

# Myakka Watershed Surface Water Quality Status Report

## October 2017

### OVERVIEW

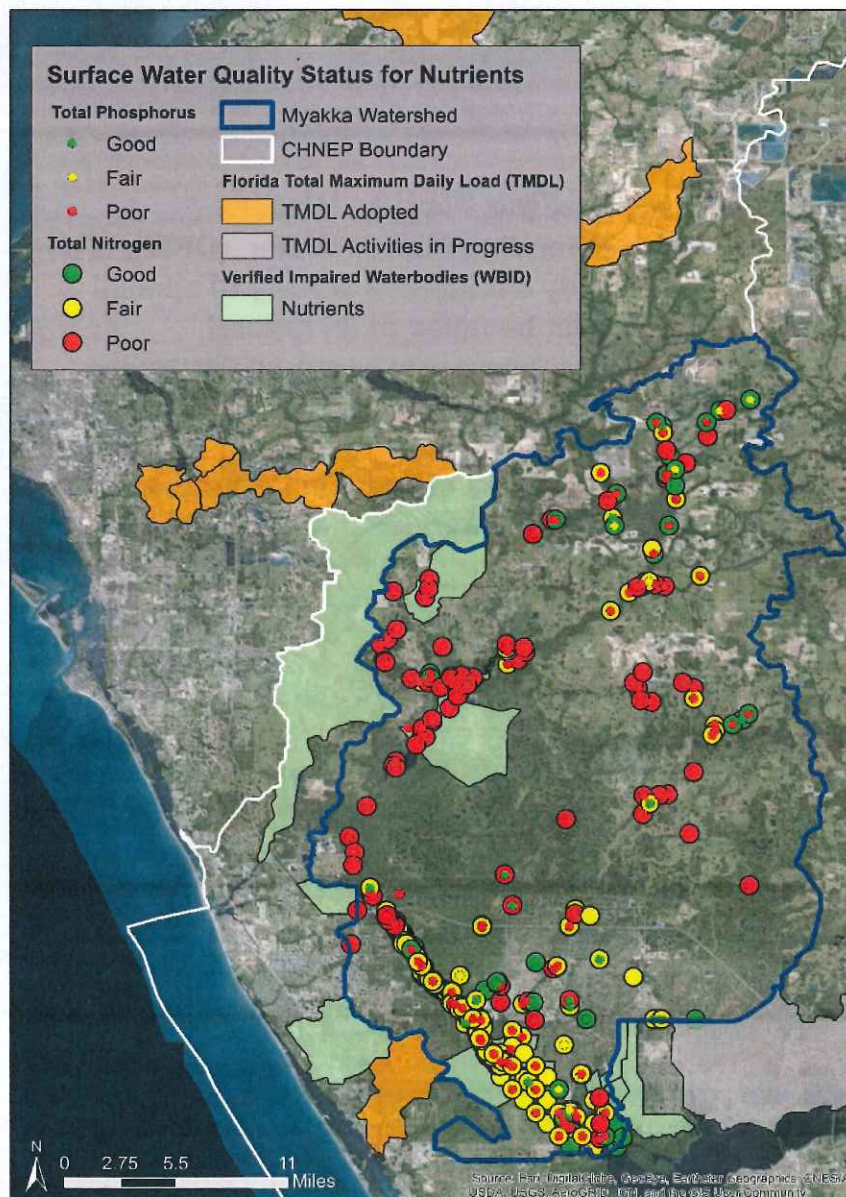
The Myakka Watershed surface waters is primarily comprised of the Myakka River and its tributaries. CHNEP and its partners such as the Florida Fish and Wildlife Conservation Commission, Charlotte County, Florida Department of Environmental Protection and the Southwest Florida Water Management District conduct much of the water quality monitoring in the area. This status report compares the five-year average of CHNEP Water Atlas data sources to local water quality targets to determine if water quality is good, fair or poor. It also identified “impaired” waterbodies that do not meet state water quality standards.

#### Major River

- Myakka

#### Major Creeks:

- Huckaby	- Sam Knight
- Sam Knight	- Oglebay
- Indian	- Curry
- Curry	- Young
- Flopbuck	- Bobcat
- Howard	- Owen



### NUTRIENTS

Nutrient pollution is one of the most widespread water quality problems, caused by excess nitrogen and phosphorus. It can cause algae to grow, degrade aquatic habitat, and decrease dissolved oxygen that fish and other aquatic life need to survive.

*Light green areas are impaired for nutrient pollution, and yellow and red dots indicate where sampling has detected high nutrient levels.*

#### Waters Verified Impaired for Nutrients:

- Myakka River
- Flopbuck Creek
- Huckaby Creek
- Tippecanoe Bay
- Manchester Way
- Lake Myakka Upper Segment
- Indian Creek
- Curry Creek – Freshwater Portion
- Cow Pen Slough
- Forked Creek



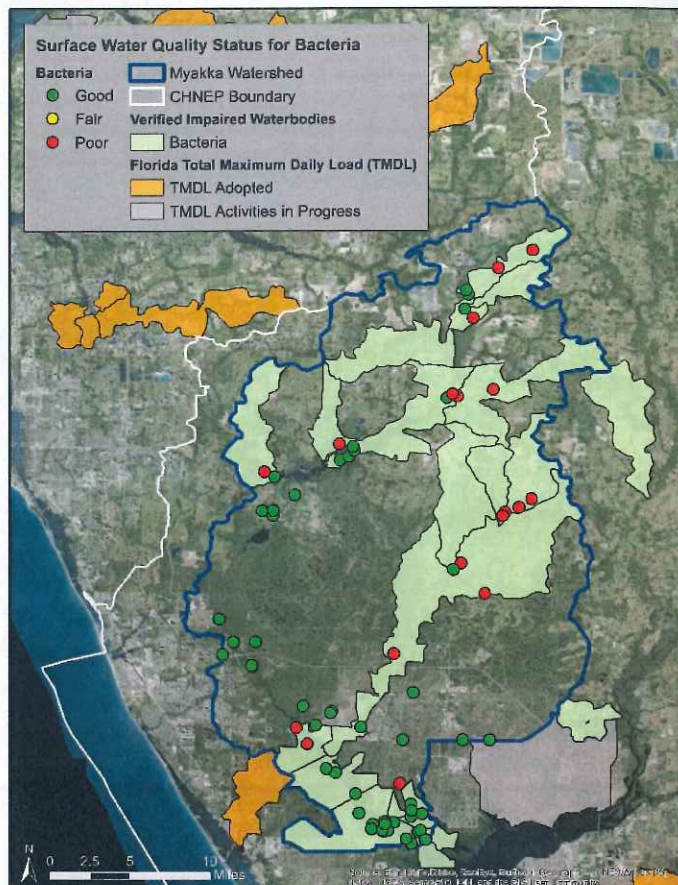
## BACTERIA

Bacteria pollution can result from human and animal waste entering waterways, and can indicate pathogens may be present.

*Light green areas are impaired for bacteria. Yellow and red dots indicate where sampling has detected high bacteria levels.*

### Waters Verified Impaired for Bacteria:

- Big Slough Canal
- Bobcat Creek
- Brandy Branch
- Bud Slough
- Howard Creek
- Mud Lake Slough
- Myakka River



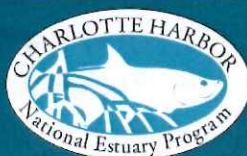
## Outstanding Florida Waters

An Outstanding Florida Water, (OFW), is a waterbody designated worthy of special protection because of its natural attributes (pursuant to rule 62-302.200(26) and 62-302.700, Florida Administrative Code (F.A.C.).

However, many of these waterbodies are currently impaired (as indicated by light blue with yellow crosshatching in map to left).

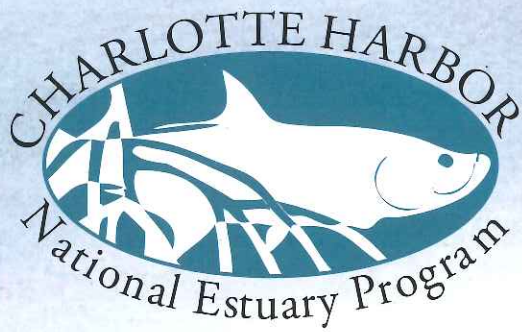
### Verified Impaired OFWs:

- Beker
- Lemon Bay Estuarine System
- Lemon Bay Aquatic Preserve
- Gasparilla Sound Aquatic Preserve
- Myakka River
- Myakka River State Park
- Myakka River Wild and Scenic River Segment



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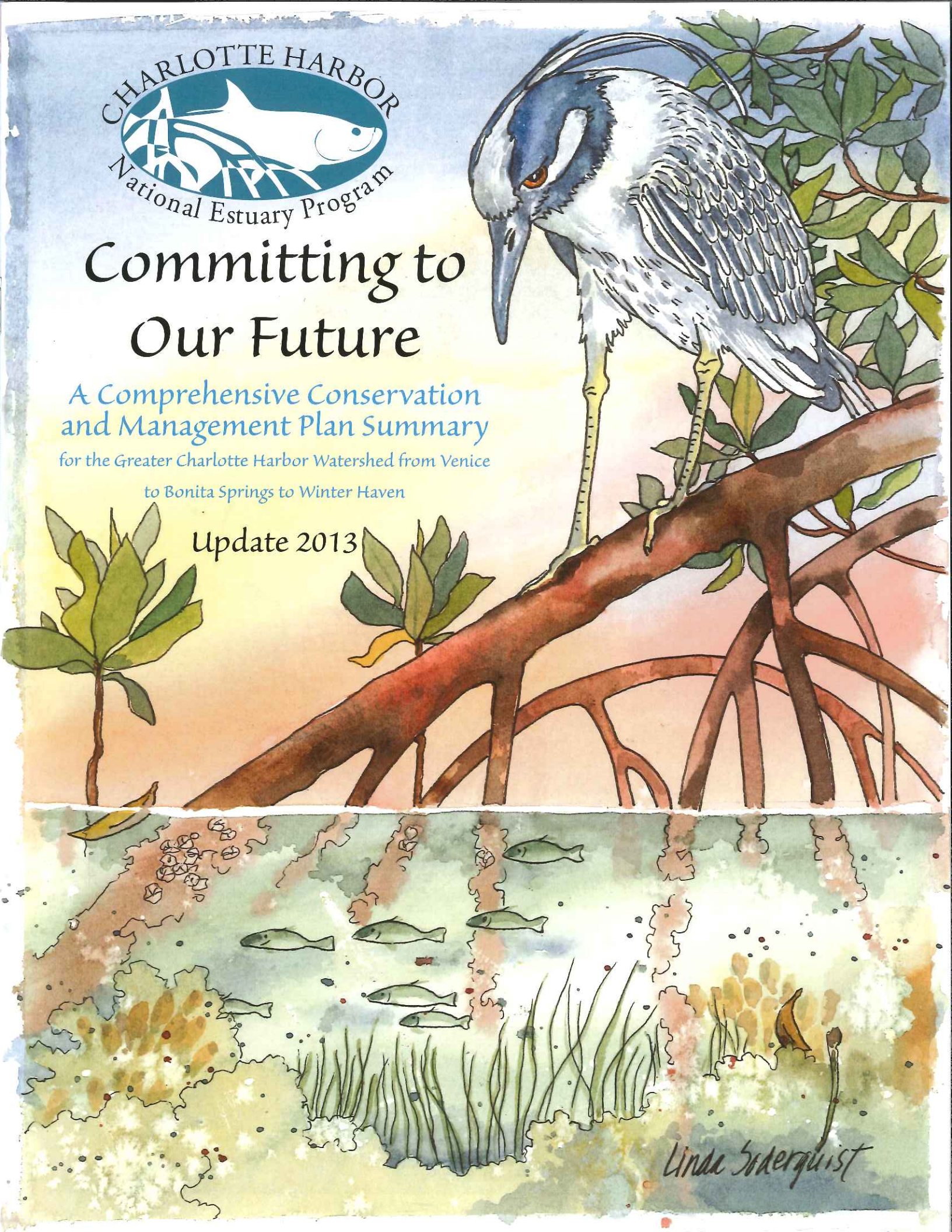
# Committing to Our Future

