WINTER 2012

Bay Soundings

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COVERING THE TAMPA BAY WATERSHED

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SLIP-SLIDING AWAY:

EROSION WIPING OUT CRITICAL COASTAL HABITAT

By Victoria Parsons

It's a common sight on the beaches bordering Tampa Bay -- gently sloping sand that rises abruptly to form a bluff a few feet from the water's edge. In almost every case, it's a sign of rapid erosion created when waves and ship wakes wash the sand away.

Protecting the bay's beaches is particularly important because two of the most threatened islands also are designated as globally important bird areas by the National Audubon Society. With so much of the region's beach already occupied by humans, the two island sanctuaries provide critical habitat for thousands of endangered or threatened birds as well as sea turtles.

And while the technology to stop erosion exists, it's expensive and may require a trade-off with other habitat like offshore seagrass beds.

Tampa Bay's poster child for preventing ongoing damage from erosion is Audubon's Richard T. Paul Alafia Bank Bird Sanctuary. Created in the 1920s when the Alafia River was dredged to make it more accessible to large ships, the two islands are now recognized as one of the most important bird nesting sites in the state.

Freezes during recent winters damaged mangroves growing on the shore of Sunken Island, wiping out the first line of protection. "You can see where palm trees have just toppled over because the sand under their roots has washed away," notes Ann Paul, regional coordinator for the Florida Audubon Society. In other locations, ancient pipes probably used when the islands were

Slip-Sliding Away
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Erosion along the western shore of Egmont Key is endangering historic structures as well as nesting grounds for endangered birds and turtles.

Photo by Victoria Parsons

RAINWATER HARVESTING – ECO-SMART AND COST-EFFECTIVE

Harvesting rainwater in cisterns is a lot like collecting sunshine in solar panels.

The technology exists to pull a home totally "off the grid" but the cost – and a long payback period – make it economically unfeasible for most of us. On the other hand, installing a cistern to capture rainwater for use in a Florida-friendly landscape can be an eco-smart and cost-effective alternative to potable water.

"Rain barrels look great but they're not going to make a significant impact in most landscapes," notes Dave Bracciano, demand management coordinator for Tampa Bay Water. "Harvesting rainwater for indoor use is complicated because it has to be stored, filtered and treated, but it's simpler and more cost-effective for outdoor use."

For Carl Roth, a retired engineer who recently moved to Port Richey, the primary goal was to reduce his "water footprint" with cost-effective technology. "A solar water heater with two people in the house has something like a 20-year return on investment. Installing a cistern and irrigation system was much more reasonable."Roth met with experts from the Florida Yards & Neighborhoods Program at Pasco County Extension, attended an FYN-sponsored seminar on cisterns, then did a great deal of research online before he began building the system, including a thorough review of reports from Florida, Arizona, Oregon, Texas and Virginia. "If you look before you leap, things work better," he quips.

Rainwater Harvesting
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Photo courtesy Rainwater Services

Creating enough storage to get through the spring dry season is typically the most expensive part of a rainwater harvesting system. This cistern for a home in Odessa was floated in rather than delivered by truck.

PROFILE

Erica Moulton: Making Science Fun

It's not often that skills a fifth-grader can master directly translate to the success of a deep-sea research mission – unless they're applied to building underwater ROVs, or remotely operated vehicles.

That's what makes teaching kids about ROVs so appealing to Erica Moulton, a St. Petersburg native and long-time environmental science teacher at Hillsborough Community College who is now faculty development and summer institute coordinator for the Marine Advanced Technology Education (MATE) Center in Monterey, CA.

"Kids can build an ROV from PVC pipe, a bilge pump and a 12-volt battery and fly it in a swimming pool," she says. "Then they want to install something to pick up a bottle on the bottom of the pool but they need more thrust and another motor so they need to learn more about physics and variable buoyancy."

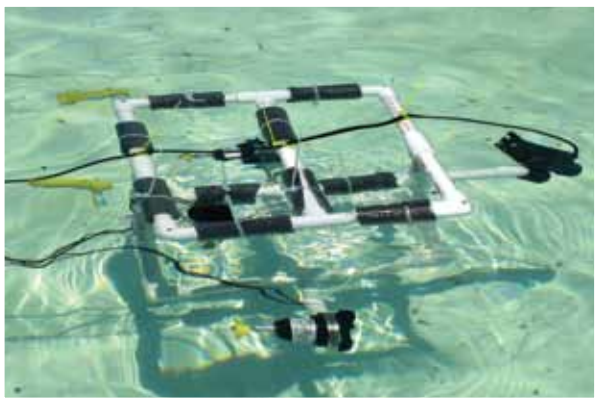
In classrooms and competitions, students are encouraged to reuse everyday items on their ROVs, resulting in vehicles armored with forks tie-wrapped to thrusters so they can snatch a prize from the bottom of the pool. The same tools can be used on ocean-going research vessels.

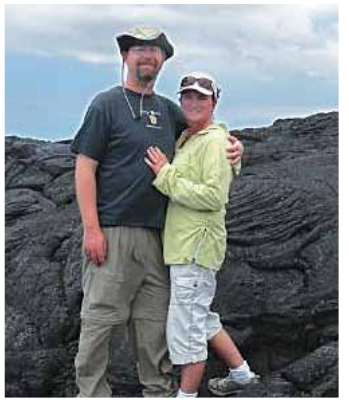
"Most ROVs are customized for the mission they're on," she says. "But if you're on a research vessel looking at water quality, and scientists see a jellyfish they want to sample, you probably don't have a jellyfish-capturing apparatus on board. You'll head for the galley and check out the drawers to see what you can use."

And while the Department of Labor doesn't identify ROV technician as a top career opportunity, the need for qualified operators is growing. "ROVs are everywhere – law enforcement uses them to examine the underside of ships, companies like Tampa-based Odessey use them to search for underwater treasure, and they're in water cooling towers and gas pipelines looking for cracks."

Millions of people who may never have heard of an ROV watched intently as the unmanned submarines connected the pipes that eventually sealed the BP well that had been gushing oil into the Gulf of Mexico. "They can go deeper for longer – and they're much safer because their operators are working from the surface."

Even beyond job opportunities actually building or flying ROVs, teaching students about ROVs is a fun way to introduce them to science, technology, engineering, and mathematics (STEM) education, Moulton said. "A lot of kids freak out when you start talking about science and engineering but ROVs are so fun, they're just hooked. "





Photos courtesy Erica Moulton

Above, "flying" ROVs is often a family activity with regional and national championships scheduled across the country. They can range from simple vehicles to complex underwater equipment like the machines that closed the BP oil rig. Above right, Erica with her husband Sean.

In fact, Moulton is a perfect example of how addictive ROVs can be. She was teaching environmental education at HCC when she heard about MATE's classes on ROVs for teachers. "I applied and was accepted, and it changed my life."

The next step was a Tampa Bay Estuary Program mini-grant to build "ROVs in a bag" for distribution to teachers across the region, then a similar program funded through the Marine Technology Society's ROV committee that gives ROV kits to teachers around the world. Finally, Moulton accepted a job running the same program at the MATE Center that first hooked her on ROVs.

She works from her Crescent Lake home most of the year, then commutes to California for the summer to run the week-long ROV Institute for advanced teacher training. "I grew up in St. Petersburg and it's a great place to raise a family," she says.

DIVE IN!

Explore Tampa Bay's magnificent waterworld and watershed with *Bay Soundings,* a quarterly news journal covering Florida's largest open-water estuary. *Bay Soundings* chronicles the news and issues affecting the bay, while profiling the people, places and creatures that make it so compelling. Thanks to generous community support, *Bay Soundings* is distributed free of charge to local and national subscribers. Interested readers may subscribe online at www.baysoundings.com or send an email to circulation@baysoundings.com. Bulk copies also are available for distribution through area attractions, schools, businesses and civic organizations.

TALK BACK

We welcome letters to the editor on topics covered in Bay Soundings as well as articles or story ideas on issues impacting Tampa Bay and the region's natural resources. Send letters to editor@baysoundings.com.

SEND US YOUR NEWS

We're always interested in news about community organizations involved in Tampa Bay, and our calendar page highlights upcoming bay-related events and activities. Send news to editor@baysoundings.com.

HELP YOURSELF

If you see an article in *Bay Soundings* that you would like to include in another publication, help yourself. All we ask is that the story appears with the following credit: "Reprinted with permission from *Bay Soundings.*" Photos, however, may not be reprinted without express written permission.

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Photo courtesy Tampa Bay Watch

Funding from the district's community education grants helped Tampa Bay Watch install oyster domes along Bayshore Boulevard.

District Sets New Deadlines for Community Education Grants

Applications will be available April 1 for the Southwest Florida Water Management District's Community Education Grant program, which offers reimbursement up to $7,500 to help create hands-on, educational experiences that lead to the conservation and protection of Florida's water resources. Individuals, community groups, volunteers, government and nongovernment agencies can apply. Community education grants are designed to target adult audiences through projects such as water body cleanups, aquatic plantings, educational workshops and more. Project activity can begin November 1, 2012, and must be completed by July 31, 2013. Applications are due Thursday, May 31, 2012. For more information, visit www.WaterMatters.org/CommunityGrants.

Splash! grants for teachers also will be awarded for 2012-13; applications are due Sept. 2. Visit http://www.swfwmd.state.fl.us/education/schoolgrants/dates.php for additional information.

Friendly Fungi Help Control Fire Ants, Mosquitoes

Modified fungi created by the University of Florida shows promise as weapons against fire ants, mosquitoes and other pests. In fire ants, the modified fungus was five to eight times as effective and also disrupted the ants' tendency to remove dead ants from their nests.

"Potentially, it's important because if you can disrupt this behavior, you may be able to increase the efficacy of the fungus in the nest, because they won't take the dead out and you can spread the infection throughout the nest better," said Nemat Keyhani, a UF associate professor of microbiology and cell science and the study's lead author.

Keyhani also led a research team in a similar study of mosquitoes, testing a modified fungus that stops the insects from producing a crucial digestive enzyme. It reduced the survival time of the mosquitoes by 25%, and resulted in female mosquitoes laying 40% fewer eggs.

Mortality levels will need to be increased before the fungi are ready for widespread use, but the ability to show that the modified fungus can target a specific insect population is important. Although lethal to fire ants, the friendly fungi had no impact on another insect used as a control.

Photo by Marianne Korosy

Royal tern chicks, just days old, are barely visible under the adults nesting at Fort DeSoto Park.

Shorebird Alliance Enlisting Volunteers Early

Warm winter weather is apparently causing shorebirds to begin nesting early, according to reports from volunteers with St. Petersburg Audubon Society who work as stewards at Fort DeSoto Park protecting the sanctuary from human visitors.

"Things seem to be gearing up a little early this year," notes Saskia Janes, volunteer coordinator for the Suncoast Shorebird Partnership. "Official stewarding season will begin in May, however we may need a few volunteers on holiday weekends like Easter, Mother's Day and during college spring break weeks."

Stewards are needed at Fort DeSoto as well as Egmont Key, Shell Key, Indian Shores and Honeymoon Island. For more information, see the Summer 2011 issue of *Bay Soundings* (http://www.baysoundings.com/summer2011/Stories/Stewards-Protect-Beach-Nesting-Birds.asp) or email bnb@stpeteaudubon.com.

Restore America's Estuaries Launches Wetlands Carbon Blog

Restore America's Estuaries has created a new blog (www.estuaries.org/blog.html) dedicated to exploring the role coastal wetlands play in sequestering greenhouse gases and reporting news and research behind national and international "Blue Carbon" efforts.

While it is well known that forest ecosystems store large amounts of the greenhouse gas carbon dioxide, promising new research is focusing on so-called "Blue Carbon" in coastal wetland ecosystems such as estuaries, mangroves, seagrasses and salt marshes.

Recent findings suggest that coastal wetlands may sequester and store carbon at rates three to five times greater than temperate forests. "Coastal tidal wetlands sequester carbon dioxide at impressive rates, primarily in the soil. Preserving and restoring coastal wetlands can be part of the solution to reducing greenhouse emissions that fuel global warming and climate change," said Steve Emmett-Mattox, RAE's senior director of strategic planning and programs.

Among RAE's goals is the creation of a national greenhouse gas offset protocol for coastal tidal wetlands. Such a protocol would help bring coastal wetlands into international carbon markets, providing new opportunities and incentives for private and public investment in the restoration and preservation of tidal wetlands, and a new tool for global coastal and marine conservation.RAE will hold its annual conference at the Tampa Convention Center Oct. 20-24.

