

STATE OF THE BAY 2006

“Celebrating Our Greatest Natural Asset”

Produced by



SARASOTA BAY
ESTUARY PROGRAM



ACKNOWLEDGMENTS



The Sarasota Bay Estuary Program would like to thank the many citizens, technical advisors, elected officials and government agency staff who have participated in the process of protecting and revitalizing Sarasota Bay. The work of our small team of five can realize comprehensive achievements when our efforts are supported by partner funds, agency staff and an active and committed Board of Directors. We offer special thanks to the partners to the 2004 Interlocal Agreement, which established the Program as a special district in Florida: 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.

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PREFACE

SARASOTA BAY: OUR GREATEST NATURAL ASSET



Great White Egret (*Egretta alba*)

Sarasota Bay Estuary Program restoration site, view from Marie Selby Botanical Gardens

The Sarasota Bay Estuary Program (SBEP) is dedicated to improving and protecting the area's greatest and most important natural asset—Sarasota Bay. The 2006 State of the Bay Report describes the current condition of the Bay in detail, presenting the latest technical information and findings. This document is produced by the SBEP for the people of Manatee and Sarasota counties.

The chapters provide updates on progress made in carrying out the Comprehensive Conservation and Management Plan, *The Voyage to Paradise Reclaimed*, signed in 1995 by the Governor of Florida and the Administrator of the U.S. Environmental Protection Agency. The achievements have been substantial, with reductions in nitrogen and bacterial pollution and increases in habitats and recreational opportunities. Bay area residents can celebrate the many improvements to the Bay, while understanding the need to remain focused on doing what's necessary to restore our Bay.



SETTING THE STAGE

SARASOTA BAY: OUR ECONOMIC AND ECOLOGICAL TREASURE



Serene and scenic view of Sarasota Bay

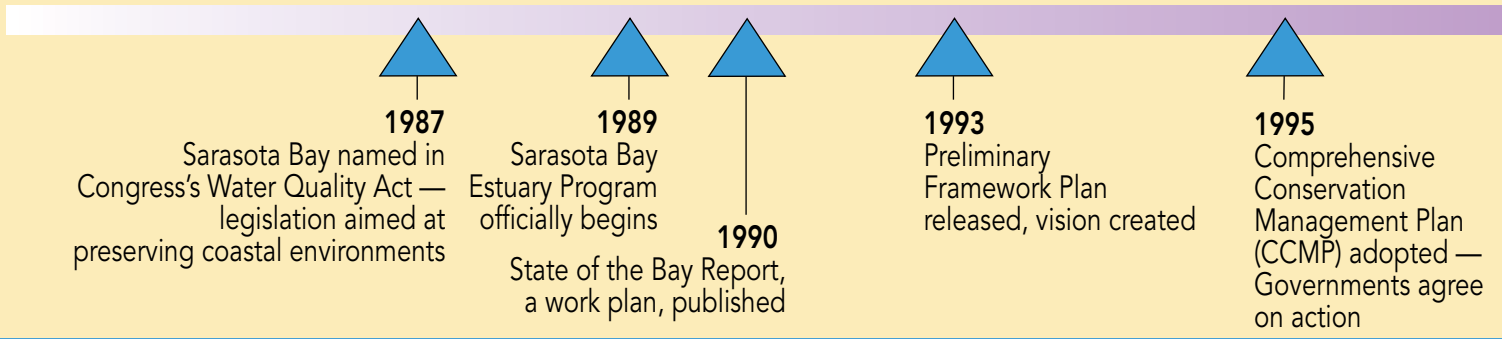
This coastal lagoon, located on the southwest coast of Florida, stretches from Anna Maria Sound to the Venice Inlet (refer to Project Area Map at the back of the report). Sarasota Bay, approximately 56 miles long, was identified as an Estuary of National Significance in 1987 by the U.S. Congress and formally designated as a National Estuary Program in 1989. More than 1,400 different native species of plants and animals as well as 500,000 people reside in the Bay area.

“Priceless is the word that comes to mind when describing Sarasota Bay’s value to our community.”

– Mark Alderson,
Executive Director,
Sarasota Bay
Estuary Program

Protecting a Natural Treasure: The Challenges and the Response

During the past 50 years, human activities have caused a slow but steady decline in the general health of Sarasota Bay. With the founding of Sarasota Bay Estuary Program (SBEP) in 1989, a partnership among local government agencies was established to reverse that trend.



Since then, SBEP has focused on these seven 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

To achieve these goals, partnerships were established and have accomplished the following:

1. Significant water quality improvements in the Bay and tributaries due to an estimated 50 percent reduction in nitrogen loading since 1988. However, nitrogen loading remains two-and-a-half times greater than pristine conditions.
2. Creation or enhancement of 4,058 acres of seagrass
3. Restoration and enhancement of 250 acres of wetland habitat
4. Creation of 20 new ecological parks around the Bay
5. Manufacture and deployment of 2,500 artificial reef modules
6. Creation of the Gulf Coast Heritage Trail to promote managed access to points of interest around the Bay
7. Establishment of a Special District within the State of Florida to manage Bay resources

8. Implementation of a comprehensive public education program (For example, 5,400 local school children have received outdoor education about Sarasota Bay)
9. Establishment of the first oyster re-colonization project for the Bay

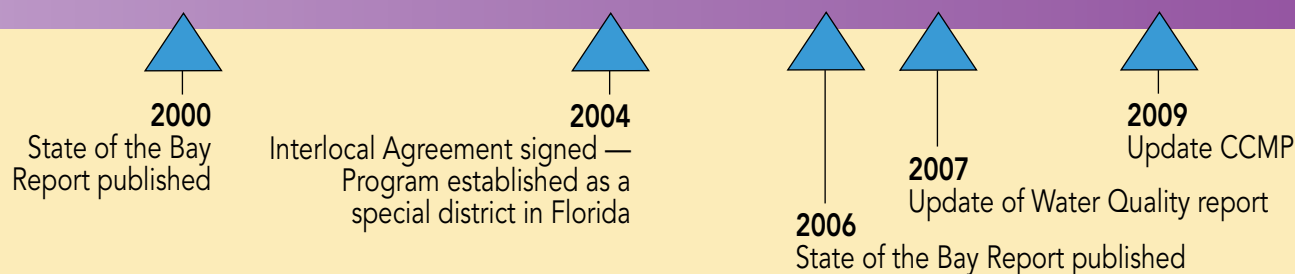
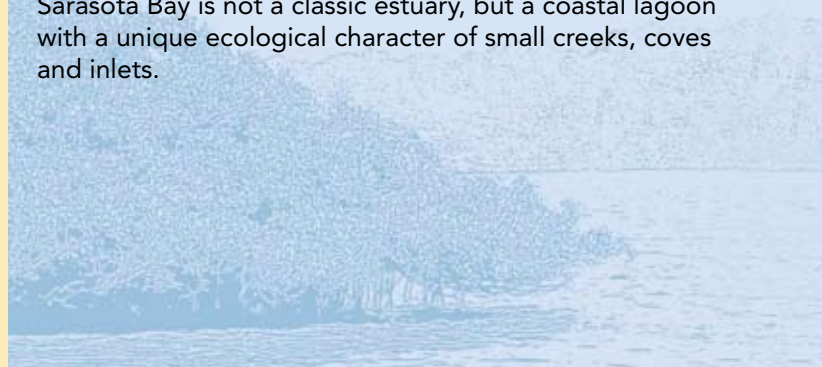
The Bay supports 50 water-dependent industries. Tourism, the largest industry in Sarasota County and the second largest industry in Manatee County, depends strongly on the condition and quality of the Bay and the Gulf of Mexico. In Manatee and Sarasota counties, property values are currently appreciating 30 to 40 percent annually, with waterfront residences commanding the highest home values. Protecting and enhancing Sarasota Bay—a major economic engine for our area—is clearly an investment worth making, not only for today’s populations but for future generations. 🌿

WHAT IS AN ESTUARY?

Estuaries are places where freshwater mixes with salty water from the sea. Teeming 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.

Sarasota Bay is not a classic estuary, but a coastal lagoon with a unique ecological character of small creeks, coves and inlets.





EXECUTIVE SUMMARY

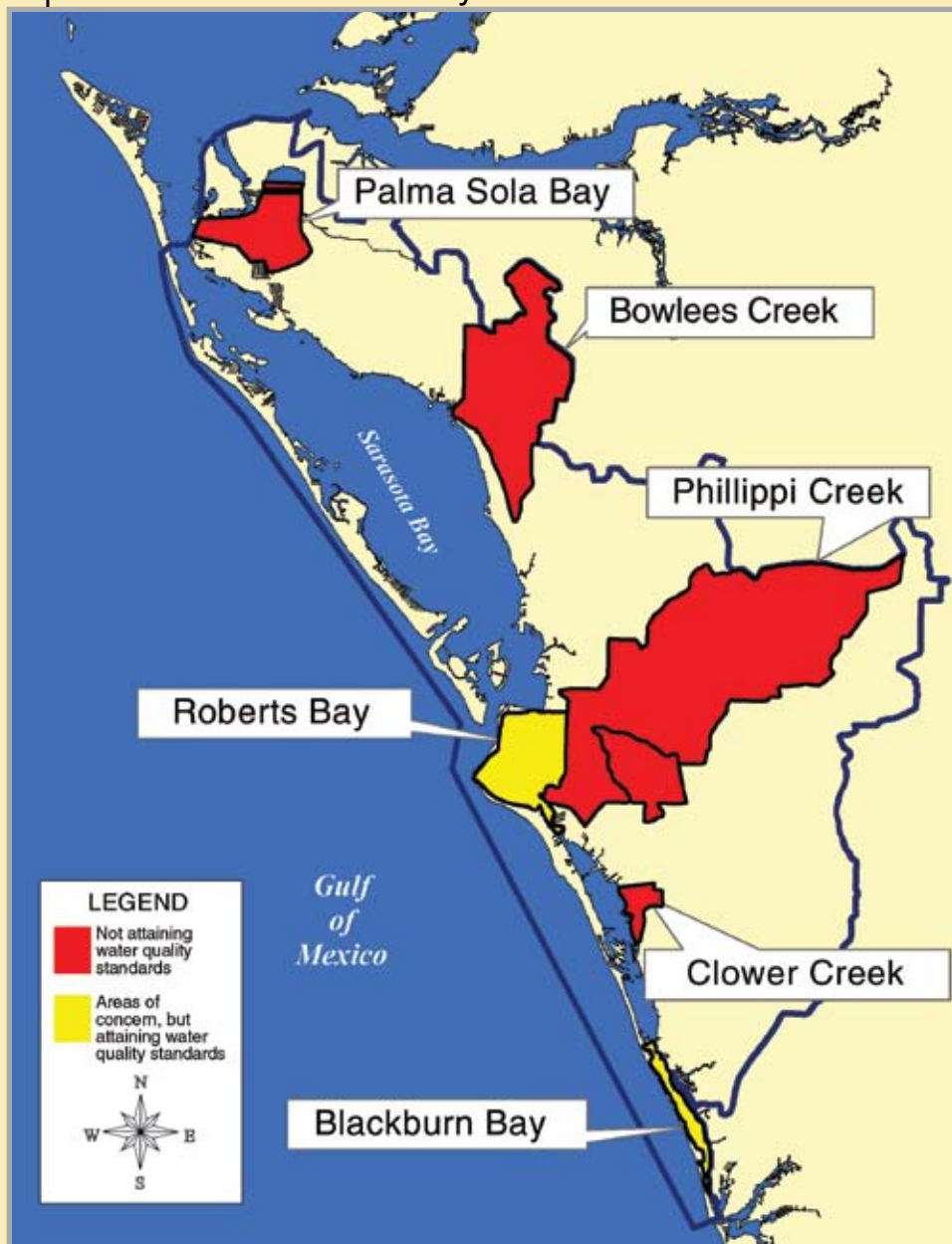
SARASOTA BAY SHOWS SIGNIFICANT IMPROVEMENTS