*A Comprehensive Conservation  
and Management Plan Summary*

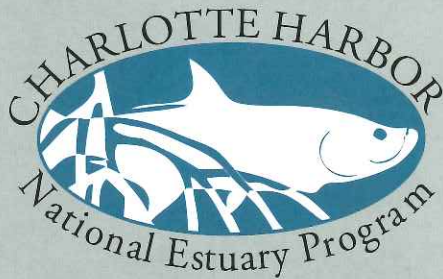
for the Greater Charlotte Harbor Watershed from Venice

to Bonita Springs to Winter Haven

Update 2013







## Charlotte Harbor National Estuary Program

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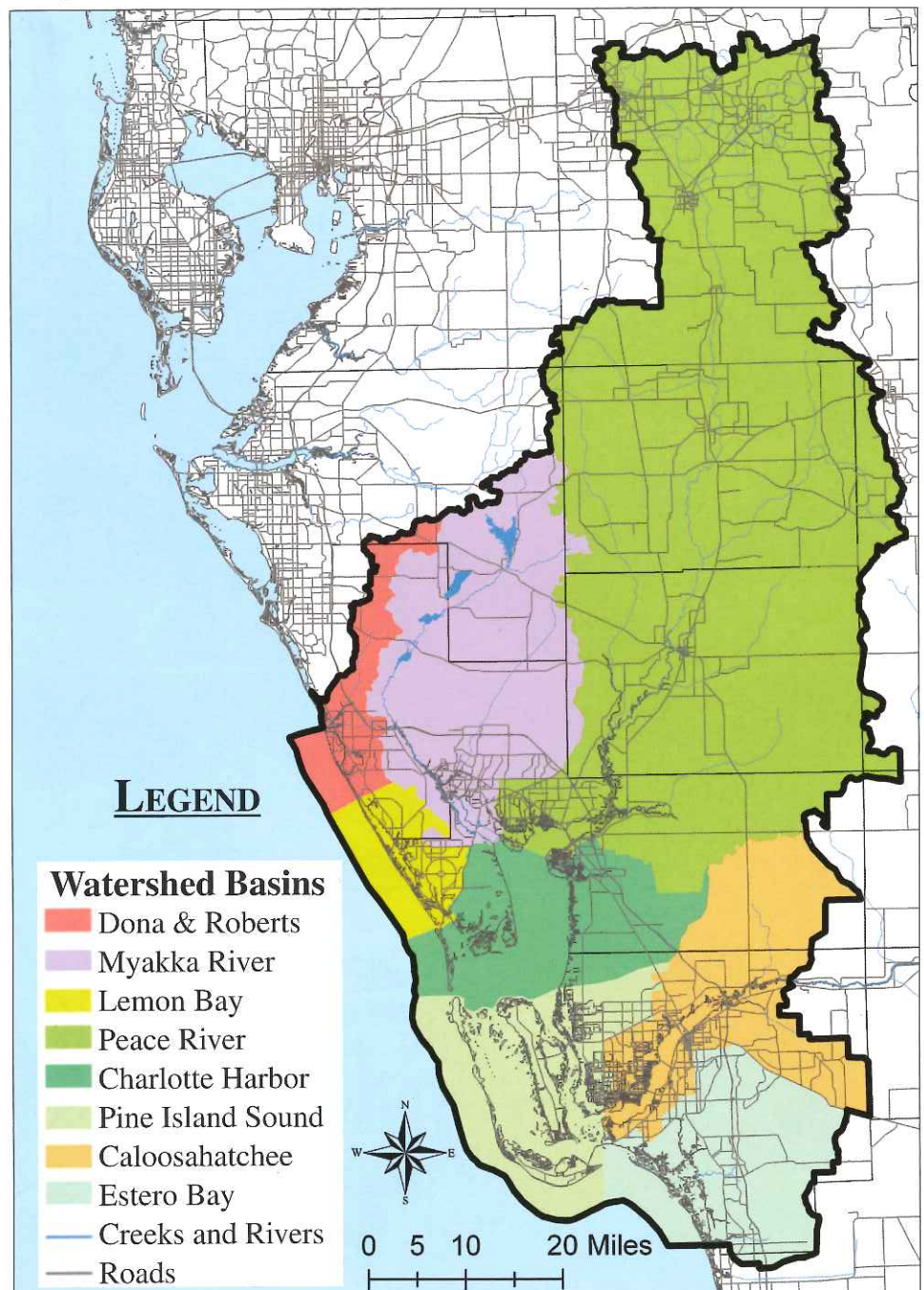
Cover art donated by Linda  
Soderquist ([www.LindasIslandArt.com](http://www.LindasIslandArt.com))  
to the CHNEP originally for  
the Charlotte Harbor Nature Festival.

The *CCMP 2013 Update* and this document, the *CCMP Summary 2013 Update*, may be obtained as PDF files from [www.CHNEP.org](http://www.CHNEP.org). Printed copies are available from the Program Office and can be requested through the website.

This summary of the CHNEP *Comprehensive Conservation and Management Plan* (CCMP) was created with information from the CCMP approved in 2000, 2008 and 2013 and various sources provided by the U.S. Environmental Protection Agency and the Southwest Florida Regional Planning Council.

The *CCMP Summary 2008* was written by Maran Hilgendorf and originally designed by The Set Up, Inc. Photographs were provided by Kharli Rose, Litaker Photography, Pat and Brady Pfeil, *The Ledger*, *Boca Beacon*, Mote Marine Laboratory, Lee County Convention and Visitors Bureau, Charlotte County Convention and Visitors Bureau, Polk County Convention and Visitors Bureau, Sarasota County Convention and Visitors Bureau and CHNEP staff.

© September 2002. Revised January 2008 and September 2014.







Estuaries are places where rivers meet the sea. They are fascinating and beautiful ecosystems distinct from all other places on earth.

An estuary is a partially enclosed body of water where fresh water from the land and rivers mixes with salt water.

In western Florida, the Gulf of Mexico provides the salt water. Harbors, bays, lagoons and portions of rivers are often estuaries. Healthy estuaries are among the most productive and valuable places on earth and are necessary for humans and wildlife. The land from which fresh water drains into the estuary is the estuary's watershed.

The National Estuary Program was established in 1987 by an amendment to the Clean Water Act to identify, restore and protect estuaries along the coasts of the United States. Governors nominate areas to be designated estuaries of national significance. By engaging local communities in the process, National Estuary Programs focus on improving water quality in an estuary while maintaining the integrity of the whole system — its chemical, physical and biological properties as well as its economic, recreational and aesthetic values — and the land-water connection.

Once selected for inclusion, the Program creates a decision-making team to identify and prioritize the problems in the estuary. A plan is developed, approved and then implemented.

Estuaries ~ where  
rivers meet the sea

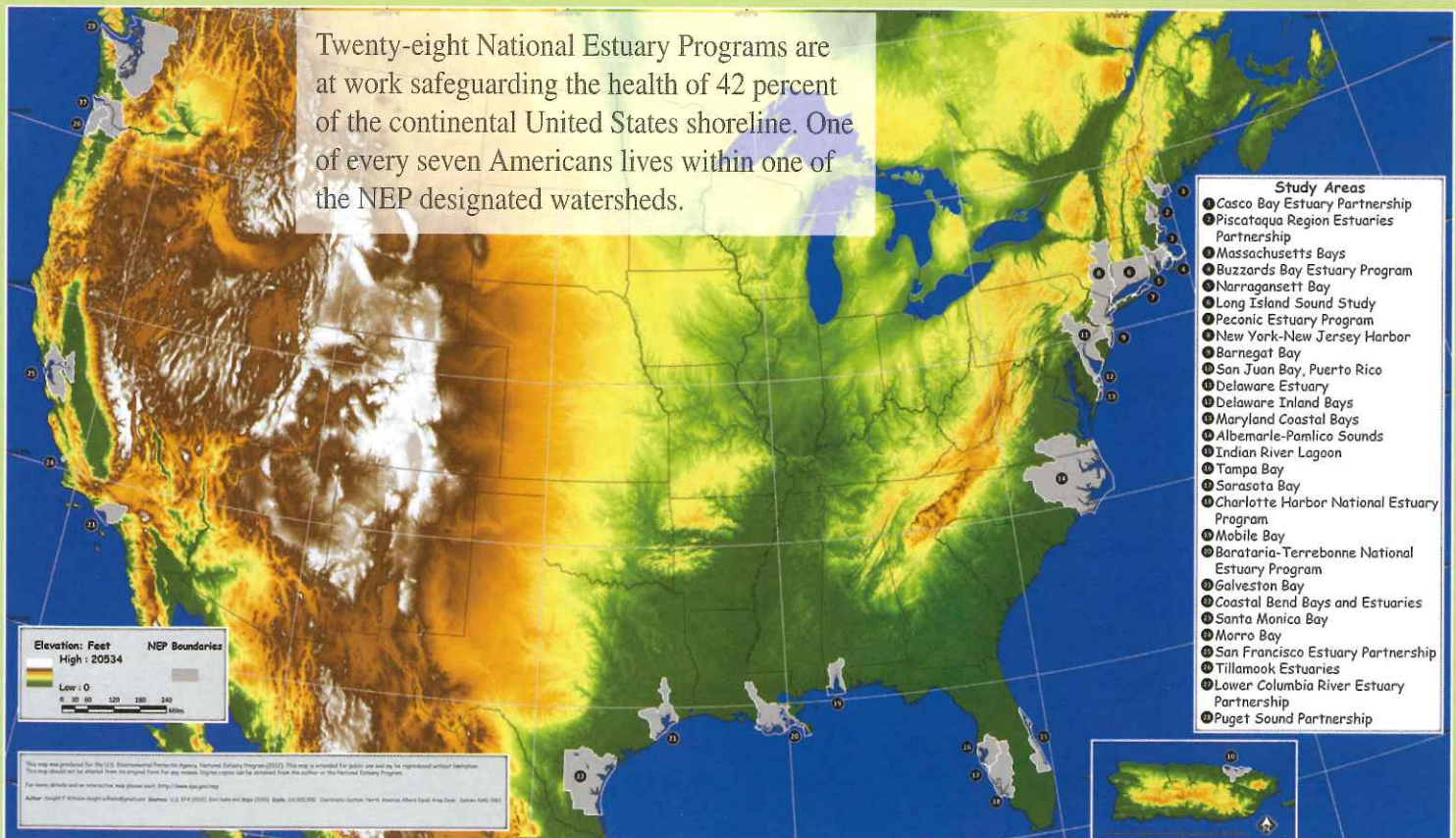
Watersheds ~ areas  
that drain to a  
common waterway



## NATIONAL ESTUARY PROGRAM STUDY AREAS



Twenty-eight National Estuary Programs are at work safeguarding the health of 42 percent of the continental United States shoreline. One of every seven Americans lives within one of the NEP designated watersheds.







Wherever there are  
estuaries,  
there is unique  
beauty.



# Estuaries

The CHNEP study area is a special place. Three large rivers — the Myakka, Peace and Caloosahatchee — flow westward to the Gulf of Mexico. These rivers start as headwater wetlands, lakes, creeks and ground water that combine and meander until they become substantial rivers. The rivers flow through cities and towns, cattle pastures and citrus groves, pine flatwoods and cypress swamps. When these rivers meet the salty water of the Gulf of Mexico, they form estuaries, which are one of the most productive natural systems on earth. Coastal bays such as Lemon Bay and Estero Bay are influenced by smaller streams and are spectacular havens for fish and wildlife. The CHNEP study area is defined by subtle topography, subtropical climate and subtropical plant communities.

As more people discover the beauty of this region and the demands for land and water intensify, the special qualities of the region are threatened. The human demands for land, water, food, transportation, and access to water and recreational lands can take precedence over the quality of water and wildlife habitat. Urban communities struggle to balance housing, transportation and commercial growth while maintaining the quality of life that drew people and businesses to their communities in the first place. Rural communities are challenged by changing markets for their products while managing the pressures of regulation, international competition and the encroachment of suburbs from nearby urban areas.

Action is needed to balance important natural characteristics and human needs. Without careful management and protection, the basic nature of the region could be spoiled. Fortunately, we know the pitfalls of overstressing our natural and municipal communities. We can measure the connections between the quality of the environment and the health of the local economy. We know the real costs of fixing problems are much greater than preventing difficulties from occurring.

