



# Harbor Happenings

\* Peace River & Watershed \* Myakka River & Watershed \* Coastal Venice, Lemon Bay, Gasparilla Sound & Cape Haze \*  
\* Charlotte Harbor Proper \* Pine Island Sound & Matlacha Pass \* Estero Bay & Watershed \* Tidal Caloosahatchee River & Watershed \*  
The newsletter of the Charlotte Harbor National Estuary Program Winter 2000-2001: Volume 4, Number 4

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## Charlotte Harbor Study

Research Initiative, in honor of Mr. Mote, to Determine Ecological Health

by Dr. Ernest D. Estevez, Coastal Resources Program Manager, Mote Marine Laboratory

**M**ote Marine Laboratory is now undertaking a coordinated, multi-disciplinary study to determine the ecological health of Charlotte Harbor. The study builds on Mote's history of pioneering research in the Harbor, present expertise in specific research areas, and access to cutting-edge technology. Five of Mote's research centers and Mote Aquaculture will be actively involved in this comprehensive program. The research centers are the Center for Coastal Ecology, Center for Ecotoxicology, Center for Fisheries Enhancement, Center for Marine Mammal and Sea Turtle Research, and Center for Shark Research.

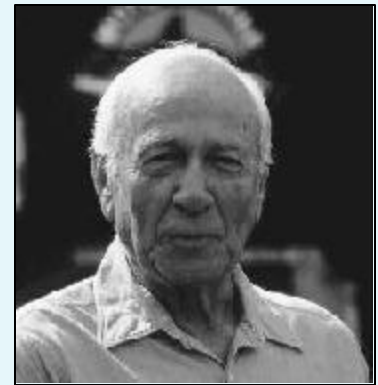
The proposed research is intended to honor the memory of William R. Mote, and his interest in Charlotte Harbor, through significant advances in basic and applied science, and the sustainable management of Charlotte Harbor for decades to come.

Charlotte Harbor on Florida's southwest coast is one of the state's last large and relatively healthy estuaries. It is vulnerable to projected future population growth and land development, so there is the pressing need for Harbor-wide health assessments and indicators that can communicate to the public whether the Harbor is declining or improving.

Mote Marine Laboratory believes the most effective response to this need in the long run will be to develop the ability to *predict* how the estuary will respond to human-caused stress through studies of how the estuary presently responds to natural stress. Mote wants to develop the ability to forecast the estuary's condition within known limits of confidence, similar to hurricane forecast models employed by the National Weather Service. Hurricane models were built after years of descriptive science and progress in atmospheric theory; none is perfect but their value to society is inestimable.

An undertaking of this scope represents a scientific milestone for Mote Marine Laboratory because it will, for the first time, make possible interactive, cooperative research among talented new and experienced scientists the

*continued on page 10*



**William Russell Mote**

October 29, 1906  July 18, 2000

*There exists in our society men and women who quietly spend their lives developing successful enterprises and then using both their expertise and wealth for the benefit of the world around them. William Russell Mote is such a man.*

*Mote Marine Laboratory is an extension of Bill Mote's lifelong goal, shared by his late wife Lenore, to give scientists the means to conduct their research to unlock the mysteries of the sea.*

*By his support of Mote Marine Laboratory, he has shared his love of the sea and quest for knowledge.*

— Dr. Kumar Mahadevan  
Executive Director  
Mote Marine Laboratory

## Program Update

**G**ood news for the Charlotte Harbor National Estuary Program! On November 7, President Bill Clinton signed the Estuaries and Clean Waters Act of 2000, legislation that reauthorizes the National Estuary Program for the next four years. The signing of this law is the result of a strong bipartisan effort in both the House and Senate and helps reinforce what we have all known for some time — the non-regulatory partnership-based approach taken by the various NEP's throughout the country works. And it works well.

“We can thank the vision and hard work of key Senators and Representatives as well as the efforts of a coalition of federal, state and local governments and non-profits for this bill that provides a strong federal commitment and resources to restore habitat in estuaries. The bill forms a true partnership between the federal government and local interests dedicated to restoring our vital estuarine resources,” said Richard Ribb, legislative coordinator for the Association of National Estuary Programs. “In addition to providing significant and much-needed funding for estuary habitat restoration, the bill supports an important community-based program that has used partnerships to effectively restore wetlands, seagrasses and fish runs over the last decade.”

The reauthorization is truly good news for us in the Charlotte Harbor watershed because it assures us that federal funds will be available to help match our local funds for implementing the Comprehensive Conservation and Management Plan that many of you worked so hard on over the past five years. And, it allows us to focus our efforts on our high priority areas in order to meet our goals and address the problems of hydrologic alterations, water quality degradation, and fish and wildlife habitat loss.

And yet there is more good news! As described in our cover article in this issue, the Mote Marine Laboratory is about to embark on a major long-term scientific study of Charlotte Harbor that will help us more clearly understand the relationships between our land and water-based activities and the ecological health of our estuary. We at the Program Office look for your support and assistance in this effort to help us develop a set of land-based indicators that can also complement the work to be undertaken by Mote. We'll be discussing these potential indicators at a joint TAC-CAC workshop on January 10, but if you have any ideas, please let us know.



**R**quests by governors, legislators, and citizens have increased the National Estuary Program to its current 28 estuaries. Now 42 percent of the continental U.S. shoreline is included in the program and 15 percent of all Americans live within one of the NEP-designated watersheds.

Albemarle-Pamlico Sounds (NC)  
Barataria-Terrebonne (LA)  
Barnegat Bay (NJ)  
Buzzards Bay (MA)  
Casco Bay (ME)  
Charlotte Harbor (FL)  
Corpus Christi Bay (TX)  
Delaware Estuary (DE, PA, NJ)  
Delaware Inland Bays (DE)  
Galveston Bay (TX)  
Indian River Lagoon (FL)  
Long Island Sound (CT, NY)  
Lower Columbia River (OR, WA)  
Maryland Coastal Bays (MD)  
Massachusetts Bays (MA)  
Mobile Bay (AL)  
Morro Bay (CA)  
Narragansett Bay (RI)  
New Hampshire Estuaries (NH)  
New York-New Jersey Harbor (NY, NJ)  
Peconic Bay (NY)  
Puget Sound (WA)  
San Francisco Estuary (CA)  
San Juan Bay (Puerto Rico)  
Santa Monica Bay (CA)  
Sarasota Bay (FL)  
Tampa Bay (FL)  
Tillamook Bay (OR)

shape what we hope will be a great meeting. Keep reading this newsletter for updates on this important upcoming event.