Improving Water Quality

The Sarasota Bay Estuary Program (SBEP), in conjunction with Florida Department of Environmental Protection (FDEP), has analyzed available water quality data and determined that all main portions of Sarasota Bay meet state water quality standards except for Palma Sola Bay (due to high bacteria and chlorophyll). The analysis documents that four tributaries are currently impaired: Phillippi Creek (due to bacteria), Bowlees Creek (due

to bacteria and chlorophyll) and Clower Creek (due to chlorophyll in the estuarine portion) and Palma Sola Bay (due to nutrients and bacteria). Further analysis, planning and improvements are currently under way in each of these impaired water bodies. Higher standards will be adopted for chlorophyll, an indicator of clarity and algal productivity, in two other water bodies—Blackburn Bay and Roberts Bay.

Impaired Waters in Sarasota Bay Area



Improving Habitats

Efforts to improve water quality have resulted in 593 acres of new seagrass. In addition, approximately 3,465 acres have been converted from patchy to more dense continuous beds resulting in habitat improvement of more than 6.3 square miles of Bay bottom (see “Seagrasses” section on pages 19-21).

SBEP and its partners continue to restore wetland habitat on publicly owned land. To complement ongoing activities in wetland enhancement, a master habitat restoration plan was completed in 2003. More than 20 new ecological parks and access points around the Bay have been created for the use and enjoyment of the community (See Project Area Map at the back of the report for the location of these sites).

Since SBEP began, more than 2,500 reef modules have been deployed to create hard-bottom habitat in the Bay and the near-shore Gulf. The first oyster enhancement projects were permitted and constructed in 2005. Data collected and analyzed by SBEP points to significant utilization by fish of both wetland restoration and reef sites. These ongoing projects are important because they help compensate for the 4,800 acres of Bay bottom habitats damaged or disturbed by past dredge-and-fill operations.

“Scientists agree that coastal pollution is not the cause of red tide or trigger for red tides; however, we do speculate that human-derived pollutants (nutrients) may be intensifying and prolonging the red tides along the coast. Although the research to definitively answer the question is still



Drains deliver nutrient-enriched stormwater to our Bay.



Inland habitats, like this Palm Hammock, are critical to restoring water quality in Sarasota Bay.

A rich variety of fish populate artificial reefs deployed by scores of the area's avid volunteers. These restoration teams include people of diverse talents and backgrounds, from elementary school students and community leaders to ecologists and engineers.

Charting the Future of Bay Restorations

Although much progress can be celebrated, nitrogen levels are still twice what they were 100 years ago. As the area's population continues to rise, so will the need to develop ever more creative ways to reduce nitrogen levels through recycling waste water, replacing septic tanks and conserving water.

Another critical issue for southwest Florida, especially Sarasota Bay, is red tide. Exploring the relationship between water quality pollution and red tide is a top SBEP priority. In 2001, a study sponsored by SBEP and conducted by Mote Marine Laboratory found relationships between rainfall and red tide outbreaks. 🐟

underway, we should do all we can to eliminate coastal pollution whether or not it enhances red tides.”

— Sarasota Herald-Tribune, Mote Marine Laboratory Editorial, September 4, 2005





WATER QUALITY

Nitrogen is the principle pollutant of concern in Sarasota Bay, while bacteria contamination is also an issue in selected areas of the Bay. A comprehensive approach to nutrient management has led to decreases in nitrogen pollution by approximately 50 percent in Sarasota Bay since 1988.

Bacteria contamination levels in tributaries leading to Sarasota Bay also have declined as a result of the implementation of the nutrient management programs specified in the Comprehensive Conservation and Management Plan.

Excessive Nitrogen Levels Stress the Ecosystem

Although nitrogen and other nutrients are essential for life, it is possible to have too much of a good thing. Nitrogen pollution comes from a variety of sources, including stormwater, wastewater, atmospheric and groundwater. Excessive nitrogen levels cause blooms of algae that reduce the amount of light penetration to submerged seagrasses. Excessive nitrogen also depletes available oxygen for fish and other marine organisms.

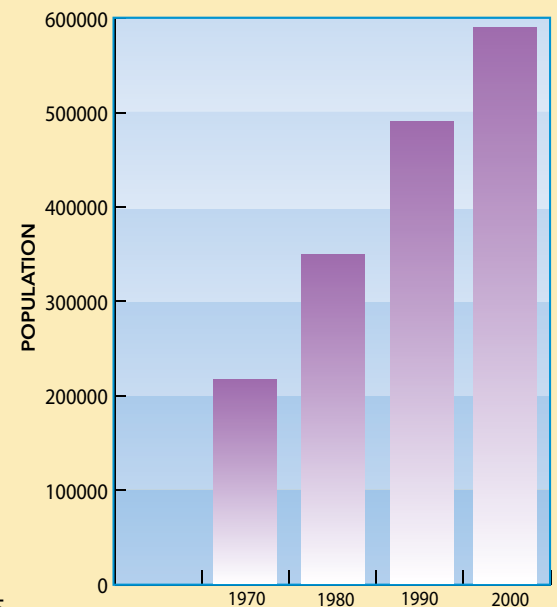
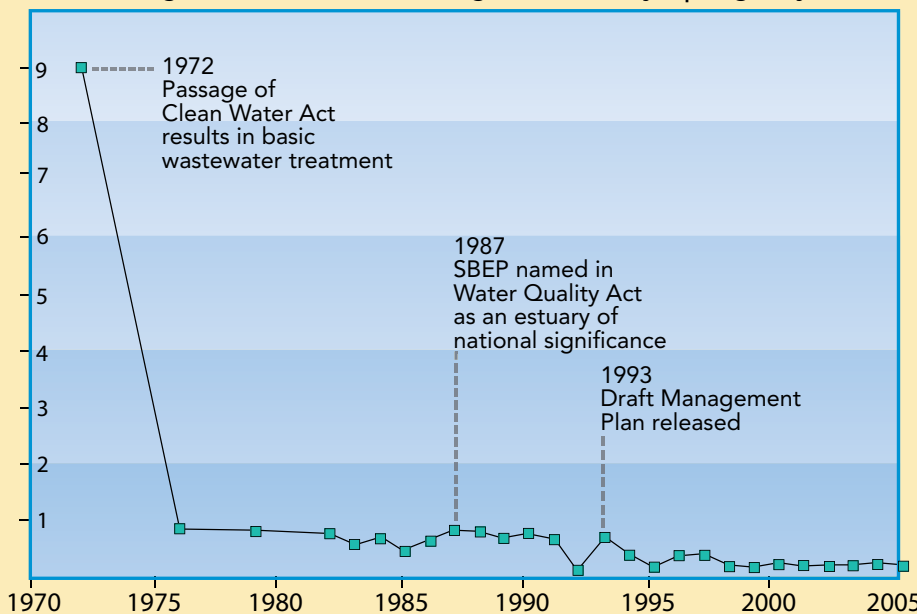
According to Sarasota Bay Estuary Program's modeling, nitrogen pollution-loading levels remain approximately twice that of predevelopment conditions. SBEP and its partners will continue to research and monitor nitrogen, light penetration, chlorophyll and other key water quality parameters on a monthly basis.

Wastewater Pollution

In 1990, the State of Florida required all wastewater treatment plants with direct discharge into the Bay or its tributaries to meet stringent, advanced wastewater treatment standards (three milligrams of nitrogen per liter of direct discharge compared with normal sewage discharge at more than 40 milligrams per liter of wastewater). In the early 1990s, a severe drought in southwest Florida focused attention on the need for alternative water sources. During that period, studies showed that over-pumping of groundwater caused saltwater intrusion in the Floridan Aquifer, threatening the state's water supply. In response, reclaimed wastewater emerged as a viable alternative source of water.

SBEP and Southwest Florida Water Management District (SWFWMD) developed a master plan for wastewater reclamation for the Sarasota Bay region. As a result,

Total Nitrogen Concentrations in Big Sarasota Bay (spring only)



Average annual trends in total nitrogen and population:

Data suggests that population growth is beginning to offset community action to reduce nitrogen inputs to the Bay.

approximately 50 percent of the wastewater currently generated in the Sarasota Bay area is now reclaimed for alternative uses, with plans for further reclamation. The local governments also have improved the area's collection, treatment and transmission systems. SBEP partners have reduced nitrogen loading from wastewater to the Bay by approximately 85 percent.

Wastewater pollution, however, remains a significant source of nitrogen in water bodies with small, private wastewater treatment plants and older septic systems. SBEP and Sarasota County studies prompted the county to consolidate 117 small, private wastewater treatment plants and to implement the Phillippi Creek septic-to-sewer program. Currently, 37 small treatment plants remain in service with plans for further consolidation.

