributors to the North Atlantic Right Whale Catalog – the central repository for archiving and maintaining photographs and sighting data on right whales. FWC has also worked closely with Federal, State, and non-governmental organizations to compile years of aerial-survey data into a geographic information system (GIS). Analyses of these spatial data help scientists and managers to evaluate right whale distribution patterns in the southeast calving grounds in relation to environmental factors, such as sea surface temperatures and water depth, and human activities, such as vessel traffic. FWC also analyzes ship traffic data to help monitor compliance with vessel speed regulations.

Six mother/calf pairs were documented in the southeastern U.S. during FY 2011-12. An additional cow-calf pair was sighted in May 2012 in the northeastern U.S. Preliminary photo

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analysis indicates FWC documented 43 individual right whales (excluding calves) during 120 aerial surveys conducted between December 1, 2011 and March 31, 2012. In addition, the teams sighted nine humpback whales and two fin whales.

One entangled right whale was documented in the southeastern U.S. during the FY 2011-12 calving season. FWC, as well as the Georgia Department of Natural Resources, the New England Aquarium, NOAA-Fisheries, Sea to Shore Alliance, Provincetown Center for Coastal Studies, and many others, participated in the documentation and disentanglement response. No right whale stranding events occurred in the southeastern U.S. during the calving season. One cow's 2012 calf is missing though the carcass was not recovered.

During the 2011-12 calving season, 35 right whale biopsy sampling trips were conducted in collaboration with NOAA-Fisheries and the Georgia Department of Natural Resources. These trips resulted in samples from five calves, several juveniles, and three adult right whales (including one entangled whale). Genetic testing will determine individual identification and gender as well as kinship and genetic variability within the population.

BIRDS

Bald Eagle (*Josephine Barnhart, Robin Boughton, Janell Brush, Matthew Hortman, Patrick McElhone, Valerie Sparling, Michelle van Deventer, Morgan Wilbur, and Angela Williams*)

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

Management Plan Implementation and Permitting – The FWC Commissioners approved a final management plan for the bald eagle in April 2008. The first five-year management plan review is scheduled for 2013. 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 is working with the USFWS to coordinate permitting efforts between the two agencies and ultimately develop a single permitting process. FWC provides assistance to the public and other agencies on minimizing the potential for disturbance to nesting bald eagles that may result from activities near nests, recommending permits when the guidelines cannot be followed, reviewing disturbance and nest removal permit applications, and issuing State bald eagle permits. FWC also engages in educational programs and local government coordination, and assists law enforcement officers responding to public alerts of possible eagle rule violations.

Nesting Surveys – Florida supports one of the largest populations of breeding bald eagles in the lower 48 states. FWC and others have monitored bald eagle nesting territories in Florida since 1972. Population monitoring is ongoing to ensure that the State is achieving the

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management plan goal of maintaining a stable or increasing population of bald eagles throughout Florida in perpetuity. FWC anticipates that without continued protection of eagle nesting habitats, the number of nesting territories in Florida could decline by 10% or more over the next 24 years, which could trigger a relisting effort. In addition to acquiring current information about the status of eagle nests, surveys enable biologists to characterize the habitat and land-use changes within each nesting territory in Florida. This information may help to identify the factors that affect population changes, movement patterns, habitat changes, and other trends that can be applied in an adaptive management approach to implementing conservation measures.

FY 2011-12 was the fourth year using a survey method based on sampling one-third of the known nesting territories in the state each year. This sub-sample approach allowed FWC to survey each nesting territory multiple times during the nesting season. The result was an unbiased confident estimate of statewide productivity. Using these data, a statewide population estimate of 1,511 nesting territories (excluding Everglades National Park) was also determined. This sub-sample survey protocol will be continued during the FY 2012-13 nesting season.

Results of the FY 2010-11 statewide survey were reported in November 2011 and are available online at <http://myfwc.com/wildlifehabitats/managed/bald-eagle/monitoring/>. The estimated number of active bald eagle nesting territories in Florida was approximately 1,457. Polk and Osceola counties have the greatest number of active eagle nesting territories, and live pine trees are the most common nesting substrate for eagle nests in Florida. This data indicates that the number of nesting pairs of bald eagles in the state continues to exceed the minimum needed to meet the population goal. Results from the FY 2011-12 are currently being analyzed and will be available in next year's report.

Nesting surveys for bald eagles were conducted in January and February 2012 on the Apalachicola River Wildlife and Environmental Area (ARWEA) and the Box-R Wildlife Management Area (WMA) in Gulf and Franklin counties to monitor the relative success of nesting eagles. Systematic aerial transects are flown on the ARWEA, Box-R WMA, and the surrounding area, as well as St. Vincent Island National Wildlife Refuge in Franklin County. All nests were recorded as either active or inactive and the number of eggs/nestlings was recorded for all nests. During the January 2012 aerial survey, 25 nests were visited with 22 actively being used. Eggs were found at six nests, and nestlings were found at nine nests. A total of 24 adult eagles were observed at 18 nests. During the February 2012 aerial survey, 30 nests were visited with 22 actively being used. Two nests that had been removed from the survey list due to inactivity were found active. In addition, three potential new nests were found during the survey. There were nestlings (young birds that are unable to fly) documented at two nests and fledglings (young birds that are able to fly) at 15 nests. Adults were observed at 13 nests. In total, there were 24 active nests during the FY 2011-12 bald eagle nesting survey, a decrease of one nest compared to FY 2010-11.

Nesting surveys for bald eagles were conducted on January 5, 2012, on the Aucilla WMA in Jefferson and Taylor counties and the L. Kirk Edwards WEA in Leon County. Two nests were monitored on Aucilla WMA. These nests were first documented in FY 2009-10, while flying systematic transects within potential eagle nest habitat. Both of these nests were monitored and determined to be active during FY 2010-11. On January 5, 2012, these nests were again determined to be active. An adult eagle was observed incubating eggs at one nest, and while there were no eggs observed at the second nest, an adult eagle was observed at the nest tree. One eagle nest located on private property adjacent to Aucilla WMA was also monitored and determined to be active as an adult eagle was observed at the nest tree. While there are no

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eagle nests located directly on L. Kirk Edwards WEA, there is one on private property adjacent to the WEA. This nest was monitored and an adult eagle was observed flying from the nest. There were no eggs at the time of monitoring.

Aerial nest surveys for bald eagles were conducted in January and March 2012, as well as ground surveys throughout the breeding season at John G. and Susan H. Dupuis, Jr. WEA (Dupuis) and J. W. Corbett WMA (Corbett) in Palm Beach County. The initial helicopter surveys determined active nests and later surveys monitored success. Volunteers with Audubon's Eaglewatch program assisted with ground surveys. The status of nests (active or inactive) and number of young were recorded. Eight active nests monitored at Dupuis produced 11 fledglings. Two active nests at Corbett produced two 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.

Kissimmee Chain of Lakes in Central Florida – In coordination with the University of Florida, a project was developed to better understand factors contributing to successful snail kite nesting attempts in the Kissimmee Chain of Lakes. The Kissimmee Chain of Lakes has consistently supported the majority of Florida's snail kite nests over the last five years, as breeding concentrations have shifted from isolated areas of the Everglades to the more heavily managed and highly recreated lakes near urban Central Florida. Nesting in the Kissimmee Chain of Lakes may be impacted by the recent proliferation of exotic snails in the region, and the fact that snail kites usually nest in non-woody vegetation in lake habitats (cattail, bulrush) which is thought to result in higher failure rates due to collapse. This project assessed which factors play prominent roles in a nest's fate by employing nest cameras at randomly selected active nests, and monitoring radio-tagged nesting adults to estimate home range size and vegetation characteristics in nesting and foraging habitats.

During FYs 2010-11 and 2011-12, hundreds of thousands of images from 95 nests were analyzed for predation events, abandonment, feeding rates, etc. Correlated habitat characteristics (nest patch size, substrate, distance from shore, etc.) were tested for impacts to nest success (produced fledglings). Surprisingly, only 55-57% of nest failures (loss of nestlings or fledglings) were due to predation in the 2010 and 2011 breeding seasons, and only one failure was attributed to a nest collapse. The only collapse documented occurred in willow. Yellow rat snakes were by far the most common predator, but more nests failed from simple parental abandonment than from snake depredation. Abandonment may have been caused by disturbances, unusually cold spring temperatures, or a lack of food (an effect of cold temperatures).

There was a general trend of attentive adults having higher nest success; i.e., the longer an adult stayed on a nest during the egg-laying stage, and the shorter their forays away from the

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nest, the better the chance for nest success. This highlights the extreme importance of less disturbance around nests, as well as smaller distance between foraging area and nesting habitat. A minimum nest patch size of seven acres (2.8 hectares) was identified as important for allowing kites to nest greater than 30 feet (ten meters) from the edge of the patch, which was associated with increased nest success in the 2011 breeding season. Nest patches are the contiguous grouping of nesting substrate (e.g., a clump of cattail, willow, bullrush, etc.) that is surrounded by dissimilar, shorter stature vegetation or open water. No rat snakes were documented in nest patches more than 330 feet (100 meters) from shore, suggesting the success of more off-shore nesting habitat.

Home range sizes and characteristics were also documented for 57 radio-tagged, nesting snail kites by recording activity points. Snail kites with smaller home ranges foraged more often and had higher foraging success, indicating that if snails are readily available then kites need less area and capture snails more frequently. Areas with Egyptian paspalidium was the most common foraging habitat, though torpedograss and pickerelweed were exceedingly important at times of higher water (late winter, early spring). Areas with hydrilla were the dominant foraging habitat later in the nesting season, once it reached the surface in foraging habitats. Several snail kites foraged distances of up to two miles (three kilometers) from their nests, highlighting areas with poor foraging habitats that may benefit from management activities. These results suggest efforts should be made to provide quality foraging habitat in close proximity to nesting areas.

Florida Grasshopper Sparrow (*Michael Delany, Tina Hannon, Jean McCollom, and David Sweetay*)

The Florida grasshopper sparrow is a Federally-designated Endangered species endemic to the dry prairie plant communities of Florida. Florida's dry prairie is a distinct region of the state characterized by flat, open expanses dominated by fire-dependent grasses, saw palmetto, and low shrubs. Following a status survey conducted by FWC, the Florida grasshopper sparrow was Federally listed as Endangered in 1986 because of its low numbers, restricted distribution, and habitat loss. The Federal recovery objective is to down-list the sparrow to Threatened when ten protected locations contain stable, self-sustaining populations of more than 50 breeding pairs each. Although the Florida grasshopper sparrow is known to exist at seven locations, only two populations meet recovery criteria: Three Lakes Wildlife Management Area (WMA) in Osceola County and Kissimmee Prairie Preserve State Park in Okeechobee County, both of which are state lands. Only three populations of grasshopper sparrows persist on Florida's public lands; these include the Three Lakes WMA, Kissimmee Prairie Preserve State Park, and Avon Park Air Force Range (Federal land) in Highlands County.

Florida grasshopper sparrows on protected public lands are monitored by annual point count surveys, a standard method used to assess the relative abundance of bird populations. Results from point count surveys on public lands indicate a decline in the abundance of Florida grasshopper sparrows at all populations. Only 75 Florida grasshopper sparrows were detected during surveys this year, down from 237 detected during 2008, which was the highest range-wide count before the decline. FWC members of the Florida Grasshopper Sparrow Working Group coordinated emergency recovery efforts with other members including representatives from the Florida Department of Environmental Protection (FDEP), USFWS, Avon Park Air Force Range, the University of Florida, the University of Central Florida, Archbold Biological Station, and Tall Timbers Research Station. For additional information about the sparrow and its

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recent decline, please visit <http://myfwc.com/research/wildlife/birds/florida-grasshopper-sparrow/>.

South Region (Hendry County) Florida Grasshopper Sparrow Surveys – The Florida grasshopper sparrow has been reported to occur on Dinner Island Ranch WMA. In order to determine if these were resident or migrant birds, a survey was conducted during the breeding season. Three thousand acres (1,214 hectares) of potentially suitable habitat surrounding the location of previous sightings were identified and a modified version of the Florida grasshopper sparrow point count survey methodology was used to conduct surveys during May 2012. No grasshopper sparrows were heard or seen during the surveys, indicating that previously identified birds were either not part of a local population or were migratory sparrows and not the endangered Florida subspecies.

Since there were previous reports of grasshopper sparrows on Okaloacoochee Slough WMA, surveys were conducted in May 2012, during the spring breeding season, to determine if this subspecies is still present on the area. Surveys were completed on 1,670 acres (676 hectares) of potentially suitable habitat. No grasshopper sparrows were heard or seen during the surveys, indicating that the previously identified birds were likely migratory sparrows and not the Endangered Florida subspecies. Surveyors did record other calls and observations, including multiple records of Bachman's sparrows, Florida sandhill cranes, sedge wrens, and an observation of a young gopher tortoise.

Monitoring on Three Lakes Wildlife Management Area in Osceola County – Point count surveys for Florida grasshopper sparrows have been conducted on the Three Lakes WMA since 1991. The surveys are conducted each spring (April-June) and consist of a grid of 190 stations spaced 0.25 miles (0.40 kilometers) apart. Each station is surveyed for five minutes, three times each spring, and all grasshopper sparrows heard or observed are recorded. Beginning in 2002, 60 stations were established north of the main population on what is called “the island” to determine if translocations of 18 juvenile sparrows in 2001 and 2002 were successful. In 2012, surveys estimated there were at least 59 different male grasshopper sparrows at the main site, down from 67 detected in 2011. No males were detected on the island in 2012. Tree removal, in which oaks and cabbage palms that have encroached on the dry prairie as a result of past fire suppression were mulched to ground level, was conducted in 2007 and 2008 on an adjacent site to the main site and 18 survey stations were added to that area in 2008. In 2009 and 2010, a male was detected at the same point within the restored area. No birds were detected in the restored area in 2011. One grasshopper sparrow was observed in the area in 2012. Overall, the FY 2011-12 surveys continue to show a declining trend in detected male grasshopper sparrows that began in 2009. The five-year declining trend of detected males is of great concern to FWC. Monitoring will continue on the WMA in FY 2012-13. In an effort to maintain the dry prairie, oaks re-sprouting within the removal areas are sprayed with herbicide to prevent re-encroachment into these areas and oaks outside of historic hammocks are being cut down by WMA staff. In addition, an interagency working group is focusing on increasing monitoring efforts on all three properties where grasshopper sparrows are found in an attempt to determine causes for their declines.

Occupancy and Abundance Trends at Three Lakes Wildlife Management Area in Osceola County – Annual point count data (2003-2012) from 166 monitoring stations at Three Lakes

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WMA were examined during FY 2011-12 to detect patterns of spatial changes in the occurrence and abundance of Florida grasshopper sparrows that may be related to the decline of that population. Point count surveys detected 60 sparrows in 2012, down from 142 detected in 2008. There was a significant increase in the area of occupancy and abundance of Florida grasshopper sparrows on Three Lakes WMA from 2003 to 2008, especially in the east and northeast portion of the WMA. However, there was a decline in occupancy at the south end of the WMA during that time. The decline along the two southernmost rows of point count stations may be due to mechanical treatment of the prairie (aeration) at this location during January 2008 and delayed prescribed fire. The resulting accumulation of thatch may have made vegetation structure in this area less suitable for nesting grasshopper sparrows. There was a significant reduction in Florida grasshopper sparrow occurrence and abundance over the entire WMA from 2008 to 2012, except in the north-central portion of the WMA around Godwin Hammock. The same areas of persistent occurrence and abundance around Godwin Hammock also were evident when Florida grasshopper sparrows were less abundant in 2003.

Variation in the spatial configuration of habitat quality can influence patterns of Florida grasshopper sparrow occurrence and abundance. Areas of persistent sparrow occurrence and abundance at Three Lakes WMA corresponded to certain landscape features ($\geq 1,968$ feet, or 600 meters from the edge of optimal habitat; and elevations 60-62 feet, or 18.5-19.0 meters above sea level). Occurrence and increased abundance of the sparrow at Three Lakes WMA also was associated with areas recently burned. Land management activities at Three Lakes WMA (frequency and seasonality of fire, and removal of encroaching woody vegetation) are in accord with habitat requirements of the Florida grasshopper sparrow. The large area of dry prairie (7,413 acres, or 3,000 hectares) at Three Lakes WMA and characteristics of the vegetation composition and structure appear to be conducive to the persistence of Florida grasshopper sparrows.

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

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

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

The Florida scrub-jay is a Federally-designated Threatened species that is endemic to Florida. Habitat loss and degradation have caused widespread declines throughout the scrub-jay's range. Scrub-jay populations are thought to have declined by as much as 90% since the late 1800s due to habitat loss and degradation. Three-quarters of remaining scrubby habitats are protected through land under public or private ownership that is dedicated for conservation. Despite this, scrub-jay numbers have continued to decline on conservation lands largely due to habitat degradation caused by decades of fire suppression and inadequate habitat management. Conserving this species requires the efforts of multiple local, State, and Federal agencies as well as non-governmental organizations and private landowners. The Florida Scrub-Jay Conservation Coordination Project assists these efforts by facilitating communication among partners, collecting and distributing information regarding monitoring and management, working with partners to establish priority management actions, and developing standards and guidelines for conservation efforts. Typical habitat management efforts include prescribed burning and mechanical treatments such as roller chopping and cutting of trees that have encroached on scrub-jay habitat to increase open areas.

Conservation Coordination – During FY 2011-12, the Florida Scrub-jay Conservation Coordination Project continued to facilitate communication and information exchange among partners by continuing to organize regional working groups and workshops focused on management and monitoring for scrub-jays and their habitat. The working group and workshop attendees included representatives from all major public land management entities as well as non-governmental organizations, university staff, and private landowners. These working groups provide an excellent opportunity for participants to network, share ideas and experiences, and learn about new developments. In FY 2011-12, project staff organized one working group meeting to promote partnerships and information exchange, two workshops to address specific conservation challenges, and a land management field trip to enhance the effectiveness of management actions on conservation lands.

FWC facilitates the sharing of information by maintaining the Florida Scrub-Jay SharePoint Site (<http://share2.myfwc.com/scrubjay/default.aspx>), a clearinghouse of information on upcoming events, working groups, funding opportunities, and options for habitat management and scrub-jay monitoring. Project staff responded to questions about scrub-jays and their habitat from both partners and stakeholders.

FWC works with partners to help establish priority management and monitoring actions for scrub-jays and their habitat. Activities in FY 2011-12 included 17 site visits to discuss land management with land managers and biologists from several State and local government agencies. Additionally, FWC served as a subject matter expert on a DEP Division of State Lands Land Management Review at Lake Wales Ridge State Forest. FWC also participated in meetings with partners in Volusia County, Brevard County, and at the Cedar Key Scrub State Reserve to discuss priority areas for scrub-jay management.

During FY 2011-12, FWC continued to participate in a recent partnership with the U.S. Forest Service to conduct monitoring in the Ocala National Forest in Central Florida, which contains the largest scrub-jay population in Florida. In 2011, FWC partnered with The Nature

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Conservancy and Archbold Biological Station to continue Jay Watch, a highly successful citizen science monitoring program that uses volunteers to monitor scrub-jay populations on properties across Florida. While helping to secure Jay Watch's long term future, FWC helped organize and implement an interim strategy to keep Jay Watch running for the 2011 field season. FWC trained volunteers, summarized results, and assisted with the transition of the program to a more permanent home with Audubon of Florida.

FWC continued to work with USFWS to identify needs for USFWS grant opportunities. FWC worked with USFWS to relocate two families of scrub-jays from degraded land to a managed conservation area in Volusia County. FWC contributed to environmental commenting on actions that could affect scrub-jays throughout the fiscal year. Finally, FWC served on the Florida Scrub-Jay Recovery Team, which is improving and updating the Recovery Plan for the species.

For more information on the Florida Scrub-jay Conservation Coordination project, please visit <http://share2.myfwc.com/scrubjay/default.aspx>.

Ocala National Forest in Central Florida – The status and trend of scrub-jays in this crucial population remain uncertain because of unique challenges stemming from forest management practices and monitoring limitations. Harvest rotations for sand pines sustain the scrub-jay population by continually creating openings in the scrub but also limiting the potential carrying capacity for the region. The sheer size of the region (> 300,000 acres; 125,000 hectares) limits the applicability of traditional color banding and monitoring methods used with scrub-jays elsewhere in the state. During FY 2010-11, FWC and project partners developed and refined a new monitoring protocol for monitoring scrub-jay populations in harvested stands in the Ocala National Forest.

During June and July 2012, FWC recruited, trained, and supervised a team of 19 individuals from FWC, the U.S. Forest Service, the USFWS, and the University of Florida to conduct post-reproductive monitoring. Forty-five stands of zero to 14-year-old sand pine scrub were surveyed. Eighty-seven scrub-jay family group territories, containing 196 adults and a minimum of 62 juveniles, were delineated, yielding a mean density of 3.40 family groups per 100 acres (41 hectares). The project will continue in FY 2012-13 with additional analysis of habitat parameters that may affect scrub-jay productivity.

Arbuckle and Walk-in-the-Water Wildlife Management Areas in Polk County – The Arbuckle Wildlife Management Area (WMA) and Walk-in-the-Water WMA are part of the Lake Wales Ridge State Forest and encompass nearly 20,000 acres (8,094 hectares) 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–February 2006. FWC initiated scrub-jay monitoring in 2008 using a pilot survey by Jay Watch, formerly The Nature Conservancy's citizen science program and now managed by Audubon of Florida. FWC continued monitoring scrub-jays on these areas through FY 2011-12.

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During FY 2011-12, scrub-jay groups were located on Arbuckle WMA by FWC; the same number of groups that were found in the previous fiscal year surveys. This is less than the number found during previous surveys conducted by FDACS and Archbold Biological Station. The mean group size increased from 3.17 in 2010 to 5.22 in 2011 and the number of juveniles per group increased from 0.67 to 2.56. Likewise, the total number of scrub-jays increased from 25 in 2010 to 36 in 2011.

During FY 2011-12, eight scrub-jay groups were located on Walk-in-the-Water WMA by FWC, the same number of groups found in the previous fiscal year surveys. This is less than the number found during previous surveys conducted by FDACS and Archbold Biological Station. The mean group size decreased slightly from 3.88 in 2010 to 3.75 in 2011 and the number of juveniles per group increased from 1.25 to 1.63. The total number of scrub-jays decreased slightly from 31 in 2010 to 30 in 2011. Since a mean family group of three birds and the mean number of juveniles per group of one is considered a normal population, the current groups in Arbuckle and Walk-in-the-Water WMAs appear to be relatively stable.

In 2002, FDACS initiated a Scrub-Jay Management Plan on the Lakes Wales Ridge State Forest. Since then, more than 2,500 acres (1,012 hectares) at Arbuckle WMA have been treated with prescribed fire, mechanical treatments, or a combination thereof and more than 4,400 acres (1,781 hectares) have been treated at Walk-in-the-Water WMA to benefit scrub-jays. No scrub-jay habitat was burned on these areas during FY 2010-11; approximately 80 acres (32 hectares) were burned during FY 2011-12.

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

Camp Blanding Wildlife Management Area in Clay County – During FY 2011-12, assistance was given regarding planning of prescribed burns and timing of surveys in management units where the three known scrub jays occur on the WMA.

Cedar Key Scrub Wildlife Management Area in Levy County – FWC currently assists the lead-managing agency, Florida Department of Environmental Protection, in the monitoring and management of Florida scrub-jays on the Cedar Key Scrub WMA. During FY 2011-12, there were four family groups of scrub-jays documented on Cedar Key Scrub WMA, consisting of ten individuals. The monitoring program includes monthly monitoring of scrub-jays at specific sites along a route set up by The Nature Conservancy's Jay Watch program, banding chicks-of-the-year (chicks born that year), and sexing the adults through territorial and nesting behavior.

