

# Turtle River Times

The Newsletter of the A.R.M. Loxahatchee National Wildlife Refuge

Issue 10  
Nov. 2005 - Apr. 2006

## Alien Snails

by Drs. Timothy Collins & Timothy Rawlings, Dept. of Biological Sciences, Florida International University

Alien snails are Sneaking into Loxahatchee National Wildlife Refuge !

Florida's wetlands are home to only one native species of freshwater apple snail, *Pomacea paludosa*, whose presence is most commonly revealed by its distinctive pinkish-white eggs found on emergent aquatic vegetation. [Fig 1] While many of you who regularly paddle the 5.5-mile canoe trail may never have seen these largely nocturnal apple snails, you will undoubtedly have noticed their egg masses during the spring and summer months when female snails emerge from the water to spawn. Puzzling

to some of you perhaps, has been the appearance over the past few years of egg masses of different shapes and colors on emergent vegetation in the Refuge. Paddle the canoe trail in early June and you are likely to see not only the distinctive pinkish-white eggs of the native apple snail, but also egg masses that are salmon, lime-green, and even vibrant pink in color. [Fig 2, Fig 3, Fig 4] Are these produced by native apple snails with artistic flair? Unfortunately not. These egg masses bear witness to the presence of at least three intruders on the scene: species of *Pomacea* that have entered our native wetland habitats from South America [Fig 5].

How can a South American apple snail suddenly appear in Loxahatchee National Wildlife Refuge? Ongoing



Figure 1: An egg mass of Florida's native apple snail, *Pomacea paludosa*, along the LNWR canoe trail.

research in Dr. Collins' laboratory (Department of Biological Sciences, Florida International University) is attempting to address just this by asking: Who are these intruders? Where did they come from within South America? By what means did they get here? You might wonder why we care about which species have been introduced. The answer is that species differ in many characteristics, including food and habitat preferences, tolerances to environmental conditions, longevity, growth rate, and reproduction. Knowing which species have been introduced should help

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**Figure 2:** A salmon-colored egg mass of the spike-topped apple snail, *P. bridgesii*, in the Refuge. Note the compact honeycombed nature of the egg mass compared to the individual grapelike *Pomacea paludosa* eggs.

us to predict how well these species will survive and reproduce within the Refuge, and ultimately, the threat that they pose to our native aquatic habitats.

How do we identify these species? Just as a forensic scientist uses DNA fingerprinting to catch a villain, we are using snail DNA to determine the species identity of these snails, to match them to their source populations in South America, and to identify the means by which they are being introduced into South Florida. The most likely mechanism for introduction is through the aquarium pet trade which routinely

stocks colorful apple snails from such countries as Peru, Brazil and Argentina. As is too often the case, once aquarium snails outgrow their tanks, pet owners release them into local canals and lakes, resulting in the introduction of "exotic" snails into Florida's wetlands. Given the propensity of these snails to lay their eggs on hard surfaces, including boat hulls and trailers, once snails are in one wetland area, movement to neighboring areas can occur quite rapidly.



**Figure 3:** The lime-green egg masses of another South American invader tentatively identified as *P. haustrum*. One ripe egg mass is shown in situ, while a fresh egg mass is presented in close-up view. A nickel is provided for scale. Look for these egg masses a little deeper in the vegetation along the canoe trail.

Should we be concerned about the presence of exotic *Pomacea* within the Refuge? The short answer is yes. Channeled apple snails, the producers of the vibrant pink egg masses, are part of a species group that has been introduced to Southeast Asia, causing dramatic changes to native aquatic ecosystems and millions of dollars worth of damage to agricultural crops such as rice and taro. Many of the changes to native wetlands

have resulted from the sheer volume of aquatic plants consumed by these voracious herbivores, changing aquatic ecosystems once dominated by large fleshy plants to ones dominated by microscopic planktonic algae. Other exotic snails, however, may have more benign effects as herbivores: the spike-topped apple snail, producer of the salmon-colored eggs, appears to feed on particulate material and not large macroscopic plants, and thus may have less dramatic effects on Florida's aquatic habitats. Clearly, it is important for us to know more about the ecology of each snail species to predict the effects of their introduction. Identifying the native range of these snails is an important aspect of this, as is tying into previous research on these snails in South America.



**Figure 4:** The pink egg mass of an exotic channeled apple snail. This species belongs to a species complex known as the "canaliculata-group", although its exact identity has yet to be determined. These egg masses are starting to appear in the Refuge. Note their beaded appearance compared to the honeycomb-like egg masses of *P. bridgesii* and *P. haustrum*.

And what about our native apple snail? How will these introduced snails interact with *Pomacea paludosa*? Will they compete with it for food? Will exotic and native apple snails interbreed? [Fig 6] As yet, these are questions that we just can't answer for certain, but we are concerned. The native apple snail is the primary prey item of the Everglade snail kite and is also an important food item in the diets of limpkin, grackles, alligators, turtles and even some fish. Will these exotics be equally tasty? Will snail kites be able to handle the large channeled apple snails or feed on them as efficiently? Remains of channeled apple snails at some locations bear the hallmarks of limpkin predation, so some potential predators are feeding on these snails at least [Fig.7]. Finally, apple snails are intermediate hosts to a variety of parasites that affect vertebrate hosts. At present, we have no idea about the diversity or identity of parasites within these introduced species, or the effect these parasites may have on native species. While we clearly have more questions than answers, there is little doubt that these



Figure 5: What do these South American invaders look like? Shown here are two views of adult shells of: *P. bridgesii* (top left), *P. haustrum* (top right), *P. "canaliculata-group"* (bottom, left), and *P. paludosa* (bottom, right), all collected from Florida's wetlands. Many of these exotic apple snails can grow to substantially larger sizes than the native apple snail. A quarter is included for scale.

introduced species may affect native ecosystems and species in many different ways.