Air Pollution

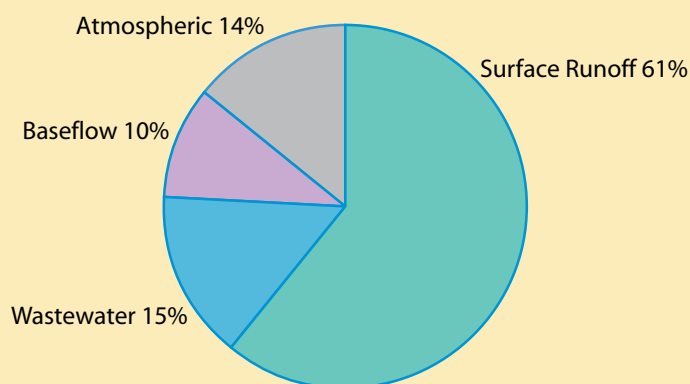
Studies conducted by SBEP show that while nitrogen levels have doubled in the atmosphere in the past 50 years, direct deposition only accounts for 14 percent of the total nitrogen input to Sarasota Bay. These same studies show that current atmospheric nitrogen levels do not stimulate algal productivity in Sarasota Bay, but can stimulate algal productivity in the Gulf of Mexico. Continued research, monitoring and public education are warranted because approximately 80 percent of the atmospheric nitrogen deposited in Sarasota Bay area waters is produced by local "mobile emission" sources. e.g., cars, motor boats and lawn mowers.

Stormwater Pollution

The amount of stormwater reaching the Bay increases as development practices harden and compact surfaces. With the large reduction in nitrogen pollution from wastewater, stormwater loading has increased to 61 percent of the nitrogen load carried to the Bay—making stormwater pollution a top priority for action.

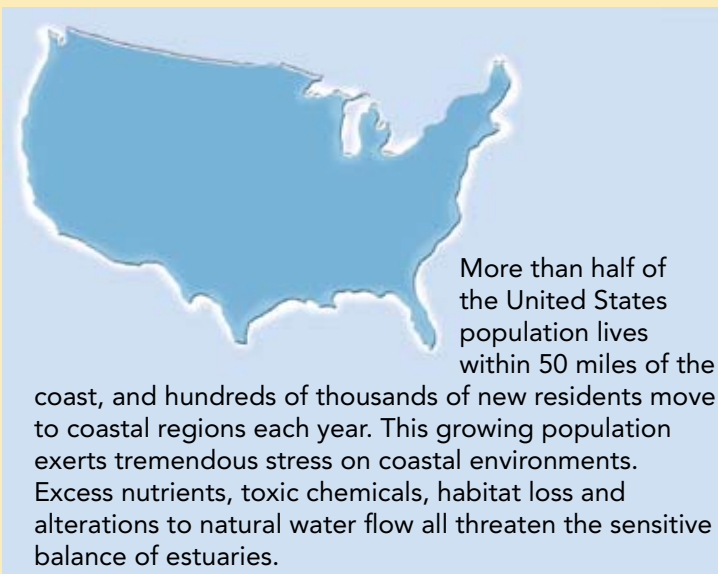
The conventional treatment of stormwater, using constructed ponds and lakes, removes only 12 to 44 percent of the nitrogen from those systems. However, several new technologies significantly increase nitrogen removal, all of which deserves serious community consideration. The SBEP is investigating other ways to reduce nitrogen loading entering those ponds via post construction soil augmentation and Florida-friendly landscaping.

Percent Distribution of Nitrogen Loads Baywide



Bacteria Contamination

Another form of pollution is bacteria contamination measured 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. Bacteria levels are consistently above standards in three Bay area waterways: Phillippi Creek, Bowlees Creek and Palma Sola Bay. These waterways have been listed as impaired by the Florida Department of Environmental Protection. In Phillippi Creek, studies have concluded that septic tanks are the source of elevated bacteria, while sources have yet to be identified in Palma Sola Bay and Bowlees Creek. SBEP has appropriated funding to investigate the sources of bacteria in these tributaries.





WATER QUALITY

Tributary Action Plans

Since most of Sarasota Bay meets state water quality standards, the focus has shifted to the tributaries, such as Phillippi Creek, Bowlees Creek and Whitaker Bayou. Additional management plans are being considered for Clower Creek, North Creek, South Creek, Catfish Creek and Eligraw Bayou.

Bowlees Creek Comprehensive Restoration Plan

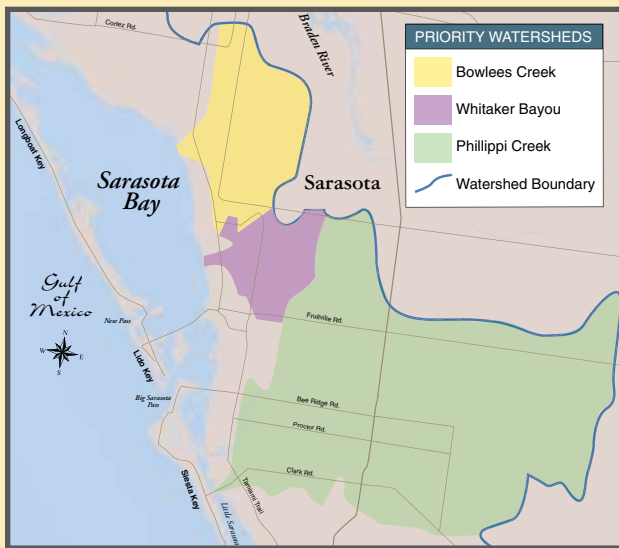
Bowlees Creek exceeds the state standards for both nitrogen and bacteria. In response, Manatee County is implementing an action plan that includes the following:

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

Whitaker Bayou Comprehensive Restoration Plan

Whitaker Bayou exceeded state standards for bacteria until the turn of the 21st century. To remediate the problem, the City of Sarasota has taken the following actions:

1. Upgraded the City's wastewater treatment plant
2. Made a \$77 million upgrade to the wastewater transmission system
3. Provided sewer service to remaining homes with septic tanks in the watershed
4. Removed remaining small, private wastewater treatment plants



Watersheds of Priority Tributaries

5. Prepared a stormwater master plan in concert with U.S. Army Corps of Engineers
6. Expanded urban and agricultural use systems to reduce wastewater discharge

Phillippi Creek Comprehensive Restoration Plan

The Phillippi Creek Comprehensive Restoration Plan focuses on three main goals: improving water quality, reducing bacteria and decreasing nitrogen loads transported by Phillippi

Creek into Roberts Bay. As called for in the Phillippi Creek Comprehensive Restoration Plan, the following actions have been implemented by Sarasota County:

1. Removal of 19 small private wastewater treatment plants
2. Expansion of the Bee Ridge wastewater treatment facility to accommodate additional flow
3. Construction of the Pine Craft Levee Project to prevent flooding in septic drainfield and lift station areas
4. Continuing implementation of a \$135 million septic-to-sewer program
5. Construction of the \$30 million Celery Fields wastewater treatment facility
6. The initiation of a feasibility study to convert the Atlantic wastewater treatment plant to a stormwater treatment facility

Results

As a result of implementing these action plans, bacteria levels are decreasing in all three watersheds. Whitaker Bayou recently met state standards for water quality and was removed from Florida Department of Environmental Protection's impaired water body list. Nitrogen levels in Phillippi Creek have dropped by 500 percent, resulting in the creek no longer being classified as impaired due to nutrients. Although there have been improvements, Bowlees Creek remains impaired for both nitrogen and bacteria.

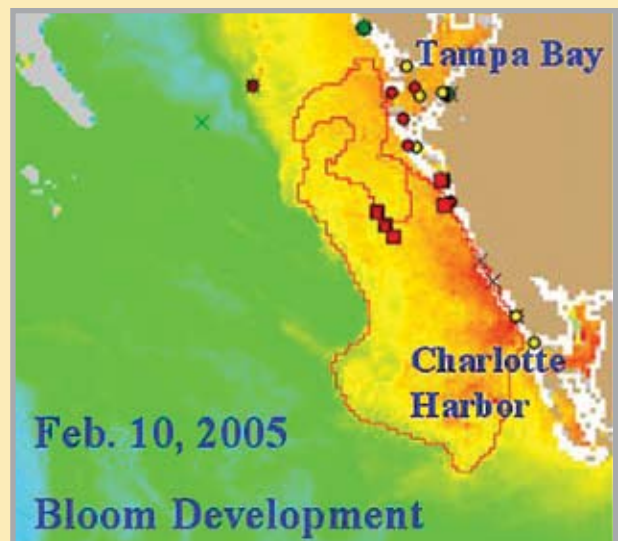
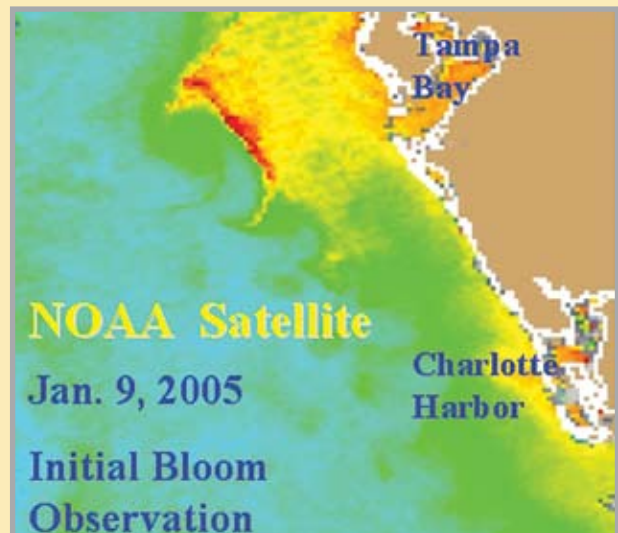
Red Tide

In 2005, communities in Manatee and Sarasota counties were economically and ecologically affected by one of the largest outbreaks of red tide in history. The outbreak was first detected in January 2005 approximately 30 miles off of St. Petersburg, Florida. The red tide was associated with a plume of water possibly from Tampa Bay. By February 2005, the bloom had spread south to Charlotte Harbor. By August, most of the Gulf Coast of Florida was experiencing red tide.

Red tide is a microscopic alga that naturally occurs in the Gulf of Mexico. The red tide organism produces toxins that kill fish and create respiratory health effects in both humans and marine mammals. Consumption of shellfish contaminated with the red tide toxin can also have significant health effects.

A “dead zone” (an area of low oxygen, concentrated fish kills and bottom habitat destruction) was also found along the Gulf Coast from St. Petersburg Beach south, encompassing an estimated 2,500 square miles. A definitive relationship between the dead zone and red tide was not scientifically established, but a similar dead zone-red tide event occurred in 1971. The hard bottom habitat and reefs impacted in the Gulf are expected to take two to three years to recover.