Fisheating Creek Wildlife Management Area in Glades County – FWC initiated scrub-jay surveys on Fisheating Creek WMA during FY 2011-12 using a pilot survey developed by The Nature Conservancy's Jay Watch Program. The Jay Watch surveys were conducted for the fourth time on Fisheating Creek WMA in June 2011, during which only one adult scrub-jay was observed. The Jay Watch survey protocol will continue to be utilized to monitor Florida scrub-jay populations.

In April 2011, 25 acres (ten hectares) of overgrown scrub were mechanically treated to reduce fuel loads (total amount of combustible material in a given area), decrease vegetation height, and facilitate regular prescribed burning.

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Half Moon Wildlife Management Area in Sumter County – FWC continued to monitor Florida scrub-jays on the 9,500-acre (3,845-hectare) Half Moon WMA during FY 2011-12. Individuals are color banded to better track the population. In FY 2011-12, seven of the ten juveniles born from FY 2010-11 were banded. Seven new juveniles were observed, and these will be banded in FY 2012-13. All juveniles observed came from three of the seven to eight family groups found on Half Moon WMA. In addition to juveniles, four adults were banded this year. The present population is estimated at 27-33 individuals.

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 (202 hectares) of potential scrub-jay habitat. During FY 2011-12, approximately 200 acres (80 hectares) of scrub-jay habitat was burned. Future habitat management will focus on saw palmetto reduction through rollerchopping, increasing open ground cover, and the cutting of overgrown oaks in and surrounding potential habitat.

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 Nature Conservancy's Jay Watch program. During FY 2011-12, tracts surveyed by Archbold Biological Station included Gould Road, Carter Creek, Leisure Lakes, Henscratch, Holmes Avenue, Lake Placid Scrub, Silver Lake, Sun 'n Lake, and McJunkin. Jay Watch volunteers and FWC surveyed at Clements, Royce Unit, and Highland Park Estates.

According to Archbold Biological Station results, the number of scrub-jay groups decreased at all locations except two (Henscratch and Gould Road) from the last time surveys were done for that particular area. The number of juveniles per group decreased slightly on one tract (Gould Road) and increased or remained stable on the remaining tracts.

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 Sebring, and Highland Park Estates) contain a checkerboard pattern of State and private lands, which limits FWC's ability to employ necessary habitat management actions on State-owned property. One of the populations most at-risk occurs at the Carter Creek tract. This population has steadily declined from 14 groups in 2003 to six groups in 2007 to only two groups in 2011. 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. Florida scrub-jay monitoring results are used as a tool to prioritize management actions.

Controlled burns during FY 2011-12 included roughly 737 acres (298 hectares) of potential or occupied scrub-jay habitat. This acreage included 278 acres (112 hectares) adjacent to current groups of scrub-jays at the Carter Creek tract. Controlled burns and chainsaw work to reduce canopy heights are planned for FY 2012-13 to improve habitat suitability for existing scrub-jays and to attract new individuals.

Salt Lake Wildlife Management Area in Brevard County – Approximately 123 acres (50 hectares) of scrub and mesic flatwoods were targeted for specific management during FY 2011-12 to benefit scrub-jays. Salt Lake WMA supports six family groups with an estimated population of 19 birds. There was no documented recruitment among the six families during FY

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2011-12. All six scrub jay family groups are located in proximity to the Salt Lake WMA's boundaries and each family group has territories that extend onto adjacent public and private properties. Continued monitoring and additional banding efforts are scheduled to continue into FY 2012-13.

Scrub-jay habitat management focused on roller chopping 25 acres (ten hectares) and prescribed burning of 99 acres (40 hectares) of potential scrub-jay habitat. Management activities slated for FY 2012-13 include the continued use of roller chopping and prescribed fire on approximately 164 acres (66 hectares) of potential scrub-jay habitat.

Marsh Birds (*Pam Boody*)

Marsh bird surveys were conducted on John C. and Mariana Jones/Hungryland Wildlife and Environmental Area in Martin and Palm Beach counties during FY 2011-12. Water levels on the area were low in March, when the surveys began, and by April, levels had dropped further, making habitat unsuitable. Surveys, therefore, were discontinued. Surveys followed the Arizona Cooperative Fish and Wildlife Research Unit Standardized North American Marsh Bird Monitoring Protocols using a call/playback method for the following focal species: black rail, least bittern, king rail, purple gallinule, common moorhen, pied-billed grebe and the limpkin (a Species of Special Concern). All of the focal species were detected during the March survey. An observation of a king rail with five chicks documented reproduction for the species on the area.

Peregrine Falcon (*Robin Boughton*)

The peregrine falcon was delisted by the USFWS in 1999. Following a biological status review, the Florida Peregrine Falcon Management Plan was developed and then approved at the June 2009 FWC Commission meeting. The peregrine falcon was subsequently removed from the State's Endangered and Threatened Species List. The 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. 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. Acquisition of coastal land is included in the Florida Forever program. Of particular importance is the high priority "Florida Keys Ecosystem" Florida Forever project. 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 including Boot Key, Lower Matecumbe, and other large, relatively undeveloped parcels in the Middle Keys. Acquisition of lands identified in the Florida Forever program is not possible at this time due to a lack of funding.

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- *Monitoring* – In 2010 and 2011, The Florida Keys Hawkwatch, a private citizen group, began to organize volunteers to continue a long-term monitoring program. The organization plans to continue the program in fall of 2012.

Red-cockaded Woodpecker (*Barbara Almario, Michael Baranski, Robin Boughton, Mary Dowdell, Norberto Fernandez, Jim Garrison, Matthew Hortman, Patrick McElhone, Ross Scott, Steve Shattler, Rebecca Smith, Valerie Sparling, Adam Warwick, and Wendy Wilsdon*)

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

- *Establish and convene a meeting of the Florida red-cockaded woodpecker working groups.* One red-cockaded woodpecker working group currently meets. Agenda items relevant to the Florida Red-cockaded Woodpecker Management Plan have been incorporated into working group meetings and will continue as needed in the future.
- *Coordinate with the U.S. Fish and Wildlife Service (USFWS) to develop a statewide Safe Harbor program for red-cockaded woodpeckers in Florida.* The statewide Red-cockaded Woodpecker Safe Harbor program (<http://myfwc.com/conservation/terrestrial/safe-harbor/>) was initiated in November 2006 through an agreement between the USFWS and FWC under the Federal Endangered Species Act. Since red-cockaded woodpeckers are protected under the Endangered Species Act, landowners have a legal obligation to protect the birds and their habitat. Safe Harbor agreements make sense whenever landowners are interested in restoring or enhancing habitats that may benefit this species but are concerned about incurring additional regulatory restrictions on the use of their land. An agreement effectively freezes a landowner's Endangered Species Act responsibilities as long as the owner agrees to restore, enhance, or create habitat that benefits red-cockaded woodpeckers. The program, maintained by FWC staff, continues to enroll landowners. By the end of FY 2011-12, there were 15 signed agreements that comprised 18 different properties in the program with a total of 64,572 acres committed for habitat management by the landowners.

At the close of the 2012 red-cockaded woodpecker breeding season, Florida red-cockaded woodpecker populations continued on a track to achieve and in many cases, exceed the year 2020 population and metapopulation goals outlined in Florida's Red-cockaded Woodpecker Management Plan. Field visits to red-cockaded woodpecker populations have confirmed that large red-cockaded woodpecker populations in Florida are well-managed and that fire suppression, reliance on dormant season prescribed fire, and low availability of old-growth pines remain the greatest threats to red-cockaded woodpecker recovery in Florida.

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 – The annual tree cavity survey on Babcock/Webb Wildlife Management Area (WMA)

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revealed 38 active red-cockaded woodpecker clusters during FY 2011-12. Fifteen trees with new cavity starts were discovered in 12 active clusters. Two inactive clusters were augmented with cavity inserts and two new recruitment clusters were installed by FWC to improve connectivity between clusters.

Annual roost checks conducted during FY 2011-12 confirmed 29 potential breeding groups and nine solitary bird clusters. In 2012, 28 potential breeding pairs attempted nesting (97% attempt) and 23 pairs successfully fledged 23 young. A total of 76 adult red-cockaded woodpeckers were tallied during nesting season from 38 clusters yielding an average group size of 2.0.

Habitat improvements for the past year included a total of 15,332 acres (6,205 hectares) prescribed burn during the dormant season and 2,040 acres (826 hectares) in the growing season. FWC ground treated 7,638 acres (3,091 hectares) of exotic flora, and 6,027 acres (2,439 hectares) were roller chopped by a contractor.

Blackwater Wildlife Management Area in Okaloosa and Santa Rosa Counties – The Florida Department of Agriculture and Consumer Service (FDACS) and FWC have cooperatively managed the red-cockaded woodpecker population on Blackwater WMA since 1996. To facilitate population monitoring, FDACS applies leg bands to nestlings and unmarked adults. Other activities include checking for fledglings, bird translocations, and installation of artificial cavities where appropriate. During FY 2011-12, FWC continued a habitat improvement program initiated in 2006 by assisting FDACS with habitat management activities within red-cockaded woodpecker clusters.

In March 2012, surveys were conducted to document any new red-cockaded woodpecker activity and to evaluate previously inactive, abandoned, and recruitment clusters. FWC focused on mature longleaf forest at the north end of Blackwater WMA adjacent to Conecuh National Forest in Alabama. Although no new cavity starts or nest trees were observed, identified potential nesting and foraging habitat will continue to be periodically monitored for red-cockaded woodpecker activity.

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. Habitat management activities included prescribed burns cooperatively conducted by Camp Blanding Forestry and FWC personnel on 1,900 acres (769 hectares) and installation of five artificial cavity inserts during March 2012.

Citrus Wildlife Management Area in Citrus County – FWC, in cooperation with FDACS, continued to monitor the red-cockaded woodpecker population on the 49,317-acre (19,959-hectare) Citrus WMA tract of the Withlacoochee State Forest. Of the 71 active clusters in 2012, 56 nested and 51 were successful in fledging 75 young. The number of potential breeding groups on the area has leveled off at 66.

Color banding continued with 83 nestlings banded during the 2012 nesting season. At least four other fledglings and seven adults remain unbanded.

Habitat management activities included prescribed burns on 7,986 acres (3,233 hectares), hardwood control, and installation of artificial cavity inserts. About 30% of the clusters received fire in the past year. Encroaching hardwoods were cut and treated with herbicide in at least 21 of the clusters that were not prescribe burned. FWC staff and volunteers protected, by mechanical

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means, 290 cavity trees from fire in 31 clusters. Seven aging inserts were replaced and 15 new inserts were installed in established clusters to provide cavities for 2012 fledglings.

Conservation efforts for this population have allowed it to increase in size sufficiently to serve as a donor for smaller populations. Ten sub-adults of this southern most donor population will be available during fall 2012 for translocation to recipient sites in South Florida.

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 2011-12, FWC determined the number of active clusters, monitored active clusters for nests, color-banded nestlings, determined fledging success, and installed artificial cavities in existing and recruitment clusters. Habitat management included maintaining a three-year, growing-season burn rotation within red-cockaded woodpecker habitat. Habitat restoration within red-cockaded woodpecker habitat included treating 23,422 acres (9,478 hectares) of exotic plant species and mechanical reduction of understory on 482 acres (195 hectares). A total of 29 artificial red-cockaded woodpecker cavities were installed including the creation of one new recruitment cluster.

There were 20 active clusters and 16 potential breeding groups during the 2011 nesting season. Nine out of 16 potential breeding groups attempted nesting, with six clusters successfully fledging six birds.

Corbett WMA received five pairs of birds from Osceola National Forest and one single female from Big Cypress National Preserve in the fall of 2011. Of eleven birds, six have been observed since the move, resulting in a 50% retention rate. Corbett WMA is scheduled to receive three pairs of birds from Camp Blanding Wildlife Management Area in the fall of 2012.

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

On Three Lakes WMA, FWC has been intensively monitoring the red-cockaded woodpecker population since 2001. The population decreased after the 2004 hurricanes but has returned to its pre-hurricane numbers. The number of potential breeding groups on the Three Lakes WMA consisted of 44 in 2011 and 45 in 2012. During the 2011 breeding season, 37 of the 53 nesting attempts were successful, 53 nestlings were banded, and 46 of those chicks survived to fledge the nest. FWC installed 19 cavity inserts to augment established clusters. Two old and damaged inserts were replaced by FWC and 131 inserts were cleaned and maintained. Habitat management activities performed by FWC to enhance red-cockaded woodpecker habitat included prescribed fire on 24,238 acres (9,404 hectares), mechanical treatment, including roller chopping and mowing on 237 acres (95 hectares), and invasive plant control on 120 acres (48 hectares). To protect red-cockaded woodpecker cavity trees during prescribed fires, FWC pre-burned around each tree.

The Herky Huffman Bull Creek WMA and the Triple N Ranch WMA have been actively managed as a single, small, red-cockaded woodpecker population since 2003; they supported eight potential breeding groups in FY 2011-12. This number has been steadily increasing since 2005, when FWC began yearly translocations of birds to the property. During FY 2011-12, six of the nine nesting attempts were successful, seven nestlings were banded, and all seven of those

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chicks survived to fledge the nest. FWC installed four cavity inserts to augment existing clusters and 80 inserts were cleaned and maintained. Habitat improvements by FWC to aid red-cockaded woodpeckers included prescribed fire on 14,762 acres (5,973 hectares), roller chopping on 899 acres (363 hectares), and invasive plant control on 248 acres (100 hectares). To protect red-cockaded woodpecker cavity trees during prescribed fires, FWC pre-burned around each tree.

Babcock Ranch Preserve in Charlotte County – Monitoring efforts for the Babcock Ranch Preserve in Charlotte County began in the spring of 2012 with Dr. Jerome Jackson from Florida Gulf Coast University taking the lead role. Inspections were made on 80 natural cavity trees, ten of which were newly discovered. Seven active clusters were verified. At least four nesting attempts were made with two attempts resulting in fledging young. The nesting status of three of the active clusters was not determined due to poor access conditions. Mapping of the clusters and GPS data for the population is underway, and as monitoring efforts for FY 2012-13 will be expanded.

Big Cypress National Preserve in South Florida – Big Cypress National Preserve (BCNP) in Collier County supports the 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 and management by FWC continued in the fall of 2011 with tree and cavity surveys to determine cluster status and activity. In October 2011, FWC completed the second red-cockaded woodpecker translocation from BCNP to J.W. Corbett WMA in Palm Beach County. During the spring of 2012, 24 artificial cavities were installed in nine cavity-limited clusters and 11 adult red-cockaded woodpeckers were banded by FWC. New clusters were discovered throughout the year, bringing the total number of known red-cockaded woodpecker clusters in BCNP to 103. A seasonal technician was also hired in April 2012 to assist in monitoring efforts.

For the fifth year, monitoring continued into the summer with nest checks, nestling banding, fledge checks, and roost checks. FWC monitored 38 of 103 potential clusters for productivity based on access and cluster activity. Out of 38 potential breeding groups, 32 attempted nesting with 27 of those successfully hatching chicks. Twenty-four chicks made it to banding age (six days old) and 16 of those fledged. Helper birds were observed in seven of the monitored clusters. Additional clusters were surveyed for signs of activity during the breeding season and totaled at least 80 active clusters within BCNP.

FWC will continue to survey BCNP for new cluster locations as well as continuing to augment cavity-limited clusters. Fire effects on red-cockaded woodpecker cavity trees will continue to be monitored and documented. FWC also plans to augment additional cavity-limited clusters and continue to closely monitor clusters for the 2013 breeding season.

Goethe State Forest in Levy County – FWC currently assists FDACS in monitoring and managing the red-cockaded woodpecker population on the Goethe State Forest. During FY 2011-12, there were 58 active clusters of red-cockaded woodpeckers, which produced 44 chicks. The annual monitoring program at the Goethe State Forest 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, and sexing the chicks when fledged. Ten inserts were replaced in active clusters.

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Tate's Hell State Forest in Franklin and Liberty Counties – During FY 2011-12, FWC mechanically cleared 48 acres (19 hectares) to reduce the hardwood mid-story surrounding both new and existing clusters. Staff also assisted the FDACS in burning 40,414 acres (16 hectares) including 8,128 acres (3289 hectares) of compartments that contain red-cockaded woodpecker clusters. From March to June 2012, 58 clusters were monitored for red-cockaded woodpecker activity. FWC documented 112 active trees (trees that demonstrate red-cockaded woodpeckers use them for roosting and nesting) within 37 active clusters, both all-time highs. The active trees were then surveyed for nests. Thirty-seven potential breeding groups occupied the 37 active clusters, and 29 (78%) of those attempted to nest. FWC banded 57 nestlings, 70% of which successfully fledged. This marked the highest fledge rate ever documented on Tate's Hell State Forest.

Apalachicola River Wildlife and Environmental Area in Franklin County – Both natural and artificial clusters within the Apalachicola River WEA (ARWEA) in Franklin County were monitored throughout the breeding season. ARWEA has a relatively small, but growing, population of red-cockaded woodpeckers. Three recruitment clusters were established in March of 2005 and two each in January of 2008 and February of 2009. FWC monitored three natural and seven artificial clusters in the Franklin County portion of ARWEA throughout the breeding season.

During FY 2011-12, nine of the ten clusters showed signs of activity and eight of those active clusters attempted nests. Nineteen nestlings were banded in 2012, up from 11 banded in 2011. Twelve of the 19 nestlings banded fledged (63% survival rate), with an additional nestling having an unknown fate. There were three fledglings produced from two natural clusters. The nest tree in one of the natural clusters was struck by lightning and the adults successfully re-nested to produce one fledgling in the same cavity. A total of nine fledges were produced from the six artificial clusters that attempted nesting (two nests with three fledglings each, one nest with two fledglings, and one nest with one fledgling). There were two artificial clusters that had nests predated, and both re-nested unsuccessfully. Management activities to enhance foraging habitat included 3,195 acres (1,293 hectares) of prescribed burning that encompassed six clusters and approximately 26 acres (11 hectares) within eight clusters were mowed to remove mid- and understory hardwood growth.

John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area in Palm Beach County – Since 2006, 61 red-cockaded woodpeckers have been captured and translocated from public lands in Florida and Georgia to Dupuis WEA. Of the ten birds translocated from Osceola National Forest in the fall of 2011, two remained on the area. In 2012, nine potential breeding groups produced eight fledglings.

As part of the area's red-cockaded woodpecker management plan, an additional ten woodpeckers will be translocated from Fort Stewart, Georgia, during fall 2012. Old cavities were replaced and new cavities installed to bring the total number of cluster locations to 24. During the next breeding season, clusters will continue to be monitored for nests, nestlings will be banded, and fledging success determined. In addition, habitat management activities to reduce mid-story height and enhance red-cockaded woodpecker habitat will continue.

Restoration of this woodpecker species at Dupuis WEA will provide an important additional population in southeast Florida as part of the Federal Red-cockaded Woodpecker

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Recovery Plan. The only other group of red-cockaded woodpeckers in southeast Florida is at Corbett WMA.

Platt Branch Mitigation Park Wildlife and Environmental Area in Highlands County – Monitoring of red-cockaded woodpeckers in the Fisheating Creek (part of the Platt Branch Mitigation Park WEA) population in Highlands County has been conducted by FWC on an intensive level since 2002. The population within Platt Branch WEA and on adjacent private properties, portions of which are protected by conservation easements, comprise seven active clusters. There was a reduction of one active cluster from FY 2010-11.

Surveys in FY 2011-12 revealed three potential breeding pairs and four solitary males prior to nesting season. Nesting success was monitored during the spring of 2012, with two pairs nesting. One pair produced two chicks that fledged, and one pair produced a single chick that fledged.

FWC completed growing season controlled burns on 306 acres (124 hectares) of suitable habitat. An additional 33 acres (13 hectares) of flatwoods was roller chopped. Mechanical fuel reduction was completed around all active clusters within Platt Branch.

Roseate Tern (*Ricardo Zambrano*)

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

In the spring of 2006, FWC biologists attempted to provide the birds displaced from Pelican Shoal with 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 colonial-nesting birds to nesting areas and to restore seabird colonies. These techniques have been successful the last five years. During the 2011 and 2012 nesting season, it was decided not to place the equipment at the Dry Tortugas National Park in order to determine if the terns would nest there without the use of the equipment and decoys. Since the stop of decoy usage, roseate terns have still returned to the alternative nesting area. The nest numbers seem to be declining each year, however. Twelve nests were recorded in 2011. No nest counts were conducted in 2012, but 19 adult roseate terns were counted, making the minimum estimate of nests at the Dry Tortugas during the 2012 nesting season nine. These numbers are down from the previous years. In the main Florida Keys, FWC biologists surveyed three colonies of roseate terns on gravel roofs to conduct nest, egg, juvenile, and adult counts. A total of 251 nests were recorded between the three roofs. The total roseate tern population for Florida is therefore estimated to be 260 pairs. During FY 2011-12, a sample of 60 chicks was captured, banded, and released at the roof colonies in the Florida Keys.

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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 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 management plan for listed shorebirds was initiated in FY 2011-12 by staff, who will continue working with stakeholders to finalize the plan for FWC Commissioner approval. If once the plan is approved, the black skimmer and American oystercatcher will be listed as State-designated Threatened.

Florida's wildlife habitats are facing unprecedented challenges ranging from sea level rise to a rapidly expanding human population. The population of Florida's coastal counties is predicted to double from 12.3 million to more than 26 million by 2060. Currently, more than half of Florida beaches are experiencing erosion problems, most of which is due to anthropogenic factors. The culmination of beach erosion and sea level rise will require an increase in the management of coastal systems in the form of habitat modifications.

Survival of Florida's vulnerable seabirds and shorebirds (e.g. snowy plover, least tern, roseate tern, black skimmer, and American oystercatcher) are dependent on community-based conservation that recognizes both the economic and wildlife values of coastal habitats. This type of conservation cannot be accomplished by any one agency and requires the skills, experience, and resources only a broad spectrum of partners can marshal. Realizing this, in 2007, FWC initiated a conservation approach for shorebirds and seabirds, which relies extensively upon partnership development and support. This project, the Florida Shorebirds Partnership Coordination is funded through Florida's Wildlife Legacy Initiative (Congressional State Wildlife Grants program). FWC helped cultivate numerous local and regional partnerships to improve conservation through cooperative efforts between key agencies, organizations, and individuals involved with the management, monitoring, and stewardship of shorebirds and seabirds. In addition, 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.

To date, ten active regional partnerships coordinate monitoring and protection across Florida. The partnerships include the Suncoast Shorebird Partnership, Florida Panhandle Shorebird Working Group, Nature Coast (Taylor to Hernando County) Shorebird Partnership, Collier County Shorebird Partnership, St. John's Shorebird Partnership, Timucuan Shorebird Partnership, Volusia County Shorebird Partnership, Space Coast Shorebird Partnership (Brevard County), Treasure Coast Shorebird Partnership (Indian River, St. Lucie, and Martin Counties), and Lee County Shorebird Partnership.

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. The Florida Shorebird Alliance also publishes a newsletter and maintains an email list-serv of 885 contacts. Together with continued expansion and development of the Alliance network, these changes will enable FWC to assess

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status and trends for many shorebirds and seabirds in Florida, information that is critical to conservation planning for coastal habitats.

