



Harbor Happenings

The newsletter of the Charlotte Harbor National Estuary Program

Spring 2003: Volume 7, Number 1

Working together to protect estuaries and watersheds from Venice to Bonita Springs to Winter Haven

In This Issue

- 1 The Health of Lemon Bay
PLAN TO ATTEND: 2004 Conference will focus on Lemon Bay
- 2 Science Plan
- 3 16 Grants Awarded by Charlotte Harbor NEP • Mini-Grant Project Descriptions
- 4 Research & Restoration Partner Grant Project Descriptions
- 5 **YOUR HELP IS NEEDED:** Oyster Reef Project

Lemon Bay: Ongoing Research

David A. Tomasko, Ph.D., Surface Water Improvement and Management (SWIM) Section - Southwest Florida Water Management District

In contrast to the adjacent estuaries of Sarasota Bay and Charlotte Harbor, Lemon Bay has not yet received the same level of detailed investigation as these two better-studied systems. A comprehensive assessment of the status and trends in water quality, pollutant loads, seagrass coverage, etc. was not available when the Charlotte Harbor National Estuary Program produced its technical synthesis of water bodies in the program's jurisdictional area in 1998. In response to this data gap, the Southwest Florida Water Management District partnered with the Florida Department of Environmental Protection to conduct an assessment of the relationship between population growth and land use, and how changes in land use might be expected to alter pollutant loads, water quality, and seagrass resources in the bay. This effort is referred to as Phase I of ongoing assessments of Lemon Bay.

In response to our findings from the Phase I study, a second effort, Phase II, was initiated.

The goals of the Phase II study, which is still underway, are as follows:

- The pollutant loading model will be revisited to incorporate a more extensive water quality monitoring effort.
- Pollutant loads will be determined on a creek by creek basis.
- Priority areas for pollutant load reduction strategies will be identified.
- Projects that might offset or minimize potential future pollution increases will be identified. At this time, preliminary results are starting to accumulate, and some of these results are perhaps surprising to many with an interest in Lemon Bay.



Lemon Bay Conference in 2004

Charlotte Harbor NEP is working with the Lemon Bay League and others to hold a Public Conference in 2004 that will bring public and private stakeholders together to discuss critical environmental issues in Lemon Bay. If you would like to be involved in this important program, contact 239/995-1777 ext 240.

- 7 Water Supply Authority "Extension" to DeSoto County • "Smart Growth" in Lee County
- 8 Library Provides Environmental Books, Videos, etc.
- 9 Wonderful Place in the Watershed • Explore Estuaries on a *Free* Wading Trip
- 10 Second Annual Cleanup of Boca Grande Pass • New Resource Manual
- 11 Upper Myakka River Surface Water Exchange Projects
- 12 **YOUR HELP IS NEEDED:** Public Information & Education Projects Underway

Conclusions from Phase I include the following:

- Lemon Bay's water quality would be sensitive to increased nitrogen loads.
- Increased loads would be expected to occur as the watershed continues to be developed.
- Water clarity would probably decrease in Lemon Bay in a predictable manner in the future.
- Decreased water clarity would be expected to cause seagrass coverage to decline as the deep edges of meadows retreat into shallower water.
- Recreational benefits of the bay would probably decrease, as a result.

continued on page 8



Buchanan's Landing on Lemon Bay.

Photo provided by Sarasota County Film Commission

Program Update

I am absolutely thrilled to show off our new *Comprehensive Conservation and Management Plan (CCMP) Summary*, hot off the presses. I received nothing but compliments on the look and content of the summary. My congratulations go to all of the Charlotte Harbor National Estuary Program (CHNEP) Conference Members who contributed to this wonderful publication, chocked full of beautiful images from our estuary and watershed!

One of my favorite sentences in the *CCMP Summary* describes CHNEP:

“The partnership works as an advocate for the estuarine system by building consensus that is based on sound science.”

My professional life has been devoted in providing elected officials the best available science on which to base decisions. Toward this end and for the past several months, the scientists of our conference have been working hard to identify gaps in science that are obstacles to decision-making. These identified science needs have provided the core to the CHNEP’s first ever “Science Plan.”

The Science Plan catalogs and describes all of the science gaps we have identified to implement the CCMP. The CHNEP has used this list to propose funding for the highest priority research projects. We have begun using the plan to develop grant applications. We are also making the plan available to research institutions for research ideas that have CHNEP endorsement and will be useful to develop policy.

The CHNEP has a long history of funding original research. We have supported more than 20 research projects through our Early Action Demonstration Projects and through our Research and Restoration Partner Program. Through these programs, our partners have inventoried the common benthic macroinvertebrate taxa of the Caloosahatchee River and Matlacha Pass, assessed the feasibility for restoration of old mine

lands, and expanded water quality monitoring programs in both estuarine and freshwater systems. Page 4 of this newsletter details new research proposals that CHNEP will fund with our partners.

CHNEP, itself, has sponsored original research. The Water Quality Status and Trends Assessment by Janicki Environmental, Inc. is nearly to press. The study provides a geographic look at long-term trends for a variety of water quality and hydrologic parameters. It also highlights the importance of newly expanded water quality monitoring programs.

What is on the horizon? CHNEP is about to enter into contracts for a Habitat Status and Change Assessment, new methods to upload randomized water quality data into the Florida’s centralized database named “STORET,” and a Groundwater Status and Change Assessment. We have applied for Gulf of Mexico Program funding to support the development of an interactive educational CD about benthic invertebrates.

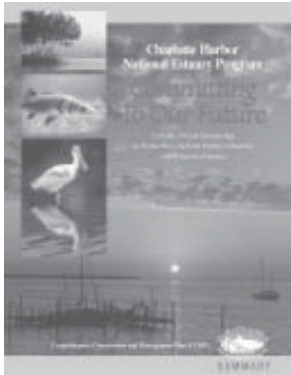
These research efforts by our partners and through the CHNEP will certainly be used to help us make the best decisions for our estuaries and watersheds.

...And there is much, much more science to come.



Dr. Lisa B. Beever
Director

EDITOR’S NOTES: Each subscriber should have received a copy of the *CCMP Summary*. If you didn’t (or would like a supply to distribute), please contact the Program Office. Look for an article about the Water Quality Status and Trends Assessment a future issue of *Harbor Happenings*.



