

# Imperiled Species Conservation: **Managing in the Face of Conflict**

Florida Chapter of The Wildlife Society | 2013 Spring Conference



April 10-12, 2013 | Crowne Plaza Melbourne Oceanfront | Melbourne, Florida



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## **The Florida Chapter of the Wildlife Society 2013 Conference**

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## president's message

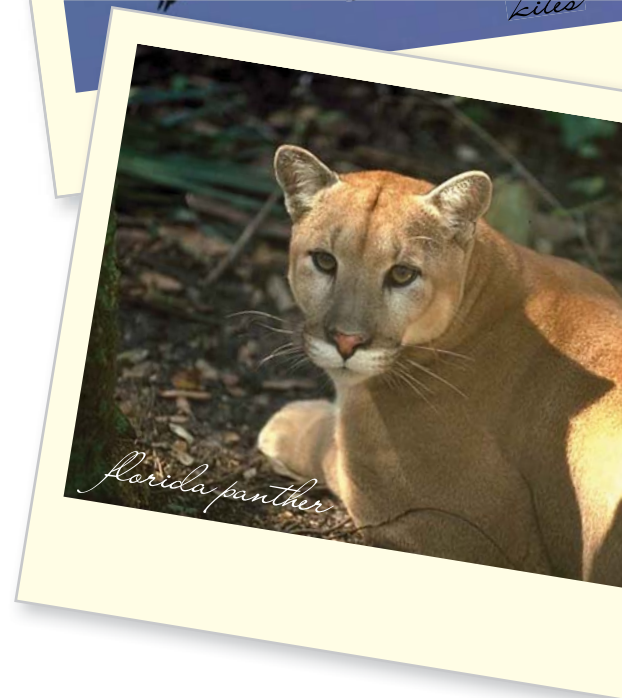
Welcome to the 2013 Spring Conference of the Florida Chapter of The Wildlife Society. This year's theme, "Imperiled Species Conservation: Managing in the Face of Conflict", is particularly relevant to Florida wildlife managers and biologists because our state is rich in both imperiled species and conflict. Our culturally and biologically diverse state ranks fourth in both human population size and number of federally listed species. But, the upside is that managing land or water in a state with such contrast is bound to drive innovation and creativity. In fact, the need to find a new way forward was what led the U.S. Fish and Wildlife Service in 1999 to unveil the landmark South Florida Multi-species Recovery Plan, a plan that simultaneously addressed the needs of 68 listed species and 23 ecological communities.

We think that the engine of innovation is still present in Florida and that you will see the result of it sprinkled among the many talks and posters at this year's spring conference. The latest approaches to management and research on imperiled species will be highlighted during the symposium on the declining grasshopper sparrow, the scrub management workshop, and the plenary session.

We know that for some of our members the scientific content of the conference will be secondary to the opportunity to build professional networks and renew contacts with colleagues and friends. Our Program Committee had this in mind when they crafted the breaks, social events, and setting for the conference. We are confident that every participant will find something of value.

Thanks for participating, and have a great conference.

Dale E. Gawlik, President, Florida Chapter of the Wildlife Society



## executiveboard

Florida Chapter of The Wildlife Society 2013

President: **Dale Gawlik**  
President-Elect: **Erin Myers**  
Past-President: **Arnold Brunell**  
Treasurer: **Larame Ferry**  
Secretary: **Marsha Ward**  
Member-at-Large: **Holly Ober**  
Member-at-Large: **Kristee Booth**  
Southeastern Representative: **Alan Alshouse**

## conferencecommittee 2013

Program Committee: **Maria Zondervan, Erin Myers**  
Workshops/Field Trips: **Erin Myers, Maria Zondervan, Samantha McGee, Craig Faulhaber, Paul Miller**  
Technical Papers: **Paul Moler**  
Student Paper Judging: **Becky Bolt**  
Poster Session: **Eric Tillman**  
Audio/Visual: **Patrick Delaney, Eric Tillman, Kimberly Tillman**  
Registration: **Larame Ferry**  
Photography: **Jodie Gless**  
Website: **Patrick Delaney, Mike Milleson**  
FaceBook: **Larame Ferry**  
Program Printing: **Jay Exum, Derek Baker**  
Sponsors/Door Prizes: **Larry Perrin, Mark Ausley**  
UF WEC & Student Coordination: **Bill Giuliano, Samantha Baraoidan**  
Fundraising: **Larry Perrin, Mark Ausley, Alan Alshouse, Kristee Booth, Arnold Brunell, Tim Hall, Patrick Delaney, Larame Ferry, Pam Boody, Stefanie Nagid**

## committeechairs

Florida Chapter of The Wildlife Society

Audit: **Alan Alshouse**  
Awards Review: **Tim O'Meara**  
Certification: **Bill Giuliano**  
Conservation Review, Resolutions and Public Statements: **Becky Bolt**  
Education and Information: **Jodie Gless**  
Membership: **Phillip Brouse**  
Nominating and Elections: **Steve Rockwood**  
Program: **Maria Zondervan**  
Scholarship: **Holly Ober**  
Website: **Mike Milleson**  
Fundraising Co-Chair: **Larry Perrin**  
Fundraising Co-Chair: **Mark Ausley**



# workshop & field trips

## Workshop

Wednesday, April 10, 2013 | 8:30am – 12:00pm

### Scrub-jay Management Workshop At Malabar Scrub Sanctuary

Cost : FREE

Contact : Craig Faulhaber, [craig.faulhaber@myfwc.com](mailto:craig.faulhaber@myfwc.com)

Bring : Binoculars, Water, Sunscreen, Bug Spray

Location : Malabar Scrub Sanctuary | 1501 Malabar Woods Blvd. Malabar, FL. 32950

Populations of the Florida scrub-jay, the state's only endemic bird species, are thought to have declined by as much as 90% since European settlement. A recent report indicated that populations of this federally-listed species have continued to decline even on managed conservation lands. The Florida scrub-jay is non-migratory, sedentary, and restricted to scrub and scrubby flatwoods natural communities. This workshop will explore the habitat needs of scrub-jays, methods used to restore and maintain scrub-jay habitat, and challenges to managing for scrub-jays and other scrub wildlife. The workshop will conclude with an open discussion of possible solutions to management challenges.

People assisting with the workshop:

- Craig Faulhaber, Florida Scrub-Jay Conservation Coordinator, Florida Fish and Wildlife Conservation Commission
- Chris O'Hara, Land Manager, Brevard County Environmentally Endangered Lands
- Dave Breininger, Wildlife Ecologist, InoMedic Health Applications, Inc.
- Todd Mecklenborg, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service
- Additional assistance may be provided by Brevard EELs staff

The workshop will take place at the 395-acre Malabar Scrub Sanctuary, located approximately 20 minutes from the conference hotel. For more information about the sanctuary, please visit <http://www.brevardcounty.us/EELProgram/Areas/MalabarScrub/Home>.

Anyone wishing to participate in the workshop, please meet at Malabar Scrub Sanctuary at 8:30 am on Wednesday, April 10, 2013. There are public restrooms and extra parking at the community park adjacent to the sanctuary. We will not be providing lunch, so if you wish to bring snacks, please do so. Please wear appropriate field clothes, and do not forget your binoculars, water, sunscreen and bug spray.



## workshops & field trips



### Field Trip

Friday, April 12, 2013 | 8:00am - 12:00pm

#### St. Sebastian River Preserve State Park Field Trip

Cost: FREE

Guide: Samantha McGee, Environmental Specialist

Contact: Maria Zondervan, mzo ndervan@sjrwmd.com

Bring: Binoculars, Sunscreen, Bug Spray

The St. Sebastian River Preserve State Park (SSRPSP) is a 22,000-acre park straddling the Brevard and Indian River County lines on the east coast of Florida and is managed by the Florida Park Service. The park contains 22 distinct natural communities and harbors 74 protected species, which makes it one of the most diverse places in the state. Some of the natural communities on the preserve include a mixture of mesic to wet pine flatwoods, wet prairie, scrubby flat woods, sandhill, scrub, depression marshes, hydric hammock, and dome swamps. The park also contains Herndon swamp, a 700-acre strand swamp, which traverses the northern half of the property. SSRPSP contains portions of the 10-mile ridge and Atlantic coastal ridge where a matrix of scrub and scrubby flat woods occurs. The SSRPSP comprises the largest contiguous conservation area for the South Brevard-Indian River-St. Lucie Florida scrub jay metapopulation, which is the fourth largest metapopulation within the species range. The preserve is also home to red-cockaded woodpeckers, eagles, and much more. One of the initial reasons for acquisition of this property was to buffer the St. Sebastian River, the 2nd largest tributary to the Indian River Lagoon. Aerial surveys indicate that more than 150 manatees may occupy the river in a single day in the winter. The SSRPSP is a beautiful park with a very active prescribed fire program, numerous habitat restoration projects underway, and a variety of ongoing monitoring programs. We hope you are able to join us for a field trip where we will explore several areas of the park by way of a truck bed hayride with occasional stops in key focal areas. In keeping with the theme of the conference, we will focus on areas where collectively we have been able to overcome management conflicts as it relates to imperiled species and areas where we are still in the process of seeking solutions and guidance.

St. Sebastian Preserve is approximately 45 minutes from the conference hotel. We will carpool from the hotel Friday morning, departing at 8:00 am. We will only be providing water, so if you wish to bring snacks, please do so. Please wear appropriate field clothes, there may be a bit of hiking. Do not forget your binoculars, sunscreen and bug spray. The field trip will finish at SSRPSP at noon and we expect to be back at the hotel by 1 pm. However, if you are travelling south and would prefer to depart directly from SSRPSP, you may do so.

## Field Trip

Friday, April 12, 2013 | 8:00am – 1:00pm

### Kissimmee Prairie Preserve State Park Field Trip

Cost : \$10 Includes Entrance Fee and Lunch  
Guide: Paul Miller, KPPSP biologist  
Contact : Erin Myers, erin\_myers@fws.gov  
Bring : Binoculars, Sunscreen, Bug Spray  
Limit : 30 Participants

The Kissimmee Prairie Preserve State Park (KPPSP) is a 54,000-acre preserve that protects one of the largest remaining stretches of Florida dry prairie, home to an array of endangered plants and animals, including the Florida Grasshopper Sparrow, Crested Caracara and Burrowing Owl.

The Florida Grasshopper Sparrow (FGSP) is a federally endangered subspecies endemic to the fire-maintained prairies of Florida. FGSP populations are declining sharply on the three public lands that support them. Three Lakes Wildlife Management Area (TLWMA) and Kissimmee Prairie Preserve State Park (KPPSP) support the largest populations remaining on public lands, and the population on Avon Park Air Force Range (APAFR) is nearly extirpated. Recent surveys recorded the lowest number of males ever (N = 74; all three sites combined), and, if trends continue, the FGSP faces extinction on public lands within a decade. The cause of the recent sharp decline is not known. With less than 10% of the Florida native prairie habitat remaining, and unknown status of FGSP populations on private lands, it is essential to determine what the population status is across the landscape; determine the causes of the sharp declines on public lands; and provide management recommendations for both public and private lands.

