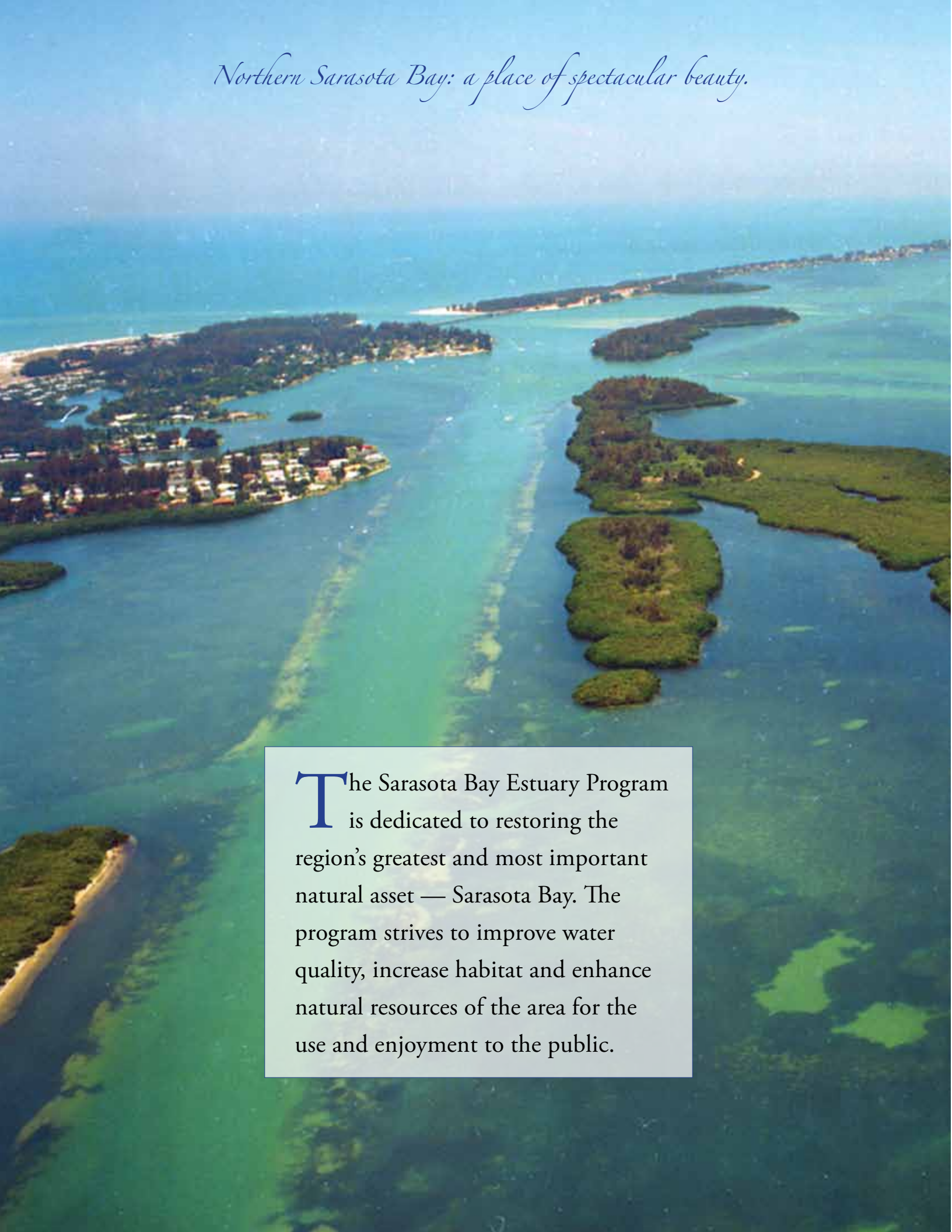
State of the Bay 2010

Celebrating Paradise

Staying the Course

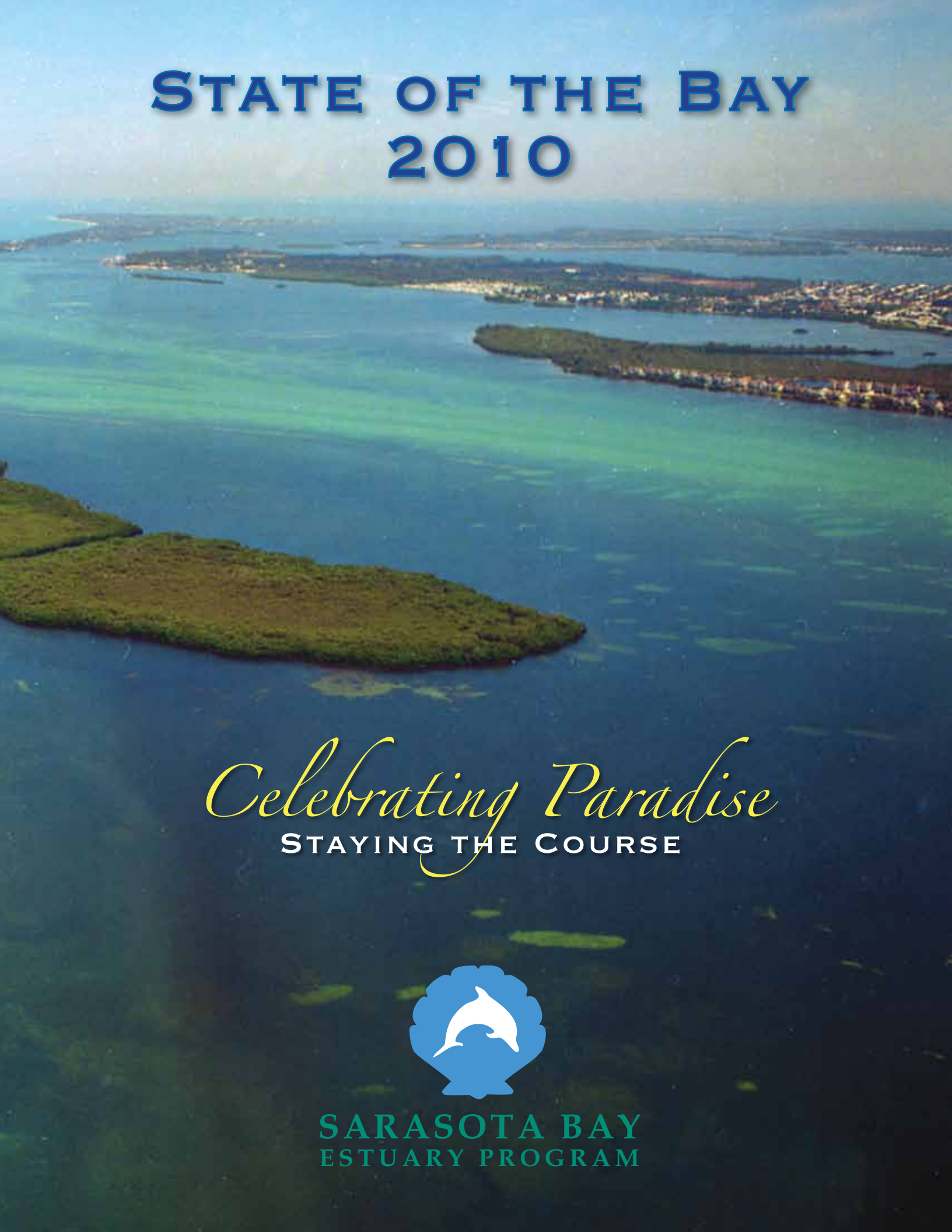
SARASOTA BAY
ESTUARY PROGRAM
Restoring Our Bays



Northern Sarasota Bay: a place of spectacular beauty.

The Sarasota Bay Estuary Program is dedicated to restoring the region's greatest and most important natural asset — Sarasota Bay. The program strives to improve water quality, increase habitat and enhance natural resources of the area for the use and enjoyment to the public.

State of the Bay 2010



Celebrating Paradise

Staying the Course

SARASOTA BAY
ESTUARY PROGRAM

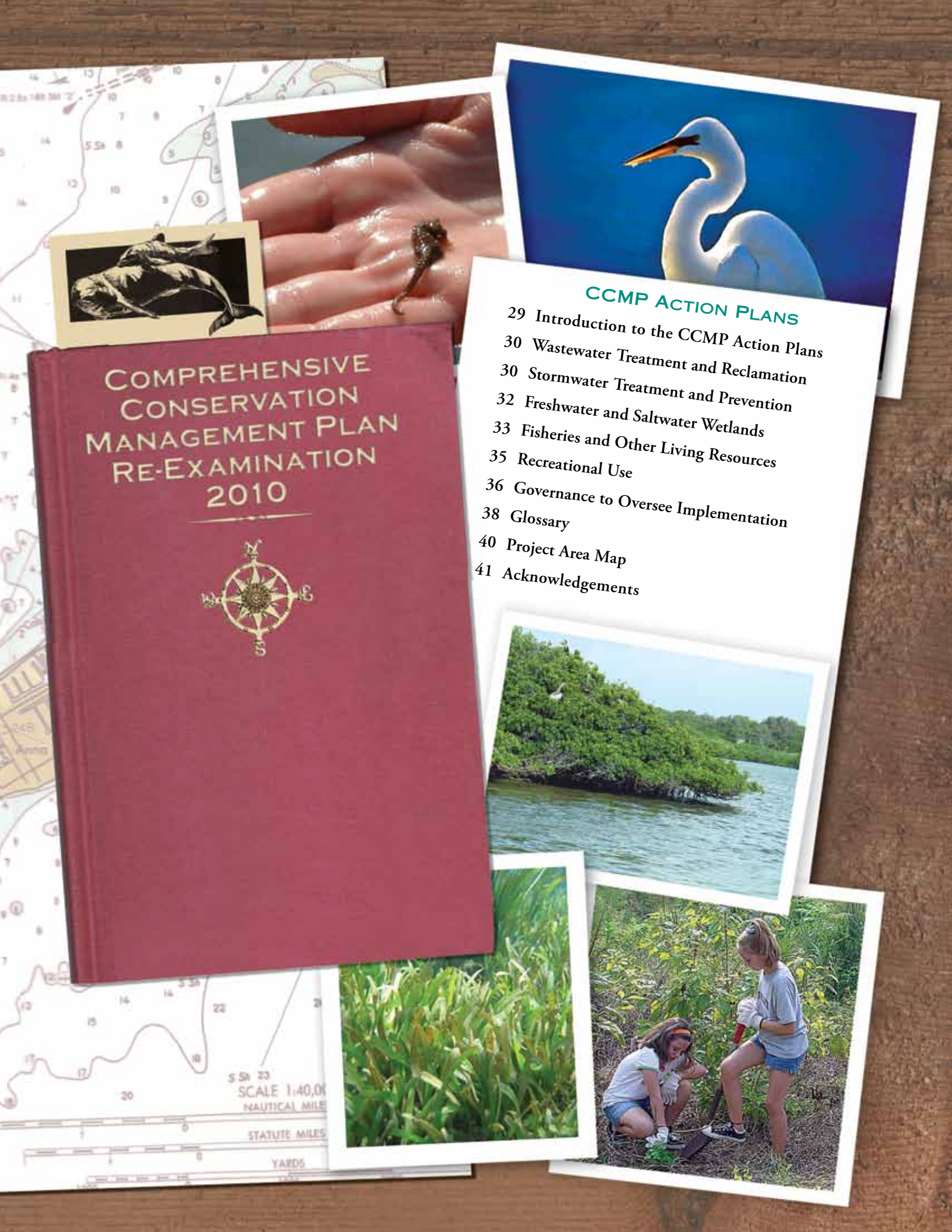
State of the Bay 2010

Celebrating Paradise

Staying the Course

Sarasota Bay: Our Greatest Asset

Public Involvement: Engage, Educate, and Encourage



CCMP Action Plans

Celebrating Paradise

Staying the Course

"Celebrating Paradise – Staying the Course" State of the Bay 2010 is an update on progress made in carrying out the Comprehensive Conservation and Management Plan (CCMP). Included in this document are revisions of the CCMP to "The Voyage to Paradise Reclaimed," signed in 1995 by the Governor of Florida and the Administrator of the U.S. Environmental Protection Agency. The fully revised CCMP is in preparation and will be released in 2011.

The achievements since 1989, when this Bay Program was founded, have been substantial, with reductions in nitrogen and bacterial pollution, recovery and restoration of natural habitats, and increased public education and access for recreational opportunities.

South Lido; Sarasota.

Accomplishments

With the founding of the Sarasota Bay Estuary Program in 1989, a partnership among local government agencies was established. Results of that partnership include:

- Significant water quality improvements in the Bay and tributaries due to an estimated 64-percent reduction in nitrogen pollution since 1988
- Seagrass coverage has increased by 24 percent above 1950
- Scallops returned to the Bay in 2008
- Restoration and enhancement of approximately 650 acres of wetland habitat with creation of 28 new ecological parks around the Bay
- Manufacture and deployment of 3,000 artificial reef modules on nine new reefs
- Establishment of the first oyster re-colonization projects
- Creation of the Gulf Coast Heritage Trail to promote managed public access to points of environmental, cultural, and historic interests around the Bay
- Establishment of the Sarasota Bay Estuary Program as a special district within the state of Florida
- Implementation of a comprehensive public education program. Since 2001, 34,000 local school children have received outdoor education about Sarasota Bay
- All Sarasota Bay waters now meet state water quality standards for nutrient pollution

The Sarasota Bay Estuary Program received first place as a Gulf Guardian in 2009 by the U.S. Environmental Protection Agency, Gulf of Mexico Program. The accolade came in the "Partnership" category due to water quality and seagrass improvements.

About the Bay

Big Pass area near Sarasota.

Estuaries are places where freshwater mixes with salty water from the sea. Teaming with life, our nation's estuaries provide vital habitats for 80 percent of the world's fish and shellfish species. Estuaries are one of our nation's most valuable natural resources, creating more food per acre than the richest farmland.

For purposes of this document, "Sarasota Bay" refers to the area that encompasses all of the Bays from the northern tip of Anna Maria Island south to Venice Inlet.

Watershed map.