Robert (Rudy) Rudolph, Director

## Charlotte Harbor National Estuary Program

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The Charlotte Harbor National Estuary Program is a partnership of citizens, elected officials, resource managers, and commercial and recreational resource users working to improve the water quality and ecological integrity of the greater Charlotte Harbor watershed. We use a cooperative decision-making process to address diverse resource management concerns in the 4,400 square mile study area.

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

## Harbor Happenings

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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 **February 15**, May 15, August 15, and November 15.

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## NEP Supports Polk County Students:

### Lake Hancock Monitoring and Education

Students from the George Jenkins High School in Lakeland became researchers, analysts, and teachers during the NEP project *Lake Hancock Monitoring and Education*.

During the 1999-2000 school year, the high school students monitored water quality in Lake Hancock, a 4,500-acre lake known for its poor water quality. They sampled water quality for dissolved oxygen, biochemical oxygen demand, pH, temperature, total nitrates, phosphates, carbon, and turbidity and they sampled soil for nitrates and phosphates. They also counted invertebrates.

During two canoe trips on the Peace River the students collected samples to compare their findings of the lake to the river. (Lake Hancock discharges to the Peace River, a primary drinking water resource in southwest Florida.) The students developed a water quality index from their data and then used their new knowledge to teach students at Valleyview, Sikes, and Highlands City Elementary Schools about



"Captain Planet" and students are determining the pH of the water sample. Photo by Ruth A. Toseland.

pollution and how to better care for Lake Hancock and the Peace River.

"This project will be a yearly tradition because it was so successful in providing the students hands-on experiences and giving them an opportunity to teach younger students," said Mrs. Toseland, the science teacher who led the project. The \$3,000 project was initiated in April 1999 and concluded in September 2000.

*"As a science teacher, I feel it is important to approach every lesson so the students are engaged in learning. It is equally important to ensure that my students understand why they learn about science and how it fits into their lives," Mrs. Toseland said.*

*"The key to grasping or wanting to learn is emotion. I was able to see many emotions in my students from joy while learning to canoe, disgust while seeing the trash that is dumped and the gators that had been killed for their tails and left to die, excitement as they learned how to relate the cause to the effect, and pride as they taught other young people."*

## NEP Supports Restoration:

### Oak Hammock Restoration at Edison Community College

Where there once was an oak hammock then a construction site, there is again an oak hammock. Because of the hard work of the Charlotte Harbor Chapter of the Florida Native Plant Society (FNPS), the hammock was restored with greater understory plant diversity.

The project began in August 1998. Over the course of the next 22 months, 14 planting days and 15 weeding/mulching days were completed with nearly 300 volunteer hours! With a \$3,000 grant from Charlotte Harbor NEP, FNPS was able to purchase 609 1- to 3-inch gallon plants and 115 4-inch plants – 50 percent more plants than had been originally estimated — as well as an interpretive sign.

Native plants added to the site include dahoon holly, Walter's viburnum, sabal palm, American beautyberry, crinum lily, slash pine, Florida privet, coral bean, coontie, firebush, shiny blueberry, tarflower, myrsine, rusty lyonia, green lyonia, wild coffee, Boston fern, swamp fern, saw pal-

metto, golden dewdrop, pawpaw, garberia, mistflower, sweet bay, and swamp bay.

Overcoming changes in hydrology due to a water management lake, invasive exotics, and construction road, the FNPS — with hard work — was able to increase historic citrus tree vigor, create a diversity of plant communities, restore a construction road to an oak hammock, restore a palm hammock understory in a stormwater flowway, establish a native garden path, and increase wildlife activity. Native plants such as morning glory are now emerging.

"The restoration efforts have led to a more biologically functional and attractive oak hammock. Squirrels have moved into the hammock and quail and marsh rabbits have been spotted using the area," explained Lisa Beever, who coordinated the project. "The site

is now a teaching tool, available to classes at Edison Community College at the Charlotte County campus."



Maran Hilgendorf



# Power Plant Conversion Will Produce Many Benefits

by Misty Nabers, Executive Director, GICIA

As many southwest Florida residents know, Florida Power and Light is converting its Fort Myers power plant from oil to natural gas. With an expected completion date of May 2002 the conversion promises to produce power for less money and to reduce the amount of pollution released into the environment. In fact, the upgraded cutting-edge facility will reduce the sulfuric oxide emissions into the atmosphere by 99 percent, nitrogen oxide by 74 percent, particulate matter by 48 percent, and carbon monoxide by 16 percent.

An additional benefit generated from the conversion will be the removal of the FP&L tank farm on Gasparilla Island. For 40 years FP&L has used the four three-story-high tanks located at the southernmost tip of the island to store oil before barging it up the Caloosahatchee River to the Fort Myers plant. Although FP&L has safely operated the storage facility without incident for four decades, many will welcome the removal of the tanks.

Grover Whidden, FP&L regional external affairs manager, spoke to the Boca Grande community nearly two years ago. He said that once the tanks were dismantled, FP&L would give the community the opportunity to purchase the 9.9 acres. Commissioner Manning agreed that it would be an asset to all of Lee County to bring this property into public ownership, further protecting this fragile parcel from development.

Since then the Gasparilla Island Conservation and Improvement Association (GICIA) has been working closely with Mr. Whidden and Commissioner Manning in hopes of receiving county assistance in the purchase. The property was nominated to Lee County's Conservation 2020 Program last year. Taxpayers of Lee County fund this program, which is charged to purchase and protect environmentally sensitive land. Unfortunately, the nomination never reached the evaluation phase of the program. The decision of the 2020 Committee to deny the property nomination from further review was due in part because the present condition of the land does not meet the criteria set forth by 2020 as environmentally sensitive.

FP&L and the GICIA agree that this parcel should be returned to its natural condition and left open to be enjoyed by everyone. GICIA's goal is to acquire and restore the property to its natural condition and manage it under the GICIA Land Conservancy Program. However, due to the significant value of this 9.9-acre parcel, funding sources are still being sought. FP&L anticipates the tanks will be dismantled in October of 2001 and the property ready for sale in the first quarter of 2002. Anyone who is interested in contributing to this project may call the GICIA office at 941/964-2667.