This *Comprehensive Conservation and Management Plan* (CCMP) details the actions needed to protect and improve our watershed as we try to balance human needs with the needs of the natural systems. Our plan is ambitious in scope and time frame. For the CCMP to be realized, citizens, governments and industry of the region will need to work together. The CCMP objectives are specific so we can measure our progress. The timelines are short to encourage immediate attention and action. Many of the actions will require multiple groups and agencies to work together, combine resources and overcome institutional boundaries. All these challenges are surmountable because we are unified in our mission — to keep the CHNEP study area a special place for ourselves and our children's children.





# The Creation of the CHNEP

The Charlotte Harbor National Estuary Program is a partnership of citizens, elected officials, resource managers, and commercial and recreational resource users who are working to protect the greater Charlotte Harbor estuarine system from Venice to Bonita Springs to Winter Haven by improving the water quality and ecological integrity of the 4,700-square-mile watershed. The partnership works as an advocate for the estuarine system by building consensus that is based on sound science.

The Charlotte Harbor study area encompasses both the estuarine system and watersheds. The 4,700-square-mile watershed includes all or portions of Charlotte, DeSoto, Hardee, Lee, Manatee, Polk and Sarasota counties. A small portion of Highlands, Glades, Collier and Hillsborough counties are also part of the watershed.

In 1995, then Governor Lawton Chiles nominated Charlotte Harbor as an “estuary of national significance.” As a result of this nomination, Charlotte Harbor was accepted into the National Estuary Program, becoming one of 28 other watersheds in the United States so designated.

The CHNEP held its kickoff ceremony in September 1996 and began the process of writing a regional *Comprehensive Conservation and Management Plan*. The partnership meets as four committees that together are known as the Management Conference. Local problems were identified, goals were established, information was collected and special projects were funded.

The 20-year *Comprehensive Conservation and Management Plan* (CCMP) identifies the region’s common priority environmental issues and the actions needed to solve them. When the CCMP was first completed and accepted in 2001, it marked the beginning of action to protect and restore the estuary and its watershed. The CCMP was first updated in 2008. An update of the 20-year plan will now be initiated every five years. This document is a summary of the *CCMP 2013 Update*.

The CHNEP implements the CCMP by building partnerships to develop integrated plans, education and outreach programs and management structures to achieve a sustainable balance between the economy, society and the environment.

The Management Conference now reviews progress and identifies concerns not consistent with the plan’s goals — continuing to use a cooperative decision-making process based on sound science. The Management Conference addresses these concerns and, when consensus is reached, that position is presented by the Charlotte Harbor National Estuary Program — backed by its partners, including the counties, cities, businesses, environmental organizations, government agencies and citizens of the watershed.



The CHNEP  
*Comprehensive  
Conservation and  
Management Plan* calls  
on those who live, work  
and enjoy the amazing  
Charlotte Harbor  
estuarine system to  
serve as its advocate.  
The problems common  
throughout the study  
area are:  
fish and wildlife  
habitat loss,  
water quality  
degradation,  
changes to water flow  
and gaps in stewardship.





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

The CHNEP also holds several events to further people's understanding of the issues.



# Management Conference

The Management Conference is the decision-making team for the CHNEP.

The Conference is composed of four committees and the Program Office. Each committee serves a specialized role to fulfill the goals and objectives in the *Comprehensive Conservation and Management Plan*. The Policy Committee has ultimate authority to establish policy. Members include elected city and county representatives as well as representatives from local, state and federal government agencies. The Management Committee oversees the operation of the Program. The Technical Advisory Committee (TAC) guides technical decisions, and a Citizens Advisory Committee (CAC) represents the interests of the public and commercial and recreational resource users.

## Partners in the CHNEP include:

- Cities and towns (24)
- Counties (7)
- Environmental organizations
- Individual citizens and Citizen associations
- Environmental education organizations and facilities
- Businesses, industries and associations
- State agencies (26 divisions within 8 agencies)
- Regional agencies (3)
- Water management districts (2)
- Special districts, including community development, conservation and easement, soil and water conservation, water control and water and sewer (more than 80)
- Federal agencies (8)
- Private science or resource management groups (16)
- Land trusts (15)



The first Comprehensive Conservation and Management Plan was endorsed by members of the CHNEP Management Conference during a ceremony held April 13, 2000.





# The Process

The Management Conference initially identified three priority regional problems (listed below) to guide the development of the initial *Comprehensive Conservation and Management Plan* (CCMP) to a specific long-term vision for the region's estuarine and watershed resources. A fourth common problem was identified in the 2008 update to coalesce stewardship actions in the first CCMP into a common problem name of stewardship gap. While these problems vary geographically in extent and severity, they are common throughout the study area. Fifteen quantifiable objectives (see next page) and priority actions with strategies were then developed to help address these problems.

The success of the CCMP depends upon the broad support of the citizens of the watershed. The Management Conference obtains this support through outreach and education efforts designed to enhance understanding of the value of the natural resources, the problems confronting the resources and actions that can be taken to resolve these problems. The citizens' role is critical; therefore, the plan incorporates a public education strategy.

The Program also has specific responsibilities to further the implementation of the management plan. Important activities include assuring coordination among the many organizations in the region, coordinating data management, assisting in the implementation of the long-term monitoring strategy, locating potential funding sources, evaluating federal activities for consistency with the CCMP, measuring progress made to implement the plan and tracking key indicators of the health of the estuarine system.

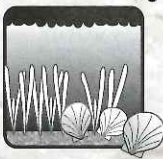
The completion of the *CCMP* and its subsequent acceptance by the Management Conference, the state of Florida and the U.S. Congress in June of 2001 marked the beginning of action to restore and protect the estuarine system. An update of the plan is now initiated every five years.

## Priority Problems



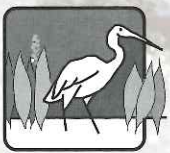
### Hydrologic (Water Flow) Alterations

Adverse changes to amounts, locations and timing of freshwater flows, hydrologic functions of floodplain systems and of natural river flows.



### Water Quality Degradation

Including, but not limited to, pollution from agricultural and urban runoff, point-source discharges, septic tank system loadings, atmospheric deposition and ground water.



### Fish and Wildlife Habitat Loss

Degradation and elimination of headwater streams and other habitats caused by development, conversion of natural shorelines, cumulative impacts of docks and boats and establishment of exotic species.



### Stewardship Gaps

Limitations in people's knowledge of choices and management decisions that will lead to sustainability within their community. These gaps include overarching issues such as public outreach, advocacy and data management.





Restore  
Enhance  
Improve  
Achieve



Fifteen quantifiable objectives were developed to help address the four priority regional problems identified by the Management Conference. These quantifiable objectives were used to develop the priority actions for this management plan. All these objectives are measurable and have an ambitious timeline to provide incentive for action. Progress will be measured against these quantifiable objectives.

## Water Quality Degradation

- Maintain or improve water quality from year 2000 levels. By 2018, bring all impaired water bodies into a watershed management program such as reasonable assurance or basin management action plan. By 2015, remove at least two water bodies from the impaired list by improving water quality. (WQ-1)
- By 2020, develop and meet water quality criteria that are protective of living resources for dissolved oxygen, nutrients, chlorophyll *a*, turbidity, salinity and other constituents. (WQ-2)
- By 2025, reduce severity, extent, duration and frequency of harmful algal blooms (HABs), including macroalgae, phytoplankton and periphyton, through the identification and reduction of anthropogenic influences. (WQ-3)
- By 2025, meet shellfish harvesting standards year round for the Myakka River conditionally restricted area and the conditionally approved areas of Lemon Bay, Gasparilla Sound, Myakka River, Pine Island Sound Western Section and Pine Island Sound Eastern Section. (WQ-4)

## Fish and Wildlife Habitat Loss

- Protect, enhance and restore native habitats where physically feasible and within natural variability, including Submerged aquatic vegetation (SAV); Submerged and intertidal unvegetated bottoms; Oyster; Mangrove; Salt marsh; Freshwater wetland; Native upland; and Water column. (FW-1)
- By 2020, achieve a 100 percent increase in conservation, preservation and stewardship lands within the boundaries of the CHNEP study area. The increase will be based upon 1998 acreage. (FW-2)
- By 2020, achieve controllable levels of invasive exotic plants, as defined by the Florida Exotic Pest Plant Council, and exotic nuisance animals, as defined by the Florida Fish and Wildlife Conservation Commission, on publicly managed lands. Encourage and support the removal and management of invasive exotic plants and exotic nuisance animals on private lands. (FW-3)



## Hydrologic Alterations

- By 2020, identify, establish and maintain a more natural seasonal variation (annual hydrograph) in freshwater flows for Caloosahatchee River; Peace River and its tributaries; Myakka River, with special attention to Flatford Swamp and Tatum Sawgrass and Estero Bay and its tributaries. (HA-1)
- By 2020, restore, enhance and improve where practical historic watershed boundaries and natural hydrology for watersheds within the CHNEP study area, with special attention to Outstanding Florida Waters and Class I water bodies. (HA-2)
- By 2020, enhance and improve to more natural hydrologic conditions water bodies affected by artificially created structures throughout the CHNEP study area, including Sanibel Causeway in Lee County; Franklin Lock (S-79) in Lee County; Dams on the Myakka River that flows through Manatee, Sarasota and Charlotte counties; Causeway between Lovers Key State Recreation Area and Bonita Beach in Lee County; Water-control structure on the south end of Lake Hancock in Polk County; Structure on Coral Creek in Charlotte County; Gator Slough canal collector system in Lee and Charlotte counties; Peace Creek canal system in Polk County; and Cow Pen Slough in Sarasota County. Reduce negative hydrologic effects of artificially created structures such as weirs, causeways, dams, clay settling areas and new reservoirs. (HA-3)
- By 2020, for each watershed, identify and recommend additional reforms to improve linkages between local, water management district, state and federal government development permitting and capital programs affecting water storage, flood control and water quality. By 2025, implement the additional reforms. (HA-4)

## Stewardship Gaps

- By 2025, a minimum of 75 percent of all residents will have recalled attending a watershed event, reading watershed material or hearing watershed/estuary information on radio or TV. A minimum of 50 percent of all residents in the CHNEP study area can recognize estuaries and watersheds. A minimum of 10 percent of all residents will be able to claim personal actions that protect the estuaries and watersheds. (SG-1)
- By 2020, the CHNEP will expand its role as a recognized resource to elected officials or their agents from local, state and federal government for policy advice. (SG-2)
- Through 2020, the CHNEP long-term monitoring strategy and data management strategy will continue and be enhanced. Resulting informational websites will be maintained systematically. (SG-3)
- Though 2020, key geographic and scientific information will be presented in ways that are meaningful to the majority of people. (SG-4)

As one of the 28 “estuaries of national significance,” the CHNEP is guided by local committees to fulfill a plan written by local people to protect the natural environment of southwest Florida.







Peace River

Myakka River

Caloosahatchee River



# The Study Area

The Charlotte Harbor study area includes eight basins that have hydrological, ecological and management distinctions. These basins are the Dona and Roberts Bays, Lemon Bay, Charlotte Harbor proper, Pine Island Sound/Matlacha Pass and Estero Bay coastal environments and the Myakka, Peace and Caloosahatchee rivers. A map is provided on page 13.

**Coastal Environments:** A series of bays, beaches, barrier islands and mangroves dominate the coastal environments of Venice, Lemon Bay, Pine Island Sound, Matlacha Pass and Estero Bay, which are located in Sarasota, Charlotte and Lee counties. Twelve barrier islands protect the estuaries and the mainland from storm waves and floods. Salt water from the Gulf of Mexico enters estuaries through San Carlos Bay, which is the mouth of the Caloosahatchee River, and 11 passes located between the barrier islands. Passes are dynamic and close, shift or open because of natural events such as hurricanes and human efforts to maintain them.

The Charlotte Harbor estuarine system is mostly influenced by its large rivers. The amount of salt in each estuary varies dramatically, depending in part on the large fluctuations of river and streamflows from the Myakka, Caloosahatchee and Peace rivers between wet and dry seasons.