Could Hatcheries Cost Fish Ability to Survive in Wild?

A new study indicates that the impact of a hatchery environment on steelhead trout may cost fish the natural ability to survive in the wild. The findings, published in Proceedings of the National Academy of Sciences, surprised researchers by the pure speed at which hatchery fish seem to evolve.

> **"We've known for some time that hatchery-born fish are less successful at survival and reproduction in the wild."**
>
> – Michael Blouin

"We've known for some time that hatchery-born fish are less successful at survival and reproduction in the wild," said Michael Blouin, a professor of zoology at Oregon State University. "However, until now, it wasn't clear why. What this study shows is that intense evolutionary pressures in the hatchery rapidly select for fish that excel there, at the expense of their reproductive success in the wild."

The study was the result of a 19-year analysis of steelhead trout in Oregon's Hood River. The challenge now is to see if this story is similar in other fish species, identify the genetic traits that evolve, and work to slow that rate of domestication.

Photo by Ann Tihansky

Mangroves and other coastal plants may play an important role in sequestering greenhouse gas.

DEP Designates 250th Clean Marina

Sarasota Yacht Club has been named the 250th Clean Marina in the state, joining 37 in the Tampa Bay region that already have earned the designation recognizing their commitment to protecting Florida's waters and natural resources.

The Clean Marina program (see *Bay Soundings*, Summer 2004) requires that marinas evaluate their operations, implement a series of environmental housekeeping measures specific to their site and educate boaters on ways to minimize impacts. After completing the application, an on-site visit confirms that the marina meets the program's stringent standards.

For a list of local facilities who have earned the Clean Marina designation, visit http://www.dep.state.fl.us/cleanmarina/marinas.htm.

New Rules Aim to Stop Invasive Species in Ballast Water

Nearly a century after the first documented introduction of an alien species via ballast water, national and international agencies are finally firming up new regulations to reduce the potential for other invasive species to be transferred.

Three distinct organizations – the U.S. Coast Guard, the U.S. Environmental Protection Agency and the International Maritime Organization – all have proposals on the table that would require ballast water to meet certain standards before discharge.

The challenge has been the fact that ballast water is critical to the safety of a ship. Exchanging it at sea can be dangerous – as shown by the near-sinking of the car carrier Cougar Ace in 2006. Treating ballast water to kill stowaways is technically challenging and new technologies are just beginning to become available.

"Ballast is not really optional, it's essential to maintaining stability," notes Bill Richardson, research associate at the Florida Fish and Wildlife Research Institute who conducted a series of tests on ballast water between 2003 and 2006. Ballast has been used for hundreds of years, he adds. "The rocks at Ballast Point were discharged from ships in the early 1800s when Ballast Point was a prominent port for shipping cattle. The accumulated ballast is said to include rock from almost every seacoast in the world."

With the advent of large metal ships, water became the preferred form of ballast and it's used in nearly every cargo ship. Ballast water is discharged into Tampa Bay at an average rate of a gallon per minute, day in and day out, Richardson notes. Scientists estimate that 65 non-native plant and animal species have been established in the Tampa Bay estuary, with ballast water considered a possible route of introduction.

Asian green mussels, the fastest-growing mussel in the world, probably entered Tampa Bay in ballast water in a ship from Trinidad. When they were first discovered blocking an intake valve at a TECO power plant in 1999, experts feared the worst. As it turned out, the mussels are surviving in Tampa Bay but not creating the environmental disaster caused by the zebra and quagga mussels in the Great Lakes where they have consumed so much of the algae that the base of the food web has shifted. The Great Lakes also are contending with the rapidly reproducing round goby and the parasitic sea lamprey. In the Chesapeake Bay, the Chinese mitten crab and the rapa whelk are wrecking environmental havoc.

"We've been very lucky in Tampa Bay," notes Phillip Steadman, environmental director for the Port of Tampa.

Left, green mussels, the largest mussels in the world, are believed to have been introduced to Tampa Bay in ballast water. Below, ships discharge ballast water as they take on cargo at the rate of a gallon per minute day in and day out in Tampa Bay.

Mussel photo courtesy of the Univeristy of Florida.
Ship photo by istockphoto.com

Until recently, open-ocean exchange was the only approved method of treating ballast water. It removes many of the estuarian organisms that could become problematic in another low-salinity habitat. Water taken on in open water is less likely to contain organisms that could survive in a coastal ecosystem.

Open-water exchange, however, is only about 90% effective because not all water can be pumped out of ballast tanks and some organisms can accumulate in the bottom of the tank. An FWRI study conducted between 2003 and 2006 sampled ballast water on 63 ships that were primarily bulk cargo carriers from Central and South America, Europe, the Mediterranean and the Pacific northwest.

RESULTS INCLUDED:

- 36% of ships and 42% of tanks had live algae
- 9 nonnative species were found
- 83 species were recorded
- 1 nonnative harmful species (*Dictyocha fibula*) was found.

CYSTS (RESTING STAGE OF MICROALGAE) ALSO WERE ABUNDANT IN BALLAST WATER:

- 39% of ships and 46% of tanks contained cysts
- Some samples contained more than 400 individual cysts
- 2,969 cysts were isolated and incubated
- 21% germinated
- Two potentially nonnative species were established in culture

Along with the non-native organisms, a native but harmful dinoflagellate, *Alexandrium balechii*, was collected and cultured from the same vessel six months apart, indicating that ships picking up ballast water in Tampa Bay may transport a harmful organism to other coastal areas with similar ecologies.

Eliminating Organisms is Technically Challenging

While it's clear that invasive organisms travel in ballast water, the most effective way to prevent them is much less clear. The U.S. Coast Guard established voluntary ballast water management guidelines in 1998, requiring that ballast water be exchanged 200 miles offshore, retained onboard the vessel or treated to kill living organisms.

The voluntary requirements were deemed ineffective so they became mandatory in 2004. Even so, the FWRI report (see sidebar) shows that treatment methods did not eliminate either living algae or dormant-stage cysts of microalgae in a significant proportion of the samples taken between 2003 and 2006.

The U.S. Environmental Protection Agency was sued by environmental groups in 2000 for failing to regulate ballast water as a point source for contamination, contending that the agency has jurisdiction under the Clean Water Act.

New rules were issued in 2008 requiring ships to exchange ballast at sea or rinse tanks with salt water before entering U.S. waters. Both the Coast Guard and the EPA are finalizing new regulations which are expected to be similar to those originally proposed by the International Maritime Organization in 2004.

The IMO rules, which are generally supported by the maritime industry, call for no more than 10 organisms in a cubic meter of water. When originally drafted, the technology to accomplish that target was limited. Although the standards have still not been ratified by enough nations (including the U.S.) to enforce them, manufacturers around the world have developed technology that does meet the standards.

Costs are expected to be about $1 million per ship for each of the approximately 68,000 ships that would be covered under the new rules, Richardson said. "The good news is that the outlook is promising in that the technology is available, tested and cost-effective."

The new systems use diverse technology ranging from filtration and deoxygenation to environmentally friendly biocides that are produced onboard from seawater without the addition of chemicals. As of 2011, 34 ballast water management systems have received basic approval and 20 systems have received final approval. Over time, as the technology continues to improve, the Coast Guard expects to implement standards that are 10 times more strict.

From Pasture to Prairie:
Pasco Restoration Project Breaks New Ground

At first glance, Jumping Gully Preserve looks just the way it should. Sandhill cranes stroll majestically through grassy meadows sweeping across gently rolling hills. Wild turkeys are nearly invisible in the scrub under low-growing oaks while wading birds stalk their prey in the ephemeral ponds of a dry lake bed. Sandy mounds on higher lands point to the presence of tortoises or perhaps burrowing owls.

But while most people simply appreciate the natural beauty of Jumping Gully, Keith Wiley envisions a preserve that's even more attractive to wildlife. As environmental lands program manager for Pasco County, he's spearheading the restoration of the 600-acre cattle operation to its historic habitat. "We'll never be able to fully restore it but we can recreate a similar structure," he says.

Across the state, only a few restorations have transformed cattle pastures back to their original sandhill or dry prairie ecosystems but they've been remarkably successful, he said. "Look at places like Disney's Wilderness Preserve or the uplands restoration in the Green Swamp and you can really see the difference – but it's a lot of work and money to get there."

The first step at Jumping Gully will be a 40-acre site at the northeastern tip of the property which abuts a natural area with a thriving population of gopher tortoises. "We think we can recruit from that population if we restore the native grass species," notes Cristina Esposito, land manager.

Gopher tortoises are not only a threatened species in Florida, they're considered a keystone species because they share their burrows with more than 350 other species. Part of the funding for the restoration work comes from the Florida Fish and Wildlife Conservation Commission's Gopher Tortoise Habitat Fund, adds Wiley. "They've funded land purchases and prescribed burns before, but this is the first-ever restoration project they've selected."

Restoration will begin later this Spring with herbicide sprays to kill off the pasture grass. "We're hopeful that one spray will work but it may take two years before we can begin reseeding," Wiley said. "Luckily it's just Bahia and dog fennel – we don't have any of the really invasive grasses like cogon."

Once the pasture grass is dead, seed from native grasses and shrubs will be harvested and broadcast on the site. "We're still looking for donor sites but we'd like to find something nearby," he said. Unlike pasture grass that grows to a uniform height, native grasses grow in different shapes and sizes so that wildlife can find niches they don't have in a pasture, Wiley said. "They need that structure in a more natural landscape, where some grasses will be waist high and then you'll have patches of bare sand."

Wiregrass, the dominant groundcover in much of Florida's natural areas, is a favorite food for the gopher tortoise and provides cover for many birds, reptiles and small mammals. It's considered a "bunch" grass that grows in dense clumps about 18 to 36 inches tall.

With so few examples of how to successfully restore cattle pasture to native dry prairie or sandhill, Pasco will start small and learn as they go. "Even 50% native groundcover is considered successful," Wiley notes. The cattle pasture is fenced in 40-acre parcels so the transition will be easier. Parts of the property are still leased for cattle operations, which also helps to fund the restoration.

Tracking progress and documenting success will be an important part of the restoration, he adds. Benchmarks on native plant species and the wildlife using them will be recorded before restoration begins. "We're talking to St. Leo University about setting up living classrooms at Jumping Gully and Pasco Palms (an ELAMP preserve on the Gulf of Mexico) so students are here on a long-term basis to learn about how preservation and restoration work."

Sandhill cranes are year-round residents at Jumping Gully Preserve. Managers hope that restoring the cattle pasture will attract other birds including burrowing owls.

Photo by Cristina Esposito

Penny for Pasco Invests in Environmental Lands

Photo courtesy Pasco County

An aerial image of Jumping Gully Preserve shows the dry lake bed that once drained into Crews Lake, as well as the current cattle pasture that is being restored.

Jumping Gully Preserve was purchased with funds raised through the voter-approved Penny for Pasco sales tax that dedicates 25% of the county's share of funds raised to environmental lands purchases. Originally passed in 2004, the program enjoys strong support from residents, with nearly 80% of voters saying they would renew the tax. A referendum to extend the tax for another 10 years may be placed on the November 2012 ballot.

Along with the Jumping Gully Preserve, Pasco's Environmental Land Acquisition and Management Program has purchased:

- Aripeka Sandhills, 210 acres northwest of U.S. 19 and Aripeka Road, jointly owned and managed with the Southwest Florida Water Management District. The property encompasses hardwood hammock, scrub, sandhill and mixed hardwood/conifer forest.
- Bailie's Bluff, a 100-acre site located near county-owned parks at Key Vista and Anclote Key. ELAMP will manage the natural resources within the three properties and the parks department will coordinate recreational activities including a planned trail that encompasses the three properties.
- Boy Scout Preserve on Green Key Road in New Port Richey, an 18-acre property located on the Gulf of Mexico in New Port Richey including sensitive mangrove and upland habitat. A 5-acre Brazilian pepper removal project was recently completed.
- Cypress Creek, a 250-acre preserve that stretches from the Hillsborough County line north to State Road 56 on the east side of Interstate 75. The county owns the entire stretch except a small section that is a Department of Transportation mitigation project.
- Pasco Palms Preserve, 117 acres of coastal property near New Port Richey featuring salt marshes, mangrove forests, tidal flats, maritime hammock and estuarine habitats, was purchased in a partnership with the state through its Florida Communities Trust Program. ELAMP is currently working with the River Ridge High School Splash Club to construct a ½ mile trail. Students also conducted a clean-up in December, collecting a half-ton of trash from along the road.
- Tierra del Sol encompasses about 110 acres including 80 acres of mitigation project and 28 acres purchased by ELAMP off U.S. 41 about three miles south of SR 52. Restoration of Five-Mile Creek will begin later this year, with hiking trails built once the creek is complete.
- Upper Pithlachascotee River Preserve, a 122-acre parcel east of the Suncoast Parkway in Shady Hills featuring scrub, wetland forest and mixed hardwood upland habitat. Located in the Starkey-Cross Bar Critical Linkage, it was also purchased in a partnership with Florida Communities Trust Program. The preserve is open from sunrise to sunset and includes a 1.14-mile trail and a facility that is used for meetings and workshops. A nature-themed playground, boardwalk and parking lot are under construction.