Misty Nabers

The FP&L tank farm on Gasparilla Island includes the four three-story-high tanks in the foreground of this photograph. The 9.9 acres of property will be dismantled by FP&L and the community will have the opportunity to purchase the property.

The first purpose of the Gasparilla Island Conservation and Improvement Association (GICIA) is "to promote land, water and wildlife conservation uses and purposes in the Gasparilla Island area ... including the preservation of the ecology of the area, the protection of fish and shellfish breeding areas, the preservation of wildlife and the promotion of anti-pollution measures ..."

In 1996, concerned about the accelerating pace of development on the island, and the increasing pressure on Boca Grande's resources resulting from population growth off-island, GICIA established a formal Land Conservancy program to acquire, restore, and preserve the island's open spaces and wildlife habitats.

The Preserve keeps approximately 90 acres of environmentally sensitive land in its natural state forever protecting some of the last wildlife habitat and open space on the island, including two active Southern Bald Eagle territories and nesting sites. It also increases the corridor of green space along Gasparilla Road between the north end and the village and will protect all of the preserved land from development. Finally, establishment of the Gasparilla Island Sound Preserve creates a substantial environmental buffer for Gasparilla Sound and Charlotte Harbor and, together with adjacent state and county lands, will ensure that 123 acres of waterfront land will never be developed.



The Florida Maritime Heritage Trail (<http://dhr.dos.state.fl.us/maritime/index.html> on the Internet) is a collection of interesting and fun locations that are open to the public. The state's 30 distinctive lighthouses, including the Boca Grande lighthouse (above) and two others in the Charlotte Harbor watershed, can be found on this trail.

# Water for Florida's Future: Water Solutions Drafted

In 1995, an estimated fourteen million Floridians used more fresh water than any other state in the East: **7.2 billion gallons a day**. This enormous amount of water is necessary to meet the drinking water needs of the fourth most populous state, the water needs of more than forty million visitors a year, and the irrigation needs of one of the nation's largest agricultural industries.

By 2020, Florida's population is expected to increase by 46 percent to 20.4 million people. Fresh water demand is projected to increase by 26 percent for a demand of 9 billion gallons per day. Agriculture and public water supply will continue to be the largest users. The public water supply sector is projected to increase at an average annual rate of 1.666 percent from about 2 billion gallons per day to about 3 billion gallons per day. The largest growth in demand will occur in the South Florida WMD, which is forecast to have a need for 902 mgd/year—almost half of the total projected statewide increase. Southwest Florida WMD is forecast to have a need for 459 mgd/year. (The Southwest Florida WMD encompasses most of the Charlotte Harbor watershed except for part of Charlotte and all of Lee counties, which are within the South Florida WMD.)

Making sure there is enough water is key to Florida's future. The **Florida Water Resources Act** (Chapter 373, F.S.) provides an overall framework for water management. The Florida Water Plan, District Water Management Plans, Districtwide Water Supply Assessments, and Regional Water Supply Plans help provide integrated water resource management solutions for each region of the state.

The Florida Water Resources Act directs the five water management districts to initiate regional water supply planning in all areas of the state where reasonably anticipated sources of water are deemed inadequate to meet year 2020 projected demands during a 1-in-10 year drought. Further, the districts are assigned the primary responsibility for conducting water resource development.

Planning is needed to ensure that the state has enough water to meet the reasonable and beneficial needs of the future while also

sustaining natural systems. Already established are several water resource caution areas and water supply planning regions. Water supply caution areas are critical or are anticipated to become critical within 20 years. Special emphasis is placed on water reuse and conservation in each water resource caution area. The **Southern Water**

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## By the year 2020,

over twenty million Floridians are expected to need **about 9.0 billion gallons a day**.

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**Use Caution Area** was declared a "water use caution area" in 1992. It encompasses 5,100 square miles covering much of the Charlotte Harbor watershed, including Manatee, Sarasota, Hardee, Desoto counties and portions of Hillsborough, Charlotte, Polk, and Highlands counties.

The Act also requires that districtwide water supply assessments be completed. **Regional Water Supply Plans (RWSP)** are assessments of projected water demands and potential sources of water to meet these demands for the period from 1995 to 2020. The plans are to provide a framework for future water management decisions in areas where the hydrologic systems are stressed due to groundwater withdrawals.

## South Florida Water Management District

There are four planning regions within this district. Portions of the Charlotte Harbor watershed (Lee and part of Charlotte county) are encompassed in the Lower West Coast planning region. The 1994 plan concluded that existing sources would not be adequate to meet demands while sustaining natural systems. By 2020, rapid growth in population and irrigated acreage has been projected to result in a 36 percent (282 mgd) increase in total 1995 demand. Meeting these demands while preventing salt water intrusion and impacts to the region's extensive wetland systems will be a significant challenge. Some of the water source options that the broad-based advisory committee suggested for consideration include brackish water aquifers, aquifer storage and recovery, surface water, regional reservoirs,

and reuse of reclaimed water. (This plan is currently available in draft form. For a copy, call 800/432-2045.)

## Southwest Florida Water Management District

There are also four water supply planning regions in this district. The East-Central and Southern planning regions comprise the majority of the previously established SWUCA. The SWUCA was established to address saltwater intrusion in the Upper Floridian Aquifer along the coast and also the problem of lowered lake levels along the Lake Wales Ridge. Groundwater withdrawals throughout the area are contributing to these resource concerns. Management strategies to address SWUCA concerns will be incorporated into the regional water supply plan. Water supply sources being evaluated by district staff and/or consultants include surface and storm water, reclaimed water, brackish water desalination, seawater desalination, conservation, and groundwater in limited areas. (This plan is currently available in draft form. For a copy, call 800/432-1476.)

ADOPTED from *Water for Florida's Future*, Florida Department of Environmental Protection, December 1999.

## How much water is being used?

- In 1995, total fresh water use in Florida was about 7.2 billion gallons a day.
- 60% of Florida's fresh water comes from aquifers, more than any other state east of the Mississippi
- Agriculture used approximately 45% of all fresh water.
- Approximately 29% of all fresh water was used for public supply.
- In 1995, Palm Beach County used the largest amount of fresh water.
- Total fresh water withdrawals in South Florida WMD are greater than the combined total of the other four districts.

