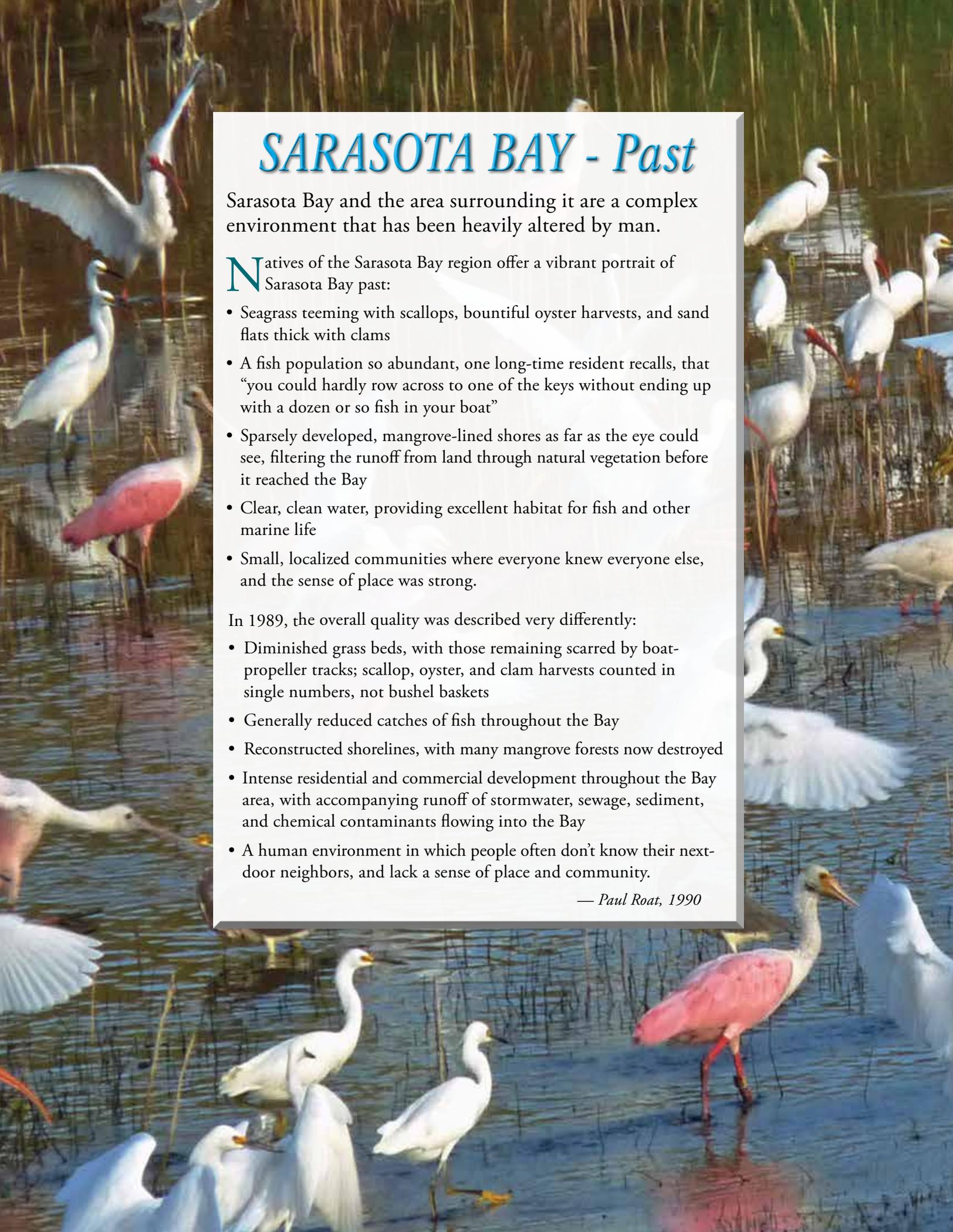


25 Years of Partnerships in Restoring Our Bays

Sarasota Bay Comprehensive Conservation and Management Plan Update & State of the Bay Report





SARASOTA BAY - Past

Sarasota Bay and the area surrounding it are a complex environment that has been heavily altered by man.

Natives of the Sarasota Bay region offer a vibrant portrait of Sarasota Bay past:

- Seagrass teeming with scallops, bountiful oyster harvests, and sand flats thick with clams
- A fish population so abundant, one long-time resident recalls, that “you could hardly row across to one of the keys without ending up with a dozen or so fish in your boat”
- Sparsely developed, mangrove-lined shores as far as the eye could see, filtering the runoff from land through natural vegetation before it reached the Bay
- Clear, clean water, providing excellent habitat for fish and other marine life
- Small, localized communities where everyone knew everyone else, and the sense of place was strong.

In 1989, the overall quality was described very differently:

- Diminished grass beds, with those remaining scarred by boat-propeller tracks; scallop, oyster, and clam harvests counted in single numbers, not bushel baskets
- Generally reduced catches of fish throughout the Bay
- Reconstructed shorelines, with many mangrove forests now destroyed
- Intense residential and commercial development throughout the Bay area, with accompanying runoff of stormwater, sewage, sediment, and chemical contaminants flowing into the Bay
- A human environment in which people often don't know their next-door neighbors, and lack a sense of place and community.

— Paul Roat, 1990

SARASOTA BAY - Present ACCOMPLISHMENTS

Since 1989, accomplishments in Bay restoration have been substantial:

- Significant water quality improvements in the Bay and tributaries due to 64-percent reduction in nitrogen pollution; all Bay waters now meet state/federal water quality standards and are rated “good” to “excellent”
- Seagrass coverage, a measure of Bay health, has increased 46 percent
- Seagrass levels are 29 percent above 1950
- Restoration of approximately 1,550 acres of wetland habitat with creation of 32 new ecological parks around the Bay
- Construction of nine new artificial reef sites.
- Implementation of a comprehensive public education program; since 2004, more than 45,000 school children have received outdoor education about Sarasota Bay, while adult education appears to be having an impact on Bay quality
- Development of protective water quality standards (Numeric Nutrient Criteria) adopted by EPA in 2012
- Creation of the Gulf Coast Heritage Trail to promote managed public access to points of historical, cultural, and environmental interest around the Bay
- From 2008 to 2012, \$233.8 million in public and private funds were leveraged
- The economic value of Sarasota Bay region was estimated at \$57.9 billion.



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

SARASOTA BAY - Future

The recent revisions to the Bay management plan presented in this document focused attention on the improvement of Sarasota Bay tidal creeks and tributaries. Although the Mote Marine Laboratory and others have conducted periodic studies of tidal creeks locally, no comprehensive assessment of these systems has been funded in Florida. The Sarasota Bay Estuary Program is currently managing a large study – in collaboration with the Tampa Bay Estuary Program and the Charlotte Harbor National Estuary Program and local governments (regionally) – to characterize the condition of creeks extending from Pinellas to Lee counties. The study is designed to assess water quality, habitat, and fisheries. As result of this study, policy changes will likely be recommended to improve sensitive juvenile fish habitats in these environs.

As a community we must be vigilant in continuing to protect and improve our precious resources. Education and Low Impact Development will certainly be key components of the continued enhancement and protection of our valued resources. Sarasota Bay is a regional destination supporting more than 20,000 jobs annually. As we mature as a community, we must remember and maintain the sense of place described in Sarasota Bay – Past for our economic prosperity.

“Tidal creeks not only serve as vital nursery habitat for juvenile sport fish such as snook, they are the conduits that connect the productivity of tidal wetlands to the larger estuary. This important function improves the fisheries productivity of the estuary as a whole.”

*– Ernst B. Peebles
University of South Florida*



INTRODUCTION

“25 Years of Partnerships in Restoring Our Bays” is an update on progress made in carrying out the Sarasota Bay Estuary Program’s Comprehensive Conservation and Management Plan (CCMP). Included in this document are revisions of the CCMP “The Voyage to Paradise Reclaimed,” signed in 1995 by the governor of Florida and the administrator of the U.S. Environmental Protection Agency.

The Sarasota Bay Estuary Program is dedicated to restoring the region’s 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 of the public.



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PARTNERSHIPS

Sarasota Bay was named an “estuary of national significance” in the Water Quality Act of 1987. The Sarasota Bay Estuary Program (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, the City of Sarasota, the City of Bradenton, the Town of Longboat Key, the Florida Department of Environmental Protection, the Southwest Florida Water Management District, the U.S. Fish & Wildlife Service, the National Oceanic and Atmospheric Administration, and the U.S. Army Corps of Engineers. The U.S. Environmental Protection Agency (EPA) is participating as a partner under a Memorandum of Understanding.



The SBEP is one of 28 EPA National Estuary Programs in the United States. Florida has four National Estuary Programs: the Indian River Lagoon National Estuary Program, the Tampa Bay and Sarasota Bay Estuary Programs, and the Charlotte Harbor National Estuary Program.

Sarasota Bay Estuary Program would like to thank the citizens and technical advisors for their thousands of volunteer hours, and for the contributions of federal, state, and local government staff in making Bay restoration a reality.

GOALS:

In 1989, the SBEP was formed with the following goals, established through the EPA nomination and acceptance process:

- Improve water transparency
- Reduce the quantity and improve the quality of stormwater runoff to the Bay
- Restore lost seagrasses and shoreline habitats, and eliminate further losses
- Establish an appropriate management structure for Sarasota Bay
- Provide increased levels of managed access to Sarasota Bay and its resources
- Restore and sustain fish and other living resources in Sarasota Bay
- Educate the public on issues and problems facing Sarasota Bay.

After approximately three years of technical assessment and studies, a preliminary management plan was presented to the community in the “Framework for Action Report 1993.” Following two years of review, the Comprehensive Conservation and Management Plan (CCMP) was formally adopted in June 1995.



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



**US Army Corps
of Engineers**

STATE OF THE BAY



GEOGRAPHY

Sarasota Bay is a 50-mile-long coastal lagoon on the southwest coast of Florida (Figure 1). It is comprised of one large bay segment (Big Sarasota Bay) and several smaller embayments, including Palma Sola Bay in the north and a series of three contiguous water features (Roberts Bay, Little Sarasota Bay, and Blackburn Bay) to the south. The Bay has four inlets or passes (Venice Inlet, Big Sarasota Pass, New Pass, and Longboat Pass). The SBEP area is bounded to the north by Anna Maria Sound, which opens into Tampa Bay, and to the south by Venice Inlet. Numerous small tidal creeks enter the Bay along the eastern shoreline, ranging in size from the largest (Phillippi Creek: drainage area of 36,417 acres) to the smallest (Palma Sola Creek: drainage area of 900 acres). The watershed is highly developed and consists of agricultural, residential, commercial, and light industrial land uses.

Circulation is primarily driven by tidal exchange with the Gulf of Mexico. Big Sarasota Bay circulation is forced by the tides at Anna Maria Sound, Longboat Pass, New Pass, and Big Pass. Tidal circulation in Little Sarasota Bay is forced by tides at Venice Inlet and the Intracoastal Waterway running through the middle of the Bay. The closing of Midnight Pass in Little Sarasota Bay in 1983 altered the circulation in the three lower embayments.