Although Sarasota Bay is not a classic estuary with the influence of a major river, it is still a highly productive coastal lagoon system. The lagoon is formed by a necklace of barrier islands to the west and the mainland of Manatee and Sarasota counties to the east. The coastal lagoon – with its unique ecological character of small embayments, tidal tributaries, coves, inlets, and passes – is bounded by Anna Maria Sound to the north and stretches to just north of the Venice inlet to the south.

Sarasota Bay is made of a series of smaller bays or embayments. Each of these embayments is unique from one another. They differ in overall size, shape, water depth, habitat, sediment characterization, circulation, freshwater inputs, and pollutant delivery. Because of these differences, each embayment must be analyzed and managed independently, while but at the same time recognizing their connectivity. The following embayments have their own unique characteristics: Palma Sola Bay, Big Sarasota Bay, Roberts Bay, Little Sarasota Bay, and Blackburn Bay.

Tributaries are creeks or streams that gather water from the adjacent lands (watershed) and discharge it into a bay. The primary tributaries are Palma Sola Creek, Bowlees Creek, Whitaker Bayou, Hudson Bayou, Phillippi Creek, Catfish Creek, North Creek, and South Creek.

Sarasota Bay Management

Citizens Advisory Committee field trip to Quick Point Nature Preserve.

Sarasota Bay was named an "estuary of national significance" in the Water Quality Act of 1987. After official designation as a National Estuary Program in June 1989, a Policy Committee of local elected officials and high-ranking federal and state officials was established to oversee program operations.

Policy Committee members first took action by establishing citizen, technical, and management committees to assist in developing program activities and to institute these core policy themes:

- Make public awareness a high priority
- Seek the required level of funds from all available sources to implement the program
- Increase overall visibility of the program
- Focus the program on action, not study, whenever possible

The Comprehensive Conservation and Management Plan (CCMP) in 1995 recognized the success of the program's operations by maintaining staff to oversee the committee structure to implement the Bay Restoration Plan. The CCMP set restoration goals and called for an independent review of progress every three years.

SARASOTA BAY ESTUARY PROGRAM

Goals

The SBEP continues to focus on eight goals:

1. *Improve water transparency*
2. *Reduce the quantity and improve the quality of stormwater runoff to the Bay*
3. *Restore lost seagrasses and shoreline habitats, and eliminate further losses*
4. *Establish an appropriate management structure for Sarasota Bay*
5. *Provide increased levels of managed access to Sarasota Bay and its resources*
6. *Restore and sustain fish and other living resources in Sarasota Bay*
7. *Improve beach, inlet, and channel management*
8. *Educate the public on issues and problems facing Sarasota Bay*

As a part of the 2001 triennial review of program performance, the U.S. Environmental Protection Agency (EPA) recommended that the Sarasota Bay Estuary Program (SBEP) "establish a more formal agreement with its stakeholders."

The SBEP was established as a special district in Florida on July 23, 2004, with the signing of an interlocal agreement. Partners to the agreement are Sarasota County, Manatee County, City of Sarasota, City of Bradenton, Town of Longboat Key, Florida Department of Environmental Protection, and Southwest Florida Water Management District (SWFWMD). U.S. EPA is participating as a partner under memoranda of understanding.

The SBEP is one of twenty-eight EPA National Estuary Programs in the United States. There are four National Estuary Programs in the State of Florida including Indian River Lagoon NEP, Tampa Bay Estuary Program, and Charlotte Harbor Estuary Program.

Sarasota County

City of Sarasota

Manatee County Government

City of Bradenton Florida

Longboat Key Incorporated

Florida

Sponsored in part by the Manasota Basin Board of the Southwest Florida Water Management District

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Sarasota Bay History

Sarasota Bay was formed about 6,000 years ago. Sea level has fluctuated substantially during the past few million years in response to global climate changes and alterations in polar ice caps. Geologically, sea level in what is now the Sarasota Bay area has ranged from as much as 330 feet below to perhaps as much as 100 feet above present levels. As recently as 17,000 years ago, the shoreline of the Gulf of Mexico was approximately 60 miles to the west.

Sarasota Bay served as a primary waterway for the Tocobaga, Timucuan, and Calusa Indians during the 1500s.

Huge shell mounds, called middens, were created by these people and are still visible on the mainland of Sarasota Bay. However, diseases brought to the New World by Europeans during the late 16th century destroyed these early Indian populations.

Clam digging in early 1900s.
(*Sarasota County Dept. of Historical Resources*)

Cortez fishermen pulling their nets off Anna Maria Bayfront Park.
(Florida archives)

Cuban fishers established fish camps, or rancheros, on the shore of the Bay from 1700 to the mid-1800s. Mullet and mullet roe were the principal products traded with Havana then, although drum, turtle, and trout were also salted and shipped south. Seminole Indians, newly arrived in the Sarasota Bay area, also roamed the Bay and coastal region hunting, fishing, and farming.

European explorers used Sarasota Bay as a sheltered water link between Charlotte Harbor and Tampa Bay. An early homesteader to the region was Josiah Gates, who arrived in the Manatee River area in 1842. A year later, William Whitaker sailed to the high yellow bluffs on the mainland further south and staked his claim to what is now much of the northwest portion of the City of Sarasota.

Tarpon were bountiful. *(Florida archives)*

Beginning in 1920, large scale drainage projects were constructed to eventually drain 100,000 acres of freshwater sawgrass marsh. These marshes extended east of the coastal ridge to Myakka and from Tampa Bay to Charlotte Harbor. The marshes were drained initially to create agricultural opportunities and later provided residential and commercial landscapes.

The slow trickle of settlers became a stream, and then a flood after World War II. Although fewer than 100,000 people lived in the Sarasota Bay area 50 years ago, that early settler population has now swelled to more than 500,000, with continued growth projected.

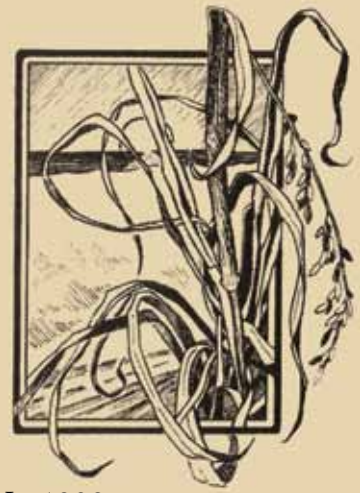
Coastal and Bay development intensified from the late 1950s to 1970, as hundreds of acres of Bay bottom were dredged to produce waterfront lots. Canals were dredged and the spoil used to create subdivisions. The drained saltwater marshes were converted to residential neighborhoods.

Bird Key/Big Pass, Sarasota. Image to the left is the same area in 1927.
(A Historical Geography of Southwest Florida Waterways")

Bird Key, located between the City of Sarasota mainland and St. Armands Key, was once the location of one of the largest seagrass beds in Sarasota Bay. The Bird Key development was bulkheaded with seawalls. Dredges filled the area behind the seawalls with material from the Bay bottom, and the resulting expanded island was subdivided into single-family home sites *(shown in the images above).*

During this development cycle, the Intracoastal Waterway was dredged to provide a deep, protected channel running the length of the Bay and beyond. Dredge-spoil islands were created throughout the Bay during construction of the Intracoastal Waterway, covering seagrass beds and changing water-circulation patterns. The natural shore was gradually replaced by seawalls to retain dredge-and-fill material for housing sites, with the seawalls protecting the homes from storms and boat wakes.

As development took place regionally, natural land cover was replaced by nonporous parking lots, roads, and rooftops. Seagrass coverage was reduced as as result of declining water quality.



In 1989, a new vision was established by the citizens of Sarasota Bay to reclaim its integrity. As a result the Sarasota Bay Estuary Program was formed.

Sarasota Bay was a very different place in 1989 from what native residents remember. Seagrass beds had diminished, and remaining seagrass flats were scarred by the tracks of boat propellers. Scallop, oyster, and clam harvests were also reduced, and anglers' catches were generally reduced as well.

Miles of natural shoreline habitats had been replaced by seawalls, and once-abundant mangrove wetlands depleted. Intense residential and commercial development throughout the Bay area created an accompanying increase in stormwater runoff, wastewater pollution, sediment and chemical contaminants in the Bay. The human-social environment had changed as well, with people often unfamiliar with their neighbors and generally lacking a sense of place and community.

In 1989, a new vision was established by the citizens of Sarasota Bay to reclaim its integrity. This vision included a Sarasota Bay with clear waters and abundant habitat, people experiencing this abundance while soaking up its natural beauty, and commitment through education to engage the community in cultivating this vision of a healthy Sarasota Bay. As a result the Sarasota Bay Estuary Program was formed.

Sarasota Bay Shows Significant Improvements

Water Quality

The Florida Department of Environmental Protection (FDEP) is responsible for ensuring that state waters meet federally mandated water quality standards. Every five years, the state of Florida revaluates Sarasota Bay and tributaries to see if its waters meet these standards. The SBEP and its partners continue to monitor and evaluate water quality within the Bay and its tributaries.

In 2009, all major segments of Sarasota Bay met water quality standards and were removed from the state list of impaired water bodies. However, several tributaries and embayments are potentially impaired. These include Cedar Hammock, Eligraw Bayou, Hudson Bayou, Clower Creek, North Creek, and South Creek. Three tributaries have been verified as impaired for action: Bowlees Creek, Whitaker Bayou, and Phillippi Creek.

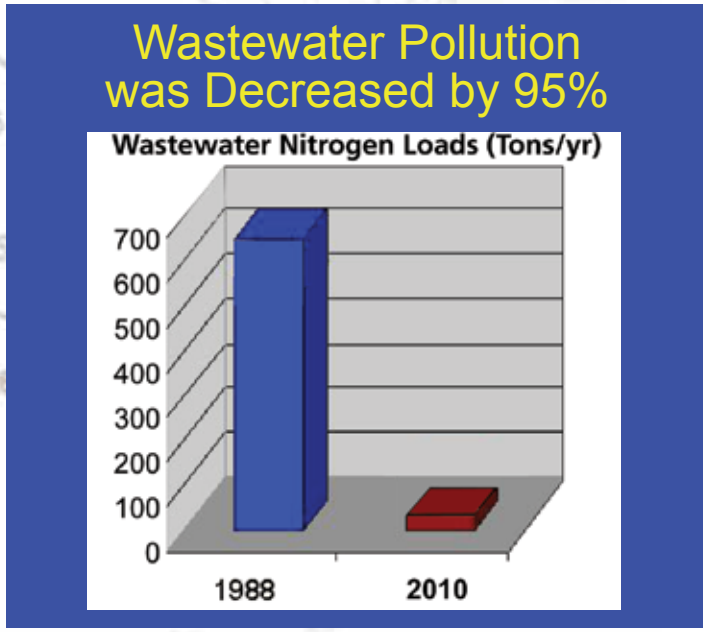
Two main types of pollution affect Sarasota Bay waters: nitrogen and bacteria.

Nitrogen Pollution

Nitrogen is the principal pollutant of concern in Sarasota Bay. While nitrogen is an essential plant nutrient, it is possible to have "too much of a good thing." Nitrogen enters the tributaries, and ultimately the Bay, from a variety of sources, including wastewater, stormwater, groundwater, and the atmosphere. Excess nitrogen causes algal blooms that cloud the water and reduce the amount of light available for submerged seagrasses. An overabundance of nitrogen can also contribute to a significant increase in macroalgal biomass; when these plants die and decompose, they deplete oxygen available for fish and other organisms.

Nitrogen pollution in Sarasota Bay has decreased by approximately 64 percent since 1989. The decrease can be attributed to improvements in wastewater and stormwater management.

The SBEP and its partners continue to monitor and research nitrogen nutrient dynamics, light penetration, chlorophyll levels, and other key water quality parameters to understand and manage nutrient loading to the Bay.



Bacteria Contamination

Bacterial contamination is currently assessed as fecal and total coliform, which are indicators of human health risks. Primary sources of bacteria can be either natural or human in origin. Therefore, to develop an appropriate management plan to reduce bacteria, a source or sources must first be identified.

Bacterial contamination levels in tributaries leading to Sarasota Bay have also declined as a result of the implementation of the Comprehensive Conservation and Management Plan.

Bacterial levels, however, intermittently remain above standards in three waterbodies – Palma Sola Bay, Bowlees Creek, and Phillippi Creek – and are listed as impaired by the DEP. In Phillippi Creek, studies have concluded that septic tanks are the source of elevated bacteria; sources have not been identified in Palma Sola Bay and Bowlees Creek.

Wastewater Pollution

Wastewater treatment plants with direct discharge to surface waters within the Sarasota Bay are being eliminated. Only two plants remain; both are scheduled to be eliminated in this decade.

The recurrence of prolonged droughts in Southwest Florida has led to the emergence of reclaimed wastewater as a valuable alternative source for irrigation. All partners within the watershed have developed reclaimed water systems that have resulted in nearly 60 percent of wastewater now being reclaimed as alternative supply. The remainder is to be injected using deep well technology.

In addition, Sarasota County has been consolidating its small wastewater treatment plants and replacing existing septic tanks with centralized systems. Today, only 14 treatment plants remain in the basin.

Stormwater discharged through pipes delivers pollution to the Bay. (*New College*)

Air Pollution

National studies have indicated that air pollution contributes substantial nitrogen pollution to estuaries. Atmospheric studies sponsored by the SBEP show that while nitrogen levels have doubled in the atmosphere in the past 50 years, direct deposition only accounts for 14 percent of the total nitrogen input to Sarasota Bay. These studies also showed that current levels of atmospheric nitrogen do not stimulate algal productivity within Sarasota Bay. Approximately 80 percent of the atmospheric nitrogen that falls on Sarasota Bay is produced by local "mobile emission" sources such as vehicles, motor boats, and lawn mowers. Additional research and education is warranted to reduce these emissions and their effects on water quality and climate change.

Stormwater Pollution

During the first half of the 20th century, large-scale government-sponsored efforts were undertaken to drain sawgrass marshes and ponds redefining the natural landscape. The resulting drainage network was expanded from 1950 to 1980, conveying stormwater from the many new residential development projects for the purpose of flood control.