Charlotte Harbor National Estuary Program

4980 Bayline Drive, 4th Floor
North Fort Myers FL 33917-3909
239/995-1777 ➔ Fax 239/656-7724

www.CharlotteHarborNEP.org

Dr. Lisa B. Beever, Director

lbeever@swfrpc.org • ext 235

Catherine Corbett, Senior Scientist

ccorbett@swfrpc.org • ext 241

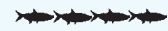
Maran Hilgendorf, Communications Mgr

mhilgendorf@swfrpc.org • ext 240

THE CHARLOTTE HARBOR NATIONAL ESTUARY PROGRAM is a *partnership* that

protects the estuaries from Venice to Estero Bay. This partnership gives citizens, elected officials, resource managers, and commercial and recreational resource users in the 4,400-square-mile study area a voice to address diverse resource management concerns, including fish and wildlife habitat loss, water quality degradation and water flow.

The program Management Conference is composed of the Program Office and the Policy, Management, Technical Advisory and Citizens Advisory committees. Each committee serves a specialized role in supporting the program goals and objectives.



Harbor Happenings

Spring 2003, Volume 7, Number 1

Request a free subscription by contacting the NEP Office.

CONTRIBUTORS: Aaran Adams, Angela Barker, Lisa B. Beever, Paula Benshoff, Steve Bortone, Todd Campbell, Catherine Corbett, Nancy Cruickshank, Wayne Daltry, Kraig Hankins, Maran Hilgendorf, P. Scott Laidlaw, Jenny Martin, Sally McPherson, Steven A. Minnis, Vera Neumann-Wood, Diane Rome Peebles, Sarasota County Film Festival, Nicolle M. Smith, Sam Stone, Jon Rodgers, David A. Tomasko, Aswani Voley, Bob Wasno, Ruth White

EDITOR AND DESIGNER: Maran Hilgendorf
News items, photographs, and letters are welcome and may be submitted to the Charlotte Harbor NEP office by mail or email (mhilgendorf@swfrpc.org). Deadlines for future issues are May 15, August 15, November 15 and February 15.

The views expressed herein are those of the authors and do not necessarily reflect the views of the Charlotte Harbor NEP or its cooperating agencies and associations. The mention of trade names or commercial products does not in any way constitute an endorsement or recommendation for use.



Printed on recycled paper.

Charlotte Harbor NEP Provides Grants for 16 Projects

Sixteen awards were made by the Charlotte Harbor National Estuary Program for nine mini-grants and seven research and restoration (R&R) partners grants. These projects provide immediate benefits to the natural resources in the NEP watershed, enhance technical knowledge, or improve community awareness of the ecological integrity of the greater Charlotte Harbor watershed.

Each year the Citizens Advisory Committee (CAC) reviews the mini-grant applications while the Technical Advisory Committee (TAC) reviews R&R proposals. These committees then recommend projects for funding to the Management and the Policy Committees, which make the final decision as to which projects are supported. This year 15 mini-grant applications and 11 R&R proposals were received.

Each year requests for mini-grant applications and requests for proposals for research and restoration partners grants are released in early September. Grant announcements released September 1, 2003 will be funded as early as February 2004. These grant announcements as well as a *Directory of Grant-Supported Projects* can be requested as printed copies and are available as PDF files on the Program Office web site (www.CharlotteHarborNEP.org).

Many of the projects selected were funded in cooperation with other sources. The total value of each project is often much greater than the support provided by the NEP. These sponsors are vital to these projects.

Since 1996, the Charlotte Harbor NEP has awarded 94 education, research and restoration projects throughout the greater Charlotte Harbor watershed. These projects are conducted by Florida residents, organizations, businesses, government agencies,

schools, colleges and universities. The education projects, which are most often funded as mini-grant projects, help multiply the number of people who are aware of the importance of estuaries and the protection of watersheds. The research and restoration partners projects, which are most often funded as R&R projects, directly benefit the natural resources in the watershed, increase technical knowledge and often include an educational aspect.

Mini-Grant Projects Initiated in 2003

Sailing Through the Environment of Charlotte Harbor

LA Ainger Middle School, Rotonda West

Seventh grade students in Englewood (Charlotte County) will participate in one of six environmental field trips on Charlotte Harbor as a result of this grant. Each of the 240 students, including special needs children, will be able to enjoy being out on the water of Charlotte Harbor and Lemon Bay – some for the first time – while they collect and analyze data. Charlotte Harbor NEP is providing \$2,700 for this \$3,190 project. This is the second year of support from the NEP.



Students at LA Ainger Middle School collect specimens from Charlotte Harbor and will later analyze what they've found.

Photo by Ruth White

Environmental Education Conference

Lakes Education-Action Drive

Teaching teachers has a multiplying effect as the teachers teach students. This project allows LE/AD to organize an environmental education conference, tentatively scheduled August 2003, for educators in Polk, Highlands, Hardee and DeSoto counties to learn about concerns within the Peace River watershed. Workshops and sessions are planned to inform participants of environmental issues, demonstrate curriculum to teach that issue and relate that issue and curriculum to specific mandated educational standards as well as receive materials from publishers. Conference papers of the workshops will also be made available. Charlotte Harbor NEP is providing \$2,902 for this \$4,227 project.

Greater Charlotte Harbor Watershed Guide

Charlotte Harbor Environmental Center

Positive attitudes, perceptions and actions flow from active participation in learning about the environment, especially through experiences such as field trips. CHEC will develop curriculum for

local educators at environmental associations, agencies and schools to use to help educate people from second grade students to adults. This project will help others provide experiences to change attitudes, perceptions and behaviors that will help protect and restore the greater Charlotte Harbor watershed. Charlotte Harbor NEP is providing \$3,000 for this \$3,580 project.

Polk County Education Initiatives

Audubon of Florida

This initiative helps Audubon offer Discovery Programs to youth in Polk County to help develop a culture of conservation and environmental awareness for the upper Peace River watershed and issues of concern. Students from kindergarten to twelfth grade will gain an awareness, appreciation and understanding of natural resources, land and water conservation and wildlife protection during these hands-on interactive science-based programs. The programs will be implemented at the two Audubon Centers in Polk County and in schools. Charlotte Harbor NEP is providing \$1,905 for this larger project.

continued on page 4

I hear and I forget. I see and I remember.

I do and I understand.

– Confucius (551 BC - 479 BC)

Mini-Grant Projects Initiated in 2003 (continued)

Stingray Ecology and its Effects on

Charlotte Harbor: Angela Barker

Working with researchers at Mote Marine Laboratory, University of South Florida graduate student Angela S.

Barker will estimate stingray feeding and use of Charlotte Harbor. Healthy elasmobranch populations are indicative of intact ecosystems. Examining

the ecology of a large predator, such as the stingray, and its impacts on an ecosystem can provide clues in assessing the health of the estuary. Estimating the extent to which stingrays use the harbor will also allow preliminary conclusions to be drawn regarding habitat use and preferences. Charlotte Harbor NEP is providing \$3,000 for this project.

