SPRING 2012

# Bay Soundings

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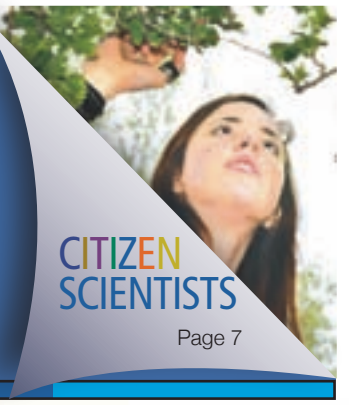
COVERING THE TAMPA BAY WATERSHED



CITIZEN SCIENTISTS
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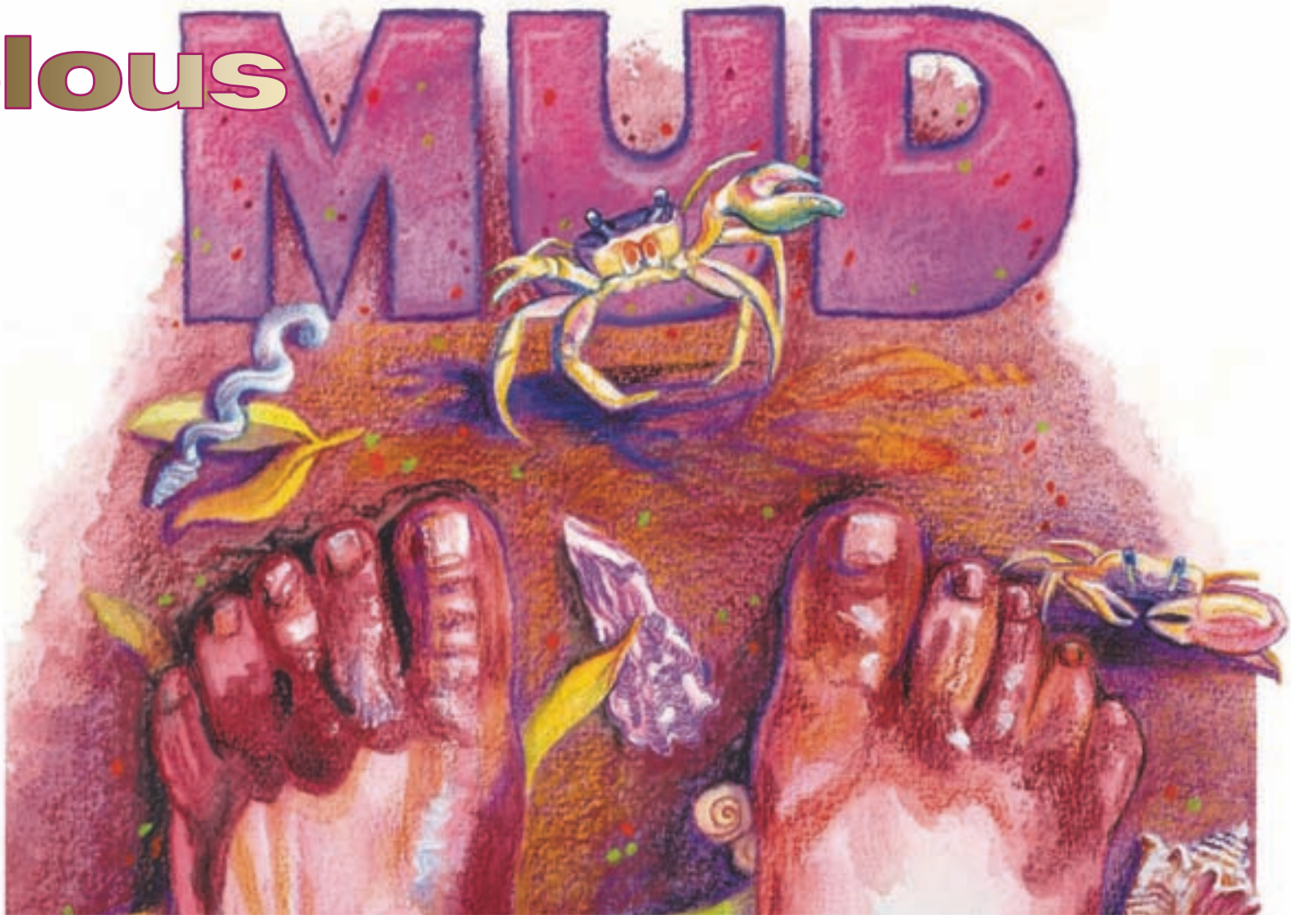
# Marvelous MUD



**Story and illustration by Sigrid Tidmore**

"Ewwww!"

"Yuck — it's icky, squishy and smelly!"

"Cool. Can we take off our shoes and play in it?"

These are the typical comments I get the first time I take kids out to the estuarine mud flats for a lesson on the web of life. Scientists refer to it as the "intertidal benthic layer." To the casual observer it may seem devoid of interest — even a little disgusting — but it's one of the most productive habitats on the planet and the foundation of our entire food chain.

It is here that the detritus (dead organic matter) of forests and fields accumulates, attracting creatures numbering in the billions per square yard. Each year more than a million tons of sediment wash into the Tampa Bay estuary, mixing with salt water to create the perfect conditions for marshes, mudflats, mangrove swamps and tidal channels — the very cradles of life.

## Life in the MUD

Mud flats (also known as tidal flats) are usually found next to salt marshes. They tend to occur along a delta where a river or creek meets the daily tides. As decaying organic detritus is swept into shallow areas, a thick oozy layer builds up when the sediments fall to the bottom. It fuels the growth of microscopic plants and animals. Oysters and clams and other filter feeders cling to nearby mangroves, enjoying the nutrient soup.

At high tide, you'll find baby fish, shellfish spawn, snails and brittle stars hunting for food. When the tide goes out and the mudflat is exposed, armies of fiddler crabs emerge from their muddy burrows to forage and court. The males have one enlarged claw that they wave around to attract females and ward off the competition. They and their cousins, the ghost crabs and the mud shrimp, dig burrows up to three feet deep across the tidal flats. Clams and worms also excavate tunnels throughout the mud, bringing in oxygen for the microbial communities and allowing nutrients to cycle back into the water.

The mud flats also are important to herons, egrets and other wading birds. Predatory animals like raccoons make their rounds frequently looking for a salty snack. As the flat matures, pioneer plants including the herbaceous species like black needle rush (Juncus roemerianus), salt meadow cord grass (Spartina patens) and smooth cord grass (Spartina alterniflora) move in. As they capture more sediment and the land rises, red and black mangroves take root, culminating in what's known as a climax community.

Over time, the plants trap additional sediments to strengthen and stabilize the formation, providing habitat and food for larger creatures, as well as protection against storm tides and erosion for the humans who live on nearby uplands.

## MUD vs. Muck

Highlighting the importance of mud, the Environmental Protection Commission of Hillsborough County monitors dozens of benthic locations twice a year to track the health and vitality of the estuary. They analyze the type and quantity of tiny creatures that live in the mud. Of the more than 1400 benthic species, worms, mollusks and crustaceans make up the largest populations. Scientists use "indicator species" (see page 13) to determine how much oxygen is available in the mud — a key factor in measuring the health of the ecosystem.

Ed Sherwood, program scientist with the Tampa Bay Estuary Program, explains it this way: "In the areas where light penetrates and the water is moving, the dissolved oxygen levels stay high. Sea grasses can grow, oysters filter sediment, and a wide variety of species thrive. Where we get into trouble is in shallow water when the sediment gets stirred up or lack of movement causes the water column to separate into layers of different temperatures or saline levels. If the light gets blocked too long, an algae bloom may occur, using up

**Marvelous Mud**
*Continued on page 13*

# Brandt Henningsen: Restoring Our Natural Legacy

**By Mary Kelley Hoppe**

The quiet mangrove coves and lush marshes rimming Cockroach Bay Preserve near Ruskin in southern Hillsborough County give no hint of the decades-long transformation there. Lands once used for farming and mined for shell used as road base now harbor freshwater and tidal lagoons and uplands teeming with wildlife.

For Dr. Brandt Henningsen, chief environmental scientist with the Southwest Florida Water Management District, it's been a labor of love and patience 20 years in the making.

Hillsborough County purchased the 651-acre tract in 1991, opening the way for one of the largest and most complex coastal ecosystem restoration projects ever conducted on Tampa Bay. Tasked with designing and overseeing construction of the project for the district's Surface Water Improvement and Management (SWIM) program, Henningsen has been a driving force since day one. But he's quick to credit the county and more than 20 collaborating partners for the success of the project, which was completed in phases as money and manpower became available.

"We couldn't have done this alone," says Henningsen. "The partnerships have been key in allowing this to move forward and be successful."

One of the first to join the SWIM program in 1987, he's helped design and plan over 40 habitat restoration projects, including nearly 2,500 acres of coastal habitat along Tampa Bay. He's become a leading advocate for habitat conservation in Tampa Bay and an authority on coastal habitat restoration. The Tampa Bay Association of Environmental Professionals recently honored him with its 2012 Environmental Excellence Award.

"His day-to-day involvement in the field has made him the high-level designer he is," says Tom Ries, vice president

**Brandt Henningsen**

*Continued on page 5*

Photos courtesy Brandt Henningsgen

Top, Camping high above a braided tidal creek at Cockroach Bay Preserve, Brandt and Lisa Henningsen, and their son, Colin, take in the view. The couple's younger son, Forest, is missing from the photo. Above, Henningsen perches beside a limestone outcropping at salt barrens at the Rock Ponds. Inset, he preps the ground for planting marsh grass at Lost River Preserve.


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.

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COVERING THE TAMPA BAY WATERSHED

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# news briefs & follow through

## Kill-A-Watt Tracks Energy Use

Through its Pinellas Energy Efficiency Project, Pinellas County Extension is promoting a new gadget that aims to get citizens more energy conscious and eco-friendly.

The Kill-A-Watt™ Energy Monitor is a simple tool used to see how much energy the devices in a home are actually using, whether they are on or off. Users simply plug the monitor into an outlet, plug an appliance into the monitor, follow The Kill-A-Watt's™ instructions and watch it work. The monitor measures various aspects of electrical consumption, from voltage of an outlet to watts and kilowatt hours. Users can find out exactly how much energy and money is being consumed by most of their household electronics.

Pinellas County Extension and the Pinellas Public Library Cooperative have come together to make these Kill-A-Watt™ monitors available for check-out at their libraries. Extension specialists will also be holding upcoming classes at select libraries to further explain how the monitors work and to give easy tips to make a home more energy efficient in their effort to decrease electric bills and increase environmental friendliness.

For more information or to register for an upcoming event, visit www.pinellascountyextension.org.

## Bat House is "Five-Star Resort"

A bat house that can accommodate up to 40,000 bats at the Florida Botanical Gardens in Largo is a "five-star resort" for animals that can each eat up to 3,000 insects per night. "That's a lot of bugs," exclaims Debbie Chayet, grants specialist for Pinellas County.

The bat house, funded with a series of mini-grants from the Tampa Bay Estuary Program, was built by county employees with assistance from Cynthia and George Marks, founders of the Florida Bat Conservancy, and master naturalist John Hood.

