THE NEWSLETTER OF THE **CHARLOTTE HARBOR NATIONAL ESTUARY PROGRAM**

HARBOR HAPPENINGS

Working together to protect the natural environment from Venice to Bonita Springs to Winter Haven

CHNEP 2012 Calendar

Since 2005, the CHNEP has been creating popular calendars of donated images, such as the one on this page, that depict the beauty of the natural environment of southwest Florida. The CHNEP will create a 14-month calendar (November 2011 to December 2012). Please help develop the calendar by donating your images by July 14 and completing an online survey during August to let us know the images you would like included. See page 3 for more details.

Bald Cypress Swamp, Babcock Ranch | Ruth Spies, Companion Prints

Program update

Dr. Lisa B. Beever, Director

CHNEP Friends

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www.CHNEPfriends.org

The CHNEP enjoys the assistance of the 501(c)3 not-for-profit known as the Friends of Charlotte Harbor Estuary aka CHNEP Friends.

Charlotte Harbor National Estuary Program

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The CHNEP is a partnership that protects the natural environment from Venice to Bonita Springs to Winter Haven.

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Harbor Happenings **Summer 2011: Volume 15, Issue 1**

The CHNEP Friends publishes this free quarterly newsletter on behalf of CHNEP to provide information about the environmental "happenings" in the CHNEP study area. News items, photographs and letters are welcome and may be submitted to the editor by mail or email. Deadlines are February 1, May 1, August 1 and November 1. The newsletter is typically distributed in January, April, July and September.

Request a free subscription by contacting the editor.

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Printed on recycled paper.

American Alligator | Malcolm J. Brenner

CHNEP 2012 calendar

Now is your chance to help create another stunning display of natural beauty

Since 2005, the CHNEP has been creating popular calendars of donated images that depict the beauty of the natural environment of southwest Florida. The CHNEP calendars are beautiful because of the generosity of many talented people. See for yourself! The CHNEP calendars produced since 2005 are available as PDF files at *www.CHNEP.org*. The featured images are also available as 12" x 9" posters.

Donate your images

If you've captured images of the beauty of the natural environment from Venice to Bonita Springs to Winter Haven, please submit up to three by July 14 for consideration in the CHNEP 2012 calendar. The images could have been captured today or 50 years ago in any medium (photography, oil, illustration, etc.). The CHNEP is now able to accept images on a CD (as has been the practice) and by email. See *www.CHNEP.org* for guidance.

Select images

In August it's everyone's turn to help. During the month of August, please review the images that were submitted and let us know which ones you would like included. See *www.CHNEP.org* for guidance.

Do you want a calendar?

If you are not already receiving *Harbor Happenings*, subscribe online by Sept. 14 to receive your free 2012 calendar in the mail by November. To have a calendar mailed to you after Sept. 14 will require a $15 donation to the Friends of Charlotte Harbor Estuary, Inc. The calendars will also be available for pickup at locations such as libraries and nature centers.

Do you want calendars to distribute?

The CHNEP has also provided small supplies of calendars to many of our partners, including nature centers, libraries and government offices. This project is funded by CHNEP's financial partners, who are committed to helping protect the natural environment of southwest Florida. If you'd like to receive a supply for your own distribution *to those who somehow help protect this environment*, please complete the request form on the website by July 14. Requests will be honored as demand and funds allow. If you would like a large supply or would like to provide calendars to others, you may buy into the press run or make a donation to cover the costs.

Would you sponsor the calendar?

Over the years it has been suggested that CHNEP accept sponsorships to offset costs. For the 2012 calendar, we have available five one-quarter pages to feature sponsors. Cost of each quarter page will be $3,000 for those at the beginning of the calendar and $2,500 for pages at the end of the calendar. These opportunities will only be available to those who wish to highlight or support the beauty of the natural environment and implement the CHNEP *Comprehensive Conservation Management Plan* (CCMP), our 20-year plan to protect the natural environment.

Please let the CHNEP know by July 14 if you are interested in supporting the CHNEP 2012 calendar or buying additional copies. For more details, visit the website or contact Maran Hilgendorf (866/835-5785, ext. 240; *mhilgendorf@swfrpc.org*).

American Alligator

Alligator mississippiensis

Alligators are considered by many to be "living fossils" because they lived 200 million years ago.

American alligators live in the southeast United States in freshwater lakes, slow-moving rivers, associated wetlands and sometimes in brackish water habitats.

They are ectothermic — they rely on external sources of heat to regulate their body temperature — and are most active when temperatures are between 82° to 92°F.

Nearly all alligators become sexually mature by the time they reach 7 feet in length. It may take a female 10–15 years and a male 8–12 years to reach these lengths. Courtship begins in early April, and mating occurs in May or June. Females build a mound nest and deposit 32 to 46 eggs in late June or early July. Hatching occurs in late August or early September. Only an estimated 15 will emerge as hatchlings. Only five are estimated to live to one year. Only four are expected to reach maturity (6 feet in length). Their average lifespan is 50 years.

Source: *http://myfwc.com/wildlifehabitats/*

Environmental education

Helping everyone to be good stewards

Partnerships are what make the Charlotte Harbor National Estuary Program successful in its efforts to protect the natural environment from Venice to Bonita Springs to Winter Haven. Through partnerships, issues of concern have been identified and a 20-year plan known as the *Comprehensive Conservation and Management Plan* was developed. The CHNEP supports partners in many ways including small grants and a committee structure to address issues and identify and fill gaps.

A workshop for people interested in environmental education within the CHNEP study area is being planned for **September 2011**. This will be an opportunity for people to network, brainstorm and build CHNEP's relationship by providing opportunities to participate in the water atlas (a gateway to comprehensive data resources), the CHNEP strategic communication plan, projects that may be funded with additional grants and other ways to help fulfill *our* plan to protect the environment.

Please contact Maran Hilgendorf (*mhilgendorf@swrpc.org*, 866/835-5785, ext. 240) if you'd like to discuss this workshop, or visit the website *www.CHNEP.org* to register.

> Never doubt that a small group of thoughtful, commited citizens can change the world. Indeed, it is the only thing that ever has.
>
> — Margaret Mead, Anthropologist

Peace River Environmental Education Network (PREEN): June 20

PREEN is a partnership of businesses, government agencies, educators, citizens and nonprofit organizations who joined together in 2000 as an information-sharing network to forge cooperation and foster relationships regarding the environmental integrity of the Peace River watershed. PREEN meets at least once a year.

PREEN will meet Monday, **June 20**, from 3:30 to 5:30 P.M. at the Paynes Creek Historic State Park in Bowling Green to discuss ways of improving paddling opportunities on the river and more. For details, visit *www.CHNEP.org* or contact Maran Hilgendorf (*mhilgendorf@swfrpc.org*, 866/835-5785, ext. 240).