Trail Guide: Calusa Nature Center and Planetarium

A 46-page trail guide will be created to provide the estimated 80,000 annual visitors with direct experience of the Fort Myers center as an ecological preserve and environmental education center. Visitors will learn more about the natural environment and issues of concern through habitats, landscapes and exhibits the center provides through its museum and three miles of trails on the 105-acre subtropical natural inland habitat. Charlotte Harbor NEP is providing \$3,000 for this \$4,431 project.

Enhancing Visitor Experience at the Circle B Bar Reserve: Interpreting Lake Hancock's Water, Wildlife and Wilderness
Polk County Environmental Lands Program

Lakeland, Winter Haven and the Green Swamp areas drains into the 4,533-acre Lake Hancock. The water then flows into Peace River, which flows to Charlotte Harbor. The conservation purchase of the Circle B Bar Reserve with its nearly two miles of Lake Hancock shoreline provides the county will opportunities to edu-

Research and Restoration Partners Projects Initiated in 2003

Control of Invasive Grasses in the Myakka River Watershed by Park Volunteers

Friends of the Myakka River, Florida Department of Environmental Protection-Myakka River State Park and Charlotte Harbor NEP

The rare Florida dry prairie covers approximately 23,320 acres of the 211,000 acres of native land in the Myakka watershed. The survival of the unique plants and animals that occur in this habitat are threatened by the invasion of exotic species such as cogon grass (*Imperata cylindrica*) and West Indian marsh grass (*Hymenachne amplexicaulis*). The Myakka River State Park will purchase two 4x4 ATVs for use by park volunteers to detect, monitor and treat areas

of invasive plants within the Myakka River State Park and Myakka Prairie, totaling 37,000 acres. Park personnel will use the results to produce a manual on the appropriate methods of eradicating invasive grasses that will be distributed to other resource managers. Charlotte Harbor NEP is providing \$10,400 for this \$45,713 project.

4  Charlotte Harbor National Estuary Program *Harbor Happenings*

cate the visiting public about the importance of water resources within Polk County and beyond by providing support for educational panels that will be placed along a hiking/nature trail on the berm of the lake. Charlotte Harbor NEP is providing \$2,500 for this \$4,496 project.

Self-Guided Trail Booklet: Crowley Museum & Nature Center

During a two-mile walk on the center's 190 preserved acres, visitors can see pine flatwoods, hammock, swamp, marsh and river habitats and the animals that depend on them. The center will create a self-guided booklet about these natural Florida habitats and their interconnectiveness. Details will be provided at approximately 35 stops, including at the Tatum Sawgrass Marsh, Myakka River and the self-contained composting toilets! The guides will allow the 8,500 annual visitors to determine the pace of their walk. Charlotte Harbor NEP is providing \$2,994 for this project. See page 9 for related article.

Don Ball School of Fishing: Charlotte Harbor Reef Association

Believing that the education of youth, not directives and laws, is the best way to protect the estuaries system of Charlotte Harbor, hardworking and devoted individuals from the association created an eight-class program known as the Don Ball School of Fishing for 100 seventh-grade students, 25 from each of the four middle schools in Charlotte County. The students, and 50 to 60 parents, learn about protecting marine assets while they learn about fishing. The school began in 2002 and is named for a Charlotte County resident who worked with youth. Mr. Ball passed away in 1998. Charlotte Harbor NEP is providing \$3,000 for this \$5,500 project.

Don Ball School of Fishing Certificate of Completion:

It is our heritage to preserve Charlotte Harbor, its estuaries and its fisheries, so that they will always be available to future generations.



Volunteers remove cogongrass seed plumes.

Photo by Jon Rodgers

Tippecanoe East Exotic Species Project

Florida Department of Environmental Protection-Charlotte Harbor Buffer Preserve, Americorps National Civilian Community Corps and Charlotte Harbor NEP

Invasive exotic species out-compete native plants, reduce and eliminate native wildlife and disrupt the ecological function of infected habitats. Brazilian pepper (*Schinus terebinthifolius*) and Melaleuca (*Melaleuca quinquenervia*) are two of the most serious threats to the

ecological integrity of native habitats in the Charlotte Harbor region. FDEP will eradicate Brazilian pepper and Melaleuca from more than 70 acres of pine flatwoods, freshwater and high marshes within the Charlotte Harbor Buffer Preserve. Charlotte Harbor NEP is providing \$9,500 for this \$19,212 project.

Research and Restoration Partners Projects Initiated in 2003 (continued)

Evaluating the Effects of Restoration of Subtropical Oligohaline Marshes on Abundance and Habitat use by Juvenile Snook and Associated Fish Communities

Mote Marine Laboratory, Florida Department of Environmental Protection-Charlotte Harbor Buffer Preserve and Charlotte Harbor NEP



Photo by Aaran Adams

Historically, during the rainy season the upland saltwater ponds and small creeks connected to the estuary that served as essential habitats for many young marine and estuarine species would be inundated. However, significant areas of the Charlotte Harbor coastline have been altered for development, water management or mosquito control, causing substantial fish habitat loss. The Southwest Florida Water Management District SWIM Program and the FDEP Charlotte Harbor Buffer Preserve are currently restoring many of the ditches within the Charlotte Harbor Buffer Preserve. Researchers at Mote Marine Laboratory will monitor the change in fish community structure and abundance of target fish species prior to and after the restoration of several mosquito ditches on the Preserve. Researchers hope to quantify the benefits of this type of habitat and hydrologic restoration and contribute to the creation of management strategies for restoration and development projects in the future. Charlotte Harbor NEP is providing \$19,360 for this \$90,773 project.

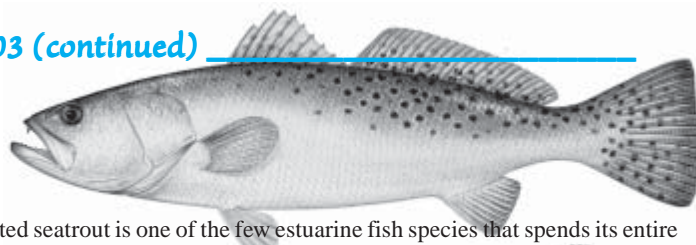
Restoration of Bay Scallop Populations in Pine Island Sound: Competent Larval Release Strategy: Mote Marine Laboratory, Bay Shellfish Company and Charlotte Harbor NEP

A recreational bay scallop fishery existed throughout the San Carlos Bay-Pine Island Sound area until the late 1980s when populations dwindled. This project hopes to replenish bay scallops (*Argopecten irradians*) in Pine Island Sound by an innovative stock enhancement strategy. Researchers at Mote will collect adult scallops from Pine Island Sound and transfer them to a shellfish aquaculture facility. There the scallops will be conditioned and induced to spawn. The resulting larvae will be reared and then released into several protected enclosures within select seagrass beds of Pine Island Sound. Charlotte Harbor NEP is providing \$19,438 for this \$38,898 project.