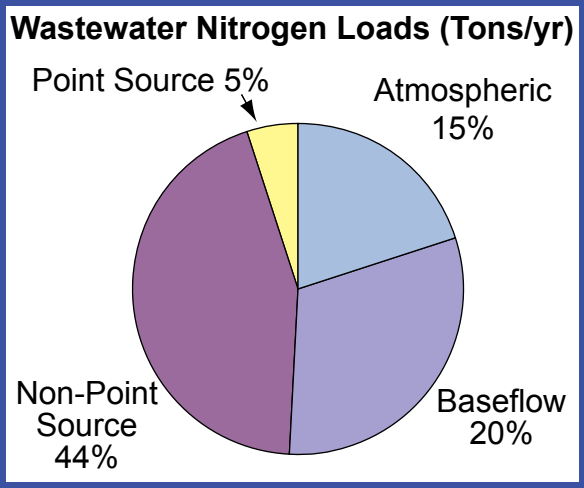
These drainage activities, coupled with an increase in impervious surface area from paving, further accelerated stormwater runoff.

As wastewater loads were being reduced, stormwater loads were increasing, and soon comprised 44 percent of the total nitrogen load to the Bay. This increase has resulted in making stormwater pollution a top regional priority. Conventional stormwater treatment, which relies on retention and detention ponds, removes only 30 to 40 percent of the nitrogen that enters these systems.

To address stormwater pollution, regional stormwater treatment systems have been constructed. Fertilizer ordinances prohibiting nitrogen application during the summer wet season have been implemented.

Florida-Friendly Landscaping programs and a Low-Impact Design manual have also been created and pest mangement programs have been implemented.
The development of these program and practices is designed to remediate additional increases in nitrogen pollution in the watershed. Stormwater reuse is an option for the future.

Stormwater Runoff Contributes the Most Pollution to the Bay



Tributary Watershed Management Plans

Phillippi Creek, Sarasota.

Since all segments of Sarasota Bay meet state water quality standards, the focus has shifted to improving the tributaries. The tributaries contributing the greatest pollution load to Sarasota Bay are Phillippi Creek, Bowlees Creek, and Whitaker Bayou.

Phillippi Creek

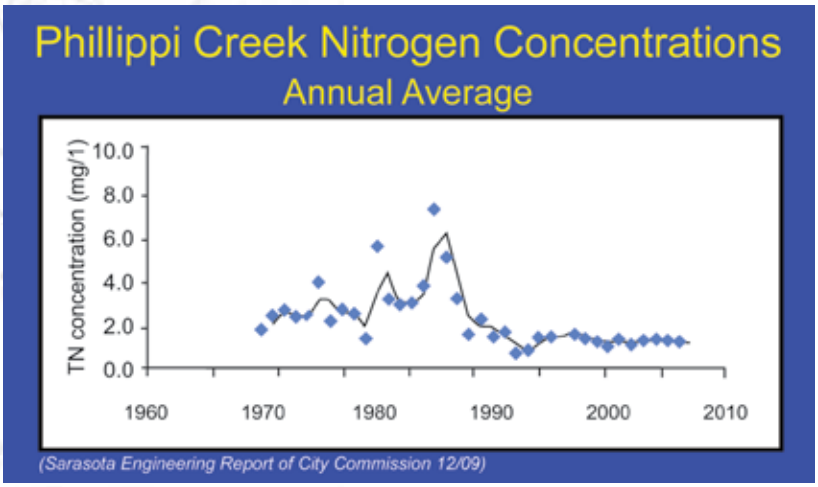
Nitrogen pollution levels in Phillippi Creek have declined 60 percent since 1988. Although Phillippi Creek remains listed for fecal and total coliforms, significant work has been completed on the system:

- Removal of 19 small private wastewater treatment plants
- Construction and expansion of the Bee Ridge wastewater treatment facility to accommodate additional flow
- Construction of the Celery Fields Regional Stormwater Treatment Facility and Pine Craft Levee Project to prevent flooding
- Continuing implementation of the septic-to-sewer program

Bowlees Creek

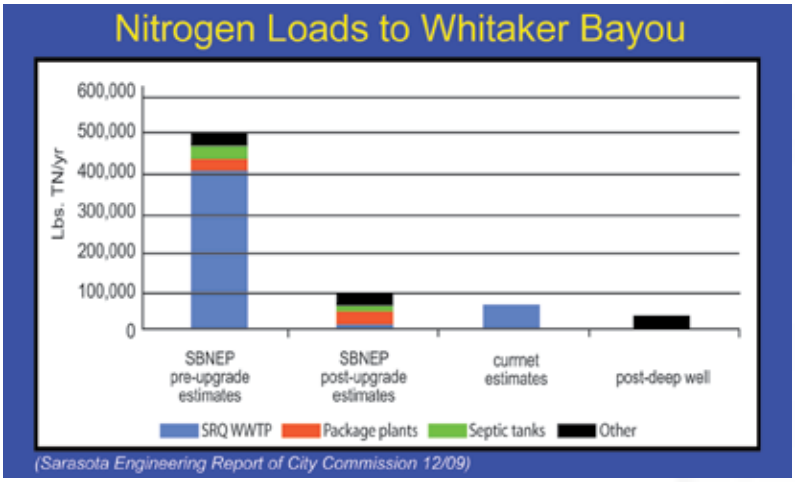
Although Bowlees Creek still exceeds state standards for both nitrogen pollution and bacteria, Manatee County has implemented significant stormwater and wastewater programs to remediate impairment:

- Installation of silt traps in the Airport Drain stormwater system
- Construction of a stormwater treatment system, silt traps and littoral zone plantings in Nicholson Branch
- Upgrade to the Sarasota Cay Club Marina pump-out facility
- Modernization of sewer system service to Trailer Estates
- Assessment of the performance of sewer lines in the Creek basin
- Expansion of stormwater treatment capacity of Lake Brennan



Whitaker Bayou

Significant improvements have been made to improve water quality in this watershed.



- The City of Sarasota and Sarasota County have upgraded the wastewater treatment plant and distribution system, provided sewer service to remaining homes with septic tanks in the watershed, removed remaining small private wastewater treatment plants, and expanded urban and agricultural use systems to reduce wastewater discharge to the Bayou. In 2009 the City Commission approved removal of the discharge in Whitaker Bayou.
- A watershed management plan by SWFWMD and Sarasota County to address water quality impairments is planned for 2010. In addition, the SBEP, in partnership with Sarasota County and the City of Sarasota, is developing a stormwater and habitat restoration and management plan for Whitaker Bayou.

Sarasota Bay Technical Studies

Water Quality Targets

For the past several years, the SBEP has been working with its partners to establish local water quality targets for the maintenance and restoration of seagrass beds in Sarasota Bay. Developing these targets also coincides with the EPA's intent to develop water quailty standards for all waters within Florida.

To date, the SBEP has established seagrass and water quality targets for each Bay segment. The SBEP and partners are in the process of establishing empirical relationships between seagrass, chlorophyll, light, and nutrient loading to each Bay segment. Appropriate water quality standards and numeric loading criteria will be recommended to the EPA and FDEP.

Red Tide

Another critical issue for Southwest Florida and Sarasota Bay is red tide. Understanding the relationship between water quality pollution and the development and persistence of red tide is a top SBEP priority. Scientists do not agree on the cause of red tide; however, it is speculated that human-derived pollutants (nutrients) may be intensifying and prolonging the red tides along the coast

Initial SBEP sponsored research by Mote Marine Laboratory found that nutrients in rainfall had a greater impact on phytoplankton growth (*Karenia brevis*, the red tide organism) in the Gulf of Mexico than in Sarasota Bay. More recently, studies have been undertaken to determine which nutrient species (i.e., nitrates, ammonia, urea, etc.) are preferred by different species of algae, and possibly red tide. However, a red tide event has not occurred in Sarasota Bay since 2005 to evaluate species preferences.

Macroalgae

Another plant community found in Sarasota Bay is commonly referred to as macroalgae. These bottom-dwelling plants occur naturally in the Bay and Gulf. However, when excess nutrients are present in the water, macroalgae are very good at competing with other plant communities (seagrasses and phytoplankton) for these nutrients and rapidly increasing in biomass. When this happens, large mats of algae become free from the bottom, where they may blanket and suffocate seagrass meadows and ultimately wash up on local beaches. The plants then become a nuisance to beachgoers.

The SBEP recently contracted with Harbor Branch Oceanographic Institute at Florida Altantic University for a study to address macroalgae biomass and distribution in the Bay and to determine where nutrients come from that fuel its growth. Two sampling events, one each during the wet and dry seasons, quantify the type and amount of algae species in the Bay. For each species, a tissue sample is collected to analyze its nitrogen signature. From this analysis, the source of the nitrogen responsible for nourishing the algae can be determined. This will help to refine targeted nutrient management strategies.

Fisheries Independent Monitoring

The Florida Wildlife Research Institute has conducted a long-term fisheries monitoring program – the Fisheries Independent Monitoring (FIM) program – since the late 1980s. This program, which monitors Florida's coastal fishery resources, finally came to Sarasota Bay in 2009. The FIM program uses standardized sampling techniques throughout the state; the data are used for generating fish species inventories, documenting species' habitat and dietary requirements, and assessing fish health. The database helps fisheries managers to develop ecosystem models and assess the implications of water resource management actions. Preliminary results from the first year show Sarasota Bay to be home to a highly abundant and diverse assemblage of adult and juvenile fish species, including popular recreational species such as snook, redfish, and spotted sea trout.

Bay Habitats

Habitats critical to Bay marine life include freshwater and saltwater wetlands, seagrasses, and hard bottom. Restoring all of these habitats is vital to restoring the balance in the Sarasota Bay watershed.

Freshwater wetlands

Freshwater wetlands, sawgrass marshes, and ponds were once the predominant feature of the Sarasota Bay watershed. Beginning in 1920, the removal of these freshwater wetlands significantly reduced the ability of the watershed to filter runoff and increased the amount of freshwater delivered to the Bay. Large-scale drainage projects significantly reduced the number of freshwater sawgrass marshes and ponds in the region.

The Sarasota Bay Estuary Program has undertaken numerous restoration projects to reclaim wetlands.

Saltwater wetlands

Tidal wetlands, primarily mangroves in the Sarasota Bay area, are essential nursery areas for many aquatic species. Wetlands decreased in Sarasota Bay by more than 1,609 acres (38 percent) between 1950 and 1990. The loss of wetland habitat was mostly due to dredge-and-fill operations that took place in the 1950s and 1960s to create waterfront homesites and boat access. A shoreline mapping project showed that more than 100 miles of seawalls and other hardened structures now dominate the Sarasota Bay shoreline. A number of restoration projects have been undertaken to reclaim wetlands.

(Lou Newman)

Tidal ponds provide the essential nursery areas for many aquatic species, and habitat for wildlife such as the Woodstorks and the White Heron shown in the inset image.

Wetland Restoration

The Sarasota Bay Estuary Program and its partners embarked on substantial saltwater wetland restoration and enhancement projects totaling more than 650 acres.

The SBEP adopted an annual goal of restoring at least one percent of the wetland habitat lost, totaling 18 acres per year. Completed to date are 28 wetland enhancement and restoration project sites, all of which involve numerous partners and volunteers.

Tower at Robinson Preserve, Manatee County.

Habitat restoration in the Sarasota Bay area generally involves removal of exotic vegetation from a designated site, excavation of intertidal lagoons to create juvenile fish nurseries, and altering land elevations to support native habitat. With the help of volunteers, the newly created shorelines are planted with native marsh grasses such as cordgrass *(Spartina alterniflora)* and upland vegetation as appropriate.

The Sarasota Bay Estuary Program is updating its comprehensive habitat master plan. The goal of this plan is to restore the balance of critical habitats that may have been disproportionately lost.

Restorations recently completed and/or ongoing projects include:

- Robinson Preserve: 487 acres
- FISH Preserve/1912 Schoolhouse: 100 acres
- Sister Keys: 50 acres
- Palma Sola Scenic Highway (SR 640): 3 miles of bordering habitat
- Bird Colony Islands: 2 acres of bird rookery
- North Lido Park: 25 acres
- South Lido Park: 100 acres
- Bowlees Creek island: 3.5 acres
- Bradenton Beach Living Shoreline Herb Dolan N. Park: 1 acre
- Perico Preserve: 75 acres
- Ungarell Preserve on Palma Sola Bay: 38 acres
- Neal Preserve: 119 acres

Restorations completed prior to 2004 include:

- Perico Bay Interconnect: 4 acres
- Leffis Key: 30 acres
- Joan M. Durante Park: 32 acres
- Powel Crosley Estate: 10 acres
- GWIZ/6th Street: 10 acres
- Quick Point Preserve: 25 acres
- Pioneer Park: 10 acres
- Ken Thompson Park: 3 acres
- Sarasota Baywalk: 2 acres
- Emerson Point: 365 acres
- Caples at New College of Florida Restoration: 1 acre
- Snake Island: 2 acres
- Ballard Elementary School: 2 acres
- Palmer Point Park: 3 acres
- Bay Preserve at Osprey: 5 acres
- Celery Field Enhancement: 50 acres

The SBEP has created a comprehensive habitat restoration plan that earmarks 31 additional projects for completion. A location map idenifying project sites is provided at the end of this document.

Wetland construction at Leffis Key.

Leffis Key after restoration was completed.

Submerged Aquatic Vegetation

Seagrass

Seagrass is an important habitat feature of bays and estuaries. Seagrasses provide shelter and serve as nursery areas essential to many estuarine-dependent fish and invertebrates. Five species of seagrasses are found in Sarasota Bay: shoal grass, turtle grass, manatee grass, widgeon grass, and star grass. Seagrass growth in the Bay depends on clear water in order for light, essential for plant life, to reach the Bay floor where grasses grow.

Sarasota Bay seagrasses are mapped every two years using aerial photography by the Southwest Florida Water Management District. This photography is used to estimate the location and amount of seagrasses present throughout the estuary. The photography is also used to distinguish two specific types of seagrass distribution: patchy seagrass (less than 75-percent coverage) and continuous seagrass (greater than 75-percent coverage). A minimum of 25-percent coverage is required for mapping a patchy seagrass bed.