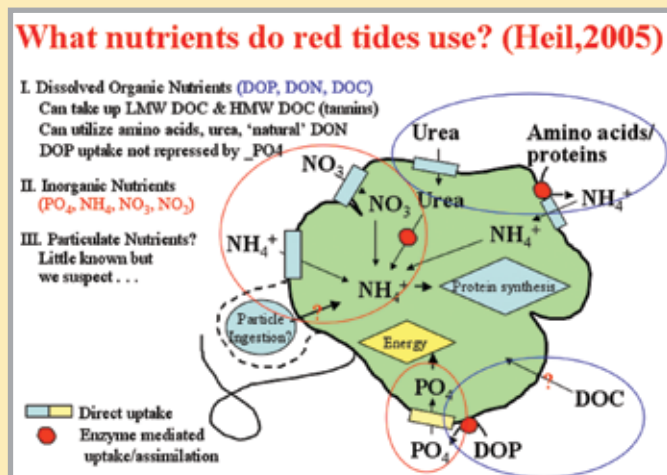
Scientists are making progress in understanding red tide. In 2001, the SBEP sponsored research (conducted by Mote Marine Laboratory) that established linkages between river flow (as a surrogate for nitrogen loading) and red tide along the southwest coast of Florida. The research was presented at an international symposium in 2002. In May 2005, an international scientific panel first recognized that pollution



Physical circulation and bloom development

inputs contribute to certain types of harmful algal blooms. More recent data suggests that red tide utilizes different forms of nutrients for growth, preferably urea, dissolved organic nitrogen and ammonium. Urea used in fertilizers and feed additives has increased 100 fold worldwide over the past four decades corresponding to a similar increase in the occurrence of harmful algal blooms.

Demonstrating a causal link between nutrient pollution and red tide will lead to decisive and appropriate management actions. In this regard, the SBEP Technical Advisory Committee has established red tide research related to water quality as its top research priority. Additionally, Sarasota Bay monitoring programs have been expanded to include red tide for comparison with water chemistry. 🐼





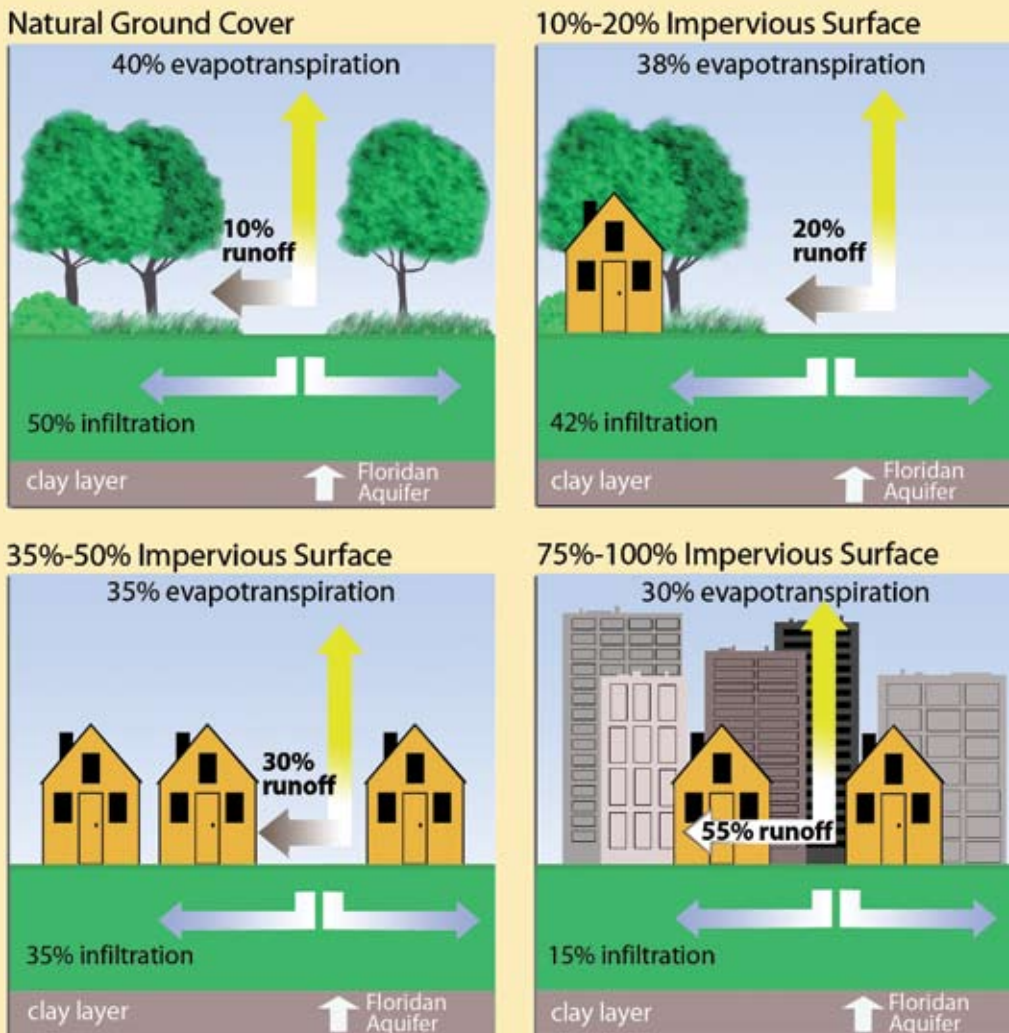
HYDROLOGY

Hydrology is the study of water's properties, movement and distribution. Water generally flows from upland sources—such as swamps and freshwater marshes, groundwater and springs—and eventually reaches bays and lagoons along the coast. Maintaining natural hydrology is important in preserving a balance in the ecosystem.

Over the past several decades, the region's watersheds—the land area that contributes runoff to Sarasota Bay and surrounding bays—have been put under stress by the area's growth. The importation of water for consumption flood control projects and the construction of impervious surfaces have changed the natural hydrology, resulting in higher peaks in the natural flow and increases in the delivery of pollutants to the Bay.

Re-establishing and maintaining the natural flow of water into the Sarasota Bay system is essential for sustaining a healthy watershed. The Sarasota Bay Estuary Program (SBEP) is evaluating possible changes in construction and landscaping practices to reduce the impact on the local hydrology. SBEP studies show, for example, that both turf and ornamental plants are effective at removing nitrogen when they are appropriately placed, planted and maintained (see Florida-Friendly Landscaping, page 25).

The movement of groundwater in the Sarasota Bay area is unique because of a confining clay layer, 20 to 30 feet deep, combined with an upward pressure gradient from the lower aquifer. As a result, water supplied to the area for public use—unless it is evaporated or transpired—ultimately reaches the Bay. Water conservation practices, therefore, will help improve the bay.



Hydrologic changes naturally occur with urbanization, e.g., increased water run-off and decreased infiltration.

In the future, yards may function as individual stormwater treatment facilities. Such ecologically designed landscapes would effectively allow rainwater to be stored and treated on site, preserving the natural hydrology and protecting the Bay. Unfortunately, current development practices tend to compact and modify soils (fill), reducing the ability of post-development soils to support beneficial plant growth and to retain water.

Changes in development standards related to site planning and preparation will help ensure that healthy, environmentally sensitive yards are created within the community. Such measures will likely include the preservation of natural vegetation, the use of contour swales, the aeration of soils before landscaping, the use of micro-irrigation and the strategic use of turf. 🌿



Bradenton's downtown marina



BAY HABITAT

Habitats critical to Bay marine life include wetlands, seagrasses and hard bottom.

Wetlands

Saltwater wetlands, primarily mangroves in the Bay area, are essential nursery areas for many aquatic species. Wetlands decreased in Sarasota Bay by more than 1,800 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 to provide boat access to waterfront home sites. A recent mapping project showed that more than 100 miles of seawalls and other hardened shorelines now dominate the Sarasota Bay watershed.

In response, the Sarasota Bay Estuary Program (SBEP) and its partners have embarked on substantial saltwater wetland restoration and enhancement projects totaling more than 160 acres.



Dredging and shoreline hardening upset the natural hydrology and destroy habitats.

*Green Heron (*Butorides virescens*) perched on a mangrove*

Wetland Restoration

SBEP adopted an annual goal of restoring at least 1 percent of the wetland habitat that's been lost—totaling 18 acres per year. Completed to date are 22 wetland enhancement and restoration projects, all of which involve numerous partners and volunteers. A list of 10 recently completed or ongoing projects follows, moving north to south:

1. Robinson Preserve: 400-acre restoration site near the confluence of Tampa Bay and Sarasota Bay in Manatee County; purchased by the state and local governments based on an environmental restoration design completed by SBEP contractors; more than \$2 million has been committed for environmental enhancement, which includes lagunal contouring, exotic plant removal, native revegetation and the construction of a three-mile canoe trail from the Manatee River to Palma Sola Bay.
2. Wares Creek at Ballard Elementary: Non-native plants removed from the shoreline at the school and native vegetation planted with help from students, teachers and neighborhood volunteers.
3. 1912 Cortez Schoolhouse: Restored and/or enhanced approximately three acres of environmentally sensitive habitat on the grounds; maintained exotics and monitored conditions; assisted the Florida Institute for Saltwater Heritage (FISH) in the acquisition of 95 acres of waterfront property adjacent to the site for preservation and future restoration.
4. Sister Keys: Non-native Australian pines and Brazilian peppers removed from 20 acres of the site; future plans call for restoration of the island complex.
5. Joan M. Durante Park: 50-acre site in Manatee County in the Town of Longboat Key; approximately 20 acres enhanced with tidal lagoons and wetlands.
6. Powel Crosley Estate: Approximately 10 acres of upland hammock restored on this site; exotic plants were removed, and the site was replanted with native vegetation.
7. G.WIZ: Approximately 100 yards of shoreline were enhanced to create valuable habitat; plans for an outdoor classroom have been completed; area elementary and middle school students visit the museum as a part of their curriculum.

Volunteers plant at Hog Creek—
a mother-daughter team.