Biological Effects of Suspended Sediments on Shellfish in the Charlotte Harbor Watershed: Implications for Water Releases and Dredging Activities

Florida Gulf Coast University, Florida Department of Environmental Protection and Charlotte Harbor NEP

Oysters and other bivalves are critical components of estuaries due to their filtration ability and role in providing habitat. This project will examine the impact of sedimentation on oysters and clams within the Caloosahatchee estuary. Researchers at FGCU will determine threshold levels of oysters and clams for clean and contaminated (by heavy metals, pesticides and PCBs) sediments as well as duration of exposure to such sediments through a series of laboratory and field experiments. The results will provide



“Spotted seatrout is one of the few estuarine fish species that spends its entire life within a single estuary. Its growth rate reflects the conditions of the estuary in which it is caught. Consequently, we can attribute changes in its growth patterns with changes in estuarine conditions, thus making it an ideal biological monitor of our local waters.”

– Steve Bortone, Marine Laboratory, Sanibel-Captiva Conservation Foundation

Illustration by Diane Rome Peebles

baseline data for the determination of water quality conditions that impair organismal function as well as information pertaining to land use management that may lead to the improvement of ecosystem conditions. The results can be utilized in a “Habitat Suitability Index” model that will help predict responses due to environmental disturbances such as dredging activities. Charlotte Harbor NEP is providing \$25,018 for this \$57,401 project. See related story on page 6.

Spotted Seatrout Growth as a Bioindicator of the Priority Environmental Stressors in the Charlotte Harbor Estuarine Ecosystem: Sanibel-Captiva Conservation Foundation Marine Laboratory, Florida Department of Environmental Protection-St. Martins Marsh Aquatic Preserve and Charlotte Harbor NEP

SCCF researchers will establish the growth history among spotted seatrout collected from a subbasin in Charlotte Harbor. The growth history will then be compared with known growth patterns in other estuaries, and SCCF investigators will examine potential relationships with annual differences in priority environmental stressors (flow, salinity, water quality parameters and seagrass condition). The results of the project should determine the efficacy of using spotted seatrout biology as a way of monitoring long-term conditions of estuarine health in the Charlotte Harbor system. Charlotte Harbor NEP is providing \$19,324 for this \$47,826 project.

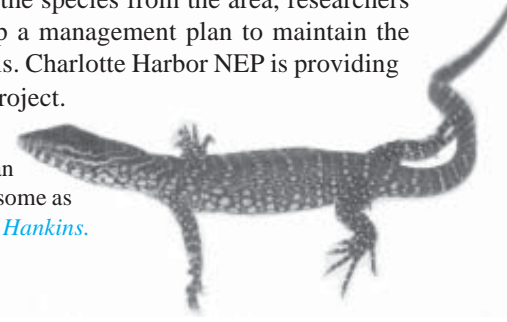
SCCF researchers will establish the growth history among spotted seatrout collected from a subbasin in Charlotte Harbor. The growth history will then be compared with known growth patterns in other estuaries, and SCCF investigators will examine potential relationships with annual differences in priority environmental stressors (flow, salinity, water quality parameters and seagrass condition). The results of the project should determine the efficacy of using spotted seatrout biology as a way of monitoring long-term conditions of estuarine health in the Charlotte Harbor system. Charlotte Harbor NEP is providing \$19,324 for this \$47,826 project.

Eradication of Introduced Carnivorous Lizards from the Cape Coral Area: University of Tampa, City of Cape Coral, University of Florida, Florida Fish and Wildlife Conservation Commission and Charlotte Harbor NEP

University of Tampa, City of Cape Coral, University of Florida, Florida Fish and Wildlife Conservation Commission and Charlotte Harbor NEP

Recently a large African lizard, the Nile monitor (*Varanus niloticus*) was established in Cape Coral of Lee County. These intelligent lizards, which can be more than 2 meters long, are carnivorous and able to consume relatively large prey. This introduced species has the potential to devastate native amphibians, reptiles, wading birds, mammals and others within southwest Florida. This project will attempt to eradicate the Nile monitor lizard from the City of Cape Coral before the species spreads. If it is not feasible to eradicate the species from the area, researchers will at a minimum develop a management plan to maintain the species at controllable levels. Charlotte Harbor NEP is providing \$19,920 for this \$51,664 project.

Juvenile 14-inch Nile lizard found in Cape Coral. More than 100 lizards have been sighted, some as long as 3 feet. Photo by Kraig Hankins.



Community-Based Restoration of Oyster Reefs in Caloosahatchee Estuary, Estero Bay and Henderson Creeks

Dr. Aswani Volety, Florida Gulf Coast University

Oyster harvesting in Florida began long before Ponce de Leon arrived at its shores in 1513 in search of the fountain of youth.

In fact, the economies of some of Florida's earliest Native American societies may not only have been estuarine-based but may also have partially relied on the mass collection of oysters and oyster-reef animals as a means of subsistence. Oysters became the basis for a thriving industry in Florida's major estuaries after European people settled in the area.

The industry was well in decline by the 1940s. Overharvesting and changes in water quality are the explanations most often given for this decline; however, these two impacts are not mutually exclusive.



Bagging oyster shells in preparation for placement.

Photo by Aswani Volety.

Oysters have the capacity to strain large quantities of water through their gills as they feed, clearing the water of small particles and anything attached to the particles, in the process. This filtering function helps maintain good water quality in estuaries, where the amount of suspended particles present can otherwise be quite high. Fixed to the bottom and exposed to the elements as they feed, oysters are on the front line in a defense against pollutants, disease organisms, and ever changing environmental conditions including salinity. As such, they can serve as sentinels of estuarine health by responding to these changes in water quality.

The Caloosahatchee estuary, Estero Bay, and Henderson Creek in the Charlotte Harbor-western Everglades watershed have

Oysters strain large quantities of water through their gills as they feed, clearing the water of small particles and anything attached to the particles, in the process.

This filtering function helps maintain good water quality in estuaries.

been significantly altered both by hydrologic modifications and by increased development of adjacent lands for agricultural, residential and commercial use. These alterations have impacted water quality and have resulted in the loss of oyster reefs and thus important fish and nursery habitat within the estuary.

Previous research suggests that oyster reefs serve as essential fish habitat (habitat for fish and shellfish) in these estuaries.

We have identified areas that currently do not have established oyster reefs, but have the potential for the development of successful oyster reefs under current water-management practices. These areas support rapid growth of juvenile oysters, attract abundant oyster spat, have reproductively active oysters, and exhibit high condition index – essential ingredients for the development of healthy reefs. However, these areas lack suitable substrate for attachment.