The average daily water use in southwest Florida is *150 gallons per person per day*—with half used to water our lawns! On average, Americans use approximately 75 to 80 gallons of water per person per day.

# Finding More Water to Drink: The Peace River Option

Population growth and overpumping of our groundwater resources have caused sporadic water shortages in our area. When too much fresh water is pulled from the aquifer, seawater replaces it, and this saltwater intrusion has damaged many wells along the coast. Once saltwater has contaminated fresh water, it can create long-term problems. Unless we change the way we manage water, this saltwater intrusion will continue to migrate inland.

Because the groundwater supply in our area is so critical, our area has been included in the Southern Water Use Caution Area (SWUCA) as declared by the Southwest Florida Water Management District in 1992. The goal of SWUCA is to stop regional deterioration of groundwater supplies and the decline of water levels, and at the same time, look to conservation and alternative supply sources to provide the water we need for our future.

The Peace River/Manasota Regional Water Supply Authority (Authority), using water from the Peace River, currently provide drinking water to consumers

in Charlotte, DeSoto, Lee and Sarasota counties, including the City of North Port.

The Peace River Option, a plan designed by the Authority, will expand the capacity of the current facility from 12 million to 18 million gallons per day, increasing the availability of drinking water to these counties. The project is due to be completed by January 2002.

Maintaining the ecological integrity of the lower Peace River and Charlotte Harbor is an essential requirement for any plan for additional withdrawals from the Peace River. With this in mind, the Authority has taken steps to protect the vitally important ecosystem of Charlotte Harbor. Since 1976, an extensive environmental research and monitoring program has been conducted on the lower Peace River and Charlotte Harbor. Based on this research, and on recommen-

Early inhabitants of southwest Florida depended on water to support and sustain their daily existence. They made their homes close to the spring-fed rivers and streams, and water was plentiful. One such river, called the "River of Peace" by the Spanish explorers, was an essential source of food and transportation to the Indian tribes that lived along its banks.

Today water is still a vital resource for our area's economy and way of life, and while there appears to be an abundance of water in southwest Florida, appearances are deceiving. We are actually running short of drinking water. Even though the area receives an average of **53 inches of rainfall per year, only a few inches actually make it to the Floridian Aquifer, which acts as a large underground storage tank.** The excess rainfall either evaporates or flows into the Gulf of Mexico.

dations from many expert ecologists, the permitted withdrawals from the Peace River will be limited to no more than 10 percent of daily flow, as measured upstream in Arcadia. During periods of low flow, no withdrawal is allowed. These strict limits will maintain the natural flow of the river on which fish, plants, and other marine life depend. The Authority budgeted \$417,000 in Fiscal Year 2001 to an annual carefully planned, comprehensive monitoring program that includes testing of water quality and vegetation as well as fishery and benthic studies.

An integral part of the Peace River Option is aquifer storage and recovery, an innovative technology that literally creates an underground reservoir. When river flows are high, additional water can be taken from the river, treated and stored for future use in our natural, underground aquifers. During dry periods, when withdrawals from the Peace River are prohibited, drinking water can be recovered from underground storage. The Peace River Option will expand the current facility by constructing a number of new aquifer storage and recovery wells and a buried pipeline that will connect the Peace River Facility in DeSoto County to the T. Mabry Carlton Water Treatment Plant in Sarasota County. This will link the major

No more than 10 percent of daily flow, as measured upstream in Arcadia, can be withdrawn from the Peace River. During periods of low flow, no withdrawal is allowed.

water facilities in the Authority's region and allow for integrated water resource management and transfer of water in either direction between the counties in case of emergency, drought or natural disasters such as hurricanes.

The Peace River Option will:

- Meet public drinking water demands with surface water as an alternative to increased groundwater withdrawals.
- Provide integrated, regional management of public water supply sources within the Authority's area.
- Manage surface water resources in an environmentally responsible manner.
- Provide emergency transfer of water between utilities within the Authority's region in case of natural disasters or system failures.
- Allow incremental expansions to maximize use of existing facilities, matching demand many years into the future.
- Monitor the lower river and Charlotte Harbor to protect the estuary.

**SOURCE:** Peace River Option brochure published by the Peace River/Manasota Regional Water Supply Authority.

*"This project was imperative and could not be done without everyone participating. We stuck with it and now have storage capacity to safely weather the cyclical droughts. If the Peace River Option had started earlier then we would have had the storage capacity we need. Now we will be very well prepared for the future."*

– Commissioner Pat Glass, Manatee County. Ms. Glass serves on the NEP Management Conference and is incoming chair of the Peace River/Manasota Regional Water Supply Authority.

# Understanding Florida's Surface Water Quality Monitoring Programs

by Catherine Corbett, Charlotte Harbor NEP

Florida has more than 50,000 miles of rivers and streams, 7,800 lakes, and 4,000 square miles of estuaries, including four of the nation's 28 estuaries of national significance, three estuarine research reserves, and numerous marine protected areas. Embodied in the vast amounts of the State's surface waters are highly diverse ecosystems with often disparate resource users, such as oysters, tarpon, wood storks, seagrasses and, of course, humans.

In order to manage this vast array of systems, Florida follows the provisions of the **Clean Water Act** that require each state to classify its surface waters according to their designated uses. For

example, located within the Charlotte Harbor NEP study area are waters listed as Class I-Potable Water Supplies, such as Shell and Horse creeks; Class II-Shellfish Propagation or Harvesting, in areas where shellfish beds are likely to occur, such as the tidal portion of the Peace River; and Class III-Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife, including most of the Peace River. An additional complement to these classifications is the designation of Outstanding Florida Waters, such as those located within the Charlotte Harbor Aquatic and State Buffer Preserve and the Myakka River State Park.

The Florida Department of Environmental Protection (FDEP) has established water quality criteria for each classification that sets standards for the acceptable amounts of contaminants, such as nutrients, pesticides, heavy metals, and coliform bacteria. If a water body is found to have exceeded the maximum allowable limit for any one of the many parameters listed for each classification in an allocated number of monitoring samples, it is considered "impaired" and should eventually find its way to the **impaired waters list, also known as the 303(d) list**. (The 1998 list is available on the Internet at [www.dep.state.fl.us/water/division/tmdl/303d.htm](http://www.dep.state.fl.us/water/division/tmdl/303d.htm).)