Sarasota Bay Estuary Program Segments and Their Watersheds



Figure 1.

Source: SBEP

BAY POLLUTION

Nitrogen is the principal pollutant of concern in Sarasota Bay. Sarasota Bay is a nitrogen-limited system, with algal growth in the water column controlled by nitrogen availability. The SBEP recognized wastewater, stormwater, and atmospheric deposition as the primary sources of nitrogen, while research conducted by the SBEP in 1997 on atmospheric nitrogen suggested its overall load to be relatively small in comparison to wastewater and stormwater. In this regard, a goal of reducing nitrogen pollution by 48 percent was set, with specific objectives and actions recommended to achieve the nutrient reduction goal (CCMP, 1995).

The following objectives are being realized:

- Eliminate direct wastewater discharge to the Bay by reclaiming wastewater for alternative supply
- Treat storm water in priority watersheds
- Implement education programs to reduce nitrogen load from residential and commercial properties.

Implementation of these objectives has reduced total nitrogen load by 64 percent since 1989.

Nitrogen Reduction Measures

The declines in total nitrogen (TN) loads are a result of extensive capital improvement projects undertaken by our partners (\$375 million). Pollution reduction efforts have focused on three major tributaries: Phillippi Creek, Whitaker Bayou, and Manatee County (coastal wastewater seepage from agricultural reuse near Long Bar).

Phillippi Creek

Phillippi Creek (*Figure 2*) drains 38 percent of the Sarasota Bay watershed. Annual TN concentrations averaged 3.12 mg/l from 1970 through 1988. Nitrogen loading from Phillippi Creek has decreased approximately 60 percent since that time, due to:

- 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, which is 65 percent complete, with funding available to complete approximately 82 percent of the program.

Whitaker Bayou

Whitaker Bayou (*Figure 1, page 6*), a tributary that was once the largest anthropogenic contributor of nitrogen to Sarasota Bay (*Figure 3*), has seen a tenfold reduction in nitrogen loads due to upgrades at the City of Sarasota wastewater treatment plants (WWTP) to advanced treatment levels, septic tank replacements, and WWTP consolidation. The City of Sarasota discharged nearly 100 percent of the wastewater to the Bayou in the mid-1980s; the discharge to Whitaker Bayou is scheduled for elimination in 2016.

Manatee County

Manatee County's southwest regional WWTP (15 mgd) in north Sarasota Bay no longer discharges to the Bay due to construction of the Manatee Agricultural Reuse System and deep-well injection system. Few septic tanks and no small private plants remain in service in Manatee County, eliminating direct discharge of wastewater into the northern Bay. The removal of this discharge near Long Bar (*Figure 1, page 6*) resulted in extensive improvements in water quality (see SBEP current conditions report page 10).

Phillippi Creek Nitrogen Concentrations (annual average)

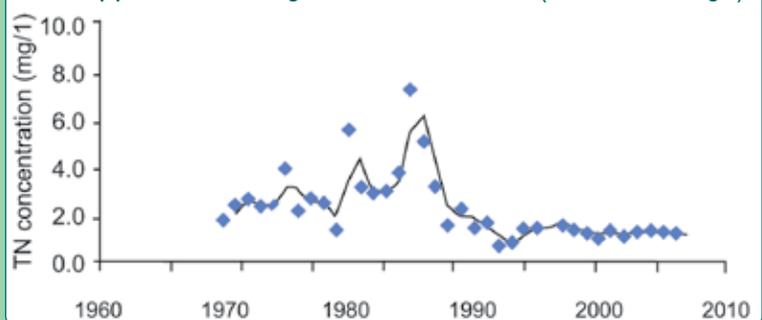


Figure 2. Nitrogen concentrations in Phillippi Creek.

Source: Kurz, 2005

Nitrogen Loads to Whitaker Bayou

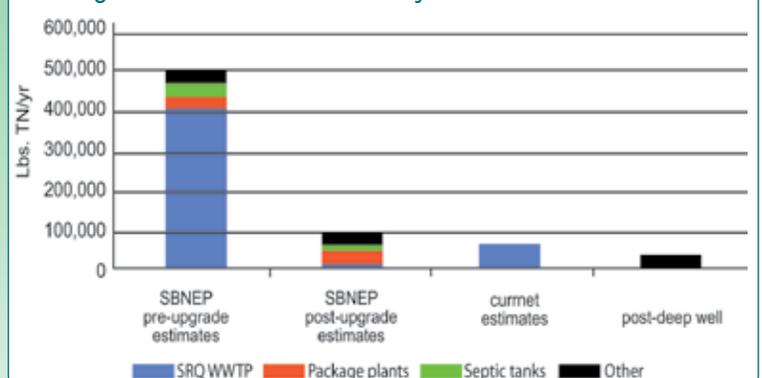


Figure 3. Nitrogen loads to Whitaker Bayou.

Source: Tomasko et al., 2005

WATER QUALITY & SEAGRASS

Water Chemistry

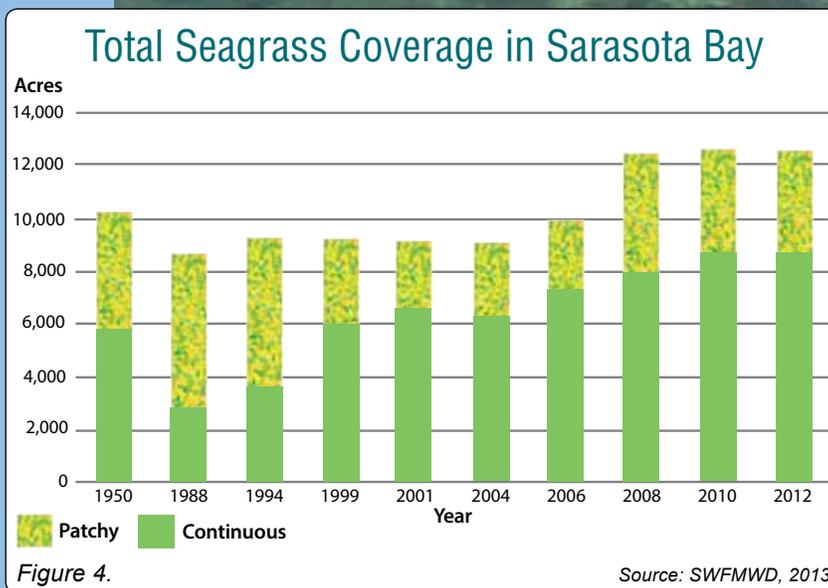
Excess nitrogen causes an overabundance of algae, reducing light available to important seagrass habitats. Total nitrogen and *chlorophyll a* (a measure of algae) are monitored carefully by water resource managers and used by regulatory authorities to determine whether the Bay meets the water quality standards mandated by the Clean Water Act. Total phosphorus is also monitored under regulatory guidelines. In 2012, water quality throughout the Bay was characterized as “good” to “excellent” for all three parameters.

The trend graphs for the indicators are provided for all segments on the Manatee/Sarasota Water Atlas website (www.sarasota.wateratlas.usf.edu), along with their target and threshold values. A **target value is a desirable goal to be attained, that a threshold is an undesirable level that is to be avoided.** For the purposes of this report, only *chlorophyll a* levels will be evaluated as the primary water quality metric. *Chlorophyll a* is a measure of the amount of algae in a water column.

Seagrass Habitats

Among the most important habitats in Florida’s estuarine environments, seagrass beds are indispensable for the role they play in cycling nutrients, supplying food for wildlife, stabilizing sediments, and providing habitat for juvenile and adult finfish and shellfish. The graph (Figure 4) shows increases in both the total and continuous categories.

The overall increase in seagrass cover and the infilling of patchy seagrass beds to make them continuous 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 have established statistically significant relationships between water quality and seagrass response throughout the Bay, and have developed protective standards accordingly.



SEAGRASS TARGETS

Increased seagrass coverage results in increased fishery productivity.

The SBEP has established targets for seagrass acreage for each Bay segments based on historic and current seagrass acreage in Sarasota Bay. These seagrass targets (*Figure 5*) were used to develop water quality targets aimed at preserving seagrass. The targets set for each segment were the average of 2004 and 2006 levels or the 1950 (restorable) seagrass levels, whichever was greater. Water quality targets were then established to meet the seagrass targets.

All five Sarasota Bay segments currently exceed 1950 seagrass levels (*Figure 5*). The cumulative target (9,997 acres) was exceeded by 2,589 acres in 2012, totaling 12,586 acres. The two segments currently below the target (Roberts Bay and Blackburn Bay) remain well above the 1950 base used regionally as the overall goal, while the shortfall (-92 acres) is offset by a large increase Bay-wide. Overall, seagrass levels exceed 1950 by 29 percent.

Declining *chlorophyll a* levels shown on the following pages suggest continuing improvements in water quality Bay-wide (1998 to 2012).



| SBEP Seagrass Coverage and Targets | | | | Unit of measure = acres | |
|------------------------------------|-------------------|-------------------|-----------------|-------------------------|---------------|
| Bay Segment | Restorable (1950) | 2004-2006 Average | Seagrass Target | Current * (2012) | +/- Target |
| Palma Sola | 1,031 | 1,015 | 1,031 | 1,240 | +209 |
| Sarasota | 7,269 | 7,041 | 7,269 | 9,741 | +2,472 |
| Roberts | 283 | 348 | 348 | 305 | -43 |
| Little Sarasota | 883 | 702 | 702 | 902 | +200 |
| Blackburn | 273 | 447 | 447 | 398 | -49 |
| Total: | 9,739 | 9,553 | 9,797 | 12,586 | +2,789 |

* All Sarasota Bay segments are above 1950 levels.

Figure 5. Seagrass targets adopted by the SBEP Policy board.
Source: Janicki Environmental 2010

The SBEP would like to thank all the local governments (and staff) in our area for their continued support in improving the Bay, and for the thousands of volunteer hours citizens and technical advisors have contributed to refining the restoration and management plan.

The improvements to infrastructure have been extensive, while the educational programs supported regionally have contributed to these improvements.

Sarasota Bay Condition Report for 2012

SARASOTA BAY



Chlorophyll a Concentration

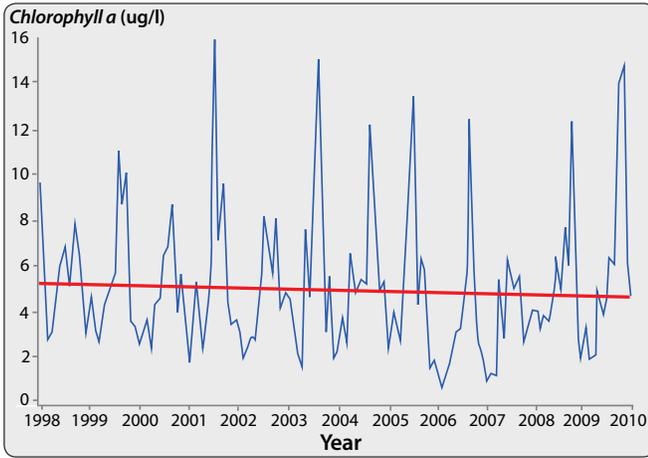


Figure 6.