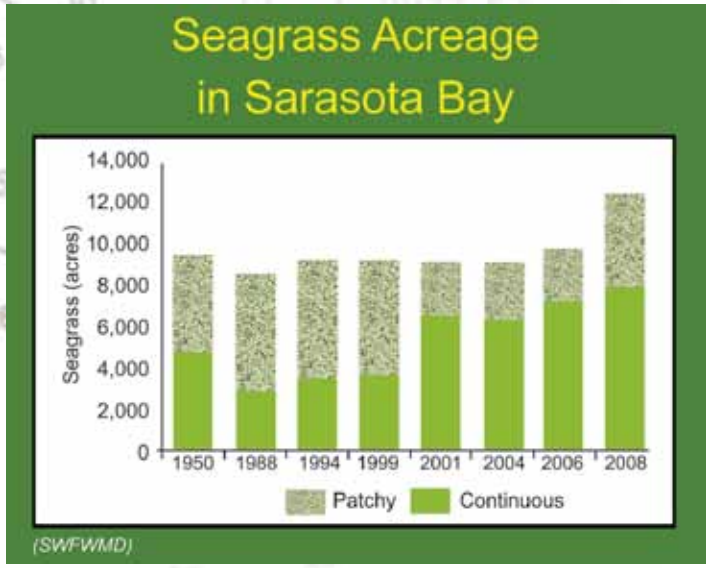
Seagrasses have been mapped roughly every two years since 1988. In addition, a set of aerial photographs taken in 1950 has been used to calculate historical seagrass coverage. From this series of maps, temporal trends in seagrass cover and distribution have been evaluated to understand how this important habitat type has changed over time.

Bay scallops – Argopecten irradians – can be found living in healthy seagrass meadows along the west coast of Florida.

- *They are a popular recreational fishery north of Sarasota Bay*
- *Their populations serve as an important barometer of water quality*
- *They filter large amounts of seawater*
- *Their populations lend themselves to restoration techniques*
- *Their populations have shown signs of recovery in Sarasota Bay since 2008*

Between 1950 and 1988, seagrass coverage decreased 15 percent mainly as a result of poor water clarity and physical disturbances. Since 1988, the Bay has gained 3,991 acres of seagrass and today has 24 percent more seagrass than 1950.

The overall increase in seagrass cover and the infilling of numerous patchy seagrass beds strongly suggest that water quality has improved in the Bay. Trends in seagrass acreage vary among embayments, suggesting differences in water quality from one part of the Bay to another. The SBEP and its partners are working to understand the complex relationships between water quality and seagrass response throughout the Bay.



Seagrass Targets

The SBEP has established targets for seagrass acreage for each of the bay segments based on historic and current seagrass trends in Sarasota Bay. These targets will guide the program as it develops water quality targets aimed at preserving seagrasses at desired target levels. The targets set for each segment were the average of 2004 and 2006 for the 1950 seagrass level. Water quality targets have been established to meet seagrass targets.

Seagrass Cover (in acres)			
Bay Segment	1950 (Historical)	2008 (Most Recent)	Seagrass Target
Palma Sola	1,031	1,164	1,031
Sarasota Bay	7,269	9,996	7,269
Roberts Bay	283	299	348
Little Sarasota Bay	883	837	702
Blackburn Bay	273	345	447
Total	9,739	12,641	9,797

Hard-Bottom Habitats

The SBEP has embarked on separate programs to restore lost oyster bar habitats and create artificial hard-bottom reefs.

Oysters

The current SBEP oyster program builds on the success of a pilot project which showed that prospective Sarasota Bay oyster habitats are substrate-limited. Two locations – one each in Sarasota and Manatee counties – are targeted for restoration. White Beach (Sarasota County) is in a highly urbanized setting that once supported oyster beds, but shoreline alterations and residential development have since destroyed them. The Gladiola Fields (Manatee County) lie adjacent to agricultural fields, and the creation of oyster habitat in this area will improve water quality by filtering runoff. The project will restore oyster habitat at each site using methods that will result in a habitat most closely resembling natural oyster reefs. Oyster recruitment, growth, and habitat utilization continue to be monitored quarterly for two years.

Oyster bed in Sarasota Bay.

Oysters are widely recognized as valued estuarine habitats. Oysters provide food for people, fish, and wildlife, and the structural complexity of oyster reefs provides habitat for many estuarine-dependent organisms. Oysters help improve water quality and clarity by filtering large volumes of water. In addition, shallow water oyster habitats help stabilize shorelines and reduce erosion by breaking wave and wake energy before it reaches the shore.

Reef balls provide habitat for fish and crabs throughout the Bay.

Artificial Reefs

The Sarasota Bay Estuary Program continues to create and enhance artificial reefs in Sarasota Bay. Starting with the development of a master artificial reef plan in 1996, the SBEP identified 20 potential sites that would be suitable for artificial reefs. These sites were selected because they contained appropriate sediments, as well as being deep enough not to impede navigation.

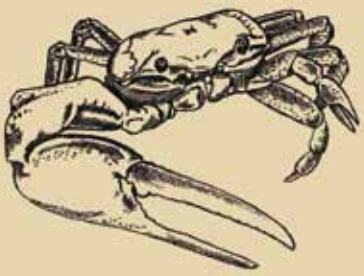
Since 2000, the SBEP and its partners have constructed more than 3,000 artificial reef modules, called "reef balls," which now rest on the bottom of the Bay. These prefabricated reef ball modules are domed structures (two feet high and three to four feet in diameter) with holes throughout for fish and crabs to move through. The SBEP currently has eight active reef sites created primarily from reef balls. Other reef materials, such as PVC pipe and limestone boulders, have been placed on two other reefs in the Bay. In addition, reef modules are being deployed around channel markers throughout the Bay to create additional juvenile fish habitat.

Preliminary monitoring has documented a variety of marine life either taking up residency within the reef balls (gag groupers and stone crabs) or utilizing the habitat for its structure (gray snapper, sheepshead, and bait fish). Several local guides have shared stories about how these artificial reefs have become popular spots for both fishing and diving.

Community Involvement in Restoring the Bay

Engaging the community through education is another critical component to the success of the mission of the Sarasota Bay Estuary Program. This mandate for educational outreach has remained a cornerstone of the SBEP. Today, the SBEP has stepped up its efforts to forge partnerships that expand the reach and scope of its educational programs. The diverse offering for all ages promotes the benefits of Bay stewardship and encourages citizens to spread the word in their local communities.

Learning about the Bay with hands-on activities.



Diverse offering for all ages promotes the benefits of Bay stewardship and encourages citizens to spread the word in their local communities.

Citizens Advisory Committee

The Citizens Advisory Committee (CAC) provides a mechanism for structured citizen input to the Sarasota Bay Estuary Program and assists in disseminating relevant information to the public. The CAC is currently made up of 27 citizens from Manatee and Sarasota counties who are interested in the issues and challenges facing Sarasota Bay. They develop a yearly action plan to communicate SBEP activities and strive to influence public policies that affect the Bay and its resources.

CAC activities are divided into three components – outreach, involvement, and education.

Annually, the Citizens Advisory Committee develops a plan of action with the following goals:

- Promote environmental stewardship and community involvement for protection of Bay resources
- Promote cultural change in the region with regard to land and water resources
- Establish links between the activities in the watershed and the resultant impacts on streams, rivers, and the Bay

The CAC also establishes immediate goals and priorities that target specific issues, including:

- Stormwater pollution components such as fertilizer, pesticides, toxicity, litter, and pet waste
- Development practices such as smart growth, low impact development, wastewater and stormwater reuse
- Habitat issues such as tributary quality, overall habitat loss, dam and weirs, top predators, fisheries productivity, and harmful algae blooms
- Public involvement including outreach programs, education, recreational use of the Bay, and landscaping behaviors in the public
- Climate change including the challenges it will bring for the Bay, habitats, wildlife, and the community, as well as how to meet or mitigate those challenges

Efforts of the CAC have brought these issues to the forefront of community decision-making:

- Fertilizer ordinances prohibiting application of nitrogen and phosphorus during the summer rainy season were passed in many jurisdictions.
- Sarasota County is in the process of promulgating a Low Impact Development manual.
- The region is considering options for stormwater resuse.
- Tributaries and habitat quality have become the focus of problematic activity as a part of watershed planning.
- Climate change was recommended by the EPA during recent program evaluation for attention and consideration of future problematic activity.

Special Projects Initiated by the CAC:

The SBEP was the lead agency in a successful application to the Florida State Community Issue Budget Request for funding for the design phase of two local projects in 2008. The Community Issue Budget Request funding received by SBEP was $150,000 for the Whitaker Bayou Greenway Park and Stormwater Retrofit, and $100,000 for Indian Beach/Sapphire Shores Stormwater Retrofit.

The purpose of the Whitaker Bayou Greenway Park and Stormwater Retrofit Project is to improve the water quality, native habitat, stormwater quantity, recreational access, and community appreciation of Whitaker Bayou.

The purpose of the Indian Beach Sapphire Shores Stormwater Retrofit Pilot Project is to utilize the latest stormwater technologies and Low-Impact Development strategies to capture, detain and treat stormwater from north U.S. 41 and the Indian Beach/Sapphire Shores neighborhood as a demonstration project for other coastal neighborhoods and municipalities.

Among the community benefits from these projects will be improved neighborhood aesthetics, removal of contaminants and bacteria in stormwater in neighborhoods, reduced exposure to contaminated stormwater, increased citizen education and involvement, and ultimately improved water quality in Sarasota Bay.

In keeping with the SBEP's partnership emphasis, these projects are collaborative efforts with the City of Sarasota, Sarasota County, neighborhoods, and consulting firms. The City of Sarasota Surtax III is expected to appropriate $1 million in surtax funding for the construction phase of the Indian Beach Sapphire Shores Stormwater Retrofit Pilot Project, and $3 million to implement the Whitaker Bayou Greenway Park Project. Although this financial commitment encompasses implementation funding, the SBEP is still looking for additional funding partners.

Learning Through Service

The SBEP has created volunteer opportunities to get everyday people involved in making a difference in their community by engaging in activities that make a positive impact on the Sarasota Bay watershed. These volunteers help the SBEP, local governments and nonprofit partners with the restoration and maintenance of parks and preserves in the Sarasota Bay watershed by removing trash and exotic plants, and planting native plants.

Bay Buddies

Sarasota Bay Buddies is a volunteer program that began in 2005 and is run in partnership with Volunteer Services of Manatee County. VSMC recruits students from private and public schools, after-school programs and other youth programs in Sarasota and Manatee counties who are interested in helping the environment. More than 1,500 Bay Buddies have participated in local restoration projects that help restore Sarasota Bay.

Bay Guardians

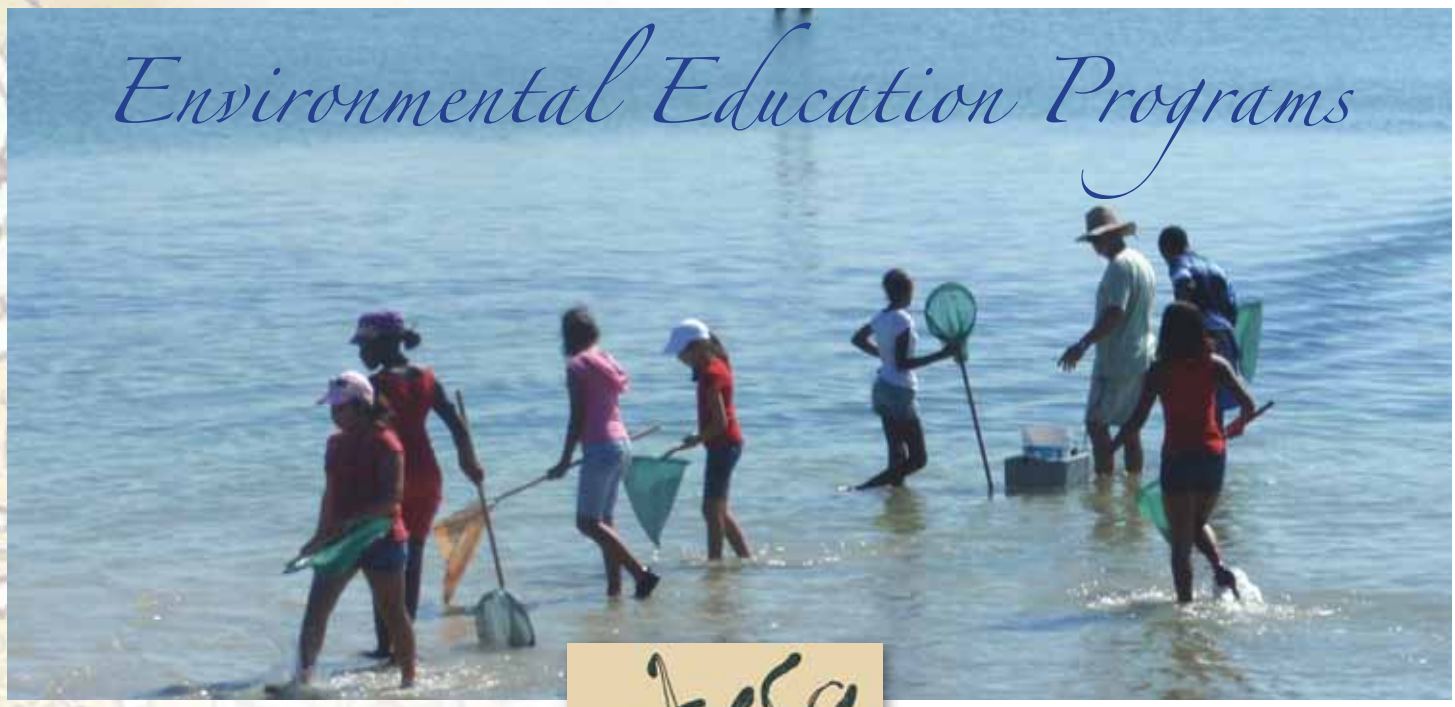
Sarasota Bay Guardians is a volunteer program that began in 2010 and is run in partnership with Around the Bend Nature Tours. Bay Guardians was established to get families, teens, and children out in the field, where they learn about the flora and fauna of the region while engaging in activities that contribute to the restoration of Sarasota Bay.