To safeguard their natural resources and

address public health issues in their respective regions, many local governments, organizations and the water management

districts have developed their own ambient water quality monitoring programs. While most of these programs collect invaluable information, they can be geographically and

temporally uncoordinated, and their monitoring results may not be reported or utilized by the State. In 1996 FDEP formed the **Integrated Water Resource Monitoring (IWRM) Committee**

to develop strategies

and techniques for implementing an integrated monitoring plan that would combine surface water, groundwater, and biological monitoring. The U.S. Environmental Protection Agency (EPA), FDEP, water management districts, and local governments were all asked to participate. The program subsequently established a three-tiered assessment approach.

**Tier 1 Status Network** monitoring program uses a stratified, random sampling design to characterize the overall health of Florida's water resources and observe possible trends. The State has been divided into 20 geographic reporting units, or strata, with four reporting units roughly within each water management district boundary. Every year each reporting unit is monitored but then five are intensely monitored, one within each

district. After four years all 20 units will have been completed. It is currently under discussion within F D E P whether a fifth year will be

The State's surface waters  
– rivers, streams, lakes, and estuaries –  
are highly diverse ecosystems with often disparate resource users.

spent repeating one of the previous year's monitoring to determine the program accuracy or whether the four-year cycle will begin again.

During each cycle, the five intensely monitored reporting units sample six resource categories. The categories are:

- confined aquifers,
- unconfined aquifers,
- high-order streams (Horton order greater than 4),
- low-order streams,
- small lakes (1-10 hectares),
- and large lakes.

Thirty randomly selected sampling sites within each of these resource categories will be sampled each year, making a total of 180 sites for each reporting unit. Thus, 30 sampling sites will be located in small order streams, another 30 in large order streams and another 30 in large lakes until all six resource categories are sampled in that reporting unit. It is possible to have all 30 sites for a resource category located, for example, in one large lake if that is the only relevant resource for that category in the reporting unit or if all sample sites fall within that location during the randomization process. Currently, the status network samples chemical and physical water quality parameters, such as pH, dissolved oxygen, water clar-

*continued on page 8*

TIER ASSESSMENT LEVEL	MONITORING OBJECTIVES <sup>2</sup>
Tier 1. Status Monitoring	Statewide Assessments 305(b) reporting Performance-based budgeting Regional and statewide issues
Tier 2. Basin Assessment	Basin assessments Management plans Total Maximum Daily Loads (TMDLs) Regional issues Site-specific issues
Tier 3. Regulatory	Permits Segment-specific TMDLs

# The United State's Water Budget

The U.S. receives enough annual precipitation to cover the entire country to a depth of 30 inches. This 30 inches is known as the U.S. water budget. The eastern half of the country receives more rainfall than the western half. Most of this precipitation returns to the water cycle through evapotranspiration. Of the 30 inches of rainfall, 21 inches returns to the atmosphere in this manner. Water loss by plants, the transpiration portion of evapotranspiration, is most significant. One tree transpires approximately 50 gallons of water a day. Approximately 8.9 inches of annual precipitation flows over the land in rivers and returns to the ocean. Only 0.1 of an inch of precipitation infiltrates into the ground water zone by gravity percolation. The actual amount of water that

enters the ground water zone for any specific area depends upon the annual rainfall in that area.

In the United States, 450 billion gallons of water are withdrawn per day from ground and surface waters for a variety of uses. Of that 450 billion gallons, *only 100 billion gallons are actually consumed*. The remaining 350 billion gallons are withdrawn for nonconsumptive industrial and agricultural uses.

In the past 30 years, the U.S. population has grown 52 percent while the total water use has tripled.

**SOURCE:** [www.epa.gov/grtlakes/seahome/groundwater/src/supply.htm#supply](http://www.epa.gov/grtlakes/seahome/groundwater/src/supply.htm#supply)

## Surface Water Quality Monitoring Programs (continued)

ity, organic carbon, and ortho-phosphate. FDEP expects to add biological parameters, such as habitat assessments, at a later date. The recently revised **Trend Network** can also be considered part of Tier 1 monitoring. With the recent inception of the IWRM program and resource reallocations, the network has decreased from approximately 430 to 80 fixed surface water quality sampling stations monitored on a monthly basis and 50 groundwater sites. The revamped network is designed:

- to correlate Tiers 1, 2, and 3 monitoring results with seasonal climatic changes,
- to estimate general basin-wide loadings for the sampled parameters, and
- to make best estimates of the temporal variance of the sampled parameters in the basin.

The results generated from these Tier 1 sampling programs are used to generate the **305(b) Water Quality Assessment Report**, a requirement of the Clean Water Act. In this report, water quality is evaluated using the results from the programs listed above as well as biological data, other chemistry data from the federal water quality database (STORET), mercury fish consumption advisories, and information solicited through public workshops. The 305(b) report is the primary method of informing the public and Congress about the water quality conditions in the State of Florida. Information from this list and the Impaired Waters Rule is then

used to help generate the 303(d) or impaired waters list. (This 305(b) report, submitted in 1996, is available on the Internet at [www.dep.state.fl.us/water/division/monitoring/pubs.htm](http://www.dep.state.fl.us/water/division/monitoring/pubs.htm).)

Florida is presently using the 303(d) list that was approved by EPA in November 1998 from data generated for the 1996 305(b) list. FDEP is currently working on assembling available biological and water quality data for a 2000 305(b) list. The new data are not expected to change the 303(d) list until 2002. Ultimately FDEP, under provisions of the Clean Water Act, will need to establish **Total Maximum Daily Loads (TMDLs)** for those waters on the 303(d) list for each parameter that does not meet the standards of the State classification system. TMDLs are quantitative analyses of water bodies where one or more water quality standards are not being met and are aimed at identifying management strategies necessary to attain those water quality standards.

The **Tier 2 monitoring programs** consist of strategically placed fixed sampling stations with the goal of further characterizing water body segments on the 303(d) list. This tier of ongoing water quality monitoring provides:

- in-depth information of water quality conditions for individual water body segments,
- identifies specific water resource problems and the extent and severity of these problems, and

## National Drought Summary

The Drought Monitor, initiated in August of 1999, provides a weekly overview of where in the United States drought is emerging, lingering, subsiding or forecast.