Source: Janicki Environmental, 2010

Summary

The overall health of Sarasota Bay remains high. Water quality metrics remained relatively constant from 2008 to 2012, with a decrease in the average value of *chlorophyll a* since 1998 (Figures 6 and 7) indicating improved water quality. Seagrass acreage has increased substantially above the target and 1950 levels (Figure 8).

Water Quality

All three water quality indicators (*chlorophyll a*, nitrogen, and phosphorus) were rated as “pass” (USEF, 2012). *Chlorophyll a* levels decreased and improved from a rating of “good” in 2010 to a rating of “excellent” in 2011 (Figure 7). The mean (4.0ug/l) was below the desired target level of 5.2ug/l (USEF, 2012).

Five-Year Trend

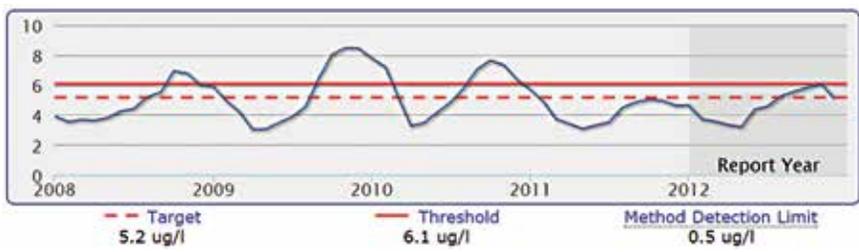


Figure 7.

Source: Sarasota County Water Atlas, 2012

Biotic Indicator

Although seagrass acreage decreased slightly in 2012 compared to 2010, the mean acreage (9,741 acres) was above the desired threshold (7,269 acres) and above 1950 levels. Additionally, seagrass acreage increased by 49 percent (Figure 8) from 2004 (6,686 acres) to 2012 (9,741 acres).

Seagrass Acreage Variation within Sarasota Bay

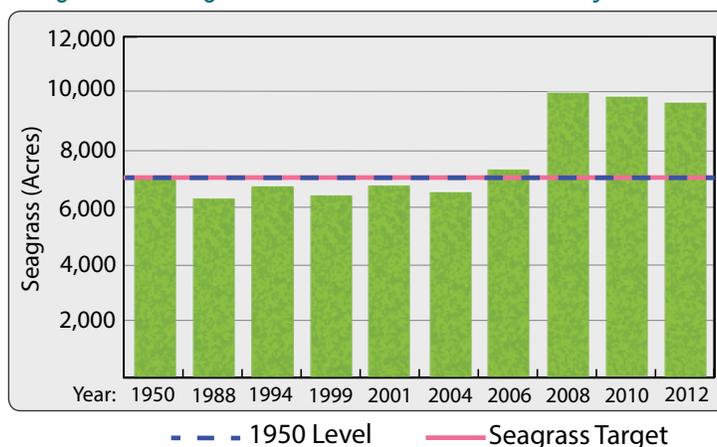
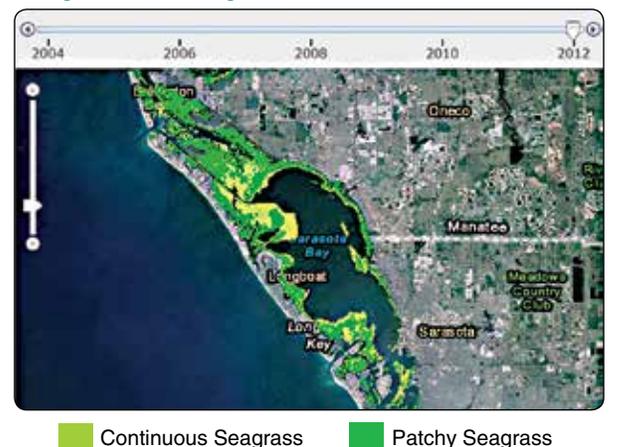


Figure 8.

Seagrass Coverage



Source: SWFWMD, 2012

ROBERTS BAY



Palma Sola Bay

Sarasota Bay

MANATEE SARASOTA

Roberts Bay

Little Sarasota Bay

Blackburn Bay

Chlorophyll a Concentration

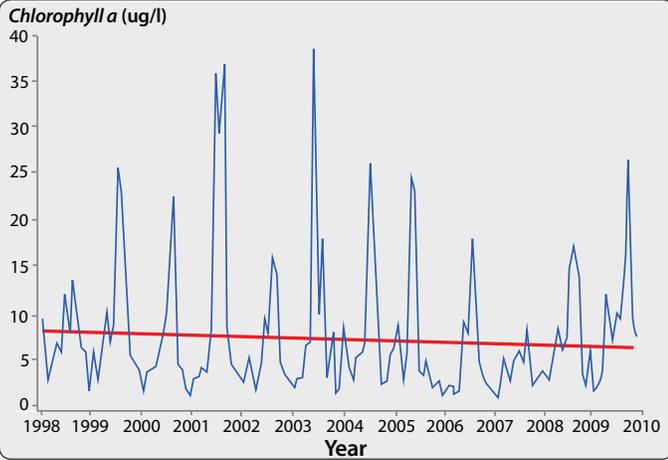


Figure 9.

Source: Janicki Environmental, 2010

Summary

The overall health of Roberts Bay has improved since 1998 (Figure 9), with all water quality parameters below threshold levels. The caution alert for *chlorophyll a* has been removed (Figure 10) by resource managers. Seagrass acreage remains above 1950 levels (Figure 11), but slightly below the target. The long-term trend in *chlorophyll a* continues to decline (Figure 9).

Water Quality

All three water quality indicators (*chlorophyll a*, nitrogen, and phosphorus) were rated as “pass” in 2012 (USF, 2012). The average *chlorophyll a* level in Roberts Bay has improved since 2010 (9.8ug/l) and was scored as “good” (scored as “caution” by resource managers) in 2010.

Biotic Indicator

The total seagrass acreage has remained relatively constant since 1988; the average seagrass level (300 acres) was below the target of 348 acres, but above 1950 levels (Figure 11).

Five-Year Trend

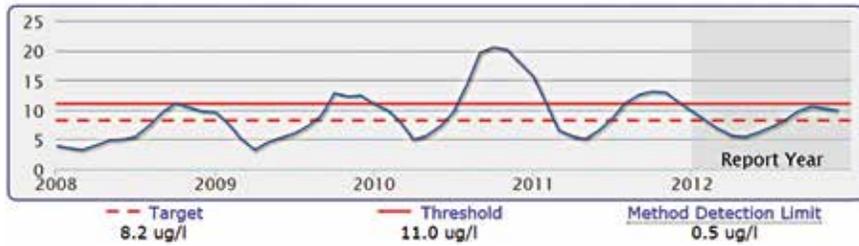
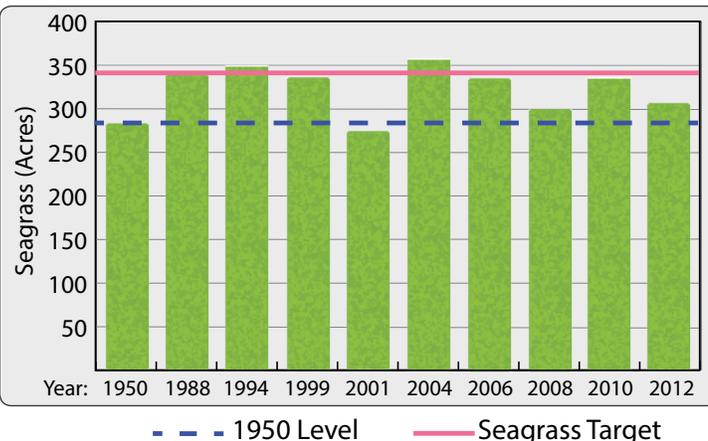


Figure 10.

Source: Sarasota County Water Atlas, 2012

Seagrass Acreage Variation within Roberts Bay



Seagrass Coverage



Figure 11.

Source: SWFWMD, 2012

Sarasota Bay Condition Report for 2012



LITTLE SARASOTA BAY

Chlorophyll a Concentration

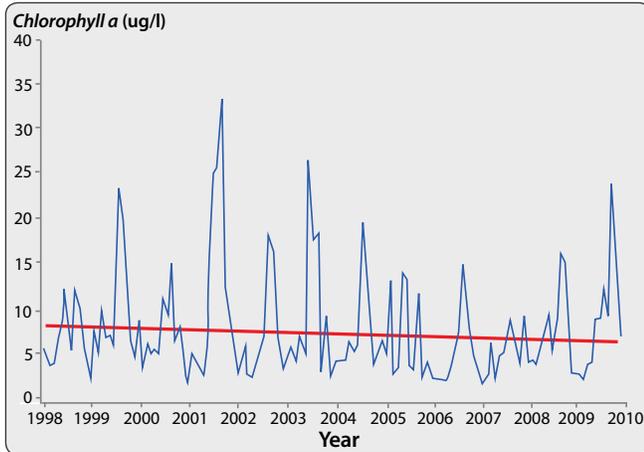


Figure 12.

Source: Janicki Environmental, 2010

Summary

The overall health of Little Sarasota Bay has improved since 2010. All water quality parameters are below the threshold levels, the caution alert for *chlorophyll a* was removed (Figure 13). Additionally, the mean seagrass acreage has continued to increase to levels above the target and above 1950 levels. *Chlorophyll a* levels declined between 1998 and 2010, indicating water quality improvement (Figure 12).

Water Quality

All three water quality indicators (*chlorophyll a*, nitrogen, and phosphorus) were rated as “pass” (USEF 2012). The average *chlorophyll a* level in Little Sarasota Bay has improved since 2010 (9.1ug/l) and was scored (Figure 13) as “good” (scored as “caution” in 2010), below the threshold of 10.4ug/l (USEF 2012).

Five-Year Trend

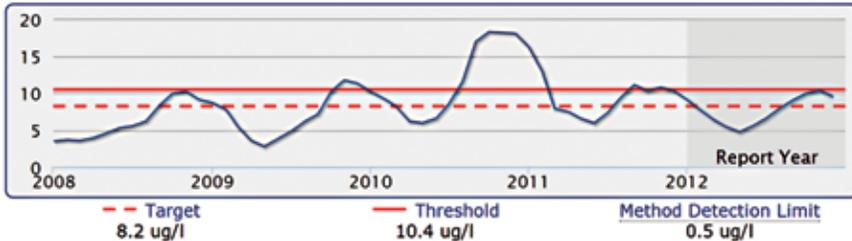


Figure 13.

Source: Sarasota County Water Atlas, 2012

Biotic Indicator

The biotic indicator (seagrass) was determined to be in good condition with a continued increase in acreage since 1988. In 2010, the total seagrass acreage increased 49 percent to 974 acres, well above the target of 702 acres (Figure 14).

