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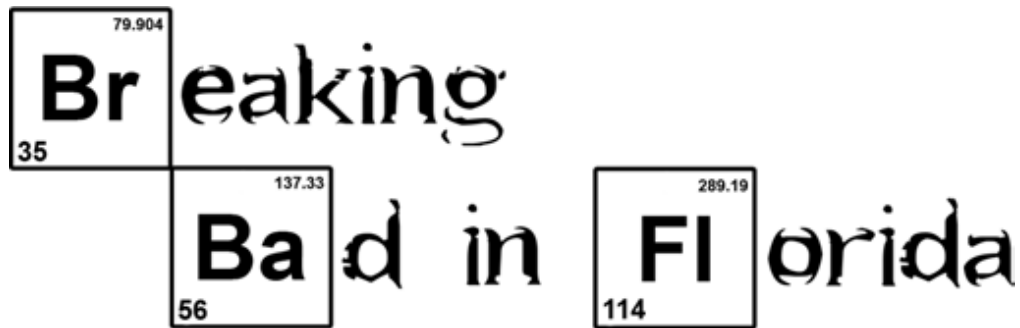


gaining ground on invasive plants  
and wildlife in the 21st century





# Presidents' Message



Welcome to the Florida Chapter of The Wildlife Society (FLTWS) and the Florida Exotic Pest Plant Council (FLEPPC) joint 2014 Spring Conference. This event marks the second time that FLEPPC and FLTWS have teamed up to coordinate our annual meetings, and we are optimistic that this opportunity will help our collective members more effectively meet the challenges that natural areas managers in our state face. Florida, along with California and Hawaii, confront the biggest environmental issues within the United States, including impacts from global climate change and invasion from non-native species, all the while managing an ever-growing human population. This year's theme, **Breaking Bad in Florida: Gaining Ground on Invasive Plants and Wildlife in the 21st Century**, offers a great forum to exchange information about these environmental issues, and how we, as a conservation community, manage for sustainability and find success in our efforts.

Successful efforts range from something as simple as inspiring a group of children to conduct an Air Potato Roundup at their school, to something as complex as the coordinated effort to eradicate an invasive species like the sacred ibis. However, all of these successes have a common component: partnerships. Over the last ten years, numerous state and "grass roots" partnerships have evolved around the need to manage invasive plants and wildlife in Florida's natural areas.



One such effort, the Florida Invasive Species Partnership (FISP), was developed in 2008 to determine the best ways to assist private landowners with invasive species management on their properties and coordinate these efforts with those on adjacent public lands. In 2008, FISP developed an interactive Incentive Program Database for landowners to use through the [FloridaInvasives.org](http://FloridaInvasives.org) website, which provides a list

# Presidents' Message



of technical and financial assistance programs suited to the individual. In 2009, the FISP Resolution was developed. This document outlined the goals and objectives of the partnership and was signed by leadership from 19 state, federal and NGO partners.

By 2013, FISP had assisted with the establishment of 18 Cooperative Invasive Species Management Areas (CISMAs) in Florida, which now cover 97% of the state. With the development of regional CISMAs, came

the development and implementation of some great innovative tools and training. Tools such as the Early Detection & Mapping System (EDDMapS) have enabled us to visualize the extent of invasion across the landscape, determine the presence of new exotic species and set priorities for management. Training in large constrictor identification and handling has enabled us to monitor the spread of these invasive reptiles and develop response networks to assist with their management with the goal of removing as many as possible from public and private natural areas.

We hope you will take advantage of this unique opportunity to meet new friends and share ideas with professionals and students, as well as enjoy time with old friends.

Thanks for participating, and have a great conference.

## Erin P. Myers

President, Florida Chapter of The Wildlife Society



FLORIDA CHAPTER

## Dennis Giardina

Chair, Florida Exotic Pest Plant Council



# Br eaking Ba d in Fl orida



## Florida Chapter of The Wildlife Society Executive Board 2013-2015

President: **Erin Myers**

President-Elect: **Becky Bolt**

Past-President: **Dale Gawlik**

Treasurer: **Kristee Booth**

Secretary: **Stefanie Nagid**

Member-at-Large: **Holly Ober**

Member-at-Large: **Larame Ferry**

Southeastern Representative: **Patrick Delaney**

Student Chapter President: **Lauren Watine**



## Florida Chapter of The Wildlife Society Committee Chairs

Audit: **Alan Alshouse**

Awards Review: **Tim O'Meara**

Certification: **Bill Giuliano**

Conservation Review, Resolutions and Public Statements:  
**Becky Bolt**

Education and Information: **Jodie Gless**

Fundraising: **Larry Perrin** and **Mark Ausley**

Membership: **Phillip Brouse**

Nominating and Elections: **Steve Rockwood**

Program: **Stefanie Nagid**

Scholarship: **Holly Ober**

Website: **Mike Milleson**



Photos by J. Exum





## **Florida Exotic Pest Plant Council Board of Directors and Officers 2013-2014**

Chair: **Dennis Giardina**

Chair-Elect: **Sherry Williams**

Past-Chair: **Jim Burch**

Treasurer: **Dianne Owen**

Secretary: **Aimee Cooper**

Editor: **Karen Brown**

Directors: **Geof Lane**

**Christen Mason**

**Michael Meisenburg**

**Cheryl Millett**

**Billy Snyder**

**Gayle Edwards**

## **Florida Exotic Pest Plant Council Committee Chairs**

Bylaws: **Mike Renda**

Control and Evaluation: **Salvador Medina**

Editorial: **Karen Brown**

Education Grant: **Jennifer Possley**

Finance: **Ellen Donlan**

Legislative: **Matthew King**

Local Arrangements: **Sherry Williams**

Membership: **Sherry Williams**

Merchandise: **Billy Snyder**

Nominations: **Jim Burney**

Outreach: **Christen Mason**

Plant Industry Liaison: **Sandra B. Wilson**

Plant List: **Patricia L. Howell**

Research Grant: **Jim Cuda**

Symposium Program: **Karen Brown and Sherry Williams**

Symposium Field Trips: **Keith Morin**

Vendor: **Michael Meisenburg and Aimee Cooper**

Website: **Chuck Barger**

NA-EPPC Representative: **Matthew King**

SE-EPPC Representative: **Karen Brown**

## **2014 Spring Conference Committee**

Program Committee: **Stefanie Nagid, Erin Myers, Becky Bolt, Sherry Williams, Cheryl Millett**

Field Trips: **Keith Morin**

Technical Papers: **Paul Moler**

Student Paper Judging: **Becky Bolt, Karen Brown**

Poster Session: **Eric Tillman**

Continuing Education and Certification Credits: **Keith Morin, Erin Myers, Patrick Delaney**

Audio/Visual: **Mike Milleson, Patrick Delaney, Eric Tillman**

Registration: **Kristee Booth, Christen Mason**

Photography: **Jodie Gless**

Website: **Mike Milleson**

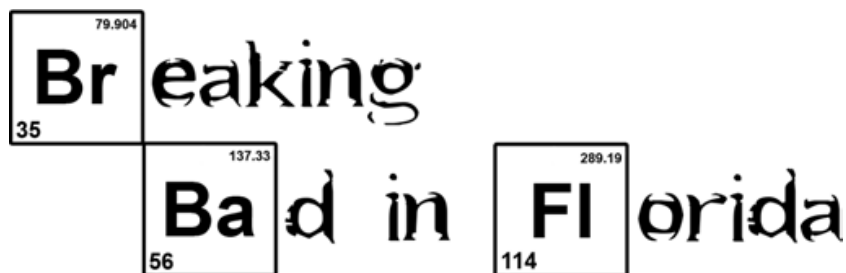
FaceBook: **Larame Ferry, Erin Myers**

Program Printing: **Karen Brown, Stefanie Nagid, Charlie Bogatescu**

Sponsors/Door Prizes: **Larry Perrin, Mark Ausley, Aimee Cooper, Michael Meisenburg, Christen Mason, Tony Pernas, Kristee Booth, Patrick Delaney, Arnold Brunell**

UF WEC & Student Coordination: **Holly Ober, Patrick Delaney, Samantha Baraoidan**

Fundraising: **Larry Perrin, Mark Ausley, Kristee Booth, Patrick Delaney, Aimee Cooper, Michael Meisenburg, Christen Mason**



## Continuing Education Units

In order to receive CEUs during the FLTWS-FLEPPC Conference you must do the following:

- Attend Conference Sessions that have been approved for CEUs.
- Sign in at the beginning of each session. This means before the speaker begins speaking. You may have to arrive a few minutes early in order to not interrupt the speaker. Please be courteous.
- Stay in the room throughout the session. While we highly recommend visiting our vendors and sponsors, please do not do this while you are trying to earn CEUs.
- At the end of each session, check out with the CEU provider at the back of the room and pick up your CEU sheets. Do not leave and then come back later and say that you forgot to pick up your sheet. We will be forced to conclude that you left early and were not present when everyone else in the session picked up their CEU sheet.
- Do not argue with the CEU provider!

Program	Time	Program #	Forest Pests	Natural Area	Right-of-way	Demo & Research	Maximum CEUs
<b>Monday, April 28<sup>th</sup></b>							
Symposium	1:00 - 3:00pm	17574	2	2	2		2
<b>Tuesday, April 29<sup>th</sup></b>							
Plenary	9:00 - 11:50am	17575	2	2	2		2
Technical Session 1	1:30 - 3:10pm	17576	1.5	1.5	1.5		1.5
Technical/Student Session 3*	3:30 - 5:10pm	17579	1.5	1.5		1.5	1.5
Technical Session 4*	3:30 - 5:10pm	17580	1.5	1.5	1.5		1.5
<b>Wednesday, April 30<sup>th</sup></b>							
Technical Session 6	8:20 - 10:00am	17581	1.5	1.5	1.5		1.5
Field Trip: Wall Springs*	12:00 - 4:00pm	17583	1.5	1.5			1.5
Field Trip: City of Largo Parks*	12:00 - 4:00pm	17584	1.5	1.5	1.5		1.5
Field Trip: Terra Ceia State Park*	12:00 - 4:00pm	17585	1.5	1.5	1.5		1.5
Field Trip: Cypress Creek*	12:00 - 4:00pm	17586	1.5	1.5	1.5		1.5
<b>Thursday, May 1<sup>st</sup></b>							
Technical Session 8	9:00 - 10:40am	17582	1.5	1.5	1.5		1.5

The conference has a maximum number of 11.5 CEUs available due to concurrent technical sessions and field trips.

# Agenda Summary

## Monday, April 28, 2014

- 10:00am - 5:00pm Registration (Baranoff Lobby)
- 10:00am - 5:00pm Vendor/Poster Setup (Four Springs Ballroom)
- 9:00am - 12:00pm FLEPPC Board and Task Force Meeting (Athena Room)
- 12:00pm - 1:00pm Lunch (on your own)
- 1:00pm - 3:00pm Symposium Helping the Public Help Us with Pesky Plants and Wildlife (Baranoff Ballroom)
- 3:00pm - 3:30pm Networking Break (Four Springs Ballroom)
- 3:30pm - 5:30pm FLTWS Business Meeting (Baranoff Ballroom)
- 6:30pm - 8:30pm Welcome Social (poolside)

## Tuesday, April 29, 2014

- 8:00am - 5:00pm Registration (Baranoff Lobby)
- 8:00am - 5:00pm Vendor/Poster Setup (Four Springs Ballroom)
- 8:30am - 9:00am Welcome Addresses (Baranoff Ballroom)
- 9:00am - 11:50am Plenary Session (Baranoff Ballroom)
- 10:30am - 10:50am Networking Break (Four Springs Ballroom)
- 11:50am - 1:30pm Lunch (on your own)
- 1:30pm - 3:10pm Technical Session 1 (Baranoff Ballroom)
- 1:30pm - 3:10pm Technical Session 2 (East Room)
- 1:30pm - 5:00pm CISMA Workshop (Athena Room)
- 3:10pm - 3:30pm Networking Break (Four Springs Ballroom)
- 3:30pm - 5:10pm Technical/Student Session 3 (Baranoff Ballroom)
- 3:30pm - 5:10pm Technical Session 4 (East Room)
- 6:00pm - 10:00pm DJed Reception (poolside)
- 7:00pm - 10:00pm Pier Fishing Tournament (next to hotel; register in Baranoff Lobby)

## Wednesday, April 30, 2014

- 8:00am - 5:00pm Registration (Baranoff Lobby)
- 8:00am - 5:00pm Vendor/Poster Setup (Four Springs Ballroom)
- 8:20am - 10:00am Student Session 5 (Baranoff Ballroom)
- 8:20am - 10:00am Technical Session 6 (East Room)
- 10:00am - 10:20am Networking Break (Four Springs Ballroom)
- 10:20am - 12:00pm Student Session 7 (Baranoff Ballroom)
- 10:20am - 12:00pm IPMA Meeting (East Room)
- 12:00pm Lunch (boxed lunch provided for all attendees)
- 12:00pm - 4:00pm Field Trips (off-site; pre-register)
- 5:00pm - 7:00pm Poster Session and UF Alumni and Friends Reception (Four Springs Ballroom)
- 7:00pm - 10:00pm Banquet Dinner and Awards Ceremony (Baranoff Ballroom)

## Thursday, May1, 2014

- 8:30am - 9:00am FLEPPC Business Meeting (Baranoff Ballroom)
- 9:00am - 11:00am FLTWS Conservation Tool Discussion (Baranoff Ballroom)
- 9:00am - 10:40am Technical Session 8 (East Room)

# Symposium Presentations

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**Monday, April 28, 2014**  
**1:00 pm – 3:00 pm**

**Baranoff Ballroom**

## **HELPING THE PUBLIC HELP US WITH PESKY PLANTS AND WILDLIFE**

### **WELCOME AND INTRODUCTIONS**

1:00 pm - 1:05 pm

**Becky Bolt**

President Elect, Florida Chapter of The Wildlife Society



### **HUMAN DIMENSIONS OF NONNATIVE WILDLIFE MANAGEMENT: EXAMPLES OF UTILIZING PUBLIC INVOLVEMENT AS A CONTROL TOOL**

1:05 pm - 1:25 pm

**Jenny Ketterlin Eckles**

Florida Fish and Wildlife Conservation Commission



### **RIDGE RANGER VOLUNTEER PROGRAM**

1:25 pm - 1:45 pm

**Bill Parken**

Florida Fish and Wildlife Conservation Commission





# Symposium Presentations



## **AN UPDATE FROM THE FRONT LINE – EVERGLADES COOPERATIVE INVASIVE SPECIES MANAGEMENT AREA**

1:45 pm - 2:05 pm

**Antonio J. Pernas**

National Park Service

**Dennis J. Giardina**

Florida Fish and Wildlife Conservation Commission



## **CONTROLLING AIR POTATO WITH THE HELP OF VOLUNTEERS**

2:05 pm - 2:25 pm

**Sherry A. Williams**

Seminole County



## **HUMAN DIMENSIONS OF NONNATIVE WILDLIFE MANAGEMENT: THE EXOTIC PET AMNESTY PROGRAM AND EXOTIC SPECIES REPORTING HOTLINE**

2:25 pm - 2:45 pm

**Liz Barraco**

Florida Fish and Wildlife Conservation Commission



2:45 pm - 3:00 pm

**Panel Discussion**

# Plenary Presentations

**Tuesday, April 29, 2014**  
**8:30 am – 11:50 am**

**Baranoff Ballroom**

## **Breaking Bad in Florida: Gaining Ground on Invasive Plants and Wildlife in the 21st Century**

8:30 am - 9:00 am

**Welcome Addresses from Dennis Giardina, Florida Exotic Pest Plant Council Chair  
and Erin Myers, Florida Chapter of The Wildlife Society President**

9:00 am – 9:30 am

### **Gaining Ground on Invasive Species through Media**

**Jeff Klinkenberg – Florida Cultural Writer, Tampa Bay Times**

Jeff Klinkenberg grew up in Miami and began exploring the Florida Keys and the Everglades as a small boy. He started working at The Miami News when he was 16 and later became a graduate of the University of Florida. He has been an adjunct instructor in the University of Florida's College of Journalism, and is a member of the journalism college's "Hall of Fame." He is the writer-in-residence for the University of South Florida's "Florida Studies" program, and has authored several books about Florida's Culture, including *Alligators in B-Flat*, *Pilgrim in the Land of Alligators* and *Seasons of Real Florida*. He has worked at the newspaper formerly known as the St. Petersburg Times since 1977. The American Association of Sunday Features Editor twice has selected a body of his work as the best in the nation. He also is a two-time winner of the Paul Hansell Distinguished Journalism Award, the highest honor in state journalism, given annually by the Florida Society of Newspaper Editors.