As of December 5, 2000, in Florida most of the state received less than 75 percent of normal November rainfall, with some southern locations recording under 25 percent as drought worsened across much of the state. Nearly 60 percent of the state's 42 reporting streamflow levels were below the 10th percentile, including 26 percent at record low flows.

The Monitor is produced jointly by the National Weather Service's Climate Prediction Center, the U.S. Department of Agriculture, and the National Drought Mitigation Center at the University of Nebraska-Lincoln.

**SOURCE:** <http://enso.unl.edu/monitor/monitor.html>

- evaluates the effectiveness of management activities.

This tier of monitoring will be used in conjunction with a land use model from EPA to extrapolate pollutant loading rates for the various land uses on an impaired water body segment and the assimilative capacity for that segment in the process of TMDL development and allocation. To help fulfill these goals, FDEP hopes to play a role in coordinating the regional water quality monitoring efforts of local governments, water management districts, and organizations.

Finally, **Tier 3 monitoring programs** function mainly as ongoing compliance monitoring programs and will determine if permitted facilities are in compliance with their permits. This monitoring tier provides in-depth information on individual water body segments and yields the basis for evaluating the effectiveness of the management choices relating to facilities.

For more information on water quality monitoring programs, contact FDEP Watershed Monitoring and Data Management Section at 2600 Blair Stone Road, MS 3525, Tallahassee, FL 32399-2400. Their phone number is 850/921-9422.

<sup>1</sup> Florida Department of Environmental Protection: [www.dep.state.fl.us/water/watershed/surface/surface.htm](http://www.dep.state.fl.us/water/watershed/surface/surface.htm) as of November 28, 2000.

<sup>2</sup> *Florida's Integrated Water Resource Monitoring Network*, St. Johns River Water Management District, March 2000.

# Wonderful Places in the Greater Charlotte Harbor Watershed

**G**reen mangrove wetlands and blue estuarine waters of the J. N. "Ding" Darling National Wildlife Refuge border Pine Island Sound on Sanibel Island. Visitors traversing the dike-drive find wildlife at every turn, such as the sparkling white, blue and bright pink of wading birds, the scream of osprey and hawk, the splash of jumping mullet, the potential threat of alligator, the bandit raccoon, swooping warblers and busy shorebirds are among the attractions.

– Molly Krival, "Ding" Darling Wildlife Society. Ms. Krival also participates in the NEP Management Conference.

## YOU CAN NOMINATE A LOCATION.

J.N. Ding Darling National Wildlife Refuge is the second location to be nominated as a natural site in the greater Charlotte Harbor watershed worthy of visiting.

Send the name of the location, your name and an explanation of why you want to share that particular site with others to Maran Hilgendorf at the NEP office (see page 2 for contact information). Nominated sites will appear in a futures issue of *Harbor Happenings* and on the program's web site ([www.charlotteharbornep.com](http://www.charlotteharbornep.com)).

## J.N. Ding Darling National Wildlife Refuge

**T**he J.N. "Ding" Darling National Wildlife Refuge includes more than 6,300 acres of wetlands, islands and mangrove forests on Sanibel Island and nearby islands. It is one of more than 500 refuges created by the U.S. Fish and Wildlife Service, U.S. Department of Interior to conserve and protect native birds, animals, and native vegetation while providing specified public access.

"Ding" Darling NWR got its name from J.N. Darling, a political cartoonist who signed his work with an abbreviated "D'ing." He was an early conservationist and was the driving force to preserve and protect these fragile barrier islands and their unique wildlife. In 1934 he designed the first Duck Stamp and then was appointed the first director of the Bureau of Biological Survey, the predecessor of the U.S. Fish and Wildlife Service. Darling led the drive that culminated in the creation on December 1, 1945 of the Sanibel National Wildlife Refuge. On February 4, 1978 the refuge was officially dedicated as the J.N. "Ding" Darling National Wildlife Refuge in his memory.

This is a refuge for native and migratory birds and resident amphibians, reptiles, and mammals. It is a sanctuary where a visitor can see large numbers of birds and reptiles, including alligators and a crocodile, in their natural habitat.

To assist the U.S. Fish and Wildlife Service, the "Ding" Darling Wildlife Society was formed. In 1982, the Society was incorporated by the State of Florida to increase the visitors' understanding of natural history and their surrounding environment.

The **Center of Education** with its exhibits, orientation video, store, and information desk is open 9:00 to 5:00 seven days a week from November 1 to April 30 and 9:00 to 4:00 from May 1 to October 31.

Access to **Wildlife Drive**, the five-mile driving road through the main refuge, is open 30 minutes after sunrise and closes 30 minutes before sunset. The drive, open to pedestrians and bicyclists, includes interpretive signs, an observation tower, and pavilion. During the fall and winter seasons, the drive is open from 7:30 to 5:30. There is a fee. The Wildlife Drive is closed on Fridays.

### Walking Trails

- Indigo Trail - 2 miles each way
- Cross Dike - .25 mile
- Red Mangrove Overlook - .1 mile
- Shell Mound Trail - .3 mile
- Bailey Tract trails - 1.75 miles

### Canoe Trails

- Commodore Creek - 2 miles
  - Buck Key - 4 miles
- ### Tarpon Bay Recreational Area (941/472-8900)
- Tram tours, canoe and kayak tours
  - Bicycle, canoe and kayak rentals

For more information contact:

J.N. "Ding" Darling NWR  
1 Wildlife Drive (off Sanibel-Captiva Rd)  
Sanibel, Florida  
941/472-1100

**SOURCE:** Ding Darling Wildlife Society web site ([www.dingdarlingsociety.org](http://www.dingdarlingsociety.org))

"Land, water and vegetation are just that dependant on one another.

Without these three primary elements in natural balance, we can have neither fish nor game, wild flowers nor trees, labor nor capital, nor sustaining habitat for humans."

Jay Norwood  
Darling

## Seeking Sponsors and Volunteers for the

# First Annual Charlotte Harbor Nature Festival!

by Randy McCormick, CHEC

**T**he Charlotte Harbor Environmental Center (CHEC), in conjunction with the Peace River Audubon Society, is pleased to announce the "birth" of a new, regional nature festival that will provide exceptional opportunities for environmental, educational, tourism, and community development interests in the greater Charlotte Harbor area.