The SBEP backs these volunteer programs wholeheartedly and invites everyone to get involved!

Bay Guardians at Robinson Preserve.

Bay Buddies working at Lido Key, Sarasota.

Environmental Education Programs



PIER program, Sarasota Bay.

Since its inception, the Sarasota Bay Estuary Program has taken an active role in environmental education by publishing reports, developing curricula for schools, and initiating community activities.

Protection, Involvement, Education & Restoration (PIER) Program

The SBEP launched the PIER program, an innovative hands-on education program aimed at educating and inspiring area students, in February 2003. The PIER program is offered to public and private schools (grades K–12) in Manatee and Sarasota counties.

Curriculum and field trips for grades K-8

The PIER program's Sarasota Bay Coastal Habitats is a unique curriculum developed in conjunction with Mote Marine Laboratory and Around the Bend Nature Tours, aimed at students in grades K through 8. The curriculum provides lesson plans and activities about watersheds, habitats, wildlife, native and non-native plants, stormwater runoff, and pollution for teachers. Each lesson plan is supported by background information, resources, lesson plans, and activities. Students also take field trips – guided by Around the Bend Nature Tours – to local restoration sites around the watershed that provide hands-on activities, such as taking soil samples, observing weather patterns, and identifying plants and animals.

These activities ensure student participants receive the background education and real world/hands-on experience to make their education experience as beneficial as possible.

The purpose of the PIER program is to:

- *Educate students about the local coastal ecology*
- *Promote the benefits of environmental stewardship*
- *Increase students' environmental literacy and steward ship behaviors*

Students in science, environmental, and oceanography classes or clubs are prime candidates for the PIER program.

Lessons correlate with the National Science Standards and Florida's Sunshine State Standards. To date, almost 34,000 students in Sarasota and Manatee counties have participated in the PIER Program.

Curriculum and fieldtrips for 9th-12th grades

The SBEP is currently working on developing a teaching resource and field study program for high school students and an environmental student internship program. The current advisory committee for the program consists of representatives from the SBEP, National Park Service, Manatee County Schools, Sarasota County Schools, Florida State Parks, New College of Florida, Florida Sea Grant, University of South Florida Sarasota-Manatee, and the Foundation for Teaching Economics.

PIER Science Teacher Training Workshops, New College of Florida

The science teacher-training workshops are offered three times a year by New College of Florida, Natural Sciences Department. Teachers from all grade levels are encouraged to attend the workshops, with a focus on improving teaching skills and the understanding of science and how to teach science. Workshops run a full day on Saturdays at the Pritzker Marine Science Research Center, and also provide teachers the opportunity to earn continuing education credits. Workshops are sponsored by the SBEP as part of the PIER program. The workshops focus on creating interdisciplinary learning opportunities about topics such as watersheds, fire ecology, and invasive species for science teachers.

Pooches for the Planet - "Clean Waters! Clean Yards! Clean Shoes!"

Pooches for the Planet is a pet waste education program that was developed by the Tampa Bay Estuary Program and brought to the Sarasota Bay watershed communities in 2009. Pooches for the Planet helps educate the public about the harmful effects of pet waste pollution on our waterways and encourages people to pick up after their pets. The TBEP and SBEP are partnering with local animal shelters to promote dog adoptions and the Pooches for the Planet message with a special adoption kit filled with pet waste education material, donations or coupons from local pet businesses, and a bio-degradable pet waste bag dispenser with the slogan "Scoop That Poop!"

Bags are available throughout the region.

Florida-Friendly Landscaping

A cornerstone of the citizens' action plan is the Florida-Friendly Landscaping (FFL) programs started in the early 1990s. FFL's purpose is to help protect Florida's natural resources by creating attractive, low-maintenance Florida-friendly landscapes. Principles advocated by the program include conserving water, improving stormwater runoff, and reducing the need for pesticides and fertilizer application – all of which improve the quality and reduce the quantity of stormwater runoff to the Bay. The community's participation in FFL practices is essential for long-term preservation and enhancement of the Bay. These principles apply not only to communities on the Bay, but throughout the entire watershed.

Florida-Friendly Landscaping
emphasizes these major principles:

Right plant, right place *– Plants selected to suit a specific site will require minimal amounts of water, fertilizer, and pesticides.*

Water efficiently *– Irrigate only when your lawn and landscape need water. Efficient watering is the key to a healthy Florida yard and conservation of limited resources.*

Fertilize appropriately *– Less is often best. Over-use of fertilizers can be hazardous to your yard and the environment.*

Mulch *– Maintaining a three-inch layer of mulch will help retain soil moisture, prevent erosion, and suppress weeds.*

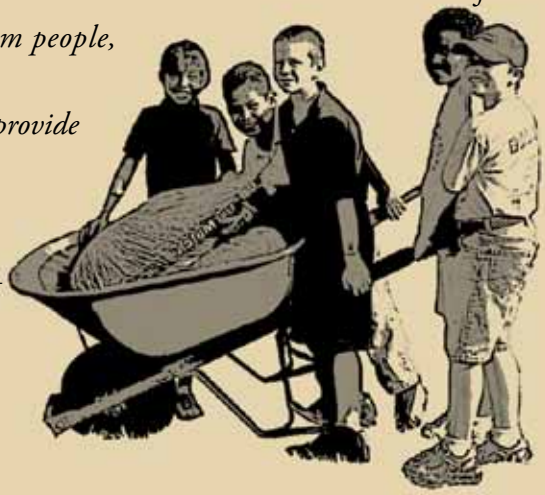
Attract wildlife *– Plants in your yard that provide food, water, and shelter can conserve Florida's diverse wildlife.*

Control yard pests responsibly *– Unwise use of pesticides can harm people, pets, beneficial organisms, and the environment.*

Recycle *– Grass clippings, leaves, and yard trimmings recycled on-site provide nutrients to the soil and reduce waste disposal.*

Reduce stormwater runoff *– Water running off a yard can carry pollutants such as soil, debris, fertilizer, and pesticides that can adversely impact water quality. Reducing this runoff will help prevent further degradation.*

Protect the waterfront *– Shorelines – whether on a bay, river, stream, pond, or beach – are very fragile and should be carefully protected to maintain freshwater and marine ecosystems.*



Bay Partners Grants Program

Bay Partners Grants is a grant program to jump-start community projects that promote Bay restoration, Bay education, or Bay-friendly landscaping. The SBEP has awarded Bay Partners grants to 83 community organizations – including schools, churches, neighborhoods, condominium associations, and non-profit organizations – since 2002.

The purpose of the Sarasota Bay Estuary Program's Bay Partners Grants is to promote environmental education, awareness, community involvement, and stewardship, and to improve the overall quality of Sarasota Bay and its tributaries. To further these goals, funding is available for projects that focus on Bay education, Bay restoration or Bay-friendly landscaping.

The SBEP's Bay Partners Grants Program has provided funds for many local schools, non-profits, government agencies, businesses, civic associations, and environmental clubs.

Types of projects eligible for funding:

- Create a wildlife garden
- Remove invasive species and replace them with native plants
- Enhance an existing landscape with native plants
- Improve and beautify an existing foot/bike trail with Bay-friendly landscaping
- Micro-irrigate a Florida-friendly landscape
- Enhance a pond with Florida native plants
- Improve an impacted tributary riparian habitat
- Design and implement a targeted Bay education and stewardship program
- Install Bay education signage
- Put in a rain garden or bioswale
- Retrofit a Bay-friendly landscape
- Educate neighbors about pet waste; distribute biodegradable doggie bags

Recipients of Bay Partners Grants:

- 4-H Club and David Cohen Park
- Action Central Revitalization Committee
- American Littoral Society
- Anna Maria Environmental Enhancement
- Anna Maria Historical Society
- Aquarian Quest
- Archery Club
- Around the Bend Nature Tours
- Azalea Park Homeowners' Association
- Ballard Elementary School
- Bay Haven Elementary School
- Bayshore Elementary School
- Bay Wise Kayak Tours
- Beekman Place
- Booker High School
- Boys and Girls Club
- Buccaneer Bay Homeowners' Association
- Calusa Lakes Community
- City of Bradenton Beach
- City of Holmes Beach
- Crooked Creek Condominiums
- Crosley Museum/SGI – USA Sarasota Chapter
- Daughtrey Elementary School
- Dolphin Tower Condominium Association
- Environmental Library Foundation
- Fairway Bay
- Foxfire West
- Florida Native Plant Nursery
- G.WIZ Hands-on Science Museum
- Glen Oaks Estates Homeowners Association
- Gulf Coast Heritage Association
- Hardee County Schools
- Harllee Middle School
- Historic Spanish Point
- Hudson Bayou Association
- Island Village Montessori School

Foxfire West.

Mote Marine Laboratory.

Sarasota Audubon Society.

Recipients of Bay Partners Grants (continued):

- Keep Manatee Beautiful
- Keep Sarasota Beautiful
- King's Gate Club
- Kinnan Elementary School
- Lakeridge Falls
- Manatee County Natural Resources
- Manatee County YMCA
- Marie Selby Botanical Gardens
- Mission Estates
- Mote Marine Laboratory
- New College of Florida
- Palma Sola Botanical Park
- Palma Sola Presbyterian
- Palma Sola Scenic Highway
- Pelican Cove
- Pelican Man Bird Sanctuary
- Reef Rakers
- Reef Rovers Bay Houses
- Riggs Landing
- Rose Street Pathway Volunteers
- Sarasota Audubon Society
- Sarasota Garden Club
- School Board of Manatee County
- School Board of Sarasota County
- School in the Park
- Sea Breeze Elementary School
- Sierra Club
- Simply Green Solutions
- South Creek Homeowners' Association
- Southgate Community Association
- St. Margaret of Scotland Episcopal Church
- Stonebridge Community
- Sunbow Bay Condominium Association
- Suncoast School for Innovative Studies
- Tidy Island
- Venice Audubon Society
- Village of the Pines
- Volunteer Services of Manatee County
- Wakeland Elementary School
- Westchester Condominiums
- Windward Bay Condominiums

Sierra Club.

Marie Selby Botanical Gardens.

Around the Bend Nature Tours.

Aquarian Quest.

Pelican Cove.

Historic Spanish Point butterfly garden..

Sarasota Bay Events

Bay Wise Kayak Tours

Bay Wise Kayak Tours began in 2007 with a Bay Partners Grant award. The popular kayak tours to restoration sites and special places around Sarasota Bay are led by retired marine biologist and CAC member Dr. Jack Taylor. These educational kayak tours in Sarasota Bay engage visitors and residents to discover plants, animals, habitats, and other features that make Sarasota Bay an Estuary of National Significance.

Participation in Workshops and Conferences

The Sarasota Bay Estuary Program hosts public events to provide fun, educational forums about Sarasota Bay. The interaction and information provided at such events raises public awareness and promotes stewardship by creating environmental advocates within the community. Jointly, with other government agencies and non-profit organizations, the SBEP participates in Earth Day events, native plant sales, and the Cortez Commercial Fishing Festival. A sampling of the more recent events hosted or sponsored by the SBEP include:

- **2005-2010 National Estuaries Days**
  The SBEP offers reduced-ticket prices for Bay cruises on Sarasota Bay Explorers and admission to Mote Marine Aquarium
- **2005-2010 Florida Native Plant Sales**
  In cooperation with the local Serenoa Chapter of the Florida Native Plant Society, the public had an opportunity to purchase native plants and learn about Florida-friendly landscaping techniques

National Estuary Day.

- **2007-2008 E-Fest**
  Florida's Green Living Music and Arts Festival, one of the largest environmental festivals in Florida.

The SBEP has also been involved in organizing, presenting, or sponsoring conferences and community engagement workshops each year, including:

- **Sustainable Communities Workshop**
- **Gulf of Mexico Alliance**
- **National Oceanic and Atmospheric Administration Smart Growth**
- **Florida Scenic Highway State Conference**
- **Trees Florida State Conference**
- **Florida Native Planet Society State Conference**
- **U.S. EPA Non-Point-Source Outreach Conference**
- **Association of National Estuary Programs Conference**
- **Restore America's Estuaries Conference**
- **Estuary Research Federation Conference**

Electronic Media

The SBEP provides a wealth of current scientific information and educational materials through its website **www.sarasotabay.org**, videos, newsletter, and associated websites including the Sarasota County Water Atlas (**www.sarasota.wateratlas.org**).

Website (www.sarasotabay.org)

The SBEP website is an interactive and comprehensive clearinghouse of information about SBEP projects, programs, and partners. The site includes in-depth sections that address habitat restoration, the water connection, educational outreach, ecotourism, research, and the many ways the community can get involved in protecting and restoring Sarasota Bay. Also included are a media center and a community events and calendar section. Interactive components include video clips from the documentary "Sarasota Bay: Celebrating Our Water Heritage," downloadable brochures on a multitude of subjects, and an interactive Gulf Coast Heritage Trail map. The website was redesigned and new content was developed in 2008 by Florida Journeys Communications.

Neighborhood Action Center is a special section on the SBEP website that was designed to help neighborhoods, homeowners, and condo associations access the information and resources they need to undertake projects and education programs that help engage their community in the restoration of Sarasota Bay. In the Neighborhood Action Center, you can find detailed stories of neighborhoods that successfully implemented Bay-friendly projects, information on Bay Partners Grants, resources about Bay-Friendly Landscaping, and the Pooches for the Planet pet waste education program.

SBEP home page.

Video

"Sarasota Bay: Celebrating Our Water Heritage" is a documentary-style 30-minute video that documents the restoration and continued recovery of the Sarasota Bay ecosystem. The documentary makes a compelling case for what's been achieved—and still needs to happen—to sustain the health of Sarasota Bay. Topics covered in the video include:

- Indications that the water system has improved substantially
- Habitat restoration – 20 years of progress
- Why continued nutrient reduction cannot be overstated as a priority
- Low-impact development – high-impact issue for the future
- The "Water Connection"– why citizen participation matters so much
- Gulf Coast Heritage Trail and ecotourism
- The SBEP's vision for a sustainable future

Produced by Florida Journeys Communications for the SBEP in 2008, this project took two years to create and features interviews with some of the community's leaders; it also addresses the Bay's most pressing issues and features beautiful footage of Sarasota Bay.