The Florida Grasshopper Sparrow Working Group (FGSWG), a public/private partnership, has identified at least seven potential factors for the declines: altered fire regimes, nest predation by fire ants, land use (e.g., open grazing, prescribed grazing, ungrazed), biased sex ratio, inbreeding, disease, and altered hydrology. These factors may interact and vary among managed populations, but none have been experimentally evaluated in a way that allows site comparisons and interactive effects to be assessed. This field trip will introduce participants to the unique habitat needs of the FGSP and some of the factors that are impacting the health of this imperiled species. If you are lucky, you may be able to hear and/or see the Male FGSP singing.

KPPSP is approximately 2 hours from the hotel in Melbourne. We will plan to caravan from the hotel Friday morning no later than 8:00 am. If you wish to leave earlier in order to go birding that is fine, just contact Erin Myers so that we know who is attending, and how many lunches to bring. We will provide water and a boxed lunch. Please wear appropriate field gear, there will be hiking through tall grass and scrub. Do not forget your binoculars, sunscreen and bug spray. When you arrive on the Preserve, PLEASE keep your vehicle speed to 25 mph or less to minimize habitat and wildlife disturbance. The field trip will finish at the Preserve 1:00 pm.



## Wednesday, April 10, 2013

8:30am-12:00pm: Scrub Management Workshop (FREE - Meet at Malabar Scrub Sanctuary)

10:00am-5:00pm: Registration (St. Foyer)

1:00pm-3:00pm: Symposium: Florida Grasshopper Sparrow Conservation (Aruba)

3:30pm-5:30pm: Business Meeting (Aruba)

6:30pm-10:00pm: Social - Dinner provided, live music by Fresh Squeeze, Silent Auction and Raffle (Ocean Deck Pavilion)

## Thursday, April 11, 2013

8:00am-5:00pm: Registration (St. Foyer)/Poster Setup (St. Lucia/St. Martin)

8:30am-12:00pm: Plenary Session: Imperiled Species Conservation: Managing in the Face of Conflict (Aruba)

12:00pm-1:30pm: Lunch (on your own)

1:30pm-5:10pm: Technical Sessions (Session #1-Aruba, Session #2-Antigua/Trinidad/Martinique)

5:15pm-5:45pm: REDDy Training (Antigua/Trinidad/Martinique)

6:00pm-7:00pm: Poster Session and UF Alumni and Friends Reception (St. Lucia/St. Martin)

7:00pm-9:00pm: Networking Dinner, Awards Presentation and Screening of *Florida Wildlife Corridor Expedition Documentary* (Aruba)

## Friday, April 12, 2013

8:00am-12:00pm: Field Trip to St. Sebastian River Preserve State Park (FREE - Meet at Registration area to sign in and arrange carpool)

8:00am-1:00pm: Field Trip to Kissimmee Prairie Preserve State Park (\$10 covers entrance fee and lunch. Meet at Registration area to sign in and arrange carpool)



## Symposium : Florida Grasshopper Sparrow Conservation

April 10th 1:00pm - 3:00pm | Crowne Plaza Melbourne Oceanside

### BIOLOGY AND STATUS OF THE FLORIDA GRASSHOPPER SPARROW

1:00pm | Greg Schrott

**Dr. Gregory Schrott** is the manager of Archbold Biological Station's project monitoring and conducting research on three species of threatened and endangered birds (the Florida Scrub-Jay, Red-cockaded Woodpecker, and Florida Grasshopper Sparrow) at the Avon Park Air Force Range in central Florida. He received his Ph.D. from UCLA in 2001 and was the chair of the Florida Grasshopper Sparrow Working group from 2008 – 2012.

### FLORIDA GRASSHOPPER SPARROW: THE PROBLEMS WE FACE

1:30pm | Paul Gray

**Paul Gray** is the Science Coordinator of Audubon of Florida's Northern Everglades Program. He has been with Audubon for 18 years and working in and around Lake Okeechobee since 1988. Paul furnishes technical support for Audubon's policy team and works with various agency teams on Northern Everglades water management, water quality (including watershed management in relation to these issues), aquatic plant and wildlife management, fire ecology, recreation, and endangered bird issues, with a priority focus on the Florida Grasshopper Sparrow. Dr. Gray holds a BS from the University of Missouri and an MS from Texas Tech University on wetland ecology. He completed his Ph.D. from the University of Florida in 1993, his primary project focused on Florida's Mottled Duck in the Okeechobee region.

### ADAPTIVE MANAGEMENT: CONTROLLING THE THREAT OF FIRE ANT PREDATION ON FLORIDA GRASSHOPPER SPARROW NESTS

1:50pm | Josh King

**Dr. Josh King** is an Assistant Professor at UCF. He got his PhD from the University of Florida in Entomology. He is an expert in fire ant ecology and the community ecology of ants and other insects in the southeastern US.

### ROLE OF THE US FISH AND WILDLIFE SERVICE IN FLORIDA GRASSHOPPER SPARROW (*AMMODRAMUS SAVANNARUM FLORIDANUS*) CONSERVATION

1:50pm | Mary Peterson

**Mary Peterson** is a Fish and Wildlife biologist with the U.S. Fish and Wildlife Service (USFWS) in Vero Beach, Florida, where she has worked for the past 10 years. In April, 2012, she was assigned to work full time on Florida Grasshopper Sparrow (FGSP) recovery. The FGSP is a critically endangered bird endemic to the Florida dry prairie of south central Florida. Mary earned her Master of Science degree in biology in 2001 from Tennessee Technological University (TTU) where she completed a wetland bird habitat utilization study to fulfill research requirements. Prior to coming to work for the USFWS, she spent two years as a research associate at TTU where she worked on several wetland-related projects. She also worked for the Tennessee Department of Conservation and the Tennessee Wildlife Resource Agency. Mary began her tenure with the USFWS working on Everglades restoration, but later transferred to the regulatory program where she was one of the primary biologists responsible for review of complex and often controversial projects affecting the Florida panther in southwest Florida.

### PANEL DISCUSSION

2:30pm to 2:50pm

## Plenary Session : Imperiled Species Conservation: Managing in the Face of Conflict

April 11th, 2013 | 8:30am - Noon | Crowne Plaza Melbourne Oceanside

### IMPERILED SPECIES CONSERVATION IN SOUTH FLORIDA

9:00am | Larry Williams



With 23 years of service in refuges across the country, Larry Williams began a new phase of his career in October 2011, as supervisor of the South Florida Ecological Services Office in Vero Beach.

Larry joined the South Florida Field Office and heads its 60-person staff at a pivotal time as restoration work accelerates in the Everglades. Staff members completed much of the GIS work for the just established Everglades Headwaters National Wildlife Refuge. They also finalized a rule banning the interstate transportation of four giant constrictor snakes - the Burmese python, the yellow anaconda, and the northern and southern African pythons.

Larry's Fish and Wildlife Service career began 25 years ago when he started as a volunteer at Eufaula National Wildlife Refuge. He grew up in Greenbrier, Alabama, between Decatur, where Wheeler National Wildlife Refuge is located, and Huntsville. As a child, he enjoyed visiting Wheeler and constantly asked his parents to bring him back to the refuge. When he was in the first grade, he met Tom Atkenson, then refuge manager at Wheeler, whom he admired.

He became a refuge manager trainee at Eufaula National Wildlife Refuge 23 years ago. Since then, Larry says he has held at least 10 other positions in the Service, including Assistant Refuge Manager at St. Marks National Wildlife Refuge in Florida; Deputy Refuge Manager at Carolina Sandhills National Wildlife Refuge in McBee, South Carolina; and Deputy Refuge Manager at Noxubee National Wildlife Refuge in Mississippi. For five years prior to coming to south Florida, Larry served as the budget chief for the National Wildlife Refuge System in Arlington, Virginia.

A 1991 graduate of Auburn University, Larry and his wife Clare have two daughters and a son.

In his spare time, Larry enjoys spending time with his family hiking, canoeing, riding bikes, and taking pictures. He and his kids like to cook together. "We make a mean cherry pie," Larry says. He also enjoys creative writing, drawing, and watercolor painting.

### THE HISTORY OF SPECIES LISTING IN FLORIDA

9:30am | Bradley Gruver



Bradley has worked for the Florida Fish and Wildlife Conservation Commission for 28 years. He was one of the initial staff of Florida's Nongame Wildlife Program, and currently serves as the Acting Section Leader of the Species Conservation Planning Section in the Division of Habitat and Species Conservation. Bradley has a Ph.D. in Range and Wildlife Management from Texas Tech University, a M.S. in Wildlife Ecology from Mississippi State University, and a B.S. in Forestry and Wildlife from Virginia Tech.

### BREAK

9:50 am

## IMPERILED RAPTORS OF FLORIDA: BALANCING NEEDS FOR FINE-SCALE KNOWLEDGE AND LANDSCAPE-LEVEL MANAGEMENT

10:00am | Kenneth Meyer



Kenneth Meyer obtained his B.S. in Zoology from the University of Maine, Orono, in 1978, and his Ph.D. in Zoology from the University of North Carolina, Chapel Hill, in 1987. From 1987 to 1997, he served as a post-doctoral and then research associate in the University of Florida's Department of Wildlife Ecology and Conservation and was employed as a research biologist with the National Park Service in Big Cypress National Preserve. In 1997, Kenneth founded and now directs the nonprofit Avian Research and Conservation Institute (ARCI), which conducts studies that support the management and conservation of rare birds. Besides producing critical data on the conservation ecology of imperiled birds, these projects have helped train students, land managers, and other biologists here and abroad. Since 1998, Kenneth has served as an adjunct Associate Professor in the University of Florida's Department of Wildlife Ecology.

## FLORIDA PANTHER CONSERVATION: MANAGING RECOVERY IN THE FACE OF CONFLICT

10:20am | David Shindle



David Shindle is a Certified Wildlife Biologist® with 20 years of professional field experience involving the survey, capture, and handling of endangered cat species in sub-tropical regions. David began his wildlife research career in 1992 assisting the Hawai'i Research Group of the USFWS's Patuxent Wildlife Research Center with studies of factors limiting the distribution and abundance of endangered Hawaiian forest birds on the Big Island of Hawai'i. As a Graduate Student and Research Associate from 1993-1998, David conducted field research in southern Texas and northeastern Mexico on the endangered ocelot for the Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville. From 1998-2005, David served as the Florida Panther Capture Team Leader for the Florida Fish and Wildlife Conservation Commission and was the lead field biologist responsible for coordinating panther captures, research, and monitoring associated with the Florida Panther Genetic

Restoration and Management Project. In addition to the Genetic Restoration Project, David's research efforts focused on improving the accuracy and efficiency of monitoring techniques for Florida panthers through the use of GPS radiocollars and more non-invasive techniques such as remote cameras. David is currently a Senior Wildlife Biologist with the Conservancy of Southwest Florida's Environmental Science Division in Naples and has served in this capacity since 2005. David's responsibilities include providing contracted scientific expertise on highly controversial and complex research and monitoring programs and projects relating to the recovery, conservation, and management of the Florida panther. David currently provides technical field assistance to FWC's Florida Panther Capture Team and provides scientific expertise to the USFWS on establishing scientific survey protocols for the inventory and monitoring of long-term trends in Florida panthers and their primary prey. In addition to the Florida panther, David has also conducted monitoring surveys for the Everglades mink. David has served as an invited, independent scientist on the U. S. Fish and Wildlife Service's (USFWS) Florida Panther Recovery Team, the Scientific Review Team for the Florida Panther Protection Program, and various Biological Status Review Teams for FWC's Imperiled Species List. David received his B.S. in Wildlife and Fisheries Sciences from Texas A&M University in 1992 and his M.S. in Range and Wildlife Management from Texas A&M University-Kingsville in 1995.