9:30 am – 10:00 am

### **Gaining Ground on Invasive Species through Legislation**

**Manley Fuller – President, Florida Wildlife Federation**

Manley K. Fuller completed a Master's Degree in Wildlife Biology at North Carolina State University, followed by a five-year employment with the National Wildlife Federation (NWF) as a Wetlands and Wildlife Specialist in their Southeastern Natural Resources Center. Between 1989 and 1992, he served as a Florida House Speaker appointee member of both the Cross Florida Greenway Commission and the Florida Greenways Commission. In 1994 and 1996 he represented the Florida Wildlife Federation (FWF) in support of Constitutional Amendment Campaigns relating to the removal of gill nets from Florida's salt waters and a polluter pay amendment to the Florida Constitution. In 2007, he was appointed by the US Secretary of the Interior to serve on the Off-Road Vehicle Management Advisory Committee for the Big Cypress National Preserve; and appointed by Governor Charlie Crist to the Action Team on Energy and Climate Change. Mr. Fuller now serves as President of the (FWF) and is a registered lobbyist with both the Florida Legislature and the Executive Branch of Florida state government working on behalf of FWF. His work with the FWF involves many aspects of wildlife and habitat conservation across the state, including representation on the Florida Conservation Coalition, leadership in Florida's Water and Land Legacy Constitutional Amendment Campaign, and engagement with the Stronger Safer Coalition in Florida and the Smarter Safer Coalition in Washington, DC. Since 1993, he has received numerous awards for his conservation efforts in Florida, including the 2007 FLTWS Dr. Herb Kale Award.



# Plenary Presentations

10:00 am – 10:30 am

## **Gaining Ground on Invasive Species through Private Lands Management**

David “Lefty” Durando – Owner/Rancher, Okeechobee Partners Ranch

Lefty Durando, was born in Dade County, Florida, but has resided in Hardee County for the past 42 years. During this time, he married the former Jane Carlton, became involved in the ranching way of life, raised two children and helps raise two granddaughters. Today, they continue this family tradition with their commercial cow/calf operation in Okeechobee County. Mr. Durando believes conservation is of vital importance in our great state of Florida, as well as across our nation, and as such, is a member of the Northern Everglades Alliance, board member of Wildlands Conservation, and board member of Partners for Conservation. He has traveled numerous times to Washington, D.C. meeting with members of Congress and their staffs to promote conservation efforts, such as the USDA Farm Bill, Land and Water Conservation Fund, the Everglades Headwaters National Wildlife Refuge and Conservation Area, the Fisheating Creek Wildlife Refuge concept and the potential expansion of the Panther Refuge.



10:50 am – 11:20 am

## **Gaining Ground on Invasive Species at Archbold Biological Station**

Hilary Swain – Executive Director, Archbold Biological Station

Hilary Swain earned her PhD. in Zoology in 1981 from University of Newcastle Upon Tyne. Following her PhD., she worked for the government conservation agency in the United Kingdom, and then moved to the US as an Associate Professor in the Biology Department at Florida Institute of Technology in Melbourne, Florida. Since 1995, Hilary Swain has served as the Executive Director of Archbold Biological Station, an independent non-profit research facility, which conducts extensive ecological research on its 8,840-acre scrub preserve on the Lake Wales Ridge and at its 10,500-acre working cattle ranch, the MacArthur Agro-ecology Research Center (MAERC). Dr. Swain's research interests are: preserve design, land management, and planning for natural communities and endangered species. She plays a key role in extensive liaison with local, state, and federal agencies, and private landowners statewide, building a bridge to the environmental communities of Florida.



11:20 am – 11:50 am

## **Gaining Ground on Invasive Species through Education and Outreach**

Ken Langeland – Professor, Agronomy, University of Florida

Ken Langeland earned his PhD. in Agronomy, Weed Science, at the University of Florida in 1982. Following his PhD., he became an Assistant Professor at NCSU and then at the University of Florida. Currently he is a Professor of Agronomy with the University of Florida, but soon to be Professor Emeritus. His career research has emphasized applied research and to a lesser extent basic research to solve practical problems related to management and understanding of aquatic and non-cropland weeds. While Assistant Professor at NCSU, his research targeted the three most problematic aquatic and non-cropland weeds in North Carolina: multiflora rose (non-cropland pastures) and hydrilla (aquatic), and alligatorweed (aquatic). His research data was key to developing successful management programs for these species in the state and by implementing management practice recommendations derived from this research, alligatorweed was brought under successful maintenance control. Dr. Langeland develops and implements UF Extension workshops and training for professionals, as well as Educational Programs for the general public related to aquatic plants, pond management, and invasive plants are conducted. He has served on the board and/or committees of 7 professional societies since 1985, and received numerous awards and honors in Weed Management Science. During his career he has published over 100 articles and authored, or been involved with, several books.





# Technical Sessions

## Technical Session 1 – Baranoff Ballroom Tuesday, April 29, 2014 – 1:30pm-3:10pm

- 1:30 – 1:50     **Effect of combinations of glyphosate and 2,4-D on torpedograss (*Panicum repens*) at Florida Fish and Wildlife's Okaloacoochee Slough Wildlife Management Area in Hendry County, Florida.** J. McCollom, K. Langeland, J. Hutchinson, and E. Leone
- 1:50 – 2:10     **Selective herbicides and herbicide treatments for control of Chinese tallow (*Triadica sebifera*).** G. MacDonald, K. K. Bohn, and H. VanHeuveln
- 2:10 – 2:30     **Selective control of invasive exotic grasses.** S. G. Richardson
- 2:30 – 2:50     **Collaborative efforts for managing melaleuca in the Cienega de Zapata, Cuba.** R. Diaz, W. A. Overholt, D. Giardina, R. Myers, F. Nuñez, C. Bergh, J. Luis Jimenez, D. Salabarría Fernandez, and P. Pratt
- 2:50 – 3:10     **Using a bioblitz to collect data on species diversity and create enthusiasm for natural lands protection.** J. H. Exum

## Technical Session 2 – East Room Tuesday, April 29, 2014 – 1:30pm-3:10pm

- 1:30 – 1:50     **Understanding people's willingness to implement measures to manage human-bear conflict in Florida.** E. F. Pienaar, D. Telesco, and S. Barrett
- 1:50 – 2:10     **Mexican red-bellied squirrel eradication efforts in Biscayne National Park.** T. Pernas and A. McKinley
- 2:10 – 2:30     **Evaluation of methods for efficiently assessing mercury concentrations in American alligator (*Alligator mississippiensis*) muscle tissue.** A. M. Brunell, J. P. Delaney, T. Lange, E. Leone, D. Richard, and G. DelPizzo
- 2:30 – 2:50     **Impacts of feral pig disturbance on depression marshes: A look at nitrogen and phosphorus fluxes.** C. A. Gates and M. W. Clark
- 2:50 – 3:10     **Getting to zero: Methods and technologies used to control feral hog populations in Nature Conservancy preserves in Hawaii.** T. Menard and T. C. Menard

## CISMA Workshop – Athena Room Tuesday, April 29, 2014 – 1:30pm-5:00pm

# Technical Sessions

## Technical/Student Session 3 – Baranoff Ballroom Tuesday, April 29, 2014 – 3:30pm-5:10pm

- 3:30 – 3:50     **Invasion risk of bamboo species in Florida.** D. Lieurance, D. Gordon, A. Cooper, S. L. Flory
- 3:50 – 4:10     **Update on *Praxelis clematidea*; a new exotic in Florida.** K. A. Williges
- 4:10 – 4:30     **An update on the search for biological control agents of cogongrass.** W. A. Overholt, J. P. Cuda, J. A. Goolsby, A. Racelis, B. P. Le Ru, K. Takasu, A. M. Burrell, and P. E. Klein
- 4:30 – 4:50     **Quantity vs. quality: Experimental evaluation of cogongrass (*Imperata cylindrica*) propagule pressure on establishment success.** J. Estrada, J. Nesmith, and S. L. Flory (STUDENT)
- 4:50 – 5:10     **Remote sensing the 3-dimensional structural impacts of Old World climbing fern (*Lygodium microphyllum*).** A. Maldonado (STUDENT)

## Technical Session 4 – East Room Tuesday, April 29, 2014 – 3:30pm-5:10pm

- 3:30 – 3:50     **Does plant sex affect the performance of the stem boring weevil *Apocnemidophorus pipitzi* (Coleoptera: Curculionidae) on its host plant Brazilian peppertree?** J. P. Cuda, J. L. Gillmore, J. C. Medal, and W. A. Overholt
- 3:50 – 4:10     **Host specificity reveals that the gall-forming psyllid, *Calophya latiforceps* (Hemiptera: Calophyidae), is safe to release for biological control of Brazilian peppertree (Anacardiaceae).** R. Diaz, V. Manrique, W. A. Overholt, J. E. Muiyaneza, V. G. Sengoda, S. Adkins, P. D. Roberts, and J. P. Cuda
- 4:10 – 4:30     **Understanding the temperature requirements and overwintering of the air potato leaf beetle *Lilioceris cheni* will improve release efforts and establishment in Florida.** V. Manrique, R. Diaz, M. C. Smith, E. C. Lake, P. D. Pratt, J. Mass, K. Bowers, S. Hight, and W. A. Overholt
- 4:30 – 4:50     **Local rules: How to regulate the unbannable.** A. Higgins
- 4:50 – 5:10     **Representing hydrologic variability in colonial waterbird models: Key processes for wetland ecosystem restoration and management.** D. E. Gawlik

# Technical Sessions

## Student Session 5 – Baranoff Ballroom

Wednesday, April 30, 2014 – 8:20am-10:00am

- 8:20 – 8:40     **The effect of red-imported fire ants on eastern fence lizard recruitment and survival.** A. K. Long, L. L. Smith, L. M. Conner, and R. A. McCleery (STUDENT)
- 8:40 – 9:00     **Fire ants in sea-turtle nesting areas: a distribution analysis of invasive ants in South Florida, USA, and St. Croix, USVI.** D. K. Romais, K. Balkaran, and J. K. Wetterer (STUDENT)
- 9:00 – 9:20     **Habitat ecology of the Florida scrub jay (*Aphelocoma coerulescens*) in Sarasota County, Florida.** M. C. Marquez (STUDENT)
- 9:20 – 9:40     **The effects of moon phase and habitat availability on the abundance of foraging wading birds in intertidal areas.** L. Calle and D. E. Gawlik (STUDENT)
- 9:40 – 10:00    **Habitat preferences and biodiversity of small mammals in southern African savannahs.** S. Baraoidan and R. A. McCleery (STUDENT)

## Technical Session 6 – East Room

Wednesday, April 30, 2014 – 8:20am-10:00am

- 8:20 – 8:40     **Engaging homeowners to remove invasive species through an expert panel forum.** G. Milch and T. Sudol
- 8:40 – 9:00     **Update of FFWCC Upland Exotic Invasive Plant Management Program.** J. C. Smith, L. King, R. Cleary and R. Clark
- 9:00 – 9:20     **Using ultrahigh-resolution aerial imaging and high-precision aerial herbicide application to control Australian tree fern, *Cyathea cooperi*, in Wainiha Valley, Kaua'i, Hawaii.** T. Menard and T. C. Menard
- 9:20 – 9:40     **2014 Update on the Invasive Plant Management Association (IPMA).** J. L. Burney, Jr.
- 9:40 – 10:00    **Hydrilla IPM Starting a Statewide Extension Project.** K. T. Gioeli, J. Cuda, J. Gillett-Kaufman, and V. Lietze



# Technical Sessions

## Student Session 7 – Baranoff Ballroom

Wednesday, April 30, 2014 – 10:20am-12:00pm

- 10:20 – 10:40 **Control of Mexican petunia with revegetation.** A. M. Smith, C. R. Adams, S. B. Wilson, and C. Wiese (STUDENT)
- 10:40 – 11:00 ***Pomacea maculata* spatio-temporal grazing impact model on *Vallisneria americana* in South Florida.** D. Monette, S. Markwith, R. Salter, E. Noonburg, and S. Ewe (STUDENT)
- 11:00 – 11:20 **A comparison of four methods for detecting fox squirrels in the southeastern U.S.** D. U. Greene, L. M. Wagner, and R. A. McCleery (STUDENT)
- 11:20 – 11:40 **What is causing the decline of marsh rabbits in the Everglades?** A. R. Sovie and R. A. McCleery (STUDENT)
- 11:40 – 12:00 **Understanding the distribution of an aquatic rodent in the wetlands of Florida.** R. McCleery and C. Faller (STUDENT)

## Invasive Plant Management Association Meeting – East Room

Wednesday, April 30, 2014 – 10:20am-12:00pm

## Field Trips – See Following Pages

Wednesday, April 30, 2014 – 12:00pm-4:00pm

## Poster Session – Four Springs Ballroom

Wednesday, April 30, 2014 – 5:00pm-7:00pm

## FLEPPC Business Meeting – Baranoff Ballroom

Thursday, May 1, 2014 – 8:30am-9:00am

## FLTWS Conservation Tool Discussion – Baranoff Ballroom

Thursday, May 1, 2014 – 9:00am-11:00am

## Technical Session 8 – East Room

Thursday, May 1, 2014 – 9:00am-10:40am

- 9:00 – 9:20 **Management priorities and the desired management states of exotic vegetation within Everglades National Park.** H. C. Cooley
- 9:20 – 9:40 **Using GIS to organize, monitor, track, and review exotic plant removal contracts.** C. Mason
- 9:40 – 10:00 **Cooperative invasive species management areas sow the seeds of change.** C. W. Grizzle
- 10:00 – 10:20 **Connecting management professionals, researchers, and the public sector to invasive plant management information.** K. Brown
- 10:20 – 10:40 **New developments for both the “IveGot1” smartphone app and the “Florida Invasive Species Partnership” websites.** K. A. Rawlins and C. Barger

# Field Trips

**Wednesday, April 30, 2014**  
**12:00pm-4:00pm**

## **Terra Ceia State Park Field Trip**

Major non-native plant infestations, with severe problems primarily with Australian pine trees, Brazilian pepper, guinea grass, cogon grass; feral pigs were widespread. Currently, maintenance by private contractors and FDEP is continuing the “battle” against re-infestation/dominance by non-native plant species. FDEP has made significant inroads in controlling the feral pig problems.