Want to visit?

Because parts of Jumping Gully Preserve are still being used as cattle pasture, the preserve is open by appointment only. Call the ELAMP office at 727-847-2411, ext. 8333 to set up a time. Guided tours are scheduled several times a year through the ELAMP office (pascocountyfl.net) or the West Pasco Audubon Society (westpascoaudubon.com).

New Florida Atlas Inspires, Educates and Entertains

By Victoria Parsons

If you're looking for a spectacular coffee table book with gorgeous images of the flora and fauna that make our state so unique, the *Atlas of Florida's Natural Heritage* will fit the bill perfectly.

But if you're looking for a wealth of knowledge in an easy-to-understand document covering Florida's diverse ecosystems, the *Atlas* is just as likely to occupy a spot of honor on your bookshelf.

Published late last year by the Florida Natural Areas Inventory at Florida State University, the *Atlas* starts with the big picture on biodiversity and why it's important to everyone who lives in Florida, then moves into detailed sections on specific ecosystems and elements of biodiversity.

The *Atlas* is designed so that most sections are covered in two oversized pages with photography, maps and charts. The text is written in a style that works for both scientists and students – or anyone who wants to know more about our wonderful state. More complex sections explain the science behind conservation with great reports on natural history methodology, how conservation priorities are determined and why strategic habitat conservation areas are important.

The sections on the elements of biodiversity look at topics ranging from topography and its impact on natural communities to detailed reports on charismatic species that depend upon specific ecological elements. It's hard to pick a favorite section because it's all so interesting and so readable, but here are some highlights that should pique your interest:

• Over the past 20 years, Florida has acquired more land for conservation than the federal government has acquired across the United States. A sidebar in this chapter details the economic benefits of conservation including tourism and outdoor recreation ($13 billion in 2006), coastal communities ($11 billion in storm protection benefits) and climate change ($340 million annually in offsets of greenhouse gas emissions) as well as water resources, agriculture and improved quality of life in nearby communities.

• Florida scrub jays are the state's only endemic (found only in a particular geographic area) bird species. Populations have declined by 80-90%, a loss primarily attributed to degradation of the scrub habitat it needs to survive. Even conservation lands must be actively managed with prescribed fires to provide open areas with low groundcover because overgrown shrubs and trees make the habitat unsuitable for scrub jays.

• Gopher tortoises, the only land tortoise living east of the Mississippi River, are still found in all of Florida's 67 counties although some populations are small and isolated. Their burrows may be up to 15 feet deep and 40 feet long and are wide enough for the tortoise to turn around in. They provide shelter from extreme temperatures and fires for up to 350 other species including skunks, snakes, crickets, frogs and mice.

Important topics are covered in two-page "double-trucks" that offer in-depth information in an easy-to-understand format.

• Prescribed fire is the most cost-effective tool used by Florida's conservation land managers to promote ecosystem health and reduce hazardous fuel buildups, thus protecting homes and nature from damaging wildfires. Florida leads the nation in prescribed fire law, training and application. The section also includes a visual description of the process land managers must follow before they burn.

• Florida has three aquifer systems. The largest and deepest is the Floridan which extends as far north as South Carolina and west through most of southern Alabama. Called "Florida's rain barrel" by geologist Gerald Parker, the Floridan is one of the most productive aquifers in the world and is estimated to contain 1,000 cubic miles of water, 100 times the amount impounded in Lake Mead behind the Hoover Dam.

• Nearly half of all hurricanes that have hit the U.S. since 1886 made landfall in Florida. The west coast is least likely to be struck because most storms that enter the Gulf of Mexico follow a northwestern track and come ashore on Florida's panhandle, or the coasts of Alabama, Mississippi, Louisiana or Texas.

• About 100 orchid species are native to Florida, representing about half of all native orchids in the U.S. and Canada. Three-quarters of them are listed as threatened or endangered, including the leafless ghost orchid featured in the 2002 movie Adaptation starring Meryl Streep.

• A single acre of seagrass may harbor 50 million invertebrates including crabs, shrimp, lobsters, sea urchins and starfish. Florida's seagrass beds, including vast expanses near Big Bend, in Florida Bay and the Florida Keys, are the largest expanse of this important resource in the world.

• The Lake Wales ridge, stretching about 115 miles from Lake Apopka to Glades County, is a series of ancient sand dunes deposited about 650,000 years ago when much of Florida was under water. Once a narrow chain of islands separated from the mainland, its plants and animals evolved in isolation. As a result, the ridge now contains one of the highest concentrations of rare plants and animals in the country. More than 85% of the original 80,000 acres of upland habitat there has been lost to development.

• More than 200 introduced plant species are listed as invasive exotics or noxious weeds, including Brazilian pepper, Old World climbing fern and water hyacinth. The state spends about $82 million per year controlling them.

About 400 exotic animals have been documented as living in Florida but not all are considered invasive.

• The northern section of the Everglades originally extended further north than Tampa Bay, into southern Orange County. Unlike most watersheds that drain through rivers and creeks, the Everglades slope seaward at a gradient of less than three inches per mile. Today, only the southern third of the marsh remains in relatively undisturbed condition, as the Everglades National Park.

• While most people associate palm trees with Florida, oaks also are integral to Florida's ecology. A total of 27 species of oaks are found within the state's boundaries including some that have adapted to extreme conditions. The dwarf live oak, for instance, occurs as a groundcover that seldom grows higher than three feet. At the other extreme, the live oak may have a crown that covers up to one-third of an acre growing from a trunk as large as nine feet in diameter.

• Native insects are responsible for pollinating approximately $3 billion worth of fruits and vegetables. Some native bees do a much better job pollinating some crops than the non-native honey bee, increasing fruit set by up to 45% and fruit weight up to 200%.

The *Atlas* sets a goal of inspiring, educating and raising awareness for all Florida citizens, particularly those who are influential in environmental issues but may lack specific information. I think they've achieved that lofty objective in an entertaining document that makes learning fun.

Purchase The Atlas of Florida's Natural Heritage *online at www.floridasnaturalheritage.org or call 850-644-2007. A hardcover publication is $69.99 and a softcover version is $49.99.*

Despite Recession, Census Shows Big Gains in Conservation by Land Trusts

By Mary Kelley Hoppe

The first census of land trusts in five years shows big gains in land conservation by private trusts across the U.S., with 10 million new acres conserved from 2005 to 2010. Florida land trusts contributed to this success, reporting an increase of 98%, or 170,779 acres of protected land, over this period. The census is online at www.lta.org/census.

At the local and state level, endowments to ensure land protection more than doubled, and operating endowments, an indicator of the staying power of these organizations, nearly tripled, according to the report by the Land Trust Alliance.

"While government is shrinking, local land trusts are saving more land," said Land Trust Alliance President Rand Wentworth. "Communities nationwide value clean water, local food, and places to play, and they are investing in those places close to home."

Total acres conserved by state, local and national land trusts grew to 47 million acres by year-end 2010, an area more than twice the size of all national parks in the contiguous U.S. Land trusts also reported a 70% increase in volunteers since 2005, and a 19% jump in paid staff and contractors.

Filling a niche

"I think this points to the power of the land trust movement," says Laura Starkey, president of the Tampa Bay Conservancy. "Land trusts fill an important niche, providing an alternative to landowners who may not be comfortable working with government agencies.

"Relationships are really important to landowners," notes Starkey. "You need to build trust. When we go out to talk to a landowner, we're going to listen and figure out the best option for them."

One of over 1,700 land trusts across the country (including 33 in Florida), the Conservancy was established in 2001 as an organization devoted to preserving the region's natural, agricultural and scenic heritage. Unlike some of its larger counterparts, the nonprofit is totally run by volunteers.

In 2006, the Conservancy acquired a 60-acre parcel near Gibsonton donated in honor of Myron and Helen Gibbons and reborn as a public nature preserve. Tucked just around the corner from one of the region's fastest-growing developments, the Myron and Helen Gibbons Nature Preserve is a slice of old Florida that could easily have been developed.

When the family decided to donate the land, Hillsborough County's environmental lands acquisition program, ELAPP, couldn't meet the family's deadlines for closing and the parcel was too small for the Southwest Florida Water Management District to accept. The Tampa Bay Conservancy became the perfect choice for the gift.

While the Gibbons Preserve is the Conservancy's first and only property so far, the group has several potential projects in the pipeline and hopes to host a forum for conservation leaders after this year's legislation session to discuss how best to advance conservation efforts in the wake of state budget cuts.

Although land trusts have posted impressive conservation gains despite the recession, major government-funded programs have stalled. Florida Forever, the state's environmental lands conservation program, received no funding in 2011 and just $15 million in 2010.

That's a far cry from the $300-million in annual funding lawmakers pumped into the program for more than two decades in an effort to safeguard future drinking water supplies, provide green space for recreation, and preserve wildlife and habitat. Since 1990, more than 2.5 million acres of ecologically sensitive lands have been preserved through Florida Forever and its predecessor, Preservation 2000.

Much of the money to buy the land came from a documentary tax stamp on real estate purchases; when the housing market collapsed, the program's revenue stream stopped flowing.

Local programs in Hillsborough and Pasco counties continue to purchase land with strong support from voters.

Moving forward, advocates are urging a greater emphasis on tools such as conservation easements that allow landowners to sell or donate certain property rights – often the right to subdivide or develop a land tract – while the land remains in private hands and may qualify for tax benefits.

"The reality for a lot of landowners is that the ability to get a tax credit makes a big difference," says Starkey. "With so many financial pressures on families that own a large piece of property, everything counts and makes a huge difference in determining if you can justify putting a conservation easement on your property."

1,000-Mile Trek Through Florida Tracks Corridor for Wildlife

A team of intrepid explorers embarked on an ambitious journey through Florida January 17 to call attention to the need for a functional wildlife corridor up the Florida peninsula. Their goal: 1,000 miles in 100 days.

Bear biologist Joe Guthrie, conservationist Mallory Lykes Dimmit and photojournalist Carlton Ward Jr. are making their way from the Everglades National Park toward Okefenokee National Forest in southern Georgia. The trio is traversing wildlife habitats, watershed and working farms and ranches to increase public awareness and generate support for the Florida Wildlife Corridor Project. The corridor project is a collaborative vision to connect remaining natural landscapes and watersheds essential for the survival of Florida's diverse wildlife, including wide-ranging panthers, black bears and other native species threatened by encroaching urban development. Award-winning cinematographer Elam Stoltzfus is documenting the expedition to produce a film about the journey and the Florida Wildlife Corridor.

With photography, video streams and daily updates on social media and digital networks, residents can follow along the expedition. Learn more at www.floridawildlifecorridor.org

Pedal Power:
Biking to Work Helps Protect the Bay

By Nanette O'Hara

In September 2010, Larry Meadows made a commitment to get in shape. With little time to exercise, the 43-year-old St. Petersburg resident took a friend's advice and decided to try riding a bike to his job with Raymond James Financial in the Feather Sound area of central Pinellas.

By September 2011, Meadows had logged 3,100 miles on his commutes, lowered his resting heart rate from 77 to 43 beats per minute, and lost an impressive 45 pounds. He also calculated savings of $721 in gas costs, based on spending an average of $3.50 per gallon on gas to drive his truck 22 miles a day instead of pedaling his Trek.

And he's still at it, faithfully traveling to work each day by pedal power, in every kind of weather but thunderstorms.

"My workday begins with 45 minutes of exercise and head-clearing, and ends with 45 minutes of exercise and head-clearing," Meadows said.