Involvement in PREEN:

- Helps maintain a network that enables a flow of information between PREEN partners.
- Keeps you informed of a variety of issues, events, programs and environmental education sites in the Peace River watershed.
- Allows you to meet and help solicit participation from citizens, environmental educators and agency and industry representations.
- Helps maintain a voice for the environment, linking economic sustainability and environmental integrity.

Wading trips

Muck about in the shallow waters of our local estuaries to see for yourself some of the aquatic critters that call these shallow waters home. The CHNEP is pleased to sponsor wading trips. To register, contact the organization that is offering the program of interest to you. Dates are subject to change due to weather, etc. An updated list will always be posted at *www.CHNEP.org*.

Cedar Point Park in Englewood at 9 A.M.
Call CHEC Cedar Point Environmental Park at 941/475-0769.

- Monday, June 27, 2011
- Saturday, July 9, 2011
- Tuesday, July 26, 2011
- Saturday, August 13, 2011

Charlotte Harbor Watershed Summit

The Charlotte Harbor National Estuary Program is pleased to have hosted its fifth Charlotte Harbor Watershed Summit on March 30–31, 2011. Learn about the state of our watershed and estuaries through experts' presentations and posters by visiting *www.CHNEP.org* to review program abstracts, presentations and posters and to watch the recorded presentations. Thanks to everyone, including the many sponsors, who made the Summit a success.

Conservation Lands Economic Value

The Estero Bay Agency on Bay Management and others will hold a conference on **Nov. 2** at FGCU to identify and discuss the economic value of conservation lands in the Estero Bay watershed. To learn more, contact Nora Demers (*ndemers@fgcu.edu*, 239/590-7211).

Charlotte Harbor Nature Festival

The twelfth annual festival will be held **Saturday, Nov. 19, 2011**, at the Charlotte County Sports Complex in Port Charlotte. Do you have suggestions to improve the festival or would you like to help plan it? If so, please contact Maran Hilgendorf (*mhilgendorf@swfrpc.org*, 866/835-5785, ext. 240).

CHNEP Meetings and Events

These dates are tentative. Confirm dates and obtain locations and agendas at *www.CHNEP.org*. Additional meetings and events are also posted on this website, as are grant deadlines.

All meetings are open but the public is encouraged to join the Citizens Advisory Committee. Membership is open to anyone interested in protecting the natural environment bounded by Venice, Bonita Springs and Winter Haven.

Peace River Environmental Education Network	June 20
TAC/Science Forum	July 14
Submit images for 2012 calendar by	**July 14**
Select images for 2012 calendar	**August**
Citizens Advisory Committee (CAC)	August 3
Management	August 5
Policy	August 22
Public outreach grant applications due	**September 7**
TAC/Science Forum	October 13
Environmental Education Workshop	September TBD
Citizens Advisory Committee (CAC)	October 19
Management	November 4
Policy	November 18
Charlotte Harbor Nature Festival	**November 19**

CHNEP Science Fair Award: First award given to eighth grade student

The Charlotte Harbor National Estuary Program presented its first ever science fair award at the 54th annual Thomas Alva Edison Kiwanis Science Fair on Jan. 29, 2011. More than 450 students from sixth to twelfth grade from four counties participated in this annual competition. Students design a learning experience in an area of personal interest, one that allows for innovation, just as scientists do in the real world.

Katie Thorp, an eighth-grade student at Bonita Middle School in Lee County, received the first award from CHNEP for a project that helps implement the *Comprehensive Conservation and Management Plan*. Katie researched the effect of aeration on algae and dissolved oxygen in ponds. She set a high standard for those who will follow. Katie received a $100 cash award and was invited and presented her research at the CHNEP Charlotte Harbor Watershed Summit.

The CHNEP will begin recognizing students' science fairs projects that help implement the CHNEP's plan, which identifies water quality degradation, hydrologic alterations, habitat loss and stewardship as problems that affect the health of the environment. The students must reside in Charlotte, DeSoto, Hardee, Lee, Manatee, Polk or Sarasota counties.

I was delighted to participate as a judge for the CHNEP first-ever Science Fair Award. I was immediately impressed by Katie Thorp and her project. Katie's clear understanding of the scientific method and her applied knowledge of pond dynamics and management made her the clear choice for the recognition. — Sarah Larsen, CAC Member

Katie collects water samples to determine oxygen levels in lakes. Photo by Annie Thorp.

The effect of aeration on algae and dissolved oxygen in ponds

Katie Thorp, Bonita Middle School

Some of the lakes in Stoneybrook were displaying signs of algal growth, or eutrophication. Eutrophication can use an excess of dissolved oxygen, which fish need to survive. Dissolved oxygen, or DO, is the amount of oxygen in the water. One method used to address eutrophication is the installation of aerators or fountains. The purpose of the experiment is to see which mechanism works best: aerators, fountains or nothing?

The experiment began by using the sampling tool to collect a cup of water from each of the lakes. Then the probe of the DO200 is put into the cup to get the dissolved oxygen reading. Next, go to the northernmost, southernmost, easternmost and westernmost points of the lake and collect the algae that float on the top of the lake at each location. Combine all of the algae from the lake and put it on a screen outside for a day. When it is dry, put the algae on a scale to weigh it. This procedure was repeated for six lakes.

In conclusion, my hypothesis was valid. The lakes with aerators had the most dissolved oxygen and the most algae. As air temperature went down, so did the dissolved oxygen level, with the exception of the month of October because copper sulfate had been applied to the lakes. After completing my analysis, I concluded that the more dissolved oxygen a lake has, the more life it can support. Therefore, lakes in developed areas will better support an ecosystem if aerators are installed.

Katie has written a longer article that is available at *www.CHNEP.org*.

Coming Together for Clean Water

EPA released "Coming Together for Clean Water: EPA's Strategy to Protect America's Waters." This strategy charts a path for meeting the nation's clean water strategic plan goals over the next several years. Protecting the nation's water resources is not only important to the health of the nation's citizens and the environment, but clean water is also a critical resource for the economy.

The strategy addresses the challenges and highlights EPA's priorities for achieving clean water goals focusing on: ensuring transparency and effectively reporting on the status of the health of all waters, increasing protection of source waters and healthy watersheds, restoring degraded waters and ecosystems, reducing the amount of pollution entering our waters that impact our health and our economy and tackling new and emerging threats to our waters in a way that will ensure healthier, more livable communities.

In 2010, EPA Administrator Jackson brought together stakeholders to focus on reinvigorating the nation's clean water programs. More information is available at *http://blog.epa.gov/waterforum/*.