BAY REFLECTIONS
Restoring Our Bays

Bay Reflections E-newsletter

The "Bay Reflections" newsletter went paperless in 2007. This public-friendly report, produced quarterly, helps keep SBEP's partners and supporters up to date with SBEP projects, programs, and the latest Bay science.

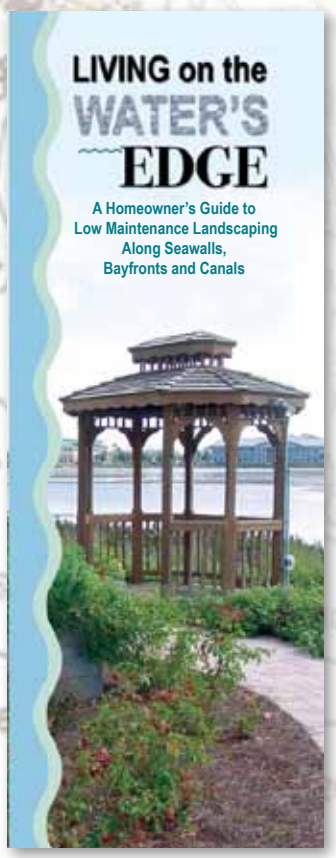
Publications

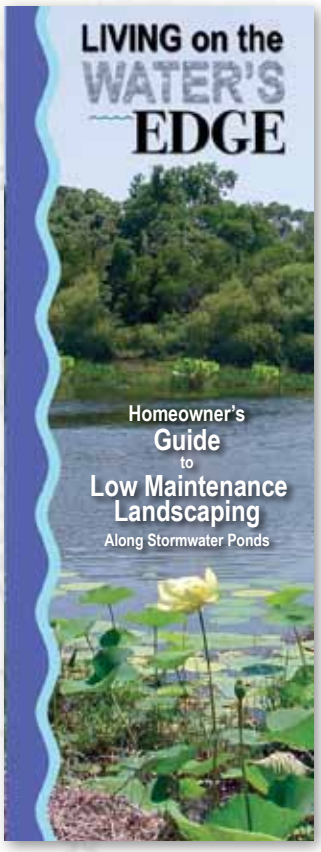
The SBEP has produced a series of brochures to educate the public about Bay issues and provide information on recreational opportunities. Many of the brochures are available at local tourist information centers.

Protecting the health of Sarasota Bay begins in your yard.

'Living On the Waters Edge'

A freshwater and saltwater version of the "Living on the Water's Edge" brochure features landscape design suggestions and a native plant pallet to help homeowners reduce fertilizer, pesticide and irrigation use associated with traditional landscape maintenance and design. Bay-friendly landscaping practice promotes the use of buffer zones around waterways and educates the public about fertilizing restrictions. "Living on the Water's Edge" brochures have been widely used in the Sarasota Bay region and adapted to other regions in the state. The brochures were developed by the SBEP, Sustainable Sarasota, and Sarasota County's Neighborhood Environmental Stewardship Team program to help educate the public about Sarasota County, City of Sarasota, and Longboat Key fertilizer ordinances.





"Living on the Water's Edge"and "Landscaping for Climate Change" brochures can be downloaded from the SBEP website: **www.sarasotabay.org**

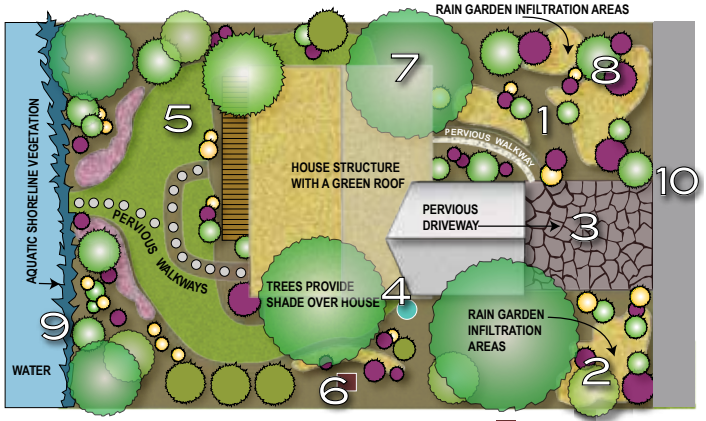
'Landscaping For Climate Change'

"Landscaping for Climate Change" is an outreach program developed by the SBEP and Sustainable Sarasota to help educate the public about hidden carbon and nitrogen footprints associated with traditional landscaping maintenance, and to offer low-emission alternatives.

"Landscaping for Climate Change" helps the SBEP meet U.S. EPA guidelines for global warming outreach, and is featured on the EPA's Climate Ready Estuaries website (**epa.gov/CRE/communications.html**). "Landscaping for Climate Change" was also recognized by the National Wildlife Federation as a local solution to the global issue of climate change. The "Landscaping for Climate Change" brochure and presentation can be downloaded from the SBEP website (**www.sarasotabay.org**).

The community's participation in Bay-friendly landscaping practices is essential for long-term preservation and enhancement of the Bay. These principles apply not only to communities on the Bay, but throughout the entire watershed.

Climate Friendly Landscape Guidelines



1. Minimize Mowing
2. Incorporate Native Plants
3. Reduce Hardened Surfaces
4. Conserve Energy by Conserving Water
5. Minimize/Eliminate Fertilizers & Pesticides
6. Reuse Yard Waste
7. Increase Tree Canopy
8. Create Biodiversity
9. Naturalize the Shoreline
10. Engage Your Neighborhood

Compost Bin

Rain Barrel / Cistern

'Gulf Coast Heritage Trail'

The Sarasota Bay Estuary Program was at the forefront of recognizing the economic value of linking and promoting Sarasota Bay's cultural, historical, and environmental heritage. The "Gulf Coast Heritage Trail" was the culmination of this recognition, and was the first regional eco-heritage based tourism trail program within Florida. The GCHT connects those special places that still remain that weave together the fabric of our history.

Information on the 127 destinations that are highlighted on the Gulf Coast Heritage Trail map. The guide includes historical, wildlife, and cultural information. Available by visiting the Sarasota Bay Estuary Program's website: **www.sarasotabay.org/tourism-ght.html**

'Gulf Coast Heritage Trail' map

For the eco-heritage tourist, this map is a must have. Whether one's passion, is birding, kayaking or visiting our area's educational, natural and cultural icons, the "Gulf Coast Heritage Trail" highlights the bountiful natural and cultural heritage that define our sense of place. A sense of place is the culture, heritage and diversity of a region. It is finding inspiration in the past, creating meaning for the present, and planning for the future. Beginning at the Sunshine Skyway Fishing Pier State Park in northern Manatee County and ending at Cedar Point Environmental Center on Lemon Bay in Englewood, the Gulf Coast Heritage Trail map highlights 127 must-visit destinations near and along Sarasota Bay. A hard copy of the GCHT is available through the SBEP's partner, the Sarasota Convention & Visitors Bureau.

Call to Action

Citizen participation in restoring and protecting Sarasota Bay and its tributaries is critical

The ecological landscape of Sarasota Bay provides a treasure trove of natural capital. These assets are the very foundation upon which our region's quality of life and economic success are built. Healthy ecosystems make very significant economic contributions, but often in ways that transcend conventional accounting.

The health of Sarasota Bay is inextricably linked to the economic vitality and quality of life experienced in Sarasota and Manatee counties. The Sarasota Bay Estuary Program is committed to restoring and protecting the ecosystem that is an economic engine of the region. You can help in this important work by expanding our network of environmental stewards. Join with others who share the vision to conserve, protect and preserve Sarasota Bay.

The Sarasota Bay Estuary Program continues to be a leader in creating a sustainable future for our community. Become our partner today and make a commitment to do your part to realize that vision.

Working together to make a difference. *(Sarasota County archives)*

How can you help?

A widespread collaborative effort is necessary to make a positive difference in the health of Sarasota Bay. Individuals can do their part by being responsible stewards. Be sure to recycle, reduce the use of fertilizers, herbicides and pesticides in your yard, carpool, plant Florida-friendly landscapes and conserve water. These are a few simple efforts that can help make a positive impact in the SBEP's ultimate goal – to restore Sarasota Bay's natural water heritage.

You can get involved by contacting Sarasota Bay Estuary Program at 941-955-8085, or email info@sarasotabay.org to find out about current projects in which you can get involved.

What else can you do?

Public lands:

- Follow land preservation, land use, and zoning issues to make informed decisions about development and preservation
- Serve on planning or permitting boards that oversee development
- Help maintain an existing public beach or nature preserve
- Help a local community or conservation group raise money to buy habitat for preservation
- Stay involved in your community

Home and garden:

- Use fertilizers and pesticides sparingly
- Keep septic systems in good working order
- Pick up animal waste and dispose of it properly
- Minimize use of toxic household chemicals
- Take motor oil to approved disposal or recycling sites
- Plant Florida native plants in your yard to create habitat and reduce stormwater contamination

Volunteer Opportunities

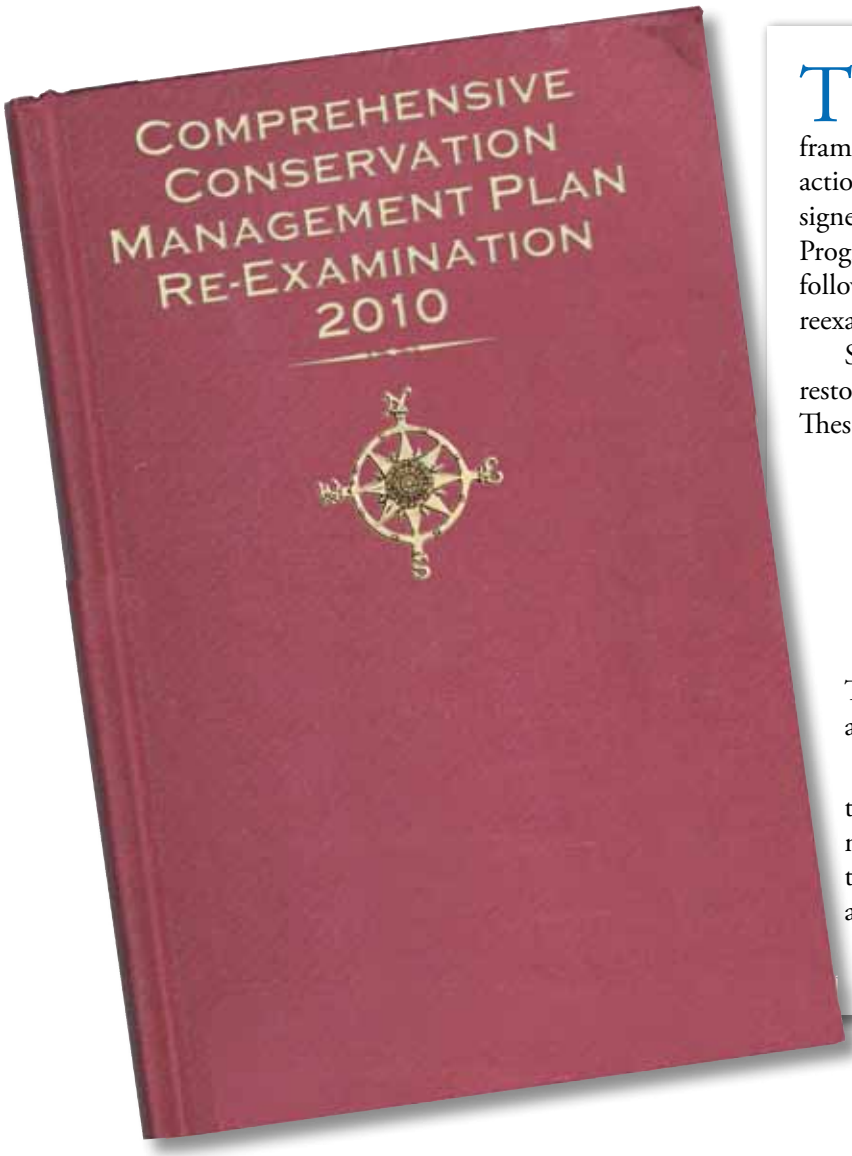
Solving Sarasota Bay's problems is a long-term process, so residents need to be strongly motivated to maintain their commitment to the Bay. Getting residents involved in hands-on activities that promote personal interaction with the Bay and its resources is a powerful step.

The Sarasota Bay Estuary Program has motivated the community to take action by offering volunteer opportunities and grants. Scores of volunteers have helped through:

- Volunteer planting at restoration sites
- Instruction during student field trips
- Participation in associated programs and events
- Networking with civic and community associations

The interaction between civic organizations and the community has resulted in widespread grassroots action to restore and protect the Bay.

CCMP Action Plans



The Comprehensive Conservation and Management Plan, approved in 1995, has served as the framework for identifying and implementing specific actions to restore Sarasota Bay. The interlocal agreement, signed in 2004, requires that the Sarasota Bay Estuary Program re-examine the CCMP every five years. The following document summarizes the results of this reexamination.

Six action plans continue to guide management and restoration decisions within the Bay and its watersheds. These action items are:

1. **Wastewater treatment and reclamation**
2. **Stormwater treatment and prevention**
3. **Freshwater and saltwater wetlands**
4. **Fisheries and other living resources**
5. **Recreational use**
6. **Governance**

The following present the action plans as revised and approved in January 2010.

The interlocal agreement also establishes the long-term financial support structure necessary to implement the CCMP and requires that measurements of program progress toward accomplishing action items be created.

The Citizen Advisory Committee and Technical Advisory Committee participated in a year-long process to review and update the CCMP. This work included summarizing progress made on specific action items, refining action items where appropriate, and making recommendations to the Management and Policy Boards for adoption. The following plan of action was promulgated as a result.

Sandwich Terns. *(Lou Newman).* Aerial of Bird Colony Key.


Longboat Pass.