Host/speaker is Stephen Raymond, a Park Biologist with the Florida Park Service. Second speaker is Brandt Henningsen, SWIM Program Lead, SW Florida Water Management District. Drive time 45 minutes (roughly). Meet at Terra Ceia State Park. Invasives that might be seen: air potato, cogon grass, Brazilian pepper, Boston fern, Natal grass, Queen palm, balsam apple, others. Discussing management of a fire suppressed property & impact of disturbance. Partnering and coastal wetland restoration/creation will also be featured.

## **Cypress Creek Preserve Field Trip**

A 7,400 acre property purchased by SWFWMD to provide flood protection and serve as a public water supply. Cypress Creek is a tributary of the Hillsborough River. Within the property, Cypress Creek threads its way through an expanse of cypress and hardwood forests. Slash pine, longleaf pine and palmetto grow on the higher flatwood ridges. The Cypress Creek property is actively managed by the SWFWMD to control invasive species infestations. Species requiring control include Chinese tallow, cogongrass, air potato, tropical soda apple, Old World and Japanese climbing ferns. Walking through some mud may be required to see some control sites.

Host is Mike Terry. Mike Terry is responsible for invasive plant control operations on the property and has more than 25 years experience controlling aquatic and upland invasive plants on District managed lands and waters. He is active with the Central Florida Lygodium Strategy and the Nature Coast Cisma. Drive time is approximately 45 minutes. Meet at 8720 Pump Station Road, Land O Lakes, FL 34639. Control of Chinese tallow, cogon grass, air potato, tropical soda apple, Old World and Japanese climbing ferns will be discussed.

## **Kayak Field Trip**

Join Sweetwater Kayaks on a tour around Weedon Island in Tampa Bay. Weedon Island Preserve is located along the northwest shore of Old Tampa Bay in Pinellas County. Today, the Preserve includes approximately 3,700 acres with more than half lying north of Gandy Boulevard. What was once a true island during high tides is now a low-lying peninsula surrounded by several small islands.

Most of the preserve is dominated by aquatic and wetland ecosystems that include miles of mosquito ditches dug in the late 1950s. The upland ecosystems comprise the remaining 1,100 acres of relatively flat, dry lands. Indian mounds and relic dune ridges occur at higher elevations.



Photo by J. Conrad



Photo by J. Korn

## Wall Springs Park and Coastal Additions Field Trip

Wall Springs Park & Coastal Additions is an approximately 216-acre coastal property located in northwestern Pinellas County. The park is named after Wall Springs, which was used historically as a popular bathing/swimming attraction. Collectively the property hosts a variety of native Florida habitats including freshwater wetlands, shallow estuary, sandhill, pine flatwoods, xeric hammock, and a beautiful small salt marsh.

The Coastal Additions portion of the property is a Florida Communities Trust site and has undergone restoration on several parcels of its 132 acres. The Coastal Additions are currently not open to the public. Twenty-six threatened and endangered plants and animals, such as gopher tortoise, and native orchids thrive on site. Vigilance with treating invasive exotic species is ongoing. A monoculture of Australian pines was removed as well as Brazilian pepper. Coastal Addition IV remains a problem area due to the former residential structures on the property. Air potato, rosary pea, cogon grass, Boston fern and other species are found on the installation, and an active identification and control program is in place. The field trip will traverse restoration and infested areas and showcase central Florida coastal habitats.

Restrooms will be available at the start of the field trip. Host/speaker is Debbie Chayet. Debbie Chayet is the liaison to the FWC Invasive Plant Management Program for the Suncoast Working Group. Her work experience includes 30 years with the Pinellas County Parks & Conservation Resources Department during which time she completed many habitat restoration projects and invasive plant control projects, including those at Wall Springs Park & Coastal Additions. Drive time 30 minutes (or less). Meet at Wall Springs Park; 3725 De Soto Blvd., Palm Harbor, FL 34683. Invasives that might be seen: air potato, cogon grass, Brazilian pepper, Boston fern, Natal grass, Queen palm, balsam apple, others. Discussing management of a fire suppressed property & impact of disturbance.

## City of Largo Parks Field Trip

Largo Central Park Nature Preserve is a 31-acre nature park virtually surrounded by water. It was the site of the old city landfill. The park houses a regional stormwater treatment plant that removes pollutants from the canal that flows through the park. The canal drains 1,200 acres of Pinellas county. The site was severely inundated with exotics such as chinaberry, Brazilian pepper, Chinese tallow, air potato and others.

As the park was constructed, all the exotics were removed and replanted or seeded with local natives. A release of air potato beetles in July of 2013 is assisting with the maintenance of the air potato vine. The park is home to hundreds of wildlife species for viewing. Over 130 species of birds, otters, red fox, American alligator, marsh rabbits, wild turkey, and bats all feed or live within the park. A 5-mile kayak/canoe route begins at the park and ends at Park Boulevard. Catch and release fishing is allowed at the park. Over 40 interpretive displays educate visitors on the wildlife at the park.



Photo by J. Exum

Restrooms available at the park. Host/speaker is Greg Brown. Greg Brown is Parks Superintendent for the City of Largo Park System. Greg holds a bachelors of science in interdisciplinary Natural Sciences, is a certified arborist, certified master wildlifer, certified park and recreation professional, certified playground safety inspector and a Florida certified landscape designer. The City of Largo is the only Sterling Tree City on Florida's West coast, has 3 nature parks where nearly a million dollars in exotic plant removal and maintenance projects have been spent over the past 12 years, and has an award winning urban forestry program.



# Poster Session

**Wednesday, April 30, 2014**  
**5:00pm – 7:00 pm**

Sponsored by the University of Florida, Wildlife Ecology and Conservation Department  
**Meet with Authors**

**Distribution and environmental impacts of introduced rhesus macaques (*Macaca mulatta*) in Silver Springs State Park.**

C.J. Anderson, S.A. Johnson, and M.E. Hostetler  
University of Florida (STUDENT)

**Development of contraception for monk parakeet population management.**

M. L. Avery, J. D. Eisemann, and E. A. Tillman  
USDA-APHIS

**Persistence of large American alligators (*Alligator mississippiensis*) in populations that have been hunted.**

A. Brunell, P. Delaney, C. Carter, and K. Mader  
Florida Fish & Wildlife Conservation Commission

**House sparrow decline in Florida: Land use associations and population trends of a once ubiquitous, invasive species.**

J. Burnett and M. Moulton  
University of Florida (STUDENT)

**Simulating the effects of southern pine beetle on Tall Timbers Research Station.**

D. Cambron  
University of West Florida (STUDENT)

**Utilizing GIS to prioritize exotic plant treatment areas on the Florida Panther National Wildlife Refuge.**

W. Gurley and A. S. O'Connor  
U.S. Fish & Wildlife Service

**Revealing the perceived benefits of wildlife biodiversity: What Floridians think about ecosystem services.**

S.A. Johnson, H.K. Ober, and D.C. Adams  
University of Florida (STUDENT)

## Four Springs Ballroom

**Habitat Ecology of the Florida Scrub Jay (*Aphelocoma coerulescens*) in Sarasota County, Florida.**

M.C. Marquez  
New College of Florida

**Engaging homeowners to remove invasive species through an expert panel forum.**

G. Milch and T. Sudol  
UF/IFAS Extension

**Disease surveillance in feral swine in Florida.**

M. Milleson  
USDA Wildlife Services

**Central Florida Lygodium Strategy: new tools for stopping the northward spread of Old World climbing fern and why we still need your help.**

C. B. Millett, K. Campbell and K. Serbesoff-King  
The Nature Conservancy

**Decadal changes in distribution and abundance of four priority invasive species in the Florida Everglades.**

L. Rodgers and T. Pernas  
South Florida Water Management District; National Park Service

**Mexican petunia (*Ruellia simplex*) as an ecosystem engineer: Potential effects on soil nutrient dynamics.**

C.M. Prince, A.M. Smith, C. Reinhardt Adams, C. Wiese, and L. Cobb Lee  
University of Florida (STUDENT)

**Florida Conservation Corps Project A.N.T.: A focused force.**

E. Schwerin and H. Grames  
Florida Park Service

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## DISTRIBUTION AND ENVIRONMENTAL IMPACTS OF INTRODUCED RHESUS MACAQUES (*MACACA MULATTA*) IN SILVER SPRINGS STATE PARK (POSTER)

Introduced species threaten native flora and fauna, the economy, and public health. Florida currently has three introduced monkey species with established populations: squirrel monkeys (*Saimiri sciureus*), vervet monkeys (*Chlorocebus aethiops*), and rhesus macaques (*Macaca mulatta*). Internationally, introduced rhesus macaques have decimated bird populations through nest predation and increased bacteria loads in water bodies and have caused millions of dollars in damages through raiding crops. Rhesus macaques are also vectors of Herpes B Virus, which has nearly 70% mortality in humans. In an effort to increase tourism, six rhesus macaques were introduced into what is today Silver Springs State Park in 1938. By the early 1980s the population had reached several hundred animals. Since that time the population has been controlled through intermittent trapping and removal, however this ended in 2013. Macaque removal has met significant public opposition, especially because the trapped animals have been sold into biomedical research. Today there are approximately 120 macaques comprising 4 groups in the park; however, the recent cessation of trapping may lead to rapid population growth. To evaluate the distribution and environmental impacts of this population, we propose to radio collar a minimum of one adult female from each group to determine each group's home range. We will then use the home range data to address three research objectives. First, we will conduct a field experiment to determine if macaques are impacting nesting birds. Replicating the study inside and outside of the macaques' range will allow us to determine whether the macaques are nest predators, and if so, how nest mortality within the macaque range compares to nest mortality caused by native predators. Second, we will evaluate forest structure within the macaques' range to evaluate habitat selection and determine what habitats are most vulnerable to macaque presence. Third, we will follow each group to conduct precise population estimates, evaluate reproductive success, and conduct a population viability analysis, which will help predict future population growth and spread. Our findings will enhance decision making for sustainable and ethical management of rhesus macaques in Silver Springs State Park.

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## DEVELOPMENT OF CONTRACEPTION FOR MONK PARAKEET POPULATION MANAGEMENT (POSTER)

Since its introduction to the U.S. in the 1960's, the monk parakeet (*Myiopsitta monachus*) has thrived. It is now an urban/suburban species with no obvious factor limiting the growth of the population. In Florida and several other states, these birds build large communal nests on electric utility substations and support structures for distribution and transmission lines. The birds maintain their nests year-round, and their nesting activity has become a significant service reliability issue. Currently, management options are limited to nest removal, trapping, and euthanasia, which are problematic because of public opposition. Research to address impacts of monk parakeets has resulted in a better understanding of the biology of the species in its non-native range and has stimulated evaluation of alternative management methods, including contraception. Diazacon is a cholesterol-inhibiting compound that has shown potential as an avian contraceptive. National Wildlife Research Center scientists have demonstrated efficacy, low non-target exposure, and virtually no secondary hazard of diazacon in a series of aviary and field studies with monk parakeets. The objective of the research is to apply to the U.S. EPA for registration of diazacon as a monk parakeet management tool.

## **LIZ BARRACO**

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## **HUMAN DIMENSIONS OF NONNATIVE WILDLIFE MANAGEMENT: THE EXOTIC PET AMNESTY PROGRAM AND EXOTIC SPECIES REPORTING HOTLINE**

In the last decade, the Florida Fish and Wildlife Conservation Commission (FWC) has focused more resources to address the challenges of nonnative species in Florida and developed programs to assist. Two of these programs, the Exotic Pet Amnesty Program and the Exotic Species Reporting Hotline, have increased in popularity and use in the last few years. To date, the Exotic Pet Amnesty Program has found homes for over 1,700 exotic pets within Florida. The animals placed through this program range from strictly regulated species, such as large constrictor snakes, to more common household pets like pond turtles. For 8 years, the program has provided an option for pet owners who can no longer care for their pets. In the last 3 years this program has expanded its reach by providing assistance to pet owners outside of regularly scheduled amnesty events. The Exotic Species Reporting Hotline, formerly the "Python Patrol" hotline, was started by The Nature Conservancy (TNC) in the Florida Keys. In 2010 TNC worked to move the hotline to the mainland with the assistance of FWC. Since its mainland debut, use of the hotline has increased tremendously. The hotline is now used to report any exotic animal species across Florida. FWC has put together a network of resources to troubleshoot and respond to calls appropriately. The hotline has provided important data to biologists and has resulted in successful rapid responses to exotic species sightings.

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## **HABITAT PREFERENCES AND BIODIVERSITY OF SMALL MAMMALS IN SOUTHERN AFRICAN SAVANNAHS**

Savannahs are dynamic ecosystems that respond readily to changes in disturbance regimes, biological communities, and anthropogenic influences. Savannahs worldwide and in Africa are seeing an increase in woody biomass (shrub encroachment), in which woody plant species begin to replace grasses. There is little knowledge about how reduced grass cover might affect the savannah ecosystem and wildlife. Small mammals have been shown to be excellent indicators of ecosystem health in African savannahs. They also fill important roles as seed dispersers, prey species, and disease vectors. Combining vegetative measurements with the abundance and biodiversity of small mammals is the first step toward understanding how shrub encroachment might alter wildlife communities in savannahs. We investigated how changes in small mammal communities corresponded with changes in vegetation in the lowveld savannah of Swaziland, Africa. We live-trapped small mammals on six grids over the course of 3 months, for a total of 3,456 trap nights. We simultaneously conducted vegetative surveys, which consisted of measurements of groundcover, shrub cover, canopy cover, grass biomass, and horizontal visual obstruction. We then developed generalized linear models to understand changes in rodent abundance and diversity to changes in vegetative structure and/or composition. While existing literature cites grassy groundcover as being crucial for small mammals in grasslands, we found horizontal visual obstruction to be the best predictor of variation in species richness and the abundance of two selected indicator species on our study plots. It is notable that while grassy groundcover and visual obstruction were positively correlated ( $R^2=0.35$ ), adding grass to the model using visual obstruction did not improve the fit of the model.

**KAREN BROWN**

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**CONNECTING MANAGEMENT PROFESSIONALS, RESEARCHERS, AND THE PUBLIC SECTOR TO INVASIVE PLANT MANAGEMENT INFORMATION**

The UF/IFAS Center for Aquatic and Invasive Plants (CAIP) has long utilized the internet for communicating with management professionals, researchers, and the public sector about invasive plant issues. The UF/IFAS-CAIP websites provide easy access to information about the problems associated with invasive plants, the accompanying management issues and activities, and the science and collective experience behind management decisions in these unique natural environments. The CAIP Information Office utilizes three distinct websites: the primary UF-IFAS Center for Aquatic and Invasive Plants (CAIP) website provides primary information about aquatic and natural area invasive plants; the Plant Management in Florida Waters site provides information about the management of aquatic plants; and the Florida Invasive Plant Education Initiative & Curriculum site provides educators with resources to teach students about invasive species issues. While researchers and personnel from invasive plant management agencies throughout the state work together for a coordinated approach to invasive plant research and management, the UF/IFAS CAIP websites cohesively present this information under the banner of the University of Florida/IFAS. The confidence and loyalty many citizens feel towards UF is an important asset; we are often trusted to be a reliable and impartial authority on these topics. Using the websites, we describe the complex considerations taken before implementing invasive plant management strategies and the years of research and collective operational experience that inform this process; we also educate the public about why invasive plant management is critical to the well-being of the state of Florida.