What can you do to help stop the spread of exotic apple snails within the Refuge? Given that the snails themselves can be difficult to find and collect, the easiest way to control these exotics is to target their egg masses. Of particular concern is the spread of the channeled apple snail. Channeled apple snails have the ability to grow to enormous sizes, spawn prodigiously, spread quickly, and severely alter aquatic habitats. Currently, these

snails are evident within canals surrounding the Refuge boundaries and a few egg masses have recently been reported within LNWR. If you see these egg masses, please report their location to LNWR officials at the Visitor Center. Only through public participation will we be able to stop the spread of these intruders.

Contributors: Dr. Tim Rawlings & Dr. Tim Collins; Funding for their ongoing research on the native apple snail is provided by the U.S. Fish and Wildlife Service.



Figure 6: A channeled apple snail egg mass laid on the same plant stem as the egg mass of our native species. What does the introduction of this exotic species mean for *Pomacea paludosa* and our native aquatic habitats? Note that the pink egg mass contains over 10 times as many eggs as the egg mass of the native apple snail.



Figure 7: Evidence that some potential predators are feeding on exotic apple snails. The holes in this channeled apple snail shell reflect limpkin predation.

## “Putting Faces to Names”

by Krista Markwardt, Refuge Ranger

### *William Miller, Refuge Biologist*



The refuge is pleased to welcome William Miller, Refuge Biologist, to the Loxahatchee team. He comes to us from the Key Deer National Wildlife Refuge where he was the Deputy Project Leader. Bill has a Bachelor's degree in Forestry (Forest Resources and Conservation) from the University of Florida and obtained his master's degree in Earth Science (Fluvial System Restoration) from the University of North Carolina. As the Refuge Biologist, he is responsible for administering refuge related science and management including exotics control, water coordination,

impoundment management, LILA coordination, staff management and general refuge biology. Welcome Bill!

### *Mark Barrett, Wildlife Biologist*

We are pleased to welcome Mark Barrett to the Loxahatchee team. Mark comes to us from the University of South Florida where he was a research assistant and teaching assistant in the Biology Department. He has a PhD in Ecology with an emphasis on plant-animal interactions and community ecology from the University of South Florida. As part of the Loxahatchee team, Mark assists in exotics control, vegetation monitoring (relative to exotics, fire effects, and water quality), and with research projects at the refuge associated with universities and other agencies. Welcome Mark!



### *Tiffany Trent, Biologist*



Tiffany Trent comes to us from the University of West Florida in Pensacola where she was involved in a predation study with apple snails and their various predators (turtles, crayfish, bony fish). She has a Bachelor's degree in Marine Biology from the University of Western Florida and is currently working towards a Master's degree in Marine Biology at Nova Southeastern University. Tiffany assists the Enhanced Water Quality team, calibrating equipment and collecting water quality samples. Welcome

Tiffany to the Loxahatchee team!

## Meet the Staff

**Project Leader....** Mark Musaus

**Deputy Project Leader....** Rolf Olson

**Administration....** Kim Arserio, Jean Ryan

**Everglades Program Team....** Nick Aumen, Matt Harwell, Leslie MacGregor, Jose Quinones, Donatto Surratt, Michael Waldon

**USFWS Ecological Services....** Cindy Brashear

**Law Enforcement....** William Calvert, Jared Klein

**Wildlife and Habitat Management....** Mark Barrett, Laura Brandt, Jennifer Hinckley, Kevin Maier, Gayle Martin, William G. Miller, Don Napier, George Pelt, Rob Smith, Tiffany Trent

**Maintenance Operations....** Manuel Garcia, Jerry Grist, Allan Hansen, Steve Matzkow

**Environmental Education & Interpretation....** Lois Chapman, Krista Markwardt, Serena Rinker

**Fee Staff....** Keith Boliek, Lew Hecker, Marie Pohl

**LILA On-site Manager ...** Eric Cline (SFWMD)

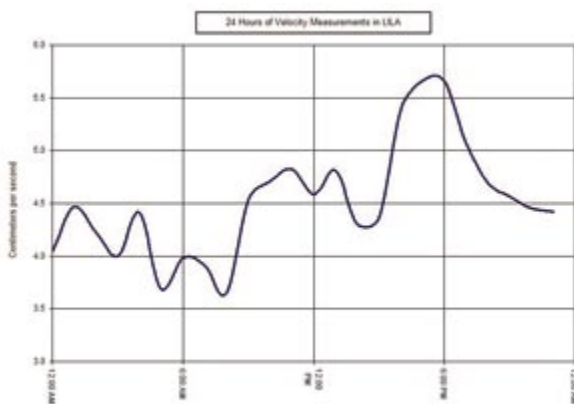
## LILA Newsletter Update: Fall 2005

by Eric Cline, LILA on-site Project Manager

The Loxahatchee Impoundment Landscape Assessment project or LILA, is a one of a kind ecological restoration and assessment project located on the Refuge. The South Florida Water Management District (SFWMD) has partnered with the U.S. Fish and Wildlife Service as well as the Army Corp of Engineers to create a landscape size replica of the Everglades. LILA is a tool that will help scientists, engineers and the general public better understand the effects of flowing water on the soil, plant, and wildlife communities of the Everglades.