Through this project we are hoping for public education and involvement to restore and/or enhance oyster reefs, thereby improving water quality as well as habitat availability and quality within the Charlotte Harbor-western Everglades watershed.

Reef restoration efforts will include:

- construction of oyster shell reefs that will provide substrate for oyster larval settlement and
- “oyster gardening” by local citizens who live on canals and along the river.

Floating cages and juvenile oysters will be given to volunteers who will suspend the cages in water, and monitor growth and survival of juveniles. At the end of one year, volunteers will collect the oysters and seed them on constructed reefs to accelerate the formation of thriving oyster reefs. This project is supported with funds from the Charlotte Harbor National Estuary Program,

We are requesting volunteers to help create, restore, and enhance oyster reefs in the Caloosahatchee River, Estero Bay and Henderson Creek. In collaboration with scientists from Florida Gulf Coast University, Lee County School District, City of Cape Coral and Lee County/Florida Sea Grant, volunteers will deposit oyster substrate in the form of shell bags at specific locations to attract larval recruitment. Volunteers are requested to bring their boat if they have one.

CALOOSAHATCHEE

MAY 10 AT 9:00 A.M.: Punta Rassa boat dock on the right side on Summerlin Drive, before the Sanibel Island toll booth.

ESTERO BAY

MAY 17 AT 9:00 A.M.: Boat dock in front of Lover's Key State Park on Bonita Beach Road.

OYSTER GARDENING

Residents living along the canals (estuarine portion) of the Caloosahatchee, Estero Bay and Henderson Creeks, who are interested in participating in the oyster gardening program will be provided floating cages and juvenile oysters. Floating cages can be hung from backyard docks where growth of the juvenile oysters can be monitored.

For more information regarding the project and participation, please contact Dr. Aswani Volety at Florida Gulf Coast University (239/590-7216, avolety@fgcu.edu).

South Florida Water Management District, National Fish and Wildlife Foundation, and Florida Gulf Coast University.

Regional Transmission System Extension

Regional effort to meet water supply needs in an environmentally responsible way

Nicolle M. Smith, DeSoto County

Although it does involve miles of pipe the “Regional Transmission System Extension” is an exciting reality in DeSoto County. Simply put, the Regional Transmission System Extension is a \$2.5 million dollar project to install approximately 5 miles of water transmission pipeline starting at the Peace River/Manasota Regional Water Supply Authority (PR/MRWSA) Water Treatment Plant and interconnecting with the new DeSoto County water utility system. But it really is much more. It is a project that exemplifies a small rural county’s effort to become a true partner in a regional water system and to proactively address environmental and public health concerns.

DeSoto County was a founding member of the PR/MRWSA, a regional water supply authority created in 1982 to supply water to a region that now encompasses Charlotte, DeSoto, Manatee and Sarasota counties. The founding counties recognized that water needs and protection of water resources could best be met by forming a partnership to own and operate a surface water withdrawal and treatment facility located along the Peace River on Kings Highway in southwestern DeSoto County and to construct the infrastructure necessary to transmit the potable (drinkable) water to meet regional demands without adverse impact on the natural environment.

Since 1982, the PR/MRWSA has constructed innovative facilities and miles of pipeline to transmit water to serve its members. The Regional Transmission System Extension is the latest cooperative project and will form the necessary interconnect to provide potable water to the new 21-mile DeSoto County Water Utility System that will serve residential, commercial and industrial customers from the Wal-Mart Distribution Center located on Highway 17 South, through the center of the County, then north on Highway 31 to the southeastern limits of the City of Arcadia.

The ready availability of potable water provides a safe and cost effective alternative to private wells and provides a solution to the public health concerns associated with

No more than 10 percent of daily flow, as measured upstream in Arcadia, can be withdrawn from the Peace River. No withdrawals are allowed during periods of low flow when the water flows at less than 130 cubic feet per second.

poor water quality and contamination. In addition, use of surface water from the PR/MRWSA will replace the use of groundwater from private wells. This addresses the key environmental concern of protecting groundwater quality, quantity and recharge, which is of particular importance to DeSoto County as it lies entirely within the Southern Water Use Caution Area (SWUCA) and is within the Peace River basin upstream of the Charlotte Harbor estuary.

It is important to note that in its Final Environmental Impact Statement (EIS) dated January 2003, the United States Environmental Protection Agency (EPA) noted that the Regional Transmission System Extension and related projects would not affect the flows downstream from the PR/MRWSA intake facility even during times of low flow because water will be withdrawn following guidelines set by the South Florida Water Management District. In addition, EPA noted that the health of Charlotte Harbor is currently being monitored via a comprehensive Hydro Biological Monitoring Program, which will continue and will allow any concerns about the health of the ecosystem to be promptly identified and appropriately addressed.

The Regional Transmission System Extension is more than just a pipeline. It is tan-

“Smart Growth” in Lee County

Wayne Daltry, Lee County

As part of the Charlotte Harbor NEP co-sponsored Caloosahatchee River Basin Festival, the Lee County Smart Growth Committee held a publicly attended full day assembly on March 14. The assembly included seven speakers from Lee County, South Florida Water Management District, NEP, U.S. Fish & Wildlife Service and Florida Department of Environmental Protection, discussing the links between their environmental and water programs and “smart growth.” After the presentations,

The Southern Water Use Caution Area (SWUCA) was declared in 1992 by the Southwest Florida Water Management District’s Governing Board. A “water use caution area” is designated where water resources are or will become critical in the next 20 years. Encompassing approximately 5,100 square miles, SWUCA includes all of Manatee, Sarasota, Hardee and DeSoto counties and portions of Hillsborough, Charlotte, Polk and Highlands counties. SWUCA water resource concerns include the decline of lake levels along the Highlands Ridge, where most Floridan Aquifer recharge occurs, and advancing coastal saltwater intrusion in the Floridan aquifer.

gible proof of the ongoing regional effort to meet water supply needs in an environmentally responsible way –an effort in which DeSoto County is proud to be an active partner.

For more information about this project contact Nicolle M. Smith, DeSoto County Coordinator (863/993-4800 ext. 209, N.Smith@co.desoto.fl.us).

approximately 50 people discussed the water and environmental issues of the County, and developed a full slate of draft recommendations for the Committee to review in formal session. The workshop was facilitated by the Southwest Florida Regional Planning Council, and funded by the Lee County Board of County Commissioners.

Those wishing to know more about the issues and the Committee progress to date may check out the web site of the Committee at www.smartgrowthlee.com Spring 2003



Photo by Maran Hilgendorf

The Charlotte Harbor National Estuary Program is fortunate to have more than 200 people volunteer on the program's Management Conference. This conference includes the Policy, Management, Technical Advisory (TAC) and Citizens Advisory Committees (CAC) as well as the Program Office. Each committee serves a specialized role in supporting the program goals and objectives. Please visit the Program web site for more information about the TAC and CAC.