## CONSERVING FLORIDA'S LISTED AMPHIBIANS AND REPTILES

10:40am | William (Bill) Turner



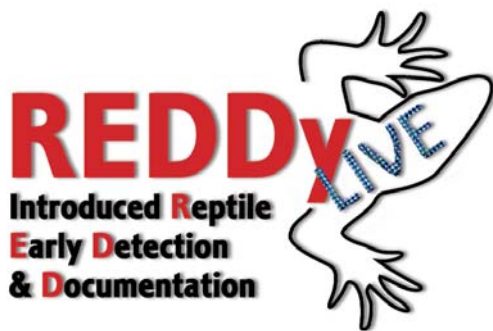
William (Bill) M. Turner received his B.S. from Erskine College and M.S. in Biology from the University of South Alabama. From 2003 to 2007, he was the Herpetological Coordinator for the Wyoming Game and Fish Department. In Wyoming, he conducted statewide surveys for amphibians and reptiles, focusing on emerging amphibian diseases and the impacts of resource development native reptiles. Since 2007, he has been the Herp Taxa Coordinator for FWC in the Division of Habitat and Species Conservation. He has conducted research on native amphibians and reptiles in Florida, Alabama and Wyoming that has resulted in several published papers and reports.

## PANEL DISCUSSION

11:00am - 11:30am

## ANNOUNCEMENTS

11:30am



One showing only for the Florida TWS Spring Conference  
 Thursday, April 11, 2013 from 5:15pm-5:45pm

Presented by Cheryl Millett, The Nature Conservancy

Quick, you're out in the field and you see a snake or a lizard that you KNOW is not quite right and someone with you turns to you and says, "WHAT was THAT??!!" You're a wildlife biologist, so you should know, right? But you don't... well, we can help.

Or someone calls you up and says, "There's a 4-foot long lizard outside my door- what do I do?" You're a wildlife biologist, so you should know, right? But you don't... well, we can help.

Take the world-renowned UF/IFAS REDDy Live training and learn how to identify and respond to exotic reptiles.. and we'll throw in a couple of non-reptiles for free. Try it. It's free, will sharpen your skills, and if you pass the final quiz, you'll earn a certificate testifying you did. And when that critter that doesn't belong shows up, you'll know what to do. You'll be part of the Early Detection Rapid Response that keeps them from establishing and becoming listed as a cause for the decline of the next imperiled species. and provide management recommendations for both public and private lands.



Exclusive Screening of Florida Wildlife Corridor  
 Expedition Film | Thursday, April 11, 2013 from 7pm-9pm

Hosted by Elam Stoltzfus

On January 17, 2012, a 1000 mile expedition over a 100 day period was kicked off to increase public awareness and generate support for the Florida Wildlife Corridor project.

Bear biologist Joe Guthrie, conservationist Mallory Lykes Dimmitt, and photojournalist Carlton Ward Jr trekked from the Everglades National Park toward Okefenokee National Wildlife Refuge in southern Georgia. The trio traversed the wildlife habitats, watersheds and participating working farms and ranches, which comprise the Florida Wildlife Corridor opportunity area.

The team documented the corridor through photography, video streams, radio reports, daily updates on social media and digital networks, and a host of activities for reporters, landowners, celebrities, conservationists, politicians and other guests. Award-winning cinematographer Elam Stoltzfus documented the expedition to produce a film about the journey and the Florida Wildlife Corridor.

For more information please visit the website: [www.floridawildlifecorridor.org](http://www.floridawildlifecorridor.org)

# technical & poster sessions

## Technical Session I – Moderator: Alan Alshouse Thursday, April 11, 2013 | 1:30pm – 5:10pm | Aruba

- 1:30pm – 1:50pm      **A habitat suitability model for wading birds at Lake Okeechobee, Florida.**  
R. A. Botta and D. E. Gawlik (Student paper)
- 1:50pm – 2:10pm      **It's good to have neighbors: developing an occupancy model for a declining nesting population of Bald Eagles in Florida Bay, Everglades National Park.**  
J. W. Bosley, J. D. Baldwin, and E. G. Noonburg (Student paper)
- 2:10pm – 2:30pm      **Visitor perceptions of crowding at Crystal River National Wildlife Refuge.**  
S. Baraoidan and T. V. Stein (Student paper)
- 2:30pm – 2:50pm      **Wading bird physiology and prey availability at Lake Okeechobee.**  
J. E. Chastant and D. E. Gawlik (Student paper)
- 2:50pm – 3:10pm      **Hydrologic variability and waterbird nesting.**  
D. E. Gawlik and R. T. Kingsford
- 3:10pm – 3:30pm      **Break**
- 3:30pm – 3:50pm      **Development of field keys for the identification of Florida mottled ducks.**  
R. Bielefeld, J. C. Feddersen, A. Engilis, Jr., J. M. Eadie, M. D. Tringali, and R. J. Benedict
- 3:50pm – 4:10pm      **Nest Success and Adult Survival of Female Florida Mottled Ducks.**  
D. M. Varner, R. R. Bielefeld, and G. R. Hepp
- 4:10pm – 4:30pm      **Expanding Protection of Ecosystem Services on Agricultural Lands in the U.S.**  
M. B. Zondervan
- 4:30pm – 4:50pm      **African wild dog (*Lycaon pictus*) conservation in KwaZulu-Natal, South Africa: A volunteers' perspective.** S. M. Nagid
- 4:50pm – 5:10pm      **Persistence of large American alligators in populations that have been hunted.**  
A. M. Brunell, J. P. Delaney, and C. Carter

## Technical Session II – Moderator: Jay Exum

Thursday, April 11, 2013 | 1:30pm – 5:1 pm | Antigua/Trinidad/Martinique

- 1:30pm – 1:50pm      **Imperiled species management planning – implementing a new conservation model for Florida species.** L. K. Barrett
- 1:50pm – 2:10pm      **Integrated conservation strategies as part of the state’s imperiled species management plan.**  
B. S. Branciforte
- 2:10pm – 2:30pm      **Wildlife conservation, prioritization, and recovery (WCPR) – an approach to imperiled species conservation on state lands.** J. D. Sullivan
- 2:30pm – 2:50pm      **Imperiled species management planning – engaging partners and stakeholders to solve adaptive problems.** C. S. Blunden
- 2:50pm – 3:10pm      **Why we think the Florida Chapter of The Wildlife Society should include invasive exotic animals in their mission.** C. B. Millett and E. Myers
- 3:10pm – 3:30pm      **Break**
- 3:30pm – 3:50pm      **The Effectiveness of Various Bat Exclusion Methods on Two Interstate (Florida Turnpike) Bridges.**  
M. G. Czerwinski and A. Holland
- 3:50pm – 4:10pm      **Conservation partnerships at Brevard Zoo.** T. Frampton
- 4:10pm – 4:30pm      **Home range sizes for the southeastern beach mouse (*Peromyscus polionotus niveiventris*) on the Kennedy Space Center and Cape Canaveral Air Force Station.** D. M. Oddy and S. L. Gann
- 4:30pm – 4:50pm      **Preventing tracking tube false detections in occupancy modeling of southeastern beach mice, *Peromyscus polionotus niveiventris*.** E. D. Stolen, D. M. Oddy, S. L. Gann, S. A. Legare, D. R. Breininger, M. L. Legare
- 4:50pm – 5:10pm      **Quantifying how Florida scrub-jay territory quality and sociobiology affect recruitment to inform fire management.** D. R. Breininger, E. D. Stolen, G. M. Carter, D. M. Oddy, and S. A. Legare

## Poster Session and UF Alumni and Friends Reception Thursday, April 11, 2013 | 6:00pm – 7:00 pm | St. Lucia/St. Martin

### Meet with Authors | USDA/APHIS Wildlife Services

**Impacts of grazer size and density on grazing intensity.** R. Atkins, J. N. Griffin, and B. R. Silliman

**Validation of field keys developed for the identification of Florida mottled ducks.** R. Bielefeld, J. C. Feddersen, A. Engilis, Jr., J. M. Eadie, M. D. Tringali, and R. J. Benedict

**A Tidal Inundation Model of Shallow-water Availability (TiMSA).** L. Calle, D. E. Gawlik, Z. Xie, and B. Johnson

**The Effectiveness of Various Bat Exclusion Methods on Two Interstate (Florida Turnpike) Bridges.** M. G. Czerwinski and A. Holland

**Impacts of Highway BR 262 on wild fauna between Anastácio and the Paraguay River Bridge, Brazil.** J. C. de Souza, V. P. da Curnha, and S. H. Markwith

**Avian richness along two transects near Aquidauana, Brazil: common species to the Pantanal and Everglades.** J. C. de Souza, G. G. Ramires, M. P. G. de Rezende, V. G. Terra, J. D. Baldwin, and S. H. Markwith

**Testing the effects of non-lethal predation risk on eastern bluebirds.** A. Powell and K. Sieving

**REBECCA ATKINS**, Department of Wildlife Ecology and Conservation, University of Florida, 1124 SW 1st Ave #201, Gainesville, FL 32601

**JOHN N. GRIFFIN**, Department of Biosciences, Swansea University, Wales, UK

**BRIAN R. SILLIMAN**, Department of Zoology, University of Florida, 409 Carr Hall, Gainesville, FL

### IMPACTS OF GRAZER SIZE AND DENSITY ON GRAZING INTENSITY

Understanding the impacts of grazers in an ecosystem demonstrated to be influenced by top-down controls is vital to predicting how the system will respond to disturbance and climate change. Grazer impacts can be governed by a number of factors, including body size, metabolic demand, density, and intraspecific interactions. This study took place during the growing season within a salt marsh on Sapelo Island, Georgia. We compared grazing intensity as a function of both body size and density. Using two size classes and six densities of *Littoraria irrorata*, we analyzed snail grazing damage on both live and dead *Spartina* stalks, compared final live and dead plant biomass, and assessed the ability of metabolic and per capita demand to explain grazing impacts. Overall, large snails have a greater per capita effect on live biomass, possibly due to morphological differences allowing them to radulate living plant tissue with greater efficiency. Small snails consumed more dead plant material. At higher densities, smaller snails consumed more biomass per metabolic gram. This indicates that at higher densities, metabolic theory alone may not explain the magnitude of the interaction strength between grazers and plant biomass. Grazer size and density are important variables influencing the ecosystem; facilitation, morphology, and the metabolic demand of individuals may be useful mechanisms for explaining how these variables influence the interaction strength between grazers and plant biomass and shape the landscape as a whole.