Though still the exception in the car-choked Tampa Bay region, Meadows is less an outlier than you might think. According to the Census Bureau's American Community Survey, the Tampa Bay area has double the national average of bike commuters, and the number of people riding their bike to work increased by 31% from 2000-2008. We also are among the most dangerous areas for cyclists in the nation. From 2005-2009, 105 cyclists were killed on roads in Hillsborough, Manatee, Pasco and Pinellas counties, nearly one-fifth of the total cycling fatalities in the state, according to statistics from the Florida Department of Highway Safety and Motor Vehicles.

Despite the hazards, bicycle commuting is clearly growing in popularity, in Tampa Bay and across the U.S.

"It's beginning to reach a tipping point, where people may not bike themselves, but they know other people who do," said Brian Smith, the recently retired planning director for Pinellas County who pedaled from his home in Ozona to his office in Clearwater for 15 years.

Cycling to work has a big upside. It's great exercise, it reduces stress, and it saves both fuel costs and wear and tear on automobiles. Since most Americans live within five miles of their workplace, the average commute is pretty short. In urban areas like ours, it typically only takes one-third longer to bike than to drive to work – in many cases, it's faster than sitting in traffic on congested roads.

There are societal as well as individual rewards. According to the U.S. Environmental Protection Agency, transportation is the largest single source of air pollution in the nation, and driving a car is probably a typical citizen's "most polluting daily activity." In Tampa Bay, studies have shown that air pollution is responsible for as much as 40% of the harmful nitrogen going into the bay. Vehicle emissions, in the form of nitrogen oxides (NOx) account for about one-quarter of that.

Remember the adage, "What goes up must come down?" That applies to automobile tailpipes as well. The NOx that comes out of them, because it is discharged low to the ground, tends to stay close to home, where it falls directly on Tampa Bay or is washed into the bay with rainfall.

"I think most people aren't aware of the impact that air pollution has on water quality in the bay," said Holly Greening, executive director of the Tampa Bay Estuary Program.

Above, Larry Meadows pauses for a moment on his daily commute from St. Petersburg to Feather Sound. Right, the Pinellas Trail is one of the nation's longest urban trail with an estimated 90,000 people using it monthly. The original sections were built on abandoned railways.

Photo by Nanette O'Hara
Map courtesy Pinellas County

"And what we've found in Tampa Bay is not unusual for urban areas across the country."

Although cars are becoming more fuel-efficient and less polluting, increases in the sheer numbers of cars from population growth could negate the gains achieved by cleaner emissions, she noted.

Public or alternative modes of transit offer long-term solutions, and that includes cycling. However, for a region as dependent on automobiles as Tampa Bay, making room for bicyclists isn't easy, or cheap. The transportation system in congested urban areas like Tampa was originally designed to move people – make that, people in cars – from one point to another as fast as possible.

But with the recognition that varied modes of transportation – light rail, buses, bicycles, water taxis, even feet – make for more desirable communities, planners

Best Bike Rides in Tampa Bay

Whether you're riding for fun, fitness or utility, here are some of our favorite rides:

1 The Pinellas Trail (throughout Pinellas County)

One of the longest urban bike trails in the nation, the Pinellas Trail runs 37 miles north and south along an old railroad line. The Trail is still being expanded; additions will eventually create a complete loop of the county. The most scenic section is from Dunedin to Tarpon Springs.

www.pinellascounty.org/trailgd/

2 Jay B. Starkey Wilderness Park (southern Pasco County)

The 7.5 mile paved trail (13 miles round trip) through the Starkey wellfield showcases gorgeous pine flatwoods and hardwood hammocks that harbor deer, fox squirrels, gopher tortoises, bluebirds and other wildlife. The Starkey Trail connects with the Suncoast Bicycle Trail on one end and Starkey Boulevard on the other, for those who want a longer ride.

www.swfwmd.state.fl.us/recreation/areas/starkey-park.html

3 The Suncoast Parkway Bicycle Trail (Tampa, New Port Richey, Spring Hill, Brooksville)

Running parallel to the Suncoast Parkway for 41.3 miles from Tampa to the Chassahowitzka area, the Suncoast is a part of the state's Greenways and Trails system. Portions closer to Tampa (such as the SR 54 access) get fairly crowded on weekends; segments north of SR 50 are rarely busy, exceptionally scenic and feature something rare for Florida: hills!

www.dep.state.fl.us/gwt/guide/regions/westcentral/trails/suncoast.htm

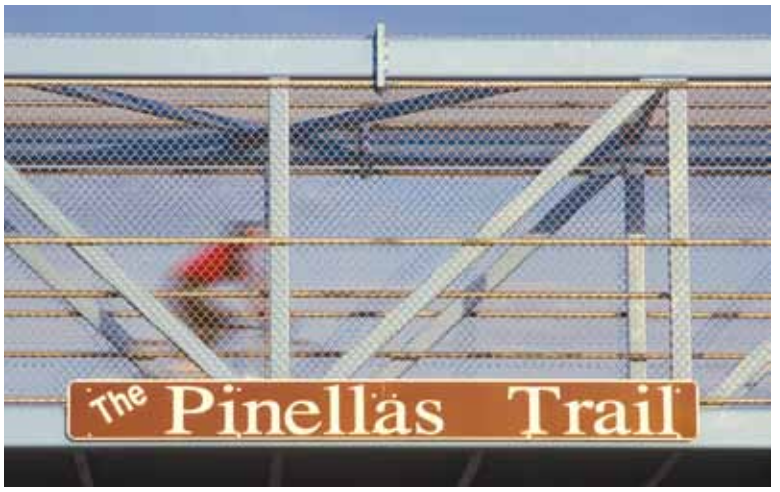


Photo by Nanette O'Hara

The Pinellas Trail features a series of overpasses that allow cyclists to avoid busy highways and intersections.

throughout the region are plotting a network of bike lanes to accommodate both recreational and commuter cyclists.

"Roads get you from one community to another, but they don't connect a community the way that bike and pedestrian paths do," Smith said.

The Pinellas Trail is one of those bike paths doing double or even triple duty. A decade after construction began on what is now a 37-mile-long cycling and pedestrian path through Pinellas County's midriff, a survey conducted by county planners revealed a surprise: about two-thirds of the bicyclists using the trail were using it to go somewhere for a purpose, such as school, work or shopping. Planners had assumed its main use would be recreational.

Because it is off-limits to cars, it is an ideal way to get around safely. Overpasses across the busiest highways, such as US 19, allow cyclists to rise above the chaos below. At Ozona Elementary School in far North Pinellas, a substantial percentage of the students ride their bikes to school using the trail.

County bicycle/pedestrian planner Sue Miller says that is the true immeasurable value of the trail. "It really addresses people's needs whatever they are," she said, from people going to work or to the grocery store to pick up a few items, to children biking to school, to serious recreational cyclists with tiny computers attached to their handlebars to record their time, distance and speed.

Pinellas park ranger Pat McGory takes the trail to work every day from his home in St. Pete to Boca Ciega Millennium Park in Seminole. Like Meadows, he began biking to work for health reasons. At 51, he's shed 35 pounds in two years and lowered his blood pressure. He also saves at least $10 a week in gas and reduced his driving so much he even sold the family's second car.

"I started doing it for health reasons and I liked it so much I stayed with it," he said. "Being able to use the trail gives me a much safer way to travel than surface roads. I see some of the same people riding at the same time every day, and I assume they're commuting too."

Unfortunately, there is only one Pinellas Trail. The region's other major dedicated cycling/pedestrian pathway – the Friendship Trail and Bridge over Tampa Bay – has been closed for several years and is slated to be demolished because of structural issues.

But communities are slowly building a tapestry of bicycle lanes and designated "Share The Road" strips along existing roadways for cyclists. Tampa currently has 60 miles of designated bike lanes; St. Petersburg more than 20 miles; and tiny Palm Harbor nearly 14 miles (thanks largely to the Pinellas Trail).

St. Pete resident Meadows, who cycles with his son for recreation on the weekends as well as to work during the week, has chronicled the good, bad and ugly of his commuting odyssey through his blog, Trek2Work.com – including one day when he had to intentionally ditch his bike to avoid being hit by a motorist turning directly in front of him, one hand on his coffee cup, the other on his cell phone and his knees on the steering wheel.

Pinellas County and Tampa Bay have a long way to go before they are as bike-friendly as Seattle or Minneapolis-St. Paul, but it is getting better, he said. "The more motorists see people on bikes, the more they get used to us and learn to live with us."

Chip Haynes, a Clearwater resident and year-round commuter, has been bicycling since he was seven years old and "just never outgrew it like most people do."

Haynes, a member of Pinellas County's Bicycle Advisory Committee, is an authority on what he calls "utility cycling." He authored a book, "The Practical Cyclist" that provides a wealth of information about using bicycles as a major form of transportation. He rides his bike to stores, to appointments, everywhere he reasonably can. With about 30 bikes in his garage – all with their own unique story – he's got one for just about any occasion.

Haynes says there are all sorts of perfectly good reasons to give bike commuting a try – health, fitness, saving energy, saving money – but "the main reason is that it's fun.

"Riding a bike makes you feel like a kid again, pure and simple," he said.

Ready To Roll? Tips for Getting Started

1. Obey all traffic laws. Bicycles are considered vehicles, subject to the same rules of the road as cars. Don't run red lights or stop signs. Do ride on the right-hand side of the road.
2. Wear a helmet and bright clothing. You want to be seen, and you want to protect the one irreplaceable body part: your brain.
3. Never wear headphones or ear buds while cycling. It's not only against the law, it's just plain stupid.
4. Keep your bike tires properly inflated. This is all about comfort and efficiency. You'll be amazed at the difference.
5. Lock your bike up, all the time and everywhere. A good lock is cheaper than a taxi ride, and a new bike.

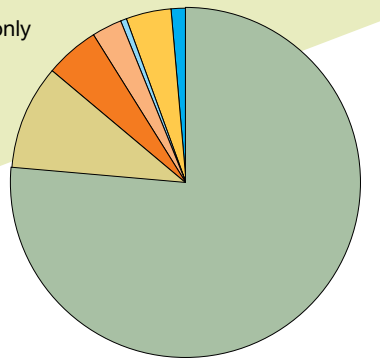
SOURCE: Chip Haynes, author of "The Practical Cyclist"

Bike Buddies

Want a pedal pal to share the ride to work? TBARTA, the regional transportation agency, will put you in touch with another cyclist going your way through the Bike Buddy program. Learn more and sign up at www.tampabayrideshare.org.

No need to fret about those times when you really need to get somewhere in a hurry. Participants who ride their bikes to work at least two days a week are eligible for free taxicab rides home in emergencies.

Currently, 114 commuter cyclists are registered for the baywide program, with 63 biking to work. The rest are looking for matches.



How Americans Get To Work

- **76.6%** Drove Alone
- **9.7%** Carpooled
- **4.9%** Took Public Transportation
- **2.8%** Walked
- **.5%** Bicycled
- **4.3%** Worked At Home
- **1.2%** Took a Taxi

SOURCE: U.S. Census Bureau 2010 American Community Survey

4 Flatwoods Park (Thonotosassa area of eastern Hillsborough County)

Home to the Morris Bridge wellfield, Flatwoods is part of the Southwest Florida Water Management District's Lower Hillsborough Wilderness Preserve. Its 7-mile paved multi-use trail is extremely popular with both casual and avid recreational cyclists. The trail winds through beautiful pine flatwoods with abundant wildlife, and connects with New Tampa subdivisions via surface roads.

www.swfwmd.state.fl.us/recreation/areas/lh-flatwoods.html

5 City of St. Petersburg Bike Trails (throughout St. Petersburg)

Officially designated a Bronze level Bicycle-Friendly Community by the League of American Bicyclists, St. Pete is working hard on bicycle and pedestrian enhancements. The "City Trails" program has designated bike lanes, "share lanes," sidewalks, and paths that link the city's charming downtown with points north and south.

www.stpete.org/transportation/citytrails/index.asp

6 Upper Tampa Bay Trail (Northwest Hillsborough)

This 7.5-mile trail runs from the Memorial Highway area of Tampa north past Gunn Highway, mainly through residential areas with overpasses, underpasses and bridges. Planned expansions will add another 7 to 8 miles and eventually connect it with the Suncoast Parkway Trail.

www.dep.state.fl.us/gwt/guide/regions/westcentral/trails/pdfs/UTB_Trail_PDF.pdf

7 Bayshore Boulevard in Tampa

The city's iconic sidewalk along Hillsborough Bay is a victim of its own popularity, so crowded much of the time that bicycling is not always safe, or easy. Help is on the way as the city nears the end of a major project to add dedicated bike lanes to the surface road in both directions, along with other enhancements to slow traffic and make crossing safer for all users.

www.tampagov.net/dept_transportation/information_resources/Bayshore_blvd_enhancement_project.asp

Aquascaping Retention Ponds Using Native Plants

By Ernie Franke

Someone recently called for advice on beautifying the retention pond next to her home. As we talked, I realized that she was frantically taking notes at the same time I was struggling to share a vision of how her pond could look. I spent some time thinking about it and came up with three primary rules and the top 10 plants for ponds in the Tampa Bay region.