"It should be in the perfect place to attract bats," Chayet said. "It's in an open area, up high, next to water and surrounded by conservation lands."

Bats have been seen in the area, although much of their natural habitat has been destroyed. Experts say it may take two to three years for the bats to accept their new home. "Several species of Florida bats prefer living in these large colonies," she adds. "We can't wait for them to move in here."

## New Boater's Guide Available


A Boater's Guide to Clearwater Harbor and St. Joseph Sound is now available. Published by Audubon of Florida, the guide details both navigational features and the plants and animals that make the area one of the region's most important areas for wildlife.

Important birds, including rare American oystercatchers, snowy plovers, reddish egrets and roseate spoonbills, nest in the area during the summer. Others, like the long-billed curlew, red knot and magnificent frigatebirds, visit seasonally.

For more information or to request a copy of the guide, visit Clearwater Audubon Society at www.clearwateraudubon.org or Audubon's Florida Coastal Island Sanctuaries at 813-623-6826.

## New App ID's Invasives

Every gardener knows there's a thin line between an "easy to grow" and an "invasive" plant. A new app for both iPhones and Androids allows you to quickly check the status of a plant before you buy one. In the field, the same app pinpoints your location, uploads photos of the invasive and then provides information on controlling it. A separate section on invasive animals has great photos but less information on why the animal could damage Florida's ecosystems.

Invasive plants and animals cost Floridians over $500 million per year. The goal of the new app is to help researchers identify potential infestations early so they are more easily controlled.

The free app, downloadable at www.eddmaps.org, was created in a partnership including the University of Georgia Center for Invasive Species and Ecosystem Health, National Park Service, Florida Fish and Wildlife Conservation Commission and the University of Florida Center for Aquatic and Invasive Plants. Along with the app, the website allows direct access to integrated invasive species reporting as well as a hotline at 1-888-IVEGOT1 for instant reports of live animals.

## Maryland Posts Bounty for Snakeheads

Maryland's Department of Natural Resources is passing out $200 gift cards to anglers who capture and kill snakehead fish. The ferocious invader from China eats everything from bass and other fish to birds and small mammals. In times of drought, it can live without water for up to four days.

Found in eight states — including a limited population in Broward County, Florida — the freshwater fish has no natural predators and reproduces incredibly quickly. A female can spawn 15,000 eggs at a time and typically mates five times a year.

The goal isn't to eradicate the snakeheads, but to increase awareness of the need to control them, DNR officials say. A recent study found that when snakehead populations declined, populations of largemouth bass increased.

In some states, snakeheads are becoming known as a gamefish with one website describing catching one as "strikes like a cobra and fights like a bull." They also are considered a delicacy in some cultures.

## Water-Wise Competition Kicks Off

Just as we enter what is typically Tampa Bay's driest season, Tampa Bay Water is accepting entries for the 14th annual Community Water-Wise Awards. The program recognizes individuals and companies that have created and maintained landscapes that are not only visually appealing, but water-efficient.

All residents, businesses, builders and other organizations in Hillsborough, Pasco and Pinellas counties as well as the cities of Tampa, St. Petersburg and New Port Richey are eligible to apply for the 2012 Community Water-Wise Awards.

Applications are available online at www.TampaBayWaterWise.org and must be submitted by June 30.

## Artificial Reefs are Buried Treasure

Artificial reefs along Florida's southwestern coast contribute more than $253 million to local economies, according to a report from Florida Sea Grant. The reefs, which provide habitat for popular sport fish and mother marine life, also supported more than 2500 jobs and generated more than $16 million in business tax revenues.

Although it costs no more than a saltwater fishing license, anglers and divers spend money on food, lodging, fuel and tackle. Visitors accounted for almost half of the total expenditures, bringing in about $117 million in new money. Counties, including Pinellas, Hillsborough, Manatee, Sarasota, Charlotte and Lee, generally invest about $20,000 to $60,000 per year in artificial reefs.

"That shows me that there is a lot of bang for the buck in terms of what the counties get out of the artificial reef program," said Bob Swett, the Florida Sea Grant specialist who led the study.

On average, 5,600 people use artificial reefs per day for an annual total of more than two million person days. Other results show that both users and non-users are likely to support public spending on artificial reefs, with 61% to 71% of non-users supporting the use of public funds to provide and maintain artificial reefs.

For more information, visit http://flseagrant.org/images/PDFs/tp178_economic_impacts_artificial_reefs_web.pdf

## Eco-Friendly Pest Control

Birds provide millions of dollars' worth of pest control for farmers around the world, according to new studies released by the University of California Berkley and Humboldt State University in Arcata, CA.

The UCB study placed 200 bluebird boxes in vineyards and then mimicked an outbreak of beet armyworms. As expected, the bluebirds removed the larva, protecting the grape vines from one of their most important pests.

In Jamaica, coffee berry borers force their way into coffee beans, destroying the value of the crop. The Humboldt study placed tents over the coffee bushes to keep birds out. Damage was significantly higher in areas where birds could not eat the borers. The right species of birds can provide from $16 to $120 per acre in protection, the study concluded.

# Teaching the Three "Ts" – Turtles, Tortoises and Terrapins

It was love at first sight.

George Heinrich was just five years old when his father brought home an eastern box turtle. It escaped shortly afterwards, but Heinrich was already hooked on learning more about the ancient animals that are largely unchanged since the days of dinosaurs.

Today he's a field biologist and environmental educator, sharing his love of all things turtle and working to protect them and the habitats they need to survive. "There is still some harvesting occurring in some parts of the state, but the biggest issue facing turtles is the loss and degradation of habitat," he says. "Certainly there are significant threats to Florida turtles and their associated ecosystems but opportunities to save them are still present — we haven't reached the tipping point yet."

That puts Florida educators at the leading edge of the conservation movement, he adds. "Turtles are the ideal subject for ecology or conservation classes because they play such an important role in the environment and they're faced with multiple threats."

Florida is the second richest center of turtle diversity in the world. About 8% of the world's known species live in the state's uplands, coastal wetlands or marine ecosystems. The threats facing them are as diverse as the species — from the massive sea turtles that spend most of their lives roaming deep oceans to gopher tortoises that thrive in hot, sandy inland areas.

One of the first questions people typically ask Heinrich is about the differences between turtles, tortoises and terrapins. "They're all turtles," he explains, although the moniker generally applies mainly to turtles that spend all or most of their lives in water.

On the other hand, tortoises typically live on land, he said. "Tortoises are a family of turtles with about 50 species in the world," he said. They range from the 7.5-inch box turtle to the Galápagos tortoise that can weigh up to 880 pounds.

The diamondback terrapins are the only species of turtles that exclusively live in brackish water. Once common in coastal areas from Massachusetts to Texas, they were considered such a delicacy at the dinner table that they practically disappeared. So little research has been conducted on terrapins that no one knows how many have survived, but some researchers believe they should be listed as endangered.

The biggest single threat to terrapins is being caught by mistake in crab traps. Like all reptiles, terrapins must breathe air, so they drown in the traps if they're not pulled out immediately. "This could be resolved with a 45-cent excluder that would allow crabs in the trap but keep most turtles out," Heinrich said. Crabbers and regulators, however, have been slow to adapt the life-saving technology. (For more information on terrapins, see the Summer 2003 edition of *Bay Soundings* online at www.baysoundings.com/sum03/terrapin.html.)

While terrapins are exceedingly shy and seldom seen in the wild, many people recognize gopher tortoises from trips to places like Boyd Hill Nature Preserve, where Heinrich serves as the volunteer leader for turtle walks through the 400-acre preserve that is the largest remaining gopher tortoise habitat in south Pinellas County. Working with a number of volunteers over nearly three months, Heinrich surveyed the entire park in six-foot transects to count gopher tortoise burrows.

"The burrows are easy to see, and then you use a formula to estimate the number of tortoises using them," he explains. "They're very good housekeepers, so an active burrow will be clear of leaves and other debris that would pile up if the tortoises weren't coming and going."

Those burrows, which may extend up to 40 feet in length, in colonies that contain up to a dozen tortoises, are the reason gopher tortoises are considered to be a "keystone species." Tortoises share their burrows with 350 other animal species, ranging from burrowing owls and snakes (including diamondback rattlers and the endangered eastern indigo) to rabbits, skunks, squirrels, mice, frogs and crickets.

But even preserved habitat may not be enough to maintain populations of gopher tortoises and the animals that depend upon their burrows. "Fire is critical," Heinrich said. "They'll eat almost anything that's green but they want tender green growth. Without fire, dense vegetation shades out new growth."

Photo by Victoria Parsons

Top: Heinrich shares his love of turtles with youngsters at programs that range from turtle walks at Boyd Hill and Weedon Island to intensive workshops for teachers and summer camps for kids.

Right: Gopher tortoises have adapted to living in dry habitats with frequent fire occurrence by digging burrows deep into the sandy soil. The burrows which average 15 feet long and 6.5 feet deep, provide the gopher tortoise with refuge from wildfires as well as heat, cold, drought and predators. If you discover a gopher tortoise burrow, avoid stepping near the entrance or the tunnel could collapse.

Photo courtesy Florida Fish and Wildlife Conservation Commission

## Learn more about Florida's threatened turtle species:

- Teachers and informal educators can join Heinrich for an intensive four-day workshop scheduled from June 18 to 21 at Boyd Hill. "Our goal is to provide a lifetime experience that will allow educators to return to their formal and non-formal education settings and excite others," Heinrich said. The workshop includes both classroom instruction and field trips to locations like Rainbow Run in Marion County, Mote Marine Laboratory and an evening hike on a Sarasota County beach to look for nesting loggerheads.
- Six week-long nature camps are scheduled at Boyd Hill and Weedon Island and Brooker Creek nature preserves for kids aged 7 to 11. Three of the programs focus on herpetology, featuring up-close encounters with a variety of animals. Campers will learn about the ecology and conservation of animals such as gopher tortoises, frogs, lizards, and snakes. Wildlife ecology camps blend classroom and field sessions with hands-on activities, guest presentations and exploration of the preserves' diverse habitats, where campers will practice their nature detective skills.

Complete information and registration forms are online at www.heinrichecologicalservices.com/programs.html.

# Nature Preserve is "Best-Kept Secret" in South Tampa

"Best-kept secrets" in exclusive south Tampa tend to be upscale restaurants or sophisticated boutiques. For nature lovers, hikers and bikers, however, the MacDill 48 is a nearly unknown wilderness area in one of the region's most densely developed neighborhoods.

The 48-acre site, located off MacDill Avenue just south of Interbay Boulevard, encompasses oak hammocks, pine flatwoods, shrub swamp and even a natural bayhead forest with an enormous magnolia tree. Surrounded by a chain-link fence except for a single entryway at the foot of Martindale Street, the park is a secret some residents would like to keep that way.

It's a particularly special place for Forest Turbiville, section manager for regional parks and conservation services in Hillsborough County. He first saw the forested site as a kindergartner, attending the B & R Ranch. "The school backed up to what is now the preserve and I can remember playing in it in 1974, thinking 'just how cool is this?' Even then it was pretty much the only natural land around, and it was just an awesome place."