So how fast can we make water move through LILA? This was the question that we asked in the last newsletter, and since then much progress has been made in answering it. Researchers from Scotland, Florida International University (FIU), and the SFWMD came together in an attempt to resolve that question and one other; how fast does the water need to move in order to carry soil particles downstream? Scientists think that this movement of soil by flowing water is very important for the restoration of the Everglades. So what did we learn?

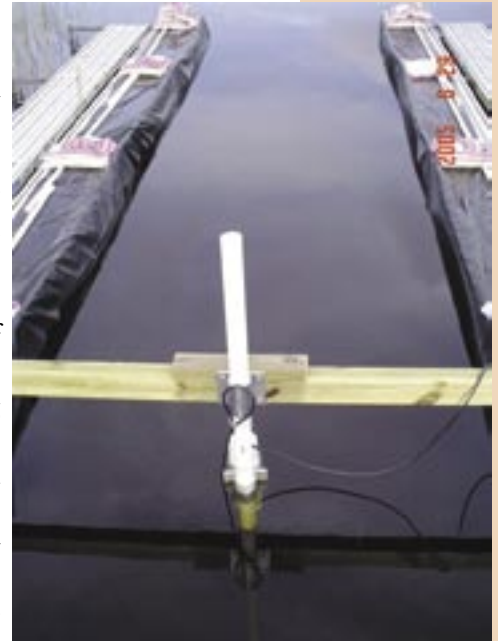
The graph shown below shows the speed of water moving through a structure called a flume that we built in two of the LILA macrocosms.



This graph is showing data generated from a velocimeter in the flume

The fluctuation in water velocity is due to wind, cycling of the pump and localized currents or eddies. This is normal and what we find in the natural system. This data is very encouraging. We are learning how

to operate LILA in order to mimic the hydrology of the Everglades. Scientists think that historically water in the Glades flowed very slowly, one to two centimeters per second. If we can mimic those flows (and faster) we can test our hypothesis about the importance of moving water in shaping, maintaining and restoring the natural system. We are still analyzing the data to find out how much soil movement was generated by this fast moving water (on average 4.5 centimeters per second over two weeks).



This is a flume, the instrument you see is measuring water velocity

Over the next few months, the LILA scientists will continue to measure water movement and velocity throughout the system. We are still fine-tuning the operation of LILA to match the way water moves through the Everglades during both the wet and dry seasons. We are also preparing the tree islands for a second round of tree planting. This may include using prescribed fire to clear out non-woody plants that may out-compete the newly planted trees. Plans are also being made to continue our investigations of fish vulnerability and movement, in the hopes to get a better understanding of how that relates to wading birds feeding and ultimately nesting success.



Wood storks, spoon bills and other bird species feeding in LILA

## USGS Assists Refuge in Distribution of Information

by Dr. Laura Brandt, Senior Wildlife Biologist

Thanks to SOFIA Webmaster, Heather Henkel (USGS), information on two Refuge projects is now available on the internet. Heather worked with Refuge staff to set up web pages on South Florida Information Access (<http://sofia.usgs.gov/>) for the Enhanced Water Quality Project ([http://sofia.usgs.gov/lox\\_monitor\\_model/](http://sofia.usgs.gov/lox_monitor_model/)) and the Annual Science Workshops (<http://sofia.usgs.gov/workshops/lox-nwr-scimtg/index.html>).

South Florida Information Access (SOFIA) is an interdisciplinary service that provides coherent information access in support of research, decision making, and resource management for the South Florida ecosystem restoration effort. Sponsored by the USGS Priority Ecosystems Science (PES), SOFIA offers a suite of information systems and tools enabling the selection, organization, documentation, dissemination and storage of data and other information products.

SOFIA focuses on the projects and products of the South Florida PES Initiative, as well as related projects and products from other information providers, including federal, state and local agencies; universities; and non-governmental organizations.

SOFIA personnel include a cross-bureau team of scientists, information managers, and informatics specialists, working in close collaboration with partner and client agencies outside the USGS.

Heather has been a Webmaster since 1995 and has worked for USGS since 1997. She has a BS in Biology from University of Wisconsin (UW) and is working on an MS in Information Technology from Carnegie Mellon. She had her first experiences with web design while at UW where she helped to develop UW's first online course. When asked what she enjoys most about working on the website she replied: "I love the fact that I'm able to use my background in science and work as webmaster for the Survey (USGS). There's so much great science done in our organization, and I feel that I help make our science stronger by building a website that provides quick and easy access to that information."

Heather made it very easy for Refuge staff to get our information on the SOFIA site. We look forward to working with her to make more Refuge science

information available in this manner. Check out SOFIA and the Refuge related web pages.