Seagrass Acreage Variation within Little Sarasota Bay

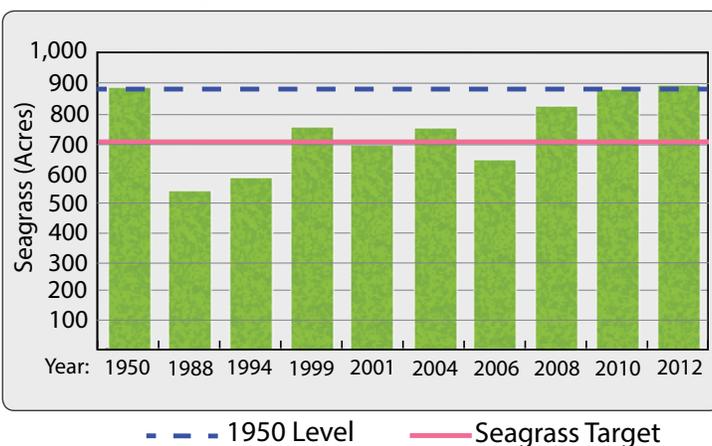
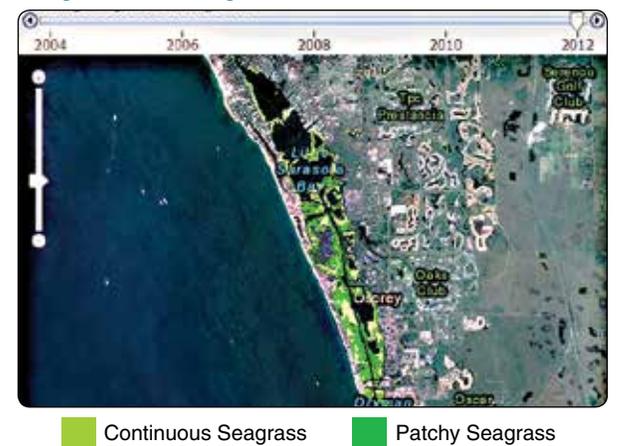


Figure 14.

Seagrass Coverage



Source: SWFWMD, 2012

BLACKBURN BAY



Palma Sola Bay

Sarasota Bay

MANATEE SARASOTA

Roberts Bay

Little Sarasota Bay

Blackburn Bay

Chlorophyll a Concentration

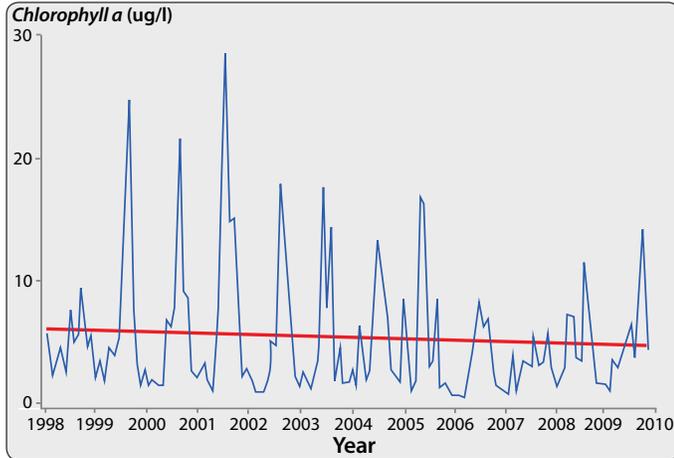


Figure 15.

Source: Janicki Environmental, 2010

Summary

The overall health of Blackburn Bay has remained in good condition. All water quality parameters are below their associated target levels. However, the biotic indicator, seagrass, remains 49 acres below target. Since 1998, *chlorophyll a* concentrations are declining, suggesting improving water quality conditions (Figure 15).

Water Quality

All three water quality indicators (*chlorophyll a*, nitrogen, and phosphorus) were rated as “pass” in 2012 (USF, 2012). The mean *chlorophyll a* level (5.1ug/l) in Blackburn Bay has decreased and was scored as “excellent” (scored as “good” in 2010), below the target (Figure 16) of 6.0ug/l and threshold (8.2ug/l) levels.

Biotic Indicator

The total seagrass acreage has remained relatively constant since 1988; however, in 2010 the mean level of seagrass (324 acres) was still below the target of 447 acres (Figure 16). This was substantially above 1950 levels.

Five-Year Trend

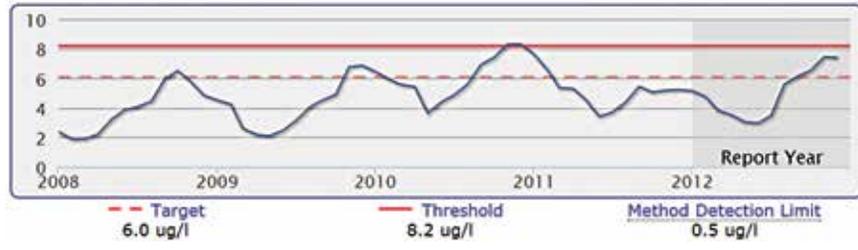


Figure 16.

Source: Sarasota County Water Atlas, 2012

Seagrass Acreage Variation within Blackburn Bay

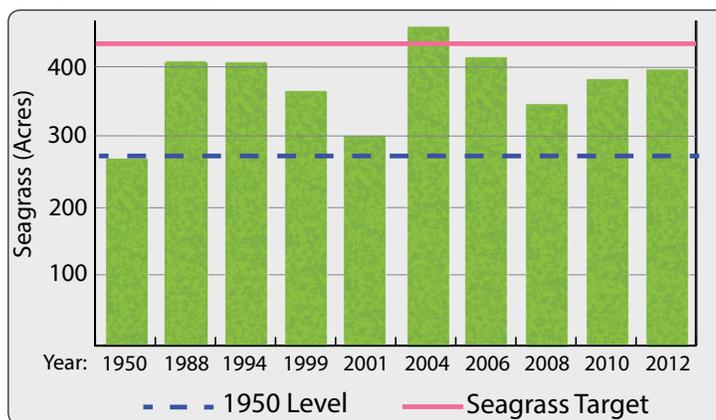


Figure 17.

Seagrass Coverage



Source: SWFWMD, 2012

Sarasota Bay Condition Report for 2012

PALMA SOLA BAY



Palma Sola Bay

Chlorophyll a Concentration

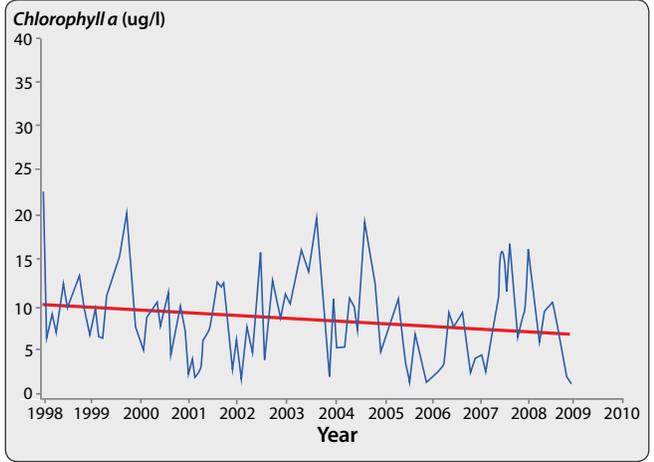


Figure 18.

Source: Janicki Environmental, 2010

Five-Year Trend

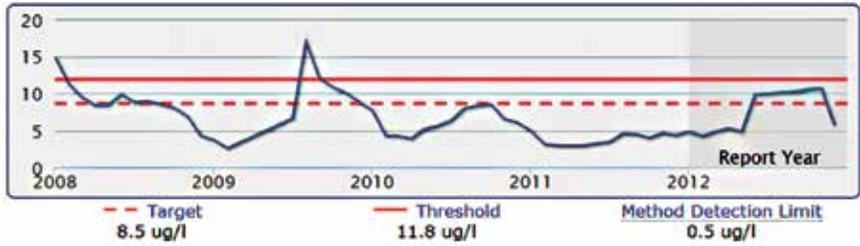


Figure 19.

Source: Sarasota County Water Atlas, 2012

Seagrass Acreage Variation within Palma Sola Bay

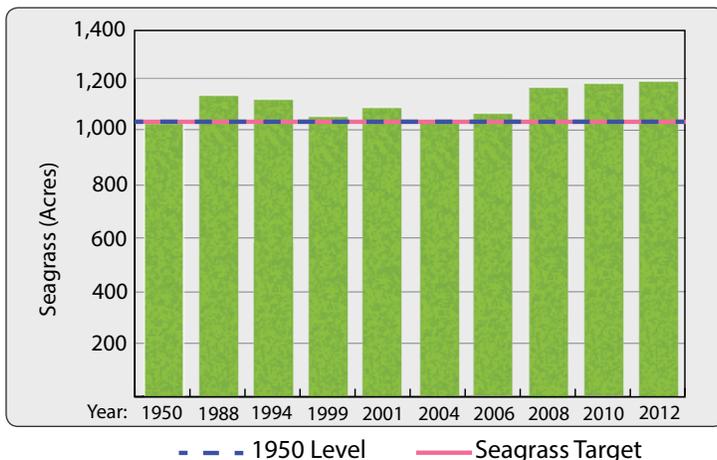


Figure 20.

Seagrass Coverage



Continuous Seagrass Patchy Seagrass

Source: SWFWMD, 2012

Summary

The overall health of Palma Sola Bay has remained high. Water quality indicators remained relatively constant, with a slight decrease in *chlorophyll a* (Figures 18 and 19). Moreover, the biotic indicator, seagrass, has increased above the target acreage and 1950 levels (Figure 20). *Chlorophyll a* levels continued to decline from 1998 to 2009 (Figure 18), while seagrass coverage improved from 2000 to 2012.

Water Quality

All three water quality indicators (*chlorophyll a*, nitrogen, and phosphorus) were rated as “pass” (USF, 2012); both *chlorophyll a* and nitrogen were rated in “excellent” condition.

Biotic Indicator

The biotic indicator, seagrass, has remained in excellent condition. Seagrass acreage has increased by 15 percent since 1999. The total acreage is above the target and 1950 levels at 1,138 acres in 2012 (Figure 20).

Sarasota Bay MANATEE SARASOTA

Roberts Bay

Little Sarasota Bay

Blackburn Bay

25 Years
of Partnerships
in Restoring Our Bays

Sarasota Bay Comprehensive
Conservation and Management Plan Update
&
State of the Bay Report



For more information
about BAY HABITATS,
refer to the CCMP
chapters.

Habitat Restoration Projects Completed over the Past Five Years

2013

Bayfront Park Living Shoreline
Otter Key
Palma Sola Scenic Highway
Palma Sola at Robinson Preserve
Robinson Preserve Phase 2 Acquisition
Sarasota Bay Artificial Reefs
Perico Preserve

2012

Bay Walk Creek
Emerson Point Preserve: Ponds
Emerson Point Preserve: West End
FISH Preserve Phase 3
Grassy Point
Jiggs Landing
New College Shoreline
North Lido Park
Quick Point
Robinson Preserve
South Lido Park
Neal Preserve Phase 2

2011

Culverhouse Nature Park
Herb Dolan Park Living Shoreline
Joan Durante Park
Lido Beach
North Lido Beach Park
Sarasota Bay Oyster Habitat

2010

Bowlees Creek Island
FISH Preserve Phase 2
Ungarelli Preserve

2009

Bay Walk at Ken Thompson Park
Blackburn Point Park
Circus Hammock
FISH Preserve Phase 1
Longboat Key Park
Neal Preserve Phase 1
North Lido Exotic Removal
Red Bug Slough Preserve
Robinson Preserve
Runaway Bay
South Lido Park Phase 3

Figure 21.