After its last meeting several CAC members joined Kayton Nedza of Hardee County's Outdoor Classroom for a canoe trip on the Peace River. The photo shows CAC Member Paul Andrews' back.

Environmental Information Available at County Library

Vera Neumann-Wood, Sarasota County Library

Sarasota County Library's Environmental Collection provides access to information concerning all aspects of our environment with special emphasis on Florida issues. Civic Leader Ann Marbut is credited with starting the collection more than 25 years ago.

In 1998 the collection was moved from the Gulf Gate Library to the new Selby Public Library in downtown Sarasota (1331 First Street). In its new home, the collection has grown to more than 100 current journal titles, 1,200 videos and 10,000 books on topics such as ecology, endangered species, conservation, natural history and waste management.

Many items in the collection can be borrowed and requested by patrons at other Sarasota libraries and via Interlibrary Loan. Materials range from scholarly books and journals for researchers to basic information and videos for students and families.

The collection is located on the second floor of the Selby Public Library, and is open to the public during all library hours. Senior Special Collections Librarian Vera Neumann-Wood (941/861-1175, vneumann@sarasota.lib.fl.us) is available for assistance and to discuss new partnerships.

Come and learn more and explore this great community resource!

Lemon Bay: Ongoing Research (continued)

For example, it appears that residential stormwater runoff in the Lemon Bay watershed is not as "polluting" as it was expected to be, based on Phase I efforts. In much of the residential areas of Englewood, grassed swales, rather than concrete curbs and stormwater pipes, are the conveyance systems for conducting stormwater to Lemon Bay and its associated creek systems. These grassed swales allow for greater stormwater treatment from residential areas, as compared to a typical urban stormwater conveyance system. It seems that the typical grassy swales in many residential areas are acting as a sort of "best management program" for urban runoff. Perhaps because of this, stormwater pollutant loads do not appear to be as significant as was originally estimated. In fact, seagrass coverage exhibits no trend from 1988 to 2002. In addition, results from the very limited amount of water quality data that has been found suggest that water clarity might not have changed in any significant way over the past 20 years or so, at least at locations where such data are available.

Other interesting (and preliminary) findings include the source of stormwater loads into Lemon Bay. When the six creeks discharging into Lemon Bay are compared, it was found that more than half of the non-point source pollution

coming into the bay was from the combined contributions of Buck Creek and Alligator Creek. Buck Creek was the greatest source of nutrient loads into Lemon Bay, perhaps because it was found that Buck Creek is actually connected to the much larger watershed of Rotunda at its uppermost reach. In contrast, Alligator Creek appears to have a high nutrient load due most likely to the fact that this watershed is essentially "built out".

Circulation is an issue that cannot be ignored, in terms of water quality in the bay. For example, water clarity and seagrass coverage tends to be greatest in areas closer to Stump Pass, and lower in areas farther away. Although the pollutant loads coming into the central portion of Lemon Bay from the combined influence of Gottfried, Rock, Oyster and Buck Creeks is twice the amount coming from Alligator and Forked Creeks, the central portion of the bay has greater water clarity and deeper growing seagrass meadows than areas north of the Tom Adams Bridge.

Once Phase II results are completed, analyzed and further reviewed, a list of potential strategies to preserve and/or restore Lemon Bay will be presented to both Charlotte and Sarasota counties for them to consider. The end result, hopefully, will be a course of action that we can steer to maintain and possibly improve the health of this still beautiful portion of Southwest Florida.

Wonderful Places in the Greater Charlotte Harbor Watershed

Crowley Museum and Nature Center

Crowley Museum and Nature Center is located on 190 acres of native rangeland adjacent to the Myakka River. The Center is a wildlife sanctuary and education center where visitors can observe and learn about the fauna and flora of natural Florida. A pioneer history center is also located in this natural setting that allows visitors to see how people lived in early Florida.

Eight nature trails lead visitors from high and dry pineland, through the shady hammock and out to the edge of the expansive marshlands along the Myakka River.

A comfortable elevated walkway traverses Maple Branch Swamp allowing visitors to enjoy the sights and sounds of the swamp. An observation tower at the end of the boardwalk overlooks the marsh.

The Homesteader: The Crowley family acquired the land that is now the Nature Center during the 1880s. A one-room cabin typical of homesteaders' homes, complete with furnishings and utensils from the late 19th century, is maintained on the property. Visitors can walk the trail as pioneers once did on a portion of the pioneer road from the Pine Level settlement, then the County seat, leading to Braidentown, a coastal settlement, that is preserved within the Center.

Early in this century a blacksmith shop was located on Pine Level Trail near the Crowley Homestead. A new working blacksmith shop built on the old site displays many of the original tools used in shoeing horses, repairing wagon wheels and other metal-working tasks.

The Museum exhibits a variety of historic objects, including household furnishings, tools and items from the original Old Miakka general store and post office.

Also at the Center is the Tatum House, a two-story "Cracker" house built in 1889 by William H. Tatum as the home for his wife and 13 children. It is one of the oldest examples of rural architecture in Sarasota County today.

From November 1 to April 30 the Center is open Tuesday to Sunday from 10:00 to 4:00. From May 1 to October 1 the Center

is open Thursday to Sunday. Admission is \$5 and \$3 for children from 5 to 12-years-old. Picnic tables offer a pleasant spot for a relaxed lunch. The Center is open for school programs and group tours by appointment.

Crowley Museum and Nature Center is located on SR 780 14.5 miles east of I-75 at

exit 210 and 7 miles south from SR70 on Verna Rd.

Crowley Museum and Nature Center
16405 Myakka Road, Sarasota
941/322-1000

www.CrowleyMuseumNatureCtr.org

SOURCE: www.crowleymuseumnaturectr.org/

YOU CAN NOMINATE A LOCATION. Send (1) the name of the natural site in the greater Charlotte Harbor watershed others should visit, (2) your name and (3) an explanation of why you want to encourage others to visit that particular site to Maran Hilgendorf at the NEP office (see page 2 for contact information). Nominated sites will appear in a future issue of *Harbor Happenings* and on the program web site. Sites featured to date include:

- Paynes Creek State Historic Site
- J.N. "Ding" Darling National Wildlife Refuge
- Myakka River State Park
- IMC-Agrico Peace River Park
- Barrier Islands GEOPark: Gasparilla and Cayo Costa
- Fort Meade Outdoor Recreation Area
- Four Mile Cove Ecological Preserve in Cape Coral
- Charlotte Harbor Environmental Center – Cedar Point and Alligator Creek
- Highlands Hammock State Park
- St. Jude Nature Trail on Pine Island

Explore Estuaries Up close and Personal at a free

Charlotte Harbor NEP 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 and you'll quickly understand the importance of these waters. Charlotte Harbor National Estuary Program is pleased to sponsor a total of 36 wading trips through September 2003 through several local environmental organizations. Upcoming trips are listed below. To register, contact the organization that is offering the program of interest to you.