## Everglades – Florida's River of Life Everglades Day Festival 2006

Everglades Day Festival 2006 is coming! Yes, make sure you mark your calendars for Saturday, February 11, 2006 from 8:00AM to 4:00PM. The Everglades Day Festival is the Refuge's annual major event and is planned in partnership with the Audubon Society of the Everglades and the Friends of the Arthur R. Marshall Loxahatchee National Wildlife Refuge. Through exhibits, special programs, tours, children's activities and music, the festival promotes an awareness and understanding of the significance of our fragile Everglades ecosystem.



Each year, our festival has a theme, and this year is no exception. Our theme this year is "Everglades – Florida's River of Life." Join us for a fun-filled day of food, music, and activities. Special programs for children and an up-close experience with wildlife make this a

wonderful opportunity for a family friendly, free event. See you February 11th!!



## Impoundment update - November 2005 to May 2006

by Bill Miller, Refuge Biologist

**LILA** - The Loxahatchee Impoundment Landscape Assessment (LILA) project came online early in 2005 and according to Eric Cline, site manager for the SFWMD/FIU partnership group, is meeting expectations. Water began circulating regularly through macrocosms in compartments C-3 and C-4 to facilitate LILA activities. One significant change is the lower water levels seen in the center canal. The canal is being kept below historic stages to create a flow gradient for LILA. To manage for low canal stage, water must be indefinitely pumped into eastern C compartments. To fix this problem, refuge staff installed a system of culverts and risers (fig 1) to provide gravity fed flow from upper A compartments to and through C compartments. This eliminates the need for pumping and provides for a fully independent operation of eastern C. Infrequent pumping events save the refuge time and money. Best of all, east impoundments will be relatively free of noisy pumps which should add to the wildlife experience for our visitors.

**Prescribed Fire** - Our impoundments were not burned in May as planned. The refuge found itself out of prescription for most of this time due to high water levels and above average rain events. Simply put, we did not have the conditions we expected to safely and effectively use fire to manage the compartments. A prescribed fire in a compartment with too much water does not promote optimal plant response. Plant tops are burned back but root and stem systems remain, which cause rapid vegetative responses. Unfortunately, when a window of appropriate conditions existed, resources such as personnel from other refuges, who broaden our experienced staff with equipment operation and years of prescribed fire skills, was unavailable for a safe prescribed fire. Our plan called for burning compartments C-1, C-7, and C-9 in May, 2005 in preparation for this winter's avian use. In preparation for the prescribed fires, Compartment C-9 (fig 2), a small portion of compartment C-7, and parts of compartment C-1 were herbicided. Staff plans to burn these compartments during the early spring months of 2006, but may try a winter burn if conditions and resources are available.

**Research/Projects** - Two research projects are scheduled in the C impoundments for 2005/2006. After the prescribed fires in C-7 and C-9 impoundments, several test plots will be established to examine the viability

of growing native wildlife food plants. For example, propagating soft bulrush (*Scirpus validus*) can provide food and cover for wildlife, including fish, mammals, marsh birds and waterfowl. Soft bulrush seeds were collected within the refuge and will be spread in plots set up on the dry soil of the impoundments after the burn. The plots will be monitored to see if the plants germinate and grow. Hopefully, this propagation will provide added resources of native food plants to entice wildlife into the impoundments. The second project will be post-burn bird surveys. Pre-burn bird surveys within the impoundments will be followed up with post-burn surveys to determine the effect of the prescribed fires on bird use of the impoundments. In addition to monitoring efforts, staff plans to herbicide emergent hardwood such as Primrose in compartment C-10. Compartment C-10 was prescribed burned in 2004 and is already showing signs of vegetative growth which limits available foraging area. Staff also plans to construct ponds in Compartment C-10 in an effort to offer greater diversity of refugia for avifauna.

**Bird Use** - Over the past winter months, bird use of the C-10 compartment was very high and we expect the same for our 05/06 winter season. Mottled ducks, blue-winged teal, green-winged teal, and even ring-necked ducks utilize C-10 as do common snipe, killdeer, black-necked stilts, solitary sandpipers, greater yellowlegs, western sandpipers, and roseate spoonbills. Birds were witnessed foraging in mudflats created by past prescribed burning events. Currently, vegetation continues to re-grow in the burned area, though openings in the vegetation persist. In 2005, continued management efforts, such as prescribed fire, will maintain these openings that provide excellent foraging habitat for wading birds, including wood storks – commonly sighted in C-10 in past observations. Plans to cookie cut Compartments C-6 and C-7 by late December 2005



**Figure 1.** Part of the new riser and culvert system designed to manage water inputs and outputs of the east compartments.

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Figure 2. Pre burn image of Compartment C-9.

will help to ensure forage and refugia for wildlife, including snail kites and perhaps rare visitors such as snow geese as seen in the previous year. Finally, nest boxes will be repaired and maintained for wood duck management within impoundments.

**Exotic control** - Impoundments will be treated mechanically and chemically to control non-native and invasive plant species that can out-compete native vegetation. This will aid in maintaining native plant diversity and allowing native food plants to thrive, providing resources for native wildlife. Invasive species control will also aid in maintaining open areas in the impoundments, including canals around impoundment perimeters, to entice waterfowl and other wildlife.