Although it was not purchased until 1992, the property was a driving force behind the creation and voter-approved funding for the Hillsborough County Environmental Lands Acquisition and Protection program. "Developers came forward with plans to build hundreds of homes on the site," he recalls. "People who lived nearby were very unhappy with the idea but there wasn't a source of funding available to buy it and protect it from development."

As a student at the University of South Florida in 1996, Turbiville selected MacDill 48 as the topic for his master's thesis on the effect of fragmentation and "island biogeology" looking at changes in ecosystems when connections to other wild areas are lost.

"MacDill 48 is the perfect example of the island effect," he says. "It's totally surrounded by pretty intense development."

But while the site is protected from development, it's losing much of its value as habitat for wildlife, particularly the gopher tortoise which has very specific requirements for success (see related story opposite page.)

Invasive plants have escaped from adjacent backyards, including air potato vines that drape many of the massive live oak trees inside the preserve, a massive stand of bamboo planted at the edge of one backyard, and non-native grasses. Even native plants, like wild grapes that are a food source for birds and small mammals, can grow so rapidly that they choke out the plants gopher tortoises need to survive.

Photo by Victoria Parsons

Forest Turbiville points out overgrown grapevines at the MacDill 48, one of the few remaining nature preserves in south Tampa. Inset, a Google Earth image shows the preserve set in the midst of one of the area's most dense neighborhoods.

"This area probably hasn't been burned in 50 or 60 years," he says, pointing to an overgrowth of wild grapes. "In a truly natural setting, it would probably burn every one to three years."

The City of Tampa, which has managed the MacDill 48 since it was purchased, is refocusing attention on the preserve as part of an effort to connect it with the greenways trail at Gadsden Park at the foot of MacDill Avenue.

"It will still have limited access parking but we'll be looking at ways we can make sure it retains its environmental value," said Greg Bayor, the city's new director of parks and recreation. Partnerships will be critical, he adds. "We'll be working with the county to do some mechanical clearing and the state to help with very small burns, and we're hoping to find a nearby school or environmental organization to help maintain it."

Prescribed burns, however, are a challenge in an urban setting. "On a larger tract of land, or one near the bay, we can wait until the wind comes out of the right direction to blow the smoke away," Turbiville said. "There's no way to wait for the right wind here."

Neighborhood meetings will be held before any burns are scheduled, Bayor notes, and state forestry experts will conduct them.

Trails throughout the preserve will provide an absolutely unique opportunity for residents more accustomed to trails that surround manicured ball fields. "There just isn't anything else like this in south Tampa — and probably never will be," Turbiville says.

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**Brandt Henningsen**

*Continued from page 2*

of Scheda Ecological Associates, who worked with Henningsen at SWIM for more than a decade. "By being hands-on, Brandt sees the nuances that make or break a project."

That hands-on attention is critical when success or failure may be measured in inches, Ries said. For instance, some marsh grasses die if they are planted above or below the water line. "It can come down to a fraction of an inch and if you don't get the grading and slope right, the plants won't grow properly."

"We try our best to put back the full suite of habitats that normally would be found in Tampa Bay," Henningsen says. "It's kind of like putting a puzzle together — you want to make sure each piece meshes seamlessly with the other components." It's infinitely more complex as projects are designed to be multifunctional, encompassing habitat restoration, treating stormwater runoff to improve water quality, and improving hydrology.

## Happiest in the Field

Unlike many senior scientists and engineers, Henningsen is happiest in the field where his energy and passion are infectious. Over the years, he's led countless tours and worked with thousands of volunteers — mostly on weekends — to rid sites of exotic plants, install marsh plants and clean up shorelines. "It changes their perspective and gives them an understanding of why this work is so important," he says.

"Brandt really loves to share his passion for conservation and see people take up the torch and carry it forward," says his wife, Lisa, who spent 22 years with the district as an environmental scientist. The two met at the University of South Florida in the early 1980s where she was an undergraduate biology student, while he was completing his PhD.

Romance blossomed two years later when Henningsen invited Lisa to join him for a 5K run. In 1984, a year before they were married, the couple ran the Boston Marathon as 'bandits' — unofficial runners. Since then the avid runners have logged thousands of miles together.

That drive and determination, along with a love for all things outdoors, traces back to his childhood in Stephensville, Texas. He was an Eagle Scout, camping and exploring the forests around his home with his two brothers, and fossil hunting with his father, a geologist and university professor.

But it was a dime-store snorkel and mask, a gift from his parents when he was 10, that forever changed him. "The first time I stuck my head underwater, it was like a light came on and I knew I wanted to be a marine biologist," Henningsen recalls. He immersed himself in the popular TV series Sea Hunt and the adventures of ocean explorer and researcher Jacques Cousteau, who pioneered and inspired marine conservation. "Cousteau became my hero."

Henningsen went on to study marine biology at Lamar University and earned a masters degree in biology from Texas A&M before moving to Tampa to attend USF. The restoration projects he has directed have earned national and international recognition for Tampa Bay.

"There's real satisfaction seeing these natural communities evolve, mature and change over time," Henningsen says. "People will look back and be thankful for these wild spaces."

# Water Atlas – Detailed Data for Scientists of All Ages

From kids to senior scientists, researchers in Tampa Bay depend upon the Water Atlas for the most up-to-date and in-depth data available on ecosystems in the region. Developed by the Florida Center for Design + Research at the University of South Florida in partnership with Hillsborough County, the Water Atlas now includes data from Pinellas, Manatee, Sarasota, Polk, Lake, Orange and Seminole counties as well as the Charlotte Harbor and Tampa Bay estuary programs.

But even as coverage has expanded, the Water Atlas has become easier to use, particularly for citizen scientists concerned about water quality in lakes and rivers near their homes.

The goal is to allow people from every walk of life to understand the issues facing the region as it continues to grow, notes Bridgette Froeschke, associate in research. A former professor at the University of Tampa, she also serves as the chair of the Gulf of Mexico Fishery Management Council's Ecosystem Scientific and Statistical Committee.

"It's crucial for the public to be able to visualize how creeks, rivers and bays are connected," she said. "The Water Atlas is very visual, but at the same time conservation scientists can drill down to the raw data."

And while an enormous amount of data is contributed by trained scientists, the Water Atlas also includes information collected by citizen-scientists both in reports from organizations like the Lake and River Watch programs and the Frog Listening Network as well as more informal alternatives.


"One of the things we'd like to see more of is interviews with people who remember Tampa Bay before it was developed," Froeschke said. "Each watershed has places for oral histories to be uploaded — that would be a great project for a kid with a smart phone."

Lake Carroll in north Hillsborough County is a good example of the information available on the Water Atlas. Nearly 40,000 data points dating back to 1965 are accessible, including one long-running series from a Lake Watch volunteer (see related story page 8) along with historical narratives.

Some of the data on the Water Atlas dates back to 1907 and some is updated daily. The Tampa Bay Water Atlas contains information on 797 water resources, including 12 bays, 555 lakes, 229 rivers and the Gulf of Mexico. Water quality data comes from over 90 sources through 33 different providers. The Water Atlas also serves as a central location for participating groups to post information on various conservation outreach initiatives, including brochures and information on community events. Other information available on the Water Atlas includes:

- Aerial photography
- Bathymetry (bottom contour) maps
- Boat ramps and parks
- Conservation advice
- Current news about water and ecosystems
- Dynamic maps
- Ecological reports
- Education curricula
- Fishing reports
- Historical photography and maps
- Near real-time data on currents and tides
- Research Reports
- Total Maximum Daily Loads (TMDLs)
- Water levels, flows and rainfall
- Water quality data, dating back decades in some cases

As a statistician with an interest in fisheries, Froeshke hopes to expand the Water Atlas to cover animals as well as ecosystems. For instance, fish need specific habitats to thrive but the complex relationships are not always understood and restoration initiatives don't necessarily incorporate the needs of individual species. "I think there's a need for that kind of information across the Gulf of Mexico," she said.

Over time, Foreschke's goal is to help students and citizens develop the critical thinking skills they'll need to balance competing objectives as the region continues to grow. "The Atlas continues to grow and the data we collect expands every day. It's going to be even more important to have that information easily accessible as we go forward."

# Community Education Programs Engage Adults

Twelve community education grants, designed to actively engage adults in water-related issues, have been awarded by the Southwest Florida Water Management District. Six grants in the Tampa Bay region include:

- $5000 to the Florida Section of the American Water Works Association to create and distribute 300 soil-test kits through Keep Tampa Bay Beautiful. The goal is to improve understanding about the connection between fertilizer use and water quality.
- $4595 to Camp Bayou Learning Center in Ruskin to host the H-2-Ohhhh!, Aquatic Reflections event on Saturday, June 2, from 9am-2pm. Sign up at http://seedoshowh2o.blogspot.com/ to compete for prizes based on your knowledge of water resources, conservation and contamination.
- $2150 to the St. Petersburg's Parks and Recreation Administration to host a community education event on water conservation and water quality best management practices. The group also will install a sign on Lake Maggiore Island describing the lake's character and a restoration project that improved water quality.
- $4224 to Pinellas County Parks and Conservation Resources for a volunteer invasive plant removal event and signs at Walsingham Park. The signs will educate visitors on wetland native plants, the negative effects of invasive exotic plants and how to protect wetland systems.
- $4946 to the Hoffman Environmental Research Institute and Karst Conservancy to create an interactive website that will provide information on groundwater issues and karst geology. The site also will feature a forum for community discussions and a calendar of water-related events.
- $4800 to Tampa Bay Living Green, Inc. to host a series of hands-on workshops in six neighborhoods in a partnership with the Council of Neighborhood Associations. The workshops will cover topics like water conservation, Florida-friendly landscaping, and rain barrel installation and use. Three of the six participating neighborhoods will be selected to install Florida-friendly demonstration gardens.

Applications for the district's 2013 Community Education Grant program must be completed by May 31. For more information, visit www.WaterMatters.org/CommunityGrants or call 800-423-1476, ext. 4757.

# CITIZEN SCIENTISTS

## STEP UP TO HELP

**By Victoria Parsons**

More and more kids are realizing that the natural resources and wildlife in their neighborhoods are threatened by development, pollution and climate change. Instead of waiting for someone else to fix the problem, they're stepping up to the plate and becoming citizen-scientists who track changes in their yards and nearby nature preserves. The data they contribute is critically important to scientists monitoring changes on both regional and world-wide scales.

"There aren't enough scientists in the world so we must have citizen-scientists to help," says George Kish, a hydrologist with the U.S. Geological Survey and project manager for the National Phenology Network.

"Some of our most important data comes from fishermen," adds Luiz Barbieri, director of the marine fisheries research section for the Florida Fish and Wildlife Research Institute. "We rely heavily on information people send in about the size, number and location of fish they catch to track populations of snook and other fish."

Technology like the internet and smart phones makes it easy for nearly everyone to contribute. "We're looking to get younger people involved because they understand the technology and really want to make a difference," says Rick Roberts, executive director of the Snook and Gamefish Foundation.

Opportunities to work as a citizen-scientist abound. Here's a look at some programs in the Tampa Bay region where kids can get involved.

### TRACK FISH


Sometimes the fish you didn't catch is as important as the ones you did – particularly if you were angling for popular gamefish like snook and tarpon.