Florida Shorebird Database – Managers and permit reviewers need real-time information to help them respond to situations involving nesting shorebirds and seabirds. The Florida Shorebird Database, launched in spring 2011, was created to serve as the central repository for data collected on shorebirds and seabirds in Florida. The Database is an online tool with a data entry interface that allows users to submit and manage observations. FWC and partners developed the Database and an accompanying protocol for monitoring beach-nesting shorebirds and seabirds. To date, 293 registered users from throughout Florida have entered 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 2011-12, FWC researchers conducted surveys in multiple historical nesting areas across the state in order to compare current nesting populations of American oystercatcher with historical populations. Survey areas included much of the eastern Panhandle, Big Bend region, and Tolomato, Matanzas and Halifax rivers in northeast Florida. Researchers found 117 pairs of oystercatchers on nesting territories. Four areas were monitored more intensively in order to document breeding success and movement patterns: Cedar Key and the Florida Barge Canal on the Nature Coast, and the Tolomato and Matanzas rivers in northeast Florida. In these areas, researchers followed 58 pairs and 69 nests. Unfortunately, high spring tides and Tropical Storms Beryl and Debby led to low nest success during the season. These pairs fledged a total of 14 chicks. FWC researchers and partners also banded 14 adults and 13 chicks during the season as part of an effort to understand adult and juvenile movements during and after the breeding season. Additional oystercatcher nests and pairs were monitored throughout the breeding season by FWC's partners; that data is available through the Florida Shorebird Database at www.flshorebirddatabase.org. Analysis of population trends is on-going.

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

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

The Southeastern American kestrel is a non-migratory falcon closely tied to sandhills in the southeastern U.S. This subspecies has undergone a range reduction and population decline throughout its range in recent decades. In July 2008, FWC initiated a long-term effort to develop a regional Southeastern American Kestrel conservation partnership within and across agencies by: 1) identifying suitable but unoccupied kestrel habitat; 2) establishing population targets for kestrels on FWC's 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

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managers, bird watchers, and others through talks, web sites, and printed media; and 7) conducting additional research on kestrel breeding habitat requirements.

During FY 2011-12, FWC coordinated kestrel monitoring with partners – Florida Department of Environmental Protection, Florida Department of Agriculture and Consumer Services (FDACS), private citizens, and local Audubon Society chapters. More than 520 nest boxes were monitored during the spring and summer of 2012. Nest boxes were located in 11 counties in north-central Florida (Alachua, Citrus, Clay, Columbia, Gilchrist, Hernando, Levy, Madison, Marion, Sumter, and Suwannee) and four counties in south-central Florida (Glades, Highlands, Lake, and Polk). Approximately 40% of the nest boxes were occupied and the majority of nesting attempts produced at least one fledgling. The three public lands with the most Southeastern American kestrel nest boxes were Camp Blanding WMA in Clay County (59 nest boxes), Mike Roess Gold Head Branch State Park in Clay County (18 nest boxes), and Withlacoochee State Forest in Citrus County (18 nest boxes). The longest-running nest-box monitoring program for Southeastern American kestrels in Florida is located at Ichetucknee Springs State Park in Columbia and Suwannee counties. Ichetucknee Springs State Park maintains 13 nest boxes and two to four have consistently been used by kestrels each year since the 1990s. FWC collected and analyzed GIS data from selected sandhill sites in north-central Florida to determine habitat preferences for kestrels at the scale of the landscape. These analyses are ongoing but suggest that at least one important factor is the size of kestrel habitat patches (e.g., nest boxes located in landscapes where the mean size of sandhill patches was larger tended to be occupied more frequently).

In FY 2011-12, 53 Southeastern American kestrel nest boxes were maintained and monitored by FWC on FWC-managed lands in southwest Florida. One of the 53 boxes was installed during FY 2011-12; the remainder were installed during previous fiscal years. FWC-managed lands with kestrel nest boxes include: Chassahowitzka WMA, Perry Oldenburg Mitigation Park Wildlife and Environmental Area (WEA), and Janet Butterfield Brooks WEA, which are all in Hernando County; Hilochee WMA in Lake and Polk counties; Lake Wales Ridge WEA in Highlands and Polk counties; Kissimmee Island Cow Company WMA in Polk County; Hickory Hammock WMA in Highlands County; Kissimmee River Public Use Area in Highlands and Okeechobee counties; Crooked Lake WEA in Polk County; and Platt Branch WEA in Highlands and Glades counties. Nest boxes were maintained and monitored by FWC during the spring breeding season. Nine nest boxes were used by breeding kestrels. Chassahowitzka WMA had four active boxes, Perry Oldenburg WEA had two active boxes, Janet Butterfield Brooks WEA had one active box, and the Lake Wales Ridge had two active boxes. Three boxes were used by great-crested flycatchers, eleven by Eastern screech owls, two by Eastern bluebirds, and one was occupied by bees. The remaining boxes were not used.

During FY 2011-12, 102 boxes were maintained and monitored by FWC on FWC-managed lands in north-central Florida. On Big Bend WMA in Taylor County, ten nest boxes were maintained and surveys were conducted. No kestrel nests or eggs were identified. The boxes were used by great crested flycatchers throughout the nesting season. Fifty-five nest boxes were cleaned prior to nesting season (February) on Camp Blanding WMA in Clay County. All boxes were then checked for usage and maintained monthly during March to June 2012. Seven nest boxes were verified as having been or currently being used by kestrels and 55 kestrel eggs were identified. Other wildlife utilizing the nest boxes in order of occurrence included southern flying squirrels, great crested flycatchers, bluebirds, screech owls, gray squirrels and Sherman's fox squirrels. On Jennings State Forest WMA in Clay and Dual counties, the 26

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existing boxes were cleaned and maintained in February and March 2012. FWC conducted four visits during nesting season (April to June). No kestrel activity was noted. Other animals utilizing boxes were Sherman's fox squirrels (four young were observed), great crested flycatchers, eastern bluebirds, and eastern screech-owls. On Twin Rivers WMA in Madison County, two boxes were checked for usage in March, April, and May 2012. One nest box was removed due to a timber sale at the location and will be replaced after the sale is complete. No kestrel eggs were identified. The boxes were used by eastern bluebirds, southern flying squirrels, tufted titmice, and great-crested flycatchers throughout the nesting season. Active kestrel pairs were frequently seen hunting in the vicinity of the two nest boxes. There are many natural cavities in the vicinity of the box and the kestrels most likely used one of these spaces for nesting. On Watermelon Pond WEA in Alachua County, five nest boxes were installed, for a total of nine kestrel boxes on the WEA. Nests were initiated in three boxes and 13 eggs laid, but all three nests failed to hatch.

In March 2009, FWC worked with a local Eagle Scout candidate and his crew to build and install ten kestrel nest boxes in open fields and wildlife openings throughout Blackwater WMA in Santa Rosa and Okaloosa counties. During FY 2011-12, FWC continued to monitor kestrel nest boxes on Blackwater WMA. Boxes were checked in April 2012 to determine nesting attempts. Two boxes that showed evidence of kestrel nesting were checked two weeks later using a peeper scope. With subsequent checks of the two boxes, FWC determined there was one successful nesting and one failed nesting attempt. FWC installed two additional kestrel boxes and added predator guards to all boxes in an attempt to reduce predation and use by species other than Southeastern American kestrels. Nest box checks revealed one box was used by owls and two boxes were used by kestrels (one box contained eggs and the other contained hatchlings). In January 2012, six new boxes with predator guards were installed bringing the total number of monitored boxes to 16. During the April 2012 checks, FWC observed four boxes occupied by kestrel. Subsequent checks revealed three boxes with clutches of eggs, two of which fledged successfully. Nest box checks and maintenance will continue during FY 2012-13.

Wading Birds (*Michael Baranski, Pam Boody, Justin Davis, Justin Ellenberger, Matthew Hortman, Jean McCollom, Paul McElhone, Alex Pries, Valerie Sparling, and Morgan Wilbur*)

Seven species of wading bird in Florida are currently listed as 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 management plan for these species was initiated in FY 2011-12; the species' status will not change until the plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

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 (a Federally-designated Endangered species). In order to monitor the relative success of wading bird populations in the area, an annual aerial nest colony survey is conducted in the spring of each year. Aerial transects were flown in late April 2012 and late May 2012. Transects are ½ mile (1 kilometer) apart and are flown at an altitude of 300-400 feet

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(91–122 meters) and an air speed of approximately 40-50 knots. Of six previously identified wading bird colonies, only one was active, the same as FY 2010-11. Of the six colonies, no more than five have ever been active at the same time. No new colonies were found. The Aucilla WMA experienced drought during the spring of 2011 that extended through the nesting season of 2012. As such, many of the wetlands where colonies are located were dry or nearly dry during the nesting season, possibly explaining the absence of nesting birds. Wading bird colonies are typically mixed with listed species and non-listed species such as yellow-crowned night-herons.

Fitzhugh Carter Tract of Econfina Creek Wildlife Management Area in Washington County – Numerous water bodies and associated wetlands present on the Fitzhugh Carter Tract of Econfina Creek WMA (Carter Tract) in Washington County provide excellent nesting and foraging habitat for the many species of wading birds found in the Florida Panhandle. In particular, one rookery has been observed supporting nests for various species of colonial-breeding wading birds. Species of special concern that have used this rookery in previous years include the little blue heron and tricolored heron. The rookery is monitored annually April – July to document species use, number of individuals present, and estimated nest success. The most recent survey documented 13 little blue herons (seven adults and six chicks), but no tricolored herons. Adult use and chick production of the rookery does not seem to follow any discernible trend to date. Analysis performed on data from 2008-12 did not show a significant correlation between fluctuating water levels on foraging water bodies within the property and adult use of the rookery and chick production. Multiple incidental observations of wood storks and white ibis were made on area water bodies from spring 2011 through summer 2012. Wood storks and white ibis concentrated foraging at receding ponds as drought conditions gathered prey in these areas. The rookery at the Carter Tract will continue to be monitored annually during the nesting season (April – July) and incidental observations of at-risk wading bird species throughout the property will also be documented.

J.W. Corbett Wildlife Management Area in Palm Beach County – Aerial wading bird surveys were conducted for active rookeries on J.W. Corbett WMA during FY 2011-12. FWC found two active rookeries containing approximately 20-30 nests of snowy egrets, white ibis, and great egrets. Shorebird surveys were conducted for two weeks and then stopped because of drought conditions in the area. Florida sandhill cranes, least bitterns, and pied-billed grebes were detected.

Okaloacoochee Slough Wildlife Management Area in Collier and Hendry Counties – Two annual bird surveys were conducted during FY 2011-12 on Okaloacoochee Slough WMA by a team of biologists and volunteers.

In September 2011, the North American Migration Count was conducted for the fifth year, and four Species of Special Concern (little blue heron, snowy egret, tricolored heron, and white ibis) were recorded on Okaloacoochee Slough WMA.

During the January 2012 bird count, one Federally-designated Endangered species (wood stork), one Federally-designated Threatened species (crested caracara), one State-designated Threatened species (Florida sandhill crane), and five Species of Special Concern (little blue heron, snowy egret, tricolored heron, white ibis, and limpkin) were seen. Part of this count

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included monitoring a large wading bird roost where over 1,100 wading birds were counted including over 700 white ibis. The roost has been monitored 24 times since 2002.

Apalachicola River Wildlife and Environmental Area and Box-R Wildlife Management Area in Gulf and Franklin Counties – The Apalachicola River Wildlife and Environmental Area (ARWEA) and Box-R WMA consist of a matrix of upland, wetland, and riverine habitats that potentially contain several rare or at-risk species. The numerous wetlands on these areas provide habitat for several species of colonial wading birds, including the great blue heron, tricolored heron, little blue heron, great and snowy egrets, white ibis, and wood stork. In order to monitor the relative success of wading bird populations in the area, an annual aerial colony survey (within the lower Apalachicola River basin) is conducted in the spring of each year. Aerial surveys were completed on the lower Apalachicola River basin on April 23, 2012 and May 29, 2012. There were six nesting colonies located, the same number as FY 2010-11. Water levels were extremely low during the wading bird surveys; areas that normally had water year round were dry. Species found nesting in the colonies included great blue heron, little blue heron, great egret, snowy egret, anhinga, and wood stork. Wood storks have been found nesting in the same general rookery in eight out of 21 years in which aerial surveys were conducted.

John C. and Mariana Jones/Hungryland Wildlife and Environmental Area in Martin and Palm Beach Counties – An annual aerial nest survey was conducted during FY 2011-12 on the John C. and Mariana Jones/Hungryland WEA. Water levels on the area were low in the months preceding May when the survey was conducted. Two Florida sandhill crane nests were observed on the area and three additional nests were observed within one mile (1.6 kilometers) of the area boundary. A small nest colony was observed supporting seven great egret nests and one great blue heron nest. Another small nest colony less than ½ mile (1 kilometer) outside the area boundary was observed supporting one great blue heron nest with two chicks, seven great egret nests with two fledges, and an anhinga nest.

John G. and Susan H. Dupuis, Jr. Wildlife and Environmental Area in Palm Beach County – The 2,500-acre (1,012-hectare) marsh on the John G. and Susan H. Dupuis, Jr. WEA provides good habitat for many species of wading birds in Florida. Monthly roadside visual surveys have been conducted since 1996 to monitor wading bird presence. The most common wading birds observed have been great egrets, great blue herons and little blue herons. Numerous other wading birds have been seen feeding on the area, including tricolored herons, snowy egrets, white ibis, and wood storks. The marsh and other wetland areas at Dupuis WEA will continue to be surveyed monthly to document wading bird activity.

Whooping Crane (*Marty Folk*)

Non-Migratory Population – The whooping crane is a Federally-designated Threatened Nonessential Experimental Population in Florida. 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 continues to monitor and study the remaining 18 birds in the flock. Research projects are primarily focused on behaviors of the birds during the breeding season. Biologists are studying behavioral differences between successful and unsuccessful nesting pairs and between whooping cranes and the more successful Florida sandhill cranes.

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Results from the research are expected to 1) allow a better understanding of the challenges for whooping cranes in Florida; 2) provide knowledge regarding the basic biology of these species; and 3) provide information of value for future reintroductions of whooping cranes.

Eastern Migratory Population – A separate reintroduction of 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 102 birds in this population. Like the non-migratory flock, the migratory flock is encountering reproductive challenges and research is underway to identify the limiting factors. FWC's involvement with this project is primarily an advisory role, with some field monitoring.

Wood Stork (*Morgan Wilbur*)

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

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 fly over of the colony. The flyover, first implemented in June 2009, was conducted in late April and again in late May 2012 from a helicopter at an altitude of approximately 600 feet (183 meters) to avoid disturbing the nesting birds. Due to a prolonged drought that extended through the nesting season, the Chaires wood stork colony was inactive (zero nests), as there was no water in Lake Lafayette or under the nest colony. It was estimated that there were more than 200 wood stork nests in the colony during the 2011 nesting season. Two additional wood stork colonies (Ochlockonee North and Ochlockonee South) that occur on private property in western Leon County were also monitored in May 2012. There were no nests observed at the location of the Chaires North colony and 35 nests were observed at the Chaires South colony.

FLORIDA AMPHIBIAN AND REPTILE ATLAS (*Kevin Enge*)

FWC, in collaboration with Kenneth Krysko of the Florida Museum of Natural History, completed a three-year State Wildlife Grant project produce an *Atlas of Amphibians and Reptiles in Florida*. Georeferenced locations (latitude and longitude) were determined for 134,404 vouchered records (specimens or photographs) from 58 museums or other institutions and 43,319 unvouchered (unverified records) from scientific and popular literature, reports, and credible survey databases. These data were used to generate distributional maps for 142 native and 56 non-native species of amphibians and reptiles known to occur in Florida. In addition, a species account was prepared with a brief discussion of its geographic distribution (including the number of vouchered records and counties in which it has been found, potential counties of occurrence, and/or identification errors), earliest known voucher, taxonomy (if changed recently), and at least two photographs. The final report may be accessed at

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<https://public.myfwc.com/crossdoi/fundedprojects/FinalReportKryskoEngemolerAtlasofAmphibiansandReptilesinFlorida08013.pdf>. The data and maps from this report have already proved useful in management plans and other FWC projects.

AMPHIBIANS

Flatwoods Salamander (*Barbara Almario, Patrick McElhone, Fred Robinette, Bill Turner, and Adam Warwick*)

Flatwoods salamanders in the population west of the Apalachicola River are reticulated flatwoods salamanders and are a Federally-designated Endangered species. Populations to the east of the Apalachicola River are frosted flatwoods salamanders and are a Federally-designated Threatened species.

Tate's Hell State Forest in Franklin and Liberty Counties – In FY 2011-12, FWC began using satellite imagery to identify remnant ephemeral ponds on Tate's Hell State Forest. These ponds were then visited and delineated on the ground. Historically, many wildlife species depended on these ponds for food and cover, including frosted flatwoods salamanders. Salamanders also depended on these grass-dominated wetlands to breed. Due to altered hydrology and many years of fire suppression, the majority of these ponds are now dominated by hardwoods, which have shaded out grass vegetation, and rendered the ponds unsuitable breeding habitat for flatwoods salamanders. FWC identified 34 ephemeral ponds and have begun to establish a GIS database of the ponds.

Pine Log and Point Washington Wildlife Management Areas in Bay, Washington and Walton Counties – FWC sampled potential breeding ponds on Point Washington Wildlife Management Area (WMA) in Walton County and Pine Log WMA in Bay and Washington counties, from November 2011 to April 2012 in an effort to re-confirm the two known breeding sites and document any new breeding populations.

Ponds were mapped and ranked as “highly likely,” “potential,” “unlikely,” or “unsuitable,” based primarily on a suitable hydroperiod (holding enough water to support amphibian larvae for at least three months) and the presence of wiregrass or other grasses at the edge of the pond.

Sampling surveys were conducted on 15 ponds classified as “highly likely” or “potential” flatwoods salamander habitat: eight ponds at Point Washington and seven ponds at Pine Log WMA. Traps along the ponds were set ahead of weather fronts when rain was predicted, for a total of 182 survey-nights on Point Washington WMA and 168 survey-nights on Pine Log. Ordinarily, approximately one-third of the ponds on each WMA are sampled using a combination of dip nets and minnow traps. This is normally done in February and March; however, because of low precipitation in the winter of FY 2011-12, most ponds were dry at that time. Minnow traps were used in one “highly likely” pond at Point Washington WMA and two “potential” ponds at Pine Log WMA. In each pond, 20-35 traps were set around the edge and wherever grass grew in the water. Traps were left in each pond for two nights. Using both drift fence and minnow trap methods, 12 amphibian and reptile species at Pine Log WMA and ten species at Point Washington WMA were captured and recorded. No flatwoods salamanders were captured during FY 2011-12.

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The recent 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 continued to work with the Florida Department of Agriculture and Consumer Service (FDACS) to improve potential breeding pond habitat through prescribed fire, mowing, thinning, and chopping. The Management Plan for the Flatwoods Salamander on Point Washington WMA was developed by FWC in 2005; FWC has also provided recommendations for mitigation (mowing, burning, or a combination of both) on the eastern section of Point Washington WMA. These recommendations continue to be employed during FY 2011-12.

Blackwater Wildlife Management Area in Okaloosa and Santa Rosa Counties – FWC has surveyed for reticulated flatwoods salamanders within Blackwater WMA over the past several years. As of April 2012, there were no confirmed flatwoods salamander breeding ponds on the WMA. A three-year sampling protocol designed to survey and monitor 118 pond sites throughout the WMA was implemented in early 2007. Priority ponds are sampled annually, while potential breeding sites are sampled on a three-year cycle.

Property containing a known flatwoods salamander breeding site and managed as the Yellow River WMA was incorporated in the Blackwater River State Forest in 2008. FWC samples this pond twice a year. During FY 2009-10, FWC located two new potential flatwoods salamander breeding ponds on Yellow River WMA and one additional pond during FY 2010-11. These ponds are also sampled twice annually. In November 2010 and April 2011, FWC used herbicide on the margins of the known breeding pond to control re-sprouting following the cooperative effort between FWC, FDACS, and USFWS to remove undesirable woody species from the pond in April 2010. In July 2012, FWC reassessed the 2010 herbicide efforts and observed that the majority of large woody vegetation sprayed was deceased. FDACS contracted for timber thinning in the adjacent slash pine plantation during spring 2012. FWC was able to work with the contractors to clear a fireline around the flatwoods salamander pond complex to facilitate burning of the pond basin independent of the pine plantation. A growing season burn will be scheduled after FDACS conducts a prescribed burn in the surrounding pine plantation to aid in cleaning the fireline and readying the area for regular burns. In July of 2012, FWC reassessed the 2010 herbicide efforts and observed that the majority of large woody vegetation sprayed was deceased. FWC will continue to work with FDACS to manage and improve habitat around all potential flatwoods salamander breeding ponds.

Apalachicola River Wildlife Environmental Area in Franklin and Gulf Counties – From 2010-11, FWC contracted for the removal of invasive hardwood shrubs, hammocks, and remnant logging debris from 54 ephemeral pond edges and basins at Apalachicola River Wildlife and Environmental Area (ARWEA) in Franklin and Gulf counties. FWC will continue restoration of the ephemeral ponds on the ARWEA mainly by allowing prescribed burns to carry through pond basins as conditions allow. Should conditions not be conducive to burning, select herbicide or mechanical applications may be used to continue the restoration of these important breeding areas.

FWC surveyed potential frosted flatwoods salamander breeding ponds in the Franklin County portion of the ARWEA from January to February 2012. Dipnet surveys were completed at 23 ponds during FY 2011-12. Of those surveyed, eight were considered “potential” breeding ponds and 15 were considered “unlikely” breeding ponds according to a 2003 assessment of the

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area. All adult and larval reptile and amphibian species captured were identified and recorded. No frosted flatwoods salamanders were captured during FY 2011-12.

Florida Bog Frog (*Barbara Almario*)

The Florida bog frog is currently listed in Florida as a 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 management plan for the Florida bog frog was initiated in FY 2011-12; the species' status will not change until the plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

Yellow River and Escribano Point Wildlife Management Areas in Santa Rosa and Okaloosa Counties – FWC began call surveys for the Florida bog frog on the recently acquired Yellow River Ravines Tract and the Escribano Point Parcels of Yellow River Wildlife Management Area (WMA) in 2009 and continued those surveys during FY 2011-12. FWC surveyed ten points distributed along three creeks in Yellow River Ravines and six points in Escribano Point in May, June, and July 2012. Survey protocols were similar to those used by the U.S. Geological Survey North American Amphibian Monitoring Program. FWC documented that bog frogs were present at one survey point in Yellow River Ravines, as found in previous years, during each of the May, June, and July 2012 night surveys. During the May survey, FWC estimated approximately three individuals calling. No bog frogs were documented on Escribano Point in 2012, although four other frog species were detected.

In cooperation with the Florida Department of Agriculture and Consumer Services (FDACS), Blackwater WMA staff are providing guidance for a management project funded by FWC beginning in the fall of 2012. The habitat restoration project aims to restore bog frog habitat along Garnier Creek in the Yellow River WMA, and to assess anticipated changes in bog frog populations using an experimental approach. Objectives of the four-year project are to: 1) restore seepage stream and slope habitat, 2) increase the area occupied by a population of the Florida bog frog, and 3) increase the number of male Florida bog frogs heard calling. FWC staff on Blackwater WMA will continue to work with FDACS, and have agreed to perform subsequent call surveys at the experimental plots after the restoration.

Gopher Frogs (*Kevin Enge*)

The gopher frog is currently listed in Florida as a Species of Special Concern, but after a biological status review in 2011, FWC staff recommended to the FWC Commissioners that the species be removed from the Endangered and Threatened Species List. A management plan for the gopher frog was initiated in FY 2011-12; the species' status will not change until the plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

The gopher frog is an "explosive breeder" (all or most of the 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, 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 2011-12, ponds on public lands were sampled for

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gopher frog tadpoles as part of two State Wildlife Grant projects: Survey of Winter-breeding Amphibian Species in the Peninsula and Disease Surveillance in Selected Species of Greatest Conservation Need – Bats and Amphibians.