## What have the Friends Done for the Refuge Lately?

by Mitch Rosenheim - President Friends of Loxahatchee Refuge

Just in case you are unaware, this Refuge, like more than 200 National Wildlife Refuges in all 50 States, has a non-profit group of concerned citizens who assist the professional staff of the Refuge in a myriad of ways. Thanks to the generosity, in both time and money, of our membership of 400+, we have been able to fund the needs of the Refuge in the following ways:

Design and Printing of 5000 copies of a new Visitor's Guide to The Refuge	\$4,458
Contribution toward construction of a new fishing pier on the L-40 Canal	\$6,500
Funding the printing and postage for Turtle River Times	\$6,141
Purchase of a new computer system for the Visitor Center Staff	\$3,057
Two months salary for the gatekeeper when federal funding ran out	2,107
New Weber BBQ for Refuge functions	\$687
Prize money for the annual photo contest	\$1,600

This is just a partial list. Yes, money certainly does talk, but behind every dollar donated there are many, many hours of dedicated work by our members in cooperation with the professional Refuge staff, to make it happen. We appreciate the spirit of both our membership and the career employees of the U.S. Fish and Wildlife Service which make possible our continued enjoyment of the Arthur R. Marshall Loxahatchee N.W.R. If the gators, deer, birds (and insects too) could speak I know they would say a heartfelt: "THANKS".

### Please Join Us

• **Membership Application** •  
**Friends of the Arthur R. Marshall  
 Loxahatchee National Wildlife Refuge**

- |   |   |
|---|---|
| <input type="checkbox"/> Individual \$15.00 | <input type="checkbox"/> Student (to age 18) \$5.00 |
| <input type="checkbox"/> Family \$25.00     | <input type="checkbox"/> Supporting \$50            |
| <input type="checkbox"/> Organization \$100 | <input type="checkbox"/> Contribution _____         |

Please mail this form to:

Friends of the Loxahatchee Refuge  
 P.O. Box 6777  
 Delray Beach, FL. 33482-6777

Make checks payable to:

"Friends of the Loxahatchee Refuge"

If paying by credit card please indicate:

\_\_\_ Visa \_\_\_ MasterCard \_\_\_ Discover

Credit Card # \_\_\_\_\_

Expiration Date \_\_\_\_\_

Signature \_\_\_\_\_ Phone \_\_\_\_\_

Name (please print) \_\_\_\_\_

E-Mail \_\_\_\_\_

Street \_\_\_\_\_ City \_\_\_\_\_

\_\_\_\_\_ Zip \_\_\_\_\_

For further information about the Friends of the Refuge please contact:

Arthur R. Marshall National Wildlife Refuge  
 10216 Lee Road  
 Boynton Beach, FL 33437-4796  
 (561) 734-8303 or (561) 732-3684



## Hurricane Wilma Ravages Refuge

Hurricane Wilma dealt some heavy blows to both the natural environment and manmade structures on the refuge. Snapped trunks on trees seemed to be especially evident on the west side of the islands surveyed in the refuge interior. Ten to twenty percent of the cypress trees in the swamp had snapped tops. In addition some cypress trees were tipped over and some other under story trees such as strangler fig suffered heavy losses.

Our administration building suffered heavy damage and is condemned. We hope that it will be replaced within two years. Many of our signage kiosks were mildly damaged and some were totally destroyed on both the marsh and canoe trails. The cypress swamp boardwalk was heavily damaged in some sections and the boardwalk will remain closed until repairs can be made for public safety. All refuge entrances have reopened.

In addition, some of our staff has been temporarily relocated to our visitor center auditorium. We hope to have the use of the auditorium by late January or early February but please contact us to verify the programs scheduled for that time.



Walkway and supports severely damaged on the Cypress Swamp Boardwalk



Destroyed Everglades Trail kiosk at the beginning of the Marsh Trail



Blown down Canoe Trail sign



Even cypress trees didn't escape Wilma

## Regular Activities and Events Descriptions

(see calendar for dates, places, & times)

**Morning Bird Walks** – This one-mile is for the birds and the early risers. Bring binocular, field guide, and insect repellent.

**Sunset Birding** – Late-day sightings may include night-herons, nightjars, and snail kites. Bring binocular, field guide, and insect repellent.

**“Canoeing the Everglades”** – Take a two hour journey through the Everglades with an interpreter on our canoe trail. Bring or rent canoe, PFD, water, sun/rain protection, and insect repellent. **RESERVATION REQUIRED Call 561-734-8303**

**“All About Nature” Walks** – Join a naturalist for a discovery tour of the plants and animals that call the refuge home.

**Swamp Strolls** – Enjoy the beauty of a cypress swamp from a half-mile-long boardwalk trail. Learn about “swamp tea,” floating plants, and thigmotropism as a naturalist reveals some of the swamp’s secrets.

**Butterflies & Wildflowers Walks** – Join a volunteer naturalist in search of these small colorful wonders of the Refuge.

**Reptile/Amphibian Program** - Learn about the refuge’s “gators,” lizards, snakes, and frogs when you join a naturalist in the search of the often shy and elusive creatures.

**Florida’s Gators & Crocs** – Friday, 27th, 1:30PM (VC) – Hobe Sound Nature Center Naturalist Pete Quincy, will unlock the mysteries of these fascinating reptiles.

### February, 2006

**Everglade’s Day** – Saturday, 11th, 8:00AM – 4:00PM – The day’s events include birding, family walks, hands-on activities, music, food, children’s activities, exhibits, and live programs. More info at 561-734-8303.