This event will be held on Saturday, March 31, 2001 at CHEC's Alligator Creek site in Punta Gorda. It will include a full day of interesting and fun activities including a wide variety of field trips, boat trips, exhib-

### First Annual

## CHARLOTTE HARBOR NATURE FESTIVAL

Saturday, March 31, 2001

CHEC Alligator Creek

10941 Burnt Store Road, Punta Gorda

its, displays, nature crafts, guest speakers, children's activities, music, and good food! Participants can learn about wildlife rehabilitation, native plants, bats, reptiles, butterflies, birds, and even estuaries!

The goal of the Charlotte Harbor Nature Festival is to contribute to the development of a regional environmental ethic and to

build commitment to the conscientious stewardship of our natural resources.

There are many opportunities to participate. CHEC is currently looking for sponsors who might be willing to assist with financial contributions. Also, if you would like to offer your time or expertise, volunteers are really needed. It is important for those interested in reserving a booth or exhibit space to make arrangements as soon as possible because space will be available on a first come, first served basis. For more information contact Randy McCormick at 941/575-5435 or [randy@sunletter.com](mailto:randy@sunletter.com).

# National Estuaries Day - September 30, 2000

The Charlotte Harbor National Estuary Program is pleased to announce that National Estuaries Day – a day that highlights the importance of estuaries as coastal resources – was a big success in the Charlotte Harbor watershed. Thanks to the generosity of many of the program’s partners, more than 250 people enjoyed one of seven wading programs, boating and kayaking trips, and birding adventures. In addition, Fort Myers Beach and Punta Gorda passed resolutions in support of National Estuaries Day.

*The program extends a special thank you to the following who made National Estuaries Day 2000 a success.*

CHARLOTTE HARBOR AQUATIC AND STATE BUFFER PRESERVES: Carla Kappmeyer • Bob Repenning • Judy Ott • Betty Gilpin

CHARLOTTE HARBOR ENVIRONMENTAL CENTER: Monica Dorken • Bobbi Rodgers  
SANIBEL-CAPTIVA CONSERVATION

FOUNDATION: Melissa Upton • Richard Finkel

WCI COMMUNITIES: Karen Childress

TOWN OF FORT MYERS BEACH: Terry Cain

CITY OF PUNTA GORDA: Stephen M.

Fabian

## National Estuaries Day 2001 - September 29

*We’ve begun planning National Estuaries Day 2001! If you have suggestions or wish to volunteer to host an event, contact Maran Hilgendorf (see page 2).*



Carla Kappmeyer



Melissa Upton



Bobbi Rodgers

From a guided kayaking tour of Pine Island Sound to “mucking about” on wading trips in Lemon Bay, Charlotte Harbor and Matlacha Pass, to bird watching and boat rides, people of all ages enjoyed the many opportunities offered because of National Estuaries Day 2000.



Bobbi Rodgers



Buzz Kelly

## Charlotte Harbor Study (continued)

Laboratory has endeavored for years to assemble. A second significant benefit to Mote will result from the community outreach, advisory committee input, and educational opportunities resulting from the study.

The proposed study encompasses all of Charlotte Harbor and its watershed. The project will require at least five years to conduct. Aspects of the study may continue beyond five years. The project will draw on satellite imagery and remote sensing, automatic sampling and measurement devices, acoustic, radio, and satellite telemetry, underwater video, and geographic information systems.

Objectives of the overall program are to:

- Identify sentinel species of estuarine health, and the flora and fauna upon which they rely for habitat, nursery, and food;
- Describe populations and food-webs relative to natural background variation of the physical and chemical environment;
- Account for species and ecosystem responses to natural and anthropogenic (human-caused) perturbations; and
- Develop a predictive capacity relating to estuarine health that may be expected as

a consequence of future management decisions.

Beginning November 1, 2000, Mote scientists will undertake a number of tasks to begin the project. The main task will be to define the scientific architecture of the study, and this will be done through meetings within the Laboratory and with external agencies and scientists with Harbor experience. Historical data will be compiled and reviewed, and pilot studies will be initiated in a variety of subjects. Input on research priorities will be evaluated by an external peer-review during the summer of 2001.

Some data will be available to the public on a real-time basis via the worldwide web. Annual progress reports will be made and technical communications of limited scope will appear on an irregular basis. Summary, synthesis, and application reports, and for a monograph or series of professional reports on findings of the overall project will be developed. The project also will arrange for educational and public access to scientists, data, and reports via the Internet.

*“This study is one of the most exciting things to happen in Charlotte Harbor. When we have a comprehensive study of the harbor it’ll give the National Estuary Program great background to further its goals.”*

—Anna Bowditch, Charlotte Harbor Advisory Committee and member of the NEP Management Conference

The overall project will cost approximately \$8 million. In October 2000 the Mote Scientific Foundation committed to providing a core fund of \$3.8 million dollars over a five-year period, beginning with \$760,000 for calendar year 2001. The Laboratory will seek the remaining sum during the years from legislative appropriations, in-kind partnerships with federal, state, and local governments, grants from other foundations, and public support.

For additional information, contact

Dr. Ernest D. Estevez  
Mote Marine Laboratory  
1600 Ken Thompson Parkway  
Sarasota, FL 34236  
941/388-4441, estevez@mote.org

# Polk County Lakes

by John Brenneman,  
Polk County Extension

What do you think of when you think of Polk County? Phosphate? Citrus? Perhaps, but Polk County is also well known for its many lakes. Over the years those lakes have earned well-deserved reputations for producing great fishing. Pleasure boating, water skiing, and wildlife viewing are not far behind in popularity.

It is difficult to travel the roads of Polk County without noticing the lakes. Indeed there are some 550 natural lakes and untold numbers of man-made lakes. Many residents aren't sure which are natural and which are left over from the early phosphate digs or borrow pits.

All but two of the municipalities in the county have

About 8 % of Polk County is covered by 550 natural lakes in 9 distinct lake regions.

natural lakes nearby. It was undoubtedly one of the attractions for early settlers. (Bartow and Fort Meade are the exceptions but they are located on the Peace River.)

Polk County lakes are like magnets for recreational fishermen with bass and panfish, such as bluegill, redear, and crappie, being particularly popular. Every weekend amateur tournament bass fishermen from throughout the state are drawn to Polk's lakes. Professional fishermen pay attention to the lakes as well. A viable commercial fishery focused on nongame fish like tilapia also exists.