"One of the most important issues is the number of fish that were released by fishermen, and how healthy they were when released," Barbieri says. "It's really difficult for us to get that information without help from fishermen."

In fact, data collected through the Snook Foundation's online Angler Action program helped scientists at FWRI document the rebound in snook populations following the devastating freezes in 2010. "Some people have a lack of confidence in the data that are used in making decisions, so this is a way we as fisherman can help," Roberts adds.

And while Angler Action provides scientists with important data, it also gives anglers a complete history of their fishing trips, including photos and locations. "We won't share locations though," Roberts said.

**LEARN MORE:** www.snookfoundation.org

**YOU CAN HELP!** More than 90% of snook are released. You can help increase survival rates with these tips from the University of Florida: http://edis.ifas.ufl.edu/pdffiles/SG/SG04700.pdf

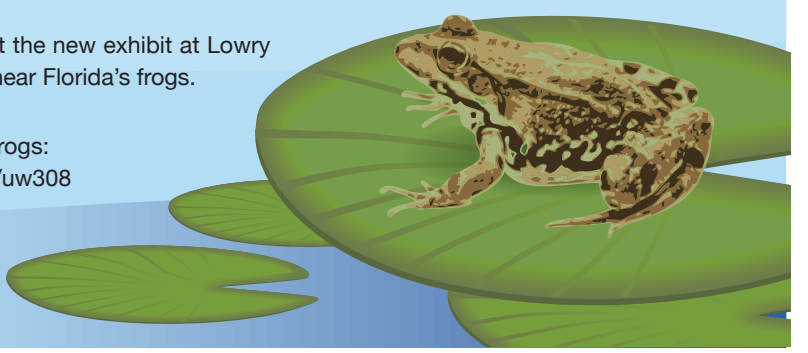
### SAVE FROGS

Across the country, researchers are recognizing that frogs are the canaries in our ecosystems, giving us an early warning if their habitats are in trouble. You can help count frogs in your neighborhood as part of the Frog Listening Network created by the Hillsborough River Watershed Alliance and Lowry Park Zoo.

A new MP3 available online at http://www.hillsborough.wateratlas.usf.edu/fln/ describes where different types of frogs like to live and then plays the sounds they make so you can match them up. You can listen in your backyard or download the MP3 and visit nearby parks. Data is recorded permanently on the Water Atlas (see story on page 6) so scientists can track changes in frog populations over time.

**LEARN MORE:** Visit the new exhibit at Lowry Park Zoo to see and hear Florida's frogs.

**YOU CAN HELP!**
Build homes for tree frogs:
www.edis.ifas.ufl.edu/uw308

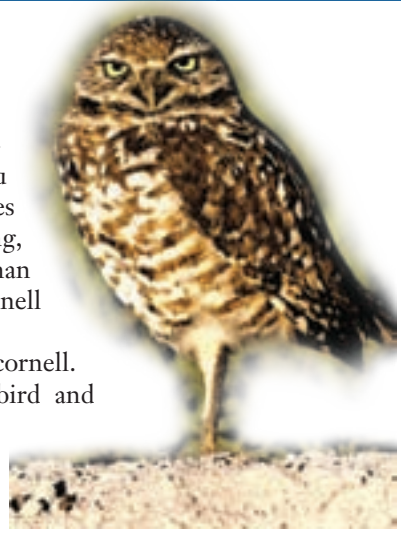


# VIRTUAL BIRDS

Some days it's just too hot or wet for citizen-scientists to get outside, but that doesn't mean you can't help out. Cornell Lab of Ornithology operates NestCams that record live images of birds courting, mating, laying eggs and raising their young. More than eight million images have been recorded – and Cornell needs help classifying them.

It's easy and fun. Just log onto http://watch.birds.cornell.edu/nestcams/clicker/clicker/index and choose the bird and activity you'd like to classify. You can even play games and win prizes.

And if you're really, really good, you can get your own motion-activated webcam for about $200. Mount it near your birdfeeder and see what drops by for a meal.



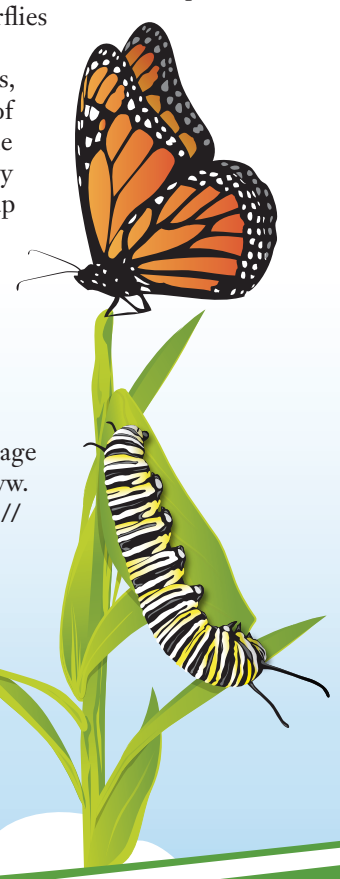

**LEARN MORE:** about Florida's threatened birds: http://fl.audubon.org/floridas-imperiled-birds

**YOU CAN HELP!** Local Audubon societies need bird stewards to protect nesting sites on beaches. You'll need an adult to participate but it's a great way to make a difference in Tampa Bay. www.baysoundings.com/summer2011/Stories/Stewards-Protect-Beach-Nesting-Birds.asp

# COUNT CATERPILLARS

Anybody can plant a butterfly garden, but it takes a special kind of citizen-scientist to plant a garden for caterpillars. Since nearly every caterpillar needs very specific food (often weeds), nobody will have butterflies unless somebody plants food for their caterpillars. In some neighborhoods, those plants are so rare that female butterflies will fly a mile to find them.

Multiple opportunities exist to track butterfly populations, including Monarch Watch in Kansas and the University of Minnesota's monarch larva monitoring project. Locally, the Florida Butterfly Monitoring Network offers training at Lowry Park Zoo and Camp Bayou but kids will need to find a grown-up partner. You can see caterpillars growing at MOSI and they sometimes need volunteer help too.



**LEARN MORE:**

www.monarchwatch.org, www.monarchlab.org, www.flbutterflies.net or www.mosi.org

**YOU CAN HELP!** Plant caterpillar food in your yard, and encourage your parents to stop using pesticides that harm them. www.baysoundings.com/fall09/Stories/butterflygardens.asp or http://edis.ifas.ufl.edu/in564

# WATER QUALITY

Water is what makes the Tampa Bay region such a special place -- but too many people living near our rivers, lakes, streams and bays can cause contamination. If you've ever wondered if the water in your neighborhood pond, creek or lake was clean, now is a great time to check it out.

Citizen-scientists are particularly important to building a long-term database on water quality because it can be difficult to measure. Not only does it change from month to month, it can vary dramatically across the spectrum of rivers, springs, creeks, swamps, estuaries, wetlands, lakes and bays. In the Tampa Bay region, two separate programs offer families and organizations the opportunity to monitor water quality.

The largest is the World Water Monitoring Challenge (previously known as World Water Monitoring Day) with more than 300,000 participants in 77 countries last year. Water is tested at least annually, but as often as monthly, with reports submitted online where they become part of a permanent record. A limited number of test kits are available to organizations including scout troops, church groups or homeowners associations by calling the Southwest Florida Water Management District. You can order the free kit online at www.WaterMatters.org/publications.

Closer to home, 1800 participants monitor water monthly through Florida Lake Watch. "Participants must have access to a lake and a way to get out to the middle of it to collect samples, but it's a great project for middle and high school community service hours," says Dan Willis, coordinator of research program services. "Some families even pass down the job to younger siblings when the older kids go off to college."

**LEARN MORE:** World Water Monitoring Challenge: www.worldwatermonitoringday.org or Florida LakeWatch: www.lakewatch.ifas.ufl.edu

**YOU CAN HELP!** Check out the YouTube video on how kids can help improve water quality in your own neighborhood: www.youtube.com/watch?v=JaxSXeXTlHU

Photo courtesy World Water Monitoring Day

Photo courtesy Project Budburst

## BUDBURSTS

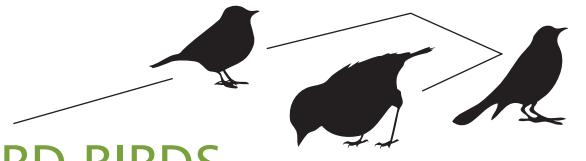
The philosopher Henry David Thoreau probably never heard of climate change but his detailed observations of plants near Walden Pond in the 1850s are invaluable to scientists tracking rising temperatures today. His notes show that some plants are blooming a week earlier in Massachusetts – a clear indication that higher temperatures impact natural processes.

Two national groups are recruiting citizen-scientists of all ages to document when those natural processes occur in their yards, neighborhoods and nearby parks. It's easy and fun. You can sign up online and then print datasheets on the plants you're tracking – or download a smart phone app that lets you input data from the field.

**LEARN MORE:**

Sign up at Project Budburst (http://neoninc.org/budburst/) or USA Phenology Network (www.usanpn.org)

**YOU CAN HELP!** The University of South Florida Botanical Gardens has identified native plants that it is tracking over time, they're also tracking the birds and butterflies that use them. Visit www.gardens.usf.edu.



## TALLYING BACKYARD BIRDS

The Audubon Society's big survey events are held at Christmas and then again in February, but summer is a great time to learn about birds so you're ready to participate later. Local Audubon societies have birding classes for beginners every month at Lettuce Lake Park in Tampa, Boyd Hill Nature Preserve in St. Petersburg and Moccasin Lake Nature Park in Clearwater. Bird walks are regularly scheduled at Weedon Island, Fort DeSoto and Brooker Creek Preserve.

Smart phone apps and online groups also can help you learn to identify birds. Apps like Audubon's field guide and iBird give you amazing details about birds, including replications of their sounds so you can identify a bird even if you don't actually see it. (Some of the apps are free, but the most complete versions cost $9.99) Online groups, including Ron Smith's Pinellas Birds and the Facebook group Hillsborough County Birds, are great resources with experts available to answer questions or help identify birds.

**LEARN MORE:**

Pinellas birds, www.pinellasbirds.com, Hillsborough birds, https://www.facebook.com/groups/204170576291372/

**YOU CAN HELP!** Learn about beach-nesting birds while protecting their sanctuaries from intrusion. www.baysoundings.com/summer2011/Stories/Stewards-Protect-Beach-Nesting-Birds.asp


## GREAT BAY SCALLOP SEARCH

Of all the citizen-scientist projects in Tampa Bay, the Great Bay Scallop Search has got to be the most fun. You get to snorkel around the bay counting creatures that look like something a mad scientist dreamed up – and even if you don't find a scallop, you're sure to discover different kinds of sea animals.

It's also very important to scientists because scallops are extremely sensitive to water quality and their populations change dramatically from year to year. Searchers found 674 scallops in 2009 but just five last year. Experts are hopeful that populations have rebounded this year after an extra-warm winter but they'll need extra eyes in the water to document the difference.