**Research – What’s Up?** – Wednesday, February 15th, 1:30PM (VC) – Senior Wildlife Biologist, Dr. Laura Brandt discusses research and monitoring on the refuge, findings, and plans for future studies.

### March, 2006

**Scat ID Workshop** – Thursday, March 23rd, 2:00PM (VC) – Join Interpretive Specialist Serena Rinker as she shows that you don’t have to see an animal or its tracks to know that it has been there.

## Refuge Hours & Fees

The refuge is open to the public from sunrise to sunset daily. Exact times are posted at each entrance and change with the hours of daylight. Currently the refuge opens at 5:00AM and closes 6:00PM.

The refuge visitor center hours of operation are Wednesday through Friday from 9:00AM to 4:00PM and on Saturday and Sunday from 9:00AM to 4:30PM. The visitor center is closed on Thanksgiving Day and Christmas Day but all trails and entrances will remain open.

A fee of \$5.00 is charged to private vehicles entering the refuge. When the fee booth is unmanned, visitors are subject to the honor system and should pay at the fee shelter next to the fee booth. Various passes are available. Check at the Visitor Center or Fee Booth for details.

## Special Programs

### January 2006

**23rd Annual Photo Contest** – Entries can be mailed or delivered in person to the Refuge Visitor Center between January 3 and 18, 2006. Information, contest rules, and entry forms will be available in the Visitor Center or on our web site at <http://loxahatchee.fws.gov>.

**Wildlife Around Us** – Friday, 20th, 1:30PM (VC) – Debbie Fritz-Quincy of the Hobe Sound Nature Center will give us a “live” look at some of Florida’s native animals.

## Loxahatchee Events Schedule - Dec. 4, 2005 - Jan. 14, 2006

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
December 4 Reptiles/Amphibs 11:00AM (MT) Swamp Stroll 2:00PM (VC)	December 5	December 6	December 7 Bird Walk 7:30AM (MT)	December 8	December 9	December 10 Bird Walk 7:30AM (MT)
December 11 Nature Walk 11:00AM (MT)	December 12	December 13	December 14 Bird Walk 7:30AM (MT)	December 15	December 16	December 17 Bird Walk 7:30AM (MT) *Canoe Trip 8:00AM (HQBR)
December 18 Swamp Stroll 2:00PM (VC) Sunset Bird Walk 4:00PM (MT)	December 19	December 20	December 21 Bird Walk 7:30AM (MT)	December 22	December 23	December 24 Bird Walk 7:30AM (MT)
December 25 Christmas Day Visitor Center Closed, All Trails will be Open	December 26	December 27	December 28 Bird Walk 7:30AM (MT)	December 29	December 30	December 31 Bird Walk 7:30AM (MT) *Canoe Trip 8:00AM (HQBR)
January 1 New Years Day Visitor Center & Trails are Open Swamp Stroll 2:00PM (VC)	January 2	January 3	January 4 Bird Walk 7:30AM (MT)	January 5	January 6	January 7 Bird Walk 7:30AM (MT)
January 8 Reptiles/Amphibs 11:00AM (MT)	January 9	January 10	January 11 Bird Walk 7:30AM (MT)	January 12	January 13	January 14 Bird Walk 7:30AM (MT) *Canoe Trip 8:00AM (HQBR)

## Loxahatchee Events Schedule - Dec. 4, 2005 - Jan. 14, 2006

Events with an asterisk (\*) Require RESERVATIONS - please call 561-734-8303 and if no answer call 561-732-3684

MT = Marsh Trail

HQBR = Headquarters Boat Ramp

VC = Visitor Center

## Loxahatchee Events Schedule - Jan. 15, 2006 - Mar. 4, 2006

Events with an asterisk (\*) Require RESERVATIONS - please call 561-734-8303 and if no answer call 561-732-3684

MT = Marsh Trail

HQBR = Headquarters Boat Ramp

VC = Visitor Center

### Loxahatchee Events Schedule - Jan. 15, 2006 - Mar. 4, 2006

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
January 15 Swamp Stroll 2:00PM (VC)	January 16	January 17	January 18 Bird Walk 7:30AM (MT)	January 19	January 20 Wildlife Program 1:30PM (VC)	January 21 Bird Walk 7:30AM (MT)
January 22 Sunset Bird Walk 4:00PM (MT)	January 23	January 24	January 25 Bird Walk 7:30AM (MT)	January 26	January 27 Alligators & Crocs 1:30PM (VC)	January 28 Bird Walk 7:30AM (MT)  *Canoe Trip 8:00AM (HQBR)
January 29 Swamp Stroll 2:00PM (VC)	January 30	January 31	February 1 Bird Walk 7:30AM (MT)	February 2	February 3	February 4 Bird Walk 7:30AM (MT)
February 5 Nature Walk 11:00AM (MT)	February 6	February 7	February 8 Bird Walk 7:30AM (MT)	February 9	February 10	February 11 Bird Walk 7:30AM (MT)  Everglades Day (See Descriptions)
February 12	February 13	February 14	February 15 Bird Walk 7:30AM (MT)  Refuge Research 1:30PM (VC)	February 16	February 17	February 18 Bird Walk 7:30AM (MT)
February 19 Swamp Stroll 2:00PM (VC)	February 20	February 21	February 22 Bird Walk 7:30AM (MT)	February 23	February 24	February 25 Bird Walk 7:30AM (MT)  *Canoe Trip 8:00AM (HQBR)
February 26 Sunset Bird Walk 4:00PM (MT)	February 27	February 28	March 1 Bird Walk 7:30AM (MT)	March 2	March 3	March 4 Bird Walk 7:30AM (MT)