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**PERSISTENCE OF LARGE AMERICAN ALLIGATORS (*ALLIGATOR MISSISSIPPIENSIS*) IN POPULATIONS THAT HAVE BEEN HUNTED (POSTER)**

One of the concerns with harvest programs is their effect on populations where the largest individuals or individuals with certain features (e.g., large antlers) are desired by hunters. In the case of Florida's annual statewide alligator harvest program, both wildlife professionals and the general public have expressed concerns regarding the effects of harvest on the existence of large American alligators (*Alligator mississippiensis*). Large alligators are commonly targeted by hunters, and as a result many larger size alligators are removed from the population. We used harvest data collected by the Florida Fish and Wildlife Conservation Commission to determine if there has been a decline in the number of bull ( $\geq 2.7$  m total length) alligators taken in the statewide alligator harvest. The average length of harvested alligators each year between 1988 and 2011 has been relatively stable. Furthermore, the percent of harvest that consisted of bull alligators has been relatively stable, approximately 25-30 percent since 1988. Another indicator for the presence of large alligators on hunted areas is the largest alligator taken for a given year. At least 1 bull alligator greater than 4 m in total length has been harvested from the original group of hunted areas every year since 1988. An assessment of annual population survey data indicates that there has been no significant statewide trend in the number of bull alligators on hunted areas since the start of the statewide recreational alligator harvest program. Although bull alligators are targeted by hunters, available survey and harvest data suggest that large alligators continue to occupy hunted areas throughout Florida.

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## **EVALUATION OF METHODS FOR EFFICIENTLY ASSESSING MERCURY CONCENTRATIONS IN AMERICAN ALLIGATOR (*ALLIGATOR MISSISSIPPIENSIS*) MUSCLE**

Mercury has been recognized as a potential health hazard for fish, wildlife, and humans for many years. Because of its position in the food chain as an apex predator, the American alligator is susceptible to accumulating high concentrations of the methylated form of mercury. Tests of alligator meat from Florida lakes in the early 1980s revealed a range of average concentrations among areas. As alligator meat became a more common food item as a result of the statewide alligator harvest, which began in 1988, concerns about the human health implications of mercury in alligator meat grew. This was especially true for alligators taken from the Everglades Water Conservation Areas because sampling of largemouth bass indicated extremely high levels were present in those ecosystems. Since that time, alligator meat has been tested for mercury sporadically on various areas during various years. However, a monitoring program has never been established to determine the extent of mercury concentrations in alligator meat from hunted areas, and determine if changes are occurring in the levels for individual areas. This study was designed to answer these questions, and to attempt to learn more about the dynamics of mercury as it relates to alligator biology. Average mercury levels for the study sites, relationship between mercury levels and alligator size, and possible seasonal variations in mercury concentrations in alligator meat were addressed. Additionally, new techniques were tested that could serve as a non-lethal way to sample alligators, increase efficiency of sampling, and significantly decrease cost of analysis compared to the techniques previously used to test alligators. The findings of this study can be used to design and implement a mercury monitoring program for wild alligator populations throughout the state.

## **HOUSE SPARROW DECLINE IN FLORIDA: LAND USE ASSOCIATIONS AND POPULATION TRENDS OF A ONCE UBIQUITOUS, INVASIVE SPECIES (POSTER)**

The house sparrow (*Passer domesticus*), a once ubiquitous [invasive] species in N. America, is declining in much of its global range. In Gainesville this species is currently documented and observed primarily, if not completely, in highly urbanized environments. The range-limited behavior of Gainesville house sparrows may be indicative of future trends across Florida, and this project aims to determine what, if any, variables are associated with this phenomenon. This pilot project, part of a larger master's thesis, aims to determine (i) if house sparrows are declining in the North/Central Florida region, (ii) whether house finch and sparrow populations in N/Central Florida are correlated and (iii) to determine what habitat and avian community factors are associated with house sparrow trends. Using SAS, we ran GLM regressions on log-transformed Christmas Bird Count (CBC) data for house sparrow (HOSP) and house finch. We will calculate Spearman's correlation coefficients to determine if population changes in HOFI and HOSP are significantly correlated in Gainesville, Jacksonville, and Tallahassee. We will also use GIS, FNAI land cover maps, and satellite imagery (2012) to determine land use within select CBC circles. We will use multivariate statistical techniques to determine relationships between synanthrope avian species' population trends and land use. Regression analyses were performed on the following cities (#observations: HOFI,HOSP): Gainesville (18,52), Jacksonville (8,60), St. Augustine (10,37), St. Petersburg (8,61) and Tallahassee (23,60). Significant HOSP declines ( $P > |t| < 0.06$ ) were found in all but St.



Augustine and significant HOFI increases in all but St. Petersburg. We will present results of our multivariate analyses for habitat associations and other synanthropic avian species in these study sites. Our current findings, using log-transformed count data of CBC count circles in Florida, show that house sparrows are declining and house finches are increasing. Inference from these population regressions will be compared with other methods of CBC data analyses that use sophisticated methods to account for annual effort per circle; these methods do not take into account whether CBC volunteers rigorously search highly urbanized, concrete areas versus natural lands.

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## **2014 UPDATE ON THE INVASIVE PLANT MANAGEMENT ASSOCIATION (IPMA)**

In response to the Great Recession's financial crisis in Tallahassee and its potentially negative influence on Florida's natural resources and those dependent on managing natural lands and waters, the not-for-profit 501(c)(6) advocacy organization, Invasive Plant Management Association (IPMA), was incorporated in 2012. IPMA was organized with the intent to provide the voice of upland and aquatic invasive plant management during the 2013 legislative session with the Mission being: "To foster sustained State funding for invasive plant management measures as an integral part of managing Florida's natural lands and waters." The Strategic Outlook is to foster an ingrained legislative culture of sustainable State funding for invasive plant control, exclusive of how the agencies distribute the funds through procurement (not concerned with influencing the Agencies' individual contracting policies). The 2013 Florida Legislative Session was the inaugural year for IPMA's advocacy for State-funded invasive plant management in Florida. Although there had been very effective lobbying activity in Florida for supporting public funding of aquatic plant management efforts, until 2013 there had not been a concerted effort by the invasive plant management community as a whole (both aquatic and upland). IPMA retained the lobbying firm Lewis, Longman, & Walker, PA. (LLW) as its advocate. The first step was the development of a 2013 Strategic Plan through IPMA's Legislative Committee and LLW. This plan centered around Legislator awareness regarding the necessity and public benefits of invasive plant management in Florida, which requires a solid public/private infrastructure dependent on sustainable public funding. Basically, putting an economic face on what most politicians see as only an environmental problem. Specific goals for the 2013 legislative session included: Maintaining (or increasing) the Invasive Plant Management Trust Fund by garnering support for FWC's increased 2013/14 budget request; Initiating discussions for seeking support for a dedicated funding source for invasive plant management on other State lands (in lieu of FWC Trust money); and, To investigate opportunities for other sources of public funding for invasive plant management. The purpose of this presentation is to provide a summary of FY 2013-14 successes and to outline strategic goals for the FY 2014-15 Session.

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## **THE EFFECTS OF MOON PHASE AND HABITAT AVAILABILITY ON THE ABUNDANCE OF FORAGING WADING BIRDS IN INTERTIDAL AREAS**

In coastal areas, tidal fluctuations determine the availability of shallow-water foraging habitat for wading birds, but the availability is dynamic, complicating analyses and sometimes undermining survey goals. We developed a Tidal Model of Shallow-water Availability (TiMSA) to disentangle tidal effects and provide temporally dynamic estimates of habitat availability. We then evaluated environmental (e.g., habitat) and informational (e.g., moon phase cue) factors affecting the foraging

abundance of Little Blue Herons (LBHE) and Great White Herons (GWHE) in the Great White Heron National Wildlife Refuge, FL. We hypothesized that (i) available habitat and foraging abundance were positively correlated, (ii) foraging abundance and moon phase were positively correlated, and that (iii) foraging abundance would be greater early in the day. Surveys of foraging wading birds ( $n = 38$ ) were conducted from a boat quarterly, between Dec. 2010 and May 2013. Model-averaged parameter estimates from a model selection analysis were used to make inferences; Models were analyzed as Poisson-distributed counts in a generalized linear model framework. Foraging LBHE abundance was largely explained by the moon phase (~7-fold change in abundance) and habitat availability (~5-fold change in abundance). Foraging LBHE abundance increased throughout the day, suggesting that birds are not satiated early in the day and, therefore, must utilize multiple habitats throughout the landscape to fulfill energy requirements. There was a significant drop in LBHE abundance during the spring compared to other seasons. Foraging GWHE abundance was moderately explained by the moon phase (~3-fold change in abundance), but otherwise, no single factor explained a large part of the variation. The strong association of the moon phase and foraging abundance suggests that this little-studied cue, coupled with a bird's prior knowledge of the landscape, may guide foraging decisions to a greater degree than previously known. In tidally-influenced habitats, maximum foraging abundance can be expected during full/new moon phases and when habitat availability is at its greatest.

## DAVID CAMBRON

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## SIMULATING THE EFFECTS OF SOUTHERN PINE BEETLE ON TALL TIMBERS RESEARCH STATION (POSTER)

Forests in the southeastern United States are subject to a variety of disturbances such as wildfire, timber harvest, storm damage, and biological disturbances. Southern Pine Beetle (*Dendroctonus frontalis* Zimm.) is cryptic in nature due to its characteristic as a bark burrowing insect, and is difficult to monitor as a result prior to host tree mortality. Modeling is frequently used to simulate landscape level changes that would otherwise be difficult to predict or accurately quantify due to large spatial and temporal resolution. The focus of this research is to determine the interaction between disturbance from the southern pine beetle and landscape succession using LANDIS ii (Scheller et al. 2007) in Tall Timbers Research Station, Tallahassee, Florida, USA. Site Selection is critical for the model input to be effective at replicating a larger area. Tall Timbers Research Station has detailed and extensive vegetation records and burn records, making parameter input possible for the high level of detail required from LANDIS ii. This model has been used in several regions throughout the world, but has not been used to predict southern pine beetle disturbance in northern Florida to date. The goal of the model run is to determine disturbance frequency and changes in landscape succession following southern pine beetle outbreaks.

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## MANAGEMENT PRIORITIES AND THE DESIRED MANAGEMENT STATE OF EXOTIC VEGETATION WITHIN EVERGLADES NATIONAL PARK

Everglades National Park (ENP), a designated World Heritage Site, is located at the southern peninsula of Florida and encompasses 1.5 million acres, of which 1.3 million are designated as the only subtropical Wilderness in the continental United States. Exotic plant species are estimated to affect approximately 200,000-300,000

gross acres, or approximately 30% of the land mass of ENP. Approximately 1,000 plant species have been recorded in the park. Of these, over 250 species are non-native. The four exotic plant species, that are currently of the highest management concern and affect the largest proportion of ENP by area are: melaleuca (*Melaleuca quinquenervia*), Australian pine (*Casuarina* spp.), Old World climbing fern (*Lygodium microphyllum*) and Brazilian pepper (*Schinus terebinthifolius*). The other approximately 246 exotic plant species vary in degree of their potential to invade, and their distribution pattern. The Exotic Vegetation Management Program at ENP is currently working to set and define goals that describe the desired management state for exotic plant species within ENP. Defined descriptions of the desired management state are important in order to determine success. Funding, current treatment and control technologies, the biology, distribution, and accessibility all influence the ability to accurately monitor and treat these species and the likelihood that the desired management state will be achieved. Currently funding levels also require that further prioritization is considered between maintaining vast areas that are at or near the desired management state versus bringing additional areas into the desired management state.

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## **DOES PLANT SEX AFFECT THE PERFORMANCE OF THE STEM BORING WEEVIL *APOCNEMIDOPHORUS PIPITZI* (COLEOPTERA: CURCULIONIDAE) ON ITS HOST PLANT BRAZILIAN PEPPERTREE?**

Interactions between plants and insects are highly dynamic and may be beneficial to both organisms, or only to one, as in the case of herbivores. A variety of insect feeding guilds, e.g., chewers, sap suckers, miners, and borers injure plants in various ways. In order to endure injury from herbivory and ensure survival and production of progeny, plants have evolved various response mechanisms to deter herbivores; however, insect herbivores have subsequently evolved ways to overcome plant defenses. Plants and insects that compete in this manner subsequently co-evolve and maintain tight relationships, which have contributed to the evolution of complex plant chemistry, or co-evolutionary arms race. Brazilian peppertree, *Schinus terebinthifolia* Raddi (Anacardiaceae), is a woody shrub that has become one of the most invasive weeds in Florida. Brazilian peppertree also is a dioecious species, which means there are separate male and female plants. There is anecdotal evidence that crushed leaves from female plants produce a more pungent aroma, indicating the plants may be better defended chemically than their male counterparts. To test this hypothesis, we compared the performance (adult feeding and survival) of the South American stem boring weevil *Apocnemidophorus pipitzi* (Faust) on foliage collected from both male and female Brazilian peppertree plants. Sexes were determined by examination of the flowers. In total, 20 adult weevils were caged with a fresh cut bouquet of either male or female terminal shoots with ~25 leaflets placed in a vial containing water. Cages with male plant bouquets were widely separated from cages containing female bouquets. Plant bouquets were replaced with fresh plant material ~3 times/ week until all the adults were dead. As plant material was removed, feeding damage was measured in mm<sup>2</sup> under a microscope. There were six replications for both the male and female plants. Results showed that weevils consumed significantly less leaf tissue from female plants compared to male plants. Furthermore, the LT<sub>50</sub> (average time required to cause 50% mortality of the weevils) was significantly shorter when weevils fed exclusively on female leaf tissue. The implications of these findings to other Brazilian peppertree herbivores will be discussed.

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## **HOST SPECIFICITY REVEALS THAT THE GALL-FORMING PSYLLID, *CALOPHYA LATIFORCEPS* (HEMIPTERA: CALOPHYIDAE), IS SAFE TO RELEASE FOR BIOLOGICAL CONTROL OF BRAZILIAN PEPPERTREE (ANACARDIACEAE)**

Brazilian peppertree (*Schinus terebinthifolia* Raddi) is one of the worst upland exotic weeds in Florida. Foreign exploration for natural enemies led to the discovery of a pit-galling psyllid *Calophya latiforceps* (Hemiptera: Calophyidae) in the state of Bahia, Brazil, in 2010. Crawlers of *C. latiforceps* stimulate the formation of galls on the leaves of *S. terebinthifolia* and galling results in leaf discoloration and in some cases, defoliation. To determine whether *C. latiforceps* is safe to release for biological control of *S. terebinthifolia*, host specificity and the presence of plant diseases were examined. Adult oviposition, gall formation, and adult survival of *C. latiforceps* were examined on 89 plant species under no-choice and choice conditions. We found that *C. latiforceps* laid eggs on species in seven plant families; however, crawlers stimulated gall formation and completed development to adult only on *S. terebinthifolia*. All crawlers on non-target plants died, probably due to starvation and, in some cases, due to a direct host plant reaction or hypersensitivity. Under no-choice conditions, 10% of adults lived for 19 days on the target weed, but adult survival was reduced (< 3 days) on non-target plants. Choice testing revealed that females preferred to oviposit on *S. terebinthifolia* compared to a non-target plant. Molecular methods and indicator host inoculations did not detect the presence of plant pathogenic bacteria or plant viruses in adult *C. latiforceps*. We conclude that releasing *C. latiforceps* in the United States poses extremely low risk to non-target plants, and provides another tool for the management of *S. terebinthifolia*.