The watershed — the area that drains to a common waterway — for the Peace River is large, 26 times larger than the estuary into which it drains. For every acre of water, 26 acres of land drains into the estuary. By comparison, the watershed for Tampa Bay is four times larger than its estuary and the watershed for Sarasota Bay is eight times larger.

Much of the submerged land is designated an aquatic preserve and much of the shoreline is designated as buffer preserve to be “preserved in essentially natural conditions for future generations to enjoy” by the Florida Department of Environmental Protection. In addition, the tributary streams in Estero Bay are designated by the state as “Outstanding Florida Waters” to be protected from harm.

Some resource management challenges, especially in the coastal environments that are dominated by urban development, are:

- Effect of boat traffic and dredging of the Intracoastal Waterway
- Health of mangroves and seagrasses
- Disposition of undeveloped yet platted land
- Effects on water quality of septic systems and stormwater runoff from developed areas
- Dynamically unstable tidal inlets
- Nuisance exotic vegetation and animals
- Canals, which change the amount, timing and quality of the water that runs into the estuaries
- Land-use changes, including urbanization



**Myakka River:** The Myakka River is the only river to be designated a Florida Wild and Scenic River. This designation provides for preservation and management of the 34-mile portion of the river within Sarasota County, 12 miles of which flow through the Myakka River State Park. Much of the 66-mile river's watershed lies to the north in Manatee County, but the Myakka River does not become well defined until numerous tributaries coalesce near the park. Two lakes and extensive marshes are prominent features of the park, which is famous for its diverse wildlife. While agriculture use dominates the majority of the upper basin and urban development in the lower basin, many acres of this watershed are protected as parks, forests and preserves.

**Peace River:** The Peace River flows 105 miles from its origin in the Green Swamp and Lake Hancock in central Polk County through Polk, Hardee, DeSoto and Charlotte counties to the estuary known as Charlotte Harbor. This river is the major freshwater contributor to the estuary. The river's rate of flow is directly related to groundwater levels, which have been falling significantly due to increased demand for the water and less rainfall. The health of the river and the estuary depend upon this water, as do the human inhabitants. The Peace River is the source of drinking water for more than 100,000 people. Agriculture, primarily cattle ranching, citrus production and row crop farming, as well as phosphate mining and residential development are the dominant land uses in this watershed. These land uses have resulted in alterations to the hydrology and natural flora and fauna of the landscape. To help protect the integrity of the Peace River and Charlotte Harbor, state laws and regulations require that land mined after July 1, 1975, be reclaimed, that the hydrology approximate that prior to mining and that habitat loss be appropriately mitigated. Since 1977, a state trust, supported with phosphate severance tax dollars, has provided funds for the voluntary reclamation of land mined prior to 1975.

**Caloosahatchee River:** The flow of this river is no longer controlled by nature. Dredging has straightened and deepened the river, damaged its many oxbows and connected it to Lake Okeechobee. Numerous structures allow the water flow to be controlled for water supply and boat traffic. The farthest west of five locks, the Franklin Lock and Dam separates the fresh water of the river from the salt water of the estuary. The CHNEP study area includes only the 30-mile reach of the river in Lee County from the Franklin Lock to the Gulf of Mexico. The part of the watershed in the CHNEP study area is dominated by urban development. The river's estuary provides critical wildlife and aquatic habitat and nursery areas.





The estuary is the point where man, the sea and the land meet and challenge each other.

— U.S. Department of the Interior,  
National Estuarine Pollution Study, 1969

*The watershed covers a region of diverse and important rural and urban communities and an environment needing protection. Fishing, agriculture, mining, tourism, retirement and construction compose the economic base. We receive uncounted benefits from estuaries that are difficult to quantify, such as clean air, safe water and scenic beauty.*

## Grants

Since 1996, the CHNEP has awarded grants to Florida citizens, organizations, businesses, government agencies, schools, colleges and universities in order to further partnerships that will protect the Charlotte Harbor estuary by improving the ecological integrity of the greater Charlotte Harbor watershed. These grants are an important component of implementing the CCMP.

The research, monitoring, restoration and educational projects supported by these grants benefit the natural resources in the watershed, enhance our technical knowledge or improve community awareness. Projects vary greatly in scope and scale, ranging from biological surveys, wetland restoration projects and volunteer water quality monitoring to curriculum development and environmental education activities. Many projects are funded in cooperation with other sources. Consequently, the total value of the project is often much greater than the support provided by the CHNEP. A directory of grant-supported projects as well as grant applications are available from the Program website at [www.CHNEP.org/grants.html](http://www.CHNEP.org/grants.html).

Annually since 1999, the CHNEP has requested applications for **Public Outreach** projects. Projects must address a Program goal and priority problem and must occur in the Charlotte Harbor watershed. Projects must demonstrate value to the community, incorporate a permanent management strategy and inform and educate. Applications for Public Outreach grants are typically due in early September.

As of 2001, **micro-grants** have been offered to help establish and maintain environmental education efforts and further partnerships to help implement the CCMP. These grants provide up to \$250 and are available year round.

From 1996 to 1998, the CHNEP supported Early Action Demonstration projects. These projects have long-term applicability and transferability and serve as models for addressing resource management issues. From 1999 to 2008, the CHNEP supported Research and Restoration Partners projects. Projects funded have long-term applicability and serve as models for addressing habitat improvement and resource management challenges.





The  
productivity  
and variety of  
estuarine  
habitats foster  
a wonderful  
abundance  
and diversity  
of wildlife.



## At a Glance

The beauty, natural diversity and tropical and subtropical climate are some of the reasons why more and more people vacation in and move to the Charlotte Harbor area. In 1960, the population in the study area was approximately 350,000. By 2010, the population increased to 1.35 million. By 2020, it is expected to near 2 million, with 80 percent living near the coast. During the cold months, the population in the watershed swells by approximately 30 percent with those who enjoy the warmer climate and beauty of the area.

The CHNEP study area, a 4,700-square-mile watershed, includes 24 cities and all or most of seven counties. (A very small portion of four other counties lie within the study area.) The area stretches from Venice to Bonita Springs to Winter Haven. It includes 30 miles of the Caloosahatchee River, 105 miles of the Peace River and 66 miles of the Myakka River. Agriculture occurs on approximately a third of the study area, residential and commercial development occur on another third and the final third is split between mining, conservation land and open waters.

Barrier islands protect the estuaries and the mainland from damaging storm waves and floods and create a quiet place for mangroves, seagrasses, fish and birds to flourish. From north to south, these islands are Manasota Key, Don Pedro Complex, Little Gasparilla, Gasparilla, Cayo Costa, North Captiva, Captiva, Sanibel, Estero, Lovers Key and Big and Little Hickory. Passes allow salt water from the Gulf of Mexico to mix with the fresh water from the land. From north to south, these openings, which are mostly passes, are Venice Inlet, Stump Pass, Gasparilla Pass, Boca Grande Pass, Captiva Pass, Redfish Pass, Blind Pass, San Carlos Bay, Matanzas Pass, Big Carlos Pass, New Pass and Big Hickory Pass.

Charlotte Harbor is a highly riverine-influenced estuary in which freshwater inflows from the Peace, Myakka and Caloosahatchee rivers, influence the water quality. In summer the Harbor becomes dark brown due to natural colored dissolved matter such as tannins, while in the winter dry season, the water is much clearer and bluer. Along with the habitat and species diversity, the flow and water quality dynamics make the Harbor a unique estuarine system.

Manatees, dolphins, sharks, sea turtles, wood storks, roseate spoonbills, gopher tortoises, American alligators and mangroves are but a few of the species found in Charlotte Harbor. Documented species found in the study area include 452 fish, 331 bird, 2,100 plant, 39 mammal, 67 reptile and 27 amphibian species. The region is internationally famous for seashelling, snook fishing and the world's richest tarpon fishing tournament. Mangroves are one of Florida's true natives. The three species known as the red, black and white mangroves thrive in salty environments because they are able to obtain fresh water from salt water. Some secrete excess salt through their leaves, others block absorption of salt at their roots. Turtle grass, manatee grass and shoal grass are the three common species of seagrasses — flowering plants that live underwater — found in the study area.



More than 170,000 acres of submerged resources are designated as six Florida aquatic preserves to be “preserved in essentially natural conditions for future generations to enjoy.” They are known as Lemon Bay, Gasparilla Sound/Charlotte Harbor, Cape Haze, Pine Island Sound, Matlacha Pass and Estero Bay. Charlotte Harbor and Estero Bay preserve state parks include approximately 56,000 acres of land adjacent to the aquatic preserves. These lands provide a buffer between human uses of the watershed and natural resources in the estuaries. From the mouth of the Caloosahatchee River north to Placida, approximately 84 percent of the shoreline is protected in a buffer preserve.

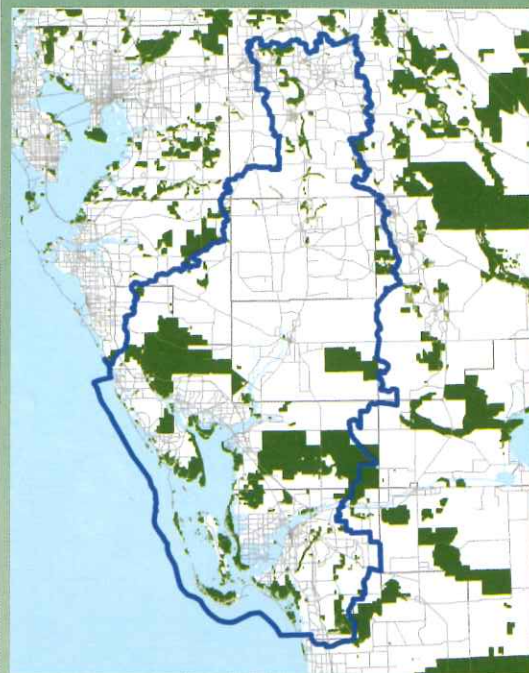
Habitat, hydrology and water quality have all been degraded in the Charlotte Harbor seven-county watershed. The assault began many decades ago. Recently, we have done well protecting remaining critical habitat, reducing exotic plant invasion and improving hydrology and water quality at specific locations.

The Charlotte Harbor estuarine system is the second largest open-water estuary in Florida, the ninth largest in the Gulf of Mexico and the eighteenth largest in the country. The watershed for the Charlotte Harbor estuarine system is approximately eight percent of the state of Florida.

Land conserved in the watershed is acquired and managed by different agencies for different purposes. These lands also improve water flows, water quality and habitat for fish and wildlife. Hundreds of these special places are open to the public for our enjoyment. (Check out [www.CHNEP.org/specialplaces.html](http://www.CHNEP.org/specialplaces.html) to learn more.) Land conservation and management efforts include those of the Federal government; State of Florida; Southwest and South Florida water management districts; Charlotte, Lee, Sarasota and Polk counties; land trusts and others. Land trusts working to acquire environmentally sensitive land in the CHNEP study area include Calusa Land Trust and Nature Preserve of Pine Island, Conservancy of Southwest Florida, Conservation Foundation of the Gulf Coast, CREW Land & Water Trust, Wildlands Conservation, Florida Trail Land Trust, Inc., Gasparilla Island Conservation & Improvement Association, Inc., Great Outdoors Conservancy, Green Horizon Land Trust, Lemon Bay Conservancy, Inc., The Myakka Conservancy, Sanibel-Captiva Conservation Foundation, Southwest Florida Land Preservation Trust, The Nature Conservancy and Trust for Public Land.

Through these combined efforts, more than 460,000 acres are preserved for environmental conservation purposes. Remarkably, more than 210,000 of these acres have been protected since 1998. A total of 14 percent of watershed is conserved. Private property is also better managed through the Department of Agriculture and Consumer Services Best management Practices (BMP) for agricultural property and local government ordinances regulate commercial and residential property fertilizer applications. More than a million acres are managed in some form for conservation.

There is more work to do. Much of the work may require increased education, regulation and enforcement, including reducing prop scars in seagrasses, mangrove trimming, failing septic tanks and nonpoint source pollution. Other work requires significant public projects, much of which is planned, permitted or is under way.



*Through combined efforts, more than 460,000 acres in the CHNEP study area are preserved for environmental conservation purposes.*





# Events

The CHNEP hosts many events to provide opportunities to solve a problem and enhance capabilities to protect the natural environment of southwest Florida.