Folks interested in the Charlotte Harbor estuary know there are lakes at the upper reaches of the watershed but most of their attention is devoted to Lake Hancock. The people of Polk County realize that the 4,500 surface acres in Lake Hancock are only a small part of the total of more than 95,000 acres of surface water in Polk County.

The first thing that must be understood about the lakes is that they are not, and never were, all the same. All lakes provide important habitats for plants, birds, fish, and other animals, and comprise a valuable resource for human activities and enjoyment. General patterns of geology and physiography cause differences in lake water chemistry and when regional development patterns are factored in, it causes considerable diversity in the lakes of Polk County.

According to a study of lake regions for Florida that mapped and analyzed water quality data sets in conjunction with infor-



Michele Medani, Polk County Natural Resources

mation on soils, physiography, geology, hydrology, vegetation, climate, and land use/land cover, Polk County has nine lake regions. These lake regions provide a basis for comparison of lakes and define distinctions between groups of lakes in different regions.

Some of the differences in lake regions within the county are visible. For example, the Lakeland/Bone Valley Upland lake region includes the sand hills of the Lakeland Ridge, and the more poorly drained flatwoods area of parts of the Bone Valley Uplands and Bartow Embayment. The dominant characteristics of all lakes in this region are high phosphorus, nitrogen, and chlorophyll *a* values. The lakes are alkaline, moderately hard water of relatively high mineral content and very biologically productive.

The Northern Lake Wales Ridge lake region extends from the Clermont Uplands in Lake County south through Polk County to the Livingston Creek drainage in Highlands County. The lakes in this region are mostly alkaline, low to moderate nutrient, clear water lakes. Nitrogen values tend to be high in these lakes.

Other lake regions in the county, such as the Lake Wales Ridge Transition and the Green Swamp, have lakes that generally have more color and acidic conditions. Specific information or referrals to best sources of information can be obtained by calling the Polk County Extension Service at 863/533-0765.

## Want to learn more?

Lakes Education/Action Drive (LE/AD) published the 32-page *Central Florida's Polk County Guide to Lakes*. While supplies last, copies are available from the Charlotte Harbor NEP (see pg 2 for contact information).

## Display Available Peace River Basin Agriculture Educational Initiative



by Paula Allen, USDA NRCS

The Central Florida Resource Conservation and Development Council, Inc. has developed a portable educational display to increase understanding of the natural resources and issues specific to the Peace River. This display shows the benefits of conservation practices currently being applied on agriculture lands and also encourages landowners to investigate practices that may be appropriate for their needs. The display was created in conjunction with Polk, Hardee, and DeSoto Soil and Water Conservation Districts with support from the Charlotte Harbor NEP. If you are interested in having the display at your event, contact Ed Sheehan in Polk County at 863/533-7121, ext. 3, or Leroy Crockett in DeSoto and Hardee counties at 863/773-4764. USDA-Natural Resource Conservation Service and County employees knowledgeable in the issues surrounding the Charlotte Harbor estuary and conservation practices will staff the display.

— Calendar of Events and Meetings —  
For a more complete list of events, please visit the Charlotte Harbor NEP web site at [www.charlotteharbornep.com](http://www.charlotteharbornep.com).

December 2000

25 ***We wish you all a Happy Holiday.***  
Christmas. The office will be closed.

January 2001

- 1 New Year's Day. The office will be closed.
- 10 **Charlotte Harbor NEP Joint TAC-CAC**, Ona, 941/995-1777
- 17 The Peace River Environmental Education Network (PREEN) Workshop, 2:00 to 5:00, Stuart Conference Center in Bartow, Randy at 941/575-5435 or email [randy@sunletter.com](mailto:randy@sunletter.com).
- 24 Community Needs Assessment, Fort Myers, 941/656-7720

February 2001

- 2 **Charlotte Harbor NEP Management Committee**, Arcadia, 941/995-1777
- 2 Watershed Management/TMDL Program, 6:30 to 8:30 p.m., FGCU Auditorium in Fort Myers, 941/332-6975
- 9 **Charlotte Harbor NEP Policy Committee**, Arcadia, 941/995-1777
- 15 *Deadline for Harbor Happenings newsletter Spring 2001 issue. FOCUS: Exotic species: What they are and why the concern.*
- 20 **Charlotte Harbor NEP Citizens Advisory Committee**, 10:00 to noon, Punta Gorda, 941/995-1777

**Treasures of the Sea** — Discover treasures washed on shore at Fort Myers Beach or enjoy the quite beauty of Matanzas Pass on these free guided walks. The beach walk is offered every Tuesday and the Preserve walk is offered every Thursday. Call 941/765-0919, ext 125, to make your reservation. These walks are funded with a mini-grant received from the Charlotte Harbor NEP.

**Charlotte Harbor Nature Festival** —

See page 9 for more details about the first annual festival to be held March 31, 2001.

## Harbor Happenings

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



Address Correction Requested

## On-line Auction Launched to Help Restore our Nation's Bays and Estuaries

You can be a part of this exciting opportunity while contributing to an important cause through an on-line auction over the popular Internet auction house, ebay! You can also help your local National Estuary Program (NEP) because the NEP responsible for arranging for a donation will receive 20 to 40 percent of the sale price, depending on the amount of the sale! The auction will be up and running in **February 2001**.

Ebay.com will be hosting an on-line "charity" auction where people like you can go on-line and bid on fun and unique donated auction items. The proceeds from the sale of the tax-deductible donations will go to support the nation's 28 National Estuary Programs (NEPs) and their Association of National Estuary Programs (ANEP). Together, the NEPs and ANEP (a 501(c)(3) non-profit) provide local and national efforts to restore our nation's estuaries, bays and lagoons. If you have Internet access, just go to [www.ebay.com](http://www.ebay.com) and select: "Charities" to see how easy it is!

Some possible prizes on our auction may be a boat ride, fishing trip, or kayaking trip in your local bay or estuary. Or, you may find out about a week or weekend vacation in a summer home – maybe in Puerto Rico, or in Seattle! Our auction will have exciting, unique items that you can't find elsewhere!

**If you have an item or service you would like to donate**, please contact Dawn Volk at ANEP (703/333-6150, [drvolk@erols.com](mailto:drvolk@erols.com)) or the Charlotte Harbor NEP.

**It's fun, it's easy, and it's for a very good cause!**

Have fun donating and buying exciting and unique on-line auction items to help raise funds for our nation's Bays and Estuaries!

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