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## **COLLABORATIVE EFFORTS FOR MANAGING MELALEUCA IN THE CIENEGA DE ZAPATA, CUBA**

The Ciénega de Zapata Biosphere Reserve is the largest protected area not only in Cuba but also throughout the Caribbean. This swamp ecosystem is characterized by a high biodiversity that comprises several endemic birds, reptiles, and invertebrates and is visited by 65 species of birds during their annual migrations from North America to South America. Endemic fauna include the Zapata wren (*Ferminia cerverai*), Zapata rail (*Cyanolimnas cerverai*), Zapata sparrow (*Torreornis inexpectata*), and the Cuban crocodile (*Crocodylus rhombifer*). Melaleuca (*Melaleuca quinquenervia*) was introduced into the Zapata swamp in 1959 to stabilize canals. In the last decade, large infestations of melaleuca have been documented in several locations of the swamp. The purpose of this presentation will be to describe the joint collaboration between Florida and Cuba to develop a management plan against melaleuca in the Zapata swamp. A series of presentations about the management of melaleuca in Florida were given at the International Wetlands Research Symposium held in November 2013 in Matanzas, Cuba. During this symposium, different aspects of the weed were covered including the history and impacts of melaleuca in Florida and the different management tactics being employed such as chemical, mechanical, fire, and biological control. Based on the experience in Florida, we suggest chemical control would be the quickest, most cost-effective way to eliminate large stands of melaleuca in natural areas without negative impacts to the environment. It can be accomplished with a minimal amount of training for work crews and inexpensive cutting and application equipment (machetes and hand-held pump sprayers). We will further discuss how to integrate other management options including fire and biological control, and the importance of international collaboration to help protect this important ecosystem.

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**HUMAN DIMENSIONS OF NONNATIVE WILDLIFE  
MANAGEMENT: EXAMPLES OF UTILIZING PUBLIC  
INVOLVEMENT AS A CONTROL TOOL**

Volunteers from the public are often utilized in natural resource management when additional person-power is needed. The Florida Fish and Wildlife Conservation Commission has instituted several programs for nonnative wildlife management with differing levels of participation by the public who may have different skill sets. Volunteers may simply provide additional eyes in the field and assistance to biologists or they may act as citizen scientists, collecting data and making more advanced observations. The public is especially interested in offering assistance when high profile species such as Burmese pythons are involved. A survey of participants in the 2013 Python Challenge™ indicated that the desire to help protect our native wildlife and ecosystems was a prominent motivating factor for participation. Creating opportunities for the public to be involved in wildlife management promotes good will and a chance to further educate stakeholders on the subject. However, misconceptions about the overall issue may result in members of the public oversimplifying solutions and underestimating the threats to human safety and even the ecosystems affected. Differing levels of experience and skill should be taken into account when creating expectations and proper training and education provided. Lessons learned from these programs will help us continue to refine the programs and find different ways to address the issue.

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**QUANTITY VS. QUALITY: EXPERIMENTAL EVALUATION  
OF COGONGRASS (*IMPERATA CYLINDRICA*) PROPAGULE  
PRESSURE ON ESTABLISHMENT SUCCESS**

Propagule pressure can be a significant predictor of both non-native plant invasiveness and susceptibility of habitats to invasion, but little is known about the relative importance of the number of propagules introduced and propagule quality. Here we evaluated the roles of propagule quantity and quality in the establishment success and performance of cogongrass (*Imperata cylindrica*), one of the most widespread and problematic invasive plant species in the southeastern US. We experimentally introduced 1, 3, or 5 cogongrass rhizome fragments (a frequent means of unintentional introduction) that were 1, 3, or 5 nodes in length into replicated mesocosms in a factorial design. In addition, to determine if the relative contributions of propagule quantity and quality were dependent on environmental conditions, we conducted the experiment across both full sun and 60% shade treatments. We found that the number of propagules introduced, their length, and the light environment all significantly aided predictions of total mesocosm biomass of emerging cogongrass ramets. Total plant biomass was, on average, 106% greater in full sun than shaded environments, and three and five node rhizome segments produced over twice as much biomass than one-node segments, regardless of propagule number. We attribute this greater early establishment and performance to more carbon stores in the three and five node propagules. Thus, the quality (length) of rhizome fragments may represent a highly important but thus far overlooked component of cogongrass invasion success. Management to reduce cogongrass spread should focus not only on the number or frequency of rhizome fragment introductions but also the length of rhizome pieces, particularly in high light environments.



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## USING A BIOBLITZ TO COLLECT DATA ON SPECIES DIVERSITY AND CREATE ENTHUSIASM FOR NATURAL LANDS PROTECTION

BioBlitzes have been conducted on natural lands in dozens of states over the past decade. They are typically conducted by professional biologists, citizen scientists, volunteers, and students with the intent of collecting data on species occurrences and to generate enthusiasm about biological diversity. I organized a BioBlitz on public lands in the Wekiva basin that was conducted over two periods of intense activity. Teams of field biologists and students were organized into loose taxonomic groups including plants, invertebrates, reptiles and amphibians, fish, birds, and mammals, and they were directed into specific tracts of public lands in central Florida during the spring of 2012 and the fall of 2013. Taxonomic group leaders organized field staff, identified the areas where surveys would take place, and cataloged the results. I compiled the results, presented them in a public forum, and provided a summary report to the Florida Department of Environmental Protection after each sampling event. A total of 1567 species was detected in the spring BioBlitz, and an additional 444 species were detected in the fall. In total, 2011 species were identified, and hundreds of species were added to known lists of species on Rock Springs Run State Reserve, Wekiwa Springs State Park, and Seminole State Forest. Accomplishments of the BioBlitz included: the number of known species on publicly-owned lands in the basin was increased; scientists have begun or sustained research projects in the area; numerous environmental activist groups were engaged in and celebrated the results; and the significance of biological diversity on 75,000 acres of public lands was highlighted in various media outlets. BioBlitzes can serve as an efficient way to conduct initial surveys on biological diversity, create excitement over plants and animals on public lands, and stimulate the careers of young scientists.

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## IMPACTS OF FERAL PIG DISTURBANCE ON DEPRESSION MARSHES: A LOOK AT NITROGEN AND PHOSPHORUS FLUXES

Rooting of soil by feral pigs (*Sus scrofa*) when foraging often results in large areas of bare ground and incorporation of litter and plant material into soil. Rooting disturbance has been implicated in water quality declines due to increased erosion and sedimentation, spread of pathogens, and increased nutrient loading, although relatively little work has been done on the topic of nutrients in depression wetlands. Three depression marshes were selected for our study at locations within Polk and Pasco counties in Florida. Selection was based on similarity of the following: soil type, severity of disturbance (moderate), time since disturbance (4-6 months), and similarity of zone of disturbance. We looked at the potential effects of rooting on nutrient fluxes by collecting soil cores from mounded soil, nearby ground soil (typically the source of the mounded soil), and undisturbed control sites. Each core was flooded with rain water then sampled at 1, 2, 5, and 7 days post-flooding to examine flux rates of nitrate/nitrite ( $\text{NO}_3^-/\text{NO}_2^-$ ), ammonium ( $\text{NH}_4^+$ ), and soluble reactive phosphorus (SRP). Total phosphorus (TP) and total Kjeldahl nitrogen (TKN) flux rates were sampled at 1 and 7 days post-flooding. In general, flux rates peaked at Day 7 for all parameters except  $\text{NO}_3^-$ . The mounded soil treatment had significantly higher cumulative flux over the 7-day period than the control for  $\text{NH}_4^+$ , TKN, and SRP. The ground treatment had significantly higher cumulative flux than the control for  $\text{NH}_4^+$  and TP. Implications of our findings as well as general impacts to plant communities will be discussed.

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**REPRESENTING HYDROLOGIC VARIABILITY IN COLONIAL WATERBIRD MODELS: KEY PROCESSES FOR WETLAND ECOSYSTEM RESTORATION AND MANAGEMENT**

The response of waterbirds to hydrologic variability has been studied for over 30 years in the Florida Everglades and globally. Collectively, these studies illustrate a variety of mechanisms through which hydrologic variability affects waterbirds, and how this variability can be represented in ecological models that have application to wetland restoration and management. In wetlands with a pronounced seasonal water cycle, waterbirds often initiate nesting when water levels are dropping and aquatic animals are concentrated into shallow water. The success of nesting is dependent on the rate of receding water being at an optimal level, with rates above and below the optimum causing lower nest survival. When water levels stop receding and rise suddenly due to rain or inflows, waterbirds will abandon their nests. This pattern contrasts with that of floodplain wetlands where birds often initiate nesting when water levels are rising and prey are dispersing rather than being concentrated. Juvenile aquatic animals disperse out of river channels to the floodplain where they experience a rapid growth rate leading to an increase in prey biomass for birds. The parameters hydroperiod and minimum water level affect the production of prey populations, establishing the upper limit to subsequent foraging conditions, with the actual value being lowered by the degree to which deep water levels restrict access to prey by birds. The range in water level fluctuations is related to the spatial extent of habitat that becomes suitable for foraging. In floodplain systems this variable is often the primary determinant of numbers of nests.

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**HYDRILLA IPM - STARTING A STATEWIDE EXTENSION PROJECT**

Hydrilla is an invasive aquatic weed, and millions of dollars are spent each year managing it in the southern United States. Thanks to a 4-year grant from the USDA National Institute of Food and Agriculture, University of Florida research and extension faculty, FAMU faculty, and an Army Corps researcher are studying new chemical and biological control methods as part of an overall hydrilla integrated pest management (IPM) plan and transferring the information to stakeholders. The goal is to increase stakeholder awareness of research-based information regarding the hydrilla miner and other sustainable strategies for managing hydrilla. Materials have been developed to help resource managers understand how new strategies for managing hydrilla fit into a hydrilla IPM plan. Using SurveyMonkey, a perception survey was distributed throughout Florida to assess the most effective information distribution method. Five hundred forty-one stakeholders completed the needs assessment survey. Responses indicated that the internet, boat launch signs, Florida Fish and Wildlife Conservation Commission, and Extension Offices in Florida were the preferred outlets for stakeholders to receive information about hydrilla IPM. Extension faculty created 10,000 hydrilla IPM 1-yd vinyl fishing rulers, 70,000 6-in rulers/bookmarks, 17,000 web cards, and 30,000 brochures for distribution to extension offices and collaborators. A web portal was designed and launched in June 2011, and 2,702 hits were recorded by December. The first 10 months of 2012 showed 6,875 hits. The current and planned hydrilla IPM information distribution platform includes educational publications and exhibits, promotional items, a project website, field tours and demonstrations, and presentations at professional and stakeholder meetings. New tactics such as the hydrilla miner and new microbial and chemical herbicides are being incorporated into hydrilla IPM programs throughout Florida. The information obtained through the perception survey have enabled Extension faculty to most effectively target their educational programming efforts.

# Abstracts Oral Presentations & Posters

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## A COMPARISON OF FOUR METHODS FOR DETECTING FOX SQUIRRELS IN THE SOUTHEASTERN U.S.

Fox squirrels (*Sciurus niger*) in the southeastern U.S. are difficult to study because of large home ranges, low densities, and low capture rates. Throughout many portions of their range, populations appear to have declined, and 3 of the 10 subspecies currently have a conservation status for protection, with two occurring in Florida. Presently, monitoring changes in population size and distribution is difficult because a reliable method is not available to study populations in the southeastern U.S. To determine which survey method is most feasible for monitoring fox squirrels, we evaluated overall detection rates (any time a squirrel was seen) and number of unique individuals identified using 4 common survey methods: live-trapping, passive infrared digital cameras, point counts, and transect surveys. Surveys were conducted over 4 seasons. Surveys using cameras produced > 4 times more detections (N = 355) than the other three methods combined (N = 83). Only live-trapping and cameras allowed for individual identification, with 48 individuals through live-trapping, and 75 individuals identified using cameras.

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## COOPERATIVE INVASIVE SPECIES MANAGEMENT AREAS SOW THE SEEDS OF CHANGE

Cooperative Invasive Species Management Areas (CISMAs) have cropped up all over Florida as a means to combat the negative effects of invasive, non-native plants like cogon grass and Brazilian pepper on native environments. The Florida Invasive Species Partnership (FISP) facilitates the formation of CISMAs, which are an alliance of stakeholders addressing invasive species management in geographic regions within Florida. Led predominantly by volunteers, the Suncoast Cisma has encouraged community cooperation across Hillsborough, Manatee, Pinellas, and Sarasota counties since it was founded in April 2011. Invasive plants and animals know no boundaries, which is why it is important to partner with entities in both public and private sector. This Cisma focuses on impacting the community through education and outreach projects as well as work days. Education and outreach projects like invasive plant removal work days in natural areas and educational workshops target both resource managers and the general public. Participants learn to identify invasive species and catch up on the latest research in the fight to protect our native habitats. In addition, public forums and roundtable discussions are held so that people can learn from one another. As evidence of the positive impact this organization is making on the community, the Suncoast Cisma was nominated for the past two years as a Treasure of Tampa Bay by the Keep Tampa Bay Beautiful organization, and the chair was awarded the 2013 Environmental Excellence award from the Tampa Bay Association of Environmental Professionals. In 2013, this Cisma was awarded a grant from the Florida Exotic Pest Plant Council (FLEPPC) and the FISP to purchase educational materials to be used as instruments for the battle against invasive butchers of biodiversity. An educational bannerstand will be developed for use at expos and public outreach events. When it isn't in use, it will be rotated between the four county extension offices.

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## **UTILIZING GIS TO PRIORITIZE EXOTIC PLANT TREATMENT AREAS ON THE FLORIDA PANTHER NATIONAL WILDLIFE REFUGE (POSTER)**

Given limited resources it is often difficult to determine the most time efficient and cost effective method of treating exotic plant infestations on large tracts of conservation land. By selecting criteria that maximize staff effort in this regard, we were able to use GIS to develop a tool that prioritizes treatment areas on the Florida Panther National Wildlife Refuge. These criteria are based on site specific nuances, refuge goals, and staff knowledge. The process has many potential applications within the field of land management and is easily utilized by those familiar with a basic understanding of the ArcMap software.

## **ALISON HIGGINS**

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## **LOCAL RULES: HOW TO REGULATE THE UNBANNABLE**

Many local land managers were frustrated when Florida legislators ruled that only the State's Noxious Weed and Invasive Plant Review Committee was allowed to maintain a list of "noxious weeds" (Florida Statute 581.091). Add to that the growing pressure to adopt TNR (Trap, Neuter, Re-Abandon) and buy just about any animal off the internet, and land managers are left with band-aids to control an artery of supply. The City of Key West is exploring outside the box policy tools available to local governments to save time and taxpayer dollars in defense of our ecosystems. Through a "superoverhaul" of its Land Development Regulations (LDR's), the City is following in the footsteps of its progressive Comprehensive Plan updates, which call for prevention, early-detection/rapid response efforts, as well as carrot and stick approaches to get conservation compliance. This presentation will review other best management policies across the US and abroad. The rules aren't set yet, so please bring your best suggestions to the table too!