Other Important BAY HABITATS

Other habitats critical to Bay marine life include freshwater and saltwater wetlands, and hard bottom. Restoring these habitats is vital to restoring the balance of 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, removal of these freshwater wetlands reduced the ability of the watershed to filter runoff and increased the amount of freshwater delivered to the Bay. Large-scale drainage projects from 1920 to 1950 significantly reduced the number of freshwater wetlands (sawgrass marshes and ponds) in the region. These extensive marshes extended from the coastal ridge east to the Myakka and Braden rivers.

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 conducted in the 1950s and 1960s to create waterfront homesites and boat access. An SBEP 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 loss and compensate for the miles of shoreline created. The restoration projects maximize the length of shoreline created.

A map showing the project locations can be found at the end of this report. *Figure 21* is a list of recently completed projects by the SBEP and its partners.



Ranger Jon Mathes

Gopher tortoise
at Emerson Point
Preserve, Manatee.

Other BAY HABITATS (continued)

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, and were deep enough not to impede navigation.

Since 2000, the SBEP and its partners have constructed more than 3,500 artificial reef modules (720 since 2009) called “reef balls,” which now rest on the bottom of the Bay (see adjacent map). These prefabricated reef ball modules are domed structures with holes so fish and crabs can move through. The SBEP currently has eight active reef sites created primarily from reef balls. In addition, reef modules have been 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.

Oyster Restoration

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

Artificial Reefs and Oyster Habitat Locations in SBEP Study Area



Source: SBEP

Tidal Creeks

The SBEP has initiated a multi-county sampling program of tidal creeks from Pinellas to Lee counties to characterize current water quality and fishery conditions. The study is being funded by the U.S. Environmental Protection Agency, the Tampa Bay Estuary Program, the Sarasota Bay Estuary Program, and the Charlotte Harbor National Estuary Program, with support from the University of South Florida, the Florida Fish and Wildlife Commission, and the Florida Department of Environmental Protection.

Water quality samples are being analyzed by Mote Marine Laboratory, with statistical analysis provided by Janicki Environmental and Mote Marine Laboratory. The results of this study are expected in 2015.

The adjacent map identifies impaired creeks and tributaries in the Sarasota Bay watershed. The SBEP will be evaluating these impairments over the next few years in developing and implementing plans for improvement.

FISHERIES

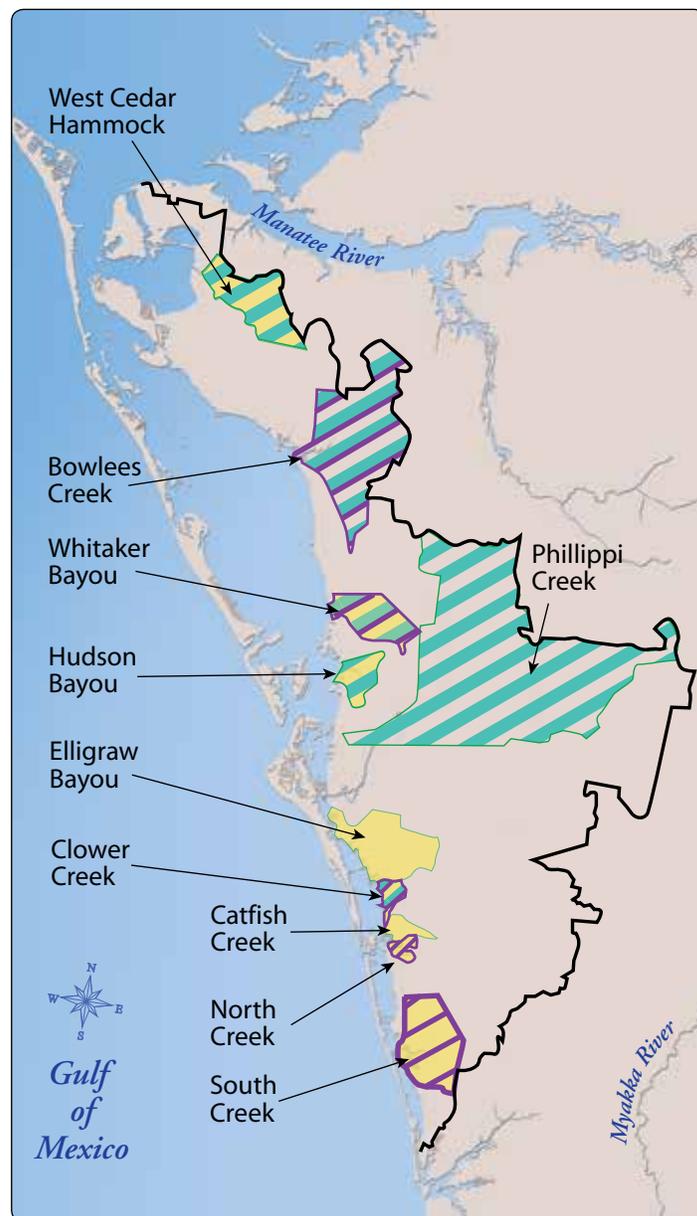
The SBEP contracted with the Florida Fish and Wildlife Research Institute to conduct the Fisheries Independent Monitoring (FIM) program in Sarasota Bay in 2009, to assess the status and health of our local fish populations. The goal of the FIM program is to provide timely, accurate, and consistent fisheries-independent data and analyses to fisheries managers to conserve and protect Florida's fisheries. This program uses standardized sampling methods throughout the state – including our neighboring estuaries Tampa Bay and Charlotte Harbor – and data are used to generate fish inventories, document species' habitat and dietary requirements, and assess fish health.

After several years, a picture of Sarasota Bay fisheries is starting to emerge. Each year, more than 125,000 fish are collected and measured from Sarasota Bay, with new species collected each year. The Bay is home to more than 115 species of fish; over 50 species are considered commercially or recreationally important, including the common snook, red drum, and spotted seatrout.

The smaller embayments (Roberts and Little Sarasota bays) are home to different fish assemblages than the larger embayments in Sarasota, Tampa Bay, and Charlotte Harbor. The underpinnings of these differences may be driven more by their small size and proximity to the Gulf of Mexico than by freshwater inflow.

In 2013, SBEP began sampling fish in the tidal creeks that flow to the Bay in an attempt to understand how these tributaries serve as fish refuges and nursery areas, as well as the role water quality and flow play in influencing these resources.