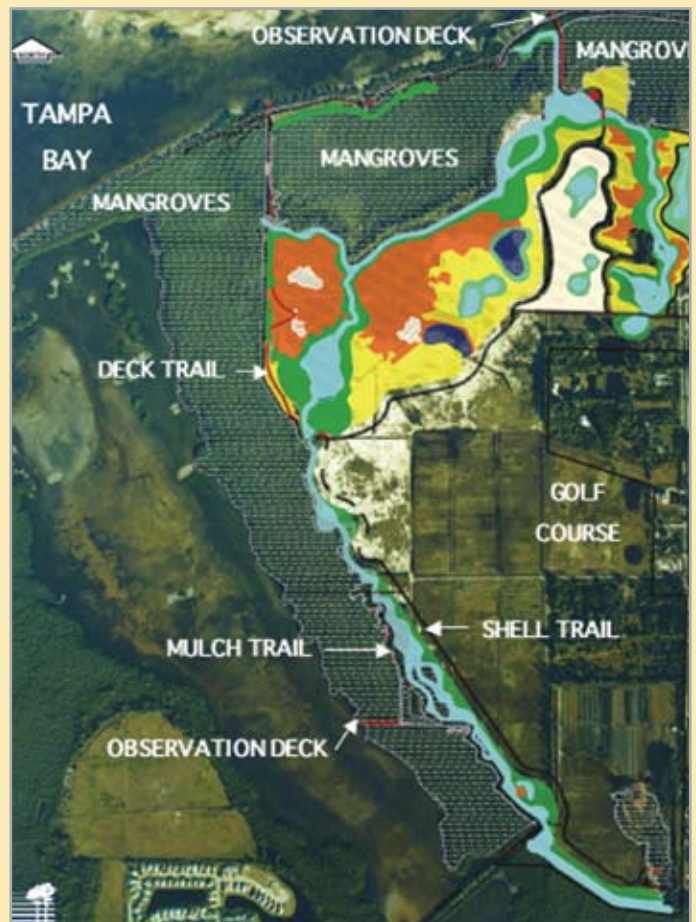


Boardwalk through a mangrove forest at Joan M. Durante Park

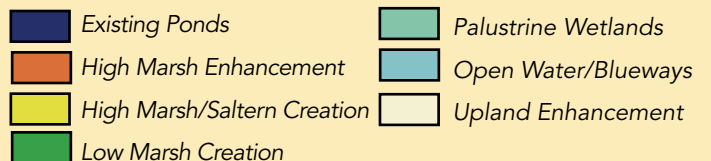


Beach sunflower
(*Helianthus debilis*)

8. Quick Point Nature Preserve: 35-acre site in Sarasota County in the Town of Longboat Key; approximately 15 acres restored.
9. Ken Thompson Park: Approximately three acres of tidal lagoons created in the City of Sarasota; boardwalks and educational signage installed.
10. South Lido Park: Approximately 10 acres restored through lagunal contouring, exotic plant removal and native revegetation; first phase completed Fall 2004, with a long-term goal of enhancing hundreds of acres of tidal and backwater habitats.



Robinson Preserve Draft Plan





BAY HABITAT

Sarasota Bay Estuary Program (SBEP) recently created a comprehensive habitat restoration plan that earmarks 29 additional projects for completion in the next five years. Generally, these projects center on removing exotic invasive plants, such as Brazilian pepper, Australian pine and carrotwood. Such projects also involve the creation of intertidal lagoons aimed at returning portions of the sites to tidal levels of plus or minus one to two feet. Additional projects are in the design phase, including Roberts Bay, Bird Colony Islands and the FISH Preserve.

Monitoring Wetland Restoration Projects

The SBEP monitors restoration and enhancement sites to gauge their success and learn better restoration and enhancement practices. A recent fisheries assessment at 40 sites found that approximately 68,000 fish inhabit each acre of restored lagoon, whereas approximately 109,000 fish per acre live in the natural lagoons. This suggests that quality habitats are being created, but they are not initially as productive as natural ecosystems. As the restoration sites mature, they should more closely resemble nearby natural habitats.

The SBEP is monitoring several restored sites to assess plant success as well as sampling for invertebrates, such as small crabs and snails found in mangrove forests. The findings may lead to alterations in future restoration plans and practices that will enhance the quality of restored or newly created habitats.



Leffis Key (left) and Quick Point Nature Preserve (below) both have educational habitat markers to guide visitors along the nature trails.



Seagrasses

Seagrasses provide shelter and protection essential to supporting much of the Bay's marine life. It is generally recognized that seagrass coverage is a function of water clarity and availability of appropriate bottom substrate. The Bay area is home to five common species of seagrasses: shoal grass, turtle grass, manatee grass, widgeon grass and star grass. Seagrass habitat decreased by 30 percent from 1950 to 1988 as a result of declines in water clarity and dredge-and-fill operations.

In the Sarasota Bay region, seagrass coverage is assessed and mapped every two years with the help of aerial photography. The analysis distinguishes between patchy seagrass beds (with less than 75 percent coverage) and continuous seagrass beds (with greater than 75 percent coverage) in a given area. A minimum of 25 percent coverage is required for mapping of a patchy bed.



Shoal grass, (*Halodule wrightii*), is an early colonizer of disturbed areas and usually grows in water too shallow for other species.



Turtle grass, (*Thalassia testudinum*), the most common of the Florida seagrasses, characteristically has deeper root structures than any other seagrasses.



Manatee grass, (*Syringodium filiforme*), is easily recognizable because its leaves are cylindrical.



Widgeon grass, (*Ruppia maritima*), grows in both fresh and saltwater and is widely distributed throughout Florida's estuaries.

Seagrass artwork by Mark D. Moffler, Florida Fish and Wildlife Conservation Commission



BAY HABITAT

Aerial photography shows that approximately 593 new acres of seagrasses have been mapped between 1988 and 2003. Continuous seagrass beds in Sarasota Bay have also increased by 3,465 acres; this equates to a total of 4,058 acres of new or improved seagrass beds in Sarasota Bay.

The overall increase in new beds and the presence of more continuous beds suggests that water quality has improved in the Bay. Moreover, trends in seagrass regeneration vary

among embayments, most likely due to differences in nearby water quality. North Sarasota Bay has seen expansion in coverage (see Figure 2: Sarasota Bay Proper) as well as the lower bays (see Figures 3 a-c). These positive trends are indicative of water-quality improvement throughout Sarasota Bay segments. The Sarasota Bay Estuary Program is working with its partners to better understand the fluctuation in seagrass coverage throughout Sarasota Bay.

Figure 1. **Sarasota Bay – Seagrass coverage (in acres) baywide**

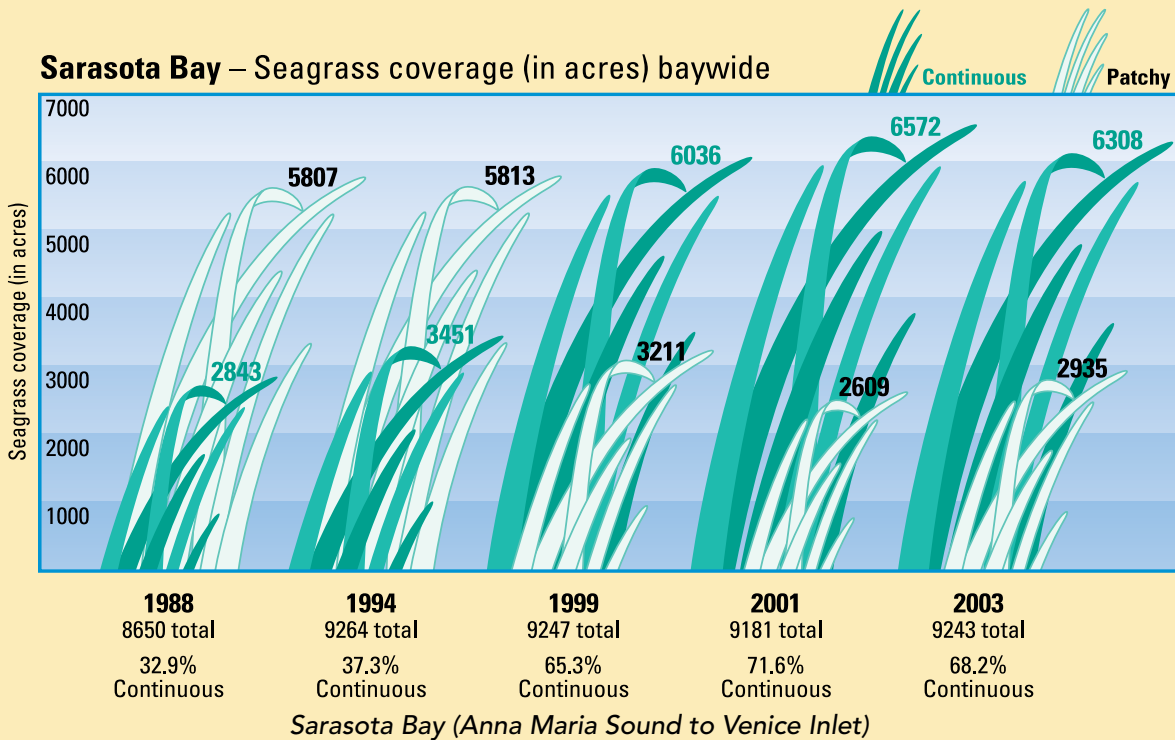


Figure 2. **Sarasota Bay Proper– Seagrass coverage (in acres)**

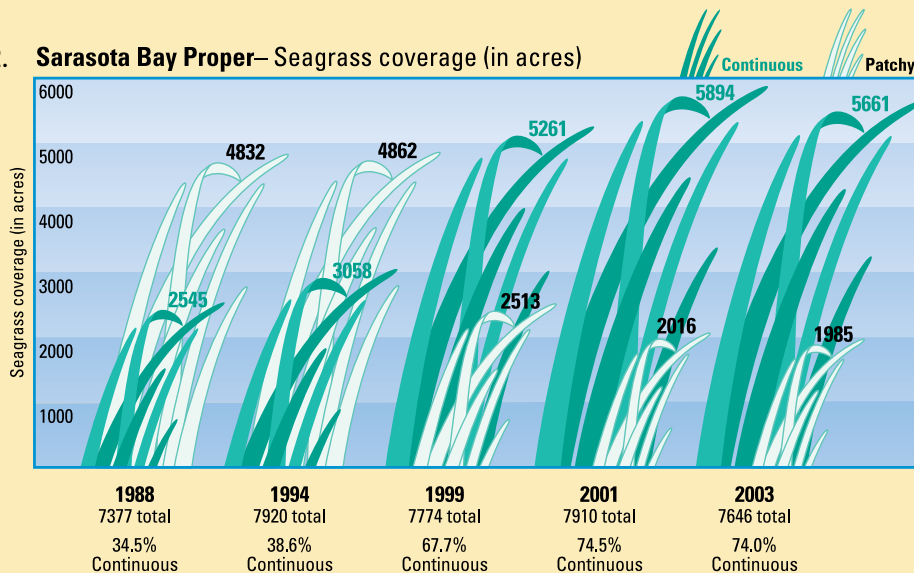


Figure 3a-c. Lower Sarasota Bay segments

Figure 3a. **Little Sarasota Bay** – Seagrass coverage (in acres)