Dolphin SMART to protect wild dolphins

Jessica Powell, NOAA National Marine Fisheries Service

Throughout the southeastern United States, numerous bays, including Charlotte Harbor, are home to bottlenose dolphins. This habitat is ideal to raise young, feed and socialize, as well as for overall survival; therefore, many dolphins spend most of their time in these bays. Living in these coastal bays also puts dolphins in close proximity to many water-related activities that may unintentionally disrupt important behaviors such as feeding and nursing activities.

The Marine Mammal Protection Act prohibits anything that may harass marine mammals in the wild, including the potential to injure or disturb their behaviors as well as feed or attempt to feed. Harassment can include separating or surrounding groups of dolphins, erratically and quickly approaching dolphins, or any other activity that may change the animals' behaviors. To prevent disturbance of such crucial dolphin behavior, it's necessary for these bays to remain safe havens and productive habitats.

Protection of dolphins and their habitat is vital for both wild dolphin conservation efforts and economic sustainability of dolphin-viewing businesses. Even unintended disturbance from people and boats can significantly alter dolphin behavior and harm the animals. In extreme cases, dolphins will permanently move away from their residential bay habitat, potentially crippling the area's viewing industry and ecosystem. Harassment and feeding wild dolphins also puts them at greater risk for boat strikes and fishing gear entanglements.

To help protect local wild dolphins from unintentional consequences of close human interactions from viewing dolphins, a unique, voluntary recognition and education program called Dolphin SMART was launched. The program began in the Florida Keys National Marine Sanctuary in 2007. With guidance from concerned local dolphin tour businesses and Key West residents, the NOAA Fisheries and the National Marine Sanctuary Program, in partnership with the Dolphin Ecology Project and Whale and Dolphin Conservation Society, developed Dolphin SMART. The one-of-a-kind program combines viewing and advertising criteria, training, field research, evaluations, outreach and education. Experts train participating businesses on how to follow program criteria, laws and regulations, as well as on how to recognize natural wild dolphin behavior (versus behavior resulting fromdisturbance).

Individual dolphins can be identified by notches, nicks, scars and dorsal fin shape.

The Dolphin SMART program is designed to:

- Minimize the potential of wild dolphin harassment caused by commercial viewing activities.
- Reduce expectations of close interaction with wild dolphins in a manner that may cause harassment.
- Eliminate advertising that creates expectations of engaging in activities that may cause harassment.
- Promote stewardship of local coastal waterways.

Program participation is open to commercial businesses conducting wild dolphin tours or any commercial vessel that may opportunistically view wild dolphins. To learn more about the Dolphin SMART program, dolphin conservation and local Dolphin SMART participating businesses, such as Banana Bay Tour Company and Tarpon Bay Explorers, visit *www.dolphinsmart.org*.

Dolphin Facts

Dolphins and porpoises are different species. Bottlenose dolphins are the only species typically seen along Florida's coastline.

Dolphins are warm-blooded mammals that are actually born with hair. They nurse their babies with milk. Babies stay with their mothers typically between 3–6 years.

Dolphins communicate through clicks and whistles.

Dolphins eat fish and squid. Bottlenose dolphins use a variety of techniques to pursue and capture prey. Common feeding behaviors observed in the southeastern U.S. include herding (especially along seawalls), kerplunking, fish tossing and whacking, strand feeding and mud plume feeding.

Dolphins typically swim about 2–4 mph but can occasionally reach speeds of 15 mph for very short periods of time.

Dolphins live in what scientists call a "fission-fusion" society because they are constantly breaking and forming new social groups. Therefore, dolphins live in groups, not pods, because the term "pod" refers to a permanent social group.

Coastal dolphins typically do not hold their breath for more than 5 minutes.

Old Technology Is New Again

City of North Port Rainwater Harvesting

Michael Frantz and Elizabeth Wong, City of North Port

All life needs water to survive. Today, population growth is straining our public water supplies. For centuries, people have used the simple technology of "harvesting" rainwater to increase the local water supply. All that is needed is a collection system, a container to hold the water and a way to distribute the water where it is needed. A rain barrel is an example of a small system, and a large rain barrel is called a cistern. The advantages of cisterns are basically twofold: (1) they can be relatively inexpensive to build, supplying free-for-the-taking water for any purposes that don't require costly, highly processed drinking water; (2) storing rainwater in cisterns also reduces the amount of stormwater runoff, which can carry pollutants such as fertilizers, pesticides and silt to our stormwater ponds, canals and bays.

Photo by Elizabeth Wong.

The City of North Port Fire Rescue District is making an investment in a modern version of cistern technology to reduce the cost of supplying water to fire stations, which also helps preserve North Port's drinking water supply while reducing pollutants.

Joint funding by a Florida Department of Environmental Protection (FDEP) grant and the North Port Fire Rescue District have allowed the installation of cisterns at Fire Station #81 (4980 City Center Blvd.) and Station #83 (3601 E. Price Blvd.). The city has separately funded and constructed cisterns at Station #82 (5650 North Port Blvd.) and Station #84 (1350 Citizens Parkway).

Harvested rainwater can be used for almost any purpose that doesn't require potable (drinking) water. Irrigating the grass and landscaping is the primary use at the fire stations. Another potential use is filling the fire trucks.

Cisterns that conserve water and save money are just one example of North Port Fire Rescue District's commitment to "building green" as the District builds new fire stations. Following is a list of environmentally friendly green features that are part of every new station:

- Rain cisterns
- High-efficiency lighting fixtures on sensors
- Organic (soy-based) insulation
- Solar hot water systems
- Water-conserving plumbing fixtures
- Drought-tolerant landscaping
- Use of organic compounds, finishes and adhesives for better indoor air quality

The public is welcome to tour the stations. Please call Stormwater Manager Elizabeth Wong (941/429-7090) for technical information and Fire Marshall Michael Frantz (941/240-8150) to schedule a tour appointment.

EASTERN Oyster

Crassostrea virginica

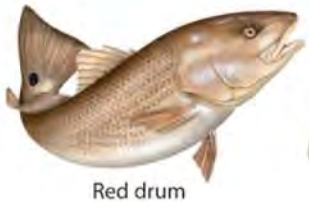
Oyster reefs are vital to our estuaries. They provide suitable habitat for small organisms and are feeding grounds for important species such as snapper and grouper. Their reefs also provide stabilization for our shorelines. Oysters remove nutrients from the water improving water quality, which is critical for seagrasses and fish.