Creeks Listed as Impaired in Sarasota Bay Watershed



- Bacteria Impairments
- Dissolved Oxygen Impairments
- Nutrient Impairments

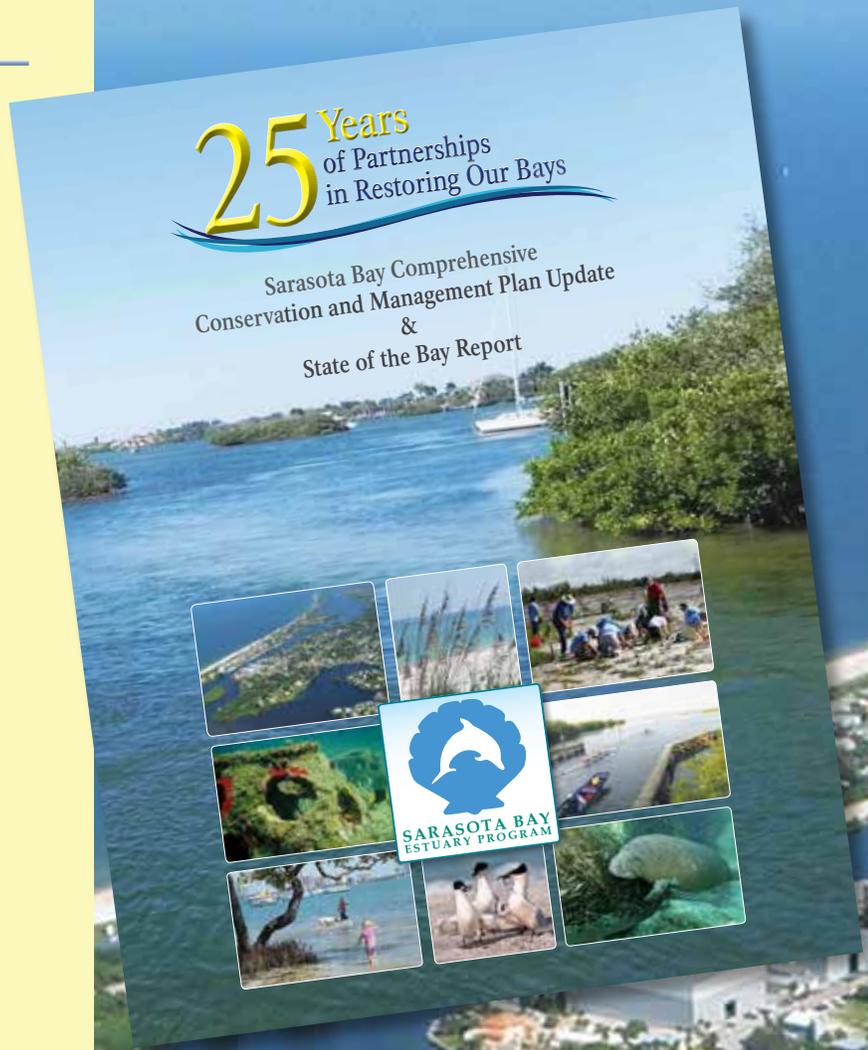
Source: SBEP

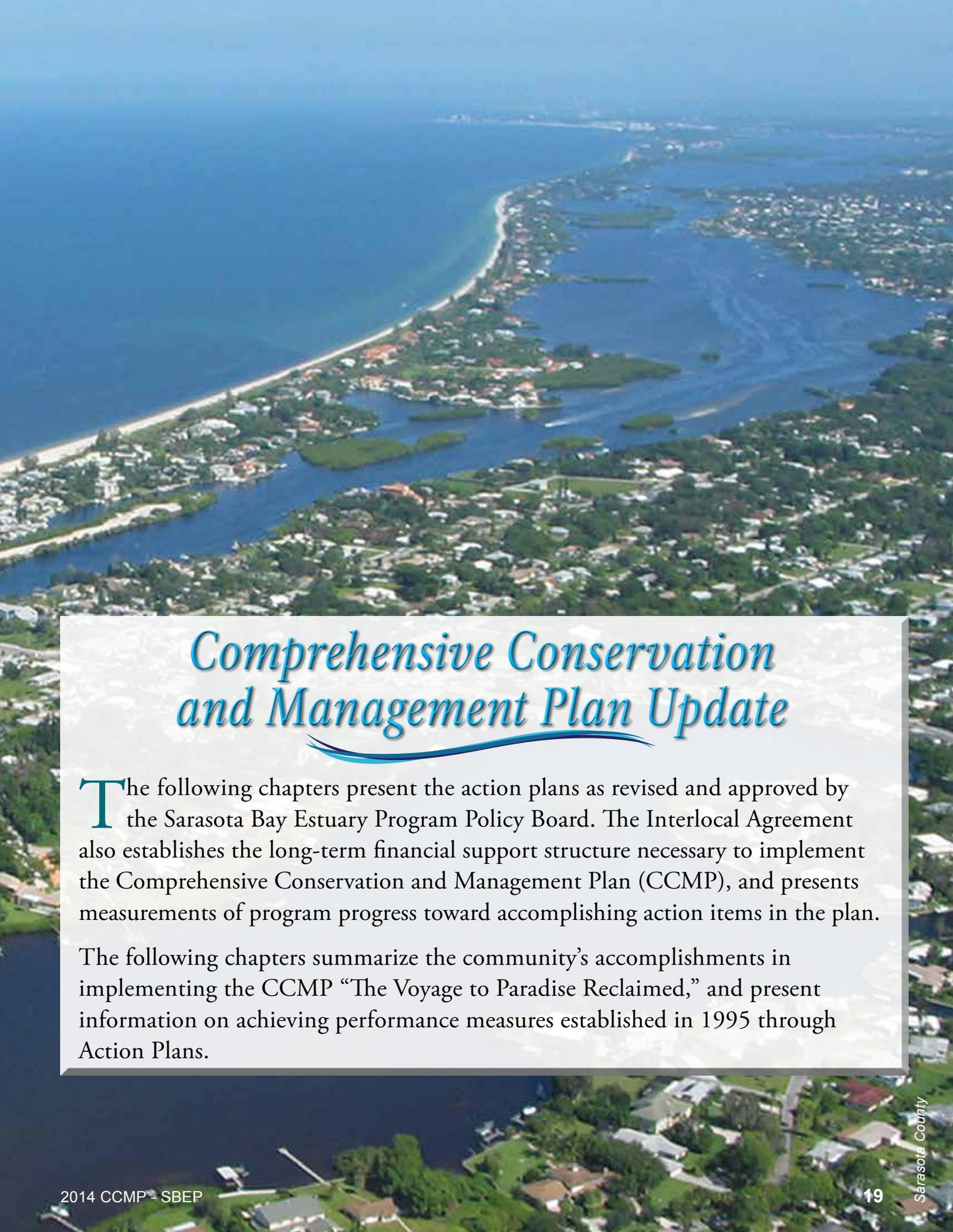


The Comprehensive Conservation and Management Plan (CCMP), approved in 1995, has served as the framework for identifying and implementing specific actions to restore Sarasota Bay. An Interlocal Agreement, signed in 2004, requires that the Sarasota Bay Estuary Program re-examine the CCMP every five years.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

Six action plans and a Citizens Action Plan Chapter continue to guide management and restoration decisions within the Bay and its watersheds:

1. Wastewater Treatment & Reclamation
2. Stormwater Treatment & Prevention
3. Freshwater & Saltwater Wetlands
4. Fisheries & Other Living Resources
5. Recreational Use
6. Governance to Oversee Implementation
7. Citizens Participation Chapter





Comprehensive Conservation and Management Plan Update

The following chapters present the action plans as revised and approved by the Sarasota Bay Estuary Program Policy Board. The Interlocal Agreement also establishes the long-term financial support structure necessary to implement the Comprehensive Conservation and Management Plan (CCMP), and presents measurements of program progress toward accomplishing action items in the plan.

The following chapters summarize the community's accomplishments in implementing the CCMP "The Voyage to Paradise Reclaimed," and present information on achieving performance measures established in 1995 through Action Plans.

Wastewater Treatment & Reclamation

BACKGROUND

Of the pollution sources to Sarasota Bay (wastewater, stormwater, and atmospheric), wastewater contains the highest concentrations of nitrogen. In the Bay area, wastewater is treated at regional treatment plants, smaller neighborhood-size treatment operations with drain fields, and septic tanks.

Technical work completed by the Sarasota Bay Estuary Program in 1993 identified opportunities to improve wastewater treatment and reclamation to reduce the amount of nitrogen pollution entering Sarasota Bay. Total nitrogen loads in 1993 were estimated to have increased to 680 percent above pristine conditions. In 1995, nitrogen pollution had decreased 25 percent due to legislation enacted in 1990 (the Grizzle-Figg Act) requiring all wastewater treatment plants with direct discharge to meet Advanced Wastewater Treatment (AWT) standards. This section explains how additional reductions have been achieved since 1995.

Excess nitrogen in Sarasota Bay causes an overabundance of algae, which reduces light penetration to submerged seagrass (reducing coverage) and depletes dissolved oxygen available for fish and other aquatic life. The effects of nutrient pollution (nitrogen) on Sarasota Bay resources were also recognized in state and federal laws governing the operation of wastewater treatment plants. However, similar rules requiring nitrogen removal do not apply to septic systems and small treatment plants with drain fields (Figure 22); septic tanks are regulated based on human health risks. Research by SBEP in the early 1990s determined that a series of small treatment plants and septic tanks can contribute as much or more nitrogen to some areas of Sarasota Bay as a large wastewater facility. Therefore, plants were prioritized for removal or upgrade based on their impact to the Bay.

The central and northern portions of the Sarasota Bay watershed are predominantly under central wastewater treatment, including Longboat Key, Anna Maria, Bradenton, unincorporated Manatee County, Lido Key, and the City of Sarasota. The wastewater is treated at two facilities, Manatee County Southwest Treatment Facility and the City of Sarasota Regional Facility. Improvement of these facilities paid high dividends for the Bay, while Sarasota County is in the process of creating a regional wastewater treatment system in relation to the southern bays.

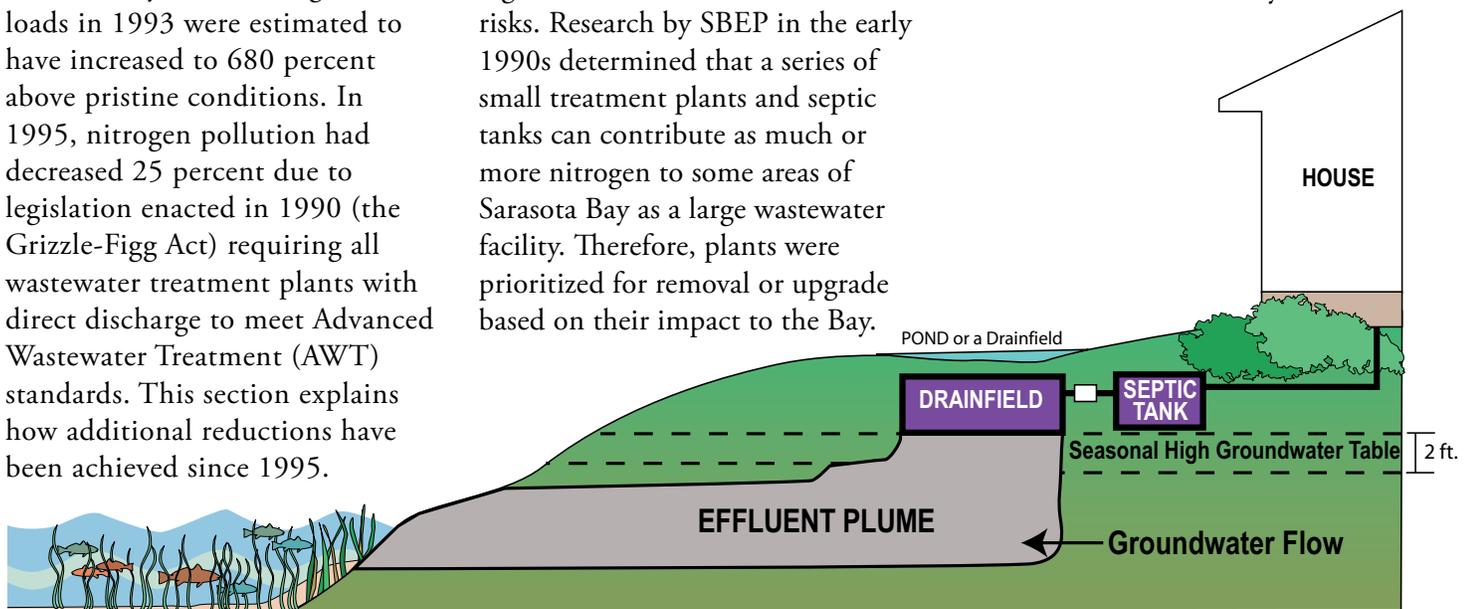


Figure 22. Septic tank drain field.

Source: SBEP-Bay Repair Kit 2010

Wastewater Treatment & Reclamation

PROGRESS REPORT

In 1990, wastewater contributed about 50 percent of the total nitrogen polluting Sarasota Bay. Nitrogen pollution from septic systems and small wastewater treatment plants was significant in Phillippi Creek, Roberts Bay, and Whitaker Bayou. Implementation of the Wastewater Treatment and Reclamation Action Plan has resulted in most of these nitrogen sources being reduced by 95 percent.

Wastewater Treatment Plant Upgrades

Wastewater treatment facilities in the region were upgraded to meet standards required by the Grizzle-Figg legislation beginning in 1990. By 1993, most major facilities were in compliance, including the Manatee County Southwest Treatment Facility, servicing the mainland from the City of Sarasota north and the barrier islands in Manatee County (Anna Maria and Longboat Key). In combination with the City of Sarasota Regional Facility (also servicing Lido Key), the two plants provided treatment for about 80 percent of the Bay surface area.

In the early 2000s, local governments throughout the region tested aquifer storage and recovery of wastewater as a means of eliminating discharge. Changes in arsenic standards by the U.S. Environmental Protection Agency (EPA) prohibited full utilization, so deep-well injection emerged as the alternative back-up disposal option in summer wet weather. During the rainy summer months, the area does not have enough surface storage capacity to manage recycled water as demand declines for alternative supply.



Fruitville Wastewater Treatment Plant, Sarasota County.



Direct wastewater discharge is expected to be eliminated by 2016.

Sarasota County's septic tank replacement program for Phillippi Creek is approximately 65 percent completed.

The deep-well option provides for safe disposal of wastewater.

Sarasota County began purchasing small wastewater treatment plants in 1999, to convert those facilities into pumping stations to transport wastewater to regional facilities. To meet the demand, Sarasota County built the Bee Ridge wastewater treatment facility, a state-of-the-art Advance Wastewater Treatment (AWT) facility with reuse and deep-well backup.

By utilizing deep well injection, wastewater loads have been reduced 95% with additional reductions anticipated with removal of the two remaining discharges (City of Sarasota and Siesta Key) in 2016.



Installation of sewer main, Lockwood Ridge Road, Sarasota County.