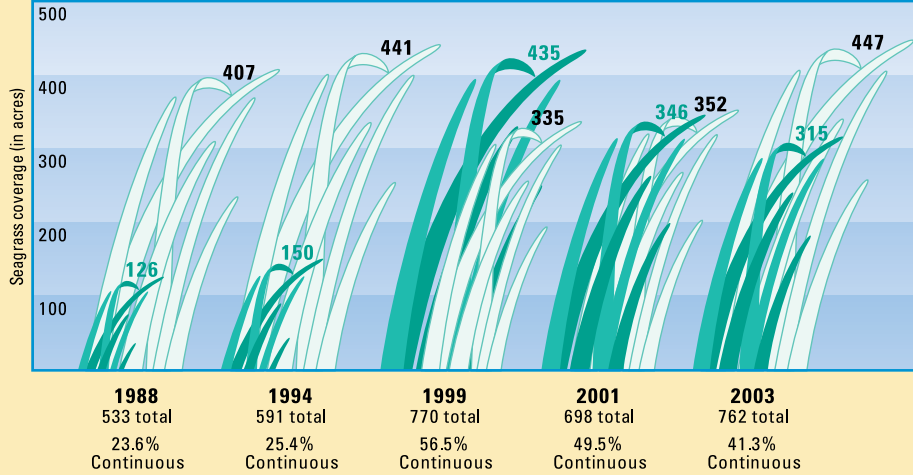


Figure 3b. **Roberts Bay** – Seagrass coverage (in acres)

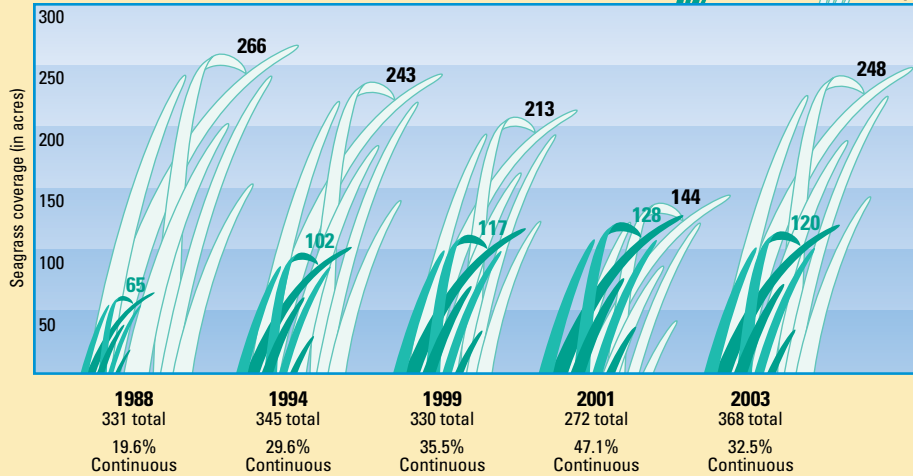
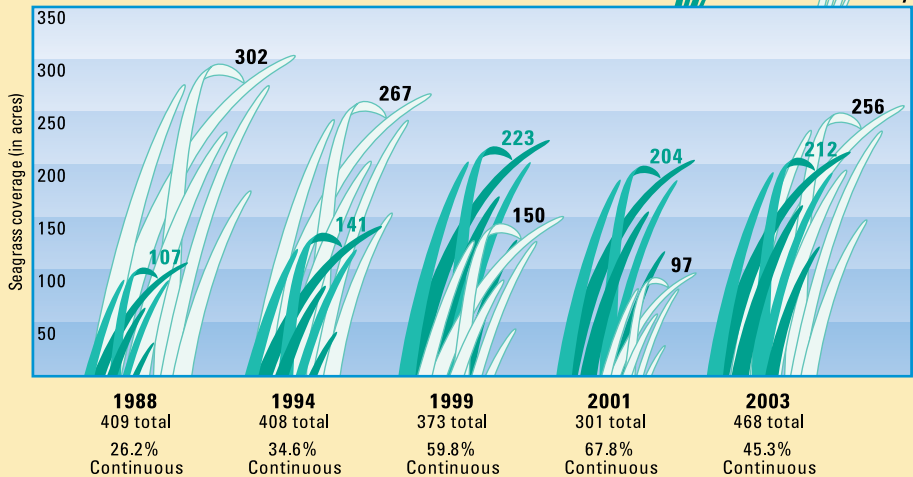


Figure 3c. **Blackburn Bay** – Seagrass coverage (in acres)





BAY HABITAT

Hard Bottom Habitat

Although the precise acreage of hard bottom habitat lost due to dredge-and-fill activities has not been determined, nearly 4,500 acres of bay bottom are known to have been covered by dredge-and-fill operations. To compensate for lost habitats, Sarasota Bay Estuary Program (SBEP) has embarked on several oyster restoration and artificial reef creation projects.

Oysters

A recent SBEP study revealed the transitions of oyster beds since the 1980s. The loss of red mangroves, whose prop roots support oyster colonies, has adversely affected the Bay's oyster populations. Even in its prime, Sarasota Bay oyster populations were not as extensive as other estuaries, such as Chesapeake Bay. Nevertheless, the Bay once supported an active oyster fishery, as evidenced by the Indian Mounds visible at Historic Spanish Point and elsewhere in the Bay area.

To help restore natural populations, the SBEP is using two oyster bars in Little

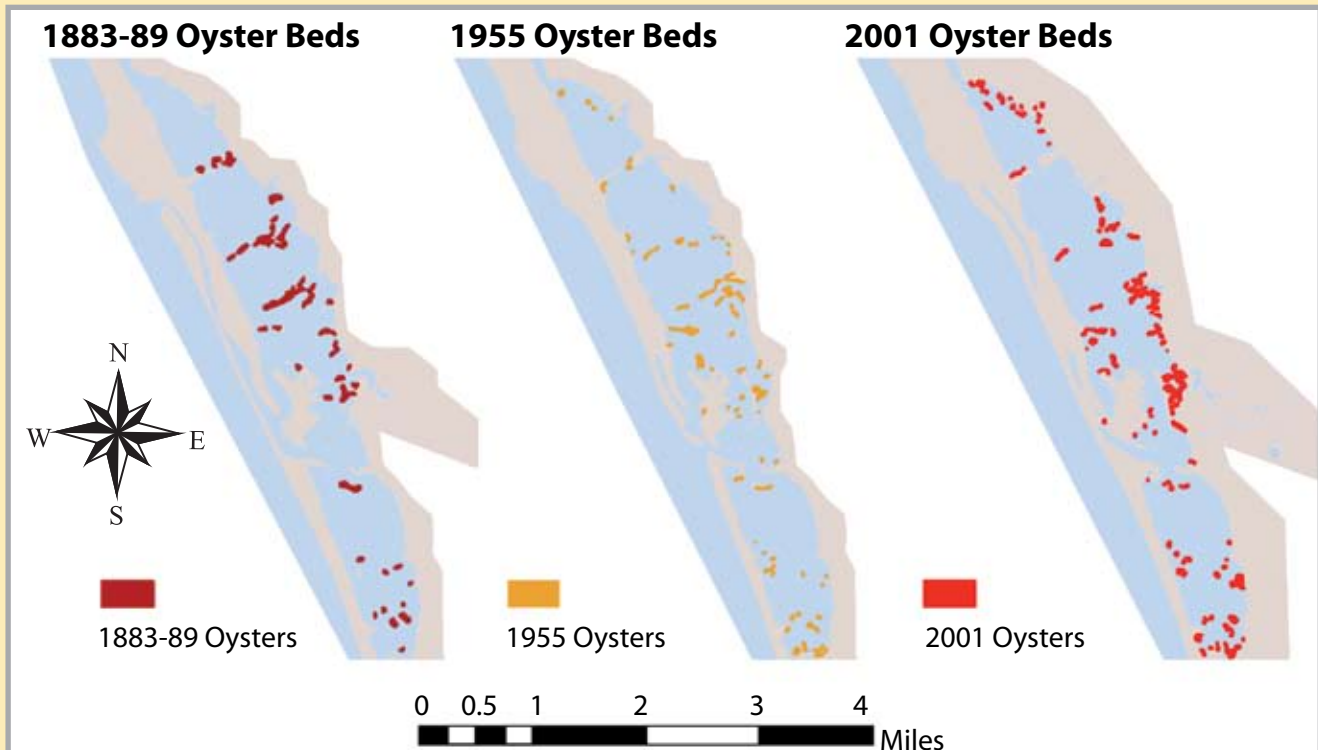
Sarasota Bay as test sites. These sites are located in areas where oysters are present, but bed expansion is limited by the lack of substrate that provides attachment areas for freely floating oyster spat (larvae). This pilot project uses fossilized oyster shells in mesh bags (oyster sausages), onto which the oyster



Restoring oyster habitat

Oyster beds are an important part of the Sarasota Bay ecosystem because they provide habitat to many other organisms and are known to improve water quality.

larvae can settle and grow. Oysters typically attach to the oyster sausages within a month of placement and grow to maturity within two years. This work is important because oysters provide habitat and filter Bay water. The SBEP will continue to monitor these sites to assess oyster regeneration.



Little Sarasota Bay oyster beds in three eras

Artificial Reefs

The Sarasota Bay Estuary Program (SBEP) has been active in the creation of artificial reefs for several years. In 1996, the SBEP created a master artificial reef plan, identifying 20 possible sites. These sites were selected because they had appropriate sediments and because they were deep enough to not impede navigation. Since 2000, SBEP and partners have contracted to construct approximately 2,500 reef modules now resting on the Bay bottom. Currently, the SBEP has eight active reef sites created primarily from prefabricated reef ball modules. Other reef materials such as PVC piping have served as successful tests on two other reef systems in the Bay area. In addition, reef modules are being deployed around channel markers throughout the Bay in an effort to create juvenile fish habitat.

The SBEP is investigating whether different placements of reef modules have an effect on the numbers and species of fish using them. The findings will help identify alternative designs and reef placements that support superior habitats.



Artificial reef deployment in Sarasota Bay

Monitoring Reefs

Initial research and monitoring indicates that diverse varieties of aquatic marine life—including gray snapper, sheepshead, gag grouper, bait fish and stone crab—are regular visitors to the artificial reefs. Several local guides have offered anecdotal evidence that artificial reefs have become popular spots for recreational fishing and diving as well. 🐟



The west coast of Florida offers some of the finest shallow-water fishing in the world.



PUBLIC INVOLVEMENT IN RESTORING THE BAY

The Citizens Advisory Committee (CAC) provides a mechanism for structured citizen input to the Sarasota Bay Estuary Program (SBEP) 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.

Community Recreation, Stewardship and Citizen Action

The goals and objectives of the current CAC action plan are:

- 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 activities are divided into three components—outreach, involvement and education.