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## **REVEALING THE PERCEIVED BENEFITS OF WILDLIFE BIODIVERSITY: WHAT FLORIDIANS THINK ABOUT ECOSYSTEM SERVICES (POSTER)**

Ecosystem services are benefits that humans receive from nature. Habitat management for wildlife may be perceived as positive or negative by society depending on how people value the outcomes. The purpose of this study is to evaluate the wildlife-related ecosystem services in Florida's longleaf ecosystem. I conduct a focus group and social survey using a stratified random sample of residents in Florida with a tailored design method and discrete choice model. Both direct use (e.g., food, hunting, tourism, pest control) and non-use (e.g., symbolic, intrinsic, supportive, aesthetic) values are identified by participants. Services are attributed to 16 species of terrestrial, vertebrate wildlife, but not all potential service-species pairings are recognized. With increasing concern for longleaf ecosystems, managers and policymakers can build support for conservation by increasing public awareness and promoting the link between habitat management and ecosystem service benefits to society. This poster will evaluate current findings and solicit potential study design improvements for future surveys.

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## INVASION RISK OF BAMBOO SPECIES IN FLORIDA

Biomass and biofuel industries in the United States are conducting research and development on various bamboo species for multiple uses, such as paper pulp, biochar, construction materials, and biofuels. However, many of the traits that suggest bamboo species could be useful as a material or feedstock, including high growth rates, abundant biomass per area, and vegetative spread, also increase the likelihood those species may become invasive. The Australian Weed Risk Assessment (AWRA), a literature-based invasion risk evaluation protocol, has been used to correctly identify 90% of high-risk plant invaders and 70% of low risk, non-invaders across various geographies (including Florida). We used the Predictive Tool, a version of the AWRA protocol modified for Florida, to assess multiple bamboo species, including species in the genus *Bambusa*, *Dendrocalamus*, and *Phyllostachys* that have been proposed for one or more uses. Our results indicate that characteristics contributing to high invasion risk include climate suitability for Florida, naturalization history, and growth habit (clumping vs. running). In general, we recommend selection of species with the clumping growth habit for large-scale production. Furthermore, to reduce the probability of escape and invasion into natural areas we suggest the adoption of best management practices such as avoidance of waterways and the use of repeated mowing to deplete rhizome masses. With proper selection of species and management, the cultivation of low risk bamboo species could be economically lucrative while minimizing threats to Florida's natural areas.

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## THE EFFECT OF RED-IMPORTED FIRE ANTS ON EASTERN FENCE LIZARD RECRUITMENT AND SURVIVAL

The red-imported fire ant (*Solenopsis invicta*) is an invasive predator that was introduced through the port of Mobile, AL, in the 1930s and is now established throughout the southeastern United States. Since their establishment, fire ants have been implicated in the decline of several native vertebrates (e.g., Bobwhite quail [*Colinus virginianus*] and Gopher tortoise [*Gopherus polyphemus*]). Little research has been completed to assess how fire ants influence reptile populations, although many species exhibit life history traits that may increase vulnerability to fire ant predation (e.g., egg laying) and fire ants may be toxic to species that consume ants. Past research has focused on the effects of fire ants on reptile populations relative to habitat utilization and foraging but few studies have quantified population parameters to understand how fire ants influence population dynamics. We used eastern fence lizards (*Sceloporus undulatus*) as a model species to determine the influence of fire ants on reptiles. Our objectives were to quantify the effects of fire ants on fence lizard recruitment and survival. We completed the study on Ichauway, the research site of the Joseph W. Jones Ecological Research Center in Newton, GA. We stocked populations of fence lizards into eight 0.2 ha enclosures either with ambient fire ant numbers or treated to reduce fire ant populations. From May 2012 to November 2013, we completed monthly mark-recapture sessions (14 total). Using Program Mark, we fit Link-Barker models to estimate fence lizard recruitment ( $f$ ) and survival ( $\Phi$ ). We found that the model with fire ant treatment affecting recruitment, but not survival, was approximately 3 times more likely than the model including fire ant effects on survival and 6 times more likely than the base model with no treatment effects. Recruitment was approximately 1.5 times greater in the enclosures with reduced numbers of fire ants ( $f = 0.69 \pm 0.10$ ) than those with ambient numbers ( $f = 0.44 \pm 0.08$ ). Survival did not differ between treatments ( $\Phi = 0.91$ ). Our results indicate that fire ants are having a negative effect on recruitment of fence lizards via depredation of eggs or hatchlings during, or soon after, emergence.



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**SELECTIVE HERBICIDES AND HERBICIDE TREATMENTS FOR CONTROL OF CHINESE TALLOW (*TRIADICA SEBIFERA*).**

Chinese tallow (*Triadica sebifera*) is a sub-tropical invasive tree that remains a serious threat in many natural communities throughout north and central Florida and has been designated by the Florida Exotic Pest Plant Council as a Category I exotic species. Though tallow has been commonplace in the Florida landscape over the last couple of decades, state agencies across the panhandle and into central Florida recognize this invasive species as one of their biggest threats. Increased invasion of this species has been observed within the last several years, possibly due to dispersal following increased hurricane activity beginning in 2004. We established trials at 2 locations to evaluate the effectiveness of new products for Chinese tallow control. Treatments were applied as basal-bark applications in basal oil to medium-size trees approximately 2-4 inches in diameter. Treatments included triclopyr at 20% solution or aminocyclopyrachlor at 5 or 10% solution. Additional treatments included over-the-top applications of imazamox, triclopyr, and aminocyclopyrachlor to small trees (< 6 feet in height) Applications occurred in the spring and summer of 2011 for both locations and studies. Aminocyclopyrachlor provided excellent control of tallow trees from basal bark applications, similar to control observed from the standard of triclopyr herbicide. Over-the-top applications also showed very good control and may provide some level of selectivity as compared to current standard treatments. Additional studies on seed germination and seedling emergence may also be discussed.

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**REMOTE SENSING OF THE 3-DIMENSIONAL STRUCTURAL IMPACTS OF OLD WORLD CLIMBING FERN (*LYGODIUM MICROPHYLLUM*)**

The physical structure of a forested system is a proxy for providing insight into the health of a community. Diverse vertical and horizontal structure has been shown to be correlated with greater primary productivity and biodiversity. Invasive species have demonstrated the ability to alter those physical attributes, especially non-native climbing plants. Invasion by non-native plant species can be considered a form of disturbance by altering the physical structure of a forest system. In the state of Florida Old World climbing fern (*Lygodium microphyllum*) is an invasive plant that relies on native vegetation for structural support. It uses the existing vegetation to ascend into the forest canopy and forms dense vegetation mats that cover tree crowns. This subsequently impacts resource allocation for native species. Quantifying the biophysical changes by Old World climbing fern (OWCF) has proved logistically difficult on large spatial scales. In this study we utilize LiDAR (Light Detection And Ranging) to measure the deviations in forest structure induced by Old World climbing fern and to quantify the extent to which it alters community structure. Airborne LiDAR technology is a form of remote sensing that measures the elevation of surfaces over a site. The following forest structure measurements were measured using the novel form of remote sensing : average canopy height, canopy openness, vertical structural diversity, degree of roughness (rugosity), and height of median return energy (HOME) for plots (n=300) across an invasion gradient and management frequencies. Our results show that there are significant differences (p=0.001) for the LiDAR-derived metrics across both invasion densities and management frequency gradients with higher percentages of OWCF being correlated with decreased structural diversity. Invasive plant management was shown to mitigate the impacts of OWCF. Understanding how forest structure is altered by invasive climbing plants allows for more effective management and in turn reduces the potential negative impacts on forested systems.

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## UNDERSTANDING TEMPERATURE REQUIREMENTS OF THE AIR POTATO BEETLE WILL IMPROVE RELEASE EFFORTS IN FLORIDA

The air potato vine, *Dioscorea bulbifera* L. (Dioscoreaceae), is a major problem in Florida, where it invades a variety of habitats, including disturbed uplands, abandoned nurseries, hardwood hammocks, and pinelands. Since 2012, the air potato leaf beetle *Lilioceris cheni* Gressitt and Kimono (Coleoptera: Chrysomelidae) has been released on public lands throughout the state for biological control of the invasive vine. Field observations at several release sites indicate that the beetle population is rapidly increasing and high defoliation has been observed at some locations but not others. In order to better predict establishment and performance of this agent, laboratory and field studies were conducted to determine the temperature requirements, diapause induction, and overwintering survival of *L. cheni*. Results showed that females entered reproductive diapause when exposed to 20°C and short days (10:14 L:D photoperiod), whereas reproduction occurred at 25°C either under short or long days. Adults are long-lived (> 6 months) and lifetime fecundity was 2068 eggs per female (range: 1038 – 4304) at 25°C. Field cages were established at three sites along a latitudinal gradient in Florida (Homestead, Fort Pierce, and Tallahassee) in October 2013, and adult survival was monitored monthly throughout the winter (25 adults per cage, 20 cages per site). In March 2014, higher survival (10 beetles per cage) was found in Homestead and Fort Pierce, while fewer adults were found alive in Tallahassee (1 beetle per cage). This high mortality in Tallahassee can be explained by the cold temperatures experienced in north Florida from December to February. Significance of the results will be discussed.

## HABITAT ECOLOGY OF APHELOCOMA COERULESCENS IN SARASOTA FL (PRESENTATION AND POSTER)

The Florida scrub jay, *Aphelocoma coerulescens*, is found in scrub habitats along coasts, rivers, and on some high inland ridges. Human-caused fragmentation of the natural environment is growing, yet the consequences of these landscape modifications to vertebrate communities are poorly understood. Habitat loss is magnified by fragmentation, which produces edge effects and alters dispersal and natural processes, i.e., fire. The author investigated the relationship between landscape structure and bird abundance in Sarasota County, Florida, using traditional land-cover maps and acquiring data from Florida scrub jay (*Aphelocoma coerulescens*) sightings published in the Sarasota County data file. There was a strong association between habitat structure and the abundance of *A. coerulescens*. Of the 553 birds sighted, 43% were in scrubby flatwoods, 35% in protected lands, 35% pinewood flat, 9.3% in coastal hammocks, 6.3% in dry prairies, 4.2% in beach land, 1.8% in mesic hammocks and 0.4% in freshwater wetlands. Proximity analysis identified potential population centers, with three bird territories completely isolated from any population; this statistical analysis revealed 11 bird territory “clusters.”

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## USING GIS TO ORGANIZE, MONITOR, TRACK, AND REVIEW EXOTIC PLANT REMOVAL CONTRACTS

Using a geographic information system (GIS) to support exotic plant removal efforts is becoming increasingly important as land managers face shrinking budgets, decreases in workforce, and a growing number of invasive species to manage. GIS can be used in all phases of contract work to ensure that work efficiency is maximized and to archive treatment records. Prior to project commencement a file geodatabase can be created as a framework to organize treatment units, track logs, and completed areas. During active projects, track logs from contractor GPS units can be loaded into GIS to define possible missed areas and can be useful for determining start and stop times under time and material contracts. Track logs from compliance checks streamline the feedback process, as the logs can be used to verify work areas were checked in their entirety, and notes from staff inspections can be stored in an attribute table and used to quickly generate a punchlist. Contract documents, including statements of work and daily progress reports, can be filed as metadata enclosures. When a project is completed, details such as start and end dates, herbicide rates, and contractor job performance can be recorded in the layer description. Systematically storing and archiving project files allows information of interest to be easily extracted when needed, and facilitates the transfer of information from one project manager to another. The use of GIS to track exotic treatments and contracts does not replace the need to conduct proper “on the ground” contract monitoring. It does, however, provide a way to more easily and effectively manage exotic species treatments by allowing more efficient tracking of treatments, ensuring critical retreatments are conducted properly, and by providing a cohesive archival system. This type of framework can be utilized for other biological and land management activities such as vegetation and wildlife surveys and prescribed fire rotations.

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## UNDERSTANDING THE DISTRIBUTION OF A RARE AQUATIC MAMMAL IN THE WETLANDS OF FLORIDA

From 1985 to 1996 Florida's total wetland area declined by a net 21,100 ha. Due to this loss the Florida Fish and Wildlife Conservation Commission has become concerned with the status of the round-tailed muskrat (*Neofiber alleni*), an aquatic rodent endemic to Florida which utilizes freshwater wetlands. We used a stratified random survey to locate round-tailed muskrat (hereafter RTM) populations in the north-central Florida region. We conducted 61 random surveys for RTMs between May and September 2013. We related the distribution of RTMs to vegetation structure and water characteristics at each site to understand how local features influence RTM occurrence. On a larger scale we investigated patch characteristics and the influence of vegetative communities, land cover, anthropogenic landscape features, and hydro regime on RTM occurrence. We compared the relative influence of local and landscape variables by comparing a priori models using an occupancy modeling approach. In order to determine if hydro period influenced RTM populations we examined GoogleEarth imagery from January 2012 (17-21 months prior to surveys) to see if water was visibly present in the wetland. Hydro period of the wetland did appear to influence RTM occurrence. Wetlands that were dry in 2012 had a higher probability of having RTMs in 2013. Periodic drying of wetlands appears to be important to RTMs, possibly because it may help promote the plants that comprise a large portion of their diet. We found that at small scales (i.e., site level) the occurrence of RTMs was heavily influenced by the presence of lily pads (*Nymphaea* spp). Occurrence of RTMs was further improved with pres-

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ence of cow lily (aka spatterdock, *Nuphar* spp), a broad-leaved herbaceous plant similar to lily pad. RTM occurrence also improved when lily pads were associated with maidencane (*Panicum hemitomon*) a grass eaten by RTMs and used to build their lodges. Both cow lily and maidencane only became influential in connection to lily pads. Landscape level variables were considerably less important than local vegetation cover; however, the amount of agriculture in the landscape negatively influenced RTM occurrence and as patches became more complex in shape muskrat occurrence decreased.

## EFFECT OF COMBINATIONS OF GLYPHOSATE AND 2,4-D ON TORPEDOGRASS (*PANICUM REPENS*) AT FLORIDA FISH AND WILDLIFE'S OKALOACOOCHEE SLOUGH WILDLIFE MANAGEMENT AREA IN HENDRY COUNTY, FLORIDA

Nine treatments, including six combinations of different concentrations of glyphosate and 2,4-D, two concentrations of glyphosate only, and a control were applied to 4x5 meter plots in two locations, with three replicates per location in April 2012. Due to the freezes the winter before treatment, approximately 40% of the torpedograss cover was alive and about 60% was top-killed by frost despite a burn the previous spring. At the time of treatment, the torpedograss was actively growing. Torpedograss composed most of the vegetative cover, with native plants covering less than 5% of the area. Plots were sampled in July 2012, February 2013, and December 2013. In the sampling 3 months after treatment, torpedograss mortality averaged between 93.8% and 98.4%. In the sampling 10 months and one full growing season after treatment, torpedograss mortality was more varied, ranging from 65.3% to 91.1%, with higher concentrations of glyphosate showing the most kill. After two growing seasons, 20 months after treatment, torpedograss is rapidly growing back into the plots with only 9% - 49% dead. The results are not sufficiently decisive to make strong statements. The analysis did show a significant difference between treatments ( $P = 0.001$ ). There was no significant difference between the four different concentrations of 2,4-D when mixed with 1.5% glyphosate. The three treatments containing 3% glyphosate were not significantly different, with or without 2,4-D. Thus, the addition of 2,4-D did not make a difference in percent kill with either concentration of glyphosate. Two treatments with 3% glyphosate were significantly different from three treatments with 1.5% glyphosate. The top three treatments with highest percent kill were the three 3% glyphosate treatments. So the higher concentration of glyphosate did the best job. Take-home messages to managers are: \*Probably skip the 2,4-D; it didn't seem to make any difference. \*Higher concentrations of glyphosate did a better job, so don't skimp on the glyphosate. \*Retreat as soon as you can; if you don't have the resources (time and money) to treat at least once a year, it's probably better to wait until you can treat that often, since after two growing seasons, much of the torpedograss has grown back.