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### VISITOR PERCEPTIONS OF CROWDING AT CRYSTAL RIVER NATIONAL WILDLIFE REFUGE

Each year, over 150,000 people flock to Three Sisters Spring (TSS) at Crystal River National Wildlife Refuge to experience a close-up encounter with a West Indian manatee (*Trichechus manatus*). The high densities of both recreationists and manatees make management of the refuge a complex and contentious issue. While the recreation experience primarily centers on the unique chance to swim with a manatee, it may also be defined by a variety of other factors, including the presence of other visitors. Past research shows that people recreating in nature often find that feeling crowded detracts from their experience. The primary purpose of this project was to measure visitors' perceptions of crowding and how crowding affected their recreation experience in TSS. We have conducted surveys to determine visitors' primary motivations for engaging in non-consumptive wildlife-oriented nature tourism and if crowding is having a significant negative effect on their experiences. Surveyors used an on-site questionnaire to collect data in order for participants to give immediate feedback on their experience. Questionnaires were administered orally and administered from a manatee rescue ramp on the side of the spring entryway. Study participants are selected at random, and surveyors then ask visitors if they will participate in a short five-minute interview. On-site questions investigate potential feelings of crowding in areas within and around the spring, including but not limited to: canal, entry gate, and main spring. Concurrently with the on-site interview, a



second surveyor counted number of visitors in the spring. Only a limited amount of data could be collected on-site; therefore, surveyors also used a mail-back questionnaire to collect data. The questions in this portion of the survey generally focus on long-term perceptions of crowding, outcomes of participating in the experience, and preferences for management. Specifically, research will identify the size of crowds acceptable to visitors who are swimming with manatees. The desired end goal is to provide informed and feasible management options to refuge staff. This will allow staff to better align their goals of managing the refuge for both the enjoyment of the public and the protection of wildlife, specifically the federally listed manatee.

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## **IMPERILED SPECIES MANAGEMENT PLANNING – IMPLEMENTING A NEW CONSERVATION MODEL FOR FLORIDA SPECIES**

The Florida Fish and Wildlife Conservation Commission (FWC) adopted a management system in September 2010 to conserve threatened and endangered species. A component of this new conservation model for Florida species is the development of management plans for the state's listed species. The adaptive leadership principles that led to the successful update of the threatened and endangered species rule, Ch. 68A-27, are being continued in the management plan development. Collaboration and new ideas infused early in the process have led to a new approach in imperiled species management planning. Phase 1 includes the development of Species Action Plans that identify species' threats and conservation actions necessary to achieve the goal and objectives. Integrated Conservation Strategies (ICS) development in Phase 2 is in support of and to supplement the Species Action Plans. The intent of the ICS development is to reduce redundancy, improve effectiveness and efficiency, and to improve implementation and prioritization across all imperiled species. Phase 3 includes the development of one combined Imperiled Species Management Plan. The Imperiled Species Management Plan (ISMP) will identify the highest priority needs for individual and suites of species and will address recommendations for implementing both priority individual species conservation actions and priority integrated conservation strategies that will benefit multiple species and their habitats. Ongoing programs and on-the-ground activities that benefit both imperiled and focal species will be highlighted, along with any ways that those programs and/or activities could be expanded or improved. This new approach to imperiled species management planning is already improving collaboration, communication, and sharing of data, information, and resources. The future of Florida's imperiled species will count on continued improvements, leadership, and contribution by FWC, our partners, and stakeholders. Together, we will continue to improve conservation for Florida's wildlife.

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## DEVELOPMENT OF FIELD KEYS FOR THE IDENTIFICATION OF FLORIDA MOTTLED DUCKS

Florida mottled ducks (*Anas fulvigula fulvigula*) are non-migratory and differ genetically from the Western Gulf Coast population of mottled ducks. Mallards (*Anas platyrhynchos*) historically occurred in Florida only during fall and winter. However, releases of captive-reared mallards have established a feral population throughout much of the Florida mottled duck breeding range. These two closely related species have been interbreeding and producing fertile hybrid offspring for decades. Unless the feral mallard and hybrid populations are greatly reduced or eliminated, hybridization and genetic introgression jeopardizes the future existence of the Florida mottled duck as a distinct taxon. The first need in developing an effective management program is the ability to distinguish Florida mottled ducks from mallards and hybrids. We developed a dichotomous key for the identification of Florida mottled ducks using a suite of potentially informative phenotypic and morphometric characteristics. Traits for the key were derived from museum specimens collected prior to the establishment of feral mallard populations in Florida then tested on a set of genetically-vetted, contemporary specimens. The most informative traits were used to develop the identification keys. These keys should allow managers to assess the composition of the mottled duck population (excluding hybrids and mallards) in Florida without the need for expensive, time-consuming genetic procedures, and if needed, facilitate the reduction of feral mallard and hybrid populations. These identification keys should allow managers to differentiate all mallards and most hybrids from pure mottled ducks when in-hand. Some hybrid individuals (most likely mottled duck backcrosses) were too similar to pure mottled ducks to be identified using the traits we included in the analyses. We are currently testing the validity, efficacy, and teachability of the keys using ducks collected throughout the breeding range and annual cycle of the Florida mottled duck. Once validated, this will greatly increase the ability of managers to address the introgressive hybridization threat from mallards.

## VALIDATION OF FIELD KEYS DEVELOPED FOR THE IDENTIFICATION OF FLORIDA MOTTLED DUCKS (POSTER)

The Florida mottled duck (*Anas fulvigula fulvigula*) is threatened as a distinct taxon by introgressive hybridization with feral mallards (*Anas platyrhynchos*). An essential component in effectively dealing with this threat is managers having the ability to accurately separate Florida mottled ducks from mallards and their hybrids while in the field. We developed identification keys to fill this need. These keys, based on just a few plumage traits, were able to separate mottled ducks from all mallards and most hybrids in a limited sample of ducks. We are currently testing the validity, efficacy, and teachability of these keys using a much larger number of ducks collected from throughout the breeding range and annual cycle of the Florida mottled duck. If validated, these keys will provide a critical tool managers can use to address the introgressive hybridization threat from mallards.

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## **IMPERILED SPECIES MANAGEMENT PLANNING – ENGAGING PARTNERS AND STAKEHOLDERS TO SOLVE ADAPTIVE PROBLEMS**

The Florida Fish and Wildlife Conservation Commission, as Florida's trustees under the Public Trust Doctrine, has responsibility for conserving and regulating Florida's wildlife for the benefit of present and future citizens of Florida. In many cases, FWC lacks jurisdiction over key aspects of public trust such as water quality, water use, and land uses that affect the habitat upon which wildlife are dependent. Because of this, we know that no single entity has the ability to conserve imperiled species across Florida. We also know that there are limited resources to implement the necessary conservation actions. All of these issues are types of adaptive problems related to imperiled species management, problems with no established procedures or known solutions. These types of challenges and problems require coordination and input from those who will be impacted by the outcomes and those who can affect management. Previous efforts to involve partners and stakeholders in the listing process focused on providing technical solutions regarding listing criteria without discovering the real concerns that stakeholders had. Leadership in the agency took a new approach to the listing process and adopted adaptive principles during the update of the threatened and endangered species rule, Ch. 68A-27. Those efforts are being continued in the management plan development and we are seeking partner support and stakeholder input at all three stages of the ISMP process. FWC staff is seeking input on multiple components during this process: the Species Action Plans for individual species needs, Integrated Conservation Strategies that address common threats and themes, and the final Imperiled Species Management plan, which will include prioritized actions and draft rules and permitting. Multiple strategies and engagement techniques will be used to solicit feedback and input at all stages during this effort. We look forward to collaborating to adapt and improve those strategies in order to create a durable product. The Florida Fish and Wildlife Conservation Commission needs to remain creative, flexible, and adaptable when integrating stakeholder considerations into conservation efforts.

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## **IT'S GOOD TO HAVE NEIGHBORS: DEVELOPING AN OCCUPANCY MODEL FOR A DECLINING NESTING POPULATION OF BALD EAGLES IN FLORIDA BAY, EVERGLADES NATIONAL PARK**

We modified the incidence function model (IFM) framework to model a nesting population of Bald Eagles, *Haliaeetus leucocephalus*, in decline. Territories within Florida Bay exist in a naturally fragmented landscape of small mangrove keys at the southernmost range of the species. Using data collected from a 50-year monitoring program, the proposed model derives estimates of colonization and abandonment rates from territory specific histories. Presence of a directional gradient in occurrence and an increase in territory patchiness coincide with changes in prey assemblages and hydrology. Probabilities of incidence were used to assess the risk of local extinction and identify habitat parameters of importance to nest success. Productive territories in close proximity relative to one another had a greater probability of being occupied than territories that were isolated or less productive.

We observed greater yearly variation in the number of nesting territories as the distances between remaining occupied territories increased. Simulated model estimates of critical territory productivity and annual turnover are in good agreement with their respective empirical values. The incidence function approach provides a meaningful framework for modeling occupancy dynamics while retaining valuable site-specific information unique to this long-term dataset.

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### **A HABITAT SUITABILITY MODEL FOR WADING BIRDS AT LAKE OKEECHOBEE, FLORIDA**

Lake Okeechobee's littoral zone, occupying approximately 450 km<sup>2</sup>, provides a large amount of habitat for wetland birds. When aerial surveys of nesting wading birds began in 1957, the lake supported about 10,000 pairs. A subsequent increase in the water-level regime produced a decrease in nesting effort, leading to the hypothesis that lake stage limits foraging habitat, which in turn limits nest numbers. Based on that hypothesis, we combined LiDAR based digital elevation data, lake stage, and vegetation data to create functions that were proxies for the vulnerability, abundance, and spatial extent of prey for the great egret (*Ardea alba*), snowy egret (*Egretta thula*), and white ibis (*Eudocimus albus*). Functions were aggregated to create a single envelope of suitable foraging habitat that was available to the three species before and during the breeding season. We validated the model with independent surveys of flocks from 2010 through 2012. The model performed moderately well, with an area under the curve of 0.77 for the receiver operating characteristics. Predicted habitat suitability 2006-2012 and peak nest effort were positively related ( $R^2=0.82$ ,  $p<0.01$ ). Nest effort ranged from 10,176 pairs in 2006 to 20 pairs in 2008, with predicted habitat suitability values of 0.61 and 0.08, respectively.

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### **INTEGRATED CONSERVATION STRATEGIES AS PART OF THE STATE'S IMPERILED SPECIES MANAGEMENT PLAN**

The Florida Fish and Wildlife Conservation Commission (FWC) adopted a new management system in September 2010 to conserve threatened and endangered species. A major challenge of this system already underway is the commitment to develop 49 new Species Action Plans for 60 state listed species. A next step in the Imperiled Species Management Planning process is the identification and development of Integrated Conservation Strategies (ICS), or common themes that cut across multiple state listed species. The intent of the ICS's is to look at all state listed species on a comprehensive scale to reduce redundancy, improve effectiveness and efficiency, and to improve implementation and prioritization across all imperiled species. The FWC looks forward to working with stakeholders and partners on creating this new systematic paradigm of how imperiled species are viewed and managed in the state of Florida.