Oyster Reefs are Important


Crabs


Shrimps


Sheepshead


Red drum


Mollusks


Polychaete worms


Eastern oystercatcher


Mangrove snapper


Blennies


Raccoon

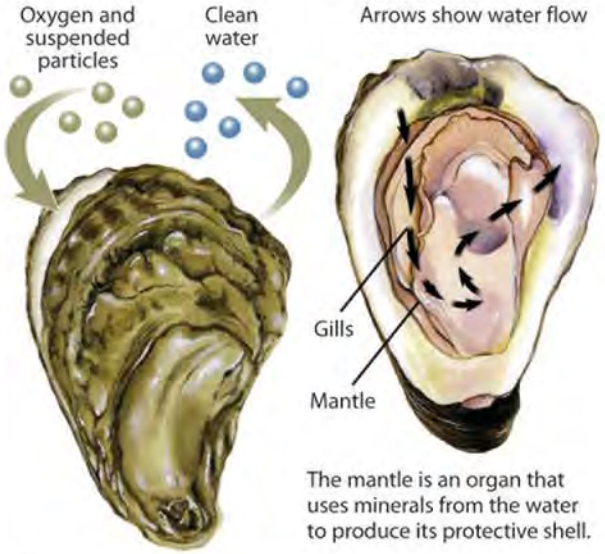
- Hundreds of species are associated with oyster reefs. They provide habitat for juvenile fish and invertebrates as well as substrate for sessile organisms.
- One adult oyster can filter up to 50 gallons of water per day contributing to the water clarity needed for seagrasses to thrive.
- Oyster reefs stabilize shorelines and reduce erosion.
- Oysters are an economically important species throughout the southeastern United States.
- Oyster reefs serve as feeding grounds for wading birds and fish such as snapper, grouper, and snook.

Habitat Requirements

Oysters thrive in brackish waters where the salinity (salt) is lower than ocean water. They need a hard surface, preferably old oyster shells, on which to grow. They rely on currents (water movement) to deliver food to them and to prevent them from becoming buried.

Filter Feeding

Oysters use their gills to absorb oxygen and strain food out of the water. One adult can strain plankton and organic matter out of the water at a rate of up to 50 gallons per day (or 1500 times its body volume). A healthy oyster reef contributes significantly to overall water clarity in the estuary.



The mantle is an organ that uses minerals from the water to produce its protective shell.

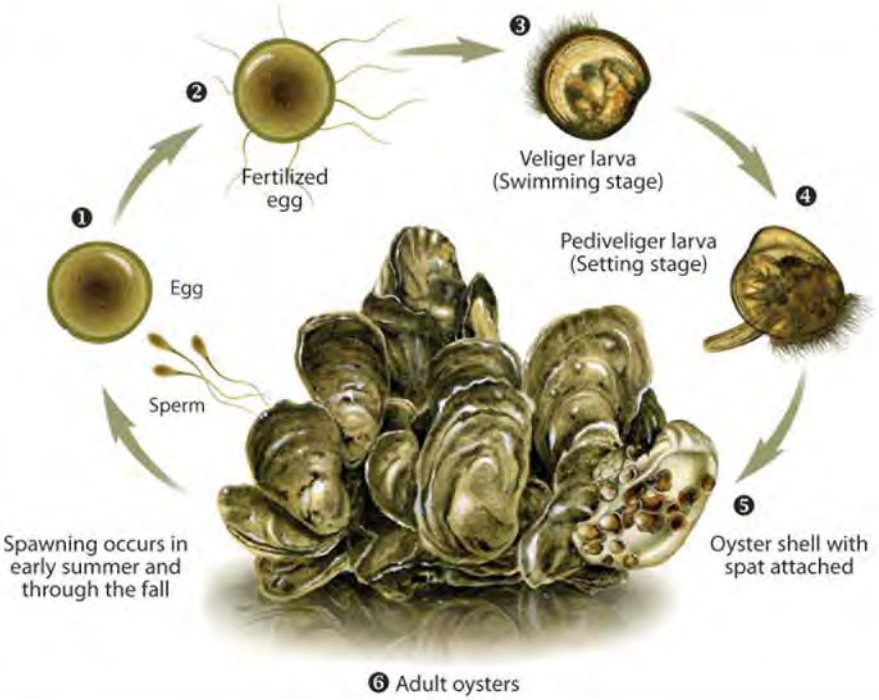
Threats

- Physical removal. Oyster reefs are vulnerable to over harvesting and disturbance by development.

Adaptations

Oysters are marine organisms that can live in both the intertidal (between high and low tides) and subtidal (always submerged) zones. The intertidal reefs are exposed to the air during low tide. Oysters are able to survive by tightly closing their shell until high tide returns. This adaptation allows them to avoid predation from organisms that must remain in the water (i.e. marine snails). Their hard shells also prevent many predators from reaching their soft bodies.

In most cases oysters are hermaphroditic. They begin life as a male, change to a female, then change back to a male. Oysters may go back and forth between sexes several times during their lifetime.



Life Cycle

❶&❷ When water temperature warms above 68°, eggs and sperm are released into the water column where they must join together for fertilization.

❸&❹ Within 24 hours a shell and cilia (tiny hairs for swimming and feeding) develop. The larvae swim for up to two weeks before settling to the bottom.

❺&❻ Spat (juvenile oysters) must settle out onto a hard surface, preferably other oyster shells. They reach adulthood in about two years and will remain attached to the same surface for the rest of their life.

Oysters can live up to 20 years.

- Sedimentation. Dredging and stormwater runoff can result in the burying of oyster reefs.
- Boating impacts. Boat wakes can erode the shoreline and disturb oyster reefs. Boat props can drag along the bottom and dislodge oyster clumps.

Brackish water has a level of salinity between ocean water and fresh water. Oyster reefs thrive in brackish water.

Restoration

Restoring oyster reefs is an effective way to improve water quality and provide new habitat for fish and invertebrates.

- Empty oyster shells collected from local restaurants are placed in depleted oyster reef areas to provide hard substrate for spat settlement and calcium needed for shell growth.
- Limestone, oyster mats, and artificial reef materials such as concrete ReefBalls™ are other methods being used to provide new substrate for spat to settle.

The Nature Conservancy
Protecting nature. Preserving life.

Loxahatchee River District
"Preserving Nature by Design"™
Poster Series, No. 5
www.loxahatcheeriver.org

Printed in the CHNEP newsletter *Harbor Happenings* Summer 2011 edition

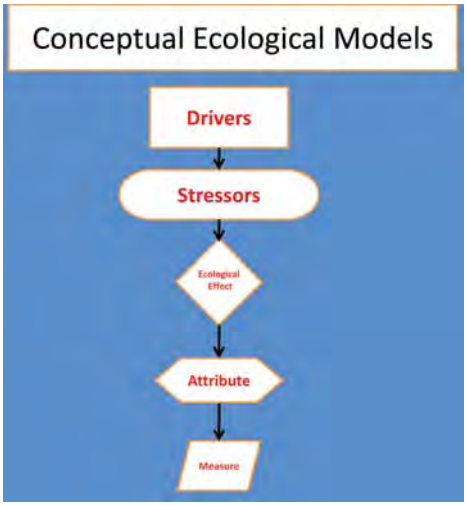
Model illustrates change on the natural environment

In 2010, the CHNEP received a technical assistance grant from the Environmental Protection Agency (EPA) to develop a climate change conceptual ecological model (CEM) for the CHNEP study area to illustrate the effects of climate change on natural systems. This is one of five projects the CHNEP has completed as part of EPA's Climate Ready Estuaries effort to apply lessons learned from its national estuary program partners to other coastal communities around the nation.