Retention ponds are everywhere because many local governments require ponds to collect storm water as a condition for development. Many "water features" in neighborhoods and office parks are actually man-made ponds that collect rainwater and allow it to seep slowly into the ground rather than just running off.

Adding native plants to retention ponds brings them to life because plants do so much more than give us pleasing vistas—they are havens for wildlife and birds. Fish rely on aquatic plants for food and habitat. Insect larvae, snails and freshwater shrimp thrive in plant beds. Submerged plants also provide habitat for many insect species and other invertebrates that are, in turn, important foods for brooding aquatic hens and migrating waterfowl. Plants also improve water quality by absorbing nutrients and pollutants. They protect the lake shoreline by holding soil on the lake bottom and water's edge—which in turn reduces erosion.

That brings us to THE FIRST RULE OF AQUASCAPING: ***You must have permission to do any work in a retention pond.*** Regional, county, city and residential authorities plan and control retention ponds.

Most governing bodies will be pleased to have you aquascape retention ponds, but they will want to see your plans before you dig the first hole.

Retention ponds are often fairly small in total size, typically less than an acre. They are also usually shallow with gently sloping sides. To imitate a natural pond and maintain a healthy ecosystem, you will want a balance of submerged plants, floating plants and plants that usually grow at the edges of a pond. Each has a different function and will help keep your pond clean and disease free.

SECOND RULE OF AQUASCAPING: ***Always select native, non-invasive plants.***

Selecting plants for your pond involves consideration of several factors, including the size of the pond, the depth of the water, and the amount of sunlight. Over the years, I've come up with a "top ten" list of plants that can be used along shallow lake and pond shorelines in Florida. We have chosen these plants because they are native to Central Florida, love full sun, withstand variable flooding, are robust and grow easily, and are readily available. These plants are perennials, but are dormant during Florida's mild winters, when the roots or rhizomes remain alive.

Most folks think I have a background in ecology (I'm actually an electrical engineer). After pouring through nature books to identify weeds and waterfowl, you get to know them quite well.

Native plants will multiply quickly. A few canna plants, for example, spread rapidly to fill in relatively large areas. Others, like native iris, may take a few seasons to really start growing. The beauty of these plants is that each of them can be propagated by simply dividing your existing plants. You just break up an older plant with a small shovel, stick the pieces in the muck, and lovingly pat them in place.

1. Pickerelweed: The easiest way to recognize pickerelweed is by the spectacular spike of violet-blue flowers from March to November. The nectar of the flowers attracts many insects, including bees and butterflies. The seeds are a good food source for ducks and muskrats, while the leaves and stems provide good cover for birds, swimming mammals, fish, reptiles, amphibians and insects.

2. Arrowhead / Duck Potato: Despite the name, ducks rarely consume the tubers, which are usually buried too deep for them to reach, although they often consume the seeds. Duck potato has large, distinct arrowhead-shaped leaves and conspicuous three-petaled, white flowers that make it easy to identify. Waterfowl and mammals feed on the seeds, while the flowers attract butterflies.

3. Alligator Flag / Fire Flag grows up to 9 feet tall from a thick rhizome and blooms from summer to fall. The leaves are lance-shaped, with broadly rounded bases. Multiple small, three-petal purple flowers hang from the bracts, attracting butterflies.

4. Southern Blue Flag is a tall wildflower with pale-green, sword-like leaves that grow in strong, flat vertical fans. The showy iris flowers are deep blue-violet with yellow and white markings.

5. Golden Canna is a native plant that typically grows to four feet tall, with showy yellow flowers. Several species of butterflies draw nectar from its flowers and it is a host plant for the canna skipper.

6. Sand Cordgrass is a large, bunch-forming grass that grows 4 to 6 ft tall. The leaves are rolled, almost wire-like and a little sandpapery (but not sharp) to the touch. Birds feed on its seeds.

7. Horse Tail is an ancient, fern-like evergreen, reaching a height of 3 feet. It is dark green with jointed or segmented stems 1/4 to 1/2 inch thick, with no true leaves. It is eaten by waterfowl and mammals.

8. Spatterdock (cow lily) blooms from spring to summer with yellow lily-like flowers that appear to be half-opened on the water surface. Large heart-shaped leaves are attached to long, stout stems that rise from spongy rhizomes. Waterfowl feed on its seeds.

Out of all the aquatic plants you might use in or around your pond, water lilies are the most easily recognizable and widely used. Although they come in many different colors, we have limited our list to the two native water lilies.

9. The White Fragrant Water Lily has very fragrant flowers (spring to fall) and smooth leaves. Ducks and mammals feed on its seeds and stems, while the roots provide a stable surface for successful fish spawning.

10. The Yellow Water Lily is more robust, often crowding out the more elegant white species.

THIRD RULE OF AQUASCAPING: ***Don't take plants without permission or you may get a free trip to jail.***

If you want to buy a few plants, we recommend using one of the shops that support the Florida Native Plant Society, found at http://floridagardener.com/FLNatives/NPS.htm. For larger purchases of a dozen or so plants, it would be worth it to visit Florida Native Plants Nursery in Sarasota (http://www.floridanativeplants.com/) or aquatic Plants of Florida in Myakka City (http://apofl.com/), which is open by appointment only.

Where Can I See Aquascaping?

Once you start your aquascaping project, you'll pay more attention to vegetation in ditches and retention ponds as well as local parks. You'll contrast those sites with the typical dull retention pond that merely has grass or weeds at the water's edge. One of my favorite spots is the pond at Walter Fuller Park in St. Petersburg, an oasis in an urban setting. It is the perfect showcase for a natural, non-chemical approach that requires less maintenance and provides habitat for wildlife.

Ernie Franke is a retired electrical engineer who aquascaped "his" pond at The Shores in St. Petersburg beginning in 2009. A longer version of this article, including photos and longer descriptions on his top ten plants is online at www.baysoundings.com/stories/aquascaping.asp His first article on pondscaping was published in the Summer 2010 edition of Bay Soundings *and is online at www.baysoundings.com/stories/Adopt-A-Pond.asp Email him with additional questions at eafranke@tampabay.rr.com or call 727-393-8639.*

Slip-Sliding Away

Continued from page 1

first dredged 90 years ago are exposed for the first time in decades.

But around the corner, on the northwest shore of Bird Island, a series of concrete reef balls installed last May are slowing down the waves and protecting the shoreline. Unlike the traditional rip-rap, which only has a lifespan of five to seven years and provides very little habitat, the reef balls are designed to last for decades and provide shelter for sea creatures like crabs and small fish.

Each of the 212 balls – weighing in at more than 8,000 pounds – look like a giant Lego with a flat bottom and triangular shapes cut out of its sides. Placed offshore in a pattern that allows manatees or dolphins access to and from the shallows, the reef balls break the waves as they come ashore, then hold the sand as the water recedes.

"What we've done is create a calm lagoon in front of the beach," Paul said. "We're seeing sand accumulate instead of washing away. Mangroves and salt marsh are growing again and birds have room to nest."

Egmont Key Still Vulnerable

Further south, at the mouth of the bay, waves and wakes from ships passing in the nearby channel continue to wash away the western shore of Egmont Key. Historic structures, including gun batteries built to defend Tampa Bay during the Spanish-American War, are now underwater. About half of the island's land mass has been lost since it was first surveyed in 1877 and managers are concerned that it could split in half in a bad storm.

Photos by Victoria Parsons

Left, mangroves and marsh grass are sprouting on the protected shoreline along the southern shore at Sunken Island. Right, wave-attenuating reef balls were installed along the northwestern shore last summer.

Protecting Egmont isn't as simple as installing reef balls on a small island with clear ownership. Egmont is owned by the US Fish and Wildlife Service as a National Wildlife Refuge but that agency doesn't have the budget or the expertise to fortify the island's shoreline. The US Army Corps of Engineers has the expertise and the sand, but funding must come from the USFWS or directly from Congress.

The USACE already has placed nearly a million cubic yards of sand on Egmont from maintenance dredging since 2000 but without fortification the sand continues to wash away. A 2008 feasibility study by the USACE assessed alternatives and recommended the construction of a sheet pile wall. Without local funding sources, a Congressional directive is required to cover costs estimated at $15.9 million for the first year and renourishment every seven years at about $8.5 million each.

Representatives from three Congressional offices, including Rep. Kathy Castor and Senators Bill Nelson and Marco Rubio, have toured the island and Congressman Bill Young has been a long-time supporter of Egmont, notes Richard Sanchez, president of the Egmont Key Alliance.

The best hope for protecting Egmont is an unlikely source – fines paid by BP and its partners in the Deepwater Horizon oil spill. A trial is scheduled to begin later this month and some people are predicting that a final settlement could top $20 billion. Current law puts those funds into general revenue but the widely supported Restore Act would send 80% of the funds toward coastal restoration.

"After years of wear and tear culminating with last year's oil spill, much of the Gulf Coast is in need of some major repairs. The Restore Act is one step towards revitalizing the Gulf Coast and areas like Egmont Key," said Senator Nelson, who co-sponsored the legislation along with Senator Marco Rubio.

Without protection, the worst-case scenario for Egmont Key is nearly invisible just a few miles away. Passage Key, once a 60-acre island with a freshwater lake, has eroded so much that it is now merely a sandbar.

Oyster Bars Protect Shores, Provide Habitat

While the Alafia Sanctuary and Egmont Key highlight potential problems with habitat destruction in Tampa Bay, erosion is an issue almost everywhere that isn't bordered by seawalls. Rebuilding oyster bars offshore is an environmentally friendly way to protect those areas, according to Peter Clark, president of Tampa Bay Watch.

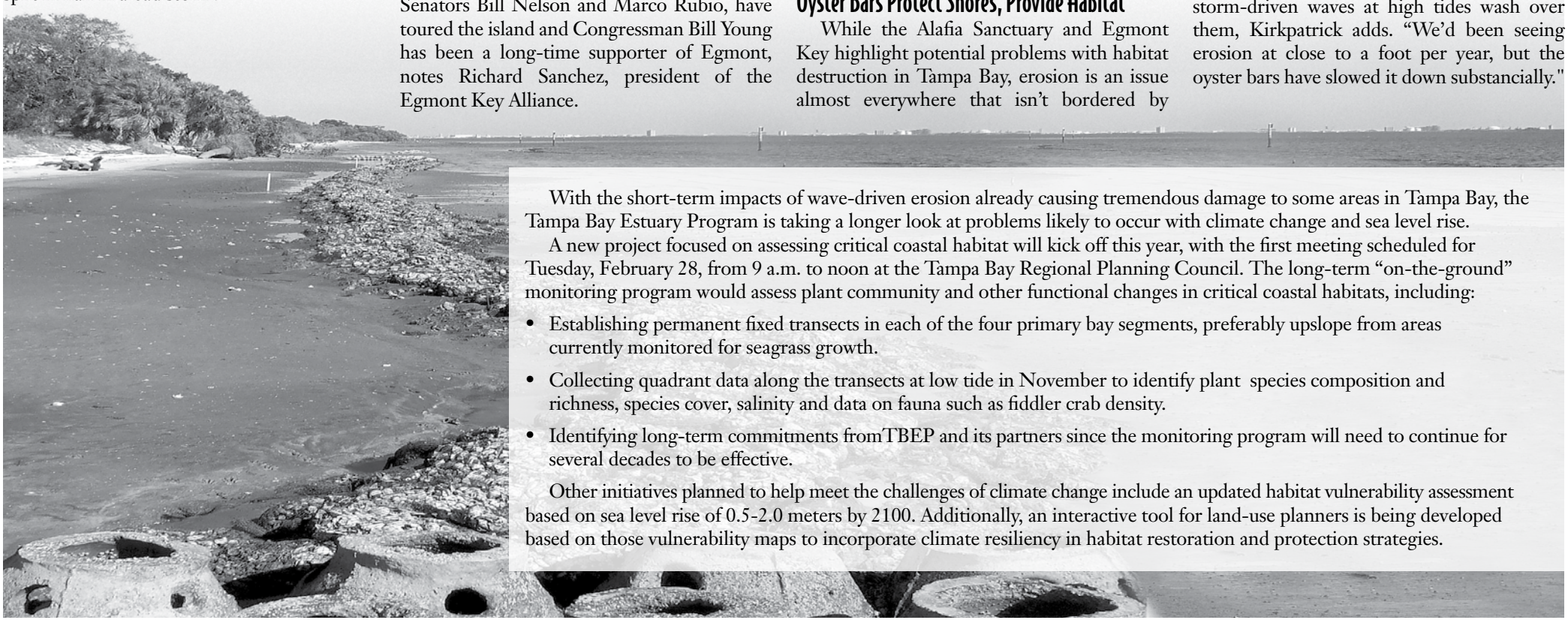
"We've had great successes at a number of locations in Tampa Bay," he said. "They're smaller, with a lower profile than some other methods, and they're much more environmentally friendly. Not only do oyster bars help stabilize a shoreline, they create hard-bottom habitat that oysters can colonize and more oysters mean better water quality."