Action Plan: Wastewater Treatment and Reclamation

Goal: Improve Water Transparency

Policies

All wastewater in the Sarasota Bay watershed should be treated to meet or exceed Advanced Wastewater Treatment (AWT) standards by the time effluent reaches the Bay or its tributaries. Septic systems can be acceptable if the septic tanks are located more than 900 feet from the Bay or its tributaries and meet current code.

Treated wastewater should be reclaimed for reuse. Explore options for zero discharge of wastewater directly in surface waters in the Sarasota Bay watershed.

Objective 1.0:
Wastewater treatment and reclamation policies should be consistent throughout the region.

Action 1.1:
Local governments in the Sarasota Bay region should require by ordinance, and appropriate monitoring and enforcement, the wastewater treatment policies outlines in the CCMP.

Action 1.2:
Educate the public about the need for consistent policies on wastewater treatment and reclamation.

Objective 2.0:
Continue to use excess capacity of the City of Sarasota wastewater treatment facility to provide sewer service to areas with inefficient septic systems and package treatment plants to maximize collection and treatment of wastewater.

Objective 3.0:
Provide centralized wastewater treatment throughout the Phillippi Creek area.

Action 3.1:
Complete septic tank replacement and wastewater treatment plant consolidation in northern Sarasota County.

Note: The septic tank replacement program is 34-percent complete; only nine small wastewater treatment plants will remain in the basin by the end of 2009.

Action 3.2:
Remaining privately owned utilities should upgrade to meet the Wastewater Treatment and Reclamation policies in this Action Plan.

Objective 4.0:
Develop a wastewater reclamation program to eliminate discharge to Sarasota Bay.

Action 4.1:
Reconsider a regional program to reclaim treated wastewater.

Action 4.2:
Explore options for alternative supply including the use of treated wastewater or potable water, aquifer recharge and protection, and other uses in Southern Water Use Caution Area.

Note: A regional reclamation strategy was developed and implemented by each respective partner in the region, and substantial wastewater in the Sarasota Bay basin was reclaimed for alternative uses.

Objective 5.0:
Attain or surpass water quality standards (i.e., beneficial uses) in water bodies in Sarasota Bay and its tributaries. (Also, see Stormwater Action Plan.)

Action 5.1:
Set resource-based water quality targets providing a framework for the establishment of site-specific alternative criteria.

Action 5.2:
Develop and participate in the preparation of Basin Management Action Plans for "impaired" waters or to meet established water quality targets.


Mangroves in Sarasota Bay.

Action Plan:
Stormwater Treatment and Prevention

Goal:
Manage the quantity and improve the quality of stormwater runoff to Sarasota Bay.

Policies:
Promote basin-wide pollution prevention, water conservation, and stormwater treatment techniques to significantly reduce nitrogen, sediment, and toxic substance loadings to Sarasota Bay.

Replicate the quality, quantity, and timing of freshwater flows to natural conditions of Sarasota Bay. Promote stormwater re-use (harvesting).

Objective 1.0:
Improve stormwater quality.

Action 1.1:
Implement Florida-Friendly Landscaping (FFL), which emphasizes reductions in use of pesticides and water and encourages broader use of slow-release nitrogen fertilizers.

Action 1.2:
Sediment control. Encourage on-site sediment management in the FFL.

Action 1.3:
Develop and support pollution-prevention programs (FFL).
Note: Florida-Friendly Landscaping coordinators have been established in both counties complementing the SWFWMD Builder/Developer Program. A fertilizer ordinance has been adopted by Sarasota County, the City of Sarasota, and Longboat Key, covering 75 percent of the watershed — no nitrogen and phosphorus application during the summer. FFL concepts have been incorporated into most new developments in the watershed.

Objective 2.0:
Reduce sediment and contaminant loadings through development and implementation of watershed improvement management plans.

Action 2.1:
Develop and implement a revised watershed management master plan for the Sarasota Bay region, with priority on the following tributaries: Phillippi Creek, Bowlees Creek, Cedar Hammock Creek, Hudson Bayou, and Whitaker Bayou.

2.1.2:
Implement a stormwater utility with appropriate rate structure and related public education in Manatee County.

2.1.3:
Focus watershed stormwater master plans on reducing toxins, sediment, and nitrogen loads to the Bay while also controlling flooding.

Note: SBEP efforts have focused on priority watersheds. Major stormwater retrofit projects were completed in the Phillippi and Bowlees Creek watersheds. Preparations are being made for similar projects in Hudson and Whitaker Bayou.

Florida Friendly yards that incorporate native plants that require less maintenance, fertilizers and pesticides as well using pervious walkways reduce the amount of nutrients that enter our waterways.

Florida Friendly Landscaping.

Objective 3.0:
Manage the quantity and rate of stormwater runoff to Sarasota Bay.

Action 3.1:
Improve stormwater management systems for maximum efficiency.

Action 3.2:
Explore options to treat and reclaim (harvest) stormwater.

Objective 4.0:
Reduce and mitigate developmental loadings to Sarasota Bay.

Action 4.1:
Through comprehensive land-use plans and land-development regulations, reduce the amount of existing impervious surface in the watershed and seek alternatives for reducing hardened surfaces in future development.

Action 4.2:
Support development and implementation of low-impact design standards.

Note: The SBEP has completed a study with the University of Florida to further evaluate soil compaction and soil modification per construction activity. Severe compaction was found in new developments. Sarasota County has prepared a Low-Impact Design manual. FDEP has proposed changes to the State Stormwater Regulations.

Objective 5.0:
Achieve, maintain, or surpass state water quality standards.

Action 5.1:
Re-evaluate impacts of agricultural activities on Sarasota Bay and development management plans as necessary under the watershed management planning process.

Action 5.2:
Evaluate impacts of citrus, cattle, sod, and other agricultural activities in the watershed.

Action 5.3:
Re-evaluate potential benefits, impacts, and inappropriate use of re-use water in relation to fertilizer, irrigation, and runoff.

Action Plan:
Freshwater and Saltwater Wetlands

Goal:
Restore shoreline and wetland habitats and eliminate further losses.

Policies

Increase the quantity, improve the quality, and protect the diversity of freshwater and saltwater wetlands in the Sarasota Bay watershed.

Recreate valuable fishery habitats throughout the Bay.

Objective 1.0:
Implement comprehensive five-year habitat protection and restoration plan.

Action 1.1:
Update the five-year plan and develop a database for tracking progress in habitat restoration.

Action 1.2:
Enhance, restore and create wetlands throughout the Bay region.

Action 1.3:
Maintain wetland protection in local comprehensive plans, ordinances, and land-development regulations. Incorporate wetlands and open-space concept in road, bridge, stormwater, wastewater, and other infrastructure projects.

Action 1.4:
Recognize the importance of adjacent upland areas as buffers in restoring, creating, or protecting wetlands.

Action 1.5:
Encourage and facilitate wetland protection through public ownership or private conservation arrangements.

Leffis Key restoration area.

Grassy Point restoration area.

Limpkins. *(Lou Newman)*

Action 1.6:
Remove exotic noxious plants.

Action 1.7:
Coordinate wetlands activities with the SBEP, citizen organizations, and existing citizen advisory committees of local governments.

Action 1.8:
Develop and implement policies that are consistent across jurisdictions regarding shoreline alterations such as docks, seawall, or other shoreline protection alternatives.

Action 1.9:
Provide cooperative consultations (as requested) to the private and public sectors on development proposals and regulatory issues that impact wetlands.

Action 1.10:
Continue to provide technical information to programs to increase public education and citizen involvement in wetlands issues.

Action 1.1:
Encourage that fines for environmental violations at the regional and local level (from either permitted or unpermitted activities) be directed to environmental enhancement projects within the watershed.

Objective 2.0:
Provide opportunities for citizen involvement in wetlands protection, enhancement, and acquisition.

Action 2.1:
Support an ongoing education program on mangrove protection and care.

Action 2.2:
Encourage citizen groups to restore and protect wetlands through trash and exotic-plant removal.

Action 2.3:
Coordinate wetlands activities with the SBEP, citizen organizations, and existing citizen advisory committees of local governments.

Action 2.4:
Continue to promote neighborhood wetlands protection and homeowner shoreline management through the Florida-Friendly Landscaping Program.

Note: Myriad wetland restoration projects have been completed throughout the Sarasota Bay watershed to complete the action plan.

Bird Colony Island restoration area.

Red drum.

Action Plan:
Fisheries and Other Living Resources

Goal:
Restore and sustain fish and other living resources in Sarasota Bay.

Policies:

Increase and protect fishery habitat, particularly for juveniles of recreationally and commercially important species.
Protect existing fish populations.

FINFISH

Objective 1.0:
Improve tributary habitats of Sarasota Bay with a special emphasis on juvenile life stages.

Action 1.1:
Identify salinity zones within the tributaries.

Action 1.2:
Prioritize restoration projects within tributaries as to their potential for increasing critical juvenile habitat (restoring the balance).

Action 1.3:
Characterize, delineate and quantify shoreline features (habitats) within the tributaries.

Action 1.4:
Develop methods/measures to quantify improvements to juvenile fisheries.

Objective 2.0:
Increase available habitats for fish in Sarasota Bay.

Action 2.1:
Educate the public on the need for improved fishery habitats.

Action 2.2:
Restore, enhance, and protect the value of freshwater and saltwater wetlands as fishery habitats.

Action 2.3:
Improve Sarasota Bay tributaries to restore the value of juvenile fisheries habitats.

Action 1 2.4:
Install seawall habitat modules along seawalls where appropriate.

2.4.1: Encourage private-sector manufacturing and marketing of the most effective designs for these modules.

2.4.2: Encourage homeowners to volunteer their seawalls and shoreline for projects. Encourage their participation through education, incentives, and permitting assistance.

2.4.3: Develop measures to demonstrate restoration effectiveness to increase acceptability by permitting agencies.

2.4.4: Sponsor a workshop to review research, share ideas, develop criteria, and discuss permitting issues.

Action 2.5:
Explore opportunities for living shorelines throughout the Sarasota Bay area.

2.5.1: Sponsor community workshops on living shorelines.

Objective 3.0:
Protect existing fish populations.

Action 3.1:
Establish a conservation area near Sister Keys with limited access or activity.

Action 3.2:
Promote catch-and-release and other angling practices to increase conservation.

Action 3.3:
Seek designation of Sarasota Bay as a test area for enhanced fisheries management measures combined with careful monitoring. Establish a baseline for relative fish abundance and diversity within Sarasota Bay.

At Robinson Preserve/Perico Bayou. *(Fred Loveland)*

SHELLFISH

Objective 4.0:
Restore and enhance shellfish populations and their habitats.

ACTION 4.1:
Reduce levels of contaminants in tributaries and restore natural stream flows to creeks and streams (see Stormwater Action Plan).

ACTION 4.2:
Establish oyster reefs in appropriate locations in Sarasota Bay.

ACTION 4.3:
Support the re-establishment of bay scallops with appropriate monitoring. Continue bay scallop seeding where water quality has improved.

ACTION 4.4:
Educate the public about the regulations regarding shellfish harvesting.

Note: High densities of bay scallops were found throughout the Bay in 2008. The initial "Great Bay Scallop Search" for Sarasota Bay was launched in 2008 (Sarasota Bay Watch). Oyster reef and scallop seeding are fully implemented. Scallops were found throughout the system in 2008; search to be implemented in 2009.

BOTTOM HABITATS

Objective 5.0:
Protect seagrasses from scarring by boat propellers.

ACTION 5.1:
Improve channel marking on the Intracoastal Waterway (ICW) and connector channels.

SEAGRASS

Objective 6.0:
Maximize opportunities for re-establishing and protecting seagrass habitat throughout Sarasota Bay.

ACTION 6.1:
Establish or exceed seagrass targets and meet water quality targets for the maintenance of seagrass acreage in designated areas.

ACTION 6.2:
Implement water quality improvement strategies to increase productive seagrass habitat (see Wastewater and Stormwater Action Plans).

ACTION 6.3:
Using appropriate techniques, restore seagrass habitat in selected areas of disturbed excavated Bay bottom by using dredge material as applicable, to elevate the bottom to within six feet of mean sea level, pending outcome of demonstration project.

ACTION 6.4:
Enforce boat speed limits in Sarasota Bay watershed to reduce turbidity.


Artificial reef.

ACTION 6.5:
Repair seagrass scarring where appropriate.

Note: Seagrass acreage has increased by approximately 4,040 acres since 1988. Continuous seagrass coverage has increased by more than 5,158 acres. Seagrass is presently at 47 percent above 1988 levels.

Objective 8.0:
Implement the Artificial Reef Master Plan.

ACTION 8.1:
Re-examine the artificial reef master plan every five years.

ACTION 8.2:
Document reef habitat quality.

ACTION 8.3:
Establish targets for artificial reefs.

Note: Fifty acres of Sarasota Bay have been enhanced by artificial reefs.

ACTION PLAN: RECREATIONAL USE

GOAL:
PROVIDE INCREASED LEVELS OF MANAGED ACCESS TO SARASOTA BAY AND ITS RESOURCES.

POLICIES:

Enhance recreational opportunities on Sarasota Bay while protecting Bay resources.

Recreational use of Sarasota Bay shall not adversely impact Bay resources.

Increase public awareness, foster behavioral change, and promote environmental stewardship.

ACTION 1.2:
Promote enforcement for boat speeds and no-wake zones in Sarasota Bay.

Objective 2.0:
Reduce recreational use impacts on natural resource areas within Sarasota Bay.


Joan M. Durante Park restoration area.

Action 2.1:
Promote channel marking to protect threatened marine areas, such as seagrasses.

Action 2.2:
Promote posting markers to discourage boats from approaching bird rookeries.

Action 2.3:
Discourage deliberate feeding of seabirds and marine mammals through education and signage.

Action 2.4:
Support fishing catch-and-release activities.

Action 2.5:
Promote disposal of fishing line and other marine debris in appropriate containers.

Action 2.6:
Promote enhanced enforcement of all boating, fishing, and other waterborne rules and laws.

Action 2.7:
Encourage marinas and other waterfront businesses to follow safe, non-polluting practices.

Action 2.8:
Encourage and support coastal cleanup initiatives.

Note: Channel marking mostly complete; bird and wildlife feeding discouraged regionally. Marine patrol are ticketing as necessary (activity ongoing).