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## QUANTIFYING HOW FLORIDA SCRUB-JAY TERRITORY QUALITY AND SOCIOBIOLOGY AFFECT RECRUITMENT TO INFORM FIRE MANAGEMENT

The combined effects of habitat quality, breeder experience, and sociobiology on population demography have generally been neglected in conservation science. Natural fire regimes, which can influence habitat quality and sociobiology, have been replaced by controlled fire management in many ecosystems. Managing fire mosaics (vegetation at different ages since the last fire) can be important to sustain species in fire-maintained habitats, but such requirements are usually poorly defined. Source-sink theory provides a foundation to quantify habitat heterogeneity, but source-sink applications are largely focused on modeling metapopulations. We quantified how habitat quality, breeder experience, and non-breeding adult helpers affected Florida scrub-jay (*Aphelocoma coerulescens*) recruitment to describe source-sink heterogeneity within local populations. We used 22 years of census data of uniquely marked Florida scrub-jays to measure recruitment at 36 sites and combined those data with habitat-specific survival from the same study sites to characterize habitat-specific demography. To define habitat quality at the territory scale, we used static habitat features (soils, scrub oak cover) and dynamic habitat states (shrub heights and open sandy patches), which resulted from fire mosaics. Habitat quality had the greatest effect on recruitment followed by the presence of helpers. Fire mosaics influenced whether territories functioned as strong sources (open-medium), weak sources (closed-medium), or sinks (short, tall mix, tall). Among the sink habitats, short territories resulted from extensive and recent (< four years ago) fires, while tall territories escaped recent fire for >20 years. Subdividing landscapes into habitat states allowed quantification of the effect of fire mosaic at the territory scale and at the population scale because the proportions of habitat states can predict local population growth rates. Our approach provides an example of how characterizing habitat quality at the territory scale, relative to source-sink categories, can explain habitat heterogeneity within local populations and inform population and fire management.

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## PERSISTENCE OF LARGE AMERICAN ALLIGATORS (*Alligator mississippiensis*) IN POPULATIONS THAT HAVE BEEN HUNTED

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Wild populations of American alligators (*Alligator mississippiensis*) have been harvested commercially and recreationally in Florida since 1988. Although these annual harvests were preceded by and modeled after experimental harvests on a limited number of lakes, much of the public remained skeptical about the ability of wild populations to sustain harvests over time. The presence of large alligators is of particular interest because of the aesthetic appeal of seeing a large predator in its natural environment. Population surveys are conducted annually and serve as an important tool for evaluating trends and managing harvest levels. Harvest levels are most commonly influenced by the status of the adult ( $\geq 1.8$  m) segment of the population. Although large bull ( $\geq 2.7$  m) alligators are a part of the adult segment, their trends are rarely used as a basis for management decisions. Given the slow growth rate and the tendency of hunters to target the largest alligators, the persistence of bull alligators in a hunted population might seem unlikely after more than

20 years of harvest. We assessed survey and harvest data to determine the presence of bull alligators in hunted populations and trends in the number that are harvested. We compare the occurrence of bull alligators in hunted and unhunted populations. Although declines have been detected on some areas, statewide trend assessment of bull alligators indicates that this segment is stable. Large alligators continue to be removed from hunted populations, but it appears that the bull segment has not been depleted on most areas. The perception expressed by some that all of the bull alligators have been harvested is likely a result of greater wariness by alligators during and for a period after the hunting season.

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### **A TIDAL INUNDATION MODEL OF SHALLOW-WATER AVAILABILITY (TiMSA) (POSTER)**

Wading birds are restricted to forage in shallow water because of their leg-length constraint, making them sensitive to small changes in water depth. In coastal systems, this sensitivity is pronounced because tidal fluctuations control both the spatial and temporal extent of available foraging habitat. An understanding of tidal dynamics is thus required to assess any potential risk (e.g., sea-level rise) to species relying on the inter-tidal zone for survival. To help make these assessments, we developed a Tidal Inundation Model of Shallow-water Availability (TiMSA). We evaluated the model's ability to predict available foraging habitat using locations of foraging Little Blue Herons, *Egretta caerulea* (N=125) observed during 14 surveys (Dec 2010 - Jul 2011). We then compared the predictions obtained from the TiMSA to those obtained using a static map of multi-annual water depths estimated at mean low lower water (MLLW), which is a commonly used method for estimating low-tide habitat. The TiMSA correctly predicted 92% of foraging locations as actual foraging habitat, while the MLLW maps provided similar results (95.2%). The usefulness of MLLW maps for predictions declines rapidly as water levels rise and fall. This is when the TiMSA provides clear advantages with its ability to provide estimates in both space and time. The temporal flexibility of the TiMSA (within tides, days, and years) makes it useful for addressing short- and long-term stressors to multiple species relying on the intertidal zone. Continuing research now involves applying the TiMSA to wading bird foraging ecology in the Florida Keys.

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### **WADING BIRD STRESS RESPONSE TO PREY AVAILABILITY IN A MANAGED LAKE ECOSYSTEM**

The restoration of wetlands in South Florida is largely based on the premise that hydrologic patterns, fish populations, and wading birds are tightly linked. Hormones play an essential role in regulating an animal's response to environmental disturbances and could determine how hydrologic patterns affect reproductive success and survival. Quantifying the physiological responses to environmental conditions will improve our understanding of how individual wading birds react to immediate changes in resource levels as well as how long-term landscape habitat conditions may regulate reproduction and nesting patterns. Our study was conducted at Lake Okeechobee, a large (1732 km<sup>2</sup>), shallow (mean depth of 2.7 m), eutrophic lake located in central South Florida. Our goal was to determine the

effects of prey availability on stress levels of great egret (*Ardea alba*) and snowy egret (*Egretta thula*) chicks. Stress was measured using the cellular protein chaperone Heat Shock Protein 60 (HSP60). Lake levels were lower in 2011 than in 2012 (January lake stage 3.8 m and 4.1 m, respectively). However, throw-trap samples indicated that mean prey density in 2011 was  $165 \pm 21.09$  SE prey/m<sup>2</sup> with a maximum prey density of 936 prey/m<sup>2</sup>, whereas the mean prey density in 2012 was only  $87 \pm 6.99$  SE prey/m<sup>2</sup> with a maximum prey density of 267 prey/m<sup>2</sup>. A total of 209 chicks was sampled for HSP60 (n = 22 great egret and n = 59 snowy egret in 2011; n = 46 great egret and n = 82 snowy egret in 2012). Stress levels were lower in 2011 than in 2012 (HSP60 =  $3.3 \pm 0.51$  SE ng/mL great egret and  $3.6 \pm 0.27$  SE ng/mL snowy egret in 2011; HSP60 =  $31.96 \pm 4.75$  SE ng/mL great egret and  $51.42 \pm 3.54$  SE ng/mL snowy egret in 2012). Results suggest prey availability may not have been a limiting factor for wading bird nesting in 2011, despite the low lake levels. Additional years of data will help refine estimates of prey availability and hydrologic conditions that lead to a food limitation in wading birds on Lake Okeechobee.

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## THE EFFECTIVENESS OF VARIOUS BAT EXCLUSION METHODS ON TWO INTERSTATE (FLORIDA TURNPIKE) BRIDGES (PAPER & POSTER)

Florida is home to 13 resident bat species, of which three species are state or federally listed (the Florida bonneted bat [*Eumops floridanus*], Gray bat [*Myotis grisescens*], and Indiana bat [*Myotis sodalist*]). The expansion joints of bridges as well as other gaps in concrete and beam bridge components are known to provide artificial roosting habitat for bats. The Florida Department of Transportation (FDOT) conducted a state-wide survey of bridges, and determined that bats roosted in about 5% of 5 common bridge types in Florida. In many cases, a single bridge may provide habitat for colonies of 500 or more bats. The most commonly encountered species in Florida bridges is the Brazilian / Mexican free-tailed bat (*Tadarida brasiliensis*), whereas other species are less frequently encountered, including the Southeastern myotis (*Myotis austroriparius*), big brown bat (*Eptesicus fuscus*), and evening bat (*Nycticeius humeralis*). It is often necessary, as part of routine bridge maintenance, to periodically replace the expansion joint seal as well as conduct other maintenance activities which have the potential to harm (take) roosting bat species. Therefore, the FDOT and Florida Turnpike Authority require construction contractors to exclude bats from known occupied bridges prior to conducting potentially harmful construction activities. Because many of the concrete bridge components are structural concrete, potentially destructive methods of installation such as using screws or bolts should be avoided to insure the integrity of the bridge is not compromised. In November 2012, we installed and later modified bat exclusion netting as well as used other exclusion methods on 4 bridge spans of the Florida Turnpike in Lake County, Florida, and monitored the relative success of the various exclusionary methods. This interim report not only provides a description of the various tools, techniques and methods of bat exclusion, but also provides significant observations on bat (exclusion) behavior and other predator prey relationships of the bridge microcosm as the results of weeks of observational surveys. Ultimately, exclusion methods must be specifically tailored to the individual bridge structures, which typically do not conform to the standard bridge details.

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## **IMPACTS OF HIGHWAY BR 262 ON WILD FAUNA BETWEEN ANASTÁCIO AND THE PARAGUAY RIVER BRIDGE, BRAZIL (POSTER)**

Highways are essential to growth and progress, but their construction has numerous impacts, with one of the most visible being collision with wild animals. This 15 month project assessed automobile collisions with wildlife over a stretch of highway BR 262 (City of Anastácio to the Paraguay River Bridge, Mato Grosso do Sul State, Brazil) between April 2011 and June 2012. The methodology consisted of driving the stretch of highway monthly, stopping when roadkill was observed, identification of species, and collection of a GPS position and photographic record. There was a total of 520 roadkill incidents over the 15 sampling events, 60% of these were mammals from 21 species. The most frequent mammals were: *Hydrochaeris hydrochaeris* (n = 89), *Cerdocyon thous* (n = 64), *Tamandua tetradactyla* (n = 33), but also included were some of the more rare species: *Myrmecophaga tridactyla*, *Leopardus pardalis*, *Blastocerus dichotomus*, *Lontra longicaudis*, *Tapirus terrestris*. Of the remaining total, 18% were birds from 12 species, where the most frequent were *Caracara plancus* (n = 47) and *Coragyps atratus* (n = 26); 13% were reptiles from 7 species, of which *Caiman yacare* was most frequent (n = 60); and 8 % were not identified due to the advanced state of decomposition. A spatial analysis of collision hotspots subdividing the highway into 10 km segments indicates that mortality generally increased from Anastácio to the Paraguay River Bridge, with >30 carcasses per segment found at 110, 150, 160, and 210 km from Anastácio. All four of these hotspot segments are found at lower elevations, with the three former segments at transition zones between floodplain wetlands and adjacent uplands. The later segment at km 210 had the highest mortality rate and is fully within the lowland savannah wetland of the Paraguay River floodplain. The embankment of the highway may be sought as a refuge from floods by animals that may normally seek natural uplands, but the refuge can be fatal. There is need for driver awareness education, posting of reduced speed zones, and installation of mitigation structures such as fencing in the Pantanal region to reduce the rate of wild animal mortality.