Outreach—How the Community is Involved

A cornerstone of the citizen's action plan is the Florida Yards & Neighborhoods Program (FYN) started in the early 1990s. FYN'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 FYN Program practices is essential for long-term preservation and enhancement of the Bay. These principles not only apply to communities on the Bay, but throughout the entire watershed.



Joan M. Durante Park boardwalk on Longboat Key



Citizens Advisory Committee field trip to Quick Point Nature Preserve



Lakewood Ranch demonstration garden complies with Florida Yards & Neighborhoods principles.



Certified Florida Yard with Plumbago (*Plumbago auriculata*) and Wild Allamanda (*Pentalinon luteum*)

FLORIDA-FRIENDLY LANDSCAPING

Florida-friendly landscaping, which coincides with the FYN Program, emphasizes these major principles:

- 1. Right Plant, Right Place** – Plants selected to suit a specific site will require minimal amounts of water, fertilizer and pesticides.
- 2. 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.



- 3. Fertilize Appropriately** – Less is often best. Over-use of fertilizers can be hazardous to your yard and the environment.
- 4. Mulch** – Maintaining a 3" layer of mulch will help retain soil moisture, prevent erosion and suppress weeds.
- 5. Attract Wildlife** – Plants in your yard that provide food, water and shelter can conserve Florida's diverse wildlife.
- 6. Control Yard Pests Responsibly** – Unwise use of pesticides can harm people, pets, beneficial organisms and the environment.
- 7. Recycle** – Grass clippings, leaves and yard trimmings recycled on site provide nutrients to the soil and reduce waste disposal.
- 8. Reduce Stormwater Runoff** – Water running off from your 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.
- 9. Protect the Waterfront** – Our shorelines, whether on a bay, river, stream, pond or beach, are very fragile and should be carefully protected to maintain freshwater and marine ecosystems.



PUBLIC INVOLVEMENT

IN RESTORING THE BAY

Sarasota County Water Efficient Landscape Ordinance

In January 2002, Sarasota County adopted a Water Efficient Landscape Ordinance that recognized the need to protect water as a natural resource through the application of enhanced landscape practices. The ordinance supports the following principles:

- Installation of rain sensor devices on automatic lawn sprinkler systems
- Water conservation through the use of site adapted plants and efficient watering methods
- Reduced energy expenditures in individual landscapes

Manatee County Rebate Program

In 2003, the Manatee County Utility Operations Department and Cooperative Extension Service Office implemented a Water Conservation Rebate Program that addressed landscape retrofits and landscape irrigation. The Water Conservation Rebate Program offers financial incentives in the form of rebates. These rebates encourage residents to install cisterns, repair old irrigation wells or install new ones, and install pumps and similar equipment in natural storage areas, such as retention ponds, for



Firebush (*Hamelia patens*) is a native plant that blooms year round and attracts hummingbirds.

irrigation. Manatee County's Water Conservation Rebate Program also promotes the conservation of drinking water, which in turn helps preserve the Bay and its tributaries.

In addition, the rebate program recognizes those who modify existing landscape irrigation systems to use less water and those who retrofit an existing landscape with a Florida-friendly design. Such innovative designs decrease the need for water through proper plant selection, placement and micro-irrigation.



Retention ponds (shown here) are critical to primary treatment of stormwater runoff.

Southwest Florida Water Management District (SWFWMD) Business Outreach

Water-Wise Landscaping

To call attention to the community efforts of good water stewards in the commercial, government and building industries, the Water-Wise Landscape Recognition Program spotlights new and retrofitted water-conserving commercial landscapes. SWFWMD initiated a program that recognizes the developers, builders, architects and landscape contractors who make decisions regarding new landscapes. From April 2000 to July 2004, approximately

According to the U.S. Census Bureau, Florida is the country's third-fastest growing state

1,229,595 people moved to Florida from other states and countries. This equates to 793 people per day. The development industry is building to accommodate these new residents, all of whom rely on Florida's precious water resources. This recognition program offers builders and developers incentives to construct homes and communities that are water-wise.

The largest development in the Bay region—Lakewood Ranch—recently won a national Award of Excellence as an ecologically friendly or “green” community for its use of energy-efficient appliances, skylights, insulation, sustainably harvested materials and Florida-friendly landscaping.



Florida Yards & Neighborhoods demonstration garden at Lakewood Ranch



Coontie (*Zamia pumila*) is the only cycad native to Florida and is the host plant for *Atala* butterflies.



PUBLIC INVOLVEMENT

IN RESTORING THE BAY

FLORIDA YARDS & NEIGHBORHOODS MINI-GRANT RECIPIENTS

- Action Central Revitalization Committee
- Azalea Park Homeowners' Association
- Ballard Elementary School
- Buccaneer Bay Homeowners' Association
- Crosley Museum/SGI – USA Sarasota Chapter
- Daughtrey Elementary School
- 4-H Club and David Cohen Park
- Dolphin Tower Condominium Association
- Glen Oaks Estates Homeowners' Association
- King's Gate Club
- Rose Street Pathway Volunteers
- South Creek Homeowners' Association
- St. Margaret of Scotland Episcopal Church

Public Involvement

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.

Sarasota Bay Estuary Program (SBEP) 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.



Students participate in restoration at the Powel Crosley Museum.



SBEP Florida Yards & Neighborhoods Mini-Grants Program

Since its inception in 1989, the Sarasota Bay Estuary Program (SBEP) has supported community-based projects in the form of grants. In 2004, the SBEP established a Florida Yards & Neighborhoods Mini-Grants Program to promote Florida-friendly landscaping for the preservation of the environment and to create a sense of place that will enhance the communities' quality of life. The mini-grants are available to neighborhoods, homeowners, civic associations, schools, religious organizations and ad-hoc neighborhood groups located in Sarasota and Manatee counties. Examples of projects are neighborhoods and schools creating Florida-friendly landscapes in community parks, schoolyards, playgrounds, right-of-ways, medians and neighborhood entryways.



Students, parents and teachers from Ballard Elementary School plant native foliage on Beautify Ballard Day.

Bay Partners Grants Program

The purpose of the Bay Partners Grants is to promote environmental education, awareness and stewardship and to improve the overall quality of Sarasota Bay and its tributaries. The Bay Partners Grants awards fall under one of four categories: stormwater runoff prevention; habitat restoration and protection; recreational use and access; and Bay education and awareness.

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

RECENT RECIPIENTS OF BAY PARTNERS GRANTS

- American Littoral Society
- Aquarian Quest, Inc.
- Around the Bend Nature Tours
- Ballard Elementary School
- Booker High School
- Boys and Girls Club of Manatee County, Inc.
- Environmental Library Foundation
- Gulf Coast Heritage Association, Inc.
- G.WIZ Hands-on Science Museum
- Harllee Middle School
- Historic Spanish Point
- Keep Manatee Beautiful, Inc.
- Keep Sarasota Beautiful, Inc.
- Kinnan Elementary School
- Marie Selby Botanical Gardens
- Mote Marine Laboratory
- Pelican Man Bird Sanctuary
- Sarasota Garden Club
- Sea Breeze Elementary School
- School Board of Manatee County
- School Board of Sarasota County
- School in the Park
- Suncoast School for Innovative Studies
- Volunteer Services of Manatee County, Inc.



PUBLIC INVOLVEMENT IN RESTORING THE BAY

Sarasota Bay Events

Sarasota Bay Estuary Program (SBEP) 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, 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:

2003 Celebrate Water! Festival –

A festival held on March 1, 2003 at the G.WIZ Hands-on Science Museum featured children’s activities and informative presentations promoting the need for water conservation and the value of Sarasota’s beautiful yet delicate Bay front.

Each year, the SBEP hosts several National Estuaries Day events, along with native vegetation planting sessions.

2003 EstuaryLive –

Sponsored by the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration, this science-based distance learning program is a national, annual event that celebrates National Estuaries Day. EstuaryLive offers students and other audiences around the world the opportunity to take a live and interactive classroom tour through eight sites within the National Estuarine Research Reserves (NERR) and the National Estuary Programs (NEP).

2004 Celebrate Sarasota Bay –

This event was hosted by the SBEP at the Powel Crosley Museum to celebrate its new independent status and designation as a Special District in the State of Florida. The October 2004 event honored community partners who have stepped up to the challenge of protecting our Bay waters.



A P.I.E.R. Program field trip sponsored by SBEP



Kinnan Elementary students remove exotic plants.

2005 National Estuaries Day –

SBEP offered reduced ticket prices for Bay cruises on Sarasota Bay Explorers and admission to Mote Marine Aquarium.

2005 National Estuaries Day Restorations –

As part of the celebration of National Estuaries Day, SBEP took 136 local students to restoration sites to learn about exotic pest plant control first hand.

2005 Florida Native Plant Sale –

In cooperation with the local Serenoa Chapter of the Florida Native Plant Society, offered the public an opportunity to purchase native plants and learn about Florida-friendly landscaping techniques. 🌿



Bottlenose dolphins (*Tursiops truncatus*) perform for a Bay Explorers cruise on National Estuaries Day.



2005 Florida native plant sale

TOP TEN FLORIDA INVASIVE PLANTS

1. Air potato (*Dioscorea bulbifera*)
2. Australian pine (*Casuarinas spp.*)
3. Arrowhead vine (*Syngonium podophyllum*)
4. Beach naupaka or half flower (*Scaevola spp.*)
5. Brazilian pepper (*Schinus terebinthifolius*)
6. Carrotwood (*Cupaniopsis anacardioides*)
7. Cogon grass (*Imperata cylindrical spp.*)
8. Melaleuca, paper bark (*Melaleuca quinquenervia*)
9. Rosary pea (*Abrus precatorius*)
10. Wedelia (*Wedelia trilobata*)



COMMUNITY EDUCATION

Environmental Education Programs

Since its inception, the Sarasota Bay Estuary Program (SBEP) has taken an active role in environmental education by publishing reports, developing curricula for schools and initiating community activities. In February 2003, SBEP launched an innovative education program aimed at educating and inspiring area students.

The P.I.E.R. Program which stands for Protection, Involvement, Education and Restoration, informs students about the local coastal ecology, promotes the benefits of stewardship and increases students' environmental literacy.

The P.I.E.R. Program is offered to public and private schools grades K – 12 in Manatee and Sarasota Counties. Students in science, environmental and oceanography classes or clubs are prime candidates for the P.I.E.R. Program. The program's field trips provide hands-on activities, such as taking soil samples, observing weather patterns and identifying plants and animals. Field trips tie to the in-class curriculum lesson plans and activities of the P.I.E.R. Program's Coastal Habitats Curriculum.

Teachers who participate in P.I.E.R. workshops gain knowledge and tools they need to conduct their own outdoor lessons and environmental education field trips.