## GETTING TO ZERO: METHODS AND TECHNOLOGIES USED TO CONTROL FERAL HOG POPULATIONS IN NATURE CONSERVANCY PRESERVES IN HAWAII

Feral hogs and other ungulates cause significant damage to native Hawaiian forested watersheds. With over 3 decades of feral hog control experience in over 40,000 acres of native forest on four different islands, most of which is located in remote, extremely rugged terrain, The Nature Conservancy, Hawaii Chapter (TNC), has refined its eradication approach for maximum efficiency and humanness. This

presentation will cover the methods and technologies used to eliminate all feral hogs from within fenced portions of two preserves: Waikamoi Preserve, Maui and Wainiha Preserve, Kauai. These include hog-proof fencing, systematic hunting with trained dogs, various trapping techniques, snaring, motion-sensing trail cameras, FLIR (forward looking infra-red), activity monitoring, and geospatial data analysis. Future plans and directions for further technology development will also be discussed.

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## **USING ULTRAHIGH-RESOLUTION AERIAL IMAGING AND HIGH-PRECISION AERIAL HERBICIDE APPLICATION TO CONTROL AUSTRALIAN TREE FERN, *CYATHEA COOPERI*, IN WAINIHA VALLEY, KAUAI, HAWAII**

As the state's third largest private nature preserve, the 7,050-acre Wainiha Preserve includes one of Kauai's largest river systems, magnificent mountain cliffs, and portions of the famed Alaka'i wilderness and Mt. Wai'ale'ale summit region, one of the wettest spots on Earth. Yet Wainiha is under threat from the invasive Australian tree fern, a fast-reproducing ornamental that was brought to Kauai almost 50 years ago. In an effort to control this weed, The Nature Conservancy has deployed "the Stinger", a precision herbicide dispenser mounted underneath a helicopter, which is used to spray extremely small quantities of Imazapyr. Over a three year period, The Nature Conservancy treated over 4,000 tree ferns in a 5,000 acre area and only used 11 gallons of herbicide. As part of the control effort, The Nature Conservancy has worked with Resource Mapping Hawaii to develop an aerial mapping system. This mapping system has produced ultrahigh-resolution imagery (1 to 2 cm per pixel side) from before and after herbicide treatment. Visual inspection of the natural color imagery confirms that nearly all herbicide treated individuals of Australian tree ferns have died. More than 90 percent of the mapped Australian tree ferns in the Wainiha Preserve have been treated and killed. These tools hold promise for controlling and monitoring other invasive weeds in Hawaii and beyond.

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## **ENGAGING HOMEOWNERS TO REMOVE INVASIVE SPECIES THROUGH AN EXPERT PANEL FORUM (PRESENTATION and POSTER)**

Invasive species are exotic plants or animals known to cause harm to the environment, economy, and/or human health. As such, their removal would benefit our ecosystems and society. Residential properties and their associated conservation easements are a source of invasive species, leaving it up to motivated homeowners to arrange for invasive plant removal. We organized a new learning format to meet homeowners' needs. Our objectives were: 1) increase participants' knowledge about the problems invasive species pose, 2) have participants identify at least one invasive plant or animal in their yard or neighborhood, and 3) distribute resources for invasive plant removal in the participants' area (including both eradication research and neighborhood cooperation). We organized a two-hour program which consisted of: a PowerPoint™ on invasive species (11 slides), a discussion with a six person panel of local invasive species experts (representing six different academic and governmental agencies), live samples with information sheets for 36 invasive plants, and a "neighborhood toolkit" for a community-based invasive plant removal event. During the class we conducted a needs assessment. We delivered a follow-up survey a week later. We had 23 public participants attend, including



nine Master Gardeners. Sixteen participants responded to a follow-up survey (70% response rate). We found that 15 participants improved their awareness of invasive species problems, 10 could identify an average of five invasive species in their yards/neighborhoods, and 15 (93% of those surveyed) are willing to remove them. Our results showed that an evening panel-based program with samples of the plants was an effective learning platform. The homeowners who remove invasive species will create habitat for native Florida flora and fauna. We intend to expand our audience and refine our materials/methods to increase the amount of invasive species removal from private property.

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## **DISEASE SURVEILLANCE IN FERAL SWINE IN FLORIDA (POSTER)**

Feral swine disease surveillance in Florida is conducted as part of the USDA APHIS National Wildlife Disease Program's Comprehensive Feral Swine Disease Surveillance Program. Feral swine captured and euthanized throughout the state of Florida are tested for classical swine fever, pseudorabies, brucellosis, foot and mouth disease, swine influenza virus, trichinosis, toxoplasmosis, and leptospirosis. The poster will present an overview of the feral swine disease sampling program, including background information on the diseases mentioned, survey methods used, a summary of results from 2006-present, and distribution maps.

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## **CENTRAL FLORIDA LYGODIUM STRATEGY: NEW TOOLS FOR STOPPING THE NORTHWARD SPREAD OF OLD WORLD CLIMBING FERN AND WHY WE STILL NEED YOUR HELP (POSTER)**

The Central Florida Lygodium Strategy (CFLS) is a landscape-scale partnership working to stop the northward migration of invasive Old World climbing fern (*Lygodium microphyllum*) in Florida. CFLS coordinates survey, control, and monitoring data, provides a private lands initiative, has built an infrastructure to share the work and funding necessary for effective rapid detection and early response across fence lines, and has "drawn a line on the vine" by establishing a sentinel zone across the central region of the state to serve as a kind of firebreak to stop the spread of this plant. Through the CFLS private lands initiative, Conservancy staff and contractors now have surveyed nearly 18,000 acres and treated 846 infested acres on >40 private properties, buffering 38 public conservation lands (within 5 km) in the northern zone with funding provided by federal and state partners. Partnering with Florida Fish and Wildlife Conservation Commission has resulted in more staff time, resulting in more Early Detection (with new infestations spotted on private and public lands) and more Rapid Response (with additional treatment capacity on private lands and outreach to new public lands partners). Partnering with Florida Forest Service has resulted in more capacity to accomplish sentinel site monitoring in the northern zone for increased Early Detection/Rapid Response (EDRR). Partnering with Southwest Florida Water Management District has resulted in increased survey (especially aerially) and treatment capacity. The USFWS Partners for Fish and Wildlife Program provides treatment support. For 2014, there are private properties and conservation lands lined up for treatment, infestations reported on road rights-of-way lined up for treatment, and hope for lower water levels to allow access to some difficult-to-access areas. Working with USDA-ARS, release of the Old World climbing fern biocontrol, the Neo moth (*Neomusotima con-*

spurcatalis) on target infestations in the northern zone is expected this spring to test this additional tool further north than it has been used to date. Needs for the future are: follow-through on treatment work; more reports of infestations, especially in the northern zone, and; increased survey capacity, preferably aerial, to get a better understanding of the distribution of infestations east of SWFWMD's region.

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**POMACEA MACULATA SPATIO-TEMPORAL GRAZING IMPACT MODEL ON VALLISNERIA AMERICANA IN SOUTH FLORIDA**

Invasive species spatio-temporal models are becoming an important tool for resource managers in predicting invasion trends and their potential impacts. Determining the abiotic and biotic factors or factor influencing animal distributions over a temporal scale is critical for model accuracy and predictive capabilities for ecological impact. Understanding how these determinants affect exotic species can provide insight to resource managers about species movement patterns responding to natural or anthropogenic change events at local and landscape level. Applying spatial scale variation is an important component in understanding gaps or linkages in a model's performance. Spatio-temporal models are designed to incorporate these datasets of changing abiotic and biotic parameters allowing managers to predict and identify exotic invasion locations by manipulating these environmental parameters. This grazing simulation model approach provides a framework for the exchange of environmental parameters for analyzing temporal species occurrence and herbivory patterns. The aim of this paper is to introduce a spatio-temporal agent based model using Nova Software Platform that integrates known factors influencing spatial behavioral patterns with associated environmental parameters for analyzing *Pomacea maculata* herbivory impact on *Vallisneria americana* communities in a South Florida freshwater managed system.

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**AN UPDATE ON THE SEARCH FOR BIOLOGICAL CONTROL AGENTS OF COGONGRASS**

Cogongrass, *Imperata cylindrica* (L.) Beauv., is one of the world's worst weeds, infesting over 500 million ha. in 73 countries. It is widely distributed in the Old World, with evidence of both Asian and African centers of origin. Cogongrass was introduced into the USA from Japan and the Philippines in the early 1900s, and since arriving, has become a highly aggressive weed in Alabama, Mississippi, and Florida. Recent molecular studies suggest that cogongrass in peninsular Florida is genetically similar to cogongrass in the Philippines, and cogongrass in Alabama, Mississippi, and the Florida panhandle more closely aligns with cogongrass from Japan. The introduction of host specific natural enemies of cogongrass from its native range may provide sustainable suppression of the weed in the USA. Surveys conducted in Tanzania, the Philippines, and Japan discovered several insect herbivores which may have potential as biological control agents of cogongrass.

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**RIDGE RANGER VOLUNTEER PROGRAM**

Engaging people in actively helping their ecosystem not only leads to understand-  
ing and ownership, but to them engaging others. Successful use of volunteers to  
survey for invasives using GPS technology will also be discussed.

**MEXICAN RED-BELLIED SQUIRREL ERADICATION  
EFFORTS IN BISCAYNE NATIONAL PARK**

In 2008, Biscayne National Park developed and implemented a program to erad-  
icate the non-native Mexican red-bellied squirrel (*Sciurus aureogaster*) from  
Biscayne National Park. The Mexican red-bellied squirrel (MRBS) was introduced  
the late 1930's on Elliott Key. Since its introduction the MRBS population continued  
to increase unchecked, posing a significant threat to Biscayne NP's resources  
including, federal and state protected plants and animals. In 1992, Hurricane An-  
drew and its catastrophic storm surge were thought to have eliminated the MRBS  
from Elliott Key. However the squirrel population rebounded and by the late 1990's  
squirrel nests or dreys were visible throughout the island. In 2006, the University  
of Northern Arizona was contracted to assess the population of MRBS in Biscayne  
National Park. The assessment concluded that MRBS were posing a threat to  
protected resources and that squirrels had spread to Sands and Old Rhodes Key.  
In 2008, Biscayne National Park initiated an eradication program. The programs  
main goals were to protect the natural resources of Biscayne National Park while  
preventing MRBS from expanding its range to other islands or to the US mainland,  
where it could compete with native wildlife such as native squirrels and state and  
federally listed species such as the Key Largo woodrat. The potential damage to  
Florida's agricultural industry was also of concern as MRBS is a significant agricul-  
tural pest in its native range. The ongoing eradication program includes systematic  
drey surveys and removal, camera trapping, and nest box monitoring.

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**AN UPDATE FROM THE FRONT LINE – EVERGLADES  
COOPERATIVE INVASIVE SPECIES MANAGEMENT AREA**

Everglades Cooperative Invasive Species Management Area (ECISMA), is a formal partnership of federal, state, and local government agencies, tribes, individuals, and various interested groups that manage invasive species within a geographic boundary that includes the Everglades Protection Area, Miami-Dade and Broward Counties, and part of Palm Beach County. The subtropical climate of South Florida, its network of drainage canals, and ample natural areas has provided an attractive environment for the proliferation of invasive exotic plants and animals. The restoration of the Everglades also poses new challenges for invasive species management and has created a need for a more defined commitment to cooperation across borders. This presentation will feature several of ECISMA's EDRR initiatives and ongoing management efforts, including the creation of Friends of ECISMA (FOE Inc.) a 501(c)3 non-profit corporation.

**UNDERSTANDING PEOPLE'S WILLINGNESS TO  
IMPLEMENT MEASURES TO MANAGE HUMAN-BEAR  
CONFLICT IN FLORIDA**

In 2009 the Florida Fish and Wildlife Conservation Commission (FWC) commenced surveying individuals who reported bear-related conflicts. The purpose of this survey is to determine whether individuals take actions recommended by the FWC to reduce or eliminate conflicts. Using conditional logit analysis, we determine which factors influence the likelihood individuals will follow the advice provided by the FWC for managing bear-related conflicts. We find outreach efforts by the FWC increase the probability that people will alter their behavior to reduce human-bear conflicts. In general, the provision of specific advice on managing bear-related conflicts, for example proper trash handling to reduce bear access to garbage, increases the probability that people will implement this advice. Despite an increase in the number of reports of human bear conflicts, these results demonstrate that outreach efforts by wildlife agencies do alter human behavior to reduce human bear conflicts.

**MEXICAN PETUNIA (*RUELLIA SIMPLEX*) AS AN  
ECOSYSTEM ENGINEER: POTENTIAL EFFECTS ON SOIL  
NUTRIENT DYNAMICS (POSTER)**

Understanding mechanisms behind the invasibility of habitats is critical to restoring invaded natural lands. While nutrient enrichment from urban runoff has been shown to facilitate weed invasion, there are also instances of the plants themselves causing nutrient enrichment and promoting further invasion of the species. Mexican petunia (*Ruellia simplex*) is an invasive weed associated mainly with urban-wild-land interface riparian wetlands. Despite identification as a FLEPPC Category I invasive plant species, little is known about this species and its association with stormwater influenced soils. A survey revealed differences in soil characteristics between Mexican petunia- invaded and uninvaded sites, e.g., comparatively higher

# Abstracts Oral Presentations & Posters

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pH and NO<sub>x</sub> in Mexican petunia invasions. It is unclear if Mexican petunia invasion is the result of these differences or the cause of them. To explore the role Mexican petunia plays in creating these differences, a greenhouse experiment evaluated effects of Mexican petunia on the soil. Soil collected from uninvaded areas was seeded with Mexican petunia, or left to allow extant seed bank to emerge. Soil was analyzed after 5 months for nutrients, pH, and organic matter. Observing these differences in controlled conditions demonstrates how Mexican petunia is modifying soil nutrient dynamics, and will help focus research into productive avenues regarding control and restoration methods. Results from the proposed research are significant in that Mexican petunia invasions may serve as a model study system for weeds of natural and agricultural areas that modify soil characteristics.

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## **NEW DEVELOPMENTS FOR BOTH THE “IVEGOT1” SMARTPHONE APP AND THE “FLORIDA INVASIVE SPECIES PARTNERSHIP” WEBSITES.**

Technology is an ever-changing world. This presentation will show how the IveGot1 Smartphone Application and the Florida Invasive Species Partnerships (FISP) website portals to EDDMapS (Early Detection & Distribution Mapping System) have been updated. Those updates translate into benefits to the end user – You! EDDMapS is a web-based mapping system for documenting invasive species distribution. It is fast, easy to use, and doesn't require Geographic Information Systems experience. Launched in 2005 by the Center for Invasive Species and Ecosystem Health (Bugwood) at the University of Georgia, it was originally designed as a tool for state Exotic Pest Plant Councils to develop more complete distribution data of invasive species. FLEPPC (Florida Exotic Pest Plant Council) and FISP were some of the first groups to work with Bugwood to develop a tool to help make collecting data in the field easier, which resulted in the creation of the IveGot1 smartphone app. The app has been updated as needed and as new technology has allowed. Another important aspect of the work of updating is the work done on the websites used by Florida's CISMAs (Cooperative Invasive Species Management Areas) to coordinate efforts and to communicate information to their group and to the general public within their CISMA area.