Conceptual ecological models are a way to organize thoughts and visually portray complex relationships. They have been used in the Everglades restoration to help identify key hypotheses and important linkages in the natural environment that tie management to natural responses, provide a coordinating science plan strategy and communicate complex ideas to managers and citizens.

Staff from the CHNEP and Southwest Florida Regional Planning Council have worked with EPA and their contractor, ICF International, to develop the CEM and descriptive narrative. The CHNEP hosted a workshop in December 2010 to discuss the hypothesized relationships between climate change stressors, drivers, ecological effects, attributes and measures on which a CEM would be based.

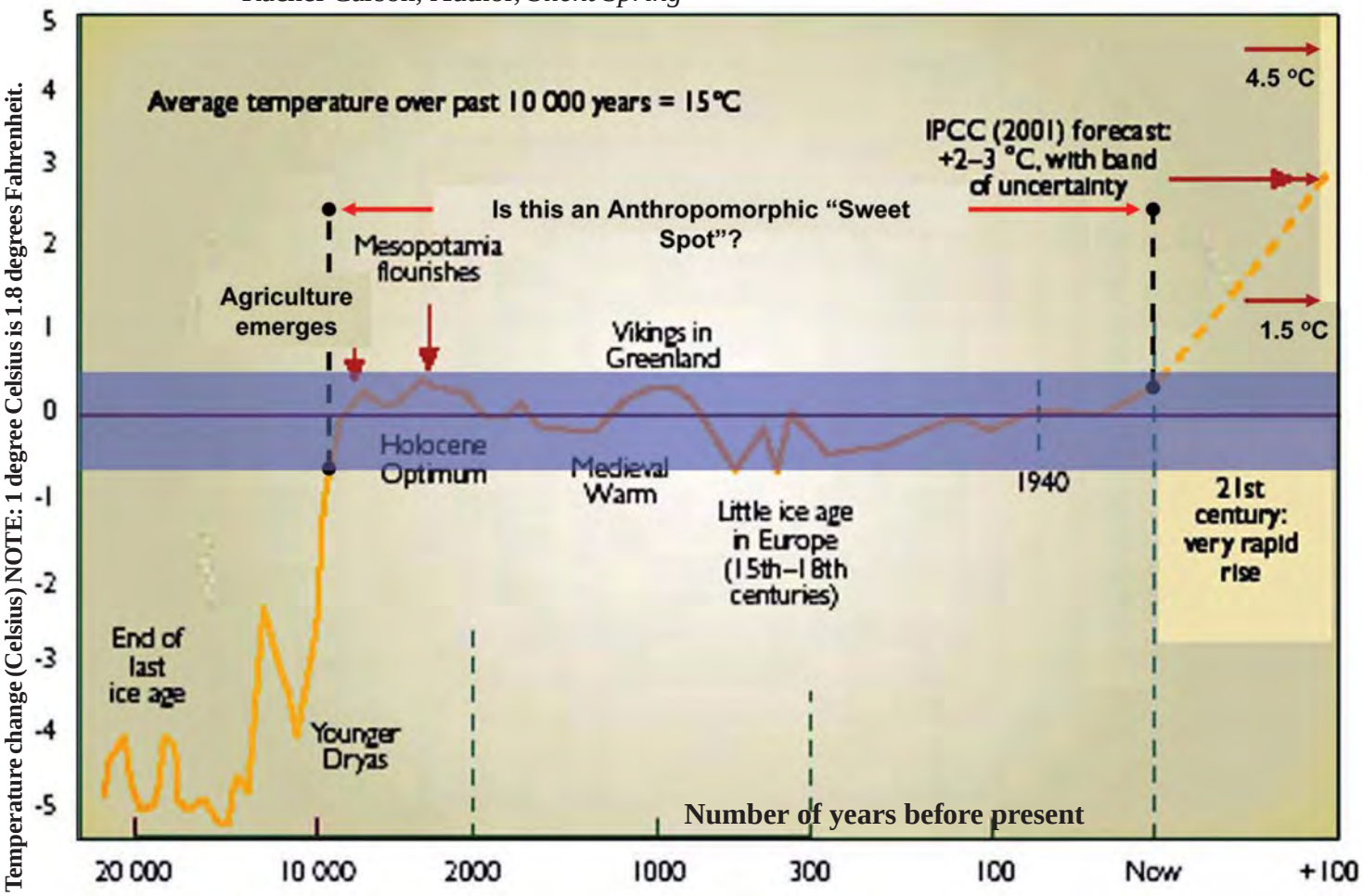
Visit *www.CHNEP.org* to learn more about the five Climate Ready Estuaries projects.



Conceptual ecological models are non-quantitative planning tools that identify the major anthropogenic drivers and stressors on natural systems, the effects of these stressors and the best biological attributes or indicators of these ecological responses.

"Considering the whole span of earthly time . . . Only within the moment of time represented by the present century has one species — man — acquired significant power to alter the nature of this world."

— Rachel Carson, Author, *Silent Spring*



 Adapted from *Adaptation to Global Change in the Arctic* by Dr. Robert W Corell. Dr. Corell is chair of the Arctic Climate Impact Assessment Steering Committee, an international project of the Arctic Council and the International Arctic Science Committee (IASC) and winner of the Nobel Peace Prize Award in 2007 for his extensive work with the the Intergovernmental Panel on Climate Change (IPCC) assessments. IPCC is the leading international body for the assessment of climate change.

Mercurial Mysteries

Ken Schexnayder, FGCU

Delicate, precise teamwork is mandatory when there's a tiger, bull or great hammerhead thrashing in the sling attached to the port side of Florida Gulf Coast University's 25-foot research vessel. Removing a shark from its environment can quickly kill it, but Darren Rumbold, an FGCU associate professor of marine science, has designed an efficient process to get what he needs and return the shark to the water in less than 10 minutes.

On a good day, the process goes something like this for the FGCU vessel's nine-member crew: Rumbold guides the shark onto a 12-foot sling, and then jumps onto its back. He drills small holes into the dorsal fin to attach a tracking device, while a crew member inserts a plastic hose into the shark's mouth to force salt water through its gills, ensuring the shark continues to get oxygen. One person holds the shark's tail in place; another holds down the head. Rumbold attaches the tracking device and a crew member takes tissue samples and a small clip of the shark's fin, which will be tested at the lab. That done, Rumbold leaps back to the safety of the boat. Quickly!