Insufficient rainfall in winter and spring of FY 2011-12 resulted in many temporary wetlands remaining dry in the northern peninsula, limiting the areas that could be surveyed for the presence of gopher frog tadpoles. Gopher frogs bred in ponds in parts of southern Florida after heavy rainfall in October 2011. In Polk County, tadpoles were found in eight ponds at Allen David Broussard Catfish Creek Preserve State Park, two ponds at the Arbuckle, two ponds at Hesperides, five ponds at the Walk-in-the-Water tracts of Lake Wales Ridge State Forest, and one pond at Lake Kissimmee State Park. Also in Polk County, surveys were conducted at Crooked Lake Prairie and SUMICA but no tadpoles were found. In Highlands County, tadpoles were found in one pond each at Carter Creek, Lake Placid Scrub, and Sun N Lakes. Surveys were also conducted at Royce Ranch, Silver Lake, Clements, Henscratch, Tubbs units of Lake Wales Ridge Wildlife and Environmental Area (WEA), and at Platt Branch Mitigation Park WEA but no tadpoles were found. In Osceola County, tadpoles were found in one pond at Bull Creek, two ponds at Three Lakes, and one pond at Triple N Ranch Wildlife Management Areas (WMA). In Brevard County, tadpoles were found in two ponds at Buck Lake WMA and eight ponds at St. Sebastian River Preserve State Park (including the portion in Indian River County). In Hillsborough County, surveys were unsuccessful at Balm Scrub, Golden Aster Scrub, and Rhodine Scrub. Surveys were also unsuccessful at Brooker Creek Preserve in Pinellas County, Green Swamp West in Pasco County, and Fisheating Creek Conservation Easement in Glades County. In the panhandle, Apalachicola National Forest in Liberty County and Econfina Creek WMA in Bay and Washington counties were also surveyed unsuccessfully. In Marion County, limited surveys in Ocala National Forest found gopher frogs in only two of the few suitable ponds that contained water, and a survey of Indian Lake State Forest was unsuccessful.

In Florida, there are several recently discovered diseases that have been associated with die-offs of amphibians including the fungal pathogen *Batrachochytrium dendrobatidis* (Bd), and ranavirus, a viral pathogen. To determine the extent of these diseases in Florida, FWC has partnered with the Central Florida Zoo and the Florida Museum of Natural History to test amphibian populations. Gopher frog tadpoles in some ponds in Polk, Highlands, and Osceola counties were tested for Bd and ranavirus during FY 2011-12. To collect samples for Bd, DNA was collected by swabbing tadpoles with a cotton swab and then testing the material on the swab for signs of Bd; for ranavirus testing, liver tissue was used. Tail tips of gopher frog tadpoles were collected for future genetic analysis, and some genetic samples were sent to Dr. Stephen Richter at Eastern Kentucky University, who is collaborating with the U.S. Fish and Wildlife Service on a range-wide status review of the species.

REPTILES

American Crocodile (*Lindsey Hord and Eric Tosso*)

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 Ellenton in Manatee County on the west coast.

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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 2011-12, FWC received 125 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 nuisance crocodile calls, some of which require translocation of the captured crocodile. Nine non-hatchling crocodiles (five males, three females, one unknown) were captured in FY 2011-12. Males ranged from 9.5 to 11.8 feet (2.9 to 3.6 meters) in length for an average of 10.8 feet (3.3 meters). Females ranged from 6.2 to 8.2 feet (1.9 to 2.5 meters) in length, an average of 7.5 feet (2.3 meters). Eight captured crocodiles were translocated to a site deemed suitable by FWC. Five of the nine crocodiles were previously captured and translocated by FWC. One captured animal, a male measuring 11.8 feet (3.6 meters), died due to previously inflicted wounds while under observation. The wounds were consistent with those inflicted during fighting with other crocodiles.

FWC was involved in the recovery of two American crocodile carcasses in FY 2011-12. Both animals were females measuring 8.5 and 9.2 feet (2.6 and 2.8 meters) in length. The cause of death was attributed to wounds inflicted by automobile traffic and drowning due to entanglement in debris within a canal. Both carcasses were recovered from Key Largo in Monroe County. One American crocodile hatchling 11.2 inches (28.4 centimeters in length) was captured in the swimming pool of a home in Coral Gables, Dade County. The crocodile was released at a location near its capture site.

In June 2011, FWC responded to a report of crocodiles hatching from a nest in the front lawn of a residence in Key Largo, Monroe County. Upon arrival by FWC, one hatchling had emerged, but subsequently died; another was discovered dead in the nest. A number of eggs were removed from the nest and three hatchlings eventually emerged from them. Those three surviving hatchlings were kept in FWC possession awaiting disposition. Two of the hatchlings succumbed to bacterial infections in early 2012 despite treatment by veterinarians. The third hatchling, measuring 1.5 feet (0.45 meters), responded to treatment and was released near the nest site in Key Largo in April 2012.

Alligator Snapping Turtle (*Kevin Enge*)

The alligator snapping turtle is the largest freshwater turtle species in North America. In Florida, this species can be found from the Suwannee River drainage westward through the panhandle. FWC turtle regulations prohibit the harvest of this species in Florida; possession of a pet alligator snapping turtle requires an FWC permit. The alligator snapping turtle is currently listed in Florida as a Species of Special Concern, but after a biological status review in 2011, staff recommended that it be removed from the Endangered and Threatened Species List. A management plan for the alligator snapping turtle was initiated in FY 2011-12; the species' status will not change until the plan is finalized by staff and stakeholders and approved by the FWC Commissioners.

Population Status and Distribution of the Alligator Snapping Turtle in the Suwannee River – Differences in genetics and the bone structure of shells and skulls of alligator snapping turtles from the Suwannee River drainage compared to those from other drainages suggest that they may represent a new species. A Conserve Wildlife Tag Grant received during FY 2010-11 funded a study to determine the population status and distribution of alligator snapping turtles in

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the Suwannee River. Alligator snapping turtles were trapped on twelve three-mile (five-kilometer) stretches of the river from White Springs to the Gulf of Mexico, yielding 87 alligator snapping turtles (13 were recaptures) in 480 trap nights. The number of captures per site visit ranged from zero to ten turtles, and turtles have been captured at 11 of the 12 trapping sites. Males comprised 69%, females 17%, and subadults (less than 9 inches [23 centimeters] straight-line carapace length) 14% of the population. Twenty-eight turtles (32% of the sample) weighed more than 100 pounds (45 kilograms), with the heaviest weighing 126 pounds (57 kilograms) and having a carapace length of 25.7 inches (64.2 centimeters). One of 22 turtles X-rayed had ingested a bush hook, and another turtle had a hook embedded in its neck. Bush hooks are fish hooks suspended from branches over the river to catch catfish. Fluctuating water levels have been a challenge for trapping, as water levels went from historical low levels to flooded conditions after Tropical Storm Debby in June 2012. Sonic telemetry, which involves the tracking of animals using ultrasonic (high-frequency) sound waves emitted by an attached transmitter, is being conducted on tagged turtles in two stretches of the river to determine their movements and habitat use. Turtles are tracked using submersible ultrasonic receivers anchored to the river bottom and a manual tracking unit in a boat. Some turtles primarily remained in a small area of the river, whereas other turtles, particularly large males, moved long distances (some turtles were never relocated after being tagged).

Distributional Survey of the Alligator Snapping Turtle – A trapping study is being conducted in seven rivers between the Ochlockonee and Suwannee rivers to determine whether the species is present in this apparent distributional gap. Trapping in the St. Marks, Aucilla, and Econfina rivers yielded no alligator snapping turtles, but severe drought conditions precluded trapping of other rivers in the Big Bend region. Genetic samples are also being collected throughout the species' range in Florida. Blood samples were collected from 41 turtles, including 15 from the Suwannee River drainage, 15 from the Central drainages (Ochlockonee, Apalachicola, and Econfina rivers), ten from the Western drainages (Yellow, Blackwater, East, and Perdido rivers), and one from the Saint Johns River, where the species is not thought to occur naturally.

Barbour's Map Turtle (*Matthew Hortman*)

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

The Apalachicola River Wildlife and Environmental Area (ARWEA) in Gulf and Franklin counties encompasses the Apalachicola River basin and is home to the Barbour's map turtle. Approximately 36 miles (57.9 kilometers) of river are surveyed in late summer; the survey route includes sections of the Apalachicola, Brothers, and Chipola rivers. On October 24th, 25th and 26th of 2011, surveys were conducted and a total of 923 turtles were recorded, with 822 of those being on the Chipola River. This is a 14.4% increase from the 2010 survey, which recorded 807 turtles. The increase may be due to an increase in detectability of the species. Drought caused this year's survey to be conducted during extreme low water conditions in the

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area; low water conditions increase the number of places the turtles have available to bask. In addition, lower water temperatures this year most likely increased basking rates compared to previous years; the survey was conducted one month later than the previous year. The lower water temperatures along with warmer air temperatures also likely led to the higher basking rate (turtles must bask in order to maintain their body temperature). Annual surveys conducted by FWC will continue to monitor the population and assess the threats facing the turtle.

Gopher Tortoise (*Barbara Almario, Shane Belson, Deborah Burr, Justin Davis, Justin Ellenberger, Kevin Enge, Allan Hallman, Donna Jones, Allie Perryman, Sarah Power, Alex Pries, Jennifer Roberts, Fred Robinette, Paul Scharine, Jason Slater, Adam Warwick, and Morgan Wilbur*)

Management – The gopher tortoise is a State-designated Threatened species in Florida. FWC published its first Gopher Tortoise Management Plan in 2007. FWC continues to coordinate with the stakeholder Gopher Tortoise Technical Assistance Group on gopher tortoise conservation issues. In FY 2011-12, the Gopher Tortoise Technical Assistance Group worked closely with FWC to revise the Gopher Tortoise Management Plan by providing input on topics such as commensal species relocation and 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) guidelines. The revised 2012 Gopher Tortoise Management Plan is intended to guide the continued conservation of the gopher tortoise in Florida through 2022 and is expected to be presented to the FWC Commissioners for consideration and approval in early FY 2012-13.

Originally approved in April 2008, the Gopher Tortoise Permitting Guidelines were revised based on stakeholder and staff input and approved by the FWC Commissioners in November 2011. The guidelines are available at <http://myfwc.com/media/1410274/GTPermittingGuidelines.pdf>. Since the Gopher Tortoise Management Plan was implemented in 2007, FWC has continued to work with stakeholders to discuss and explore possible solutions to challenges encountered with gopher tortoise permitting and conservation issues. The continued participation of stakeholders is vital to the long-term conservation of the species.

Through the recipient site permit program (a program in which landowners may use their lands to receive gopher tortoises from development sites), approximately 11,357 acres (4,596 hectares) of gopher tortoise habitat have been protected through conservation easements and are currently managed for and receiving gopher tortoises. Twenty-seven recipient sites with a capacity for 15,594 tortoises have been permitted. An additional 11 recipient site permit applications are currently under review with potential capacity for 3,532 tortoises on 2,304 acres (921 hectares) of gopher tortoise habitat. During FY 2011-12, 4,910 tortoises were authorized for relocation under the relocation permits.

During FY 2011-12, FWC coordinated with the South Carolina Department of Natural Resources to explore options for restoring waif gopher tortoises to public lands. A Memorandum of Understanding was established between FWC and the South Carolina Department of Natural Resources to place groups of waif gopher tortoises on the Aiken Gopher Tortoise Heritage Preserve in South Carolina where the population has been depleted due to prior habitat neglect (under previous ownership). In addition, FWC established the first waif gopher

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tortoise recipient site in South Florida providing additional options for placing waif gopher tortoises.

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

During FY 2011-12, \$123,000 in funding assistance was provided to assist gopher tortoise habitat management activities that benefited more than 1,100 acres (445 hectares) 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 30,000 acres (12,000 hectares) of gopher tortoise habitat was conserved through prescribed fire and other habitat management activities on both public and private lands during FY 2011-12. This number exceeds FWC’s annual minimum target by 20,000 acres (8,000 hectares).

Wildlife Management Area (WMA) and Wildlife and Environmental Area (WEA) Activities – FWC has annually surveyed, monitored, and assessed the status of the gopher tortoise on Point Washington WMA (Walton County) since 1993, and on Pine Log WMA (Bay and Washington counties) since 2004. Aerial photos were used to identify suitable gopher tortoise habitat (primarily sandhill areas), and divided into clusters for management purposes. Point Washington WMA's sandhill habitat is grouped into 33 clusters, on a three-year schedule rotation so that approximately one-third of the area is surveyed each year. Pine Log WMA is grouped into 14 clusters and the entire area is surveyed annually. These sandhill clusters are systematically searched each summer for gopher tortoise burrows, on foot or using all-terrain vehicles. Burrow locations are recorded using GPS units, and the data points are downloaded into a Geographic Information System (GIS). Burrows are classified as active, possibly active, inactive, or abandoned. Using burrow widths, the burrows are further grouped into categories, 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 within the WMAs. During FY 2011-12, a total of 62 active burrows were found on Pine Log WMA, and 19 were found on the northern and east-central sections of Point Washington. These numbers fall within the usual range for the past several years, suggesting that activity level has remained fairly steady on both Pine Log WMA and the surveyed section of Point Washington WMA. Working in cooperation with Florida Department of Agriculture and Consumer Services (FDACS), the lead management agency, habitat improvements are being prescribed and implemented. Prescribed fire continues to be the preferred management tool, although herbicide has been effective in controlling encroaching scrub oaks on sandhill habitat where prescribed fire is impractical or ineffective. FDACS has removed the majority of sand pine plantings from Pine Log WMA, and replanted several of the resulting clearcuts in longleaf pine. With re-growth of herbaceous groundcover, these areas are well on their way to becoming suitable habitat for gopher tortoises.

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Currently, habitat conditions within Aucilla WMA (Jefferson and Taylor counties) are not ideal for gopher tortoises. Since acquisition, FWC has initiated timber thinning activities and applied prescribed fire in a manner that has allowed for significant improvement of habitat conditions. Recognizing the potential for continued habitat management activities to benefit this State listed species, FWC designated a Strategic Management Area for the gopher tortoise. The Strategic Management Area identified individual management units within the Aucilla WMA containing habitats that, if fully restored, would provide the greatest benefit to gopher tortoises. In order to determine the effectiveness of habitat management within these management units, it was determined that a baseline burrow survey was necessary. Therefore, during spring 2011 and 2012, FWC contracted with the Florida Natural Areas Inventory to conduct a baseline burrow survey for gopher tortoises on approximately 1,510 acres (611 hectares) of potentially suitable habitat within Aucilla WMA. Using a standardized survey protocol, Florida Natural Areas Inventory surveyed the area by systematically establishing linear transects that contained approximately 23% (347 acres, 140 hectares) of the 1,510 acres (611 hectares). In total, 13 burrows were found, of which seven were determined to be active. The gopher tortoise population estimate at Aucilla WMA based on overall occupancy rates of active and inactive tortoise burrows and corresponding total burrow estimates is 27 tortoises. Future surveys will be conducted using the same methods to determine if habitat management activities have been successful in increasing the number of gopher tortoise burrows on the area.

During FY 2011-12, FWC continued a multi-year, comprehensive burrow survey of the gopher tortoise population, designed to evaluate the entire 200,000 acres (80,937 hectares) of Blackwater WMA (Okaloosa and Santa Rosa counties). The purpose of the survey was to provide FDACS, the lead land manager on the area, with habitat improvement recommendations. Burrow activity was defined by FDACS compartments, so that habitat improvement recommendations could be more easily translated into management actions. During the summer of 2012, FWC surveyed more than 1,800 acres (728 hectares) of suitable gopher tortoise habitat and located 288 burrows. To date, over 78,000 acres (31,565.5 hectares) of habitat have been surveyed and 2,893 burrows have been located. Of the marked burrows observed, approximately 17% have been classified as having no tortoise activity. FWC worked with The Nature Conservancy to procure funding from the Multi-State Sandhills Ecological Restoration Project for gopher tortoise surveys on the Hutton Unit of Blackwater WMA. Gopher tortoise populations on the Hutton Unit were initially surveyed by FWC in 2008 and 2010. In July 2012, an estimated 290 acres (117 hectares) of new potential habitat for gopher tortoises and 114 acres (46 hectares) of previously surveyed habitat were assessed with the assistance of the Longleaf Alliance. FWC surveyed parcels that had undergone management within the past two years such as prescribed burns and selective timber cuts. Looking ahead, FWC intends to sub-sample gopher tortoise populations and habitats within each unit on Blackwater WMA to assess whether forest management efforts have impacted gopher tortoise population sizes, distributions, and recruitment.

Surveys and monitoring continued from May to June 2012 on the Fitzhugh Carter Tract of Econfina Creek WMA (Washington County). The 2,155-acre (872-hectare) tract contains approximately 1,200 acres (487 hectares) of sandhill uplands (gopher tortoise habitat). For logistical and accounting purposes, gopher tortoise burrows on the area are grouped into six clusters. The monitoring protocol follows that established for Point Washington WMA (see below). The 2012 surveys yielded 512 total burrows; 55 more burrows than were documented in 2011 (**Table 4**). Twenty-three percent of burrows were classified as active or possibly active.

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While the number of possibly active burrows declined from 2011 to 2012, the number of active burrows increased from 76 in 2011 to 92 in 2012. Gopher tortoise burrow surveys on the Carter Tract have revealed a continuous cycle of burrow creation and abandonment over time. Due to the complexity of gopher tortoise behavior, frequent burrow status changes are natural and expected. The number of burrows in use per tortoise does not remain constant, with burrow occupancy rates influenced by region, season, and population density, as well as habitat quality. Habitat improvements including removal of sand pine and slash pine and planting of longleaf pine and wiregrass, were implemented in 2007. Restoration activities designed to continue to improve and/or maintain habitat include prescribed burning, scrub oak reduction, herbicide application, and planting of native groundcover types (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 4. Gopher tortoise burrow count and status by year at the Fitzhugh Carter Tract of Econfina Creek WMA (Washington County).

Burrow Status	Year							
	2005	2006	2007	2008	2009	2010	2011	2012
Active	12	53	12	26	17	73	76	92
Possibly Active	10	12	0	9	29	23	47	28
Inactive	58	95	63	40	49	64	99	83
Abandoned	7	34	131	182	176	214	235	309
Total	87	194	206	257	271	374	457	512

FWC is currently involved in an experimental research project at Guana River WMA (St. Johns County) to assess the response of vegetation and gopher tortoises to various land management practices. As part of this research, FWC determined the occupancy status of five management units within the WMA by tortoises after prescribed fire activities. Occupancy of burrows in these management units ranged from 42% to 60%, with all units showing signs of multiple age-classes (juvenile, sub-adult, and adult). FWC will continue to document tortoise use of these areas over time.

Activities to enhance habitat for gopher tortoises on Jennings State Forest WMA (Clay and Duval counties) consisted of one survey on April 16, 2012 on a 40-acre (16-hectare) tract that received funding for turkey oak removal to stimulate ground cover forbs. Follow-up surveys will be completed on the tract every five years. During FY 2011-12, four transects were performed on the site using three observers. The survey found 66 gopher tortoise burrows, of which 29 were occupied and 37 were abandoned. The total area surveyed was 14.4 acres (5 hectares), 36% of the site's area.

In FY 2011-12, FWC began to track by Global Positioning System (GPS) gopher tortoise burrows on Tate's Hell State Forest. FWC documented 56 active burrows, size-classed as 31 adult, 4 sub-adult, 20 juvenile, and one hatchling. All of the burrows were located either in the Womack Creek Unit or High Bluff Tract.

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Mitigation Park Program – FWC’s Mitigation Park Program was developed in 1998 with the primary goal of improving the biological effectiveness of listed species habitat protection efforts required for new land developments. The program increased the biological value of mitigation by consolidating habitat protection areas into larger tracts, implementing listed species habitat management plans, and providing for permanent management by endowing each facility with a dedicated funding source. Primary management emphasis at mitigation parks is gopher tortoise habitat enhancement and restoration. To date, 14 mitigation parks totaling 15,320 acres (6,200 hectares) have been established in Duval/Clay, Hamilton, Gilchrist, Lafayette, Alachua, Hernando, Orange/Osceola, Polk, Hillsborough, Manatee, Highlands, and Lee counties.

In north-central Florida, during FY 2011-12, habitat management at Watermelon Pond WEA in Alachua County included wiregrass seeding on 47 acres (19 hectares) and herbicide treatment to 110 acres (45 hectares) of pasture grasses in preparation for subsequent ground cover restoration to benefit gopher tortoises. Growing season controlled burns were used to maintain sandhill habitat on 720 acres (291 hectares) at Bell Ridge Longleaf WEA and 215 acres (87 hectares) at Fort White WEA, both in Gilchrist County. Dormant season controlled burns were completed on 496 acres (201 hectares) of sandhills at Suwannee Ridge WEA (Hamilton County). At Lafayette Forest WEA (Lafayette County), a sandhill restoration project on a former pine plantation included mid-story reduction on 200 acres (81 hectares) and pine and wiregrass planting on 165 acres (67 hectares). Gopher tortoise population surveys were completed at Suwannee Ridge WEA (Hamilton County) and Branan Field WEA (Duval County).

In Central Florida, habitat management at Split Oak Forest WEA (Orange and Osceola counties) included growing season controlled burns on 259 acres (105 hectares) and exotic plant survey and treatment on 162 acres (66 hectares) of gopher tortoise habitat. At Crooked Lake WEA (Polk County), exotic plants were surveyed and treated on 124 acres (50 hectares). Perry Oldenburg WEA (Hernando County) received 15 acres (six hectares) of controlled burning, 12 acres (five hectares) of mechanical hardwood control, and 64 acres (26 hectares) of exotic plant survey and control. Gopher tortoise management at Janet Butterfield Brooks WEA (Hernando County) included the mechanical treatment of dense vegetation on two acres (one hectare) of fire-suppressed uplands and exotic plant survey and control on 265 acres (107 hectares).

In south-central Florida, 44 acres (18 hectares) of uplands were prescription burned and 17 acres (seven hectares) of scrubby flatwoods were mowed at Hickey Creek WEA (Lee County). At Platt Branch WEA (Highlands County), 33 acres (13 hectares) of uplands were mechanically treated to improve habitat structure, and controlled burns were completed on 306 acres (124 hectares).

Trapping – A trapping techniques paper describing a new type of gopher tortoise trap was submitted to the *Herpetological Review* journal during FY 2011-12. FWC staff on Blackwater WMA invented the “flap trap,” and FWC staff tested its effectiveness relative to pitfall traps. A flap trap is made of 14-gauge, one-inch (2.54-centimeter) rabbit wire and sits atop the entrance to a tortoise burrow. A tortoise is trapped when it exits its burrow into the trap and pushes up a hinged trap door (i.e., flap) on the bottom of the trap. Trapping results were comparable between flap and pitfall traps. Flap traps were much easier to install in the field and caused less disturbance to the burrow mound, but they are more expensive than pitfall traps, which are plastic buckets. Flap traps also captured gopher frogs and nine-banded armadillos.

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

FWC continues to maintain robust management and research programs for the five species of sea turtles that occur along Florida's coast. The Agency provided expertise on sea turtles to the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers team on the programmatic biological opinion for beach restoration. FWC served on numerous teams, scientific advisory committees, governing boards, working groups, and committees during FY 2011-12: Archie Carr Sea Turtle Refuge Working Group, Southeast Regional Sea Turtle Network meeting, the Sea Turtle Hospital Rehabilitation Workshop, Florida Department of Environmental Protection's (FDEP) Beach Management Agreement for Palm Beach Island, the Florida Sea Turtle License Plate grants committee, the USFWS/National Marine Fisheries Service Loggerhead Critical Habitat Team, the USFWS International Working Group for the Conservation of the Northwest Atlantic Loggerhead Populations, the steering committee for FDEP's Beaches Habitat Conservation Plan, university graduate committees, and the International Union for the Conservation of Nature's Marine Turtle Specialist Group. FWC reviewed all research-related proposals submitted for consideration by the small grants program of the Florida Sea Turtle License Plate.