This year's Great Bay Scallop Search will be held on Aug. 18. Registration won't begin until July but you can sign up now to be notified at www.tampabaywatch.org

**LEARN MORE:** Visit the Florida Fish and Wildlife Research Institute's site on scallops at http://myfwc.com/research/saltwater/mollusc/bay-scallops/

**YOU CAN HELP!** Scallops are extremely sensitive to water quality, particularly high levels of nutrients. Talk to your parents about how the fertilizer used on your landscape can contaminate Tampa Bay. Visit www.tbep.org/help/lawn_fertilizer.html for more information.

## COUNTING CRABS

The first thing Tiffany Black tells kids about horseshoe crabs is that they aren't really crabs – and they have lots of little legs but can't pinch or bite!

Like many of the critters tracked by citizen-scientists, horseshoe crabs are threatened by habitat loss. Scientists with the Florida Fish and Wildlife Research Institute have asked for help identifying where the horseshoe crabs mate. "We know they're most likely to come ashore at high tide, just before, during or after a new or full moon," said Black.

Thousands of reports have been filed since FWRI first asked for help in 2002, but much more information is needed. "Anecdotally, we hear that there are a lot fewer horseshoe crabs now than there were 20 or 30 years ago, but we don't have the baseline to measure it."

Reports can be filed online at www.myfwc.com, then click on the "Submit a Horseshoe Crab Survey" link, then "Florida Horseshoe Crab Spawning Beach Survey." You can also email findings to horseshoe@MyFWC.com

**LEARN MORE:**

http://myfwc.com/research/saltwater/crustaceans-marine-arthropods/horseshoe-crabs/

**YOU CAN HELP!** If you see a horseshoe crab upside down, take a moment to flip it over. Gently handle it on the edge of its shell, not its tail. For a video of the process, visit www.horseshoecrab.org/act/flipem.html

# SCOOP THAT POOP

Every little pile adds up – but everybody can do their part to prevent "poo-llution."

About a half-million dogs in the Tampa Bay region produce about 125 tons of poop per day – and only about 40% of it is picked up. That leaves about 50 tons of poop on the ground to wash into creeks, rivers, ponds and lakes, and eventually into Tampa Bay.

If you have a dog, make sure you clean up behind it. You can also encourage your friends to do their part at local parks and ball fields. It's easy to make a pooper scooper dispenser. Just take two clean plastic bottles, cut off the bottom of one and the top of the other so they fit together. Cut little holes in the top for a hanger and a larger hole in the back to refill with plastic bags from newspapers or grocery stores.

You can even insert a special note or a poster to tell your friends why it's important to keep our parks and neighborhoods clean.


**LEARN MORE:**

www.tbep.org/help/scoop.html

**YOU CAN HELP!** Step-by-step directions to make a pooper scooper dispenser with a link to posters you can insert in your creation. www.baysoundings.com/pooperscooper



# EVERY DROP COUNTS

How much water does your family waste every month – and how much money could you save if you fixed the problems?

The average American home leaks more than 10,000 gallons of water every year, a full month's worth for most of us. Ask your parents how much that average monthly bill would be, then put on your citizen-scientist cap and look for ways to save.

And in Florida, half of our water is used to irrigate lawns and landscapes. You can check to see if your sprinklers are working right, and make sure the rain sensor is working so you're not watering if you don't need to.

**LEARN MORE:**

www.watermatters.org/conservation

# BACKYARD BUGS

Who could resist a book with a title like "The Secret Lives of Backyard Bugs?"

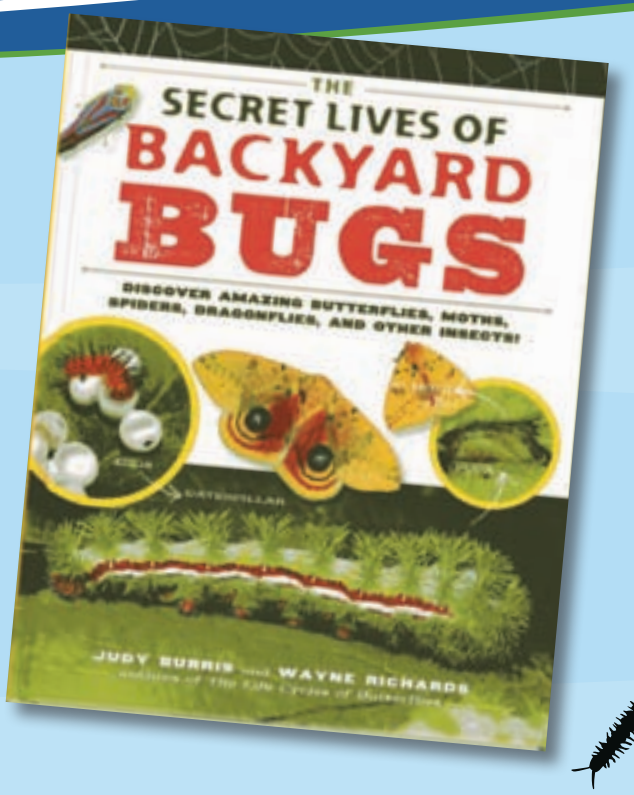
Naturalists know that the best place to enjoy nature is somewhere close at hand, so it's easy to see the seasons change and watch what happens to plants, animals and bugs. Secret Lives makes it even more fun and interesting for beginning citizen-scientists as well as experts who may specialize in other critters.

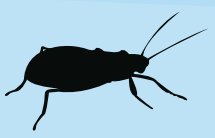
Written and photographed by a brother-sister team who admit to being "kids who never grew up," Secret Lives starts at ground level with a section on composting companions. I was delighted to read that roly-polys do more than entertain toddlers – they're crustaceans that feed on dead plant matter so nutrients return to the soil. (Slugs and snails have some redeeming value too, but I don't think I'll ever learn to like them!)

Even critters that initially invoke fear, like bees and spiders, are fascinating from a life-cycle perspective that highlights their roles in an ecosystem. The book also clears up common questions about backyard bugs: what's the difference between bees and wasps, or between butterflies and moths, even between damselflies and dragonflies.

The photography, 90% of which was taken in a small yard in Kentucky, is amazing. Macro views allow you to recognize the bugs you see daily but micro views show details that highlight their "secret lives."

Although written for kids, I was enthralled to learn more about the critters who share my backyard with me. I've already promised my copy to a young friend, but I'm sure I'll be buying more to share with other kids so they can learn to love bugs too!



# TBRPC Celebrates 50 Years of Regional Leadership

**By Suzanne Cooper**

On September 12, 1961, St. Petersburg Mayor Herman Goldner made a bold statement to his peers throughout the Tampa Bay area, declaring that "It is time for us to plan together on a regional basis." He challenged a group of elected officials from Tampa, Clearwater, Sarasota and St. Petersburg to begin an ongoing dialogue. Through these deliberative efforts and discussions, the first regional planning council in Florida was formed and aptly named the Tampa Bay Regional Planning Council. What started as a luncheon was actually a clarion call to action focused on building a better plan for our future in an organized, coherent and regional fashion.

Mayor Herman Goldner

Prophetically, the *St. Petersburg Times*, in February, 11, 1962 published a commentary:

> "…it is sometimes hard to look 50 years ahead. Those old enough to look 50 years back can testify that *tempus fugit* (time flies) far more rapidly than is realized and there is nothing unrealistic in starting now to get ready for needs of the 21st century. By that time, there will undoubtedly be several million people clustered around Tampa Bay. How well and comfortably they can live depend upon how wisely we can act now. Many of us won't be around to enjoy the fruits of this foresight but our children and grandchildren will be. Besides, by 1970 or 1975... we are going to find an already shapeless megalopolis far less pleasant for living than it should be."

The council has provided local, statewide and national leadership over the past 50 years, in the areas of mass transit, comprehensive planning, growth management and development review, hurricane evacuation, hazardous materials management, regional economic modeling, catastrophic and post-disaster economic planning, sustainability, statewide energy resiliency, and more. (For a more complete history of the council's accomplishments, visit www.tbrpc.org/events/pdf/TBRPC_50th_Anniv_program.pdf)

## Focused on Tampa Bay and the Region's Natural Resources

TBRPC also has been a leader in protecting the region's natural resources, including the Tampa Bay estuary. A search through its Regional Information Center revealed a large number of pertinent publications which paved the way for the regulations, monitoring and management programs that have helped Tampa Bay earn national recognition for its successes in estuarine restoration. By identifying adverse impacts and potential impacts early, various regulatory and management agencies have been able to effectively target implementation strategies. Just some of the significant studies, reports and actions where the council has spearheaded the effort include:

- 1973: Courtney Campbell Causeway Flushing Study
- 1976: Evaluation of the Effects of Urban and Industrial Stormwater on Water Quality in the Tampa Bay Region
- 1978: Stormwater and Lake Systems Maintenance and Design Guidelines
- 1978: Areawide Water Quality Management Plan, which identified "procedures for implementing effective water quality control and improvement programs" and included "a delineation of priority actions to be taken to prevent and control water pollution problems."
- 1981: Tri-County Areawide Environmental Impact Statement, which evaluated the cumulative impacts of residential development in Hillsborough, Pinellas and Pasco counties
- 1982: Ground Water Protection Plan for the Tampa Bay Region
- 1984: Reservoir Protection Implementation Measures for the Tampa Bay Region
- 1984: Tampa Bay Regional Marina Siting Study

By 1985, it had become clear that a regional approach to protecting and restoring Tampa Bay would be important. The Agency on Bay Management was formed as the result of a special legislative act to examine the opportunities for — and the constraints against — developing a unified, comprehensive management strategy for Tampa Bay. The agency was to provide a comprehensive approach to management of the bay's resources.

ABM has provided a forum for discussing and reviewing many issues that could or would affect the estuary, including the desalination facility, surface water withdrawal for potable use, degradation of Clam Bayou, and land development plans in sensitive areas. The agency has participated in various legislation aimed at protecting and restoring a healthy ecological balance to the bay. Legislative efforts included:

- Mandatory improvements to municipal wastewater treatment levels to reduce nutrient discharge to Tampa Bay.
- Developing and spearheading passage of legislation to create the Surface Water Improvement and Management program (SWIM) which is administered by the Southwest Water Management District and has, to date, completed 79 habitat restoration projects totaling 2,700 acres and improved stormwater treatment for more than 50,000 acres in the Tampa Bay watershed alone.
- Federal designation of Tampa Bay as a National Estuary Program recognizing the bay's national importance.
- Laws governing commercial netting of fish and food shrimping in Tampa Bay.