Objective 3.0:
Improve recreational access to Sarasota Bay.

Action 3.1:
Facilitate neighborhood-initiated improvements for visual access to the Bay through the Florida-Friendly Landscaping Program.

Action 3.2:
Enhance recreational use of publicly owned Bayfront land.

Action 3.3:
Acquire undeveloped Bay shoreline as public recreation Bayfront parks or low-impact preserves.

Action 3.4:
Identify Bay vista points in local comprehensive plans and consider them in landscaping, road-building and other construction.

Action 3.5:
Fully implement and expand the Sarasota Bay Heritage Trail and Blueways System.

Note: Heritage Trail and Blueways system fully implemented with the assistance of the National Park Service. The maps and guides (Blueways and Heritage Trail) are regularly used and distributed at information centers. The SBEP updated the Heritage Trail guide in FY08.

Objective 4.0:
Improve education of recreational users to protect the resources of Sarasota Bay.

Action 4.1:
Work with appropriate organizations to increase enrollment in boater education programs to promote better protection of Bay resources.

Action 4.2:
Develop an educational program for target audiences including youths, tourists, and visitors to improve awareness and sensitivity about the Bay.

Note: Educational programs are fully implemented through annual Citizen Action Plans: Participation, Involvement, Education and Restoration; Bay Buddies; and signage.

Objective 5.0:
Promote the Sarasota Bay region as "paradise."

Action 5.1:
Continue to develop and market a system of integrated recreational opportunities.

Note: Heritage Trail and Blueways System are operational. The Sarasota area is commonly referred to as "paradise" by the business community and Chambers of Commerce; and media.

Action 5.2:
Promote litter prevention throughout the Sarasota Bay region.

Note: Litter prevention programs are operated by Keep Manatee/ Sarasota Beautiful. Eco-tourism is becoming an increasingly prominent opportunity regionally.


Roseate Spoonbill.

Action Plan: Governance to Oversee Implementation

Goal:
Establish an appropriate institutional structure to oversee implementation of the Sarasota Bay Comprehensive Conservation and Management Plan (CCMP)

Policies:

Oversee and promote implementation of the CCMP to ensure effective participation of public agencies and private citizens.

Improve Sarasota Bay to the maximum extent possible, given best-available technology and economic constraints.

Loggerhead turtle. *(Mote Marine Laboratory & Aquarium)*

Objective 1.0:
Maintain an appropriate committee structure and staff to ensure effective implementation of the Sarasota Bay Comprehensive Conservation and Management Plan.

Action 1.1:
Implement the CCMP utilizing the Interlocal agreement. The SBEP Interlocal Agreement requires a re-examination of the CCMP every five years. FY 09. The SBEP Interlocal Agreement was enacted Oct. 1, 2005, adding the Town of Longboat Key and City of Bradenton to the Policy Board as contributing members. The CWA was re-authorized in 2000 and is presently undergoing revision at the Congressional level. Surface Water Improvement Management Program (SWIM) designation occurred in 1996, and funding continued through FY 08. Independent assessments by U.S. EPA were completed in 1997, 2000, 2003, and 2006.

Action 1.2:
Conduct an independent strategic assessment of program performance at intervals not to exceed three years subsequent to approval by Florida's governor and the U.S. EPA administrator.

Dolphin are common to Sarasota Bay.
(Mote Marine Laboratory & Aquarium)

Objective 2.0:
Expand financial opportunities to benefit Sarasota Bay.

Action 2.1:
Support Clean Water Act reauthorization for continuing appropriation for CCMP implementation.

Action 2.2:
Maintain designation of Sarasota Bay (in 1995) as a State of Florida Surface Water Improvement and Management program priority water body.

Action 2.3:
Continue and expand grant writing to benefit Sarasota Bay and fund specific projects in the CCMP.

Action 2.4:
The SBEP encourages an independent foundation to further support the goals of the CCMP.

Objective 3.0:
Expand environmental education programs, with an emphasis on boaters.

Guided nature walks. *(Sarasota County Government)*

Glossary

Accretion – the build-up of land due to artificial or natural causes.

Algae – any of various primitive, chiefly aquatic, one-celled or multicellular plants that lack true stems, roots, and leaves but usually contain chlorophyll. Included among the algae are kelps and other seaweeds and the diatoms.

Algal bloom – a proliferation of algae in a body of water often associated with excess nutrients (especially phosphorus and nitrogen) in the water column and/or sediments.

Artificial reef – a manmade reef of sunken ships, cars, demolition spoil, military tanks, oil rigs, or specially constructed modules deployed for the purpose of promoting marine life.

Bacteria – small single-celled organisms from the Moneran kingdom. They are known as prokaryotes, which are classified together because they lack nuclear membranes. They are the most primitive living beings, but help in the nitrogen cycle.

Bayou – a small, sluggish secondary stream or lake.

Coastal lagoon – a shallow body of water, especially one that is separated from a sea by sandbars, barrier islands, or coral reefs located on, near, or bordering a coast or seashore.

Chlorophyll – a chemical mixture or compound found in the chloroplasts of plant cells that gives plants their green color. Plants use chlorophyll to convert the energy of sunlight to food in the process known as photosynthesis.

Creek – a natural stream or channel, normally smaller than and often flowing into a river.

Deep-well injection system – a process whereby liquid, usually either treated water or treated wastewater, is pumped underground.

Dredging – removing bottom material from a waterway.

Ecological/habitat restoration – altering an area in such a way as to reestablish an ecosystem's structure and function, usually bringing it back to its original (pre-disturbance) state.

Ecosystem – an interdependent and dynamic system of living organisms with their physical and geographical environment.

Effluent – the liquid waste of sewage and industrial processing.

Embayment – indention in a shoreline forming a bay.

Enhancement – modification of a natural or created habitat to increase the level of one or more functions, typically to the detriment of other functions.

Erosion – the loosening, transporting, and wearing away of the land, chiefly by water or wind.

Estuarine habitat – the natural home or dwelling place of an organism that lives in an estuary.

Estuary – regions of interaction between rivers and nearshore ocean waters, where tidal action and river flow create a mixing of fresh water and saltwater. These areas may include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife.

Florida-Friendly yard – landscaping principles utilized in Florida Yards and Neighborhoods Program, which has nine principles including 1) right plant, right spot, 2) water efficiently, 3) non-cypress mulch, 4) recycle or compost, 5) minimize fertilizer, 6) reduce chemical pest control, 7) reduce stormwater runoff, 8) plant with wildlife in mind by using native species, 9) utilize plants to protect shoreline instead of structures and do not use chemicals close to shoreline.

Groundwater – any water naturally stored underground in aquifers, or that flows through and saturates soil and rock, supplying springs and wells, often used as a drinking water source.

Habitat – the natural or unnatural environment of a plant or animal.

Hard-bottom habitat – primary reef structures accreted from coquina mollusks, sand, and shell marl, which lithified parallel to ancient shorelines and have been expanded by colonies of polychaete worms and other invertebrate and macroalgal species.

Hardened shorelines/shore hardening – the artificial alteration of a shoreline, using seawalls, rubble, or other means; replacement of vegetation or otherwise natural shoreline with manmade structures.

Hydrology – the science of dealing with the occurrence, circulation, distribution, and properties of the waters of the Earth, and their reaction with the environment.

Impervious surface – any surface such as roads, rooftops, or parking lots that does not allow water to soak into the ground.

Littoral zone – the portion of a body of fresh water extending from the shoreline lakeward to the limit of occupancy of rooted plants; a strip of land along the shoreline between the high and low water levels.

Mangrove – a salt-tolerant tree that grows along tropical coasts in salty ocean water, sending down roots from its branches that form a breeding place for marine life and aid in building up dry land.

Nitrogen pollution – pollution containing nitrogen which stimulates aquatic algal growth, thus robbing waters of oxygen-killing fish and other aquatic organisms. Nitrogen pollution comes from runoff of excess fertilizers, animal waste, and other diffuse sources, as well as from wastewater treatment plants and other industries.

Non-point source pollution – diffuse pollution sources (i.e. without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by stormwater. Common non-point sources are agriculture, lawns, and city streets.

Paulstrine – any inland wetland that lacks flowing water and contains ocean derived salts in concentrations of less than .05 percent.

Point-source pollution – pollutants that are discharged or emitted from traceable, detectable, and discrete sources such as sewage pipes or smokestacks.

Pollution – contamination of soil, water, or the atmosphere by the discharge of harmful substances.

Red tide – a bloom of dinoflagellates that causes reddish discoloration of coastal ocean waters. Certain dinoflagellates produce toxins (brevetoxin) that kill fish, contaminate shellfish, and irritate the respiratory systems of people and other animals.

Runoff – a portion of precipitation on the land that ultimately reaches a body of water.

Salinity – any concentration of salt in water, usually measured in parts per thousand.

Salt marsh – a marine habitat that is usually wet with saltwater and contains shrubby vegetation and grasses.

Seagrass bed – a mass or growth of marine plants, generally found on the sea bottom in relatively shallow water.

Sediment – the soil, sand, minerals, and organic material at the bottom of surface waters, such as streams, lakes and rivers. Sediments collecting in rivers, reservoirs, and harbors can destroy fish and wildlife habitat and cloud the water so that sunlight cannot reach aquatic plants. Loss of topsoil from farming, mining, or building activities can be prevented through a variety of erosion-control techniques.

Sound – a body of water, wider than a strait or channel, usually connecting larger bodies of water.

Stormwater runoff – precipitation that does not infiltrate into the ground or evaporate due to impervious land surfaces, but instead flows onto adjacent land or water areas and is routed into drain/sewer systems.

Total Maximum Daily Load (TMDL) – a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet government established water-quality standards and an allocation of that amount to the pollutants sources.

Tributary – a body of water, such as a creek or stream, that supplies a larger body of water, such as a lake or estuary.

Wastewater – water that has been used for industrial or domestic purposes and is therefore contaminated with pollutants.

Watershed – the land area from which surface runoff drains into a stream, channel, lake, reservoir, or other body of water; also called a drainage basin.

Water-quality standards – the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect waterbodies from pollutants.

Wetlands – a land inclusion that has a predominance of hydric (wet) soils and is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation adapted to wet soil conditions under normal circumstances.

Robinson Preserve

Artificial reef modules

Refer to page 27 to learn more about The Gulf Coast Heritage Trail.

Oyster habitat in Sarasota Bay

Joan M. Durante Park & Preserve
Bayshore South Reef
Bayshore Island
Jiggs Landing
Bowlees Creek
Bowlees Creek Island
Whale Key Reef
Crosley Estate
Indian Beach / Sapphire Shores
Longboat Key
Sarasota Bay
University Pkwy.
MANATEE COUNTY
SARASOTA COUNTY (to I-75)
Walker Reef
Caples Campus Complex
Hart Reef
Whitaker Bayou
Sportfisherman Reef
Whitaker Bayou
Pioneer Park
Hog Creek
Ken Thompson Park
6th Street Park
Quick Point Nature Preserve
888 Reef
G.Wiz
Sarasota
Miller Reef
New Pass
Fruitville Rd. (to I-75)
Pop Jantzen Reef
Sarasota BayWalk
Marie Selby Botanical Gardens
North Lido Park- Phase 1
North Lido Park- Phase 2
Hudson Bayou
Lido Key
Evans Reef
Gulf of Mexico
South Lido Park- Phase 1
Pinecraft Park
South Lido Park- Phase 2
Coker Reef
Big Sarasota Pass
Bee Ridge Rd. (to I-75)
Roberts Bay
Big Edward Island Preserve
Bird Colonies Preserve
Little Edward Island Preserve
Skiers Island Preserve
Proctor Rd.
Red Bug Slough
Phillippi Creek
Silvertooth Reef
Clark Rd. (to I-75)
Siesta Key
Tamiami Trail
White Beach Oyster Habitat
Little Sarasota Bay
41
75
Turtle Beach Oyster Habitat
Pelican Cove
Catfish Creek
Jim Neville Preserve
North Creek
Palmer Point Park
Bay Preserve at Osprey
Historic Spanish Point
Blackburn Point Park
Casey Key
681
South Creek
Blackburn Bay
Laurel Ave. (to I-75)
Snake Island Preserve
Lyons Bay
Dona Bay
Venice Inlet
Roberts Bay
Venice
Venice Ave.

PROJECT AREA

Project Status

- HABITAT RESTORATION - Completed
- HABITAT RESTORATION - In Progress
- HABITAT RESTORATION - Future
- ARTIFICIAL REEFS - Completed
- ARTIFICIAL REEFS - In Progress
- ARTIFICIAL REEFS - Future
- OYSTER HABITAT ENHANCEMENTS
- SEAGRASS HABITAT
- GULF COAST HERTIAGE TRAIL AUTO TOUR ROUTE

SARASOTA BAY ESTUARY PROGRAM

Acknowledgements – State of the Bay 2010

SBEP Policy Board

Deborah Getzoff, Florida Department of Environmental Protection
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Jon Thaxton, Commissioner, Sarasota County
Jack Bispham, Manasota Basin Board, Southwest Florida Water Management District
Kelly Kirschner, Commissioner, City of Sarasota
Marianne Barnebey, Commissioner, City of Bradenton
Lynn Larson, Commissioner, Town of Longboat Key
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John Stevely, Florida Sea Grant; Co-chair, Technical Advisory Committee
Nick Gladding, Chair, Citizens Advisory Committee

SBEP Technical Advisory Committee (TAC)

The Technical Advisory Committee provides a mechanism for technical peer review and input to projects and programs of the Sarasota Bay Estuary Program. The TAC initiates technical studies, reviews projects put forth by other SBEP committees for scientific merit, and assists SBEP staff with restoration and management plans for Bay resources.

SBEP Citizens Advisory Committee (CAC)

The Citizens Advisory Committee provides a mechanism for structured citizen input to the Sarasota Bay Estuary Program and assists in disseminating relevant information to the public. The CAC develops action plans to communicate SBEP activities and strives to influence public policies that affect the Bay and its resources.

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This publication is dedicated in memory of Tom Cross (1954-2008), a longtime local environmental proponent and talented artistic contributor to SBEP publications. His vision and talents will be missed.