- Forums
- Charlotte Harbor Nature Festival
- Conservation Lands Workshop
- Environmental Education Program
- Charlotte Harbor Watershed Summit
- Trainings, often taught by NOAA Coastal Services Center
- Public conferences held in cooperation with a local partner

Most presentations given at these events are available as PDF files from the program website [www.CHNEP.org](http://www.CHNEP.org). Since 2012 presentations have also been saved as videos by combining the PDF of the presentation and the voice of the speaker. These are linked on the website and posted on CHNEP's YouTube channel CHNEP1995. These videos help fulfill our plan to protect the environment.

## Videos and More

The CHNEP has produced a series of videos and is developing a Citizens Academy, an e-learning website to learn about the natural environment of southwest Florida and ways to resolve issues that confront the health of the environment.

All videos are online on YouTube channel CHNEP1995 and are available on DVD from the CHNEP. Libraries within the CHNEP study area may also have copies available on loan.

- ***Sea life in Southwest Florida Estuaries: Animals in the fresh and salt water mix***. Eight “virtual wading trip” videos feature the animals that live in the waters of our estuaries. Estuaries — where fresh and salt water mix — are important habitats for a variety of sea life. The 30-minute video features 18 experts and nearly 50 animals. Seven other videos range from 1 to 3 minutes in length and feature megafauna, sharks eye, univalves, crabs, creeks in fish, sea hairs and invertebrates.
- ***CHNEP Neighbor-to-Nighbor Florida-Friendly Landscaping***. Seventeen neighbors in southwest Florida show how they transformed their diverse properties into beautiful oasis for people and wildlife that conserve precious water resources and reduce pollution but also save time and money. Ten 1-minute videos focus on 10 principles.
- ***The Network of an Estuary: Charlotte Harbor National Estuary Program***. Clyde Butcher and 17 members of the CHNEP Management Conference tell the story of the value of our local estuaries, the importance of the CHNEP and issues of concern and actions undertaken by the Program's partners during this 27-minute and 8-minute videos.

Other videos include *Adventures in the Charlotte Harbor Watershed Read-a-Long*, produced by Lee County School District, and short videos for the CHNEP Citizens Academy, Charlotte Harbor Nature Festival and the Student Advisory Council.





# Printed Resources

The CHNEP is pleased to offer several resources free of charge to provide information to help you become part of the solution. These resources include a wide variety of publications for the general public and for the scientific community (some are only available as PDF files on the website), grant reports, PowerPoint presentations (as PDF files and videos) and reports from conferences and other events, videos and posters. New resources are listed on the website at [www.CHNEP.org](http://www.CHNEP.org) as they are created. This document only describes a few items created for the public.

- **Harbor Happenings Magazine**

Want to receive information on a regular basis? Subscribe to this free magazine. Four times a year the 16-page magazine provides current information on Program activities as well as topics and issues of concern in the greater Charlotte Harbor watershed. Most issues now also include a 11x17" poster.

- **CHNEP Calendar**

Since 2005, the CHNEP has produced a calendar of donated images that capture the beauty and diversity of the native, natural environment found within the CHNEP geographic area. The calendar is mailed free to subscribers of the magazine *Harbor Happenings* and is available for pickup at select events and locations.

- ***Adventures in the Charlotte Harbor Watershed: A Story of Four Animals and Their Neighborhoods***

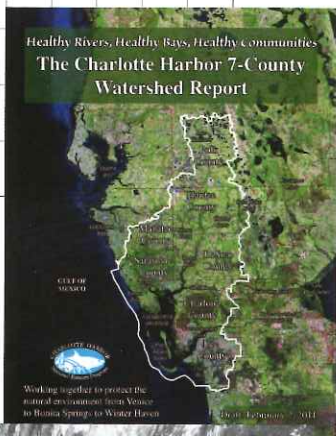
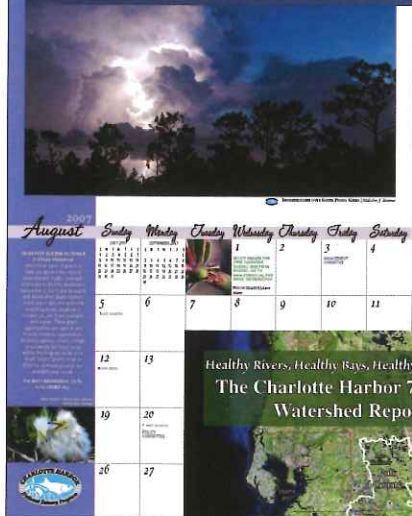
Since 2008, the CHNEP has distributed this 60-page book to each child at one grade level (third or fifth) in each of the seven school districts. For many of these 18,000 students, *Adventures* is the first book of their very own. Books are also available to private school and home-schooled students. It is available for purchase from the Friends of Charlotte Harbor Estuary ([www.CHNEPfriends.org](http://www.CHNEPfriends.org)) and is available free as a PDF file.

- ***Charlotte Harbor 7-County Watershed Report: Healthy Rivers, Healthy Bays, Healthy Communities***

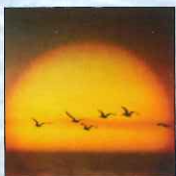
The 24-page report published in 2011 provides environmental indicators that answer important questions: • Do our waters support diverse and healthy fish communities? • Are the fish and shellfish safe to eat? • Is fish and wildlife habitat increasing or decreasing? • What is our shoreline condition? • What lands are managed for the environment? • Who restores nature? • Do our river flows reflect nature? • Is our water clean? • Where does water pollution come from?

- **Posters**

Two of the four posters CHNEP has produced are currently available. Clyde Butcher donated the black-and-white image of the Myakka Canopy Trail in this 22-inch wide x 19.5-inch wide high poster. Artist Diane Pierce features a captivating, real-life osprey/river scene in this 36-inch wide 24-inch high poster.







## Thoughts From CHNEP Management Conference Members

The CCMP is the guiding document for all of our actions. The CCMP guides our science and strengthens our stewardship. Regularly scheduled updates keeps the CHNEP ever current and ever vigilant. — Deb Highsmith, Citizens Advisory Committee

This *Comprehensive Conservation and Management Plan* represents a unique collaboration among local, regional, State and Federal governments to commit to comprehensive actions to restore and protect this nationally recognized estuary. — Doug Mundrick, U.S. EPA Region 4

This update of the CCMP for the CHNEP reflects the forward thinking and collective energy of an engaged local citizenry which is, in the end, the only true means for achieving sustainable watershed management of our nationally significant estuaries like Charlotte Harbor. — Bill Cox, U.S. EPA Region 4

The CHNEP's outreach program provides a powerful mechanism to inform and involve the public regarding significant activities affecting the Charlotte Harbor estuary. An informed and active public provides the foundation and support for balanced decisions that protect the unique and valuable resources of this nationally important resource. — Bob Howard, U.S. EPA Region 4



The CHNEP is incredibly productive and fosters valuable collaborations that help us keep southwest Florida a desirable place to live. I am honored to be involved. — Nora Egan Demers, Florida Gulf Coast University and Estero Bay Agency on Bay Management

The CCMP is the product of collaboration on a scale that is hard to comprehend. The result of all these entities working together is a successful continuing improvement of conditions in Florida's unique estuary, Charlotte Harbor. This is good for tourism, business and the flora and fauna that sustain our economy. — Don McCormick, SWFRPC delegate to the CHNEP Policy Committee

I think we can all agree that protection of our nation's estuaries is a worthwhile endeavor. It is not enough, however, just to say the words. Quantifiable goals and objectives detailing how the estuaries are to be protected, along with quantitative metrics to measure progress toward achieving stated objectives are critical. The CHNEP *Comprehensive Conservation and Management Plan* is a model document which fulfills this critical need. — Louis E. Kovach, Citizens Advisory Committee

There are 146 estuaries in the United States. 27 of them are on the National Estuary Program with 26 being on "cleanup" programs. Charlotte Harbor is on a management program as it is the most pristine. It is a privilege to serve on the Citizens Advisory Council for CHNEP. It makes an ordinary person such as myself feel involved in the protection of Charlotte Harbor and its contributory rivers - the Myakka, the Peace and the Caloosahatchee and of course all its wetlands, creeks, and streams, Charlotte County must take care of its greatest treasure for its beauty, recreation, economics and the health of all its dependent species. — Gail Giles, Citizens Advisory Committee

It is nice to know that the efforts we make in improving the quality and flow of the water to our lakes will not only improve our resource but also all of the waters downstream. — Beverly Sidenstick, League of Women Voters



# What can you do?

## Become a Steward

Stewardship is critical to the continued preservation, restoration and enhancement of the Charlotte Harbor estuarine system. This careful and responsible management of our natural resources is entrusted to the care of the people who live in, work in and enjoy the estuaries and watersheds.

The CHNEP brings citizens, elected officials, resource managers, and commercial and recreational resource users together as partners who will work as advocates for the estuarine system by building consensus based on sound science and assessment.

To learn more, visit [www.CHNEP.org](http://www.CHNEP.org), contact the Program Office, participate in the many activities the Program offers through its partners and join the Technical and Citizens Advisory committees.

## Speakers Are Available

The CHNEP offers a free program to interested groups and organizations. The presentation focuses on the efforts of hundreds of people working together to ensure the health of the greater Charlotte Harbor watershed. Local participation is crucial to the Program's success. To learn more, please contact the Program Office (toll-free 866/835-5785) and request that a presentation be made to your organization.

## CHNEP Friends

The Friends of the Charlotte Harbor Estuary, Inc. is the CHNEP's support group. Make a tax deductible donation to support our programs online at [www.chnepfriends.org](http://www.chnepfriends.org) or by mail to PO Box 511422, Punta Gorda FL 33951-1422.

## Charlotte Harbor Water Atlas

This web-based tool provides comprehensive and current water quality, hydrologic and ecologic data, information about local conservation efforts, volunteer and recreational opportunities, and a library of scientific and educational materials on water resource issues. Learn more at [www.wateratlas.com](http://www.wateratlas.com).

## Things To Do

1. Keep your boat and our water clean. Take your boat out of the water when doing thorough cleaning, scraping or painting jobs. Always use pumpouts to empty your holding tank.

2. Watch for and keep exotic plants and animals out of our area. Never release nonnatives into the wild.

3. Use your car less and never pour anything down the storm drain.

Vehicles are the biggest cause of air pollution in Florida.

4. Keep vegetation and shorelines natural.

5. Use less water.

6. Cut down on fertilizers and pesticides. Follow local fertilizer ordinances.

7. Pick up after your pets.

8. Keep your septic tank in top working order. Have your system inspected every 2–3 years and get your tank pumped when needed.

9. Reduce impervious surfaces in your yard. Improve water quality and water flows by reducing the area concrete and asphalt at your home or business.

10. Get involved!

## Committing To Our Future



When an estuary's  
components  
are in balance,  
all life flourishes.





The Charlotte Harbor National Estuary Program  
*Comprehensive Conservation and Management Plan (CCMP)*

is a starting point — a time to take stock in what we have accomplished.

To those who contributed time and energy,  
your efforts are realized in this plan.

For those citizens of and visitors to the greater Charlotte Harbor watershed  
who are learning about our issues for the first time,

we hope you will join us in our efforts  
to protect the well being of this special region.

**Let us all commit to making the CCMP a success.**



**Charlotte Harbor National Estuary Program**

326 West Marion Avenue  
Punta Gorda, FL 33950-4417



THE MAGAZINE OF THE CHARLOTTE HARBOR NATIONAL ESTUARY PROGRAM



# HARBOR HAPPENINGS

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

## Tackling a new pollutant threat to our waters: Microplastic!

Plastic material is entering our ocean at an alarming rate, breaking into small pieces from larger plastic objects or washing in as microfiber strands. This material, often too small to see with the naked eye, is called Microplastic. It can be readily taken up the food chain, posing risks to aquatic life and human health. To learn more about this growing problem and what the Charlotte Harbor National Estuary Program is doing about it, *check out page 6.*

Summer 2017: Volume 21, Issue 2



Photo credit: Heidi Savelli





## Executive Director Update

*Jennifer Hecker*

Sometimes it's the things we don't see or even think about that are adversely impacting our waters. Whether its microplastic or unnatural salinity swings, these nearly invisible factors can pose significant risks to aquatic life, water quality, and our quality of life.