Lemon Bay in Englewood: Call CHEC Cedar Point Environmental Park at 941/475-0769.

- Wednesday, May 28
- Wednesday, June 25
- Wednesday, July 30
- Wednesday, August 27
- Wednesday, September 10

Estero Bay near Lover's Key: Call Estero Bay Aquatic Preserve at 941/463-3240.

- Thursday, May 22 at 9:30
- Monday, June 9 at 12:30
- Thursday, July 31 at 9:30
- Wednesday, August 20 at 12:30



Photo by Maran Hilgendorf

Caloosahatchee in Cape Coral: Call Calusa Nature Center at 239/275-3435.

- Saturday, May 17

Charlotte Harbor from Ponce de Leon Park in Punta Gorda: Call CHEC Alligator Creek Site at 941/575-5435.

- Tuesday, May 27
- Tuesday, June 24
- Saturday, July 5
- Tuesday, July 22
- Tuesday, August 26
- Tuesday, September 9

Cleaning Up Boca Grande Pass

Catherine Corbett, Charlotte Harbor NEP

On April 7 and 8, 2003 more than 60 participants removed thousands of pounds of debris that accumulated at the bottom of Boca Grande Pass. Over the two days between 25 and 35 certified divers collected monofilament, old fishing traps, fishing poles and one very old 400-pound anchor for a combined total of over 7,250 pounds

– an event record. Organized by Bob Wasno, the Lee County Sea Grant agent, the cleanup also included two fish fries and a raffle.

It should be noted that Old Hitler – the infamous giant hammerhead of the Pass – did not make it in time for the dives this year but has volunteered to help with next year's event.

2002 Cleanup

During the award-winning inaugural effort last year, divers recovered approximately 6,000 pounds of material ranging from steel cable and anchors to old tires and crab trap lines. That effort was recognized with the 2002 Keep Florida Beautiful Award for Community Enhancement.

The shape of the deep hole in Boca Grande Pass surrounded by 30-foot high limestone ledges acts much like a gold diggers pan, trapping all bottom debris flowing down from Charlotte Harbor and the Peace and Myakka rivers.



Aside from cluttering up the bottom of Boca Grande Pass, these obstacles snare fishing line at an alarming rate and if left unchecked would make it nearly impossible to land a tarpon in Boca Grande.

With an eye on protecting this natural resource, Capt. Lou Baggett and a handful of tarpon guides set out to create a nonprofit organization, the Boca Grande Pass Enhancement Fund, whose primary function is to clean up and maintain Boca Grande Pass.

REPRINTED in part from *Charlotte Sun*, April 4, 2003.



Photographs by Bob Wasno.

Florida Waters: A New Water Resource Manual

Florida Waters, a joint project of Florida's five water management districts, is a comprehensive, easy to read resource guide on Florida water. It is available in book format and on CD.

Written for lay people, *Florida Waters* is readable and interesting. It uses the graphics and illustrations of the of *The Florida Water Resource Atlas* and treats many aspects of water in Florida. For teachers, it has activities and projects tied to education requirements.

It includes six chapters, illustrative graphics, an extensive glossary and comprehensive index, combined with hands-on projects and activities correlated to Sunshine State Standards.

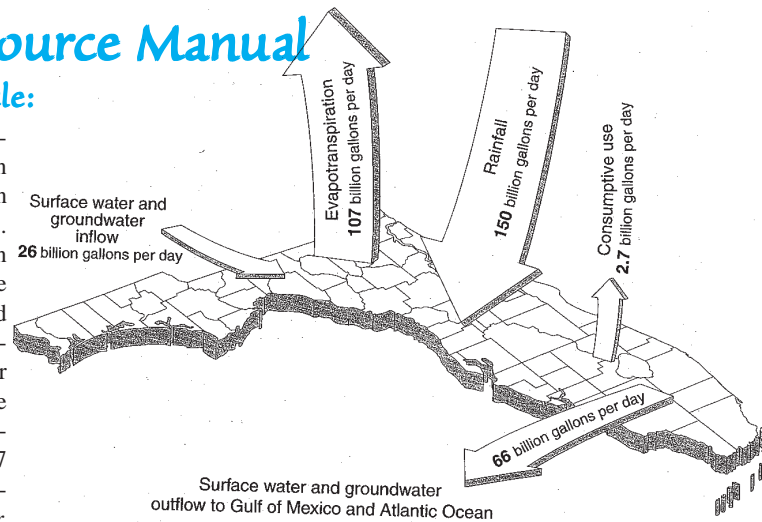
Chapter 1: The Human Framework examines water in social, legal, economic and political contexts.

Chapter 2: Water It's Magic explores the chemical and physical properties of water, the hydrologic cycle, climate, weather and the "magic" of water's cleansing, healing and renewing powers.

Chapter 3: Florida Water Resources examines groundwater and surface waters and the links between them. Watersheds, pol-

Florida's Water Cycle:

An average of 150 billion gallons of rain falls each day in Florida. Another 26 billion gallons flows into the state. Nearly 70 percent of the rain returns to the atmosphere through evaporation and plant transpiration. The remainder flows to rivers or streams or seeps into the ground and recharges aquifers. Each day in Florida, 2.7 billion gallons of water is consumed. From *Florida's Water*.



Source: Fernald and Purdum 1998

lution and the interdependence of water resources are addressed.

Chapter 4: Water and Life: Natural Systems focuses on how the amount, distribution, timing and quality of water affects the soils, plants and animals. And, how human activities affect biological and economic sustainability.

Chapter 5: Water Supply and Water Quality examines sources of water and efforts to create alternate water sources as well as trends in water use; and, water quality, for drinking, ecology and recreation.

Chapter 6: Forward to the Past concludes that Florida's natural systems have been radically changed and fragmented and that Floridians have responded with aggressive actions in land acquisition and management, resource protection and ecosystem restoration.

The publication is available as a PDF file (www.sfwmd.gov/stude/2_student.html) and as a printed document or on a CD-ROM from Allison Tripp (atripp@sfwmd.gov). If you have questions about the booklet, contact Sally McPherson (smcphers@sfwmd.gov).

Upper Myakka River Surface Water Exchange Projects

Steven A. Minnis, Southwest Florida Water Management District

As of March 2003, the first phase for both the Falkner Farms and Pacific Tomato Growers (PTG) surface water exchange projects are now operational and appear to be successfully working. These projects demonstrate that public/private partnerships can be effective in helping to resolve water resource issues such as the abnormal tree stress and mortality issue in Flatford Swamp.