## Loxahatchee Events Schedule - Mar. 5, 2006 - Apr 29, 2006

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
March 5 Reptiles/Amphibs 11:00AM (MT) Swamp Stroll 2:00PM (VC)	March 6	March 7	March 8 Bird Walk 7:30AM (MT)	March 9	March 10	March 11 Bird Walk 7:30AM (MT) *Canoe Trip 8:00AM (HQBR)
March 12 Nature Walk 11:00AM (MT)	March 13	March 14	March 15 Bird Walk 7:30AM (MT)	March 16	March 17	March 18 Bird Walk 7:30AM (MT)
March 19 Swamp Stroll 2:00PM (VC) Sunset Bird Walk 4:00PM (MT)	March 20	March 21	March 22 Bird Walk 7:30AM (MT)	March 23 Scat Program 2:00PM (VC)	March 24	March 25 Bird Walk 7:30AM (MT) *Canoe Trip 8:00AM (HQBR)
March 26 Butterflies & Wildflowers 11:00AM (VC)	March 27	March 28	March 29 Bird Walk 7:30AM (MT)	March 30	March 31	April 1 Bird Walk 7:30AM (MT)
April 2 Reptiles/Amphibs 11:00AM (MT) Swamp Stroll 2:00PM (VC)	April 3	April 4	April 5 Bird Walk 7:30AM (MT)	April 6	April 7	April 8 Bird Walk 7:30AM (MT) *Canoe Trip 8:00AM (HQBR)
April 9 Nature Walk 11:00AM (MT)	April 10	April 11	April 12 Bird Walk 7:30AM (MT)	April 13	April 14	April 15 Bird Walk 7:30AM (MT)
April 16 Butterflies & Wildflowers 11:00AM (VC)	April 17	April 18	April 19 Bird Walk 7:30AM (MT)	April 20	April 21	April 22 Bird Walk 7:30AM (MT) *Canoe Trip 8:00AM (HQBR)

## Loxahatchee Events Schedule - Mar. 5, 2006 - Apr. 29, 2006

Events with an asterisk (\*) Require RESERVATIONS - please call 561-734-8303 and if no answer call 561-732-3684

MT = Marsh Trail

HQBR = Headquarters Boat Ramp

VC = Visitor Center

Kids  
Corner

## Annie's Big Adventure

story by Chrissanna (gator) Srdoch - University of Florida  
artwork by Frank LohanKids  
Corner

*Remember our little Annie? On that dark and stormy night during hurricane Irene, she was blown from her warm and cozy nest, AND HER MOMMY! Well, she is back with her family and ready to explore the Refuge and make new friends.*

"Bye Mom, I'm off to go watch for Robbie! He's gonna stop here any day now on his way to Central America for the winter. I haven't seen him all summer and I can't wait to hear all about his migration again!" Annie rang out excitedly as she once again resumed her daily vigil of keeping watch for Robbie during his migration.



Annie's mother, Abigail Anhinga, just sighed. Every morning, Annie awoke wondering if it would be the day she that she would finally see Robbie and his family. The constant talk of his migration and adventures was getting very old. "Please let today be the day she finds them," Abigail muttered to nobody in particular.

She didn't have long to wonder whether Abigail had found Robbie, because all of a sudden she heard Annie's excited squawks. "They've come! They've come! After all these days, they have finally made it!"

"That's wonderful, dear," Abigail said, quickly getting caught up in the excitement. "How long will Robbie and his family be here?"

"That's the bad news," Annie sadly explained, "They are leaving in the morning. So, bye, Mom, I have to go hear some more about the migration."

The next morning when Abigail woke up, she found a note from Annie. Gone south for the winter. "Oh no, Abigail exclaimed, "Annie thinks that she is supposed to migrate. She's an anhinga who lives here, not a migratory bird who heads south for the winter." Abigail left the nest in an incredible hurry to find Annie before she left to head south with Robbie.

Annie's mom  
Abigal the  
Anhinga

Annie



Ally the Alligator

**Annie's Big Adventure**

story by Chrissanna (gator) Srdoch - University of Florida  
artwork by Frank Lohan

It did not take long for her to hear Annie's constant questions about migration. "When I find her, we are going to have a nice long talk about how not all birds need to migrate."

As Abigail approached the group of birds eating before once again beginning to fly south, Robbie's mother ran up to her. "I was so worried you wouldn't get here in time. Annie thinks she can migrate with us and nothing I say can change her mind. Please, explain to her that she is a residential bird."

"Aww, Mom, Robbie doesn't want me to migrate with them, but I want adventure, too. Why can't I migrate? Please can I? Please can I go to Central America?" Annie looked at her mother with pleading eyes.

Abigail sighed. Why couldn't her daughter understand? As tiring as it was to keep up with Annie's constant adventures, Abigail couldn't help but smile. How could she be angry with her daughter for thinking that aningas could migrate, after all other birds migrate? "Come, my dear. Let's go home, on our way I'll explain to you why you can't go with Robbie."