Catching sharks is essential to Rumbold's research at FGCU. His ongoing study, which he is conducting in partnership with University of Miami researchers, measures the amount of mercury in shark tissue to better understand the levels of toxicity throughout the marine food chain. He's also attempting to identify areas where larger concentrations of mercury enter the water — and by extension, the food web — in an effort to potentially control the flow of mercury and more effectively manage southwest Florida's coastal ecosystems.

Rumbold says that the Gulf of Mexico — particularly in south Florida — has a serious mercury problem. Right now, Florida's coastal waters are home to more than 60 species of fish listed by the Florida Department of Health for limited consumption because of high levels of mercury in their tissue.

"My research is focusing on methylmercury because it is the form of mercury that

Photo by Brian Tietz.

actually moves through the food web," says Rumbold, "and people are exposed to it almost entirely by eating fish or other aquatic wildlife that are at the top of that food web."

According to the U.S. Geological Survey, methylmercury is one of the most toxic forms of mercury.

"It affects the immune system, alters genetic and enzyme systems, and damages the nervous system. . .and is particularly damaging to developing embryos, which are 5 to 10 times more sensitive than adults," the agency reports.

"The ultimate goal here is to keep people safe, to keep people healthy," Rumbold says.

The presence of mercury in the environment does not necessarily contaminate an ecosystem or pose a toxic risk. However, after mercury enters the environment and interacts with bacteria, it can transform into methylmercury, which is not only more toxic, it takes longer for an organism to get rid of it.

Rumbold hopes that by tracking the migratory movements of sharks, he can compare methylmercury levels in sharks with levels in other marine species (scallop, crab, shrimp), and then compare that with known mercury levels in various habitats. That should help pinpoint the source of the contamination.

The primary source of mercury is mineral deposits, which can filter into the freshwater system. But it can also enter in greater quantities through mining of mercury or as a byproduct of mining other metals. Recycling devices that use mercury in components, such as fluorescent lamps, cell phones and some batteries, can also introduce mercury into the environment. Coal-fired power plants introduce mercury into the atmosphere, and that mercury can be carried from as far away as China and deposited into the Gulf. Rumbold says on rainy days he doesn't bother to sample Gulf mercury levels because they are exceptionally high from the mercury deposited by the rain.

Finding the mercury, however, is just one piece of the puzzle. Another critical piece comes in the form of biomagnification, an increase in the concentration of a substance as it moves up the food web.

continued on page 12

Mercurial Mysteries — continued from page 11.

"Mercury tends to be stored in the tissues," he says, "the very tissues that we like to eat — the fillets. It's efficiently absorbed into the fishes' tissue, but very slowly excreted."

Not all chemicals biomagnify, but mercury does.

"Sharks feed at the apex of the food web; they eat the fish that eat other fish that eat other fish," says Rumbold. "So, as they feed on fish with a concentrated level of methylmercury, their level increases."

Most of the debate today centers on the amount of methylmercury contamination necessary to produce low-level chronic conditions, which can have subtle symptoms.

"There's a book written out in California that has termed these subtle changes 'fish fog,' " he says. "People are claiming to experience a hangover-like feeling, and the suspicion is that this is a result of eating very large amounts of very high-quality fish (such as tuna and mackerel), fish that tend to eat other fish.

"With the public's recognition of the health benefits of omega-3 oils from fish and the expanding move to incorporate fish into our diet, it's important that we understand what's happening with methylmercury toxicity," Rumbold says. "If we understand it, we can begin to manage the problem and implement solutions to ultimately eliminate it."

Photo by Brian Tietz.

Rumbold's study, funded by the West Coast Inland Navigation District, includes resources for 20 satellite tags to attach to tiger, bull and great hammerhead sharks. Preliminary assessment of the data collected so far has yielded some surprises. For instance, tiger and bull sharks have had lower concentrations of mercury than expected, which opens up the possibility that migratory patterns, which are being tracked as part of the study, or caloric requirements of the species may influence toxicity levels.

There is no short-term solution for methylmercury contamination; no quick fix. And our ability to ensure that fish are a safe source of essential oils and a regular part of a healthy balanced diet lies in the hands of researchers like Darren Rumbold. Whatever the immediate future holds for Rumbold's study, what he learns will have implications for not only the coastal waters of south Florida but for ecosystems around the world.

This article was excerpted from the Winter 2011 issue of Pinnacle *magazine. For the complete story and video, visit* www.fgcu-pinnacle.com.

With support from a CHNEP research and restoration partner grant, Dr. James Gelsleichter of Mote Marine Laboratory evaluated the risks that pharmaceutical-related pollutants pose to the bull shark (*Carcharhinus leucas*) in the Caloosahatchee River. Because the bull shark is uniquely able to survive in freshwater habitats for extended periods of time, it is more likely to be in danger from the impacts that human populations can have on coastal ecosystems than most, if not all, other shark species. None of the nine chemicals tested were consistently found in the sharks.

Learn more by reading the Spring 2009 issue of *Harbor Happenings* or the project report. Both are available at *www.CHNEP.org*.

Grants are available

Throughout the year, the CHNEP offers small "micro" grants up to $250 to assist others in their efforts to help protect the environment as defined by the program. Guidance on how to apply for the CHNEP's annual public outreach grants of up to $5,000 is now available. Visit *www.CHNEP.org* to learn more and to apply.

Update on the Area-wide Environmental Impact Statement for Continued Phosphate Mining in the Central Florida Phosphate District

An Areawide Environmental Impact Statement (AEIS) is being prepared by the U.S. Army Corps of Engineers (ASACE) that addresses expansion of phosphate mining proposed by Mosaic Fertilizer and CF Industries on lands these companies own within the Central Florida Phosphate District (CFPD). (Additional information was provided in the last issue of Harbor Happenings.) Phosphate mining has occurred within this geographic area since the late 1800s, with most of the historical mining occurring in the northern part of the CFPD. Ongoing mining is occurring primarily within the central part of the CFPD. Future mining expansion is proposed for areas further to the south.

Because of the locations of these proposed future mining expansion areas, the key geographic areas to be evaluated are the Myakka River and lower Peace River watersheds. Direct impacts are to be evaluated with respect to the specific mine areas. Indirect effects will be evaluated with respect to areas immediately adjacent to these proposed mine expansions. Cumulative effects will be evaluated on a regional level focused on the specific basins and subbasins within which the proposed mining would occurinclusive of the downstream basins and subbasins to the Charlotte Harbor estuary. The cumulative impact evaluations are to primarily focus on potential mining effects, but some consideration of the influence of agricultural and urban land uses on the estuarine portions of the study area will also be included.

The USACE is the lead agency responsible for AEIS preparation. The U.S. Environmental Protection Agency (USEPA) and the Florida Department of Environmental Protection have committed to serving as cooperating agencies, and as such will be active members of the AEIS team. A broad range of other federal, state, regional and local agencies have indicated they will be participating agencies. Participating agencies provide technical information to be used during the AEIS evaluations and provide technical review during the Draft AEIS and Final AEIS review periods.