Hundreds of volunteers have helped build oyster bars in Tampa Bay, one bag of oyster shells at a time in locations from Weedon Island and the Schulz Preserve to MacDill Air Force Base and the Sunshine Skyway Bridge. (Work is still underway at Schultz Preserve and Weedon Preserve, volunteer opportunities are listed in the Bay Soundings calendar.)

At MacDill, where the southeastern tip of the Interbay peninsula is eroding rapidly, a fifth phase of oyster bars is being planned. "They've been very successful," says Jason Kirkpatrick, natural resources manager with the 6th Civil Engineer Squadron. "They haven't 100% stopped the erosion but we are seeing salt marshes growing."

A plan to place larger reef balls further offshore is on hold following questions from the Florida Department of Environmental Protection and the Agency on Bay Management about seagrasses growing in the area where the reef balls were planned. "We took a step back and since there isn't any money available in 2012, it's effectively back-burnered until 2013 or 2014."

The oyster bars, at 18-24 inches tall, are very effective most of the time, except when storm-driven waves at high tides wash over them, Kirkpatrick adds. "We'd been seeing erosion at close to a foot per year, but the oyster bars have slowed it down substancially."



With the short-term impacts of wave-driven erosion already causing tremendous damage to some areas in Tampa Bay, the Tampa Bay Estuary Program is taking a longer look at problems likely to occur with climate change and sea level rise.

A new project focused on assessing critical coastal habitat will kick off this year, with the first meeting scheduled for Tuesday, February 28, from 9 a.m. to noon at the Tampa Bay Regional Planning Council. The long-term "on-the-ground" monitoring program would assess plant community and other functional changes in critical coastal habitats, including:

- Establishing permanent fixed transects in each of the four primary bay segments, preferably upslope from areas currently monitored for seagrass growth.
- Collecting quadrant data along the transects at low tide in November to identify plant species composition and richness, species cover, salinity and data on fauna such as fiddler crab density.
- Identifying long-term commitments fromTBEP and its partners since the monitoring program will need to continue for several decades to be effective.

Other initiatives planned to help meet the challenges of climate change include an updated habitat vulnerability assessment based on sea level rise of 0.5-2.0 meters by 2100. Additionally, an interactive tool for land-use planners is being developed based on those vulnerability maps to incorporate climate resiliency in habitat restoration and protection strategies.

Rainwater Harvesting
Continued from page 1

Above, a rainwater harvesting system at the new Dunkin' Donut in St. Petersburg is visible from the drive-through lane. Right, Carl Roth's cistern was designed to be inconspicuous in his side yard.

Photos by Brian Gregson and Carl Roth

His goal was to irrigate 900-plus new landscape plants using low-flow and mist irrigation with water collected from 3100 square feet of tile roof. Space limitations – combined with a wife who made aesthetics a top priority – limited Roth from installing a cistern large enough to capture all the rain that lands on his roof. "An inch of rain pretty much fills a 1500-gallon tank," he notes. "I was really glad that the tank overflow was sized correctly to deal with heavy rains."

Installation of the system was simple enough that Roth created a Power Point (http://www.baysoundings.com/stories-images/rainwater.pps) to encourage other people to build their own. "I wanted to show 'handy' folks that the project is relatively straight-forward and should not be too daunting."

In fact, the toughest parts of the project were sourcing the cistern and then digging a hole deep enough that the 1550-gallon tank didn't dominate the yard, he said. "Do a lot of research before you buy a tank, some of them are two or three times the cost of others."

With Roth doing the installation himself, the total cost of the system was just $2250, including fittings and pipes for the irrigation system as well as an automatic controller with rain sensor. "It works even better than I expected," he said. "I had to use supplemental water when we first installed the plants, but the cistern gives me about three weeks of water using the low-flow emitters twice a week."

From a technical perspective, rainwater harvesting is so simple that people in places like Key West have been doing it for many years, adds Brian Gregson, general manager of Rainwater Services in St. Petersburg. "You catch the water on your roof, it runs down gutters and into tanks and then it's pumped back out when you need it."

Costs for professional installation can vary significantly depending upon whether a customer is looking for low-volume irrigation or a totally off-the-water-grid home that recycles "gray" water from showers and washing machines as well as capturing rain, he says. "Most of our installations are upscale new homes," Gregson said. "They're taking a whole-house approach with other green features like solar power and natural lighting. They're definitely looking at costs and return on investment but they also have strong conservation mindsets."

That was exactly the case for the owners of the region's first certified Platinum LEED (Leadership in Energy and Environmental Design) home built on Coffee Pot Bayou. "They didn't care what size or style the house was, they wanted it to be certified as Platinum LEED," notes Jimmy Brattain, president of Design Works Florida, which designed and built the home.

Three 900-gallon tanks capture about 80% of the rain that falls on the waterfront home with two of the tanks providing low-flow irrigation for a landscape that contains 100% native plants. The third tank is used for flushing toilets and includes a UV purification system as well as a connection to the city water system. "It's on a float valve so there's always water available even if we don't get any rain."

In retrospect, the design would have been significantly more cost effective if it had not called for indoor water use, Brattian notes. "It's not really a practical application for most people because city codes required that the rainwater was treated and it got a little complicated."

Because it was new construction, building the rainwater harvesting system was "nearly a wash" in terms of construction costs, he adds. "We used copper gutters but we went with less-expensive PVC pipes inside the walls to collect the water. At that point, it doesn't make sense not to harvest rainwater."

In fact, Brattian predicts that Florida building codes will eventually require that all new homes are built with rainwater harvesting systems for irrigation. "It just requires a couple of simple steps and we need to save all the water we can."

Along with the dollar savings homeowners realize, capturing rainwater helps minimize contaminants that flow into Tampa Bay. Stormwater, which picks up pollutants as it flows through yards and across parking lots, contributes more than half of the nitrogen in the bay.

Rainwater harvesting hasn't been evaluated for its impact on stormwater treatment and nutrient run-off but clearly there is an impact, Bracciano said. Most rainwater harvesting systems release the first half-inch of rain – which typically contains the highest level of contaminants – so measuring the impact isn't quite as easy as subtracting the gallons of water harvested. "We haven't done that research yet."

Checklist for Rainwater Harvesting

Roof size: Calculate square footage including space like garages and covered porches but subtract areas that would be difficult to connect by gutter.

Determine maximum capacity of your roof: Roofs act like gigantic funnels catching water. A general rule of thumb calls for a half-gallon of water per square foot per inch of rainfall. A 2000-square-foot roof could capture 1000 gallons with an inch of rain although most systems divert the first few gallons instead of allowing it in the system.

Estimate the amount of water needed: Demand varies dramatically based on the type of landscape and irrigation system. An automatic irrigation system treating 500 square feet of turf uses about 4700 gallons during the spring dry season. A manual system would only use about 2800 gallons and irrigating plants other than turf would require even less water. Optimally, the rainwater harvesting system, irrigation system and landscape will be designed to work together. If necessary, your cistern can be connected to a water supply line with a float valve so that water is available even in times of drought.

Conveyance: Do existing gutters capture all rainfall? Will additional downspouts be necessary to connect to the cistern? If your home is surrounded by trees, you may need to install leaf guards on your gutters.

Pretreatment: Will you need a first-flush device or a filter to separate out leaves and other litter?

Determine your cistern requirements:

- Size needed
- Material type
- Above or below ground
- Foundation material
- Strapping (if above ground)
- Tank level indicator
- Overflow valve, where directed
- Connection to potable water source

Distribution: pump or pressure tank?

Build a Better Birdhouse
Continued from page 16

abandoned, but dead or sick trees are typically trimmed in urban and suburban settings so these birds may need artificial nest structures.

When buying or building a bird house, make sure it is designed for a specific species – not just for "birds." Commercial boxes are often built more to attract buyers than birds. Keep in mind that each species has preferred nesting requirements. The closer you match these preferences, the more likely it is that your nesting structure will become occupied.

For more information, visit http://myfwc.com/viewing/adventures/wildlife-viewing-at-home/cavity-nesters.

Building a Birdhouse

Species	Floor of Cavity	Depth of Cavity	Ht. of Entrance Above Floor	Diam. of Entrance	Ht. Above Ground	Special Notes
Carolina Wren	4"x4"	8"	1"-6"	1.25"	6'-10'	use shelf, basket or gourd
Bluebird	5"x5"	8"	6"	1.5"	5'-10'	
Crested Flycatcher	6"x6"	10"	6"	2"	8'-20'	
Purple Martin	6"x6"	6"	1"-2"	2"-2.25"	10'-20'	will also use gourd
Wood Duck	10"x10"	24"	20"	3" h x 4" w	land: 15'-25' water: 5'-25'	use predator guard
Downy Woodpecker	4"x4"	10"	8"	1.25"	6'-20'	Put 3-4" sawdust in box
Red-bellied or Red-headed Woodpecker	6"x6"	15"	9"	2"	8'-20'	Put 3-4" sawdust in box
Flicker	7"x7"	18"	14"	2.5"	8'-20'	Put 3-4" sawdust in box
Tufted Titmouse	4"x4"	8"	6"	1.25"	5'-15'	
Chickadee	4"x4"	8"	6"	1 1/8"	5'-15'	
Screech Owl	10"x10"	24"	20"	3" h x 4" w	10'-30'	
Barred and Barn Owl	12"x12"	25"-28"	12"-16"	7"x7"	10'-30'	

Estuary Program Awards $81,000 in Community Grants

The Tampa Bay Estuary Program has awarded 21 community groups a total of $81,000 for projects that directly involve citizens in restoring and improving Tampa Bay. More than 30 applications were received for the program.

Recipients by county include:

Hillsborough County

Community Stepping Stones, $4,940 for their "One Waterway – One Tampa Bay" program targeting at-risk teens who will learn how their community connects to the Hillsborough River.

Hillsborough River Watershed Alliance, $5,000 to expand the Frog Listening Network display at Lowry Park Zoo with new information on frogs and toads as indicators of the health of the environment.

Keep Tampa Bay Beautiful, $2,300 to expand the popular Keep Our Schools Beautiful to several additional high schools in Hillsborough County.

Robinson Elementary School, $2,390 for the "Grow – Learn – Teach – Reach" program that includes field trips followed by student-created lesson plans and projects targeted toward younger students.

Sulphur Springs Museum and Heritage Center, $1,668.19 to create an attractive low-impact landscape using Florida native plants with signs to direct visitors to different areas and plants within the park.

Hillsborough Head Start Community Foundation, Inc., $2,000 for the "Natural Beginnings to Butterfly Endings" project. Two butterfly gardens will be planted and parents will attend classes about water conservation and chemical-free gardening, then take plants home at the end of the year.

Manatee County

Around the Bend Nature Tours, $4,800 to cover field trips for 350 K-8 students at Emerson Point Preserve with hands-on activities focused on the connection between Tampa Bay and its watershed.

Clerk of the Court of Manatee County, $4,663.80 for a sustainable landscape at the Manatee County Courthouse to educate visitors about native plants and environmental landscaping practices.