Management Activities – During FY 2011-12, FWC continued to work closely with the Federal government, State regulatory agencies, volunteer conservation groups, and local governments to implement the State's responsibilities in accordance with the Marine Turtle Protection Act [Section 379.2431(1). Florida Statutes] and the USFWS' Recovery Plans for five species of sea turtle (also known as marine turtles): the loggerhead (Federally-designated Threatened), green, leatherback, hawksbill, and Kemp's ridley (all Federally-designated Endangered). FWC efforts to ensure protection of Endangered and Threatened sea turtles, their nests, hatchlings, and habitats emphasizes a cooperative approach with the diversity of stakeholders who depend on Florida's beaches, reefs, and coastal areas for their livelihood and recreation. Public education concerning sea turtle biology and important conservation issues such as wildlife friendly lighting, the threats from marine debris, and the importance of protecting nesting beaches and in-water habitats, as well as partnering with State, local, and Federal agencies, continues to be the major focus of FWC's marine turtle management efforts.

During FY 2011-12, FWC continued to provide scientific and logistical support to ongoing response efforts for the Deepwater Horizon oil spill to ensure protection of sea turtle nests during ongoing cleanup activities in Escambia, Okaloosa, Santa Rosa, and Walton counties.

FWC provided comments on approximately 364 projects to FDEP, Water Management Districts, and the State Clearing House during FY 2011-12. Projects reviewed included coastal construction control line applications, environmental resource permit applications, and joint coastal permit applications. FWC participated in meetings and conference calls on these projects and on other issues involving sea turtles with local governments, other State and Federal agencies, and stakeholders. FWC also participated in the development of two habitat conservation plans for Walton County and a statewide plan (in cooperation with FDEP). More than 80 site inspections were conducted as part of FWC's environmental commenting responsibilities, including lighting inspections conducted at the invitation of local governments and property owners.

No rule making activity for sea turtles occurred during FY 2011-12.

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Approximately 215 applications for conservation activities with sea turtles, including nesting beach surveys, stranding and salvage work, research, public turtle walks, rehabilitation at captive facilities, and educational displays were reviewed and approved by FWC during FY 2011-12.

FWC issued 30 authorizations to hold sea turtles for rehabilitation, educational display, or research. Agency staff coordinated transfer and release of sea turtles undergoing rehabilitation and supervised public sea turtle releases; this included the transport of a Kemp's ridley that stranded in Europe from Portugal to Florida for release. FWC coordinated the review and approval of approximately 87 requests for monitoring and research involving Threatened and Endangered sea turtles. Fourteen educational turtle walks were authorized, once or weekly, from June through August, on the southeast coast and the southwest coast.

Currently, FWC is administering two grants that involve sea turtles, including \$416,000 from USFWS for Walton County's Habitat Conservation Plan, and a second grant from the National Fish and Wildlife Foundation to the Wildlife Foundation of Florida to develop a mobile sea turtle response unit for quick response to catastrophic events such as cold stuns. FWC assisted the Wildlife Foundation of Florida in completing all requirements of a grant from the National Fish and Wildlife Foundation (approximately \$450,000) to assist two local governments with lighting improvements along sea turtle nesting beaches during 2011. Grant management includes oversight of contracts to local governments and vendors as necessary.

FWC participated in rule development meetings at the invitation of FDEP to ensure that laws requiring protection of sea turtles, their nests, hatchlings, and nesting habitat were met. The agencies also worked together to reduce monitoring requirements required as part of beach nourishment projects, while still ensuring sufficient protection of sea turtles, their nests, hatchlings, and nesting habitat.

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

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

During FY 2011-12, a total of 1,515 dead or debilitated sea turtles was documented (711 loggerheads, 602 green turtles, 147 Kemp's ridleys, 15 hawksbills, 12 leatherbacks, and 28 sea turtles not identified by species). FWC responded to 1,391 reports, through FWC's Wildlife Alert Hotline, regarding sea turtle concerns (primarily reports of dead, sick, or injured sea turtles), transported 97 sick or injured sea turtles to rehabilitation facilities, and conducted necropsies on 280 carcasses. Florida sea turtle stranding data were regularly entered into the Network's on-line database for use by NOAA-Fisheries, as well as FWC law enforcement and protected species personnel. FWC also continually worked to identify and characterize any unusual sea turtle mortality events as soon as possible.

Population monitoring involves collection of nesting and habitat information throughout the geographic range of sea turtles in Florida. Approximately 90% of the world's largest loggerhead nesting population occurs in Florida, and the green turtle and leatherback nesting populations are of regional significance. FWC assesses nesting abundance and reproductive

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output by coordinating a network of State, Federal, and volunteer permit holders who monitor sea turtle reproduction on Florida's beaches. The Agency establishes scientifically sound monitoring designs, provides training, resolves data collection problems, assesses data collection error rates, analyzes data trends, and serves as a clearinghouse for information on sea turtle populations and habitats.

Two overlapping monitoring programs, the Statewide Nesting Beach Survey Program (initiated in 1979) and the Index Nesting Beach Survey Program (initiated in 1989), have different objectives. The Statewide Nesting Beach Survey Program provides nearly complete survey coverage of the State's nesting beaches to acquire data on total nest numbers, nest geographic distribution, and nesting seasonality for each species. Managers use results to minimize human impacts to turtles and nesting beach habitats, and to identify important areas for land acquisition or enhanced protection. In 2011, 206 survey areas were monitored, comprising 819 miles (1,317 kilometers) of beaches. Statewide, in 2011, the program documented 68,587 loggerhead nests, 15,325 green turtle nests, 1,652 leatherback nests, and six Kemp's ridley nests.

The Index Nesting Beach Survey Program collects data that are more detailed from a smaller set of index beaches. Surveyors identify each sea turtle track to species, identify the tracks as a nest or abandoned attempt, and locate nests within an approximate half-mile beach zone. Nests and nesting attempts have been monitored for 22 years at 478 index beach zones surveyed daily during each 109-day season (May–August), an effort that currently provides 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 22 years of the program and among the 246 miles (396 kilometers) 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 2011, the program documented trends in nesting for loggerheads (stable or declining), green turtles (increasing), and leatherbacks (increasing).

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 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 they address population structure (including gender ratios), growth rates, genetic identity (a determination of which nesting population 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 2012, 60 loggerheads were captured during an eight-day sampling session in Florida Bay as part of a project that has been conducted continuously in the Bay since 1990. The primary elements of this study include assessments of relative and absolute abundances, health assessments and monitoring of fibropapillomatosis (a condition most likely caused by a herpes-type virus that causes growths or tumors on the skin), studies of growth, determinations of sex ratios and genetic identities, and studies of residency and movements. All captured turtles were measured and tagged. Twenty-six of the turtles had been previously marked, providing data on growth and residency in Florida Bay. All turtles were released shortly after capture. Some individual turtles have now been captured numerous times over periods as long as sixteen years.

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FWC studies the abundance, distribution, behavior, and diet of recent hatchlings and small juvenile sea turtles in open-ocean habitat off Florida's coasts. These sea turtles live in surface waters and occupy a pelagic stage (deep ocean water) in sea turtle development that precedes a time when, as larger immature and adult sea turtles, they will live primarily along the bottom of more shallow, coastal areas. Study objectives are to measure relationships between open-ocean habitat and pelagic sea turtle abundance, and to measure threats unique to this habitat such as mortality and morbidity from plastics and tar ingestion. FWC records physical oceanographic measurements, sea turtle behavior, sea turtles' relationships to floating objects and other organisms, sea turtle weights and measures, and evidence of ingested plastics and tar. Seventeen sampling trips were conducted during FY 2011-12. This effort is a continued study in which approximately 800 miles (1,287 kilometers) of search transects were sampled between 2005 and 2012. On these search transects, a total of 922 sea turtles were observed: 780 loggerheads, 81 green turtles, 55 Kemp's ridley, and six hawksbills. Survey locations included Gulf of Mexico waters offshore from Pensacola, Apalachicola, and Sarasota, and Atlantic waters offshore from Sebastian Inlet. Additional benthic-stage sea turtles recorded during this seven-year effort included 205 loggerheads, four green turtles, two Kemp's ridleys, and two hawksbills.

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

Eastern Indigo Snake (*Kevin Enge*)

The Eastern indigo snake is a Federally-designated Threatened species that once occurred throughout Florida but has experienced significant population declines in some areas, particularly the Panhandle and heavily populated areas. In 2008, FWC started compiling historic and recent sightings of indigo snakes to determine its current status in Florida. Additional sightings were reported in FY 2011-12, and the database of observations has been provided to the U.S. Fish and Wildlife Service (USFWS) and other interested parties. FWC is collaborating with The Orianne Society (a privately funded organization to conserve indigo snakes), the Georgia Department of Natural Resources, and USFWS to publish a paper on the current and historical distribution of the species throughout its range. In Florida, 1,397 individual records have been compiled, 41% of which were records since 2000. Since 2000, indigo snakes have been observed in 49 of 67 counties and on 100 conservation lands greater than 2,500 acres (1,000 hectares) in size.

FISH

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

Atlantic Sturgeon Activities – The Atlantic sturgeon was Federally listed as an Endangered species on April 6, 2012. FWC has continued collaboration with the Georgia Department of Natural Resources, U.S. Fish and Wildlife Service (USFWS), the St. Johns River Water Management District, U.S Geological Survey (USGS), and the National Oceanic and Atmospheric Agency's National Marine Fisheries Service (NOAA-Fisheries), as members of the St. Marys River Fisheries Restoration Committee. FWC is currently leading the revision of a fisheries management plan for the St. Marys and St. Johns rivers to return Atlantic sturgeon, among other species, to sustainable populations within the system. King's Bay Naval Base has

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agreed to fund a project to tag and monitor the movements of the juvenile Atlantic sturgeon population in the St. Mary's estuary to determine whether they are year-round residents or transients from the Altamaha or Satilla rivers. This determination may impact Endangered Species Act-Section 7 consultations for the St. Marys River. Long-term monitoring of water quality has been initiated by USFWS. Side-scan sonar surveys of the river have been initiated by USFWS and USGS to identify potential habitat restoration sites and to identify potential spawning or holding sites for Atlantic sturgeon.

Gulf Sturgeon Activities – The Gulf sturgeon is a Federally-designated Threatened species. FWC provided the USGS and USFWS with 20 acoustic tags for tracking sturgeon from the Suwannee and Ochlockonee rivers. These tags are designed to last for five years. Several Suwannee River Gulf sturgeon were subsequently located off of Tampa Bay by acoustic receivers, and one Ochlockonee River sturgeon was relocated in the Suwannee River.

A dam permit application to create the Little Choctawhatchee Reservoir in Dothan, Alabama, was withdrawn in the spring of 2012. The Choctawhatchee River is designated as critical habitat by USFWS for Gulf sturgeon (and is also important to the few remaining alligator gar) in Florida.

Shortnose Sturgeon Activities – The shortnose sturgeon is a Federally-designated Endangered species in Florida. No shortnose sturgeon were caught or reported in Florida during FY 2011-12.

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

Federal Wallop-Breaux Sport Fish Restoration Program – During FY 2011-12, 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, collections and/or observations of listed species were made. All information gathered is critical for developing proper conservation and management strategies to protect Florida's sport fish populations and associated communities. Aside from research to monitor geographically-constrained sport fish species, such as the shoal and Suwannee bass, and research assessing the alligator gar population to remedy loss of that fishery, there is presently little funding for on-going research to determine the status and trends of imperiled 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 2011-12, FWC began drafting Imperiled Species Action Plans to address species-specific conservation needs for listed fishes in Florida. Species-directed sampling projects were initiated during FY 2010-11 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 listed as a State-designated Threatened species in Florida. FWC is currently drafting a management plan for the species. The blackmouth shiner was not collected during FY 2011-12. Sampling was conducted within the known range of the species in the Blackwater and Yellow River watersheds of northwest Florida. This species is difficult to monitor and warrants an alternative monitoring strategy to properly assess the population status and trend of the species. Known locations of blackmouth shiners

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have not been recently sampled and no new blackmouth shiner populations have been discovered since 2003.

Bluenose Shiner – The bluenose shiner is currently listed in Florida as a Species of Special Concern. FWC is currently drafting a management plan for the species. The total number of bluenose shiners collected from multiple historic Panhandle locations during FY 2011-12 was 116. Of that total, 69 were collected from Holmes Creek (Choctawhatchee River watershed), 35 were collected from Rock Springs Run (upper St. Johns River watershed), 11 were collected from the Wekiva River (upper St. Johns River watershed), and one individual was collected from the Dead Lakes (Chipola River watershed). Sampling techniques used for Florida's River Monitoring project appear to be sufficient for collecting the species, and it is anticipated that a population status and trend assessment may be possible in 2013.

Crystal Darter – The crystal darter is a State-designated Threatened species in Florida. FWC is currently drafting a management plan for the species. Two individuals were collected from one location during FY 2011-12, which is the second new record of the species in three years. Despite extensive sampling being conducted within the known range of the species, the other most recent crystal darter collections from the Escambia River were from 2009 and 2004. The status and population trend of the species is currently unknown, warranting a need for an alternative monitoring strategy for the species.

Harlequin Darter – The Harlequin darter is currently listed in Florida as a Species of Special Concern. Based on concerns of insufficient local data, however, this darter remains a Species of Special Concern, while additional population sampling occurs. Updated data will determine whether it is de-listed or listed as State-designated Threatened. FWC is currently drafting a management plan for the species. The harlequin darter is only known to occur in Florida in the Escambia River watershed. This widely-distributed American species, while restricted in range in Florida, is regularly collected from both tributaries and the mainstream Escambia River when suitable habitat (submerged woody debris) is present. Recent sampling indicates that the species is distributed throughout the Escambia River watershed. Five harlequin darter were collected from the mainstream Escambia River during FY 2011-12. Species-directed sampling was initiated in FY 2011-12, specifically using visual survey methods from Big Escambia Creek (tributary to Escambia River). Preliminary results indicated that these techniques may be sufficient to determine the population status and trends of this species.

Lake Eustis Pupfish – The Lake Eustis pupfish is currently listed as a Species of Special Concern in Florida, but a status review conducted in 2011 determined that the species does not warrant listing. FWC is currently drafting a management plan for the species and the species will not be removed from Florida's Endangered and Threatened Species List until the plan has been approved by the FWC Commissioners. This species' population trend appears to be stable to increasing. Water quality in their range of lakes is closely monitored by government agencies and stakeholder groups. Most lakefront homeowners clear weeds from their shore, actually increasing suitable habitat for this species.

Mangrove Rivulus – The mangrove rivulus is currently listed as a Species of Special Concern in Florida, but a status review conducted in 2011 determined that the species does not

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warrant listing. FWC is currently drafting a management plan for the species and the species will not be removed from Florida's Endangered and Threatened Species List until the plan has been approved by the FWC Commissioners. This species' population appears to be stable and/or increasing. Formerly known only from crab burrows and presumed threatened, research has shown it to be common and often the dominant species, in often hypersaline salt marsh ponds.

Saltmarsh Topminnow – The saltmarsh topminnow is listed in Florida as a Species of Special Concern. FWC is currently drafting a management plan for the species. The saltmarsh topminnow is also currently under review by the U.S. Fish and Wildlife Service (USFWS) for Federal listing. This species is known to occur from Galveston Bay in Texas eastward, but in northwest Florida the saltmarsh topminnow is only known to occur in the Escambia/Blackwater/Yellow rivers watershed, while presumed to formerly range almost to the Apalachicola River. One specimen was collected by FWC during FY 2011-12 from the lower Escambia River. Sampling was conducted by Dr. Mark Peterson (Mississippi State University) in the vicinity of the species' known range, although no individuals were encountered. 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. Alabama recently reported successfully electro-shocking saltmarsh topminnows in the Mobile delta, implying this species may be more common than predicted. Similarly, FWC will attempt to locate this species in less saline conditions along the northwest coast of Florida.

Southern Tessellated Darter – The Southern tessellated darter is listed in Florida as State-designated Threatened. FWC is currently drafting a management plan for the species. In Florida, tessellated darters are only known to occur in the Ocklawaha River watershed (a tributary to the St. Johns River) in north-central Florida. Sampling conducted in this river's during FY 2011-12 did not yield any individuals; but 14 were located in Orange Creek and Little Orange/Gum Creek. The species was not previously collected in Florida since 2004; therefore the population status and trend of tessellated darters is unknown. Additional long-term monitoring and species-specific sampling is needed to properly assess 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 removals, and other projects impacting State-listed species. Many of the proposed activities had the potential to negatively affect State-listed fishes by increased sediment loading, water quality degradation, habitat alteration, and/or indirect lethal take. FWC commented on activities involving: Atlantic sturgeon, bluenose shiner, blackmouth shiner, Gulf sturgeon, harlequin darter, Okaloosa darter, Southern tessellated darter, saltmarsh topminnow, and smalltooth sawfish.

Smalltooth Sawfish (*Gregg Poulakis and Phil Stevens*)

The smalltooth sawfish is a Federally-designated Endangered species that was once common in the coastal and estuarine waters of the southeastern U.S.; but during the 20th century

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it became rare throughout its North American range. This decline is attributed to two main factors: 1) bycatch in commercial and recreational fisheries; and 2) life history parameters that include late maturity and production of small numbers of young. Smalltooth sawfish in Florida are currently found only from Charlotte Harbor (Charlotte County) to the Florida Keys (Monroe County).

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

In November 2004, FWC initiated long-term monitoring specifically designed to collect data on the life history, biology, and ecology of the smalltooth sawfish. During FY 2011–12, two complimentary sampling methods were used to collect smalltooth sawfish in the Charlotte Harbor estuarine system, which is located on the southwest Gulf Coast of Florida. Monthly sampling that targeted smalltooth sawfish was conducted in the Caloosahatchee River (Lee County) and in upper Charlotte Harbor (Charlotte County) using a multi-gear approach.

Thirty-four smalltooth sawfish were captured and released. 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 (.76–1.8 meters); 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 Agency'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 FWC sawfish hotline from poster and permanent sign distribution) and research is compiled and archived as part of the National Sawfish Encounter Database. This database has been used by the Smalltooth Sawfish Recovery and Implementation Teams in a variety of ways, including designation of juvenile critical habitat for the species. When citizens provide information on sawfish, FWC takes the opportunity to inform responders about the smalltooth sawfish and FWC's role in its protection. For more information on FWC's Smalltooth Sawfish Research and Monitoring, including access to publications on specific topics, please visit <http://research.MyFWC.com/sawfish>.

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INVERTEBRATES

Black Creek Crayfish (*David Cook, Terry Doonan, Jim Garrison, and Paul Moler*)

The Black Creek crayfish is listed in Florida as a Species of Special Concern. Black Creek crayfish were historically recorded only from the Black Creek drainage (Clay and Duval counties), the Julington Creek drainage (Duval County), and Rileys Creek (Duval County). The next major drainage south of Black Creek is the Etoniah Creek – Rice Creek system, which enters the St. Johns River in Palatka. A survey during FY 2009-10 documented the occurrence of Black Creek crayfish in headwater streams of Etoniah Creek (Putnam County); surveys in FY 2010-11 documented Black Creek crayfish in the lower reaches of Etoniah Creek. Surveys in FY 2011-12 recorded Black Creek crayfish in Trout Creek (St. Johns County).

To aid the development of the species' Management Plan, observations recorded during all previous surveys have been compiled in a single document. Observations were cross-referenced by survey site to better analyze the distribution of this species and changes in distribution that have occurred over time. All historical surveys of the Black Creek crayfish were consolidated into a comprehensive geo-database to assist the Black Creek crayfish management plan team in developing the species action plan.

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

The Panama City crayfish is a State Species of Special Concern which will become a State-designated Threatened species once a management plan for the species is finalized and approved by the FWC Commissioners. The historic range of the Panama City crayfish is restricted to 51 square miles (132 square kilometers) of the Bay County peninsula that includes Panama City and Lynn Haven. Urbanization and alteration of natural wetlands (e.g., pine flatwoods prone to seasonal flooding) have eliminated this crayfish from most of the western and central parts of its range. The species is now most commonly found in disturbed wetlands and roadside ditches that are vulnerable to continued habitat degradation. The present draft management plan, dated May 2007, is available at http://myfwc.com/media/1355365/Revised_Draft_PCC_Plan.pdf.

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

During FY 2011-12, FWC addressed questions involving developments and other activities with possible impact to the Panama City crayfish, and made site visits to evaluate potential crayfish presence or habitat. In particular, FWC reviewed a number of Environmental Resource and Wetland Dredge and Fill permit applications. FWC consulted with the Florida Department of Environmental Protection (FDEP) and the U.S. Army Corp of Engineers (to whom the applications had been submitted), and with environmental consultants, to provide guidance on proposed development projects and to prevent unauthorized taking of Panama City

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crayfish. FWC also led habitat restoration activities (e.g., prescribed burning, and removal and chemical treatment of invasive vegetation) for the Panama City crayfish on a conservation easement in Gulf County, and continues restoring Panama City crayfish habitat on additional conservation easements. Future efforts may include relocating Panama City crayfish to areas of suitable, but unoccupied habitat within the range of the species in order to increase its area of occupancy.

In February and March 2012, following sustained rain activity, FWC led a multi-party survey effort to sample previously recorded crayfish sites on Gulf Power rights-of-way, public road edges, and other areas, and to search for previously undocumented sites throughout the species' historic range. The surveys resulted in confirmation of Panama City crayfish present on most previously documented power line sites, and on several historic sites elsewhere. The surveys also documented the species at a number of newly discovered sites, including several that slightly increased the species known extent of occurrence to the northwest, north, northeast, and southeast. However, the surveys failed to document the species from a number of historic sites, especially in the middle and western parts of its range.

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

Freshwater Mussels (*Gary Warren*)

During the past 60 years, the abundance and diversity of North American freshwater mussel communities has declined to the extent that mussels are now considered to be among the most at-risk of all animal groups on the continent. Of the nearly 300 mussel species known from North America, over 70% are considered by experts to be Endangered, Threatened, or Species of Special Concern. Currently, there are 71 U.S. species listed by the U.S. Fish and Wildlife Service (USFWS) as Endangered or Threatened. Florida freshwaters are inhabited by 60 species of pearly mussels (Family Unionidae). Currently, seven of these Florida species are Federally-designated as Endangered or Threatened (**Table 5**). Another seven Florida species have been proposed as candidates for Federal listing and will probably be listed in late 2012 or in 2013 (**Table 5**). These species were listed or proposed for listing because of their rarity, declining population, small areas of distribution, and risk of preferred habitat loss. Primary threats to the continued existence of listed mussels in Florida include stream impoundment (dam construction), channelization, sedimentation, destabilization of stream banks and bottoms, and reduced stream flows and water levels. Contaminants such as pesticides, fertilizers, heavy metals, and acid mine drainage have also contributed to the decline of Florida mussels. All but one of Florida's listed or candidate species are restricted to streams in the Florida Panhandle. The lone species occurring east and south of the Ochlockonee River basin is the oval pigtoe, which is distributed

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as far south as, and has critical habitat designated by USFWS in, the Santa Fe River in the Suwannee River basin.

Table 5. Florida mussel species listed or proposed for listing by USFWS under provisions of the Endangered Species Act. Status categories are: C = Candidate, E = Endangered, and T = Threatened.