Opportunities for participating agencies, other stakeholders and the public to participate in the AEIS preparation in accordance with National Environmental Policy Act (NEPA) guidelines are limited to the public scoping process and the Draft and Final AEIS review periods. The AEIS team are in the process of considering extending additional opportunities for participation by agencies, stakeholders and the public with the goal of improving on the inclusiveness of the process of background information review, selection of evaluation methods to be applied during alternatives analysis and consideration of unavoidable impacts and appropriate mitigation strategies. Examples of such extended opportunities include the pre-NEPA phosphate mining summit hosted by the USACE in Lakeland in October 2010 and the USEPA-sponsored State of the Science on Phosphate Mining conference held in Punta Gorda on March 28–29, 2011. These public meetings, which technically were not part of the AEIS activities, promoted information sharing and issue identification.

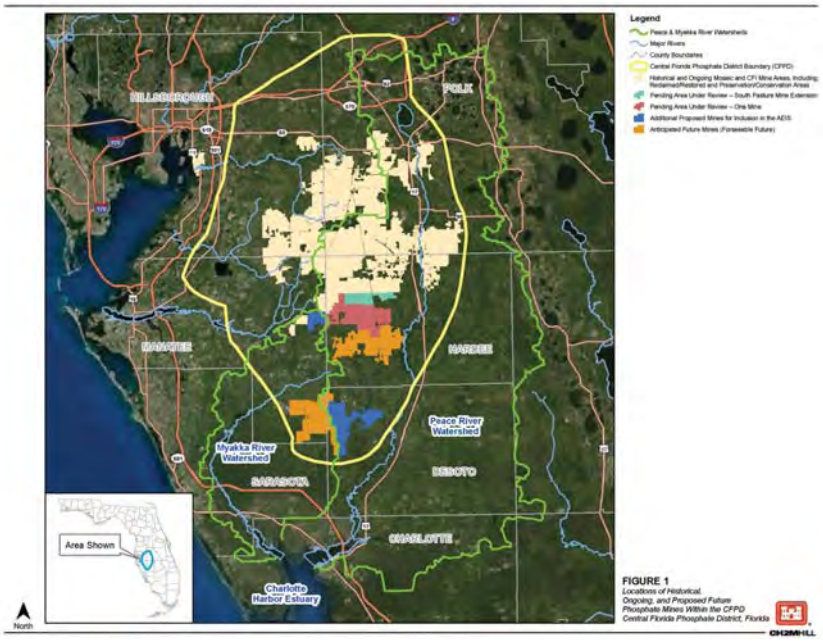


FIGURE 1
Locations of Historical, Ongoing, and Proposed Future Phosphate Mines Within the CFPD
Central Florida Phosphate District, Florida

The AEIS formally was initiated in February 2011. Since then the major activity has been devoted to planning and execution of the public scoping process. Two public scoping meetings were held in March 2011. A brief project overview presentation was followed by an open house format with AEIS team members positioned at a series of subject matter stations to allow interested parties an opportunity to discuss their questions, concerns and suggestions with team members. Comment submittals were solicited. Comments received through the end of April 2011 are being compiled.

Over the next several months, the AEIS team will continue its review of relevant documents and information provided by agencies, other stakeholders and the public with respect to defining the existing conditions against which the alternatives will be compared. Better definition of the alternatives under consideration will occur and evaluation methods for regional impact assessments and alternatives comparison will be defined. As currently planned, impacts will be assessed and evaluation of alternatives will occur during the summer of 2011. Draft documentation is planned for the fall of 2011. This schedule remains dynamic in that the scope of the evaluations to be conducted may evolve as the public scoping comments are reviewed and evaluation methodologies are better defined. Many requests for study expansion both spatially and temporally have been received from participating agencies and the public, and these requests are being weighed against the regulatory drivers under which the AEIS performance is authorized. AEIS updates will be provided in future CHNEP newsletters as well as through information releases posted to the project website at *www.phosphateaeis.org* and through email notices.

EPA State of the Science on Phosphate Mining and the Environment

Current and detailed scientific information about the environmental effects and reclamation of phosphate mining in Florida was provided during the U.S. Environmental Protection Agency's conference on March 28–29, 2011. Visit *www.CHNEP.org* to review presentations.

A new beginning for Wildflower

Percy Angelo, Lemon Bay Conservancy

In September 2010, the Lemon Bay Conservancy (LBC) purchased the former Wildflower Golf Course on Placida Road in west Charlotte County with the goal of turning it into a wildlife preserve.

Wildflower had operated as a golf course for decades until it was contracted for sale to a developer who intended to replace its fairways and wetlands with as many as 400 condos. The community objected because, when the neighborhood had been originally developed, the golf course had been promised as open space and its housing density moved to neighboring condos. The neighbors finally prevailed against the development, but the golf course was simply closed and left to return to nature.

Lemon Bay Conservancy is a land trust, which has had roles in the past in protecting parts of Cedar Point Park as well as islands in Lemon Bay. LBC was interested in the closed golf course, in part because it was a way to protect Lemon Creek, a tidal creek which directly connects Lemon Bay almost immediately to the west with Lemon Lake in the Amberjack Preserve to the southeast. In spring 2010, LBC and the owner reached agreement on a price of $750,000 for the 80-acre Wildflower property. LBC then had until September, about six months, to raise the money. This it did with contributions from neighbors, a substantial commitment from its own reserves, some timely donations from generous friends and a one-year loan for the remaining $250,000.

Retired biologist Dr. Bill Dunson, who leads many nature walks in the area, has led efforts to develop a trail system and identify the wildlife at Wildflower. Early on, he found tarpon in the tidal pools and wetlands. Tarpon hatch at sea but then make their way to such inland ponds to grow without the competition found in more open waters. He also identified a soldier butterfly, the first ever to be seen in Charlotte County. Other wildlife seen include a bobcat family, an otter family, gopher tortoise habitat, alligators and visiting mature and immature bald eagles. Something new is found almost weekly.

After the amazing fundraising success, one of the most impressive elements of the Wildflower story is the role of the community and volunteers in developing the preserve. While the golf course had only been closed a few years, it had truly gone back to nature. There were no trails, no discernible fairways, and getting lost in the woods and brush was not only easy, it was almost inevitable. Beginning with Bill's one-man efforts, a crew of volunteers, led by Phil Dakin and Lucia Schattelyn, has shown up at least once a week since last fall to cut trail, pull up vines and dig out stumps. Another volunteer, working on her master naturalist certification, prepared a brochure. Other volunteers have developed trail markers, built trail benches and planted habitat for butterflies. A local landscaper has donated a crew for several hours every two weeks to do special projects, including chipping the mounds of brush created by the trail work. In almost every case, it's the volunteers who walk in the door with an idea for a project and then make it happen.