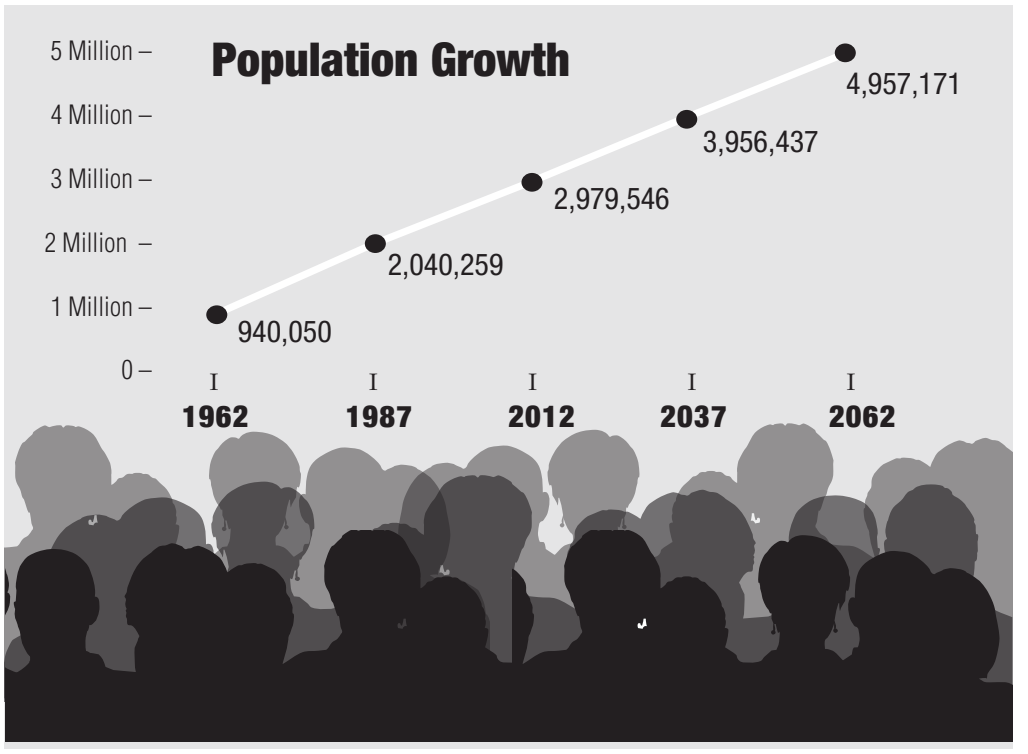
ABM also spearheaded multiple research studies forums that have helped make ecosystems in Tampa Bay among the best-understood in the nation:

- 1986: including Ecological Assessment, Classification and Management of Tampa Bay Tidal Creeks
- 1986: Water Quality Studies of the Anclote and Braden Rivers
- 1991: Convened the Tampa Bay Area Scientific Information Symposium 2 - The Watershed
- 1993: Implications and Management of Sea Level Rise in the Sarasota Bay Region
- 1996: Co-convened Tampa BASIS 3 - Applying our Knowledge
- 2003: Co-convened Tampa BASIS 4 - Linking Science and Management
- 2009: Co-convened Tampa BASIS 5 - Using Our Knowledge to Shape Our Future

Community outreach and education also have been important goals for ABM. Working with the Tampa Bay Estuary Program, it secured 10,000 signatures for the Tampa Bay estuary's own specialty license tag. The "Tarpon Tag," designed by Russ Sirmons, has generated over $1.3 million for restoration and education projects in the watershed to-date. Funding from the Tarpon Tag has supported the publication of *Bay Soundings* since its first issue in April 2002.

TBRPC is fully committed to ensuring that Tampa Bay and the region's natural resources are maintained for the future. The Agency on Bay Management brings together representatives of recreational and commercial fisheries, industrial, regulatory, academic and scientific sectors, local, regional, state and federal governments, and legislators. It continues to serve as a broad-based forum for open discussion of the myriad issues involving the estuary, and as a voice for protection, restoration and wise use of the bay by the entire region. For more information, visit www.tbrpc.org/abm/

*Suzanne Cooper, AICP, is a principal planner with the Tampa Bay Regional Planning Council and staff to the Agency on Bay Management.*




*Sources: US Census, Florida Statistical Abstracts TBRPC/REMI PI+1.3(2012)*

**Summer Camp**
*Continued from page 16*

**Clearwater Marine Aquarium:** Coastal learning experiences with summer camps are available for students in K-12. Or spend the day at CMA for a laid-back look at Tampa Bay's wildlife, including Winter, the dolphin with the prosthetic tail in a new tank with underwater viewing windows. Campers can choose to snorkel, kayak, interact with animals, travel to nearby animal attractions or enjoy arts and crafts. Call 727-441-1790 or visit www.seewinter.com.

**Destination Aviation:** Students ages 11-18 can learn to fly while exploring the science and technology of aviation. Both day and overnight camps are offered at Florida Air Museum in Lakeland. Activities are designed to capture the imagination of children and interest them in aerospace science. Activities are scheduled both in climate-controlled classrooms and outside, utilizing the resources of the spacious campus as a learning lab. Call 863-904-4073 or visit www.floridaairmuseum.org.

**Girl Scouts of West Central Florida Residential Camps:** Day camps or ACA-accredited overnight camps on Crescent Lake in Odessa or Camp Wildwood on 589 acres outside Ocala give girls an opportunity to participate in outdoor activities. More than 100 sessions are offered across the region with themes including science and technology. Call 813-281-4475 or visit www.gswcf.org.

**Eckerd College:** Located on the shore of Boca Ciega Bay, the Eckerd College Waterfront Program is one of the largest collegiate programs in the US. Campers ages 5-17 explore watersports including sailing, wakeboarding, windsurfing, kayaking, saltwater fishing, and looking for marine life. Call 800-456-9009 or visit www.eckerd.edu/waterfront.

**E.G. Simmons Park:** Ruskin camp open to kids ages 9-15 with activities including canoeing, camping and swimming, culminating with a deep-sea fishing trip. Visit www.hillsboroughcounty.org/summercamps.

**Estuary EDventures Summer Camps:** Tampa Bay Watch expands its summer camp offerings with multiple opportunities for learning and adventure from its Tierra Verde headquarters. Its location on the Shell Key Preserve provides summer campers with exciting hands-on opportunities to learn about marine ecology and restoration projects. The preserve boasts rich mangrove forests, grass flats and shallow waters teeming with marine life. Camp activities vary depending upon session type and may include snorkeling the grass flats, seine net pulls, animal collection and identification, kayaking through the mangroves, and exploring nearby islands. Also on site is the marine education center and classroom featuring outdoor wet labs, touch tanks, and aquariums — all of which are utilized for education about Tampa Bay and restoring its marine habitats. Income-based scholarships are available. Call 727-867-8166 or visit www.tampabaywatch.org.

Photos courtesy Florida Aquarium

Summer camps in the Tampa Bay region range from hands-on dive trips to indoor learning activities. Sign up for your first choice early — the best classes fill up fast!

**Eureka Springs Park:** Discover Hillsborough County's historic arboretum with master gardeners. Children ages 9-12 will learn to compost, identify garden insects and diseases, and observe seasonal changes with field trips to the USF Botanical Garden, a downtown green roof complex, and Tampa Bay History Center. Visit www.hillsboroughcounty.org/summercamps.

**Florida Aquarium AquaCamps:** Diverse offerings for kids ages 3 to 15 with a strong focus on science and wildlife encounters in downtown Tampa. Every camper will have an amazing camp experience by incorporating themes that focus on environmental science topics and feature up-close animal encounters with plenty of hands-on learning. Call 813-273-4000 or visit www.flaquarium.org.

**Great Camps at Great Explorations Children's Museum:** 10 week-long themed camps including science are featured with volunteer opportunities for children over 13 in St. Petersburg. Children ages 5-7 can explore everything from solving problems, learning about fossils, going on a space mission, riding in a hurricane simulator and protecting our planet. Themes for kids 8-11 years old include participating in CSI investigations, archaeology, astronomy and learning culinary chemistry in the kitchen. Call 727-821-8992 or visit www.greatexplorations.org.

**Lettuce Lake Canoe and Nature Camp:** Explore one of Tampa's most spectacular nature preserves. Campers ages 10-15 will learn the basics of backpacking, building a fire, canoeing, camping, pitching a tent and hiking while identifying native plant and animal species.

**Lowry Park Zoo:** Tampa's award-winning zoo hosts more than 100 week-long camps for kids K-8. Kids and teens can learn about nature, science and the animal kingdom while hiking through the zoo, exploring behind the scenes and cooling off in the zoo's water play areas. Adventure camps include animal encounters, keeper talks, educational shows, games, crafts and more. Call 813-935-8552 or visit www.lowryparkzoo.com.

**Mad Science Summer Camps:** Budding scientists can attend camps in various locations across the region to learn to make indoor lightning, launch rockets and experience a giant vortex. Mad Science engages children in scientific explorations ranging from bridge building and dinosaur digs to model rockets and the science behind their favorite sports. Call 727-895-5595 or visit www.madscience.org/tampabay to find a location near you.

**MOSI Summer Science Camp:** Take advantage of learning adventures in a wide range of science and technology areas for ages 2-18 at the region's top science museum. From finding rocks to launching rockets or making rock music, campers will create experiences that expand their interests. Doing real science with the tools and technology used by professionals is just one of the ways MOSI Summer Science Camp inspires our campers with a "can do" attitude that can last a lifetime. Call 800-995-6674 or visit www.campfun.org.

**Mote Marine Aquarium's Summer Camps:** Hands-on marine science camps for kids from 2-18 on Longboat Key. There are also high school internships, volunteer opportunities, field trips and overnight adventures. Call 941-388-4441 x229 or visit www.mote.org/summerprograms.

**Nature's Classroom Summer Camps:** A series of programs open to students who have completed grades 4-8 include wilderness, survival and outdoor skills, and fishing camps. A Water Adventure Camp, sponsored by the Southwest Florida Water Management District, is free and includes a field trip to Crystal Springs Preserve. Call 987-6969 ext 221 or 222 or visit www.naturesclassroom.net.

**Pathfinder Outdoor Education Summer Camps:** Day or overnight camps in locations across the region exploring nature and developing student leadership. Outdoor activities include canopy tree climbing, canoe games, a challenge course, night hikes and campy arts and crafts. Call 727-328-0300, ext. 221or visit www.pathfinder-ed.org.

**Pier Aquarium Summer-ful of Fish and Fun in the Sun:** Eleven camps combine marine science with other activities for students entering grades 1-6 in downtown St. Petersburg or John's Pass Village in Madeira Beach. Call 727-895-7437, ext. 205 or visit www.pieraquarium.org.

**Science Center of Pinellas Summer Camps:** The nation's oldest science center offers a full schedule of summer camps for kids from K-12 featuring hands-on science, technology, engineering and math programs. Call 727-384-0027 or visit www.sciencecenterofpinellas.org.

**University of South Florida's St. Petersburg Campus:** Camps for kids ages 8-18 include kayaking, snorkeling, swimming, sailing and off-campus boat trips. Also offered are Junior Lifeguarding Guard Start camp and Junior Bulls Watercraft Operator camps. Call 727-873-4597or visit www.stpete.usf.edu/waterfront/events.htm.

**Upper Tampa Bay Park:** Camps introduce kids ages 8-15 to Florida's wildlife, with canoeing, fishing and hiking, and field trips to regional aquariums and a deep-sea fishing charter. Visit www.hillsboroughcounty.org/summercamps.

**Weedon Island Preserve Cultural and Natural History Center:** A series of camps introduce kids ages 6-12 to the natural wonders of Weedon Island while exploring the ecology and conservation of Florida's wildlife and natural habitats. Call 727-453-6503 or visit www.weedonislandpreserve.org.

**Marvelous Mud**
*Continued from cover page*

all the dissolved oxygen, creating a condition called hypoxia when the sediment falls into deep holes that are immune to tidal influences. No light — no movement — no life."