Common Name	Scientific Name	Status	Year Listed	Critical Habitat Determined
fat threeridge	<i>Amblema neislerii</i>	E	1998	2007
Chipola slabshell	<i>Elliptio chipolaensis</i>	T	1998	2007
purple bankclimber	<i>Elliptoideus sloatianus</i>	T	1998	2007
tapered pigtoe	<i>Fusconaia burkei</i>	C	2011	2011
narrow pigtoe	<i>Fusconaia Escambia</i>	C	2011	2011
round ebonyshell	<i>Fusconaia rotulata</i>	C	2011	2011
Southern sandshell	<i>Hamiota australis</i>	C	2011	2011
shinyrayed pocketbook	<i>Hamiota subangulata</i>	E	1998	2007
Gulf moccasinshell	<i>Medionidus penicillatus</i>	E	1998	2007
Ochlockonee moccasinshell	<i>Medionidus simpsonianus</i>	E	1998	2007
Choctaw bean	<i>Obovaria choctawensis</i>	C	2011	2011
oval pigtoe	<i>Pleurobema pyriforme</i>	E	1998	2007
fuzzy pigtoe	<i>Pleurobema strodeanum</i>	C	2011	2011
Southern kidneyshell	<i>Ptychobranthus jonesi</i>	C	2011	2011

Healthy mussel populations are integral to the normal function of freshwater ecosystems. Mussels provide a food resource for a large number of predators including limpkins, otters, raccoons, fish, and alligators, and are critical to the nutrient cycling and decomposition processes in streams, lakes, and marshes. Given this importance, and the extent of the imperilment of mussels, FWC's Freshwater Invertebrate Resource Assessment Unit is in the process of establishing the Florida Freshwater Mussel Conservation Program. The goal of the Program is to preserve and enhance mussel diversity in Florida, with the primary focus on listed and candidate species. The first step in implementing the program was to produce a book, *The Freshwater Mussels of Florida*, a project that was funded by a State Wildlife Grant from USFWS. The book project was initiated in 2008 and writing of the book was completed in April 2012. Publication of the book is planned for the spring of 2013. The book includes descriptions of all Florida mussel species and, most importantly, provides information on the currently known distributions, abundances, and ecologies of the listed mussel species that occur in the state.

With the benefit of the baseline information provided by the field and lab work associated with production of *The Freshwater Mussels of Florida*, FWC sampled streams in the Choctawhatchee, Apalachicola, Ochlockonee, and Suwannee river basins during FY 2011-12. The goal of the effort was to obtain more detailed information on the distribution, abundance, and habitat requirements of Florida mussels, with emphasis placed on determining if ranges of listed and candidate species were expanding, reduced, or stable. All listed and candidate species found during surveys were inhabiting stream reaches inside or near the outer limits of their

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historical ranges; hence, ranges of the observed species were judged to be stable. Specimens of the oval pigtoe were observed in the Santa Fe River near Worthington Springs (Union County), which is inside their historical range but at a location where they had not been observed for decades. Specimens of the extremely rare (but not yet listed) Suwannee moccasinshell were found in the Suwannee River near Branford (Suwannee County) where they had not been observed for a considerable period of time. Reference specimens and location information from surveys were archived at the Florida Museum of Natural History in Gainesville.

One objective of the Florida mussel program is to develop a facility and methods for propagation of at-risk mussel species. Such a facility would be extremely useful for developing mussel stocks that could be used to replace extirpated or critically-low mussel populations, provided that suitable habitat conditions are present in the subject locations. The facility would also be useful for the determination of fish host species of listed mussels. During FY 2011-12, a flow-through culture system was developed at the Blackwater State Fish Hatchery (Okaloosa County) utilizing culture tanks, pumps, and equipment already in-place at the hatchery. The system is currently being tested to verify suitability of the water supply. Female individuals of a common mussel species placed in the culture system were able to produce glochidia (larval mussels) during spring 2012.

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

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

Over the last decade, FWC has partnered with several government agencies, non-governmental organizations, and the University of Florida to protect and conserve this species. FWC has coordinated closely with the University of Florida, the National Park Service, and the Florida Department of Environmental Protection (FDEP) for previous captive propagation and reintroduction efforts. A Conserve Wildlife Tag grant from the Wildlife Foundation of Florida supported captive propagation and reintroductions during 2005 and 2006, including the release of over 1100 captive raised Miami blue butterflies in Biscayne National Park and Dagny Johnson Key Largo Hammocks Botanical State Park. FWC, through the State Wildlife Grants program, provided funding to the University of Florida to conduct Miami blue butterfly population surveys and to examine their genetic diversity at Key West National Wildlife Refuge. The Agency also assisted in the fieldwork for that study.

During FY 2011-12, progress on implementing the 2010 Miami Blue Butterfly Management Plan (which may be accessed at <http://myfwc.com/media/1349003/MiamiBlueButterflyManagementPlanRevised.pdf>) was severely limited due to the 2010 loss of both the wild population at FDEP's Bahia Honda State Park and the captive population at the University of Florida. Planned research to use captive-raised Miami blue butterflies to develop techniques to successfully reintroduce the species has been postponed until a new captive population can be established, and until it can be determined that the remaining wild populations in Key West National Wildlife Refuge are robust enough to support collection from the wild. FWC is working closely with USFWS to coordinate ongoing

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and future conservation efforts for Miami blue butterfly populations on the wildlife refuge, and to assist with drafting a Federal recovery plan. FWC will continue to support USFWS efforts to conduct a comprehensive survey on the wildlife refuge and consider the feasibility of establishing a new captive Miami blue butterfly population. Surveys for Miami blue butterflies elsewhere in the historic range will continue with assistance from FWC.

Schaus Swallowtail Butterfly (*Ricardo Zambrano*)

The Schaus swallowtail butterfly (Schaus) is a Federally-designated Endangered species. At an Imperiled Butterfly Work Group meeting in 2010, lepidopterists (moth/butterfly biologists) and members of the North American Butterfly Association presented information and data from long-term surveys that indicated Schaus numbers at Biscayne National Park (Miami-Dade County) and North Key Largo (Monroe County) were very low. The Work Group decided more information was needed to determine whether this species had declined. It was determined that comprehensive and intensive surveys of all areas potentially occupied by Schaus should be conducted. FWC, with assistance from the Miami Blue chapter of the North American Butterfly Association and the National Park Service, took the lead in coordinating those efforts in 2011. In 2012, the U.S. Fish and Wildlife Service (USFWS) contracted the University of Florida's Maguire Center for Lepidoptera Research to conduct the surveys.

The 2011 Schaus swallowtail butterfly survey was conducted from May 7, 2011, to June 19, 2011, at Biscayne National Park, John Pennekamp Coral Reef State Park and in North Key Largo. A total of 52 individuals participated in the surveys. Twelve of those were from State and Federal agencies and universities, and 39 were butterfly enthusiasts, volunteers with non-governmental organizations, or volunteers with the government agencies. Thirty-five separate Schaus were seen at Biscayne National Park during the survey period and six Schaus were seen on North Key Largo.

The University of Florida, assisted by a private consultant from Eco-Cognizant, the North American Butterfly Association, and FWC, helped conduct surveys in 2012 at Biscayne National Park and North Key Largo. Surveys were conducted between May 15 and June 30. Only four adult Schaus were seen, and all were on Elliot Key at Biscayne National Park. No Schaus were found at North Key Largo. This precipitous decline has prompted concern that the species may be in imminent danger of extinction. Drastic measures may be required to save this species. Additional surveys are planned for 2013 that include capturing adult females to be held in captivity until eggs are deposited. The number to be captured is still to be determined. The eggs will then be taken to the University of Florida's Maguire Center for Lepidoptera Research for captive raising and eventual reintroduction to Biscayne National Park or North Key Largo.

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

FWC is taking a pro-active, science-based approach to evaluating management needs of imperiled species on FWC managed lands. The approach is being implemented through the Wildlife Conservation Prioritization and Recovery Program. This program integrates geospatial analytical techniques to model potential habitat with conservation planning and population viability analysis results. Using this information, FWC determines where species conservation can be affected on each wildlife management area (WMA) or wildlife and environmental area (WEA). FWC integrates the outcome of the landscape level assessment with area-specific and

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expert knowledge to produce species management strategies. Strategies are particular to each WMA/WEA and outline the role of the area in wildlife conservation. Each strategy contains measurable objectives for managing priority species and their habitat, a list of actions necessary to achieve these objectives, and 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 2011-12, FWC completed five workshops covering six WMAs and six WEAs. The areas covered by a workshop included: Apalachee WMA and Judges Cave WEA (Jackson County); Watermelon Pond WEA (Alachua County); Everglades and Francis S. Taylor WMA (Dade, Broward, and Palm Beach counties); Rotenberger WMA and Holey Land WMA (Palm Beach County); Herky Huffman Bull Creek WMA and Triple N Ranch WMA (Osceola County); Chinsegut WEA, Perry Oldenburg WEA, and Janet Brooks Butterfield WEA (Hernando County); and Little Gator Creek WEA in (Pasco County). FWC finalized Strategies for the Corbett WMA (Palm Beach County); Big Bend WMA (Taylor and Dixie counties); Lake Wales Ridge WEA (Highlands and Polk counties); Apalachee WMA and Judges Cave WEA (Jackson County). FWC initiated the drafting of strategies for Watermelon Pond WEA (Alachua County); Everglades and Francis S. Taylor WMA (Dade, Broward, and Palm Beach counties); Rotenberger WMA and Holey Land WMA (Palm Beach County); Herky Huffman Bull Creek WMA and Triple N Ranch WMA (Osceola County); Chinsegut WEA, Perry Oldenburg WEA, and Janet Brooks Butterfield WEA (Hernando County); and Little Gator Creek WEA (Pasco County). These strategies are anticipated to be completed during FY 2012-13.

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 (*Brad Gruver, Bonita Gorham, Richard Kiltie, Erin Leone, Caly Murphy, Kristin Rogers, and Twanisha Gordon-Presley*)

Coordination – Listed species coordination during FY 2011-12 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 the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Agency's Marine Fisheries Service (NOAA-Fisheries) through Section 6 of the Federal Endangered Species Act of 1973, Florida's Nongame Wildlife Trust Fund, and the Florida Panther Research and Management Trust Fund.

Assistance on listed species was provided to State and Federal agencies, environmental-related consulting firms, private individuals, and local authorities through telephone calls, e-mails, written correspondence, and agency commenting. Section 6 Cooperative Agreements with USFWS and NOAA-Fisheries were administered, including preparing emergency handling reports, preparing and executing Section 6 grants, and developing the renewal packets for the Cooperative Agreements. During FY 2011-12, FWC revised the Section 6 Cooperative Agreement with USFWS. In addition to renewing the agencies commitments to cooperate in the

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conservation of Federally-listed species, the revised agreement provides a framework for FWC to issue conservation and incidental take permits, under specific guidelines, for Federally-listed species. The intent is to 1) reduce unnecessary permit duplication and inconsistency; 2) result in more predictable outcomes; 3) compress permitting timeframes; and 4) create conservation/mitigation measures that are less haphazard and more effective in conserving listed species. The revised agreement became effective May 14, 2012.

FWC's Listed Species Website, <http://myfwc.com/wildlifehabitats/imperiled/>, includes, among other things, copies of previous legislative reports, the current list of listed wildlife, information on listed species permits, and listed species management plans. During FY 2011-12, 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 2011-12. The Agency contributed to 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 turtle, Kemp's ridley sea turtles, leatherback sea turtles, alligator snapping turtles, striped mud turtles, pine barrens treefrogs, short-tailed snakes, and Florida pine snakes, as well as analyzing loggerhead sea turtle nesting trends.

Reviews and Assistance for Transportation Projects – FWC performed a total of 68 reviews of highway projects during FY 2011-12, 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 614 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 2011-12. The types of projects reviewed and commented on included: Developments of Regional Impact, County Comprehensive Plan Evaluation and Appraisal Reports, proposed amendments and Sector Plans, regional visioning projects, various State and Federal permit applications, environmental assessments, and environmental impact statements, and power plant site applications and ten-year plan reviews. The content of consultations was based on established best management practices, species management guidelines, and GIS analysis. In addition, FWC contributed to the development of comprehensive habitat-based management plans, and coordinated landscape-level planning with local, State, and Federal agencies to provide benefits to species and habitats of greatest conservation need.

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CRITICAL WILDLIFE AREAS (*Carol Rizkalla*)

Critical Wildlife Areas (CWAs) are established by FWC 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. FWC's regional species conservation biologists and CWA Coordinator (see below) are responsible for evaluating needs for potential CWAs, producing or revising establishment orders, and coordinating necessary management and monitoring activities for the wildlife populations using those areas each year. Management and monitoring activities are conducted with multiple partners including other State and Federal agencies, local governments, and non-governmental organizations.

Managed areas within CWA boundaries are defined with posts and signs to identify the area, increase public awareness, and reduce disturbance to the fragile wildlife resources that are present there. During FY 2011-12, all active and potentially active CWAs that could be posted were posted with appropriate signage as necessary.

Active CWAs were monitored in FY 2011-12 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.

Fifteen of the 21 established CWAs supported populations of listed and other important wildlife species during FY 2011-12 (**Table 6**). The most notable and active CWAs that supported listed species included: Alafia Bank in Hillsborough County (several wading bird species, American oystercatchers, and brown pelicans); ABC Islands in Collier County (little blue herons, snowy egrets, and reddish egrets); St. George Causeway in Franklin County (least terns, royal terns, and American oystercatchers); Big Marco Pass in Collier County (least terns, black skimmers, and wintering piping plovers); and Fort George Inlet in Duval County (royal terns). Results show that CWA management is important for effective conservation of many species. For that reason, this project is expected to be an ongoing priority for FWC.

A Florida Coastal Management Program grant from the Department of Environmental Protection allowed a CWA Coordinator to be hired during FY 2011-12. The Coordinator will, in conjunction with the Coastal Wildlife Conservation Initiative, other FWC programs, and partners, identify CWAs that need to be re-established (or new sites that need to be established); initiate the establishment process; implement management strategies at CWAs to reduce human-wildlife conflicts; and improve habitat for wildlife. In coordination with FDEP, the Coordinator will discuss current vegetation management limitations and begin to develop guidelines for vegetation management, and develop an online map of the CWA system that includes species present, best practices to reduce conflicts, and closure dates.

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Table 6. Critical wildlife areas (CWAs) in Florida during FY 2011-12, with relevant information about each.

FWC Region CWA name	County	Closure period	Primary taxa	Status ^a	Area within the CWA boundary
Southwest					
Alafia Bank	Hillsborough	1 Dec. to 1 Sept.	Great blue heron, great egret, snowy egret, little blue heron, tricolored heron, reddish egret, cattle egret, green heron, black-crowned night heron, yellow-crowned night heron, white ibis, glossy ibis, brown pelican, roseate spoonbill, American oystercatcher, cormorant, willet	35, 50, 45, 35, 150, 8, 575, 1, 20, 35, 5300, 140, 310, 155, 12, 125, 3 nests	75 acres (ac) (30 hectares [ha])
Little Estero Island	Lee	1 April to 1 Sept.	Least tern, Wilson's plover, snowy plover, American oystercatcher	9, 3, 0, 1 nests	25 ac (10 ha)
Anclote River Islands	Pasco/Pinellas	1 Feb. to 1 Sept.	Hérons, egrets, brown pelican	Inactive ^b	5 ac (2 ha)
Myakka River	Sarasota	1 March to 1 Nov.	Wood stork, great egret, great blue heron, cattle egret, anhinga, snowy egret, little blue heron	70, 15, 1, 3, 2, 1, 1 nests	1 ac (0.4 ha)
Red Lake	Sarasota	1 June to 31 Aug.	Hérons, egrets, brown pelican	Inactive	34 ac (13.8 ha)
North Central					
Amelia Island	Nassau	1 April to 1 Sept.	Least tern, black skimmer, Wilson's plover, American oystercatcher, willet	~100, 9, 15, 2, 2 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	~5900, 14, 1, ~2600, 1, 4 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	21, 0, 23, 17, 1, 1 nests	10 ac (4 ha)
Alligator Point	Franklin	1 April to 1 Sept.	Snowy plover, Wilson's plover, American oystercatcher, least tern, willet	0, 1, 2, 0, 3 nests	145 ac (59 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	60, 0, 0, 1100, 75, 1, 0 nests	32 ac (13 ha)
Gerome's Cave	Jackson	1 March to 1 Sept.	Southeastern myotis bat	~4700 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	Little blue heron, great blue heron, tri-colored heron, great egret, reddish egret, snowy egret, cattle egret	2, 12, 22, 96, 5, 17, 12 nests	75 ac (30 ha)
Big Marco Pass	Collier	Year-round	Least tern, black skimmer, snowy plover, Wilson's plover, wintering shorebirds ^c	2, 0, 0, 9 nests	60 ac (24 ha)
Caxambas Pass	Collier	1 April to 1 Sept.	Least tern, black skimmer, Wilson's plover, wintering shorebirds ^c	40, 0, 0 nests	1 ac (0.4 ha)
Rookery Island	Collier	Year-round	Hérons, egrets, brown pelican	Inactive	5 ac (2 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	3, 10, 0 nests	28 ac (11 ha)

^aCounts or estimates of peak numbers of individuals and/or nest attempts at each site during the closed period in FY 2011-12.

^bInactive means the site was either not used, or not available for use, by wildlife during FY 2011-12.

^cMonitoring to count or estimate numbers of wintering shorebirds was not conducted.

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

FWC has been administering the Landowner Assistance Program (LAP), in cooperation with the U.S. Fish and Wildlife Service (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 focal area approach ensures that Federally-funded dollars are being distributed in the most efficient and equitable manner on properties with the greatest potential benefits for listed species.

During FY 2011-12, FWC's LAP assisted more than 605 landowners, including providing evaluations of effects from proposed agricultural practices to listed species on 542 projects (**Figure 1**). 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, the Florida Department of Agriculture and Consumer Services, 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 2011-12, public conservation land managers including the U.S. Department of Defense and county governments received assistance with management plan development or updates for their conservation lands.

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

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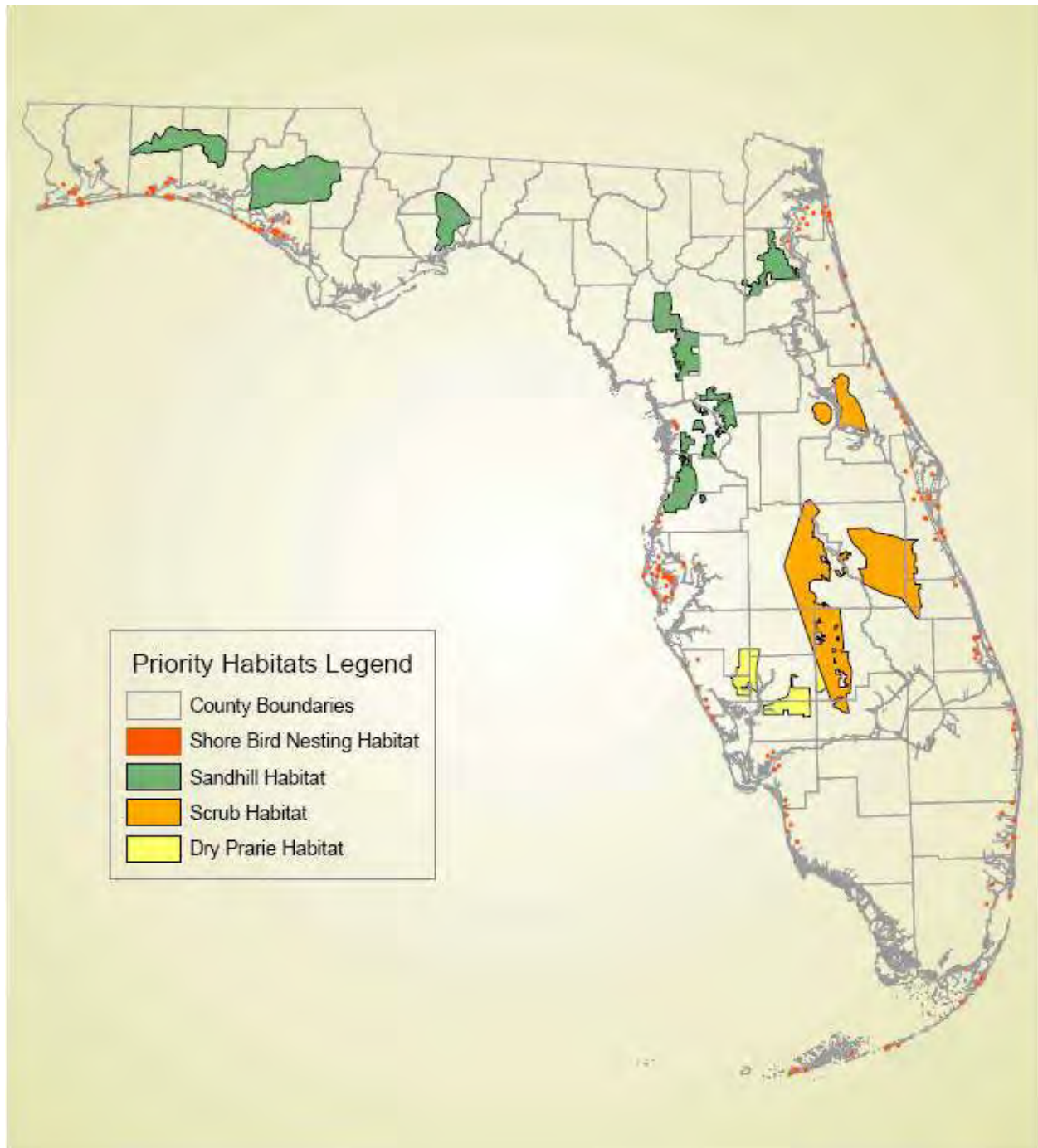


Figure 1. Landowner Assistance Program Focal Areas

LAW ENFORCEMENT (*Lieutenant Chuck Mincy*)

FWC's Division of Law Enforcement continued statewide enforcement activities to protect Endangered and Threatened species during FY 2011-12. Some targeted activities

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included:

- Regular patrols of the Florida panther reduced-speed zones in Lee and Collier counties to protect panther and prey species, and to provide public safety;
- Regular patrols in Monroe County as part of a multi-agency task force enforcing the Key deer speed zone on Big Pine Key;
- Patrol efforts targeting coastal nesting areas of sea turtles; to reduce nest destruction and unlawful egg removal or theft;
- Patrol efforts directed toward the enforcement of specific gear requirements (i.e., Turtle Excluder Devices) to protect sea turtles from becoming entrapped in shrimp trawl nets;
- Patrol efforts targeting coastal nesting areas of protected shore birds to reduce nest disturbance, nest destruction, and incidental take;
- Investigations by the Internet Crimes Unit targeting the unlawful sale and possession of protected species on the internet; and
- Enhanced statewide enforcement efforts directed towards utilizing radar and the Manatee Cam surveillance technology to ensure compliance with boat speed zones and prevent manatee vessel strikes and manatee harassment. More than 110,300 water patrol hours were dedicated to manatee enforcement, resulting in 1,805 citations and 3,159 warnings.

Law Enforcement also assisted in increasing public awareness of black bears, gopher tortoises, Perdido Key beach mice, sea turtles, and other species through response efforts, public events, workshops, etc.

The Division of Law Enforcement issued 14 additional citations and eight warnings separate from manatee citations, involving Endangered species, Threatened species, and Species of Special Concern.

PERMITTING AND ASSISTANCE (*Angela T. Williams*)

During FY 2011-12, 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, flatwoods salamander, peregrine falcon, and Miami blue butterfly. Scientific permits are generally

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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 and sent hundreds of emails and formal letters in conjunction with these assistance efforts. An estimated 280 protected and listed species scientific collection, captive possession, translocation, wildlife relocation, nest removal, disturbance, and incidental take permits (and permit amendments) were issued during FY 2011-12. The number of permits issued has decreased because of changes to the State listed species process intended to avoid duplicate issuance of permits. Previous rules required both an FWC as well as a U.S Fish and Wildlife Service (USFWS) permit for species in Florida protected under the Federal Endangered Species Act. FWC no longer issues permits for Federally listed species (i.e. Eastern indigo snake, Florida scrub-jay, red-cockaded woodpecker, American crocodile, sand skink, bluetail mole skink, piping plovers, and other listed migratory birds) unless it has entered into a written agreement with USFWS to issue the permit instead of USFWS. No agreements for permitting Federally-listed species have been approved through FY 2011-12.