In addition to educating students, the P.I.E.R. Program provides local teachers with many free resources, including outdoor environmental education training workshops, a curriculum about coastal habitats, field trips to parks and restoration sites around Sarasota Bay and funding for High School environmental research projects. Since P.I.E.R. was launched, the program has hosted 147 field trips, educated 5,400 students and trained 80 teachers in Manatee and Sarasota counties.

“Coastal Habitats,” an engaging curriculum developed in conjunction with Mote Marine Laboratory and Around the Bend Nature Tours, is aimed at students in grades K – 8. The curriculum provides lesson plans and activities about watersheds, habitats, wildlife, native and non-native plants, stormwater runoff and pollution. Each subject includes background information, resources, lesson plans and activities. Lessons correlate with the National Science Standards and Florida's Sunshine State Standards.



Examining seaweed for marine life on a P.I.E.R. excursion



Students are eager to learn about fish and habitats.

Pollution Prevention Outreach Program

The Sarasota Bay Estuary Program (SBEP) has a new pollution prevention outreach program designed for early elementary school teachers and students. Geared to the learning levels of kindergarten and first-grade students, this self-administering program provides teachers with Pollution Prevention Recycling Kits on loan to use during environmental, conservation and communal responsibility units and lessons.



Water conservation lesson during a P.I.E.R. field trip



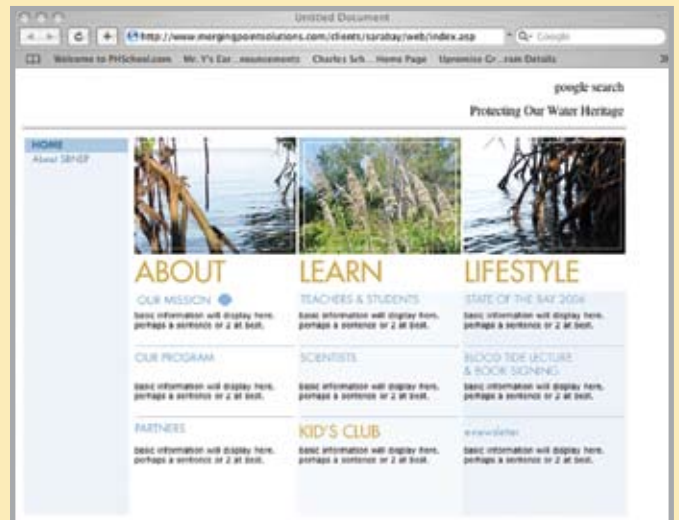
Public school recycling program sponsored by SBEP



SBEP's educational publications

Publications and Electronic Media

The SBEP provides a wealth of current scientific information and educational materials through its website (www.sarasotabay.org), newsletters, videos and associated websites including the Sarasota County Water Atlas (www.sarasota.wateratlas.org). The SBEP also has produced a series of brochures to educate the public on Bay issues and to provide information on recreational opportunities. Many of the brochures are available at local Tourist Information Centers and the SBEP office.



SBEP on the web



SARASOTA BAY MANAGEMENT

THE NEW STRUCTURE AND FUNCTION OF SBEP

Sarasota Bay was named an “estuary of national significance” in the Watershed 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 Sarasota Bay Estuary Program (SBEP) 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

In 1995, the Comprehensive Conservation and Management Plan (CCMP) recognized the success of the Program’s operations and committee structure when it called for the 1989 management structure to continue, indefinitely, as the mechanism for overseeing the implementation of the Bay’s restoration plan. The CCMP also called for an independent review of SBEP every three years. As a part of the 2001 triennial review of program performance, the U.S. Environmental Protection Agency recommended that SBEP “establish a more formal agreement with its stakeholders regarding the continued existence of, and commitment to” the SBEP office. The EPA also recommended that SBEP enter an agreement similar to Tampa Bay’s.

In response, the SBEP staff drafted an Interlocal Agreement establishing itself as a special district in Florida. The Interlocal Agreement was filed in the courts on July 23, 2004. 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.

The Interlocal Agreement provides a formal commitment to the long-term financial support of the partners implementing the CCMP and establishes program milestones. Six Action Plans continue to guide SBEP’s Bay restoration and preservation efforts:

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



Dr. Ernie Estevez, Center Director at Mote Marine Laboratory, speaks about the importance of preserving and restoring flows of fresh water to estuaries.



Tom Dabney, SWFWMD governing board chair, and Richard Martin, then Mayor of Sarasota, celebrate Bay restoration in October 2004.

The establishment of a special district preserved the functions of the committees established in 1989 with one exception: Under the new status, the Policy Committee evolved into a bona fide Board of Directors with authority set forth under chapter 163 of Florida State law. Additionally, the Board's membership expanded to include representation from the City of Bradenton and the Town of Longboat Key.

The Interlocal Agreement also established a water quality management consortium composed of Bay stakeholders whose role is to address water quality issues in Bay segments verified as "impaired" by the Florida Department of Environmental Protection (FDEP). Additionally, the agreement calls for a revision of the CCMP sections related to water quality within two years of approval and a full revision of the plan within five.

On October 1, 2004, the newly named Sarasota Bay Estuary Program separated operating functions from the City the Sarasota. 🌊

Policy Committee

Marianne Barnebey, City of Bradenton	Randall Clair, Longboat Key
Bo Crum, U.S. EPA	Richard Meyers, SWFWMD
Deborah Getzoff, FDEP	Ken Shelin, City of Sarasota
Pat Glass, Manatee County	Jon Thaxton, Sarasota County

Management Committee

Felicia Burks	Wanda Kerr
Theresa Connor	Seth Kohn
Juan Florensa	Cece McKiernan
Lizanne Garcia	Mike McNees
Eric Gasch	Spencer Simon
George Henderson	John Stevely
Charlie Hunsicker	

Citizens Advisory Committee

Jack Bispham	Linda Larsen
David Bulloch	Pat Paterson
Charles Edwards	Annemarie Post
Marcia Heath	Thomas Price
Mark Hirsh	Virginia Sanders
Sumner Hoffman	Rick Smith
Wanda Kerr	Jonnie Walker
Kathy King	

Technical Advisory Committee

John Stevely	Daphne Macfarlan
Gary Comp	Robert Mendoza
Laura Ammeson	Sherri Swanson
Chris Anastasiou	Ari Nissanka
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Greg Blanchard	Annemarie Post
Larry Beggs	Stephanie Powers
Robert Brown	Rose Poynor
David Bulloch	Bryan Pridgeon
Allen Burdett	Thoman Ries
Theresa Connor	Brad Robbins
Catherine Corbett	Dianne Rosensweig
Jack Creighton	John Ryan
Robert Day	Steven Sauers
Kellie Dixon	Steve Schield
Robert Duke	Gary Serviss
Charles Edwards	Mark Shelby
Brooke Elias	Curtis Smith
Ernie Estevez	Michael Solum
Holly Greening	Daniel Somodi
Michael Jones	Mark Sramek
Kristen Kaufman	George Tatge
George Kish	David Tomasko
Ray Kurz	Javier Vargas
David Landers	Amanda Weinkauff
Jeannie Lessman	Amber Whittle
Jay Leverone	Laird Wreford
Chuck Listowski	

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HOW YOU CAN HELP...

ENVIRONMENTAL STEWARDS NEEDED—CALL TO ACTION

Environmental Stewards Needed— Call to Action

The Sarasota Bay Estuary Program (SBEP) is working to restore and protect the ecosystem that is, truly, an economic engine of our community. Your support is essential. Join us in addressing the range of environmental issues affecting Sarasota Bay. 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. Each inch of shoreline that is preserved is important. So is every Florida-friendly tree planted, and patch of seagrass restored. Your contribution counts.

So how can you help?

A widespread, collaborative effort is necessary to make a positive difference in the health of Sarasota Bay. As individuals, you can do your part by being a responsible steward. 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 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 us at info@sarasotabay.org to find out about current projects in which you can get involved.



Osprey
(*Pandion haliaetus*)



Brown pelicans (*Pelecanus occidentalis*) and double-crested cormorants (*Phalacrocorax auritus*) roost in red mangroves (*Rhizophora mangle*).

What else can you do?

Public Lands

- Follow land preservation, land use and zoning issues so that you can 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

* National Oceanic and Atmospheric Administration's Restoration Center, Silver Spring, MD



Removing Brazilian peppers (*Schinus terebinthifolius*) at the Powel Crosley Museum



Payne Park in downtown Sarasota



Bay Buddies volunteer event at Joan M. Durante Park on Longboat Key



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 – indentation 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.

Hardbottom 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 waste water 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 which lacks flowing water and contains ocean derived salts in concentrations of less than .05%.

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.

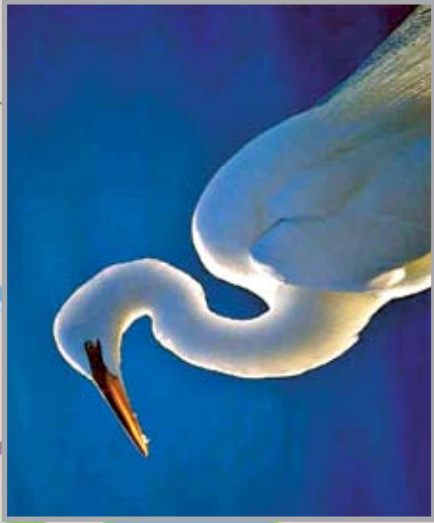
Water quality standards – the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect waterbodies from pollutants.

Wetlands – a land inclusion that has a predominance of hydric (wet) soils; 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.

PROJECT AREA MAP

SARASOTA BAY ESTUARY PROGRAM

HABITAT RESTORATION PROJECTS & THE GULF COAST HERITAGE TRAIL



Bulkheads Reef

Tampa Bay Reef

Emerson Point Preserve

Emerson Point

Emerson Point Reef

Robinson Preserve

Robinson Preserve

Perico Bayou Hydrologic Reconnection

Perico Trail

Grassy Point Preserve

Neil Preserve

1912 Cortez Schoolhouse

Bradenton Beach Pier Reef

Leffis Key Reef

Leffis Key Park-Phase 2

Leffis Key Park-Phase 1

FISH Preserve

Coquina Beach

Leffis Key

Sister Keys Preserve-Phase 2

Sister Keys Preserve-Phase 1

Sister Keys

Bradren River

Manatee River

Bradenton

Palma Sola Bay

75th St. West

Cortez Rd.

Longboat Pass

Ballard Elementary School

10th St.

275

75

301

41

41

Anna Maria

Anna Maria Sound

Holmes Beach

Terra Ceia Bay

Tampa Bay