Robert Rorebeck, senior environmental technician at Sustany Foundation, recalls road construction projects where digging and dredging disturbed the mudflats around the edge of Tampa Bay, blocking off tidal flow to a nearby salt marsh. "The water quickly became stagnant and in a matter of days, it was covered with a green noxious scum. In the industry, this is no longer mud — it's muck. When hypoxic muck conditions continue for long without tidal flushing, the nearby mangroves and grasses will eventually start to die."

Deeper out, channels dredged for boating traffic also become dead zones as they fill with benthic mud. Too deep for sunlight to reach and separated from daily tidal flushing, they are almost lifeless. Repeated dredging must be done carefully because it can release decades of accumulated organic matter, as well as heavy metals and petroleum products into pristine environments, creating a whole new ecological challenge.

## Bacteria to the Rescue

Are decades of muck building up in Tampa Bay? I started to wonder how much toxicity from human pollution could be hiding in these areas, so I called Dr. Ernst Peebles, the USF biological oceanographer who's been involved in researching the impact of the Deepwater Horizon oil spill in the gulf. Are we creating our own "oil spill" with all the toxic wastes we pour down our drains?

"Benthic mud, by its very nature, has a strong affinity for the toxins released from boats, autos and runoff," he said. "Marinas and commercial boat traffic contribute the largest amount of oil and hydrocarbons but they are far more refined, and probably less toxic than the suite of chemicals dumped in the gulf during the BP accident."

Despite the number of restoration projects conducted in Tampa Bay over the past 25 years, the US Environmental Protection Agency's 2007 Coastal Condition report identified the bay's overall benthic condition as somewhere between fair and poor. Along with hydrocarbon contaminants from petroleum products, heavy metals such as airborne mercury and even household cleaners or prescription drugs can increase water toxicity. When medications are disposed of down the drain, endocrine disruptors are released into the waterway and settle in the mud, ultimately interfering with the hormone systems of marine life. (Note: take your old meds to the Sherrif's Office to be incinerated. Don't dump them down the toilet!)

I asked Dr. Peebles if there was a hopeful note in all this. "Well, of course we can improve things with prevention through increased public awareness. But in the meantime, we need to be thankful for bacteria — they eat just about anything. The microbes are the real heroes doing the work to clean up our mess."

# Discover the marvels of mud yourself!

1. Grab a net and see what you can find. While many benthic creatures are too tiny to see with your naked eye, lots are large enough to be interesting. Depending on the time of year, some of the creatures you may find in Tampa Bay include crabs, clams, scallops, starfish or sand dollars. (Steer clear of white sand beaches and look for the bayous and inlets that surround the bay, because more critters live in calm water than in surf.)
2. Sign up for the Tampa Bay Watch Great Bay Scallop Search on August 18 or help build oyster beds. Visit www.tampabaywatch.org for times and places.
3. Find an expert. Get a group together and hire a naturalist. They're available through groups like Pinellas County Extension, Lettuce Lake Resource Center, Hillsborough Community College, American Littoral Society and local aquariums.
4. Plant a salt marsh with the Southwest Florida Water Management District SWIM program. Marsh grasses stabilize sediment so other benthic organisms can grow. Visit www.watermatters.org
5. Participate in a clean-up. Tampa Bay Estuary Program (www.tbep.org) schedules regular "Give A Day for the Bay" events across the region and local Keep America Beautiful chapters offer ongoing opportunities. Or set up your own family fun day and see who can pick up the most trash in a set amount of time.
6. Check out the calendar of events online at www.baysoundings.com for more ideas!

## Good Mud Bugs

**Examples of Dominant Creatures from a Healthy Estuarine Site**


*Ampelsice holmesi*


*Branchiostoma floridae*


*Chione elevata*

## Bad Mud Bugs

**Examples of Creatures Associated with a Degraded Site**


*Enteropneusta*


*Nassarius vibex*


*Paraprionospio pinnata*

## The Fragrance of MUD

And speaking of bacteria… Did you ever wonder what creates the occasional "Eau de la Bay" aroma along Tampa's Bayshore Boulevard? Although raw sewage was discharged into the bay decades ago, it hasn't happened in years — so it's not that.

Arising in the Green Swamp, the Hillsborough River flows 59 miles before discharging tons of sediment into Hillsborough Bay just below downtown Tampa (in fact, that's where the land came from to create Davis Islands). Unlike sand, thick mud sediments are not very porous and don't allow water carrying life-giving oxygen to pass through. The shallow mud flats provide an ideal home for anaerobic bacteria living just below the surface. These bacteria thrive in an environment of low oxygen, high organic material and warm temperatures — all of which are present along the Bayshore on a warm summer's day at low tide.

As these bacteria convert matter into energy, they produce hydrogen sulfide— the same gas that emanates from rotten eggs. The stench grows more powerful in the summer because gasses released in warmer air move faster and spread more quickly. It's like cheese -- when you put it out, it warms up, and it smells stronger. On a sultry day, mudflats can smell worse than aged Gorgonzola, but console yourself knowing that while these little stinkers are breaking bits of leaves, algae and wood into stinky gasses, they are serving an important ecological role.

It's that fragrant chemical activity that releases nutrients into the water column where they're available to other microscopic creatures at the base of the food web.

## Play in the MUD

So let's return to the kids who came to learn about the web of life. After a short bit of instruction and donning the proper footwear, I've armed them with benthic sieves and nets and sticks for poking things. And for one amazing afternoon they've forgotten about video games and Facebook. They're actually engrossed in a scavenger hunt for squirmy little creatures. Who'd have thought a bunch of icky mud would provide so much pleasure?

There are a number of organizations and locations where you and your family can learn about benthic mud, and even get some of the heavenly goo between your toes. (See sidebar left.)

While you're enjoying this new encounter with Mother Earth, take a moment to appreciate the vital role humble mud plays in recycling natural waste materials into new life. As so often is the case, we humans are the greatest threat to the process. Maybe we should all ponder this question a little more: When WE create waste materials and throw something away — exactly where is "away"?

# 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 in the last column of the page.

## may

**May 12,** noon-3pm, Discovering Wildlife with Your Child at Brooker Creek Preserve.

**May 12,** 10am-noon, Going Coastal – Saltwater Seining at Weedon Island Preserve.

**May 13**, 6:30pm, Boat trip with St. Petersburg Audubon.

**May 15,** 10:30am, Florida Native Plants at Charles Fendig Library with Hillsborough County Extension.

**May 15,** 6:30pm, Get Those Hummers – Temple Terrace Library with Hillsborough County Extension.

**May 16,** 9-11:30am, Bucket Brigade at Manatee County Extension.

**May 16,** 7-9pm, Hurricanes and Boats with St Petersburg Sail and Power Squadron.

**May 19**, 9am-4pm, Hummingbird Festival at Pioneer Florida Museum.

**May 19,** 10-11:30am, The Balancing Act at Brooker Creek Preserve.

**May 19,** 2-3:30pm, Discovering Tracks, Scats & Signs at Weedon Island Preserve.

**May 19,** 9am-noon, The Pinellas County Watershed Management Division and the City of Largo's annual Lakes & Ponds Education Day at Pinellas County Extension.

**May 19,** 9-11am, Manatee County Extension Office's Certified Master Naturalist Habitat Tour.

**May 19,** 8am, Tour Venice Rookery, Oscar Scherer State Park and The Celery Fields with Tampa Audubon.

**May 22,** 6:30pm, Compost Happens, Hillsborough County Extension.

**May 23,** 10am-noon, Worm Composting – Vermiculture with Manatee County Extension.

May 23, 2:30-4pm, Manatee Energy Efficiency Project at Manatee County Extension.

May 24, 1-3pm, Plant Munchers, Crunchers, and Crawlers with Manatee County Extension.

**May 25,** 6pm, Lagoon dip-netting, Pasco County Extension.

**May 31,** 6pm, Beetle Perfume, Pasco Palms Preserve; Pasco County Extension.

**June 15- 16,** Ed Alber Tarpon Rodeo to benefit Tampa Bay Watch. The region's first all-release tarpon and shark tournament features awards and prizes valued at over $5,000. The tournament, which attracts anglers from acorss the state, recognizes that tarpons are a resource to be treasured, respected and protected, and demonstrates that humans can be both sportsmen and stewards of our fragile marine environment. For more information, visit www.tampabaywatch.org.

## ONGOING EVENTS

**Thursday through Saturday,** 9am-4pm, Windows to Our Wildest Place at Brooker Creek Preserve.

**Thursday through Saturday,** 9am-4pm, Connecting People and Place at Weedon Island Preserve.

**Most Saturdays and Sundays,** 10-11am, Nature Walks at Fort De Soto Park; Pinellas County Extension.

**Thursdays & Fridays** during June, July and Aug, 11am-1pm, Summer Field Trips available at Brooker Creek and Weedon Island Preserves.

**First Saturdays**, 8am, Morning Nature Walk at Starkey Park with West Pasco Audubon, with St. Petersburg Audubon at Boyd Hill Nature Preserve or at Moccasin Lake Nature Park with Clearwater Audubon.

**Mondays**, July 9-Aug 20, 7-9pm, America's Boating Course; St Petersburg Sail and Power Squadron.

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

**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.

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

## june

**June 2,** 11am-2pm, Mote Aquarium's World Oceans Day.

**June 2,** 8:30am, Compost, Water-Wise Rain Barrel programs at Hillsborough County Extension.

**June 2,** 9-11am, Family Gardening at Pasco County Extension.

**June 2,** 10am-noon, Zap Your Garden Soil Through Solarization, Manatee County Extension Office.

**June 2,** 1-2pm, Garden Birds, Big and Small at Weedon Island Preserve.

**June 5,** 6:30-8pm, Manatee Energy Efficiency Project, Manatee County Extension.

**June 6,** 10am-noon, Home Composting Workshop, Manatee County Extension.

**June 7,** 9am-noon, Agency on Bay Management meeting.

**June 7,** 2-4pm, Rain Barrel Workshop, Manatee County Extension.

**June 9,** 9-11am, Native American Gardening with Pasco County Extension.

**June 12,** 7pm, Cold-hardy Palms for Central Florida, Pasco County Extension.

**June 16,** 7am, Tampa Audubon tours Lake Kissimmee.

**June 21,** 7pm, Summer Solstice Wildflower Bingo, Aripeka Sandhills Preserve, Pasco County Environmental Lands Division.