Overall, FWC provided science-based and regulatory guidance to ensure that permitted activities would result in a net conservation benefit for the involved species. Additional information regarding species guidelines, policies, and permit applications may be accessed at <http://myfwc.com/license/wildlife/protected-wildlife/>. An online permit system was launched several years ago for scientific collecting, migratory bird nest relocation, and non-resident falconry permits, which may be accessed 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, Florida Department of Economic Opportunity, and the University of Florida Institute of Food and Agriculture Services) strategy that began in May 2007. The goal of the CWCI is to initiate a statewide, cooperative process to provide for greater consistency and coordination in protecting coastal wildlife populations, conserving and managing coastal ecosystems, and achieving balance between these efforts and human use of coastal areas. The CWCI's comprehensive approach focuses on wildlife and their habitat needs as well as socio-economic issues. Through this interactive process, agencies can improve coordination on coastal issues, address emerging issues, and work towards greater consistency statewide in the conservation of wildlife. The people of Florida will benefit from this process through improved efficiency of State and local agencies in meeting missions for coastal management and conservation.

A full-time coordinator, funded through a State Wildlife Grant and a Florida Coastal Management Program grant, is responsible for creating the partnership network, developing and implementing the framework for a standing team and working groups, and coordinating actions

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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. A Conserve Wildlife Tag grant was awarded by the Wildlife Foundation of Florida in May 2010 for implementing the CWCI and developing the partnership network. A statewide series of 11 regional informational forums was initiated in June 2010 and concluded in November 2011. Following each forum, efforts were made (and are ongoing) to assemble working groups in each of FWC's regions to focus on wildlife, habitat, and human interests in coastal areas. Working groups have currently been established in the Southwest, Indian River, Tampa Bay, Northeast, Upper Southeast, Western Panhandle, and Nature Coast regions (collectively including Sarasota, Charlotte, Lee, Collier, Volusia, Brevard, Indian River, Pinellas, Hillsborough, Manatee, Nassau, Duval, St. Johns, Flagler, St. Lucie, Martin, Palm Beach, Escambia, Santa Rosa, Okaloosa, Levy, Citrus, Hernando, and Pasco counties), with four additional groups slated to be added through 2012. Priorities include continued development of a web-based partner database for coastal programs statewide, and a campaign on the importance of wrack (marine vegetation that washes up on the shore and is used as a source of food for many species) on beach habitats. 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, developed "best practices" for recreational crabbers to reduce by-catch of diamondback terrapins and other species, and are developing a monitoring and collection effort to reduce impacts from invasive lionfish in the Indian River Lagoon. Team members and the coordinator participate in other working groups to lend expertise and to strategize on how the CWCI and its partnership may assist with achievement of goals focusing on coastal conservation issues.

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CITIZEN AWARENESS PROGRAM

Compiled by *Diane Hirth*

Contributors to this section: *Bonnie Abellera, Naomi Avissar, Scott Ball, Laura Barrett, Deborah Burr, Beverly Eikeland, Craig Faulhaber, Judy Gillan, Annemarie Hammond, Lori Haynes, Diane Hirth, Cavell Kyser, Mark Lotz, Ann Morrow, Gary Morse, Wendy Quigley, Liz Sparks, Claire Sunquist, David 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 throughout the agency to fulfill the Statute requirement. The following summarizes these efforts for listed species from July 1, 2011 to June 30, 2012.



To earn a Girl Scout Gold Award, Caitlin Kaloostian created a project, raised money, and worked with fellow students to paint a mural (shown here) featuring native Florida wildlife such as the panther and alligator. At the same location, an FWC law enforcement office in Miami, this Senior Girl Scout planted a garden using native plants to attract butterflies and birds. FWC often works with Girl Scouts of America, and Caitlin's effort is an example of how today's youth are involved in preserving Florida wildlife and habitat for future generations.

partnership with other public agencies and private organizations. Examples are:

The communications campaign on FWC's conservation plan for the Florida black bear. At a November 10, 2011 news conference in Tallahassee, FWC Executive Director Nick Wiley introduced the draft Florida Black Bear Management Plan to conserve the state's largest terrestrial mammal. Wiley highlighted the black bear's recoument from 300 bears to more

than 3,000 bears over the last four decades and invited public input on the plan. A conference call was later held for reporters around the state. Posted online at www.MyFWC.com/Bear were: the draft Bear Management Plan; a public comment feature; a brief video about the plan; FAQs; and the announcement of four public workshops on the



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plan during November and December 2011. More than 550 public comments and 5,400 emails were received on the Plan, with social media promoting opportunities for the public and stakeholders to engage in the discussion. FWC's Commissioners moved forward on the Plan in February 2012, asking staff to include many of the public's suggestions. In June 2012, the Commissioners gave final approval to the Plan, which removed bears from Florida's Endangered and Threatened Species list while adding a new rule continuing to protect bears from being injured or killed. The Plan creates seven Bear Management Units to promote local input on bear issues. The communications campaign for the Bear Management Plan was recognized with a 2012 award from the Association of Conservation Information, a national organization of wildlife agency writers. Additionally, high school students throughout the state competed last year to create winning "Bear Smart" videos, now posted on FWC's YouTube channel <http://www.youtube.com/user/MyFWCvideos>.

Launch of the 1st Florida Panther Festival on October 29, 2011, in Naples. About 1,000 people got the chance to interact with panther biologists through lectures and exhibits on the Federally-designated Endangered Florida panther on October 29, 2011. This was the inaugural panther festival, a free festival done as a partnership among FWC and many others such as the U.S. Fish and Wildlife Services (USFWS), Collier County Parks and Recreation, Defenders of Wildlife, Friends of the Florida Panther Refuge, and Florida Gulf Coast University. Activities included presentations by panther biologists, a Living with Wildlife Pavilion, interactive walks, fun and educational activities for children, livestock pen demonstration, live bluegrass music, food vendors, information from various conservation agencies and organizations in panther territory, and much more. The Living with Wildlife Pavilion provided area residents proactive steps that can be taken to protect pets and livestock on private property from any wildlife. An FWC biologist gave a presentation on the panther's life history, the threats they face, and what is being done to enhance their survival. Attendees watched an FWC video on how biologists capture and track panthers. The biologist discussed how people can coexist peacefully with panthers.



Participation in the Florida Wildlife Corridor Expedition (a 1,000-mile, three-month trek from the Florida Everglades north to Okefenokee Swamp in Georgia). The expedition, that kicked off January 17, 2012, was a public awareness effort by photographer Carlton Ward, bear biologist Joe Guthrie, videographer Elam Stolzfus, and conservationist Mallory Lykes Dimmitt. This group highlighted the importance of connectivity of both public and private lands to support the state's wildlife, particularly the Florida panther and black bear. Both regular media and social media by the Expedition and FWC reported on the trekkers' encounters with wildlife, habitat, and the people who support the corridor. Joining the Expedition February 1, at her ranch, was FWC Commissioner Liesa Priddy, who talked of the culture of Florida cattle ranchers conserving wildlife and habitat. An FWC panther biologist also joined the Expedition that day to discuss panther management and conservation. FWC Commissioner Ron Bergeron, at a separate event on February 4, shared

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his knowledge of Everglades history, wildlife, and hunting traditions. FWC staff also participated in the Expedition. FWC's Southwest Regional Director spent several days hiking and camping with the team. Staff also joined the Expedition at Archbold Biological Station (Highlands County) on February 21, 2012 to talk about FWC's Cooperative Conservation Blueprint. The Expedition ended on April 22, 2012, Earth Day, in the Okefenokee Swamp. Videographer Stoltzfus plans to produce a documentary on the journey and Florida's wildlife corridor.

Media Relations – FWC news releases reach regional, statewide, and national audiences, including nearly 500 daily and weekly newspapers and online publications, 105 magazines, 260 organizations and public agencies, and nearly 1,500 stakeholders. During FY 2011-12, FWC issued 68 news releases on Endangered and Threatened species. FWC news releases are posted online and archived at MyFWC.com/News. A selection of news releases from July to December 2011 follows:

- Holidays mean more boats in manatee zones – July 1, 2011
- Storm may toss sea turtles ashore; how to help – August 26, 2011
- FWC rescues two orphaned panther kittens – September 23, 2011
- Panther conservation progress comes with challenges – September 7, 2011
- 2011 a banner year for 2 Florida sea turtle species – October 10, 2011
- Learn about bears, have family fun at Forgotten Coast Black Bear Festival – October 10, 2011
- Slow down for manatees migrating to warmer waters – November 14, 2011
- FWC shares black bear conservation success, solicits feedback on new bear management plan – November 10, 2011
- Hurlburt Field to be recognized for aggressive efforts to reduce bear complaints – November 7, 2011
- Holiday celebrations minus balloon releases best for Florida wildlife – December 9, 2011
- Count birds instead of staying inside this winter – December 5, 2011

In each of FWC's five regions, a public information coordinator communicates with the media regarding listed or at-risk species. For example in the Southwest Region that covers 12 counties, this coordinator responded to 123 media requests and issued nine press releases regarding listed species during FY 2011-12. In addition, FWC produced research-related Web articles such as: Fewer Florida Grasshopper Sparrows are Home on the Range, <http://myfwc.com/research/about/outreach/research-spotlight/grasshopper-sparrow/>. FWC gopher tortoise staff assisted with "Save Space for the Gopher Tortoise," for the "*Wildlife Matters*" TV series, which was filmed in the sandhill habitat at Gold Heat Branch State Park near Keystone (Clay County). The story was broadcast throughout the state.

Social Media – FWC uses social media extensively to help people join the conversation about protecting Florida's listed species. A broad audience interacts with FWC via two separate Twitter accounts (<http://twitter.com/MyFWC>) and (<http://twitter.com/MyFWCLife>), Facebook (www.facebook.com/MyFWC), YouTube (www.youtube.com/user/MyFWCvideos), and Flickr (www.flickr.com/photos/myfwc). In addition, FWC's Great Florida Birding and Wildlife Trail website (<http://www.floridabirdingtrail.com/>) is active with its own social media.

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- **Major FWC news releases now are accompanied by a Flickr photo gallery**, including “Making more room for manatees” on February 16, 2012, which included 24 photos illustrating the process of restoring Fanning Springs.
- **MyFWC Facebook has more than 11,500 Likes.** Among the most popular Facebook posts: An FWC Wildlife Officer’s rescue of a large injured eaglet in Collier County; an FWC bear biologist capturing a black bear roaming Sanibel Island; rescues, rehabilitations, and releases of dolphins, manatees, and sea turtles, including Governor Rick Scott’s May 2012 visit to Turtle Hospital in Marathon, where he helped release a sea turtle; and three arrested for cruelty, killing gopher tortoises.
- **People who follow FWC on Twitter are growing**, with 3,900 followers of @MyFWC, which reports FWC news, and 1,900 followers of MyFWClife, which takes a family-friendly approach to providing interesting facts and fun events involving wildlife and conservation.
- **Species Spotlight**, a regular feature on the Great Florida Birding and Wildlife Trail’s Facebook and Twitter accounts, talked about Endangered species such as the Florida panther, Florida grasshopper sparrow, Eastern indigo snake, and Schaus’ swallowtail butterfly, as well the limpkin and roseate spoonbill, listed as species of special concern. For example, information on roseate spoonbills, including where to see them in Florida reached more than 5,000 people on My Great Florida Birding and Wildlife Trail Facebook (<https://www.facebook.com/MyGFBT>) and more than 1,000 on My Great Florida Birding and Wildlife Trail Twitter (<http://twitter.com/MyGFBT>).

FWC Websites, Wildlife Alert and Ask FWC – The public’s first instinct in today’s online world is to go to the Internet for news and information on Florida’s listed species.



- **Empowering citizen science via Internet:** A new feature is FWC’s deployment of Web pages allowing people to share wildlife observations online. People are asked to post locations and photos of their sightings on a Google Maps program. This “citizen science” strategy helps FWC pinpoint where key species live and the habitats they prefer. It provides more data than FWC could collect on its own,

and people are excited about sharing the species they have spotted. Another bonus: creating citizen science online surveys that are cost-effective, requiring staff time but not additional funding. Species-specific web pages were used last year for fox squirrels, Eastern chipmunk, and Everglades mink, with another developed to go live in August 2012 to report panther sightings: <https://public.myfwc.com/hsc/panthersightings/getlatlong.aspx>. It is part of www.FloridaPantherNet.org, which provides accurate and up-to-date information about the Federally-designated Endangered Florida panther. The Everglades mink Web page (<https://public.myfwc.com/hsc/mink/>) also helped spread the word about a less well-known Florida species. The



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fox squirrel web page (<https://public.myfwc.com/hsc/foxsquirrel/default.aspx>) results were impressive, especially when amplified by a news release and social media. About 600 sightings of fox squirrels had been logged online between August 2011 and September 2011 when the news release was issued. By the end of February 2012, the total of fox squirrel sightings reported online were up to 3,500.

- A new **Wildlife Alert** option is the ability to use a text message to report sick or injured animals, illegal wildlife activities, nuisance alligators, or human-animal conflicts by using Tip@MyFWC.com. Wildlife Alert is a non-profit, reward-based program created 30 years ago to encourage citizens to report violations and get involved conserving and protecting the state's fish and wildlife. The public can still contact Wildlife Alert by calling **888-404-FWCC (3922)** or **#FWC** or ***FWC** on their cell phones.
- **Several listed species were highlighted on the homepage of FWC's website, MyFWC.com** during FY 2011-12. MyFWC.com is designed to be comprehensive and user-friendly with easy access to information. The homepage includes news highlights, a featured video, and a link to FWC's customer service survey.
- **Ask FWC** remains a popular feature on MyFWC.com. During FY 2011-12, some of the most frequently asked questions about listed or at-risk species and wildlife in general were:
 - What are some things I can do if I live in a panther habitat area?
 - Coral – How long does it live?
 - Native bird and waterfowl protection.
 - Establishing a bird or wildlife sanctuary.
 - Has any bear ever hurt a person in Florida?
 - Manatee speed zones – maps, definitions and rules.
 - How many bears are there in Florida?
 - May I feed, give water to, touch or swim with manatees?
 - Panther identification – sounds, tracks and tail length.
 - What do I do if I hook a sea turtle while fishing?
- **Wildlife 2060: What's at stake for Florida** – This website, accessible at <http://myfwc.com/conservation/special-initiatives/wildlife-2060/>, addresses continued human growth and development, and promotes understanding of what this means for Florida's fish and wildlife.
- **The Manatee Mortality Database**, which is accessible at <http://myfwc.com/research/manatee/rescue-mortality-response/mortality-statistics/>, provides users with a way to search for data on manatee mortalities in Florida. The summary report allows users to search manatee mortality data by Florida county, probable cause of death, and month and year. The individual report allows users the same options as the summary report, and provides more detailed information including sex, size, and region in which the death occurred. Visitors to the site can subscribe to receive a notification e-mail when the database has been updated or new or updated tables have been posted.



Community Meetings, Workshops, and Presentations – FWC responds and reaches out to local communities, including homeowners, landowners, businesses, and stakeholders, on

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an array of issues involved in living with Florida's listed species. Highlights during FY 2011-12 included:

- **Gopher tortoise education included 26 outreach events:** eight local government workshops, three FWC Law Enforcement training events, and 15 additional educational events including wildlife festivals, 4-H Agriculture Day, a Master Naturalist course presentation, and teaching high school envirothon students about the importance of the gopher tortoise.
- **Helping people learn about and live with black bears.** An extensive outreach effort was conducted by the Bear Management Program, which provided information on bear ecology and natural history as well as suggestions for successfully living in bear country. There were 121 public presentations, meetings, and events, offering over 16,415 people information about bears and ways to minimize conflicts. FWC also distributed over 10,000 bear-related information materials to the public.
- **Partnering with local governments, businesses, and communities to reduce bear access to garbage.** Results of these 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 like cans, sheds, and electric fencing more available. Through grant funding generated by the Conserve Wildlife license plate, FWC purchased reinforced dumpster lids for the City of Fort Walton Beach and bear-resistant metal garbage containers for Gulf Coast University and Okaloosa County Parks. In addition, FWC worked with Okaloosa County Commissioners and Waste Management, Inc. to get 100 bear-resistant residential cans out those experiencing human-bear conflicts. Waste Management, Inc. purchased the cans and FWC paid the additional \$7 per month service fees for residents so they could try the new cans out for the first six months without incurring additional costs.
- **The WISE (Women in Science and Engineering) professional series** at Brevard Community College heard a presentation on marine biology careers from FWC. About 60 people attended.
- **Florida scrub-jay conservation information for private landowners** was presented at a workshop in the Cedar Key area. Staff serves on the agency's hardwood management team, developing responses to questions regarding habitat restoration.
- **A presentation on how to look out for nesting shorebirds and their chicks** was given at the Florida Marine Turtle Permit Holder's meeting in Gainesville in February 2012.
- **Florida grasshopper sparrow assistance.** FWC assisted the U.S. Fish and Wildlife Service USFWS and the Florida Department of Agriculture and Consumer Services (FDACS) by providing information on habitat requirements of the Florida grasshopper sparrow. A trip to Three Lakes Wildlife Management Area (WMA) and an adjacent private ranch were used to demonstrate suitable dry prairie grasslands and unsuitable improved pastures. FWC also contributed to a USFWS and the U.S. Department of Agriculture consultation document used for assessing the suitability of private lands for Florida grasshopper sparrows.



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- **Red-cockaded Woodpecker** – An FWC biologist spoke on the management and status of red-cockaded woodpeckers in Big Cypress National Preserve (BCNP) at the BCNP Research Symposium in November 2011, the South Central Florida Recovery Unit annual meeting in August 2012, and assisted in the Rookery Bay Nature Festival in January 2012.
- **FWC co-hosted the 2012 Sea Turtle Permit Holder Workshop in Gainesville** (Alachua County) with the Sea Turtle Conservancy. Approximately 350 to 400 Marine Turtle Permit Holders, volunteers, and staff from local, State, and Federal governments attended this two-day event. Activities included approximately fifteen presentations by agency management and research staff, conservation organizations, and local governments as well as summaries of sea turtle grant projects.
- **FWC was invited to participate in the North American Wildlife and Natural Resources Conference Transformation of State Fish and Wildlife Agencies III: Perspectives from Outside the Tent conference** in Atlanta, Georgia. The information presented on sea turtle conservation in Florida will be included in the Transactions of the 77th North American Wildlife and Natural Resources Conference. FWC also presented information on sea turtle management at the Southeast Regional Sea Turtle Meeting.

School-based Programs and Presentations – Students, teachers, schools, and universities offer wonderful opportunities to learn and talk about Florida’s amazing and diverse wildlife. The efforts by Project WILD and FWC during FY 2011-12 are examples of the breadth of engagement with students and teachers ranging from pre-kindergarten to college. Educational topics included:

- **Becoming a Project WILD volunteer** to infuse wildlife conservation into the classroom is easier now, with the ability to complete six to eight hours of training online, plus a one-day in-person training or mentoring by an active Project WILD volunteer or staff member. This innovative approach replaces the former training requirement of a three-day weekend in the woods. Project WILD is an interdisciplinary conservation and environmental education program emphasizing wildlife that is designed for educators of kindergarten through 12th grade students. In FY 2011-12, 57 Project WILD volunteers contributed 920 hours to facilitate workshops on Project WILD/Aquatic WILD, Growing Up WILD, Flying WILD and Schoolyard Wildlife.
- **Canterbury School (Pinellas County):** FWC contributed scientific data for an educational display on sea turtles. The display was coordinated by the Cousteau Center for Marine Studies. FWC continues to provide sea turtle satellite transmitter data for two websites that deliver teacher plans and general public information: www.seaturtle.org and www.conserveturtles.org
- **Pinellas County Great American Teach-In, November 2011:** A sea turtle researcher spoke to 153 students at Sanderlin Elementary.
- **Mayport Elementary School (Duval County):** A mock manatee rescue was performed for 200 students.
- **Our Savior’s Catholic Church School (Brevard County):** A manatee presentation was given to 50 pre-K to 6th grade students
- **Otis Mason Elementary School (St. Johns County):** A right whale program was given at an outdoor education field trip for 50 4th grade students.

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- **FWC presented information about Florida black bears to the following schools and University of Florida students:** Littlewood Elementary (Alachua County), Shadowlawn Elementary (Clay County), Belleview-Santos Elementary (Marion County), Pinewood Christian Academy (Clay County), and high school students from Alachua County. In addition, FWC presented to 50 members of the University of Florida's Student Chapter of the Wildlife Society, as well as demonstrating bear capture and handling techniques in the field for 40 wildlife students at the University's Wildlife Research Lab.
- **Over 1,500 copies of a children's activity book on gopher tortoises were distributed to educational centers and museums,** including many of FWC's Florida Youth Conservation Centers. The facilitator's training and companion teacher's curriculum, *Encounters with Gopher Tortoises: Protection and Natural History*, developed and implemented in October 2010, has been distributed to more than 50 educators and was made available at the Florida Association of Science Teachers annual conference. A curriculum DVD is available upon request to teachers and meets Florida's Sunshine Standards for education.
- **Meet a Scientist:** An FWC panther biologist participated in a "Meet a Scientist" panel that met with middle and high school students taking summer environmental classes at Florida Gulf Coast University.

Festivals and Events – A smart way to reach kids, families, retirees, and tourists is to meet them at places where they are having fun. FWC participated in fairs, festivals, and events, big and small during FY 2011-12, so people could become better acquainted with the state's amazing wildlife. Following are highlights:

- **The 3rd annual Florida Scrub-Jay Festival** celebrated and raised awareness about the Florida scrub-jay. The festival at Oscar Scherer State Park (Volusia County) included guided walks, presentations, tram tours, environmental exhibitors, children's activities, live entertainment, and a panel of experts to answer questions. More than 1,900 people attended. The festival was a cooperative effort led by the Park and the Education and Outreach Committee of the Northeast Florida Scrub Working Group, which includes staff from FWC, Department of Environmental Protection, Volusia County, and the Florida Scrub-Jay Consortium.
- **The 3rd Annual Right Whale Festival** in Jacksonville Beach celebrated the annual return of North Atlantic right whales to their only known calving area in the southeastern United States. About 4,000 attendees learned about the Endangered species at the event.
- **2012 Florida State Fair.** FWC's State Fair exhibit showcased displays of Florida panthers and black bears. Information on nesting shorebirds and sea turtles also was prominently displayed. Nearly 350,000 fair patrons visited FWC's exhibit at the Fair in 2012.
- **13th Annual Florida Black Bear Festival and 4th Annual Forgotten Coast Black Bear Festival.** Each year FWC participates in two festivals that help people understand and live in



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harmony with the Florida black bear, the Florida Black Bear Festival in Umatilla and the Forgotten Coast Black Bear Festival in Carrabelle. The goal is to educate the public about black bear biology and behavior, and teach communities how to live safely among bears and other wildlife. FWC partnered with the Umatilla Florida Chamber of Commerce, the U.S. Forest Service, the Wildlife Foundation of Florida, Defenders of Wildlife, Lake County, and private business sponsors to present the 13th Annual Florida Black Bear Festival. An estimated 5,000 attendees received valuable information on successfully living with black bears, the activities of FWC bear staff and the results of bear research through talks, displays, children's activities, and field trips.



FWC is partnering with Defenders of Wildlife, the U.S. Forest Service, FDACS, the Franklin County Tourism Development Council, the Carrabelle Chamber of Commerce, the City of Carrabelle, Forgotten Coast TV, Oyster Radio, and Carrabelle CARES to present the 4th Annual Forgotten Coast Black Bear Festival, which will be held on October 6, 2012. FWC will conduct educational presentations and a children's activity called "Come Be a Bear." FWC will also provide information about bear-resistant garbage cans.