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## **AVIAN RICHNESS ALONG TWO TRANSECTS NEAR AQUIDAUANA, BRAZIL: COMMON SPECIES TO THE PANTANAL AND EVERGLADES (POSTER)**

The Pantanal supports a very diverse community of birds, with >650 species. Some species are permanent residents of the region, whereas others migrate between the Pantanal and other regions and countries with the seasons. The objective of this study was to survey the avifauna diversity along two roads in Aquidauana, Mato Grosso do Sul, Brazil, and compare the species composition to that of the Everglades. We drove an average speed of ~15km/h for 74 km each sampling period along each transect road, the Taboco road and the Retirinho road. Each transect was sampled six times, totaling 444 km for each transect road (a total of 888km). Individuals were identified and counted by sight and audible calls. A total of 7,704 observations was collected, with 4,126 along the Retirinho transect and 3,578 along the Taboco transect. The Retirinho transect is



closer to the Aquidauana River, which may influence the higher concentration of birds in comparison to Taboco. We counted 118 species belonging to 21 orders and 42 families. The species with the greatest abundance along the Taboco transect was *Aratinga aurea* (n=421), and along Retirinho *Vanellus chilensis* (n=235) was most abundant. We sighted *Anodorhynchus hyacinthinus* (Hyacinth Macaw), whose conservation status according to IUCN is Endangered. The diversity of birds, using the Shannon Diversity Index, was  $H = 3.70$  and  $3.92$ , evenness was  $E = 0.78$  and  $0.82$  for the Taboco and Retirinho transects, respectively. Several of the sampled species were common to both the Pantanal and Everglades (14.4% of species), including *Ardea alba*, *Athene cunicularia*, *Bubulcus ibis*, *Cairina moschata*, *Caracara plancus*, *Cathartes aura*, *Coragyp satratus*, *Crotophaga ani*, *Egretta caerulea*, *Egretta thula*, *Falco sparverius*, *Mycteria americana*, *Pandion haliaetus*, *Passer domesticus*, *Platalea ajaja*, *Porphyrio martinica*, *Rostrhamus sociabilis*. The Pantanal region in proximity to Aquidauana (Taboco and Retirinho roads) still has a rich bird life and should be conserved for the future.

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## CONSERVATION PARTNERSHIPS AT BREVARD ZOO

The mission statement of Brevard Zoo (BZ) is "Wildlife Conservation through Education and Participation." The commitment to this mission can be seen all over the zoo, from our "Quarters For Conservation" program that involves all of our guests, to the species we exhibit at the zoo, to the active participation in many local conservation efforts. Several of these programs involve the conservation of imperiled species. This presentation focuses on two programs: Florida scrub-jay (FSJ), *Aphelocoma coerulescens*, translocation and captive breeding and reintroduction of Perdido Key beach mice (PKBM), *Peromyscus polionotus trissyllepsis*. Since 2008 BZ has partnered with various agencies including Florida Fish & Wildlife Conservation Commission (FWC), United States Fish & Wildlife Service (USFWS), Brevard County Environmentally Endangered Lands, Innovative Health Applications, and St. Johns River Water Management District to translocate FSJ from degraded habitat covered under an incidental take permit to protected conservation lands. We have carried out three translocations: in 2008, 2009, and 2013. Ten FSJ families totaling 32 birds have been moved from Palm Bay and Melbourne, FL. The first family was moved to South Lake Conservation Area, Titusville, FL. The remaining jays have been released at Buck Lake Conservation Area, Mims, FL. Our role in this effort is to apply for permits, desensitize the jays to feeding in traps, capture and transport the jays, build hack cages, and monitor post-release. The role of the biologists is to select donor and recipient sites, prepare the habitat, and write the protocol. Since 2007 BZ has partnered with FWC, USFWS, Santa Fe Teaching Zoo, and West Palm Zoo to breed and reintroduce PKBM. We started with 12 PKBM. In less than 2 years, the population at BZ was over 80 mice. The captive breeding program was so successful, it was decided that a reintroduction experiment would be warranted. In March 2010, 48 captive mice were released at Gulf State Park in Alabama where no PKBM currently lived. After 2 years, the population has stabilized and biologists estimate the habitat is well saturated with PKBM.

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## HYDROLOGIC VARIABILITY AS A GLOBAL DRIVER OF COLONIAL WATERBIRD NESTING

One of society's most pressing issues is to meet the growing demand for fresh water without causing irreversible degradation to wetland ecosystems. Serious impacts to wetlands stem from reduced water flows and shifts in the timing and magnitude of flood pulses. Waterbirds are a group of indicators that respond strongly to hydrologic manipulations. Their ubiquitous nature and biological similarities led us to investigate bird responses to hydrologic variability. We compared waterbird responses to water level fluctuations with a meta-analysis and two case studies: the Everglades in North America and desert rivers in the Murray-Darling Basin in Australia. Variability in the number of stork nests tended to be higher for wetland obligates than for species that commonly forage in uplands. When hydrologic conditions were good, nest numbers (all species pooled) were higher in the Murray-Darling than in the Everglades. Birds in the Murray-Darling had a longer interval between years with good nesting, and in both systems that interval increased after flow regimes were altered. Birds in the 2 ecosystems differed in the timing of nest initiation, which likely corresponded to foraging preferences and food availability. One difference was that Murray-Darling birds nested during rising and peak water levels. Desert rivers have long inter-flood intervals so the density of terrestrial prey can increase during dry periods and then become available to birds on the rising water edge. Thus, food availability is high with rising water and again when aquatic prey concentrate in drying pools. In the Everglades there is no pulse of availability with rising water and nesting is not initiated until water levels drop and aquatic prey are concentrated into pools. Although birds in different regions differed in the magnitude and timing of nesting, we hypothesize that these differences were a consistent response to food availability driven by hydrologic fluctuations.

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## FLORIDA GRASSHOPPER SPARROW: THE PROBLEMS WE FACE

There is a high probability that the Florida grasshopper sparrow (FGSP) (*Ammodramus saviannarum floridanus*) will go extinct in the near future. Preventing extinction will require many things to happen, which presently are in doubt. An overriding concern is the availability of adequate and consistent funding for research, annual surveys, land management, and captive breeding. Funding streams will have to come from many sources, and to date funding from state and federal agencies has been inadequate. Management should be guided by an understanding of various actions to demographic success, yet basic research, including interactions between management actions and survival and nest success (and fire ants), has been at small scales, with limited sample sizes, and leaves managers with a grossly inadequate understanding of these factors. Another limiting factor is time. If FGSP populations continue their rapid decline, the ability to draw strong conclusions from field research soon will be impossible. In that vacuum, best management actions will remain unknown and successfully releasing captive-bred birds will be more challenging. Small populations also are vulnerable to uncontrollable problems such as genetic depression and other Allee effects. We will present a list of achievable goals that might reduce the risks of extinction, an evaluation of how certain they are to be obtained within an adequate timeframe, and a projection of which shortfalls are most serious.

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## THE HISTORY OF SPECIES LISTING IN FLORIDA

Since the early 1970s, the Florida Fish and Wildlife Conservation Commission has maintained an imperiled species list. From 1972 through 1999, Florida's listing process was an intuitive process, with no fixed criteria and no standardized review process. Several proposed listing actions in 1994 caused significant controversy, raising concerns that Florida's imperiled species list was a "black box" where staff made listing recommendations that simply required approval of the majority of Commissioners without being based on biological information. This resulted in a listing moratorium and need for a more transparent and defensible listing process. In 1999, a group of select stakeholders helped staff develop a process based on criteria from the International Union for Conservation of Nature (IUCN) that superficially appeared to address concerns. However, new listing controversies arose in 2002 resulting in another listing moratorium, and staff was directed to reconvene the stakeholder group, with several new stakeholders added, and improve the process. This group could only agree on a few minor changes which were implemented in 2005. Listing controversies arose again in 2007 resulting in another listing moratorium and review of the listing process. Staff realized that the dissatisfaction with the listing process was a symptom of concerns with how imperiled species were managed in Florida. They decided to take a new approach to design an Imperiled Species Management System of which listing was one component. Over the next several years, adaptive leadership principles were used to involve stakeholders in defining and understanding the problems, and then creating solutions most stakeholders could live with. By July 2010, stakeholders were willing and ready for staff to present rules to the Commission, and this was done in September 2010. The Commission unanimously approved the new imperiled species system, including rules for a revised listing process. This update created one category for state listing and detailed the development of management plans for all species. The new paradigm also worked to increase efficiencies between the state and federal wildlife agencies. FWC staff continues to work toward the completion of the overall Imperiled Species Management plan with the help of partners and stakeholders.

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## ADAPTIVE MANAGEMENT: CONTROLLING THE THREAT OF FIRE ANT PREDATION ON FLORIDA GRASSHOPPER SPARROW NESTS

Florida Grasshopper Sparrow (FGSP) populations are declining sharply on the three public lands that support them. Three Lakes Wildlife Management Area (TLWMA) and Kissimmee Prairie Preserve State Park (KPPSP) support the largest populations remaining on public lands, and the population on Avon Park Air Force Range (APAFR) is nearly extirpated. Recent surveys recorded the lowest number of males ever ( $N = 74$ ; all three sites combined), and, if trends continue, the FGSP faces extinction on public lands within a decade. The cause of the recent sharp decline is not known. The Florida Grasshopper Sparrow Working Group (FGSWG), a public/private partnership, has identified nest predation by fire ants as a potential factor for the population decline. Although observation of fire ants actively preying on adults or nestlings of FGSP is rare, we know fire ants may be an important predator of ground-nesting vertebrates in some grassland ecosystems

in the southeastern US. We have been conducting fire ant control experiments to provide a feasible management action for public land managers. Fire ant densities can be manipulated very effectively using large volumes of hot water. The experimental ecological and conservation implications of this approach will be discussed, and results demonstrating the effectiveness of the hot water method will be presented. We know a combination of research and adaptive management is crucial to understanding FGSP declines, and this project provides one component to averting extinction through informed management strategies.

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### **IMPERILED RAPTORS OF FLORIDA: BALANCING NEEDS FOR FINE-SCALE KNOWLEDGE AND LANDSCAPE-LEVEL MANAGEMENT**

Long-term studies of individual species increase our knowledge of life-histories, ecological needs, and population dynamics. Such data support tests of unifying ecological principles applicable to taxa, communities, and systems. These principles, in turn, are valuable to wildlife managers striving to restore and maintain ecological integrity at large scales. This mission has become more challenging as we are forced to achieve more in less time with fewer resources, making it all the more important to remember the hierarchy of information vital to planning for functional systems at broad scales. Studies of several distinctive Florida raptors dating back to 1988 help illustrate these points. While many common principles apply to conserving species such as swallow-tailed kites, short-tailed hawks, snail kites, crested caracaras, and southeastern American kestrels, we may not be able to protect the systems they represent without understanding the respective limiting factors and ecological needs of key component species. This may mean greater expense (e.g., further study) or more care in considering what is already known. However, we have little choice if we wish to succeed, and other benefits will accrue. For example, a sharper focus on species can reveal specific management actions that are feasible, affordable, and effective, even for other taxa. We also might discover cost-effective ways to monitor species of concern, thus quantifying the success of management treatments and identifying potential improvements. It is clear we presently lack sufficient resources for the types of pre- and post-treatment studies we would find ideal for building large-scale networks of functional conservation lands. Nonetheless, we should set high standards for science-based planning by soundly interpreting all available data and judiciously applying research at necessary levels, including critical and representative species. Respectful and supportive collaborations among agencies, institutions, and organizations will be essential, as will promotion of inclusive discussions of research priorities and assignment of resources to close data gaps for critical species.