Here at the Charlotte Harbor National Estuary Program (CHNEP), we have been diving into understanding lesser known pollutants. This summer, we are launching a new Citizen Scientist initiative to gather and analyze samples to test for the presence and distribution of microplastic along our coasts. This particularly insidious pollutant is growing and becoming a larger problem worldwide; however, there has been little sampling done to date in our region. That is why we are excited to work with the Florida Sea Grant program and other partners to help fill this data gap. Only when we truly understand the severity and nature of this problem, will we be able to make informed-decisions to address it.

Another unseen threat is too much or too little freshwater flow — causing the delicate balance of saltiness or salinity in our estuaries, which is needed to support aquatic grasses and oysters, to be lost. After a winter where many rivers were deprived of enough flow to keep them healthy, now followed by a summer that has them deluged with excess stormwater, it is clear more needs to be done to restore hydrology and add additional water storage and treatment capacity throughout our entire Study Area.

Fixing hydrology in our region is a priority for CHNEP. Therefore, we are working with partners on initiatives such as the South Lee County Watershed Initiative. Facilitating and supporting our partners to identify the highest priority projects, and then assisting in preparing funding applications and advocating for them, is a critical role for us as a National Estuary Program.

Another important role for us is providing technical review to our partners. We are very pleased to have peer reviewed the recently released *Estuaries Report Card for Southwest Florida*. This Conservancy of Southwest Florida report compliments the work we do here at CHNEP in collecting and conveying scientific information. Additionally, with our new Program Scientist and two Conservation Associate interns, who are studying Environmental Studies and Marine Biology, CHNEP is well positioned to increase its scientific research, analysis, and communications.

CHNEP is at the forefront of protecting and restoring our waters but we need you. Please consider joining us as a CHNEP Citizen Scientist or CHNEP Ambassador if you haven't already. As a volunteer, you will make a much-needed direct impact. If your are unable to, there are so many other ways to get involved through our website - whether by donating, becoming better informed through our online resources, or coming to one of our meetings or community events.

Thank you for all you do to protect our waters,

*Jennifer Hecker*



# Meet CHNEP's Summer Conservation Associates

The Charlotte Harbor National Estuary Program (CHNEP) is now offering paid internships to aspiring environmental professionals — starting this summer with two interns from Florida Gulf Coast University: Jessica DeYoung and Sierra Strickland. They have been providing important assistance with many CHNEP projects such as updating the regional RESTORE Act project list, compiling projects for the South Lee County Watershed Initiative, supporting the launch of a microplastic monitoring program, and conducting oyster monitoring in our study area.

Jessica DeYoung was born and raised in Punta Gorda. As a Florida native she is passionate about both local art and the environment. After earning her B.A. in Environmental Studies, she plans to center her career on conservation efforts in sub-tropical environments while earning her Masters in Ecology. She is contributing specifically to CHNEP's public outreach and research initiatives.



"I am appreciative of the opportunity to gain valuable field work experience interning with CHNEP." — Jessica DeYoung



Sierra Strickland, also a Florida native, is currently finishing her B.S. in Marine Science with minors in biology and geology. She is zealous on all matters pertaining to marine ecosystems, particularly as it relates to water quality. She hopes to next attend graduate school to earn her Masters in Environmental Studies and her Juris Doctorate to practice Environmental Law. At CHNEP, Sierra is focused on supporting the various CHNEP science projects — both in the office and out in the field.

"I admire what CHNEP does for Southwest Florida and I'm proud to be a part of this program." — Sierra Strickland

Both Conservation Associates have been working closely with each other and CHNEP staff to further CHNEP's Comprehensive Conservation and Management Plan's objectives and priority actions. It's a win-win partnership that is enabling them to gain professional experience and mentorship, while strengthening CHNEP's relationship with local universities and expanding its reach for protecting our waters.

## Charlotte Harbor National Estuary Program

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## Harbor Happenings, Summer 2017: Volume 21, Issue 2

CHNEP publishes this free magazine to provide updates about environmental news in CHNEP study area. News items, photographs and letters are welcome and may be submitted to the editor by mail or email. The magazine is typically distributed quarterly. Sign up for a free subscription on our website.

**Editor:** Jennifer Hecker, [jennifer@chnep.org](mailto:jennifer@chnep.org)

**Contributor:** Eric Strickland, Florida Forest Service



# Restoring the Longleaf Pine Ecosystem

Contributor: Eric Strickland, Senior Forester, Florida Forest Service

When the state of Florida was being settled by explorers from Europe, there were reports of open or widely scattered forests of large pines with thick grasses underneath, growing throughout large swaths of Florida. The great pines in these forests later came to be known as Longleaf pine because of their up to 15-inch-long needles, which are the longest of any pine in the southeast United States. They are a unique ecosystem with many dependent animals and plants.

These forests, which covered as much as 90 million acres throughout the southeast U.S., were later decimated down to less than 4 million for several reasons. The first reason being that their timber was very valuable for building homes,

barns, and fences. In addition, settlers opened spaces in the forests to plant crops and raise cattle.

It did not occur to the harvesters that this natural resource would ever run out. They did not consider replanting or practicing any form of natural regeneration such as leaving seed trees. The second, not as obvious, reason for the decline of these great forests has to do with the dependency of this species on fire.

One unique characteristic or adaptation of this pine species is what is called the grass stage. As a seedling, the pine bursts out into a thick tuft of needles resembling a thick mass of grass. At the center of this tuft of needles is a growth bud key to the trees' survival and growth. The tuft of grassy needles is a shield for the bud so if lightning or some other kind of ignition starts a wildfire, the needles burn from the outside in allowing the hot fire to pass over the seedling with negligible damage. This is not the case with surrounding vegetation, which the fire kills completely until the plants have time to regrow. This gave the pine tree the advantage in a race to dominance.

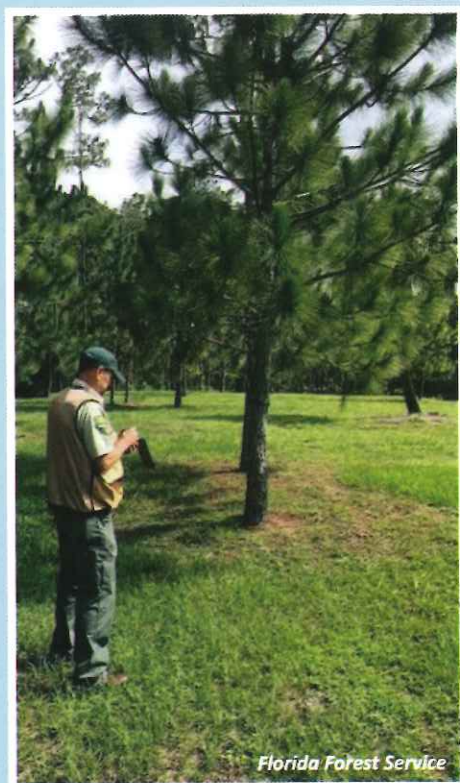
Wildlife campaigns such as the popular Smokey the Bear campaign promoted land management to suppress fire altogether. Without fire, the Longleaf pine lost its edge over faster growing, early transitional species.



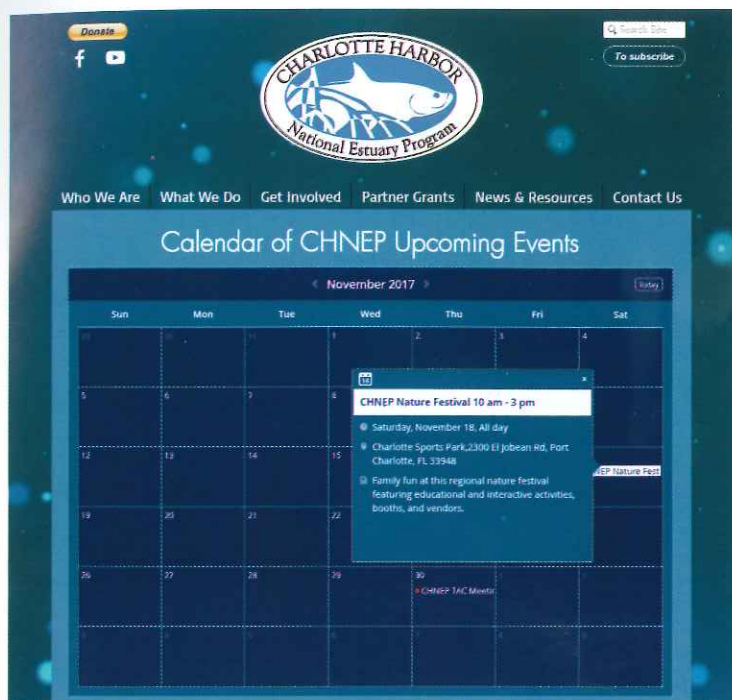
Finally, foresters realized the need to start replanting timber for replenishment, so colleges and universities started teaching young foresters to replant. However, these schools were focused on growth and yield. The faster you could grow a tree and get it to a point for harvest, the better.

This is where the grass stage, once again, plays a role in the Longleaf regeneration, but this time it is a disadvantage. The schools realized that the Longleaf pine stays in the grass stage for 4 to 10 years while it establishes its root system and develops a more formidable stem diameter. This is a serious delay in growth; therefore, forestry teachers at major colleges recommended the planting of other, faster growing pine species. For this reason, there are not many replanted Longleaf pines.

*Continued on Page 12*







## SAVE THE DATE for CHNEP's Fall Events

Want info on upcoming Conservation Lands Workshop, Nature Festival, and more?  
***Check our Calendar online.***

**TO REGISTER AND LEARN MORE:**  
Go to <https://www.chnep.org/events>, click on the "Get Involved" tab in the top navigation bar and then choose "CHNEP Events Calendar."  
Also, check out [www.EventBrite.com](http://www.EventBrite.com), search for CHNEP and be sure to change the location to Florida.

## New Program Scientist Joins CHNEP

We are pleased to introduce Allison Conner, who has been retained to assist CHNEP this coming year as a Program Scientist. Since 2008, Allison has conducted numerous projects throughout Florida involving the biological assessment of habitats including pine flatwood, oyster reef, mangrove, seagrass, coral reef, hardbottom, and wetland environments. She earned her B.S. in Biology from the University of Central Florida and her M.P.S. in Tropical Marine Ecosystem Management from the University of Miami Rosenstiel School of Marine and Atmospheric Science.

Most recently, Allison was employed by the Florida Department of Environmental Protection (DEP) South District office, providing the agency with natural resource assessment of freshwater, marine, and estuarine environments. In 2016, she was recognized by then Secretary Jon Stevenson for her efforts to enhance and streamline the Department's environmental resource assessment protocol and reporting.



"I am eager to assist partnerships and initiatives that help protect the natural resources in these watersheds." – Allison Conner

Prior to her tenure with the DEP, she worked as Data Manager and Scientific Diver for Dial Cordy & Associates, Inc. South Florida Regional office, on the Port of Miami Phase III Federal Channel expansion Project, conducting seagrass, hardbottom, and coral reef construction monitoring and reporting.

As part of her M.P.S. degree program, she worked for the Key Biscayne Citizen Scientist Project, teaching species identification, coastal resource survey methodology, proper data collection and entry techniques to environmental stewards of Key Biscayne.

In her role with CHNEP, Allison will be staff liaison to the Technical and Citizens Advisory Committees, as well as the team lead on CHNEP's scientific research and restoration projects.



# The Basics about Microplastic

## What is microplastic and why is it an issue?

Microplastic is plastic materials less than 5mm in size. This means they are often not visible to the naked eye, but can be seen with the help of a microscope. The material can break into smaller sizes but does not biologically degrade. Therefore, its composition, size and persistence can lead to it becoming widespread in our waters.

## Where does it come from?

Microplastic can originate from several processes. One is from larger pieces of plastic breaking into smaller pieces through the forces of sun, wind, and waves. Another is that it can start off as a tiny plastic particle that has been used for industrial purposes in plastic shipping and commercial personal care products such as cosmetics and clothes. Through storm water run-off and the natural watershed system, plastic eventually ends up in large water bodies. Microplastic can also originate as a piece of microfiber that has shed from washing of synthetic fabric clothing.