- **Chinsegut Birding and Wildlife Festival** was held March 24, 2012, with FWC leading guided walks to find Bachman's sparrows and gopher tortoises, and presenting talks on the American alligator and gopher tortoise with a live gopher tortoise on hand. About 700 people attended.
- **Munson Heritage Festival.** Each October, FWC sets up an interactive wildlife exhibit at the Munson Heritage Festival located within the Blackwater River State Forest in Santa Rosa County. Audiences learn about wildlife and how habitat management protects the red-cockaded woodpecker, gopher tortoise, and other rare species found in the area. A popular display is the Florida black bear exhibit, where people learn the life history of the black bear and ways to reduce human-bear conflicts. FWC sets up similar displays for the annual Beaches to Woodlands Tour-Coastal Encounters Festival (Santa Rosa County), and the annual Forestry Conclave and Lumberjack Festival held at Pensacola Junior College, Milton campus. A smaller version of this display is also presented to visiting school groups at the Blackwater Fisheries Research and Development Center in Holt (Okaloosa County). In May 2011, FWC was asked to present the black bear presentation at the E.O. Wilson Biophilia Center in Freeport (Walton County).
- **1st Annual Florida Panther Festival.** The first annual Florida Panther Festival was held on October 29, 2011, at the North Collier Regional Park in Collier County, and was a success with over 1,000 people attending. The Festival theme was to promote the safe coexistence of people, pets, livestock, and panthers by fostering community appreciation of the Florida Panther and Florida's unique ecosystems that serve as panther habitat. The Festival included family-oriented education and entertainment activities focused on Florida panther conservation and awareness, including children's games and crafts, music, speaker presentations, trail walks, livestock enclosure displays, a "Living with Wildlife" pavilion, over 30 environmental exhibitors, arts and craft sales, food vendors, and field trips to panther habitat and conservation areas the day before the Festival. Highlights from the 2011 Festival and details about the 2012 Festival may be found at www.floridapantherfestival.com.

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Publications, Exhibits and Signs – Sharing compelling stories and critical information about Florida wildlife in writing and pictures is an ongoing, inviting challenge. Following is a sampling of the work done in FY 2011-12:

- **Sea turtle decal.** FWC created a colorful decal featuring a drawing of a green hatchling turtle. This decal, number 21 of a series, was distributed to local tax collectors offices across Florida for sale to the public. Funds from the sale of this decal support FWC's sea turtle program.
- **The Wrack Line** monthly e-newsletter is sent to a growing audience of more than 900 Florida Shorebird Alliance partners and posted on www.flshorebirdalliance.org. It covers the latest news in shorebird and seabird conservation, management, and monitoring.
- **Waterways information cards promoting boat operator safety in regard to manatees.** The Save the Manatee Club and FWC worked together on redesigning and updating FWC's card, with the Club funding most of the printing. The waterways cards were distributed to FWC officers, Broward County, Volusia County, nature centers, and people attending festivals. Boat rental businesses, eco-tour operators, and marinas were offered information on how to obtain the cards.
- **The 2011-12 edition of the manatee decal** was distributed, along with related information to all 67 of Florida's county tax collectors. The \$5 decals are redesigned annually for public purchase to support manatee conservation efforts.
- **Florida Monthly** featured six articles on listed species: green sea turtle in August 2011, Schaus' swallowtail butterfly in September 2011, Florida panther in October 2011, whooping crane in December 2011, West Indian manatee in January 2012, and snowy egret in March 2012. Each article provided a photo and detailed natural history on each species. These two-page features appear in a statewide lifestyle magazine with a print circulation of more than 150,000 a month and total online visits of more than 15 million.
- **The Wildlife Society's Florida Chapter** shared two articles with its members about FWC's ongoing efforts to develop management plans for 60 listed species in Florida.
- **Recreation guides** were developed for the following FWC WMAs that include photos and brief life-history information on listed species: **Big Bend WMA** (Taylor County) – American oystercatcher; **Fisheating Creek WMA** (Glades County) – American alligator, Audubon's crested caracara, and Florida scrub-jay.
- **New gopher tortoise educational materials** were created during FY 2011-12. These materials include an "Online Permit System" factsheet that will be distributed to local governments and residents, and a "Captive Gopher Tortoise Care" factsheet that is being distributed to all wildlife rehabilitators and waif gopher tortoise permit holders. The poster "Got Gophers, Get Permits" is continuously distributed to planning councils, county and city building departments, and local permitting offices. Since July 2011, more than 100 posters have been distributed, with additional distribution efforts ongoing. In FY 2011-12, 2,088 of the "A guide to living with gopher tortoises" English language brochures and 301 of the Spanish language version were distributed to individuals, non-profit groups, government entities, and by staff at meetings and conferences. More than 1,100 copies of another brochure, "Before you build," were distributed in the past year and more than 1,000 fact sheets containing information on laws, permitting, and recipient sites were distributed to various organizations and entities. All publications are available at www.MyFWC.com/education/wildlife/gopher-tortoise and at each of FWC's Regional

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Offices. Over 1,500 copies of a children's activity book on gopher tortoises, created by Zander Srodes, were distributed to educational centers and museums in Florida including many of FWC's Florida Youth Conservation Centers. The facilitator's training and companion teacher's curriculum, "Encounters with Gopher Tortoises: Protection and Natural History," developed and implemented in October 2010, were distributed to more than 50 educators and made available at the Florida Association of Science Teachers annual conference. This curriculum DVD is available upon request to teachers throughout Florida and meets Florida's Sunshine Standards for education.

- **Panther Awareness Materials:** A 4X9 inch card titled "Safe Roads for People and Panthers," was developed for FWC Law Enforcement officers to hand out to motorists stopped for exceeding speed limits in posted, reduced night-time panther speed zones in Collier, Lee, and Hendry counties. The cards contain information on the importance of observing posted speed limits, safety tips for driving through panther habitat, and contact information if a injured or dead panther is observed. The card can be viewed by visiting the Florida Panther Net website at:
http://www.floridapanther.net.org/images/uploads/safe_roads_FINAL_w-ADA.pdf.
- **Black Bear:** FWC distributed over 10,000 bear-related informational materials to the public during FY 2011-12. Several video and audio segments are available to the public via FWC's website (<http://myfwc.com/education/educators/black-bear/education/>), FWC's YouTube website (<http://www.youtube.com/user/MyFWCvideos>), and as DVD hard copies. At the end of FY 2011-12, FWC's "Living with Florida Black Bears" 14-minute video segment was viewed over 18,400 times, the "How to secure attractants from black bears using electric fencing" 12-minute video segment was viewed over 19,000 times, the "We want your input on the Draft Florida Black Bear Management Plan" 33-second video segment was viewed over 1,800 times, and six different audio clips were listened to a total of over 23,300 times.
- **Publications** – A list of scientific publications is included in Appendix C.

Volunteer Opportunities and Training – Volunteers are making a difference in Florida, contributing to the success of the State's conservation efforts. Volunteers get the bonus of working in some of Florida's most beautiful wild areas. Examples of volunteer efforts and training during FY 2011-12 include:

- **Least tern habitat improvement.** FWC partnered with the City of Tallahassee (Leon County) and volunteers from diverse organizations to improve nesting habitat for the State-designated Threatened least tern in an urban lake setting. Volunteers from Apalachee Audubon Society, Florida State University, and Lincoln High School Naval ROTC contributed physical labor preparing the site and transporting sand with wheelbarrows and hand tools. Basic wildlife viewing skills were shared with volunteers during the work days. Volunteers later monitored the site during least tern nesting season to report breeding behavior.
- **Volunteers role in FWC research.** During FY 2011-12, 154 volunteers contributed more than 8,000 research hours to projects involving listed species such as the alligator



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snapping turtle, beach mouse, Key Largo woodrat, Key Large cotton mouse, Black Creek and Panama City crayfish, gopher frog, Florida grasshopper sparrow, sea turtles, Florida black bear, and Florida panther.

- **Sea turtle nesting survey training.** To ensure the large network of volunteers who conduct sea turtle nesting beach surveys have the information they need to do their work, FWC conducted training workshops in six counties for more than 1,000 volunteers.
- **Everglade snail kite stewardship.** FWC is working with local partners to protect the Federally-designated Endangered Everglade snail kite on Lake Tohopekaliga (known as Lake Toho in Osceola County). Volunteers assisted FWC in educating the public about breeding and feeding behaviors and nesting requirements for the Everglade snail kite. Volunteers helped educate boaters at boat ramps and prior to fishing tournaments regarding proper boating practices in snail kite nesting areas. Additionally, volunteers assisted with placement and maintenance of 60 signs marking active snail kite nests and the creation of 60 feeding platforms allowing young kites to land and feed on larger snails.
- **Black bear education.** Volunteers canvassed neighborhoods to provide education on how to reduce human-bear conflicts by securing garbage, pet food, and birdseed. They worked in small teams with FWC staff to share information with neighborhood associations and individual homeowners in areas where human-bear conflicts are common.
- **“Jay Watch.”** Volunteers assisted FWC and partners with Florida scrub-jay population surveys in the Ocala National Forest, as well as at other sites around the state. Volunteers collected data and monitored more than 100 different families of scrub-jays over 3,600 acres of scrub habitat. They also worked on habitat enhancement, including tree and wiregrass plantings and invasive plant removal.
- **Florida mouse trapping and census.** Volunteers with the Brooksville Ridge Volunteer Program assisted FWC at Watermelon Pond WEA (Alachua and Levy counties) and Half Moon WMA (Sumter County) with small mammal trap set-up, capture, and data collection for the State-designated Threatened Florida mouse. Sixty-five Florida mice were captured and marked at the Watermelon Pond WMA and none were captured at Half Moon WMA.
- **Gopher tortoise habitat improvements and monitoring.** Brooksville Ridge Volunteer Program worked on habitat enhancements benefitting the gopher tortoise. These projects included prescribed fire preparation, wire grass plantings, invasive plant removal, and oak thinning. Volunteer activities occurred at the Chinsegut WEA, Chassahowitzka WMA, and Perry Oldenburg WEA (all in Hernando County), and at Half Moon WMA (Sumter County). Volunteers also worked on a gopher tortoise survey at Watermelon Pond WEA in Alachua and Levy counties.
- **Southeastern American kestrel nest box monitoring.** Volunteers built 18 kestrel boxes and monitored 23 nest boxes on four properties in Marion and Sumter counties. FWC also initiated nest box programs to augment populations in many areas including the Brooksville Ridge (Hernando, Citrus, Sumter and Levy Counties), where volunteers have been monitoring kestrel nest boxes for two years. FWC staff and volunteers prepared and monitored 19 nest boxes on six properties in Hernando County.



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- **Red-cockaded woodpecker monitoring.** FWC manages 75 active red-cockaded woodpecker nest clusters in the Citrus WMA (Citrus and Hernando counties). Volunteers helped with checks on active nest clusters and chick banding. Volunteers also assisted FWC with habitat enhancement at 49 nest clusters, including prescribed fire preparation, oak thinning, and repairs on nest inserts.

Protecting Seabird and Shorebird Species through Partnership – Collecting and communicating data on Florida’s large array of seabirds and shorebirds spread along more than 1,200 miles of coastline on the Atlantic Ocean and Gulf of Mexico is a huge task. FWC has, therefore, collaborated with partners to build a shorebird database and shorebird alliance. Stakeholders are investing their time, work, and knowledge in these cooperative efforts.

- **Florida Shorebird Alliance** – Long-term monitoring of shorebirds and seabirds across Florida requires an extensive network of partners. The Florida Shorebird Database (see below) facilitates this collaborative approach by providing a central location for data entry, compilation, and storage, but it is only as comprehensive as the network contributing to it. In an effort to coordinate and expand coverage of shorebirds and seabirds in Florida, the Florida Shorebird Alliance was created. The Alliance is organized into regional partnerships that work locally to ensure important shorebird and seabird sites are surveyed and monitored. To date, eight active regional partnerships coordinate monitoring and protection across Florida. The Alliance has a newsletter, maintains an email list-serve of 550 partners, and has a website, which may be accessed at www.flshorebirdalliance.org.
- **Florida Shorebird Database** – Managers and permit reviewers need real-time information to respond to situations involving nesting shorebirds and seabirds. The Florida Shorebird Database was created to serve as the central repository for data collected on shorebirds and seabirds in Florida. It is an online tool with a data entry interface allowing users to submit and manage observations. FWC and partners developed the Database and an accompanying protocol for monitoring beach-nesting shorebirds and seabirds. The database was launched in Spring 2011 and 114 registered users from throughout the state currently are entering locations and nesting data on these birds. The data are now available to anyone online, thereby allowing researchers, managers, conservationists, permit reviewers, and the public to use the information to help conserve shorebirds and seabirds. The Florida Shorebird Database may be accessed at www.flshorebirddatabase.org.

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APPENDIX A. LISTED WILDLIFE SPECIES IN FLORIDA AS OF JUNE 30, 2012

VERTEBRATES

FISH

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

AMPHIBIANS

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

REPTILES

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

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

BIRDS

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

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

MAMMALS

Common Name	Scientific Name	Status
Anastasia Island beach mouse	<i>Peromyscus polionotus phasma</i>	FE
Big Cypress fox squirrel	<i>Sciurus niger avicennia</i>	ST
Caribbean monk seal	<i>Monachus tropicalis</i>	FE
Choctawhatchee beach mouse	<i>Peromyscus polionotus allophrys</i>	FE
Eastern chipmunk	<i>Tamias striatus</i>	SSC
Everglades mink	<i>Neovison vison evergladensis</i>	ST
Finback whale	<i>Balaenoptera physalus</i>	FE
Florida black bear ³	<i>Ursus americanus floridanus</i>	ST
Florida bonneted (mastiff) bat	<i>Eumops [=glaucinus] floridanus</i>	ST
Florida mouse	<i>Podomys floridanus</i>	SSC

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

INVERTEBRATES

CORALS

Common Name	Scientific Name	Status
Elkhorn coral	<i>Acropora palmate</i>	FT
Pillar coral	<i>Dendrogyra cylindricus</i>	ST
Staghorn coral	<i>Acropora cervicornis</i>	FT

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CRUSTACEANS

Common Name	Scientific Name	Status
Black Creek crayfish (Spotted royal crayfish)	<i>Procambarus pictus</i>	SSC
Panama City crayfish	<i>Procambarus econfinae</i>	SSC
Santa Fe Cave crayfish	<i>Procambarus erythropros</i>	SSC
Squirrel Chimney Cave shrimp	<i>Palaemonetes cummingi</i>	FT

INSECTS

Common Name	Scientific Name	Status
American burying beetle	<i>Nicrophorus americanus</i>	FE
Miami blue butterfly	<i>Cyclargus thomasi bethunebakeri</i>	ST
Schaus' swallowtail butterfly	<i>Heraclides aristodemus ponceanus</i>	FE

MOLLUSKS

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

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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 Nonessential Experimental Population
FT(S/A) =	Federally-designated Threatened Species Due to Similarity of Appearance
ST =	State-designated Threatened
SSC =	Species of Special Concern

LIST NOTATIONS

- ¹ Lower Keys population only.
- ² Monroe County population only.
- ³ Other than those found in Baker and Columbia counties or in Apalachicola National Forest.

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APPENDIX B. LIST OF ACRONYMS USED IN THIS REPORT

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

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APPENDIX C. FWC PUBLICATIONS DURING FY 2011-12.

FWC strives to produce high-quality publications has been doing so since the Florida State Board of Conservation's first publication in 1948. That first paper in the 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/>.

Bartareau, T., Larter, N., Cluff, D., and Leone, E. 2012. Body condition and growth dynamics of black bears in Northern Canada. *Ursus*, 23(1):12-20.

Benson, J. F., Hostetler, J.A., Onorato, D.P., Johnson, W.E., Roelke, M.E., O'Brien, S.J., Jansen, D. and Oli, M.K. 2011. Intentional genetic introgression influences survival of adults and subadults in a small, inbred felid population. *Journal of Animal Ecology* 80:958-967.

Benson, J. F., Lotz, M.A., Land, E.D., and Onorato, D.P. 2012. Evolutionary and practical implications of pseudo-estrus behavior in Florida panthers (*Puma concolor coryi*). *Southeastern Naturalist* 11:149-154.

Berish, Joan E. Diemer, Kiltie, Richard A., and Thomas, Travis M. 2012. Long-term population dynamics of gopher tortoises (*Gopherus polyphemus*) in a pine plantation in northern Florida. *Chelonian Conservation Biology* 11:50-58.

Chapman, D. D., Simpfendorfer, C.A., Wiley, T.R., Poulakis, G.R., Curtis, C., Tringali, M.D., Carlson, J.K, and Feldheim, K.A. 2011. Genetic diversity despite population collapse in a critically endangered marine fish: the smalltooth sawfish (*Pristis pectinata*). *Journal of Heredity* 102:643–652. doi: 10.1093/jhered/esr098

Cunningham, M. W., and Yabsley, M.J. 2011. A primer on tick-borne diseases in exotic carnivores. In M. Fowler and E. Miller (eds) *Zoo and Wild Animal Medicine*. Elsevier, St. Louis, Missouri, pp 458-464.

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Gore, J. A., Lazure, L., and Ludlow, M.E.. 2012. Decline in the Winter Population of Gray Bats (*Myotis grisescens*) in Florida. *Southeastern Naturalist* 11:89-98.

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APPENDIX C. Continued

Hostetler, J., Onorato, D., Bolker, B., Johnson, W., O'Brien, S., Jansen, D., and Oli, M.K. 2012. Does genetic introgression improve female reproductive performance? A test on the endangered Florida panther. *Oecologia* 168:289-300.

Lirman, Diego, Schopmeyer, Stephanie, Manzello, Derek, Gramer, Lewis J., Precht, William F., Muller-Karger, Frank, Banks, Kenneth, Barnes, Brian, Bartels, Erich, Bourque, Amanda, Byrne, James, Donahue, Scott, Duquesnel, Janice, Fisher, Louis, Gilliam, David, Hendee, James, Johnson, Meaghan, Maxwell, Kerry, McDevitt, Erin, Monty, Jamie, Rueda, Digna, Ruzicka, Rob, and Thanner, Sara. 2011. Severe 2010 cold-water event caused unprecedented mortality to corals of the Florida Reef Tract and reversed previous survivorship patterns. *PLoS ONE* 6(8):1-10.

Note: Staghorn coral is mentioned in this publication, but it is not the subject of the publication

McBride, R., and Sensor, R. 2012. Photographic Evidence of Wild Florida Panthers Scent-Marking with Facial Glands. *Southeastern Naturalist* 11:349-354.

Meylan, Peter A., Meylan, Anne B., and Gray, Jennifer A. 2011. The ecology and migrations of sea turtles, 8. Tests of the developmental habitat hypothesis. *Bulletin of the American Museum of Natural History*, no.357, 70 pp.

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Woodward, Allan R., Percival, H. Franklin, Rauschenberger, R. Heath, Gross, Timothy S., Rice, Kenneth G., and Conrow, Roxanne. 2011. Abnormal alligators and organochlorine pesticides in Lake Apopka, Florida. Pp. 153-187 in Elliott, J.E., et al., eds. *Wildlife Ecotoxicology: Forensic approaches* (Emerging topics in ecotoxicology, Vol. 3). Springer, New York.

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

Common Name

Scientific Name

FISH

Alligator gar

Atractosteus spatula

AMPHIBIANS

NONE

REPTILES

Yellow rat snake

Patherophis alleghaniensis quadrivittata

BIRDS

Anhinga

Anhinga anhinga

Bachman's sparrow

Aimophila aestivalis

Bald eagle

Haliaeetus leucocephalus

Black rail

Laterallus jamaicensis

Cattle egret

Bubulcus ibis

Common moorhens

Gallinula chloropus

Eastern bluebird

Sialia sialis

Eastern screech-owl

Otus asio

Glossy ibis

Plegadis falcinellus

Great blue heron

Ardea herodias

Great-crested flycatchers

Myiarchus crinitus

Great egret

Ardea alba

King rail

Rallus elegans

Least bittern

Ixobrychus exilis

Peregrine falcon

Falco peregrinus

Purple gallinule

Porphyryla martinica

Pie-billed grebe

Podilymbus podiceps

Royal tern

Sterna maxima

Sedge wren

Cistothorus platensis

Yellow-crowned night-herons

Nyctanassa violacea

MAMMALS

Big brown bat

Eptesicus fuscus

Brazilian free-tailed bat

Tadarida brasiliensis

Cotton mice

Peromyscus gossypinus

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APPENDIX D. Continued

Cotton rats	<i>Sigmodon hispidus</i>
Eastern gray squirrels	<i>Sciurus carolinensis</i>
Eastern woodrat	<i>Neotoma floridana</i>
Evening bat	<i>Nycticeius humeralis</i>
Golden mice	<i>Ochrotomys nuttalli</i>
House cat	<i>Felis catus</i>
House mouse	<i>Mus musculus</i>
Nine-banded armadillo	<i>Dasypus novemcinctus</i>
Old-field mouse	<i>Peromyscus polionotus</i>
Puma	<i>Puma concolor stanleyana</i>
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>
Red bat	<i>Lasiurus borealis</i>
Seminole bat	<i>Lasiurus seminolus</i>
Southern flying squirrel	<i>Glaucomys volans</i>
Southeastern myotis bat	<i>Myotis austroriparius</i>
Tricolored bat	<i>Perimyotis subflavus</i>

INVERTEBRATES

MOLLUSKS

Choctaw bean	<i>Obovaria choctawensis</i>
Fuzzy pigtoe	<i>Pleurobema strodeanum</i>
Narrow pigtoe	<i>Fusconaia escambia</i>
Purple bankclimber mussel	<i>Elliptiodes sloatianus</i>
Round ebonyshell	<i>Fusconaia rotulata</i>
Southern sandshell	<i>Hamiota australis</i>
Southern kidneyshell	<i>Ptychobranthus jonesi</i>
Suwannee moccasinshell	<i>Medionidus walker</i>
Tapered pigtoe	<i>Fusconaia burkei</i>

PLANTS

Bullrush or Cattail	<i>Typha</i>
Cabbage palm	<i>Sabal palmetto</i>
Egyptian paspalidium	<i>Paspalidium geminatum</i>
Hydrilla	<i>Hydrilla verticillata</i>
Longleaf pine	<i>Pinus palustris</i>
Oak trees	<i>Quercus</i> spp.
Pickerelweed	<i>Pontederia</i>
Sand pine	<i>Pinus clausa</i>
Saw palmetto	<i>Serenoa repens</i>
Seagrass	Order: <u>Alismatales</u>
Scrub oak	<i>Quercus</i> spp.

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Slash pine	<i>Pinus ellioti</i>
Torpedograss	<i>Panicum repens</i>
Turkey oak	<i>Quercus laevis</i>
Willow	<i>Salix</i>
Wiregrass	<i>Aristida stricta</i>

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APPENDIX E. GLOSSARY OF TERMS

DEFINITIONS

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

Anthropogenic – Resulting from human influence on nature.

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

Cavity – A hollow or hole occupied by an organism.

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

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

Colony – A distinguishable localized population within a species.

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

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

Ephemeral – Lasting a very short time.

Extirpation – Cease to exist in a given area.

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

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

Fledged – To leave the nest.

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

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

Genetic Introgression – Adding new genes to a population.

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

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

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

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

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

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

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

Necropsy – The examination of a body after death.

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

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

Pelagic – Deep ocean water.

Productivity – The ability to produce; fertility.

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

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

Rookery – A colony of breeding animals.

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APPENDIX E. Continued

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

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

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 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 declined geographic range, a population size that numbers fewer than 10,000 mature individuals, a small and/or restricted population, and/or a quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years

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

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

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

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

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

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APPENDIX F. MAP OF FWC'S REGIONS



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APPENDIX G. MAP OF FWC'S MANAGED AREAS