According to a 1998 Southwest Florida Water Management District Study, excess water seepage from agricultural irrigation has resulted in abnormal tree stress and mortality in Flatford Swamp. Most of the damage is within the swamp, although effects are found to the north and south of the swamp's boundaries. District staff have estimated that there is between 8 to 12 million gallons per day of excess volume in the system during the driest times of the year.

In order to monitor tree health in Flatford Swamp the District established hydrobiological transects along four strategic locations in the swamp. The May sampling events from 2000 to 2002 indicate that the system appears to have stabilized, as there are no signs of further degradation or improvement.

Initial results appear to show that subsurface irrigation seepage can be safely captured and used to reduce the amount of excess water entering the swamp. Additionally, these projects illustrate that surplus water in the Flatford Swamp System can be withdrawn and used for irrigation. The implementation of these public/private partnerships is helping to restore the normal hydroperiods in the swamp and simultaneously conserve the ground water resources in the District.

At present, discussions regarding phase two of the projects are underway. The next phase with Falkner Farms and PTG is intended to capture and use even more of the excess water that is currently seeping into Flatford Swamp. Although discussions are preliminary at this time, the District remains highly optimistic about the possibility of having these future phases approved by the end of the year.

Flatford Swamp

- In addition to its great value as a wildlife habitat, Flatford Swamp acts as a runoff detention area, influencing the flows and water quality of the Upper Myakka River.
- Flatford Swamp is an area of mostly hardwood swamps and marshes in Manatee County just north of Myakka City.
- The swamp itself encompasses a broad, flat area approximately 4.5 square miles in size.
- The Flatford Swamp system is a confluence of at least seven named tributaries – the Ogelby Creek, Taylor Creek, Wingate Creek, Myakka River, Youngs Creek, Long Creek and Maple Creek.
- Approximately 85 square miles drain into the shallow basin swamp, part of the Myakka River drainage basin.
- The swamp's southern terminus and sole outfall point is located roughly two river miles north of the bridge at SR 70.
- The entire Myakka River watershed encompasses more than 550 square miles, extending from its headwaters north of Myakka City to Charlotte Harbor, the second largest open water estuary in the State of Florida.
- In 1992, the Southwest Florida Water Management District purchased nearly 2,400 acres, or approximately two-thirds of Flatford Swamp.



How the Water Exchange Projects Came to Be

P. Scott Laidlaw, P.G., SWFWMD Regulation Department

In 2000, the Southwest Florida Water Management District solicited ideas from the agricultural community for innovative ways to reduce the amount of water entering the swamp and restore normal hydroperiods in order to begin to reverse the mortality of trees located in Flatford Swamp.

John Falkner of Falkner Farms came forward to voluntarily join in a partnership with the District to implement a program designed to capture and reuse irrigation run-off on his farm, thereby reducing the volume of water entering the swamp and decreasing groundwater demands in the Southern Water Use Caution Area. The surface water captured and reused will offset an equivalent volume of irrigation groundwater that is currently being pumped from an area already deemed susceptible to salt-

water intrusion. The site is an approximately 9,230 acre farm located adjacent to Flatford Swamp in eastern Manatee County. Should the first phase of this project prove feasible, Mr. Falkner will consider the implementation of a second and possibly third phase that would include the capture and reuse of water to irrigate 2,523 additional acres of row crops. If all phases are successful, surface water will be used to irrigate more than 3,700 acres of farmland and reduce stress to the local groundwater resources.

The District also entered a partnership with Pacific Tomato Growers for a surface water exchange project to withdraw excess water from Flatford Swamp for use as irrigation water to offset ground-water withdrawals on their adjacent farm.

SOURCE: SWFWMD Resource Regulation 13(1) January 2001.

Exciting Projects Planned for Summer

This summer the Charlotte Harbor National Estuary Program will be producing several new items – and we'd like your help. When the Charlotte Harbor NEP was first created, members of the Management Conference quickly recognized that to protect our estuaries and watersheds, residents and visitors first needed to appreciate the beauty and value of the region would then want to learn more and do more to protect these valuable natural resources.

A guide of environmental places will be a publication of places a resident or visitor can go to learn more about the environment. It will include everything from parks to libraries to nature centers to ecotour businesses.

Children's book: Entries submitted to Charlotte County's River of Words poetry contest revealed that many of the young people in the region don't understand the natural system in which they live. To help them better understand concepts such as sheet flow, Charlotte Harbor NEP will be publishing a book about our natural environment. The program's goal is to create a keepsake that will be given to every third grader in the program study area.

Web site: The program maintains an ever expanding web site – and it is time for ma-

ior changes. Please visit the program web site (www.CharlotteHarborNEP.org) and let us know if you can easily find what you are looking for and if there is additional material you'd like added. We'll consider all of your suggestions as the web site undergoes its change.

Estuaries Live: Charlotte Harbor NEP was chosen to produce a live broadcast on September 25 or 26, 2003. Last year's two-day program is available on the Internet at estuarylive.org and VHS copies of the Charlotte Harbor hour-long program are available from Charlotte Harbor NEP. Viewers of all ages will enjoy the program but students in middle school grades will appreciate it most.

There is more! This is just a sampling of just some of the upcoming projects. Other projects include National Estuaries Day celebrations, developing a video for boaters about seagrasses, developing a series of two-minute programs on estuaries with WGPU-the local PBS affiliate, and much more!

Please help. Additional details about each project is available on the program web site.

www.CharlotteHarborNEP.org
239/995-1777 extension 240

Harbor Happenings

Charlotte Harbor National Estuary Program
4980 Bayline Drive, 4th Floor
North Fort Myers FL 33917-3909



– Calendar of NEP Meetings –

For a complete list of events, visit the Charlotte Harbor NEP web site at www.CharlotteHarborNEP.org.

Watch for more details in future issues of *Harbor Happenings*.

May 2003

- 2 Management Committee - Punta Gorda
- 26 Memorial Day – Office Closed
- 28 Policy Committee - Fort Myers

June 2003

- 4 Technical Advisory Committee
 - 4 TAC Habitat Conservation Subcommittee
 - 4 TACHydrologic Alterations Subcommittee
 - 4 TAC Water Quality Quantifiable Objectives Subcommittee
- All four TAC meetings will be held at South Florida Water Management District Office in Fort Myers.*
- 18 Citizens Advisory Committee

July 2003

- 4 Independence Day – Office Closed
- 16 Citizens Advisory Committee
- 23 Technical Advisory Committee

Dates to remember in 2003

- September 1:** Grant announcements will be released. See page 3 for details
- September 25-26:** Estuaries Live!
- September 27:** National Estuaries Day

PRSR-STD
U.S. POSTAGE PAID
PERMIT NO. 273
Manasota, FL