## How does it harm us?

Since plastic is a man-made material, it is composed of different chemicals. These chemicals can be known carcinogens (cancer-causing), flame retardants, and other harmful substances. Microplastic or microfibers in the water can become ingested in marine life and, in turn, if we eat that fish or shellfish, can cause human health issues.

### To learn more go to:

<http://www.beatthemicrobead.org/product-lists>  
<https://householdproducts.nlm.nih.gov/index>  
<http://www.plasticfreejuly.org/personal-care>

## DID YOU KNOW?

- ♦ 78% of the chemicals used in plastic are considered to be “priority pollutants” the US Environmental Protection Agency.
- ♦ The amount of plastic bags used in a year could circumnavigate the globe 4,200 times!

## What is the solution?

Prevention in choosing natural materials over plastics is the best solution. Reducing personal reliance on one-time use plastic, such as opting for reusable cups and canvas bags instead of bottled water and plastic grocery bags, can dramatically reduce the microplastic we generate. Additionally, buying cotton, silk, rayon or other natural clothing instead of synthetic clothing can reduce the microfibers entering our air and water.

## Categorizing Microplastic

When analyzing Microplastic samples, they are actually classified into the four categories:

**Fibers** typically are emitted from synthetic clothing that sheds fibers when washed.

**Film** is paper-thin plastic flakes from food wrapping and grocery bags.

**Fragments** are broken off pieces from larger plastics (possibly from things like toys or plastic parts).

**Microbeads** are tiny round plastic beads used in many cosmetic and hygiene products, including toothpaste and soap.



# Partnering with Local Organizations to Conduct Microplastic Monitoring

The Charlotte Harbor National Estuary Program helps our partners obtain training, funding, equipment and other tools to do the research and restoration work needed to protect our waters. Recently, in launching our Microplastic Research area in CHNEP study area, we have engaged two local organizations to sample and analyze this emerging pollutant.

## Hardee County

The Hardee County Outdoor Classroom offers a unique opportunity for students interested in the environment. Grade school students from elementary to high may participate in the Outdoor Classroom program by going on special field trips focusing on water quality. Recently, CHNEP and Hardee County school district staff facilitated a microplastic sampling project with the summer program students at Cayo Costa State Park. Following the Gulf of Mexico Alliance (GOMA) Marine Debris Monitoring Programs' methods, students conducted water and sediment sampling along the undeveloped barrier island.

The purpose of this project is beneficial in an assortment of ways including:

- Educating future scientists
- Generating a map of where microplastic are along our coast
- Understanding the scope of the issue
- Furthering research for restoration efforts

## FGCU's Marine Field Station—"Vester"

Vester will be the southernmost microplastic sampling station in our watershed, allowing students and citizen scientists' accessibility to the station's facilities to contribute further in identifying microplastic along the Gulf Coast.

Interested in being a Microplastic Research Partner organization? Contact us at [chnep@chnep.org](mailto:chnep@chnep.org).



Students from Hardee County working diligently collecting samples from Cayo Costa beaches.



Hardee County students analyzing samples after collection with CHNEP staff and interns.







## All That Plastic... Where Does It Go?

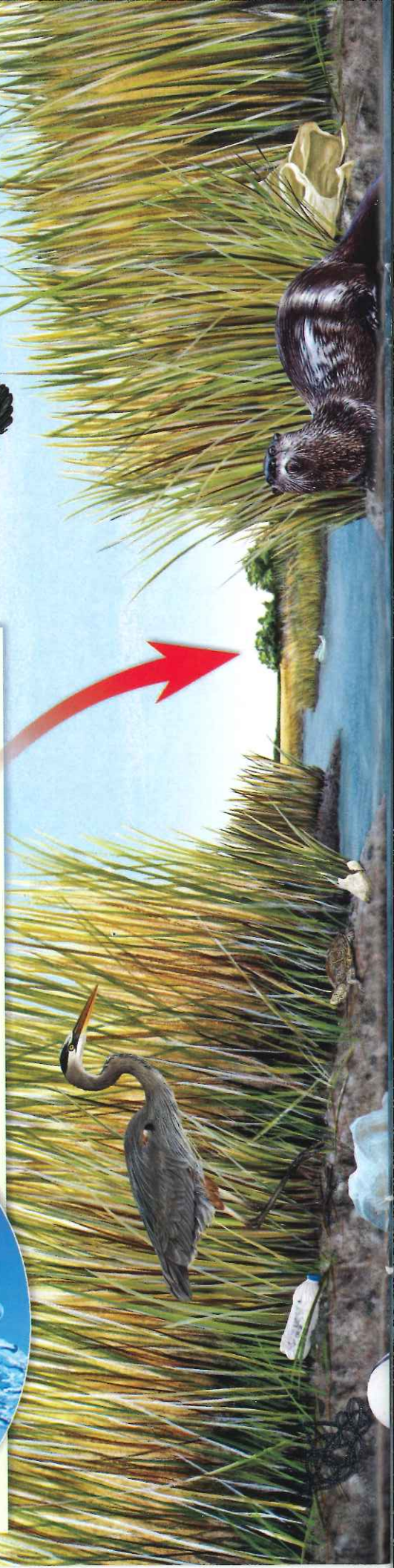
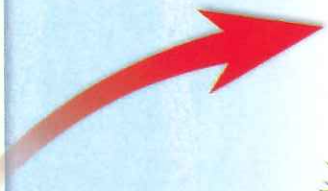
Drains, gutters, ditches, and streams lead to our rivers, estuaries, and the sea, where plastics that get flushed, tossed, or washed away end up.



Plastic litter eventually degrades into microplastics. These particles also come from microbeads used in toothpastes and facial scrubs, and from laundry fibers shed by synthetic fabrics. Many wastewater-treatment facilities are unable to filter out these particles.

# Microplastics in Estuaries

Most plastic containers can take up to 450 years to completely degrade. But well before it's gone, plastic litter breaks into smaller and smaller pieces that continue to persist in the environment. These tiny plastic particles, called microplastics, can be consumed by marine organisms. Effects from microplastics are especially pronounced in the estuaries that foster a diversity of wildlife species.





# Plastics, Microplastics, and Wildlife

Litter finds its way into our estuaries. Plastics break into tiny particles that are hard to see, but their molecules are resilient enough to remain intact for thousands of years.



**1** **Deposition and Weathering** — A discarded piece of plastic is exposed to sunlight and wave action.

**2** **Disintegration and Microplastic Formation** — In a few months, microplastic particles are released from its surface. After about a year, the plastic begins to break apart.

**3** **Adsorption** — Toxic chemicals stick (adsorb) to the surfaces of microplastics in concentrations that are a million times higher than in the surrounding water.

**4** **Ingestion** — Microplastics can be mistaken for food and ingested by small organisms and larger filter-feeders. After ingestion, adsorbed chemicals can seep into the tissues of the animals.

**5** **Secondary Ingestion** — Chemicals and microplastics in the tissues of small organisms can transfer up the food chain as small organisms are eaten by larger ones.

## Did You Know

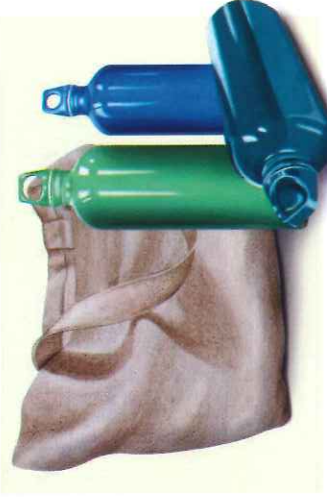
You could fit more than 400 microplastic particles on the head of a pin. The best way to keep waters free of microplastics is to clean up plastics before they break apart.



Picking up one plastic bottle and properly disposing of it will prevent tens of thousands of microplastic particles from being released into the environment.

## You Can Help

- Buy fabrics made of natural materials like cotton, flax, and wool.
- Carry a refillable drink bottle instead of using single-use beverage bottles.
- If you do drink from a disposable container, be sure it gets recycled.
- Take part in clean-up efforts to make our neighborhoods and estuaries free of plastics.



**Think about all the plastics you use, and strive to Reduce, Reuse, and Recycle.**

THE CITADEL



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# Oyster Restoration *without Plastics*

Oyster restoration can involve a number of techniques, one of which uses plastic netting to hold shell together in place when building a reef. But what if we could restore oysters without introducing more plastics into our waters? Well, we may now have the technology to do so.

The new technology is a biodegradable material that was specially designed to be used for ecosystem restoration. The Biodegradable Ecosystem Engineering Elements, or BESE-elements® for short, were originally engineered to meet the needs of scientists in the Netherlands working on mussel bed restoration.



*Greg Favish, a PhD student at Radboud University, Nijmegen, the Netherlands assembling a BESE-element.*

The team of scientists, working for the Bureau Waardenburg, collaborated with materials engineers to develop a sustainable, non-toxic material that would biodegrade over time in the natural elements. **The material, interestingly enough, is made from potato starch, which is a bi-product from potato chip manufacturing.**

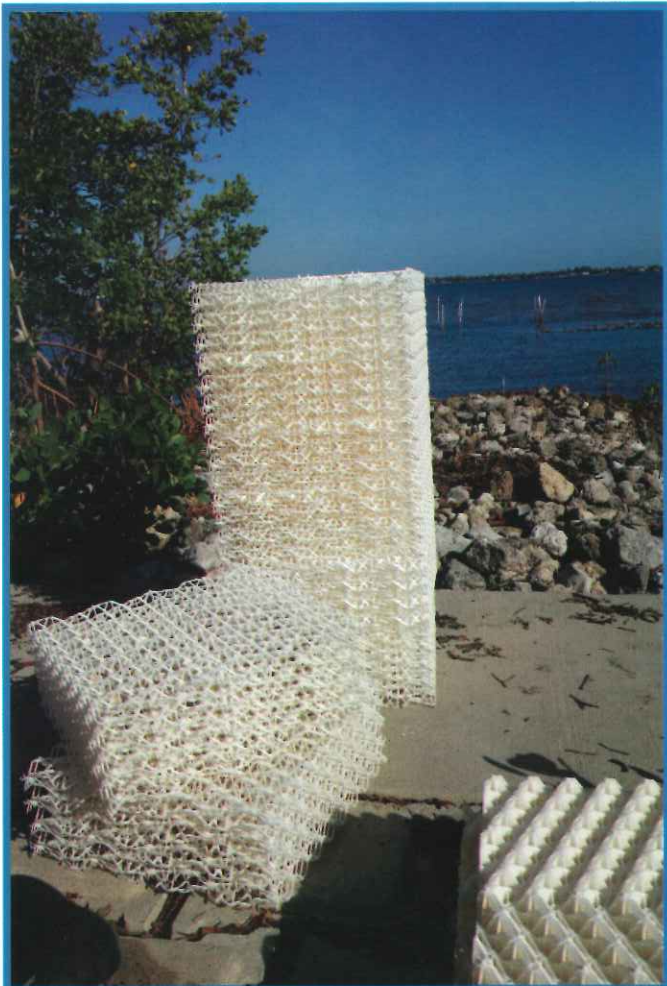
The material is produced in sheets that can be layered to provide a three-dimensional structure of any height, allowing tailoring to specific project needs. The BESE elements® are **currently being tested for the utility to stimulate recovery of a wide-variety of natural habitats, including shellfish reefs, salt marsh vegetation, dune and bank-side vegetation, submerged macrophytes, mangroves and coral reefs.**

Could this material be a better solution for restoring oyster reef habitat in our region? *Read on next page to learn more how we hope to find out.*

**For more information about BESE-elements® visit [www.bese-elements.com](http://www.bese-elements.com) or contact:**

**Wouter Lengkeek, [w.lengkeek@buwa.nl](mailto:w.lengkeek@buwa.nl)**

**Karin Didden, [k.didden@buwa.nl](mailto:k.didden@buwa.nl)**



*A stack of BESE-elements waiting to be deployed.*



# CHNEP Working with Partners to Deploy New Technology

Over the past two years, the Charlotte Harbor National Estuary Program (CHNEP) has been working in partnership with The Nature Conservancy (TNC) and the Charlotte Harbor Aquatic Preserves to assist in monitoring the success of three different oyster reef restoration techniques at Trabue Harborwalk in Punta Gorda. **Recently the circle of partners expanded, along with the addition of the testing of a new restoration technique.**

Dutch scientists Dr. Wouter Lengkeek, Dr. Karin Didderen and Malenthe Teunis, in collaboration with Dr. Christine Angelini at the University of Florida, are studying the use of BESE-elements® throughout Florida.