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## **SELECTIVE CONTROL OF INVASIVE EXOTIC GRASSES**

Invasive exotic grasses, such as cogongrass (*Imperata cylindrica*), torpedo-grass (*Panicum repens*), natalgrass (*Rhynchoselytrum repens* or *Melinis repens*), and smutgrass (*Sporobolus indicus*), can be controlled with high rates of imazapyr or glyphosate, but what if there are desirable native plants worth saving? This paper will discuss methods for selectively controlling these grasses, that is, severely injuring these weeds while minimizing injury to desired native plants. Selective control involves consideration of the following: differences in tolerances of various plant species to different herbicides; different herbicide chemistry and mode of action; the rate of herbicide application; additives (such as surfactants); timing of application (season or growth stage); and directed application of herbicide to hit the target weed and miss the desirable plants. We have found that at lower rates of imazapyr (12 to 16 oz Habitat or Arsenal/acre) several native

species (including *Andropogon* spp., *Aristida beyrichiana*, *Eragrostis* spp., *Liatris* spp., *Chaemaechrista nictitans*, *Pityopsis graminifolia*, *Schizachyrium scoparium* var. *stoloniferum*, and *Solidago stricta*, *Helianthus angustifolia*, *Pinus* spp. and *Galactia* spp.) have greater tolerance than does cogongrass, thus making selective control possible. Natalgrass can be selectively controlled with imazapic (12 oz Plateau/acre), with the tolerant native plant list similar to that for imazapyr. Hexazinone (1 to 1.5 qt Velpar L/acre) can selectively control smutgrass and natalgrass (*Andropogon* spp., *Aristida beyrichiana*, *Pinus* spp. have some tolerance). Maidencane (*Panicum hemitomon*) tends to go dormant in late fall or winter while cogongrass or torpedograss are still metabolically active, thus allowing selective control with glyphosate or modest rates of imazapyr. Torpedograss can be selectively controlled with fluazifop-butyl (Fusilade DX), a grass selective herbicide. Natalgrass seed germination can also be controlled by application of pre-emergent herbicides in the summer following a burn. These and other examples will be discussed based on research and demonstration projects.

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## DECADAL CHANGES IN DISTRIBUTION AND ABUNDANCE OF FOUR PRIORITY INVASIVE SPECIES IN THE FLORIDA EVERGLADES (POSTER)

Four invasive, non-indigenous plant species—Australian pine (*Casuarina* spp.), Brazilian pepper (*Schinus terebinthifolius*), melaleuca (*Melaleuca quinquefolia*), and Old World climbing fern (*Lygodium microphyllum*)—are well established in the Greater Everglades region and are high priorities for control due to documented ecological impacts. The South Florida Water Management District, National Park Service, and other partner agencies have conducted region-wide aerial surveillance and mapping for these four species since 1993. The aerial survey program has two primary objectives: 1) determine the regional distribution and relative abundance of invasive plants targeted for management and 2) provide rapid and cost-efficient spatial data to land managers to direct control efforts. Data presented here were collected in 2003 and 2012-13 within the RECOVER Greater Everglades Module (excluding Corbett WMA). Biologists in low-flying aircraft made visual estimates of invasive plant locations and abundance along fixed east-west transects. Estimates of infestation area and canopy area were calculated for the 2012-13 dataset. Zonal analysis using a 4-km grid system facilitated assessments of landscape level changes in distribution and abundance of the four species between 2003 and 2013. Infestation area estimates in 2012-13 indicate that Brazilian pepper is the most abundant of the four species, occupying 14,442 ha within the module. This is followed by melaleuca (9,046 ha), Old world climbing fern (7,326 ha), and Australian pine (2,765 ha). Zonal analyses for each species suggest that the abundance of melaleuca, Brazilian pepper, and Australian pine decreased in the Greater Everglades Module between 2003 and 2013, although local increases in abundance were noted for Brazilian pepper (e.g., Cape Sable region). In contrast to these three species, Old World climbing fern increased in abundance and spatial distribution during the monitoring period. Specifically, abundance increased in the Loxahatchee National Wildlife Refuge and southwestern Everglades National Park, and distribution expanded in central and southeastern portions of the RECOVER module. Decadal changes of distribution and abundance of the four priority species reflect both the successes of management programs (e.g., interagency melaleuca management plan) and continued challenges of managing highly invasive species in remote areas of the Everglades.

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## FIRE ANTS IN SEA TURTLE NESTING AREAS: A DISTRIBUTION ANALYSIS OF INVASIVE ANTS IN SOUTH FLORIDA, USA, AND ST. CROIX, USVI

The red imported fire ant, *Solenopsis invicta*, is a South American native introduced in Alabama in the early 20th century, and it has spread throughout the southeastern US and parts of the West Indies, causing ecological and economic impacts. *Solenopsis invicta* attacks the eggs and hatchlings of ground nesting birds and reptiles (i.e., sea turtles). This study examines ant distribution on sea turtle nesting areas in St. Croix, USVI, and Boca Raton, FL, USA. We analyzed changes in invasive ant distribution at nesting areas in St. Croix, comparing a baseline survey conducted in 2006 with two follow-up surveys conducted in 2010 and 2014. In Boca Raton, we conducted a baseline distribution survey with four temporally independent replicates validating the survey methodology by finding consistency in species distribution over multiple days. We performed the Chi-Squared Test comparing the ratios of native versus exotic over the three surveyed periods in Sandy Point and the two surveyed periods (2011 and 2014) in Jack Bay, St. Croix. We performed the same test comparing the ratios of *Solenopsis invicta* versus *Solenopsis geminata* over the three surveyed periods in Sandy Point, St. Croix, because no fire ant species was detected in Jack Bay. Our results indicated no significant difference in the ratio of native versus exotic species in Sandy Point, St. Croix, from the baseline study in 2006 to the follow-up surveys in 2010 and 2014. P-values for native and exotic ratios were 0.21 and 0.41 respectively. For Jack Bay, the results indicate no significant difference between the baseline survey in 2011 and the follow-up survey, with p-values for native and exotic ratios at 0.92 and 0.14 respectively. For the Boca Raton baseline survey, we used the same test comparing the ratios of native versus exotic and the ratio of sites with *Solenopsis invicta* among the four replicates and testing the consistency of the surveying methods. Our results indicated that there was no significant difference in the ratio of native versus exotic or *Solenopsis invicta* among the four replicates, with p-values at 0.7 and 0.63 respectively.

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## FLORIDA CONSERVATION CORPS PROJECT A.N.T: A FOCUSED FORCE (POSTER)

The mission of the Florida Conservation Corps (FLCC), formerly Florida State Parks AmeriCorps, is to provide civic service programs that develop natural and cultural resource leaders by connecting them to areas of critical need in conservation, preservation, interpretation, and resource based recreation. Now in its third year, the FLCC Project A.N.T. (AmeriCorps Non-native plant Terminators) program focuses the energy and enthusiasm of its members on improving invasive exotic plant management in Florida state parks. In 2013, from February through December, 47 members assigned to state parks, mostly in pairs, focused their time and effort on a three prong approach to invasive exotic plant management: treatment, detection and prevention. The result of their combined 74,026 hours of work was the treatment of over 10,000 gross acres of invasive exotic plants, nearly 16,000 acres surveyed for infestations along with conducting 357 educational programs and recruiting more than 2,273 new volunteers. For 2014, 50 fulltime members will continue to be a focused force, assigned in pairs to state parks across Florida again performing invasive exotic plant management through treatment, detection and prevention. During this year, an emphasis is being placed on volunteer recruitment and training, with the goal of members developing a dedicated group of volunteers, or Volunteer Invasive Exotic Plant Strike Teams, that will expand the efforts and carry on after the members have completed the program. Additionally, the Project A.N.T. program is looking to develop partnerships with other public land agencies



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to expand the positive impact beyond state parks as well as providing the member with other agency experiences and contacts in the field.

**BEYOND INITIAL HERBICIDE APPLICATIONS: CONVERTING MEXICAN PETUNIA (*RUELLIA SIMPLEX*)-DOMINATED FLOODPLAINS TO NATIVE PLANT**

Active revegetation with native species may be one method to limit reinvasion of invasive plants, but methods for this approach are under researched. To explore this issue, we researched invasions of Mexican petunia (*Ruellia simplex*), a commonly planted ornamental known for invading natural areas throughout the southeastern United States. Mexican petunia invades natural areas and displaces native plant communities, is listed as a FLEPPC Category I invasive, and is not recommended for use in Florida by the UF/IFAS Assessment. Land managers have emphasized the need for control of Mexican petunia invasions, yet little information is available on effective control and management methods. A single application of glyphosate during the fall or spring has proven to be enough to limit Mexican petunia; however, lack of native species establishment following invader control limits restoration of the native plant community and facilitates further potential reinvasion. Active revegetation with native species may promote native species establishment, and further limit reinvasion, but methods are not established. In a greenhouse competition study between Mexican petunia and select native species establishment from seed, we found that a broad mix of native species suppressed Mexican petunia, suggesting that seeding a broad mix of natives may suppress Mexican petunia in formerly invaded floodplains. Although this finding is encouraging, more research is needed to increase effectiveness of revegetation efforts through limitation of invasive ornamental propagules and use of soil characteristics to guide revegetation efforts.

**UPDATE OF THE FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION UPLAND EXOTIC INVASIVE PLANT MANAGEMENT PROGRAM**

The FL Fish & Wildlife Conservation Commission, Invasive Plant Management Section, Upland Plant Program has been funding exotic plant control throughout the state of Florida since 1999. This talk will discuss the section's past, present, and future efforts to control exotic plants and discuss new requirements for submitting proposals for plant control monies.

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**WHAT IS CAUSING THE DECLINE OF MARSH RABBITS IN THE EVERGLADES?**

Marsh rabbits were once a commonly encountered member of south Florida's mammalian fauna but have apparently suffered drastic declines in parts of their range, specifically Everglades National Park. Declines in marsh rabbit sightings over the last ten years coincide with increasing observations of invasive Burmese pythons (*Python molurus bivittatus*). However, other factors such as changes in habitat quality brought on by altered hydroperiods and fire frequency may coincide with the decline as well. We evaluated several potential hypotheses for marsh rabbit decline in south Florida utilizing an occupancy modeling framework. We assessed 84 sites throughout the ecosystem for marsh rabbit occupancy, vegetative structure, changes in hydrology, and distance from the python invasion epicenter: Flamingo, FL. We then used vegetative structure, changes in hydrology, and distance to Flamingo, FL, as predictor covariates to model the probability of site occupancy. Marsh rabbit detection was high (0.84), and the best performing model included only one explanatory variable, distance from the python invasion epicenter, to predict marsh rabbit occupancy ( $0.05 + 0.005$ ). Estimates of site occupancy ranged from 0 to 1 as distance from the invasion epicenter increased over 120km. These results strongly indicate that invasive pythons have a significant impact on marsh rabbit distribution in south Florida.

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**CONTROLLING AIR POTATO WITH THE HELP OF VOLUNTEERS**

Air potato (*Dioscorea bulbifera*) is a fast growing, established, exotic, invasive vine from Asia and north Africa. In central Florida it is one of the most prevalent exotic invasive species. The Seminole County Natural Lands Program began holding an air potato (*Dioscorea bulbifera*) raid event open to the public in 2004 at the Spring Hammock Preserve in Longwood. At this time, the air potato infestation was estimated at 120 acres. Ten years, ten events, four invasive species removal grants and over 40,000 pounds of air potato later, the infestation on the property is finally coming under management control. We attribute this success to our thousands of volunteers who have helped remove the bulbils from this property every year (reducing the seed source on-site).

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**UPDATE ON PRAXELIS CLEMATIDEA; A NEW EXOTIC IN FLORIDA**

*Praxelis clematidea* (Kuntze) R.M.King & H.Rob. a native of South America, was first discovered in Florida by University of Florida researchers in 2006 where it was found growing in several localities in Orange County. A year later in 2007, the plant was found in Lake County by Florida Fish & Wildlife Conservation Commission (FWC) researchers during routine monitoring of a ground cover restoration site at Hilochee Wildlife Management Area. We had difficulty identifying it for several years because the morphological characteristics of the plant did not match up with any identification keys available at the time. The species was first positively described by J. Richard Abbott, C. LeAnn White, and S. Barry Davis from the University of Florida, who published their discovery in the Journal of the Botanical Research Institute of Texas in 2008. This species is not only new to Florida but is also a new species for all of North America. Subsequently, *P. clematidea* was included in the 3rd edition of Wunderlin and Hanson's Guide to the Vascular Plants of Florida published in 2011. Since then, *P. clematidea* has been documented in 3 additional Central Florida counties including Hardee, Manatee, and Polk, where

it appears to be encroaching on the Lake Wales Ridge. It is unclear how long *P. clematidea* has been in Florida or how it got here. It can easily be mistaken for look-alike species, including those of *Conoclinium* and *Ageratum* genera. This makes it hard to detect, which has also been a problem in other countries such as Australia and China, where the plant now poses a significant threat to native flora and agriculture. It appears to be strongly associated with disturbed sites and orange groves. Land managers should be on the lookout for this species in these types of habitats, and all *Conoclinium* and *Ageratum* occurrences should be inspected for the presence of *Praxelis*. *P. clematidea* can easily be distinguished from all look-alikes by the distinctive pungent cat urine-like odor emanating from the plant when the leaves are crushed.



Photos by R. Mindick

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# FLORIDA'S Water & Land Legacy

<http://www.voteyeson1fl.org/>

Amendment 1 gives Florida voters a direct opportunity to keep drinking water clean, protect our rivers, springs and beaches and restore natural treasures like the Everglades—without any increase in taxes.

We owe it to our children and grandchildren to protect Florida's water quality, natural areas, beaches and wildlife, so future generations can enjoy them the same way we do!

## **Florida's Amendment 1 Placed on November Ballot**

Stephanie Carroll Carson From Public News Service

This November, Florida voters will have the chance to take part in a historic vote. The Legacy Amendment – now classified as Amendment 1 – will be on the ballot. If it passes, it would dedicate a portion of the state's real estate transfer fee to water and land conservation.

Manley Fuller, president of the Florida Wildlife Federation, says the consistent funding stream is necessary to protect one of the state's greatest environmental and economic resources. "Florida has experienced tremendous population growth," he points out. "It has incredible natural resources, but we believe that we need a long-term, steady commitment of resources for our conservation lands."

If passed, 33 percent of the state's documentary stamp tax revenue – paid when real estate is sold – would be dedicated to land conservation, provide for outdoor recreation, managing existing lands and protection of lands critical to the water supply. Fuller reminds voters this is not a new tax, just an allocation of what they're already paying. "We think that this is a win-win situation for Florida," he says. "And the voters have the opportunity to express their opinion in November 2014 on the Legacy Amendment."