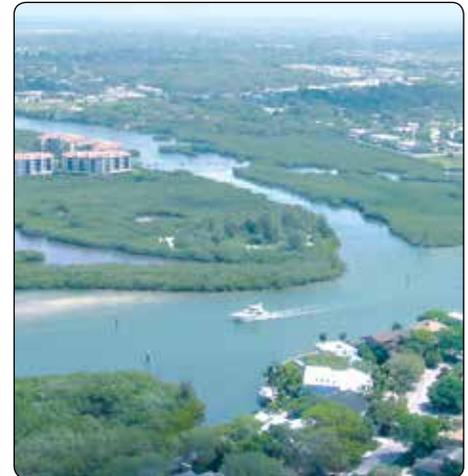
Wastewater Treatment & Reclamation

PROGRESS REPORT *(continued)*

Septic Tanks and Small Treatment Plants

Another major component of this action plan is to address replacement of septic systems as well as small treatment plants (Figure 23) not specifically designed to remove nitrogen (Figure 22, page 20). Nitrogen from septic-system drain fields and treatment plants with percolation ponds

is transported by ground water into tributaries and Sarasota Bay. Analysis of soil types, percolation rates, and horizontal-groundwater travel times established a 900-foot safety distance between a septic tank and a nearby water body. This information was used in prioritizing areas to receive central wastewater systems through septic-tank replacement programs.



Phillippi Creek, Sarasota.

Phillippi Creek Septic System Replacement Program

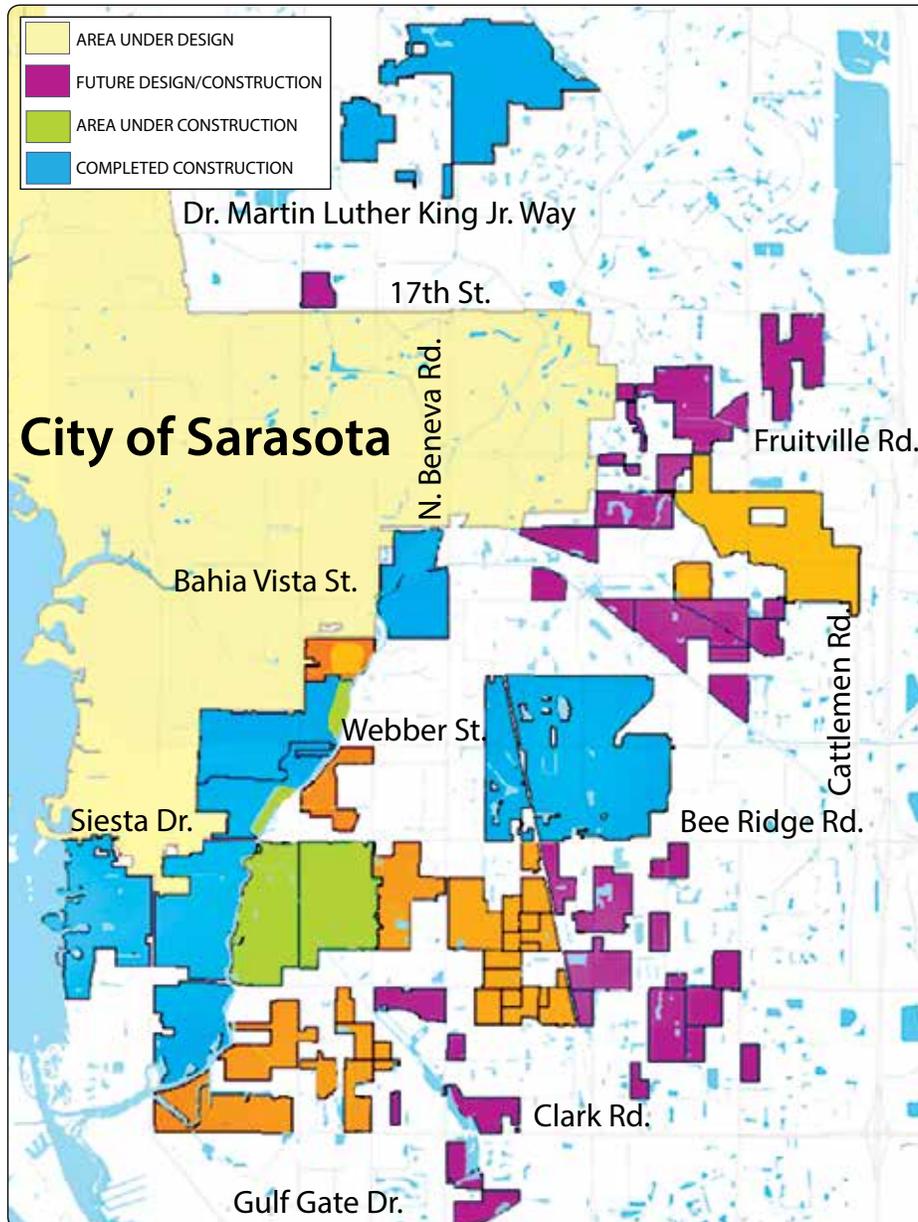


Figure 23.

Source: Sarasota County

The \$188-million Phillippi Creek septic tank replacement program is approximately 65 percent complete, with funding available to complete 82 percent of the program. In concert with this program, Sarasota County is consolidating its wastewater treatment plants while providing options for reclaiming wastewater. The number of treatment plants has been reduced from 120 to 25, with only nine plants remaining in the Sarasota Bay basin.

Septic tanks and small, ineffective wastewater treatment plants also posed a threat to public health. Due to elevated bacteria levels, in 1998 Phillippi Creek was posted with warning signs indicating the water was unsafe for bodily contact because of consistently high bacteria levels. Total nitrogen (and bacteria) levels have improved in the Phillippi Creek watershed, and Phillippi Creek has been delisted as “impaired” for nutrients.

Wastewater Treatment & Reclamation

Reclaimed Water

Studies conducted by Mote Marine Laboratory in the 1980s showed decreased salinity in Sarasota Bay, suggesting increasing amounts of freshwater inflow. In the early 1990s, the Southwest Florida Water Management District (SWFWMD) had advised the community that over-pumpage of the Floridian Aquifer was causing the intrusion of saltwater into the aquifer.

The Sarasota Bay watershed was included in the Southern Water Use Caution Area (Figure 24), where stringent water conservation and control measures for withdrawals were implemented.

Wastewater became a valued source of water for alternative supply to reduce demand on the aquifer. A connection was then made between reclaiming wastewater and improving the Bay's water quality (and seagrass habitats) by reducing or eliminating discharge of wastewater into the Bay or tributaries.

The SBEP and SWFWMD co-chaired a task force comprised local governmental staff in the region, resulting in development of a regional plan to reclaim wastewater. Major features of this reclamation plan included:

- Manatee Agricultural Reuse System
- City of Sarasota Reclaimed Water System (for urban and agricultural reuse)
- Sarasota County's Master Reuse Plan
- Bradenton Reclaimed Water System.

Approximately 65 percent of the wastewater used in the Sarasota Bay basin is reclaimed for alternative supply. The remainder of the water from treatment plants is (or soon



Wastewater was determined to be a valued source of alternative supply to reduce demand on the aquifer.

will be) injected into the ground into an impermeable saline aquifer approximately 2,500 feet below the surface, thus eliminating most direct discharge into Sarasota Bay. Only two direct discharges remain, with their removal scheduled in 2014.

In conjunction with the alternative water supply systems, the municipalities surrounding Sarasota Bay have also

developed a regional water-use system through the Peace Manasota Regional Water Supply Authority. This collaboration included the development of the Peace River Option to augment the Manatee County Reservoir, Sarasota County Carlton Preserve, City of Bradenton Reservoir, Carlton Reserve, and the City of Sarasota's Verna Well Field. As part of the regional effort, water conservation programs were implemented that cut per capita consumption from 150 g/day to 86 g/day, reducing the amount of effluent possibly polluting the Bay.

The replacement of septic tanks and small wastewater treatment plants in Sarasota County also provided increased opportunities to reclaim wastewater, as the systems have greater capability to process wastewater for alternative supply.

Southern Water Use Caution Area (SWUCA)

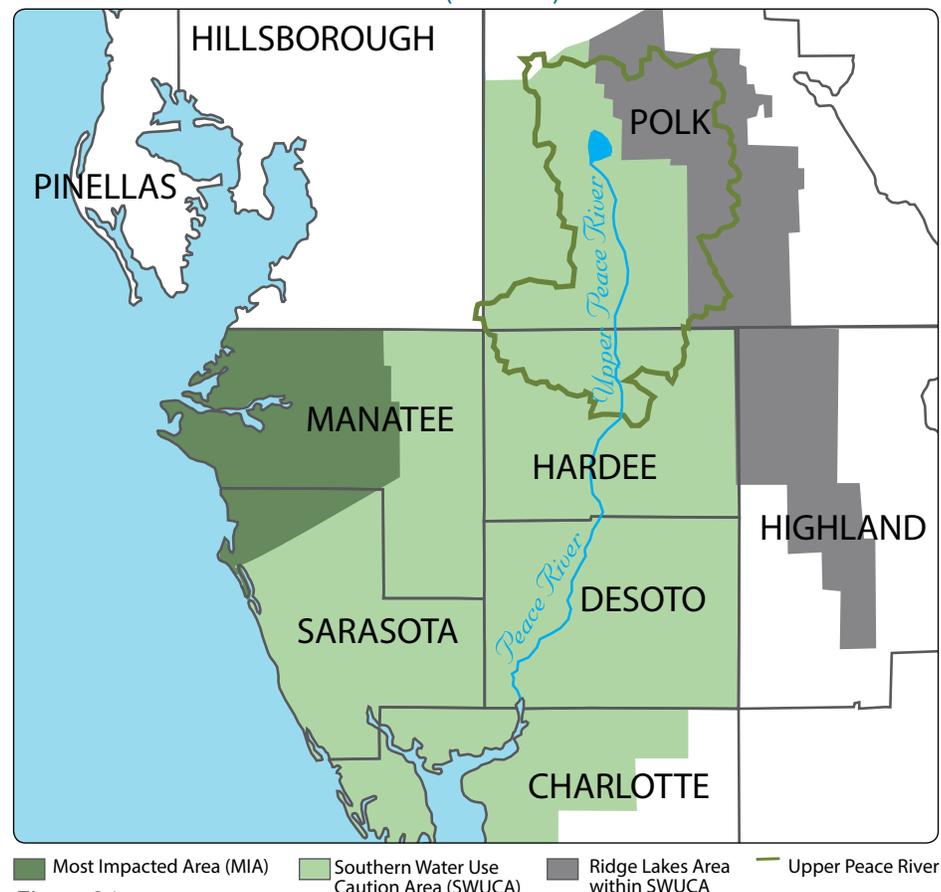


Figure 24.

Source: SWFWMD

Wastewater Treatment & Reclamation

ACTION PLAN

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.



Sewer pipe at Hudson Bayou, City of Sarasota.

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 outlined 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.

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 the Southern Water Use Caution Area.

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 Treatment & Prevention Action Plan on page 33, Objective 5.0). All segments of Sarasota Bay meet state water quality standards.

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.

Wastewater Treatment & Reclamation

PERFORMANCE MEASUREMENTS & RESULTS

In 1995, performance measurements were established to evaluate the effectiveness of wastewater treatment and reclamation practices.

Currently, all segments of Sarasota Bay meet federal and state water quality standards. No dissolved oxygen violations have occurred in Sarasota Bay since 1998. Seagrass coverage is 46 percent higher than in 1988, an indication of improved water quality (Figure 4).