When TNC found out about the collaboration, they jumped on the opportunity to bring the scientists and their experimental materials to Charlotte Harbor.

The Nature Conservancy was able to quickly get approval from the Department of Environmental Protection and the US Army Corps for the **placement of 16 small BESE-element® units within the vicinity of the existing experimental oyster reefs.**

With the help of the Charlotte Harbor Aquatic Preserves staff, locations were identified where seagrass would not be impacted. **On a beautiful April morning, a group representing all the various partners including CHNEP staff met to assemble and install the BESE-elements®.**

The experimental units were placed to test the success at two different water levels. Half of the units were also manipulated to include oyster shell between the layers of materials; this will allow the scientists to determine if the inclusion of oyster shells enhances the settlement of juvenile oysters.

CHNEP, including a few citizen scientists, will continue to assist with monthly checks on the BESE-elements®.

**After one month in the water, observations showed that the structures were integrating into the natural environment, with crown conchs laying eggs on the structures, barnacles and algae attaching and growing, and small fish swimming around and through the material.**

This new technology is looking promising and we are excited for the potential to reduce the use of plastic materials in the restoration process!



*Laura Geselbracht from TNC, Malenthe Teunis from Bureau Waardenburg and a graduate student assembling BESE-elements with oyster shell to ready for deployment.*

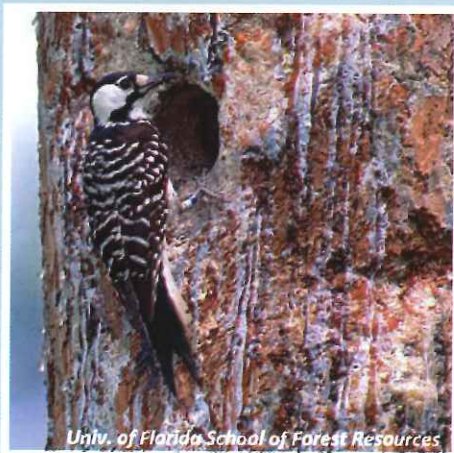


## Longleaf Pine, from page 4

However, recovery is in reach. In recent years, foresters have become more educated on the importance of conservation and care of ecosystems that were in danger. In the case of Longleaf, there has been a huge effort, led by multiple organizations, to regain the imperiled ecosystems.

One such organization is the Longleaf Alliance, which was established in the mid-90s by teachers and foresters from Auburn University. Their goal is to have 8 million acres of Longleaf pine re-established by the year 2024, and they planted approximately 1.6 million Long-leaf seedlings on 3,200 acres in 2016 alone. The Alliance has also taken part in educating over 4,300 landowners by giving them technical assistance in site preparation, planting, prescribed burning, and other stand-management issues.

The Florida Forest Service (FFS) has also played a large role in this effort in the state of Florida. The FFS employs Cooperative Forestry Assistance foresters throughout the state who have the responsibility of assisting land-owners with management issues by writing plans and making management recommendations.



*Endangered Red-cockaded woodpecker nesting in a Florida Longleaf pine.*



*Babcock Ranch Pine Flatwoods*

FFS foresters administer or guide landowners to a number of Cost Share programs to include the Environmental Quality Incentive Program (EQIP), which helps landowners turn cropland back into Longleaf pine by paying for a portion of site preparation, planting, and prescribed burning through the Natural Resources and Conservation Service (NRCS).

In recent months, the foresters have been assisting Florida Natural Areas Inventory (FNAI) experts in on-the-ground confirmation of the location of the existing Longleaf pine ecosystem. It is very important work to find out more information on where the pines still exist and where focus must be placed when restoring the trees.

The FFS also assists landowners with conducting prescribed burns. They also provide training and certification for them to conduct their own burns properly and safely. Our state foresters are helping to restore this great pine species to its original glory and in doing so, help to secure the ecosystem and the many dependent

animals and plants who rely on it including the endangered Red-cockaded woodpecker.

CHNEP has prioritized protecting rare native habitats like the Longleaf pine ecosystem. We have advocated for the purchase of lands in our study area, such as Babcock Ranch, which contains some of these special forests.

Babcock Ranch was purchased by the State of Florida and is now being managed by the Florida Forest Service as a Preserve — one of many examples of how CHNEP works with its partners to protect these outstanding natural resources.

### **Longleaf Alliance**

<http://www.longleafalliance.org>

### **FNAI Longleaf Mapping**

<http://fnai.org/LongleafGDB.cfm>

### **Florida Forest Service**

<http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service>



# The Effects of Boat Traffic on Water Quality

as Measured by Levels of Turbidity, Colored Dissolved Organic Matter, and Chlorophyll a

*Special Contributor: Melissa Marchese, Canterbury School, Grade 12, CHNEP Science Fair Award Winner*

We often find that our daily activities have a scope beyond ourselves, for better or for worse. Our Florida waterways burst with life, from plankton to marine mammals, and are enjoyed by many people. The marine lifestyles of residents and tourists alike provide opportunities to experience the natural beauty that surrounds us but do not come without responsibility. Boating activity impacts the environment in various ways, especially the vital abiotic factor of water quality.

As boats pass through water, especially in shallow areas with higher speed limits, the wakes cause disturbances that re-suspend matter previously at rest. This can be anything from inorganic sediment to decaying organic material, to phytoplankton and algae. The organic components can be assessed by measuring colored dissolved organic matter (CDOM) and chlorophyll a- algae's main photosynthetic pigment. These various particles are classified as turbidity, which decreases clarity of the water, raises temperatures, decreases dissolved oxygen levels, and increases light attenuation so less light penetrates to the seafloor where light dependent producers such as seagrasses are growing. While these fluctuations may seem trivial, with heavy boat traffic and certain conditions, the effects can dramatically alter the seafloor, water quality, and ecosystem.

The declining Southwest Florida seagrass presence, despite restoration efforts, is largely due to water clarity among many other factors. Increased turbidity serves as an indicator of decreased clarity. Through experimentation, I sought to determine to what extent water clarity is affected by boating in measuring turbidity and two of its organic components— CDOM and chlorophyll a. I also aimed to study the relationship between these three factors.

Data collection took place during fall 2016 and early winter 2017. Water was sampled on weekdays and weekends at varying times of the day from both the Estero Bay and the Caloosahatchee River Estuary. Both locations had substantial boating, speed limits which permit significant wake, and contain seagrass beds (according to maps). Wind and tides at the sites were recorded during sampling to account for

environmental variables. The samples were then analyzed using a laboratory fluorometer to measure the amount of light deflected by specific particles present in the water.

The results supported the hypothesis in both locations with a solid relationship between increased boats and turbidity, correlating 81% and 86%. However, this trend did not carry over to the organic components of turbidity- CDOM and chlorophyll a levels- which are likely affected in greater part by other environmental factors, demonstrating that the majority of suspended particles were inorganic sediments. While boat traffic was shown to affect turbidity levels both wind and tide only possessed weak or non-existent correlations. Thus, the results support a significant link between boat traffic and water clarity.

These conclusions are not to discourage boating but instead provide an opportunity to stabilize seagrass populations through prevention of a problem before mitigating the effects. The results suggest that reducing boating impact via decreased traffic or lowered speed limits and smaller wakes near beds would create more favorable growing conditions for struggling seagrass populations. If nothing else, everyone can remember to be mindful of our ecosystem while enjoying it and do everything possible to preserve and protect it.

I would like to acknowledge Dr. Mike Parsons of the FGCU Marine Science Department for his generous mentoring and the help of the graduate students of the department for making the project possible.

Melissa was one of four students selected and awarded a \$100 cash prize from CHNEP at 3 regional science fairs this year. This is the seventh year CHNEP has provided monetary awards to students grade 6-12 to do research relating to water resource protection.



# Working with Homeowners to Protect Their Waterways



CHNEP and its partners created a program in 2012 to assist homeowners in improving the condition of the waters they live near—called WETPLAN or Watershed Education Training - Ponds, Lakes & Neighborhoods.

WETPLAN helps residents take an active role in improving the appearance and functionality of ponds and lakes by planting or maintaining appropriate watershed-friendly vegetation and trees along the banks or in the water, and supplying supplemental aeration if needed. It also assists homeowners with shoreline restoration that improves water quality, minimizes bank erosion and provides wildlife, bird and fish habitat.

WETPLAN workshops, materials and tools outline how water from neighborhood ponds and canals finds its way downstream into creeks, rivers, and estuaries; giving residents practical tools and resources to enhance them.

Since 2013 we have held 20 workshops with more than 500 attendees, and also conducted 2 workshops targeted to specific neighborhoods and their circumstances. For the 2017-2018 season we plan to hold a full day workshop at the Lee County Hyacinth Control District facility – watch our website – [chnep.org](http://chnep.org) for the details!

For additional information about WETPLAN, and to use the app to evaluate your stormwater pond go to [wetplan.org](http://wetplan.org).

Rainy season is upon us, and that means it is time to cut back on Nitrogen and Phosphorus (N/P) fertilizer application. Here are the local requirements:

## **Lee County**

- No N/P fertilizer on turf and landscape plants June 1 through September 30
- 10 foot buffer form top of bank of any waterbody, seawall, or designated wetland

## **Sanibel:**

- No N/P fertilizer application from July 1 through Sept. 30.
- 25 foot buffer from any body of water October 1 through June 20

## **Fort Myers Beach:**

- No N/P fertilizer June 1 through September 30
- 3 foot buffer from waterbodies

## **Cape Coral:**

- No N/P fertilizing June 1 through September 30
- 10 feet buffer from seawall or waterbody

## **Charlotte County**

- No N/P fertilizing on turf or landscape plants June 1 through September 30
- 6 foot buffer from waterbody or wetland recommended

## **City of Punta Gorda**

- No N/P fertilizing June 1 through September 30
- 10 foot buffer zone (or 3 feet with deflector shield) from any waterbody or drain

## **Sarasota County**

- No N/P fertilizer June 1 through September 30
- 10 foot buffer zone from waterbodies and designated wetland or from the top of a seawall (exceptions for the first 60 for newly planted turf or landscape plants).



# Get Involved



## Join CHNEP's Citizen Science Microplastic Sampling Project!

Our staff are gearing up to work with Citizen Scientist volunteers from across the region to sample our sandy shorelines and waterways for Microplastic!

As you've read from our lead article, microplastic is cumulating into a sizable problem for marine ecosystems.

During the 2017-2018 Coastal Cleanup events in Florida, sediment and water samples will be collected in our study area.

At each collection site, 3 samples will be taken along the wrack line (point onshore where debris is deposited after high tide). Approximately a gallon of sand is scraped from the top inch of sand within the defined sampling area.

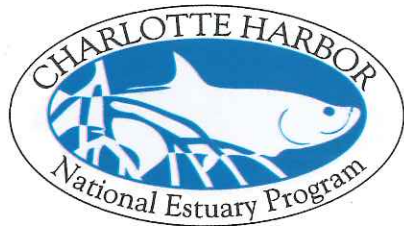
The sand is then sifted with pieces of debris discarded. Corresponding water samples are also taken in the same area as the sediment samples, just past the wave break point offshore.

These samples are then taken back to a lab for further filtering and processing. Microplastic is identified with the use of a dissection microscope; sorting out types and categorizing.

The data collected is then shared with other researchers with hopes that it will generate ways of preventing further plastics from reaching the ocean.

Interested in helping? Sign up as a Citizen Scientist at <https://www.chnep.org/get-involved>





326 W. Marion Avenue  
Punta Gorda, FL 33950-4417

***Remember: fertilizing in the summer months can feed the green algae slime monster!***

Rain naturally has nutrients, so plants thrive in our rainy season without fertilizer. Fertilizing in summer with the frequent rains can wash fertilizer away before plants uptake it, feeding algae in our waters instead. That is why fertilizing should wait until after October 1st.