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## **WHY WE THINK THE FLORIDA CHAPTER OF THE WILDLIFE SOCIETY SHOULD INCLUDE INVASIVE EXOTIC ANIMALS IN THEIR MISSION**

In the spring of 2012, the Florida Exotic Pest Plant Council and the Florida Chapter of The Wildlife Society held a joint conference with an Invasive Wildlife talk session that was well-attended by and brought energy to both groups. This collaboration seemed natural and provided a place for invasive exotic animal information to be shared among people working statewide. This makes sense since those working on native wildlife and treating exotic plants both have opportunities to encounter exotic animals and know what looks out of place. During and following the joint conference, some members talked about adding invasive exotic animals to the FLEPPC mission and wondered whether FL TWS or FLEPPC would be the best place for exotic animal issues. A survey of FLEPPC members that asked if exotic animals should be added to the mission found that membership was 50/50 for and against. The matter has been tabled for now. We suggest it be reconsidered and, furthermore, we suggest it be considered a joint project of FLEPPC and FL TWS. We will explain why we think adding a focus on invasive exotic animals will benefit both groups and not detract from their other good work but will enhance it. We will address some of the concerns we have heard and hope to continue the discussion that began at last year's conference and make a bigger tent that we think will add energy to both groups.

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## **AFRICAN WILD DOG (*LYCAON PICTUS*) CONSERVATION IN KWAZULU-NATAL, SOUTH AFRICA: A VOLUNTEER'S PERSPECTIVE**

It is estimated there were over 500,000 African wild dogs (*Lycaon pictus*) in 39 African countries just one-hundred years ago. Today, the estimates are 3,000-5,000 individual animals in half as many countries, with less than 400 individuals in South Africa, of which approximately one-quarter are living in the KwaZulu-Natal region. Habitat loss and predator control are the two main reasons why the wild dog is listed as an endangered species by the IUCN, however additional challenges include loss of genetic diversity, inter-specific competition, poaching, and disease from domestic animals. Wildlife ACT was created in 2009 with the mission of providing wild dog monitoring for game reserves in South Africa. Currently, four game reserves utilize Wildlife ACT's services to monitor wild dogs and other species of interest – Hluhluwe-iMfolozi Park, Mkuze Game Reserve, Tembe National Elephant Park and Thanda Private Game Reserve. The dogs are collared and tracked on a daily basis. This intense monitoring is essential for following movement patterns, determining habitat utilization, gathering population demographics and responding to incidents of snaring, poaching, or escape. The information gathered by the Wildlife ACT monitors is directly used in management to plan pack introduction or removal strategies. This presentation will illustrate one volunteers' three-month experience with African wild dogs on four game reserves and the conservation efforts required to ensure their survival in the face of harsh challenges.

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## HOME RANGE SIZES FOR THE SOUTHEASTERN BEACH MOUSE (*PEROMYSCUS POLIONOTUS NIVEIVENTRIS*) ON THE KENNEDY SPACE CENTER AND CAPE CANAVERAL AIR FORCE STATION

The southeastern beach mouse (*Peromyscus polionotus niveiventris*) is one of seven subspecies of the old-field mouse that reside in the coastal ecosystems of Florida and Alabama. The Kennedy Space Center (KSC) and surrounding federal lands are the last strongholds for this subspecies, whose range has declined by 79%. While demography and population estimation data have been collected for this threatened mouse, home range sizes have never been determined. Forty five beach mice on KSC (23 males and 22 females) were fitted with a BD-2NC radiocollar from Holohil Systems Ltd. Fifteen mice were tracked in Summer 2008, 10 in Fall 2008, 10 in Winter 2008, and 10 in Spring of 2009. Home range size was determined using minimum convex polygon methodology. Home range sizes on KSC ranged 56m<sup>2</sup>- 3508m<sup>2</sup> for males and 237m<sup>2</sup>- 4573m<sup>2</sup> for females and varied by season. An additional 28 southeastern beach mice (11 males and 17 females) were radiocollared on Cape Canaveral Air Force Station in coastal scrub, dune, and strand habitat. Fourteen mice were tracked in Winter and Spring 2012. Home range sizes on CCAFS ranged 87m<sup>2</sup>- 8075m<sup>2</sup> for males and 99m<sup>2</sup>- 31820m<sup>2</sup> for females and varied by habitat and age.

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## THE ROLE OF THE US FISH AND WILDLIFE SERVICE IN FLORIDA GRASSHOPPER SPARROW (*AMMODRAMUS SAVANNARUM FLORIDANUS*) CONSERVATION

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The Florida Grasshopper Sparrow (FGSP) is a federally endangered subspecies endemic to the fire-maintained prairies of Florida. Over the last few years, FGSP populations have declined sharply on the three public lands that support them, and the FGSP has been elevated to a high-priority species for the U.S. Fish and Wildlife Service. The cause of the recent sharp decline is not known. With less than 15 percent of the Florida native prairie habitat remaining, and unknown status of FGSP populations on private lands, it is essential to determine what the population status is across the landscape; determine the causes of the sharp declines on public lands; and provide management recommendations for both public and private lands. The US Fish and Wildlife Service is involved with the Florida Grasshopper Sparrow Working Group (FGSWG), a public/private partnership, which has identified at least seven potential factors for the declines: altered fire regimes, nest predation by fire ants, land use (e.g., open grazing, prescribed grazing, ungrazed), biased sex ratio, inbreeding, disease, and altered hydrology. These factors may interact and vary among managed populations, but none have been experimentally evaluated in a way that allows site comparisons and interactive effects to be assessed. With the FGSP Working Group, the Service has developed a multi-faceted approach to prevent extinction of the sparrow, including research to identify threats, habitat and predator management, more extensive surveys, and captive propagation. So far, the Service has funded over \$1 million in projects to support population monitoring, habitat enhancement, and research projects over the past decade. With the help of the FGSWG, we are striving to develop and fund many more projects which are crucial to understanding FGSP declines and averting extinction through informed management strategies.

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## TESTING THE EFFECTS OF NON-LETHAL PREDATION RISK ON EASTERN BLUEBIRDS (POSTER)

Predation risk has long been recognized in ecology as a major evolutionary driving force. In recent years the non-lethal, or trait-mediated, effects of predation have gained increasing attention due to their importance on shaping the ecology of organisms. In this study, we experimentally tested the effects of non-lethal predation risk from a dangerous adult predator, the Cooper's hawk (*Accipiter cooperii*), on the reproductive investment and output of adult eastern bluebirds (*Sialia sialis*). We predicted birds with a heightened risk of predation will invest less energy into producing large clutches and more into personal survival, and thus produce fewer eggs than birds with a lower level of predation risk. We instead found that adults under a higher perceived predation risk increased their reproductive investment and output in both the first and second clutches. Discrepancies between predictions and results may have arisen from study site differences in human disturbance and food availability.

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## BIOLOGY AND STATUS OF THE FLORIDA GRASSHOPPER SPARROW

REED NOSS, University of Central Florida, Orlando, FL

The Florida Grasshopper Sparrow (FGSP) (*Ammodramus savannarum floridanus*) is endemic to the dry prairie of south-central Florida. Frequent fires ( $\leq 2$  years) are vital for maintaining its preferred habitat conditions of low shrub cover and tree density with patches of bare ground. Fire and seasonal flooding probably interact to maintain a mosaic of habitat conditions that shifts through space and time. Large patches of high-quality native dry prairie are apparently necessary to support viable populations of FGSP. The FGSP has been listed as Federally Endangered since 1986, with the primary cause being large-scale conversion of native prairies, mostly to "improved" (monoculture) pastures dominated by non-native grasses. Approximately 90% of the original Florida dry prairies have been lost, mostly since the 1950s. Little evidence exists that FGSPs can persist in improved pastures unless stable populations are present in nearby dry prairies. The cryptic nature of the FGSP and the presence in its habitat of the non-endangered migratory *pratensis* subspecies during the first month of the breeding season make it difficult to obtain precise population estimates, but  $<300$  are thought to remain. Currently most are found at Three Lakes Wildlife Management Area and Kissimmee Prairie Preserve State Park. FGSPs were formerly numerous at Avon Park Air Force Range, but very few remain there and that population appears to be functionally extirpated, with no breeding activity confirmed since 2009. The number surviving on private lands is unknown but thought to be small. FGSP populations on all public managed lands have declined dramatically in recent years, but the reasons are poorly understood. Hypotheses include: a breakdown of metapopulation dynamics, interactions between fire and hydrological regimes and climatic events, and the acceleration of the invasion of dry prairies by red imported fire ants (*Solenopsis invicta*), a known FGSP nest predator, involving interactions with prescribed fire and/or cattle grazing. Allee effects probably limit reproduction within the current low-density population. Given the FGSP's rapid decline and the small number remaining, captive breeding is being considered as a conservation tool. However, a better understanding of its management needs will be required if it is to persist in the wild.

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## FLORIDA PANTHER CONSERVATION: MANAGING RECOVERY IN THE FACE OF CONFLICT

The endangered Florida panther (*Puma concolor coryi*), once distributed across the southeastern United States, was reduced to an isolated, remnant population in southern Florida comprising as few as 10 individuals in the mid-1970's. Since 1978, intensive panther conservation efforts were directed towards ensuring the survival of this critically endangered population. These conservation efforts included habitat preservation, installation of wildlife crossings in highways, improved habitat management practices benefiting both panthers and their primary prey, and thorough biomedical assessments of individual panthers captured for ongoing research and monitoring studies that began in 1981. These early health assessments revealed that the Florida population was suffering from inbreeding depression, and demographic models predicted a 95% likelihood of extinction within 2 decades. In 1995 with the population numbering approximately 20-30 individuals, conservation managers initiated a genetic restoration program via the translocation of 8 female pumas (*P. c. stanleyana*) from Texas into habitat occupied by Florida panthers to increase depleted genetic diversity, improve population numbers, and reverse symptoms of inbreeding depression. Subsequent to this genetic restoration effort, panther numbers increased 4-fold, genetic heterozygosity doubled, survival and fitness measures improved, and inbreeding correlates declined significantly. Although these results are encouraging, persistent inbreeding, infectious agents, and possible habitat saturation pose new dilemmas. In spite of these persistent threats, the panther population growth over the past 30 years is an encouraging and desirable outcome of the aforementioned conservation efforts. However, panther population growth over the last decade has been associated with a concurrent increase in human-panther interactions, hobby livestock depredations, depredations on commercial livestock, and perceptions that game species have been declining as a result of the increasing panther numbers. These collateral impacts of successful panther conservation efforts have the potential to undermine certain stakeholder support for current and future conservation initiatives critical not only for maintaining the current population but also for facilitating and fostering population expansion north of the Caloosahatchee River that is an essential component of panther recovery.