**June 23,** 9am-noon, Rain Harvesting at Weedon Island Preserve.

**June 27,** 2:30-4pm, Manatee Energy Efficiency Project, Manatee County Extension.

**June 30,** 8am, Nature Walk, Pasco Palms Preserve, Pasco County Environmental Lands Division.

## july

**July 7,** 8:30am, Compost, Water-Wise & Rain Barrel programs, Hillsborough County Extension.

**July 10,** 7pm, Native Dye Plants with Pasco Native Plant Society.

**July 12,** 9am-noon, Agency on Bay Management meeting.

**July 14,** 9am-noon, Tampa Bay Watch mid-summer coastal cleanup at Fort DeSoto Park.

**July 14,** 9am-noon, Compost & Rain Barrel Workshops at Manatee County Extension.

**July 14,** 1-3pm, Open Classroom, Discovering the Estuary with your Child at Weedon Island Preserve.

**July 18,** 7-9pm, Sail Trim and Rig Tuning with St Petersburg Sail and Power Squadron.

**July 23,** 8am, Tour Power Line Road in Pasco County with Tampa Audubon Society.

**July 28,** 10-11:30am, Unveiling Our Urban Wildlife at Brooker Creek Preserve.

## august

**Aug 11,** 8:30am,Compost, Water-Wise & Rain Barrel programs, Hillsborough County Extension.

**Aug 11,** 9-11am, Propagation: Starting New Plants from Seeds and Divisions, Pasco Extension Master Gardeners.

**Aug 14,** 7pm, Annual Round Robin Forum with Pasco Native Plant Society.

**Aug 14,** 7-9pm, How to Use a Chart with St Petersburg Sail and Power Squadron.

**Aug 18,** Great Bay Scallop Search, Tampa Bay Watch.

**Aug 25,** 8am-noon, Bird watching at Sawgrass Lake with Tampa Audubon Society.

## september

**Sept 8**, 8:30am, Compost, Water-Wise & Rain Barrel programs, Hillsborough County Extension.

**Sept 11,** 7pm, Ferns of Florida with Pasco Native Plant Society.

**Sept 13,** 9am-noon, Agency on Bay Management meeting.

**Sept 19,** 7-9pm, Boating on Rivers, Locks and Lakes with St. Petersburg Sail and Power Squadron.

**Sept 29,** Clean-up in commemoration of National Estuaries Day, locations TBD, Tampa Bay Watch.

## Contact information

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

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

Brooker Creek Preserve, Tarpon Springs, 727-582-2100 or www.pinellascountyextension.org

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

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

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

Mote Marine Laboratory and Aquarium, 941-388-4441 or www.mote.org

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

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

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

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

Pioneer Museum, Dade City, 352-567-0262 or www.pioneerfloridamuseum.org

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

St. Petersburg Power and Sail Squadron, www.boating-stpete.org

Tampa Audubon Society, www.tampaaudubon.org

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

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

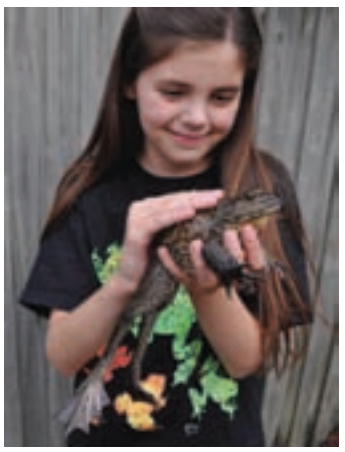
Weedon Island Preserve Cultural and Natural History Center, St. Petersburg, 727-453-6500 or www.pinellascountyextension.org

West Pasco Audubon Society, www.westpascoaudubon.org

# Hey, Kids! This is Earth Calling. Are you Listening?

**By Avalon Theisen**

Habitat loss, pollution, homeless animals… and kids can't do anything to make a difference. Right? Wrong! Kids can definitely improve our world, even our very own Tampa Bay. Let me share some of what I do. Using the website www.ConserveItForward.com, I support three non-profit groups that 1) help people get safe drinking water around the world using biosand water filters, 2) promote the conservation of amphibians and their importance to our environment, and 3) run my favorite local nature preserve.



I raise awareness through my website, live presentations and running my booth at places like schools, zoos and festivals. I also sometimes raise money through my business where 100% of the profit benefits my three groups.

Now I'd like to tell you about one of my favorite topics: frogs. Frogs are an indicator species. Does that mean they are fortune tellers? Well, they won't read your palm, but they do read the environment. Frogs have permeable skin, which means chemicals pass through it easily, so they are one of the first species to be harmed in their habitat. If there is a healthy population of native frogs in Tampa, then we know we are doing something right. If there is not a healthy native population, then something is wrong and we must act quickly. Many people do not know that 1/3 of the world's amphibian species face extinction. According to www.SavetheFrogs.com, approximately 200 amphibian species have disappeared since 1980 and that is not normal.

So how do we know if frogs are healthy in Tampa? Well, first we have to know which ones are here. One way we can do that is by listening to them. You do not need a college degree to be a frog listener, but you do need to know what frogs you are hearing. That leads me to my favorite citizen science project, where you attend workshops to learn about frogs and their calls. Next, you collect data about the frogs you hear and send it to scientists. They need lots of data. If you want to be a local frog listener, Lowry Park Zoo hosts a FrogWatch USA chapter. Go to www.aza.org/frogwatch to learn more.

I love sharing with other kids how easy it is to help frogs and our environment. You can build frog habitats with things you have around your house like old Tupperware and PVC pipes. Ask your parents to not use so many chemicals in the yard. If you get a pet amphibian, make sure it was captive bred and not taken from the wild. Also, if you have a pet cat, don't let it go outdoors unleashed because they enjoy pouncing, and that is not good for frogs and other small critters.

No matter what the topic is, I challenge you to find a project you love that will help our world. Create your own project or for ideas, visit www.SciStarter.com or www.CampBayou.org. Once you choose your project, act on it, encourage others to do the same — and we can all conserve it forward!

*Avalon Theisen of ConserveItForward.com has been recognized internationally for her conservation efforts. With a goal of working for* National Geographic *when she grows up, her hobbies include traveling abroad and animal handling.*

# Green Jobs: The What, The Where, The Why

**By Scott M. Deitche**

"Green jobs" have been the buzzword in economic development for a few years now. From politicians who envision millions of green jobs to naysayers declaring they don't exist, it's tough to know how much of an impact green jobs have had on our economy. It's even harder if you're thinking about a green career in your future.

But fear not, between the hope and the hype, there is a real green economy emerging. The Bureau of Labor Statistics just released a report showing that there were about 3.1 million green jobs (referred to in the report as green goods and services) in 2010 in the United States. While this represents less than 3% of all employment, it's a number that has continued to grow, through recession, politics and the realities of the world market.

Green jobs are not new. Many of the people who read and write for Bay Soundings are in a green job, and some have been for a long time. What's new is the wider variety of jobs that fall under the green category, that didn't exist even a decade ago. A green job can be in alternative energy, traditional engineering, contracting, manufacturing, and even creative class jobs like design and fashion.

What's interesting to note is that, according to both the Brookings Institute and the Bureau of Labor Statistics, 75% of green jobs are found in the private sector. This shows that caring for the environment can have an economic benefit as well. It's certainly true in Florida, where a healthy environment supports such mega-industries as tourism, fishing, and watersports.

It's no longer just about good PR to get a company some good press. Companies from Wal Mart to Coca-Cola have taken sustainability metrics and incorporated them into every aspect of their business models. And with that, comes more jobs.

There are a few ways to start on your path to a green career. One area that has seen tremendous growth is the availability of environmental education tracks at local colleges and universities. The University of South Florida started a Masters in Sustainability through its Patel Center for Global Sustainability. Eckerd College, the University of Tampa, Hillsborough Community College, St. Petersburg College and USF all have degree programs in either environmental science or sustainability. There are dozens of trade and vocational training programs across the country for solar and wind turbine maintenance, as well as green manufacturing.

One reality is that green jobs are not universally available in all regions. If you want alternative energy like wind or geothermal, you should look towards the Great Plains. New England has a lot of green jobs, as does California. Be adaptable.

Finally, one of the most important aspects of a green career is to get as much experience as you can now, to set you apart from everyone else out there looking to get into the field. Get involved! Sign up for a beach clean-up, get involved with one of the many environmental groups in the Tampa Bay area, volunteer to help out on community projects, recycle, the list is endless. There are also great environmentally themed events around the area, from the Living Green Expo to the Give a Day for The Bay events sponsored by the Tampa Bay Estuary Program.

A green job gives you the perfect blend of doing something good for the environment, for your community, and earning a living. And while they are still a small part of the jobs out there, their growth is very real.

*Scott M. Deitche is the director of environmental and water resources with GPI Southeast, Inc. in Tampa. He is the author of six books, including* Green Collar Jobs: Environmental Careers for the 21st Century *(Praeger, 2010).*

# Letters to the Editor

Good afternoon

Just received the most recent copy of *Bay Soundings* — another excellent job. However, it is truly sad, that after 30 years of having one of the oldest and most comprehensive stormwater management programs in the US including extensive public education programs that your authors/reviewers do not know the difference between retention and detention systems. I am referring to Ernie Franke's very good story on aquascaping. However, retention basins are infiltration systems that do not have permanent pools of water and, therefore, do not need aquascaping.

Best wishes,

Eric H. Livingston, Program Administrator, Florida Department of Environmental Protection NPDES Stormwater Section

# inside this issue

Spring 2012



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c/o Tampa Bay Regional Planning Council
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# Summer Camps Boost Knowledge for Young Citizen-Scientists


Photos courtesy Florida Aquarium

The stereotypical scientist toiling alone couldn't be further from the truth for most researchers – particularly those working to understand and improve local ecosystems. Summer camps are the perfect opportunity for budding scientists who want to learn more about Tampa Bay and its watershed.

Organizations across the region host summer camps to introduce budding scientists to their areas of expertise and interest with outdoor camps covering nearly every topic. Along with regional attractions, some local governments offer summer camp programs with science themes, including St. Pete Beach, Clearwater, Safety Harbor, Tampa and Hillsborough County. Contact your local government for more information. Some of the best regional camps for budding environmental stewards are listed alphabetically below.

**Boyd Hill Nature Preserve:** A 245-acre park located on the shores of Lake Maggiore in St. Petersburg featuring more than three miles of trails and boardwalks and five unique ecosystems plus six different summer camps. Creative, memorable and affordable fun geared toward children as young as 3 and adults with physical or mental disabilities. Financial aid available for eligible parents. Call 727-893-7326 or visit www.stpete.org/boyd/daycamps.asp.

**Brooker Creek Preserve:** An 8,500-acre wilderness area located in the northeastern corner of Pinellas County features multiple programs for adults and children scheduled year-round, including summer camps. Children will experience science-based, hands-on learning as they explore and investigate the ecology and conservation of Florida's wildlife and natural habitats. Call 727-453-6800 or visit www.brookercreekpreserve.org.

**Busch Gardens Summer Camps:** The nationally known attraction also offers behind-the-scenes summer camps for local kids. Inspiring, exciting and educational programs range from single-day adventures to an entire week. Call 1-877-248-2267or visit www.swbg-adventurecamp.com/adventure-camps.

**Camp Bayou:** Although the camp doesn't offer regularly scheduled classes, it is open for field trips with programs that range from general ecology and river habitats to the importance of pollinators and gopher tortoises. Camp Bayou has Nature Center programs where children can discover Florida's waterways – finding all kinds of life living near the water's edge. Or visit a Native American campsite and make clay pots or weave palm fronds. Call 813-363-5438 or visit www.campbayou.org.

**Camp Invention:** Sponsored by the National Inventors Hall of Fame Foundation in partnership with the U.S. Patent and Trademark Office, camps are scheduled in various locations across the region. Enroll your children entering grades one through six for a weeklong summer enrichment program. The Camp Invention program instills vital 21st century life skills such as problem-solving and teamwork through hands-on fun. For more information, call 800-968-4332 or visit www.campinvention.org.

**Summer Camps**

*Continued on page 12*