Eckerd College, $475.93 to estimate populations of wild hogs in Terra Ceia Preserve where they are causing severe damage. Using the "Mark/Re-sight Method," hogs will be marked with paint and surveyed several times to determine behavior patterns.

Florida West Coast RC&D Council, $4,240 for workshops to be held at Gamble Creek Farm to educate farmers in Best Management Practices for water conservation, successful use of tailwater recovery, reclaimed water, micro-irrigation and hydroponics. Science teachers' workshops will incorporate sustainable agriculture methods into their curriculum.

Manatee School for the Arts, $4,935 for marine biology education and environmental stewardship program allowing economically disadvantaged students to participate in projects like salt marsh restoration, building oyster domes, invasive species removal, water testing, coastal clean-ups and community-based trips.

Pinellas County

Canterbury School of Florida, $5,000 to create a custom salt marsh grass nursery and learn how plants act as natural filters to clean the water, followed by planting events at Cockroach Bay Aquatic Preserve.

Friends of Fort De Soto, Inc., $2,500 for an education kiosk highlighting information about nesting shorebirds at the bird sanctuary on North Beach. Girl Scouts will lead the project, and the kiosk will include their photos as well as a "talk box" so visitors can learn the importance of protecting nesting and migrating birds.

Jungle Terrace Civic Association, Inc., $2,687 for the 5th Annual Parks Clean-Up in conjunction with city, county and other local organizations targeting areas around Jungle Lake, Abercrombie Park and along the Pinellas Trail, including the removal of invasive plants.

Nature's Academy, $5,000 to create an Island Adventure Pilot Project with nature walks, dip netting and a coastal clean-up at Fort De Soto Park. Students will be tested to measure new knowledge and Keep Pinellas Beautiful will document the total amount of trash collected.

Pinellas County Commission for Parks and Conservation, $5,000 for invasive plant control at Walsingham Park. The two-phased project also includes hands-on community involvement and educational signage.

Seminole Middle School (Environmental Club), $4,095 for a native plant beautification project that restores school property to a "living model" that demonstrates environmental value. Native plantings will promote environmental literacy and inquiry-based science activities to engage students, faculty, staff and parents about the connection between the community and the watershed.

Tampa Bay Watch, $4,875 for hands-on learning including field trips to Tampa Bay Watch's Marine Education Center to work on restoration efforts such as salt marsh grass planting for shoreline restoration, construction of oyster domes and oyster shell reef and planting of sea oats and dune sunflower.

The Shores of Long Bayou Homeowners Association, Inc., $4,800 to restore a retention pond that drains into a larger pond that has been restored. Residents of the retirement community will be recruited to help remove muck and invasive plants, then plant native species that clean water and attract wildlife.

Council of Neighborhood Associations of South Pinellas County, $5,000 for a two-day event that will restore Brooker Creek at Campbell Park with volunteers removing trash and invasive plants and installing native plants and educational signs.

Hillsborough, Manatee and Pinellas Counties

Keep Pinellas Beautiful, $4,760 to create "Adopt an Island" program that provides signs, bags and litter pickers to organized groups to clean up spoil islands in Tampa Bay and help eradicate invasive plants.

For additional information on each of the projects, visit the estuary program's website at http://www.tbep.org/bayminigrants/recipients_2011_2012.html. Applications for 2012-13 must be complete Oct. 1; learn more at http://www.tbep.org/bayminigrants.html.

Tarpon Tag Sales Benefit Bay Mini-Grants

More than $1.5 million in Bay Mini-Grants have been awarded to community groups across Tampa Bay since the program was established in 1998 with funds raised through the sale of the Tampa Bay Estuary specialty license tag – most commonly known as the "Tarpon Tag."

The Tarpon Tag is the only marine tag where all the funds raised stay in the Tampa Bay area, notes Dave Moore, program development director for the Tampa Bay Estuary Program. "The colorful new tags, including the manatee, turtle and dolphin tags, support state-wide programs but the Tarpon Tag money stays right here."

As the economy has declined, so have sales of the tag, forcing TBEP to cut maximum amount of the mini-grants from $7,500 to $5,000. A bill in the legislature now will raise the donation for the tag from $15 to $25.

"They've been $15 since 1999 when they were first introduced and now we're one of only 15 tags that cost just $15," he said. "We have a core group of about 8,000 plateholders so raising the cost will bring in about $65,000 per year."

Since the donation is a small part of the overall cost of the tag, most people probably won't even notice that the cost has gone up, he adds.

Nearly all of the TBEP's revenues goes directly to the Bay Mini-Grants. Funds directed to the Agency on Bay Management are primarily used to publish *Bay Soundings*.

Bay scallops ready for release into lower Tampa Bay as part of a 2006 Tampa Bay Estuary Program Mini-Grant.

QUARTERLY **CALENDAR**

The *Bay Soundings* calendar lists some of our favorite events and top trips, but there are many more events online at www.baysoundings.com where you will also find more complete information on each of the outings. It's compiled months in advance so we strongly suggest that you contact organizers to confirm. To allow additional space for events, contact information is listed at the bottom of the page.

february

Feb 25, 10-11:30am, Florida Snakes, Native Necessities to Invasive Predators program at Brooker Creek Preserve.

Feb 25, 2-3:30pm, Owl Cast Cafe© at Weedon Island.

Feb 25, 8am, Bird Circle B Bar Preserve with Tampa Audubon Society.

Feb 25, 8–11:30am, Shorebirds ID program with St. Petersburg Audubon.

Feb 25, 9-11am, Guided tour of Flatford Swamp in Myakka City.

Feb 28,1:30-4:30pm, Smart Landscape – Planning And Care, Manatee County Extension.

Feb 29, 9-11:30am, Bucket Brigade program on container gardening, Manatee County Extension.

march

Mar 1, 12-1:30pm, community outreach volunteer training for Tampa Bay Watch.

Mar 1, 6:45-8pm, Salty Topics – Underwater Soundscapes of Coastal Florida, Weedon Island Preserve.

Mar 2, 5pm, Magnify It, plant ID program, Pasco Palms Preserve.

Mar 3, 7am, Tampa Audubon Society tours Felts Audubon Preserve, Emerson Point Park and The Celery Fields.

Mar 3, 9am-noon, Florida Friendly Family Festival focused on environmental awareness and water conservation, Manatee County Fairgrounds.

Mar 3, 9am-noon, Plant salt marsh at Cockroach Bay Aquatic Preserve in Ruskin with Tampa Bay Watch.

Mar 3. Noon-12:45pm, Rain Harvesting, Pinellas County Extension.

Mar 3, 10-11:30am, Prehistoric Florida program at Brooker Creek Preserve.

Mar 3, 9-10:30am, History Hike at Weedon Island followed by a program on coastal archaeology from 11am-2pm.

Mar 5, 7:30pm, Mote's Immersion Cinema with Charles "Flip" Nicklin.

Mar 6, 8am-3pm, Live it, Love it, Preserve it. Keep Tampa Bay Beautiful. Environmental Conference for Future "Eco Activists."

Behind the Science programs at Mote Marine Laboratory offers kids ages 6 and up an opportunity to experience the lab's groundbreaking research. Ninety-minute programs on Tuesdays and Saturdays through May introduce marine animals and environments that inspire the research conducted by Mote scientists. Topics range from penguins, turtles and manatees to kayaking and seagrass snorkeling. Details and registration at www.mote.org/behindthescience.

ONGOING EVENTS

Feb to May, Birds of Brooker Creek and Wild Florida, a series of workshops presented by Sensing Nature.

Feb to May, Weedon Island Workshops – Restoring Nature's Balance, workshops presented by Sensing Nature.

Tuesdays March to May, 10-11am, Mote Aquarium: Mommy and Me: Exploring the Bay.

Second and Fourth Thursdays, Book Time at Brooker Creek and Wee Time at Weedon Island.

Wednesdays, 11:15am, Boyd Hill Nature Preserve, Jungle Boogie for ages 3 and 4.

2nd and 4th Saturdays,10am-1pm. Ask a Master Gardener, Rocky Bluff Library, Ellenton.

First Saturdays, 8-11am, Bird Walk with St. Petersburg Audubon at Boyd Hill Nature Preserve or Moccasin Lake Nature Park with Clearwater Audubon.

Most Saturdays and many Sundays, 10-11am; Guided Nature Walks at Fort DeSoto Park.

Most Saturdays, Guided hikes at Brooker Creek and Weedon Island.

Various Dates and Times; Coast Guard Auxiliary Safe Boating Courses available throughout West Central Florida. Visit www.cgaux.org.

Mar 6, 2:30-4:00pm, Manatee Energy Efficiency Project, Manatee County Extension.

Mar 8, 9am-noon, Agency on Bay Management meeting.

Mar 8 & 9, 9am-noon, oyster shell project at Schultz Nature Preserve with Tampa Bay Watch.

Mar 8, Two classes at 2pm and 6:15 pm, Florida-Friendly Landscaping around ponds, Pinellas County Extension.

Mar 10, Noon-3pm, Discovering Wildlife with Your Child: Brooker Creek Preserve.

Mar 10, 2-4pm, The Feathers of Florida – Past, Present and Future. Weedon Island Preserve.

Mar 12, 7:30pm, Mote's Immersion Cinema with José Castro.

Mar 13, 7pm, "Introducing Florida Friendly Landscaping to a Home Owners Association (HOA)," Pasco Native Plant Society.

Mar 17-18, Tour Sanibel Island and Corkscrew Swamp with Tampa Audubon Society.

Mar 17, 3:45-7pm, Sunset Cruise in St. Joseph Sound with Clearwater Audubon Society.

Mar 21, 8pm, Stargazing, Upper Cotee Preserve, Spring Hill. Pasco County Environmental Lands.

Mar 25, Tampa Audubon Society tours Golden Aster Preserve, Balm.

Mar 31, 8am, Dunedin Hammock City Park Bird Walk with St. Petersburg Audubon Society.

Mar 31, 10am–2pm, Drive-by Invasives at Fivay Cemetery, Pasco County Environmental Lands.

april

Apr 7, 8:30am-1pm, "Give A Day for the Bay" with the Tampa Bay Estuary Program invasive plant removal at Walsingham Reservoir, Largo.

Apr 12, 9am-noon, Agency on Bay Management Meeting.

Apr 17, 7pm, Water, Wilderness, Wetlands and White Birds with St. Petersburg Audubon Society.

Apr 21 & 28, 8am, Spring Migration with St. Petersburg Audubon, Ft. DeSoto County Park.

Apr 21, 2-4pm, Unveiling Our Urban Wildlife, first of a three part series. Weedon Island Preserve.

Apr 21, 8am-noon, Great American Cleanup, locations throughout the Tampa Bay region.

Apr 21, Honeymoon Island hike, Tampa Audubon.

April 21, 9am-2pm, Wildlife Safari for kids ages 3-12. Brooker Creek Preserve

Apr 22, Earth Day, multiple celebrations at various locations.

Apr 24, 7-10pm, Restoring Florida's Native Plant Communities from the Ground Up, Pasco Environmental Lands.

Apr 26-27, 9am-noon, oyster shell bar building at Weedon Island with Tampa Bay Watch.

Apr 29, 8am, Fort DeSoto Park birds, Tampa Audubon.

may

May 4, 7-11pm, Tropical Nights Benefit for Keep Tampa Bay Beautiful at the Cruise Terminal

May 5, 10:30-noon, Ocean Habitats at The Pier Aquarium.

May 8, 7pm - "Becoming Better Environmental Stewards Through the Florida Master Naturalist Program", Pasco Native Plant Society.

May 12, 9am, Wildflower Walk. Upper Cotee Preserve, Spring Hill. Pasco County Environmental Lands.

May 13, 6:30pm, Coffeepot Bayou Bird Island boat trip with St. Petersburg Audubon.

May 18, 6-8pm, Tampa Bay Watch's Potluck on the Porch.