Annie took one last look at the group of birds getting ready to leave, said goodbye to Robbie and the rest of his family, and went home with her mother.

**Want to Know more About About Migration?**

When Annie's mother explained that she didn't need to migrate she reminded Annie that different birds eat different foods. Then she paused and had Annie think for a minute. If a bird eats bugs, will it be easy for them to find bugs in the snow? Probably not. But what if a bird eats nuts and seeds? Do you think it would be able to find that in the snow? It sure would be easier! That's why some birds need to migrate, but what about Annie?

Annie, our anhinga friend, catches fish at Loxahatchee. She can do that in the summer and in the winter, so she doesn't need to migrate. A lot of the other birds on the refuge stay there all year also, so even when Robbie leaves on his migration, she will still see many of her critter friends!

If a bird doesn't migrate, then it is called a resident species. Loxahatchee has both resident bird species and migratory bird species. That's one of the reasons it seems like life here at the refuge is always changing. See for yourself, the winter months are a great time to see some of the migratory birds. Robbie, the American Redstart that Annie the Anhinga meets in her story, isn't the only species of migratory birds that comes to the refuge. There are many others, here are some of them and their pictures so you can be sure to look for them!



**Rocky the  
Raccoon**

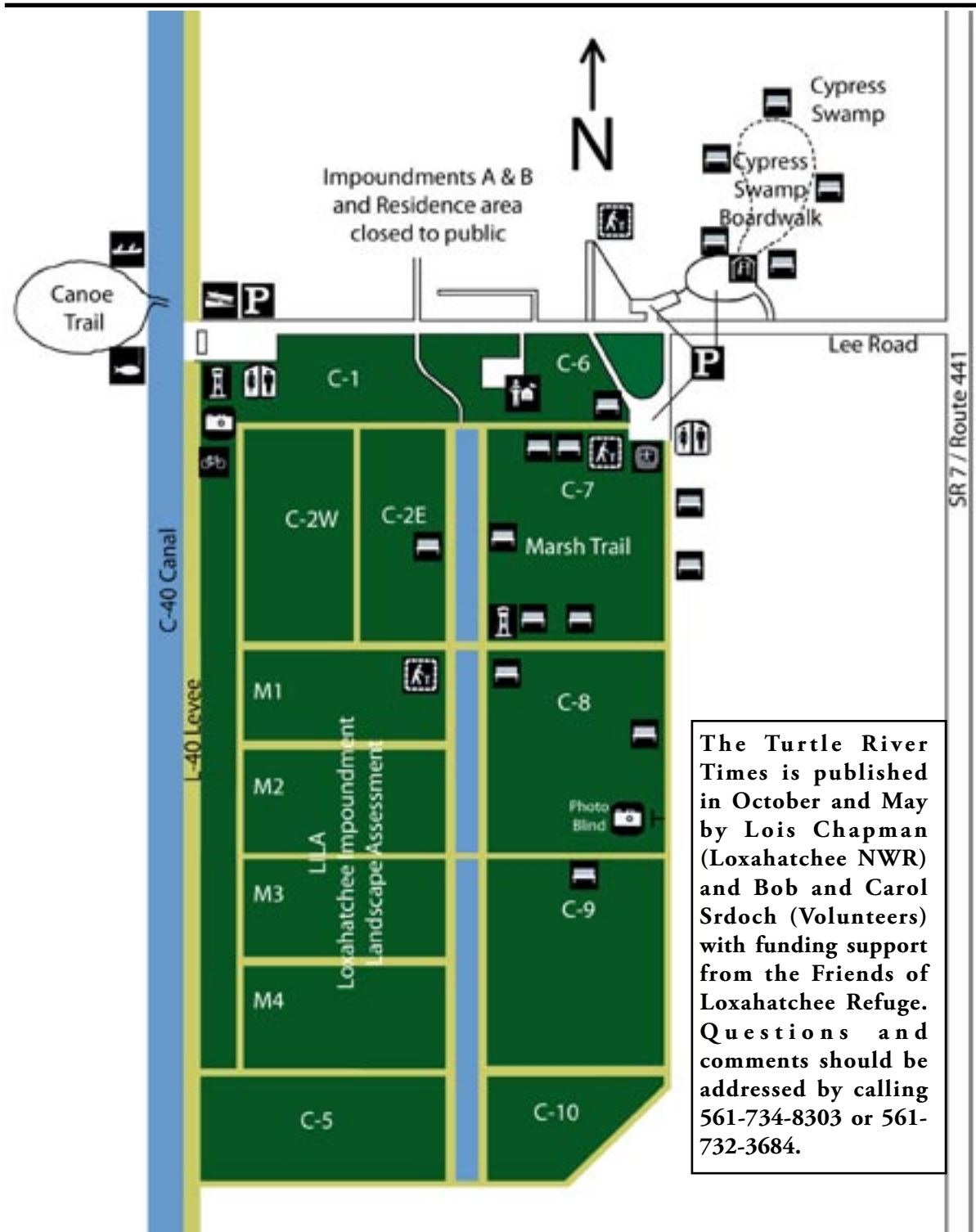


**Otto the  
Otter**



**Bertha the  
Butterfly**

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
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