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## PREVENTING TRACKING TUBE FALSE DETECTIONS IN OCCUPANCY MODELING OF SOUTHEASTERN BEACH MICE *PEROMYSCUS POLIONOTUS NIVEIVENTRIS*

Habitat occupancy of the southeastern beach mouse (*Peromyscus polionotus niveiventris*) is important for managing this threatened species throughout its limited range. Tracking tubes were used to detect the occurrence of beach mice in coastal habitat on the federal lands of the Kennedy Space Center, Cape Canaveral Air Force Station, and Canaveral National Seashore. Four other small mammal species ranges overlap with that of the southeastern beach mouse on the above listed lands: the Golden mouse (*Ochrotomys nuttalli*), cotton rat (*Sigmodon hispidus*), Florida mouse (*Podomys floridanus*), and cotton mouse (*Peromyscus gossypinus*). The most common of these in the coastal habitat is the cotton mouse. Due to this potential for overlap, each of these four species footprints



needed to be distinguished from those of the beach mouse. Because the tracking tube method relied on observations of footprints, detections of beach mice were confounded by the common occurrence of the cotton mouse, which has larger but slightly overlapping footprint sizes. Mice of all the above mentioned species were live trapped and footprinted using tubes to collect a baseline data base of footprints of known identity small mammals. These data were used to develop a Bayesian hierarchical model of the cut-off size at which a print could be assigned as beach mouse with a known probability of error (this was done only for beach mice and the cotton mouse). We explored the use of the estimated cut-off size using occupancy models which allow for false positive detections, and found that the use of the cut-off size performed well.

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## **WILDLIFE CONSERVATION, PRIORITIZATION, AND RECOVERY (WCPR) – AN APPROACH TO IMPERILED SPECIES CONSERVATION ON STATE LANDS**

Good wildlife management begins with sound natural communities management. Monitoring select focal species allows a manager to ensure habitat management is having the desired effect on wildlife. The Florida Fish & Wildlife Conservation Commission (FWC) takes a proactive, science-based approach to species management on lands in the Wildlife Management Area (WMA/WEA) system. This conservation planning approach integrates the results of potential habitat models and population viability analysis (PVA) to help determine where to affect focal species conservation. Staff uses the results of the landscape level models, input from species experts, and input from people with knowledge of the area to create site-specific wildlife assessments for a number of focal species. We then combine these assessments with species-specific management considerations to develop a wildlife management strategy for the area. As of March 2013, the FWC has developed wildlife strategies covering 38 properties. These strategies have resulted in a number of on-the-ground projects. Some highlights include initiating select wildlife monitoring surveys on WMAs, a scrub management research project, and a number of habitat restoration and enhancement actions. Further, when allocating annual resources, FWC staff gives priority to actions identified in these strategies. While still early in the implementation of this program, these projects are good indicators of the potential to affect focal species management. By implementing natural community management informed by a formal wildlife strategy, the FWC will ensure we meet the management needs of Florida's wildlife.

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## **CONSERVING FLORIDA'S LISTED AMPHIBIANS AND REPTILES**

There are 16 amphibians and reptiles listed as Threatened or Species of Special Concern (SSC) in Florida, but after recent evaluations under newly adopted listing criteria, the listing statuses of many will change. In 2010, the Florida Fish and Wildlife Conservation Commission (FWC) adopted new imperiled species listing criteria based on International Union for Conservation of Nature Red List categories and criteria. All listed species were evaluated by teams of staff biologists and external experts to consider threats to the species and determine whether the species warranted continued listing.

After the evaluations, staff developed recommendations to change or retain the species' listing status. The recommendations included removing 2 amphibians and 5 reptiles from the list, while listing all of the other species as Threatened. Although the recommendations were approved in 2010, the listing status of the species will not change until the management plan is finalized for all 16 species in 2015. In 2011, staff began working with stakeholders to draft management plans for all of these species, whether or not delisting was recommended. Plans have been drafted for all 16 species. These plans include recommendations for habitat management, research, monitoring, and outreach. Implementing the plans will require a collaborative approach. This overview of our progress is presented as an invitation to partner with us to conserve these species.

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## **NEST SUCCESS AND ADULT SURVIVAL OF FEMALE FLORIDA MOTTLED DUCKS**

Survival of adult females and nests are two of the most important vital rates affecting population growth rates of ducks. Waterfowl populations can be more efficiently and effectively managed when information about these survival rates, and how they vary across space and time, is available. The mottled duck consists of two genetically distinct populations. The range of the western sub-species (*Anas fulvigula maculosa*) extends along the Gulf Coast between Alabama and Mexico. The Florida sub-species (*A. f. fulvigula*), the state's only endemic duck, resides primarily in peninsular Florida. Loss of historic habitats is one of the greatest threats to many species of waterfowl, but some species have adapted to disturbed or altered habitats. Nearly half of Florida's mottled ducks may use and nest in urban habitats, but estimates of reproductive success and survival of individuals using these areas are generally lacking. Moreover, much of interior Florida has been converted for agricultural and livestock production. In south Florida, mottled ducks are known to nest in pastures, citrus groves, sugarcane, and other agricultural fields, but we know very little about the success of females using these altered areas. In this study, we used abdominally-implanted radio transmitters to estimate daily nest survival rates of adult female Florida mottled ducks in altered urban and rural habitats to help assess how loss of historical habitats may impact nesting success. We also compared annual and seasonal survival rates of those females that used urban habitats to those that did not. Our results indicated that nest survival did not vary between study sites and that nest age at discovery was positively correlated with daily nest survival. Our data also indicated that survival varied among seasons, years, and habitat types. Our nest survival estimate of 29% is among the highest reported for mottled ducks and nearly double the 15% estimate reportedly required to maintain stable mid-continent mallard populations. Additionally, annual survival of ducks that used urban habitats was high. Our results suggest that mottled ducks in Florida have adapted well to loss of historical habitats.

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## **IMPERILED SPECIES CONSERVATION IN SOUTH FLORIDA**

The South Florida Ecological Services Office (Office) has primary federal responsibility for conserving the natural plant and animal communities in South Florida. There are 68 federally protected plant and animal species in the Office's area of operations, which encompasses 26,000 square miles across 19 counties. Because of the abundance of threatened and endangered species in the Everglades ecosystem, the Office has a major role implementing the Comprehensive Everglades Restoration Plan (CERP) and the related Central Everglades Planning Project (CEPP). The Office faces several challenges while striving to conserve imperiled species and restore the Everglades. These challenges include: budget cuts; urbanization/population growth; sea level rise; invasive species; poaching; need to develop alternative energy sources; complicated conservation challenges (Florida panthers, Florida grasshopper sparrows, sea turtles, manatees, Schaus swallowtail butterfly, Everglade snail kite, and more). More listed species are coming: 1) we are at various phases of evaluating 19 imperiled South Florida species to determine if they warrant listing under the Endangered Species Act (Timeline: 2011-2016) and 2) we were petitioned to evaluate another 19 aquatic species and herps (Timeline: 2016+). Fortunately, we've been able to offset these challenges with some success stories: American Prime; Picayune Strand; Coastal Program partnerships and funding; four large non-native constrictors listed under Lacey Act; livestock depredation study; Florida's first roadside automated detection system; new Florida panther population model; resolving litigation addressing listed species conservation in Florida Keys. Based on lessons learned, our work in the future will be based on these principles: 1) better conservation planning, 2) better partnerships, 3) functional landscapes, 4) ambitious and innovative science.

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## **EXPANDING PROTECTION OF ECOSYSTEM SERVICES ON AGRICULTURAL LANDS IN THE U.S.- U.S. FARM BILL AND REGULATION CONSIDERATIONS**

Ecosystem services that people depend upon for their well-being are being lost at an alarming rate. These services include the provisioning of natural resources, food, medicine, flood protection, climate regulation, water purification, and biodiversity retention. In the U.S., the main threat to these services comes from the rapid pace of land conversion. In just a twenty-year period, an area the size of the State of Illinois of farmland, wildlife habitat, and open space was converted to urban, suburban, or industrialized uses. The majority of land in the U.S. is privately owned and maintained in some form of agriculture. These lands are essential to providing the ecosystem services people and wildlife depend on for the basic necessities of life. This paper examines what can be done to expand the protection of ecosystem services on agricultural lands to provide for the well-being of the nation, while maintaining an economically viable agricultural industry. It provides options for 1) improving existing conservation programs, 2) increasing landowner participation in conservation programs, and 3) increasing the use of better environmental practices on agricultural lands, regardless of program participation.

Findings from this research show that current conservation programs are effective in reducing impacts and are even improving ecosystem services; but their reach is limited, applications can be cumbersome, landowner understanding and acceptance is highly variable, and implementation could be more effective. Combining and streamlining current conservation programs has the potential for large cost savings while simultaneously making the programs easier for landowners to comprehend. This should result in both increased desire on the part of landowners to enroll, and increased capacity for enrollment. An increase in cross-compliance requirements or shifting funds from commodity support payments to conservation payments would provide even greater capacity, while still providing income support to the agricultural sector. Finally, consideration should be given to fining landowners who cause excessive ecosystem damage. This would be a revenue neutral program where the funds received from these measures would be allocated to conservation programs. Costs of these measures should be sufficiently high to encourage investment in better conservation practices.

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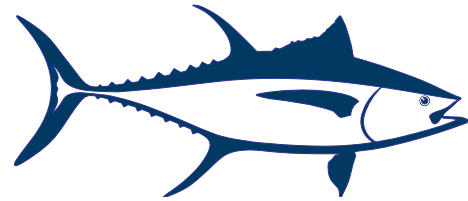
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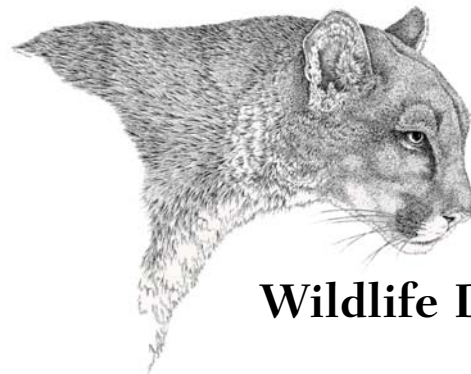


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**Wildlife Drawings**

*by Jim Wilson*

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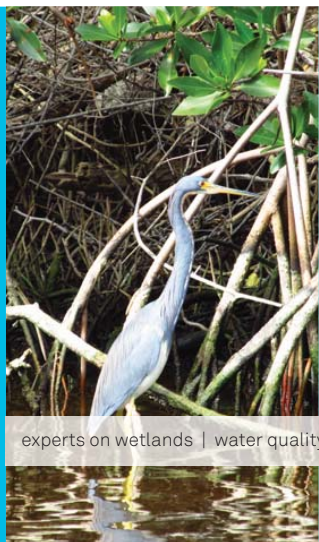
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