Tarpon have been found to use Tarpon Creek at Wildflower. The success of Wildflower as important conservation land is due to many volunteers. Volunteers measure pond depths. Photos by Bill Dunson.

The LBC is currently working on plans for development of a portion of the site with water features and other elements to attract birds. It plans to work on opening Lemon Creek, which is currently silted in and fish like tarpon can get in, but then grow and can't get out. A healthy Lemon Creek will also benefit Lemon Lake, which has an amazing bird population when water levels are welcoming. LBC is still actively fundraising to pay off its purchase loan (due in September 2011) and provide funds for development projects and ongoing maintenance. Contributions are very welcome.

Wildflower is open to LBC members (dues are $35/year) but members are asked to visit with a partner or group. Tours are offered for the public but are less frequent in the summer. Anyone interested in learning more is encouraged to check the LBC website at *www.lemonbayconservancy.org* or contact the office (*lbconservancy@comcast.net*, 941/830-8922).

Virtual Wading Trip

The CHNEP is working on its next video project — a virtual wading trip! Through 15 experts, you'll learn about the animals that live in and depend on the local estuaries. One longer video (less than 30 mins.) and multiple 1–2 mins. videos will be created. The videos will be available in September. Four experts will lead actual wading trips. Teacher Susie Hassett from Littleton Elementary School in Lee County had third-grade students collect specimens during a wading trip. They caught and then released the following: pygmy seahorse (see photo), pipefish, pinfish, puffer fish, tonguefish, bryozoan, king's crown egg case, oysters, hermit crab, spider crab, fiddler crab, whelk, mud crab, shrimp and barnacle. *Photos by Maran Hilgendorf.*

Tide watch: High tide photography opportunity

EPA's Climate Ready Estuaries encourages National Estuary Programs (NEPs) to observe and photograph higher-than-average water levels predicted for many coastal areas from October 28–30, 2011. (High tides were also experienced May 16–18.) Visit NOAA's "Tidal Prediction" webpage (*http://tidesandcurrents.noaa.gov/tides11/*) to find the time of day when the highest tides will occur.

Extremely high tides occur when the earth, sun and moon align and the gravitational pull is at its greatest. These higher-than-normal high tides occur with the coming of new and full moons. In some places, these are referred to as "king tides." This gravitational force causes tides that can push enough water to raise sea levels by as much as a foot in some areas. Fishermen will be familiar with this astronomical phenomenon that exacerbates both the low tide and the high or "spring tide."

Recent scientific studies project that global sea level will rise three to five feet by 2100, indicating a rapid acceleration in sea-level rise rate compared to observed twentieth century trends. These new projections, combined with observed trends in vertical land motion, suggest that these high tide water levels in many NEPs will become average high water levels by the 2030s, 2040s or 2050s. Sea-level rise impacts should be taken into account when investing in infrastructure, development or restoration projections that are expected to last for long periods of time.

When the highest tide of the year happens later this year, it will provide an opportunity to witness the impacts of higher water levels and to communicate the message that sea level rise will cause today's king tides to become the future's daily high tides.

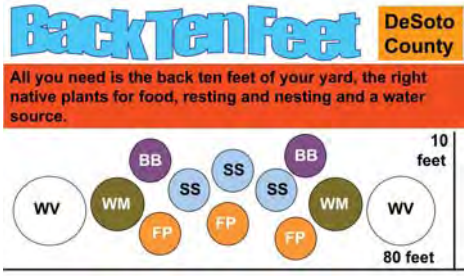
Citizens in Santa Monica, CA, and Seattle, WA, have already begun documenting the effects of the king tides along the west coast of the U.S. and have been uploading their photos to a Flickr website.

In Florida, citizens will be able to participate as "tide watchers" by taking photos of areas at low tide and during the king tide to photo-document changes on land from the unusually high tide. Citizen photos, along with details about where the photos were taken, will be uploaded and collected on an online photo sharing site.

For more information, contact Misty Cladas with Tampa Bay Estuary Program (*misty@tbep.org,* 727/893-2765).

SOURCE: *www.epa.gov/climatereadyestuaries/index.html*

Back Ten Feet: Create a Neighborhood Greenway



The last issue of *Harbor Happenings* includes a template to help residents convert 10 feet of their lawn into a native habitat. If you have a question about going native and chemical-free in your landscape, check out The Back Ten Feet with Sue Scott blog at *http://backtenfeet.blogspot.com*. You can email her your questions at *backtenfeet@gmail.com*.

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Not receiving *Harbor Happenings* in the mail? Request a free subscription. Visit the website at *www.CHNEP.org* for details.

Please let us know of any address corrections by sending an email to *mhilgendorf@swfrpc.org*.

Harbor Happenings en Español: Cada publicación de *Harbor Happenings* será traducida al español y publicada en el website del Charlotte Harbor National Estuary Program *www.CHNEP.org*. Por favor anime a sus amigos que hablan español a darle un vistazo.

Calling one and all to join CHNEP Friends

Thank you to those who have already generously supported CHNEP by making a donation.

Do you want to be more involved in the CHNEP?

Consider joining the CHNEP Citizens Advisory Committee (see *www.CHNEP.org* for details) or the Friends of Charlotte Harbor Estuary, Inc., also known as CHNEP Friends. The CHNEP Friends are seeking members and members to serve on their Board of Directors.

The CHNEP directly benefits from the financial assistance of CHNEP Friends, a 501(c)3 not-for-profit. In September 1999, the CHNEP formed a funding committee to investigate raising alternative sources of funding for implementation projects. In May 2000, the Friends of Charlotte Harbor Estuary, Inc., was created as a 501(c)3. The not-for-profit corporation provides an avenue to channel charitable contributions to CHNEP's outreach projects that protect and enhance the Charlotte Harbor watershed and estuaries.

Among other things, CHNEP Friends now allows people to support the CHNEP by accepting donations electronically and by making select resources (such as the posters featured in the last issue of the newsletter) available for a donation.

Donations received to date have supported several CHNEP outreach projects, including:

- CHNEP calendars
  The calendar has received financial support from donors since 2008.
- *Harbor Happenings*
  The 16-page newsletter on the "happenings" of concern to the CHNEP
- *Adventures in the Charlotte Harbor Watershed: A Story of Four Animals and Their Neighborhoods*
  The book is given to each of 20,000 students in either third or fifth grade in Charlotte, DeSoto, Hardee, Lee, Manatee, Polk and Sarasota counties since 2008

To become a member (at this time, there are no dues), to volunteer to serve on the Board of Directors or to learn more, visit their website at *www.CHNEPfriends.org*. A meeting will be held in September to further the Friends and to screen the CHNEP Virtual Wading Trip video (see page 15).