Contact information

Agency on Bay Management, Tampa Bay Regional Planning Council, Pinellas Park, 727-570-5151, ext. 32 or www.tbrpc.org

Boyd Hill Nature Preserve, St. Petersburg, 727- 893-7326 or www.stpete.org/boyd

Brooker Creek Environmental Education Center, Tarpon Springs, 727-582-2100 or www.pinellascountyextension.org

Camp Bayou, Ruskin, 813-641-8545 or www.campbayou.org

Clearwater Audubon Society, 727-518-6241 or www.clearwateraudubon.org

Florida Botanical Gardens, Largo, 727-582-2100 or flbg.org

Florida Fish & Wildlife Research Institute, www.myfwc.com/research/about/outreach/

Heritage Village, Largo 727-582-2233 or www.pinellascounty.org/heritage

Hillsborough County Extension, www.hillsborough.ifas.ufl.edu or 813-744-5519

Keep Manatee Beautiful, www.keepmanateebeautiful.com or 941-795-8272

Keep Pasco Beautiful, www.keeppascobeautiful.org or 888-454-8837

Keep Pinellas Beautiful, www.keeppinellasbeautiful.org or 727-533-0402

Keep Tampa Bay Beautiful, www.keeptampabaybeautiful.org or call 813-221-8733

Manatee County Extension, 941-722-4524 or http://manatee.ifas.ufl.edu

Pasco County Extension, 352-518-0156 or www.pasco.ifas.ufl.edu

Pasco Environmental Lands Division, 727-847-2411 or www.pascocountyfl.net

Pasco Native Plant Society, 727-849-2335 or http://www.pasconativeplants.org

Pinellas County Extension, 727-582-2100 or www.pinellas.ifas.ufl.edu

St. Petersburg Audubon Society, www.stpeteaudubon.org or 727-526-3725

South Florida Museum, Bradenton, 941-746-4131 or www.southfloridamuseum.org

Tampa Audubon Society, www.tampaaudubon.org

Tampa Bay Estuary Program, St. Petersburg, 727-893-2765 or www.tbep.org

Tampa Bay Regional Planning Council, Pinellas Park, 727-570-5151 or www.tbrpc.org

Tampa Bay Watch, Tierra Verde, www.tampabaywatch.org or 727-867-8166.

Weedon Island Preserve Cultural and Natural History Center, St. Petersburg, 727-453-6500 or www.pinellascountyextension.org

Letters to the Editor

Dear Editor:

I recently read your article describing the study on the efficacy of fertilizer bans. As a landscape contractor, horticulturalist, and ornamental pest control operator, I really try to do what is best for our community and our bay. As you well know, the research and agreement amongst the "experts" is contentious to say the least. To have a study that answers all of the local competing science will no doubt be grand!

I have a few questions about your study and the bay on the whole. Ultimately your study results will be of assistance, but for now, any insight would be appreciated.

1. Every entity concerned about water quality in the bay (TBEP, DEP, Sierra Club, Pinellas County, City of Tampa, SWFWMD, Extension, and many more) all advise that if one utilizes "reclaimed water," then curtail fertilizer usage. Yet, seemingly no one is addressing the fact that the City of Tampa is loading 55 MILLION gallons of (nitrogen-containing) treated wastewater – potential reclaimed water into the bay daily. Are the nitrogen amounts in reclaimed water high enough for landscape usage and augmentation, but not high enough to harm the bay? Please help me understand the numbers.

2. How much loading does residential fertilizer use account for relative to other nitrogen inputs, such as the City of Tampa reclaimed treated wastewater (if indeed this is a problem), farm operations in east Hillsborough county (if indeed their practices make their way to the bay), septic tanks, industrial usage, etc. into the bay? And, are your current "residential" usage amounts strictly residential usage rates (ie: homeowners), or does it include municipal usage (parks, recreation fields, etc.), certified pest control operators, theme park usage, golf courses, etc.? Can you separate input sources?

I ask because a recent study I read by IFAS reported that municipalities account for 3% of the fertilizer usage in Florida, pest control and environmental horticulture professionals accounted for 4%, and homeowners accounted for well over 50%! Defining which users are the most egregious will no doubt help in solving the long-term solution. Also, do you have benchmarks for residential usage? I, like many others, suggest that the current bans in the bay area will indeed change purchasing behaviors, but not usage. Certified pest control operators will comply because they (I) have a direct financial incentive to do so! Your quantitative data will be great, but informal qualitative studies of blog responses on media coverage (on TBO and other local news sites) seems to indicate that homeowners will not comply with the rulings. Again, isolating the worst offenders, if possible, will be beneficial. But to do so requires benchmark usage before the ban, usage during, who or what is the offending party.

3. According to the construct of your study, as described in the article on your website, samples will be taken from neighborhood storm water ponds and drains. Again, I cannot wait to see the results of your study. However, and I am no scientist (environmental, hydrological, or otherwise), thus I am no expert on your scientific methodology, and I accept there is a causal relationship between subdivision ponds and residential usage/non-compliance and subsequent runoff, but are you similarly taking samples of the bay? The whole purpose of the fertilizer bans is to help the bay. Longitudinal nitrogen data of the bay, and direct correlation with the new fertilizer ban periods on the bay, would also ultimately provide some valuable data. Would it not? Are there corollary studies and sample analysis directly on the bay being conducted in concert with this study?

I really appreciate your expertise on the aforementioned questions. Again, I am a landscape contractor, many people ask me questions about this issue. I know what the environmental lobby claims, and what my industry espouses. I follow my industry's lead because I trust their science. If however there is fresh or contradictory data, I want to know about it, for my business, my community, and my industry. Once more, I am contacted by customers and citizens regarding our fertilizer usage. I try to relay, and answer folks questions, by framing both sides of the argument. But, on the aforementioned questions, I require clarification.

Will Womack, President
Tampa Bay Landscaping

We Respond:

We asked Nanette O'Hara, public outreach coordinator for the Tampa Bay Estuary Program to respond:

Mr. Womack:

Thank you for your inquiry. Here are answers to your questions:

1. Regarding nitrogen in reclaimed water, the amount varies according to the utility. But, overall, most reclaimed water in our area is not treated as thoroughly as wastewater that is directly discharged to the bay. The City of Tampa's wastewater, for example, is treated to advanced standards which remove more than 96% of the nitrogen prior to discharge to the bay. The City of St. Petersburg's wastewater, which is largely reclaimed for use on golf courses, medians, commercial properties and residential lawns, contains much more nitrogen. By our estimates, a homeowner irrigating twice a week with 0.75 inches of reclaimed water from St. Pete per irrigation would not need to apply any fertilizer at all to the lawn, per IFAS fertilization guidelines. The requirements for direct discharge of wastewater to the bay are much more stringent than those for wastewater that is reused for irrigation.

2. Our estimates indicate that nitrogen from urban fertilizer use comprises about 20% of the nitrogen carried in stormwater runoff to the bay. This is an extremely conservative estimate. Urban fertilizer refers primarily to residential fertilizer (single-family homes, condos, and office/retail complexes). Most of the local governments use very little fertilizer; Pinellas does not fertilize any of its properties anymore, except for athletic fields. Even the Florida Department of Transportation has stopped fertilizing highway medians and shoulders. As far as benchmarks for residential usage of fertilizer, studies conducted in the Wekiva Basin and other areas indicate that fertilizer use is highest in deed-restricted communities and especially in deed-restricted communities served by professional lawn care companies.

3. Our study will help to determine whether, and to what extent, the fertilizer bans are working. It is our assumption that communities which have a sales ban in place will show a greater reduction in nitrogen; our study is designed to test that hypothesis by measuring nitrogen levels in communities with different fertilizer ordinances (i.e. Hillsborough versus Pinellas). After one full year of a use and sales ban in Pinellas County, I can tell you that the overwhelming majority of homeowners are complying. In order for them not to comply they would have to drive to another county to buy fertilizer, and studies conducted by IFAS indicate that people buy fertilizer from the closest available store, NOT one in another county. They simply can't buy fertilizer in Pinellas anymore that is not at least 50% slow-release nitrogen from October - May and 0% nitrogen from June - September. The retail stores are reporting no appreciable decline in sales of fertilizer, and they tell us that their customers are satisfied with the ordinance-compliant products they are offering. The list of compliant products continues to grow and Florida fertilizer companies have been very proactive about producing 50% slow-release N fertilizers and zero N fertilizers to meet demand. The majority of ordinance violations that were issued in Pinellas County (which enforces its ordinance very aggressively) were given to commercial fertilizer applicators. The most common violations were applying fertilizer right before or during a heavy rainfall, and leaving fertilizer granules on roadways and other impervious surfaces or blowing them into ponds or storm drains. However, I personally have worked with several lawn care companies that have been very supportive of the ordinance and pleased that BMP training is now required of all applicators in Florida.

> **Our study will help to determine whether, and to what extent, the fertilizer bans are working. It is our assumption that communities which have a sales ban in place will show a greater reduction in nitrogen; our study is designed to test that hypothesis by measuring nitrogen levels in communities with different fertilizer ordinances (i.e. Hillsborough versus Pinellas).**

4. Our study is indeed taking samples of nitrogen both in storm water ponds (in cross-sections of neighborhoods where the only source of nitrogen is lawn fertilizer) and in the receiving waters of the bay. We have tracked nitrogen loadings in Tampa Bay for close to two decades and have very good estimates on loads by bay segment as well as at smaller scales. For this study, we are especially interested in measuring nitrogen amounts at a very localized level (thus, storm water ponds) to ensure we are only measuring nitrogen from residential fertilizer and not from any other sources. Because storm water ponds within the bay watershed ultimately drain to the bay, then logically less nitrogen going into those ponds means less nitrogen going to the bay. But, yes, we are monitoring both the ponds themselves and the nearest bay waters they drain to. Our research may not give us all the answers to all the questions, but it will be the first real effort to scientifically quantify and compare the effectiveness of fertilizer ordinances. We know many people are awaiting the outcome of our research.

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Inner-City Kids Learn to Love the Great Outdoors

By Victoria Parsons

Can inner-city kids learn to love the outdoors?

Absolutely, says Rocky Milburn, chairman of Tampa Bay Sierra Club's Inner-City Outings (ICO) program.

"Kids who come face to face with the wilderness learn to love it – and then they learn to protect it," says Milborn, a former Eagle Scout who shares his love of the outdoors through the ICO. "You can lecture them all day and they won't pay a bit of attention, but if you get them outside, they absolutely understand why we need to protect our natural environment."

The Tampa Bay ICO is working with four groups of inner-city kids, from the Academy Preps in Tampa and St. Petersburg, the Boys and Girls Clubs of Tampa and Plant City, and the University Area Community Development Corporation (UACDC) Girls Club. The goal is to get kids, who might not ever have a wilderness experience, outside with adults who can share their knowledge and love of nature.

BACKBAY Adventures

Photo by Rocky Milburn

The ICO trip to Crystal Springs Preserve is one of the highlights of the year at Academy Prep of Tampa.

"It's not something we do once or twice a year," he said. "We do monthly events from August to May and the program always culminates with an overnight camping trip."

The most recent event with Academy Prep of Tampa taught students how to build bird nesting boxes that will be placed in Hillsborough County nature preserves. "We all got together at The Home Depot and built 30-some boxes to be placed at Cockroach Bay, Wolf Branch Creek and Golden Aster preserve."

Nesting boxes are particularly critical because birds like owls, woodpeckers and wrens typically nest in cavities in dead trees -- usually the first type of habitat to be lost in an urban or suburban setting and relatively rare even in natural settings.

Building nesting boxes gave kids an insight into the importance of habitat, Milburn said. "You can't expect to hang a blue birds box in Ybor City and get birds, but you might get wrens because they tolerate a more urban ecosystem."

Other excursions include the Great Fort DeSoto Challenge, an annual event with kids "rescuing" rocks thrown into the surf, racing kayaks across the calm lagoons and a contest to see which team can pick up the most trash. The trip to Crystal Springs Preserve is a perennial favorite, with up to 50 people participating in nature walks and net dipping in the river. "We always seem to get a lot of parents and siblings for this trip," he said.

This year's camping trip is planned for May at Colt Creek State Park north of Lakeland, where kids will spend the weekend without electricity or running water. "This place is so wild that from inside the tents you can hear bob cats making a kill," Milburn said. "We'll go on a midnight hike with no flashlights so the kids can really see the stars, then we'll come back and sit around a campfire with s'mores and storytelling."

Get Involved with ICO

Leaders of ICO events have extensive training in both outdoor skills and first aid, but adults with outdoor experience are welcome to participate after completing an application online at http://ico.sierraclub.org/tampabay/ico_involve.htm.

Build a Better Birdhouse

At least 22 resident Florida birds nest in cavities in trees or branches, according to the Florida Fish and Wildlife Conservation Commission. Most depend upon natural cavities chiseled out by woodpeckers and then

Build a Better Birdhouse
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