MEASURE #1:

Water quality monitoring data and biological monitoring will document measurable improvements, particularly in but not limited to Whitaker Bayou, Phillippi Creek, and Roberts Bay.

RESULTS 1.1:

Chlorophyll a concentrations in all segments of Sarasota Bay declined between 1998 and 2010.

RESULTS 1.2:

No dissolved-oxygen violations were detected in Sarasota Bay from 1998 to 2010, indicating full aquatic life support and use.

RESULTS 1.3:

Fisheries-independent monitoring suggests good abundance and diversity of fishery in Sarasota Bay.

MEASURE #2:

Physical improvements to treatment systems may be included in the Sarasota Bay Estuary Program's Pollutant Loading Model to calculate achievements in relation to these actions. The model estimates that implementing this strategy will reduce nitrogen loadings by up to 35 percent in Whitaker Bayou, 32 percent in Phillippi Creek, and 24 percent in Roberts Bay.

RESULTS 2.1:

A re-evaluation of the Sarasota Bay program pollutant-loading model indicates a 64-percent reduction in nitrogen pollution to Sarasota Bay, exceeding 1995 estimates.

RESULTS 2.2:

This includes a 60-percent reduction in load for Phillippi Creek and an

80-percent reduction in load from Whitaker Bayou.

MEASURE #3:

Water quality monitoring and biological monitoring will show that nitrogen loadings from wastewater treatment operations in Manatee County remain low.

RESULTS 3.1:

Biological monitoring (seagrasses) shows the largest increases in seagrass coverage between 1998 and 2010 in upper Sarasota Bay near the Manatee wastewater treatment operation.

RESULTS 3.2:

Water quality monitoring in this segment of the Bay has shown significant declines in *chlorophyll a* concentrations between 1998 and 2010. Water quality in this segment is excellent (USF, 2012).

RESULTS 3.3:

Seagrass coverage has increased 46 percent since 1988; seagrass levels are 29 percent above 1950.



City of Sarasota influent upgrade.

Wastewater Treatment & Reclamation

ACTION PLAN UPDATE

The SBEP worked with the University of South Florida Policy Institute and local planning departments across the region to incorporate pertinent language into the comprehensive planning amendments in the late 1990s, creating the necessary policies to implement all CCMP action plans.

The City of Sarasota's wastewater treatment permit and discharge into Whitaker Bayou were addressed through a task force – including the City, the Florida Department of Environmental Protection (DEP), the U.S. EPA, SWFWMD, the SBEP, and a citizen representative – that examined the permit issues and recommended a course of action in 1993. The permit was revised in 1995 to allow additional treatment of wastewater. An agreement was

reached between the City of Sarasota and Sarasota County in 2002 to allow for such treatment and increase reclaimed water supplies.

Another major component of the plan was to investigate alternative on-site treatment systems for nutrient removal. The SBEP and the U.S. Soil Conservation Service evaluated alternative systems and their relevance to the Sarasota Bay area. In concert with the EPA, it was determined that these innovative systems would not adequately treat the wastewater to meet policies established in the CCMP.

In the 1990s, the City of Sarasota provided sewer service to residences in the Whitaker Bayou watershed, while Sarasota County provided sewer service to residents on septic tanks in both the Phillippi Creek

and Whitaker Bayou watersheds. With regard to reclaimed water, the SWFWMD Manasota Basin Board financially supported the development of reclaimed water systems for alternative supply.

Multiple funding sources – local, state, and federal – were used to develop these multi-functional systems. Progress in establishing sustainable infrastructure resulted in major modifications in the CCMP in 2010 and deletions of major elements related to:

- Revisions to the City of Sarasota WWTP permit
- An interlocal agreement between the City of Sarasota and Sarasota County related to the treatment and reuse of wastewater
- Ordinances requiring hookup to central sewer
- Replacement of small wastewater treatment plants
- Use of innovative septic tanks
- Establishing priorities for treatment.

Additions to the action plan included eliminating wastewater discharge and establishing and maintaining water quality standards for the Bay.

The Florida DEP adopted the recommended numeric criteria for Sarasota Bay in December 2011 as part of the State Rule. In December 2012, the EPA adopted the Sarasota Bay numeric nutrient criteria into federal law. All Sarasota Bay waters are currently meeting the standards adopted by the Florida DEP and the EPA.



Manatee County Southwest Water Reclamation Facility.



BAY STEWARDSHIP

HOW YOU CAN HELP:

As a property owner:

- Find out how your wastewater is treated. If you are on a septic system, talk to your local elected representative about the need to provide sewer service in your area to protect Sarasota Bay. This is particularly important if you live close to the Bay or its tributaries.
- If a treatment plant provides wastewater treatment in your area, request information from the utility company on the plant's treatment status and any health or environmental violations.
- Support the community's efforts to reclaim treated wastewater for use in golf courses and agricultural irrigation. If reclaimed water is available in your neighborhood for irrigating yards, use the water sparingly to reduce the potential of polluting the Bay through stormwater runoff.
- Find out more about opportunities for using reclaimed water for potable use after additional treatment.

As a civic group member or educator:

- Help your organization or students become informed about wastewater treatment and reclamation issues. Schedule a tour of a local treatment operation or request a presentation from utility operators or government agencies involved in these issues.



Cistern system.



Sarasota Central County Water Reclamation Facility.

Stormwater Treatment & Prevention

BACKGROUND



The treatment of stormwater is vital to the health and restoration of Sarasota Bay and a major priority of the Sarasota Bay Estuary Program.

The Sarasota Bay watershed receives an average of 56 inches of rain per year, most of which falls during the summer months. Stormwater, which results from rainfall, travels over land to streams and ponds and ultimately reaches Sarasota Bay. As our community grows, natural ground cover, which absorbs much of this water, is converted to impervious surfaces such as buildings, roads, and parking lots, reducing the amount of water that can soak into the ground.

If unmanaged, the increased stormwater running off these impervious surfaces can cause serious flooding and water quality problems.

Stormwater collects the debris and residue of our daily lives and becomes a source of pollution. The amount of pollutants carried by stormwater has increased as the area's population has grown. Today, stormwater contributes the largest percentage of pollution to Sarasota Bay (*Figure 25*).

Stormwater carries a variety of pollutants and substances, including nutrients, sediments, debris, metals, pesticides, and petroleum products. These pollutants are delivered to aquatic systems, causing harm to them and their living resources. The treatment of stormwater is vital to the health and restoration of Sarasota Bay, and a major priority of the Sarasota Bay Estuary Program. The pulses of freshwater are also of concern during storm events as nutrients and other pollutants are flushed into the Bay.

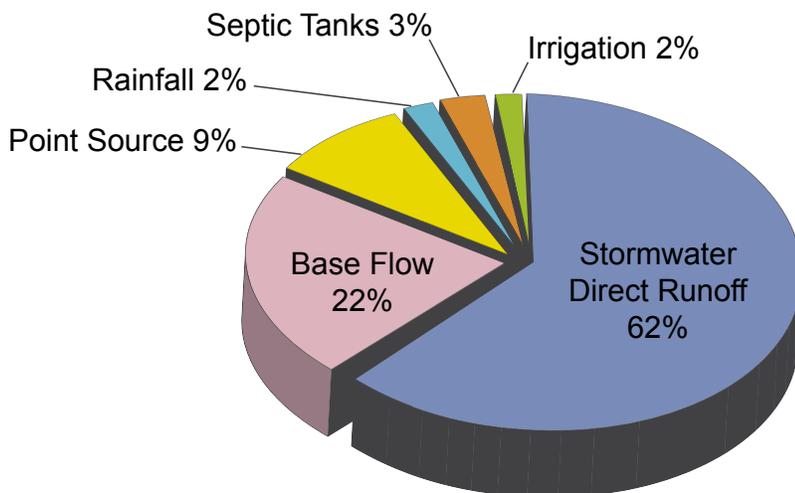


Figure 25. Sources of pollution – and their relative contribution – to Sarasota Bay.

Stormwater Treatment & Prevention

PROGRESS REPORT

Treatment and prevention of stormwater pollution within the Sarasota Bay watershed has been addressed through retrofit (major capital-improvement projects) and effective outreach/educational programs. Highlights of these practices include:

- Retrofit of the Phillippi Creek watershed
- Construction of the Celery Fields regional stormwater system on Phillippi Creek
- Adoption of fertilizer ordinances regionally
- Implementation of the Florida Friendly Landscaping Program (previously known as the Florida Yards and Neighborhood Programs)
- Increased use of Low Impact Development (LID) techniques and products in public and private construction practices.

Heavy metal and pesticide pollution was originally thought to be a potential risk to Sarasota Bay,

but studies in the 1990s revealed very low concentrations of metals and pesticides in sediments throughout the Bay and its tributaries except for Hudson Bayou, where elevated levels of lead contamination were detected. To date, no financially or technically feasible solution has been found to remove contaminated sediments from Hudson Bayou.

Traditional stormwater treatment technologies such as retention and detention ponds can be very effective (over 90 percent) in removing certain pollutants, such as metals and sediments, but less effective (30 percent) in removing nutrients and other soluble pollutants.

In response, Sarasota County has produced a Low Impact Development (LID) manual that uses a suite of hydrologic controls (structural and non-structural) integrated as a treatment train (i.e., in series) to replicate the natural hydrologic functioning of the pre-development landscape.

LID integrated management practices can be applied to most development scenarios. They require consideration of the following objectives:

- Preserve or conserve existing site features and assets that facilitate pre-development hydrologic function
- Minimize generation of runoff from impervious surfaces (i.e., use peak and total volume controls) and contamination (i.e., use load controls) as close to the source as possible
- Promote distributed retention, detention, treatment, and infiltration of runoff
- Capture and reuse stormwater on site
- Minimize site disturbance and soil compaction through low-impact clearing, grading, and construction measures.

Manatee County is developing a similar manual in the long term. LID practices provide opportunities for continued Bay improvement.



Example of a bioswale planted with a variety of native plants to increase water percolation and pollutant removal as stormwater flows through it. To learn more, visit www.sarasotabay.org, click on "Media Center," then click on "Rain Gardens & Bioswales."

Stormwater Treatment & Prevention

PROGRESS REPORT *(continued)*



Celery Fields regional stormwater treatment system.

The Comprehensive Conservation and Management Plan targeted five major tributaries for stormwater management and improvements: Phillippi Creek, Whitaker Bayou, Bowlees Creek, Hudson Bayou, and Cedar Hammock Drainage.

Phillippi Creek construction began in the early 2000s to remediate chronic flooding in certain neighborhoods; subsequent construction elements focused on water quality improvements. Major accomplishments of the Phillippi Creek plan are:

- Construction of the Celery Fields stormwater treatment system to handle stormwater from the headwaters of the Phillippi Creek watershed drainage
- Construction of the Pinecraft Park levee
- Watershed improvements in Red Bug Slough that flow into Phillippi Creek.

Stormwater management systems have since been constructed on Bowlees Creek (Lake Brennan) and Catfish Creek. System designs have been completed for Hudson and Whitaker bayous, with certain LID elements under construction in 2014.

Sarasota County has produced and partially implemented watershed management plans for all its major watersheds. These plans address flood protection, water supply, water quality, and natural systems.

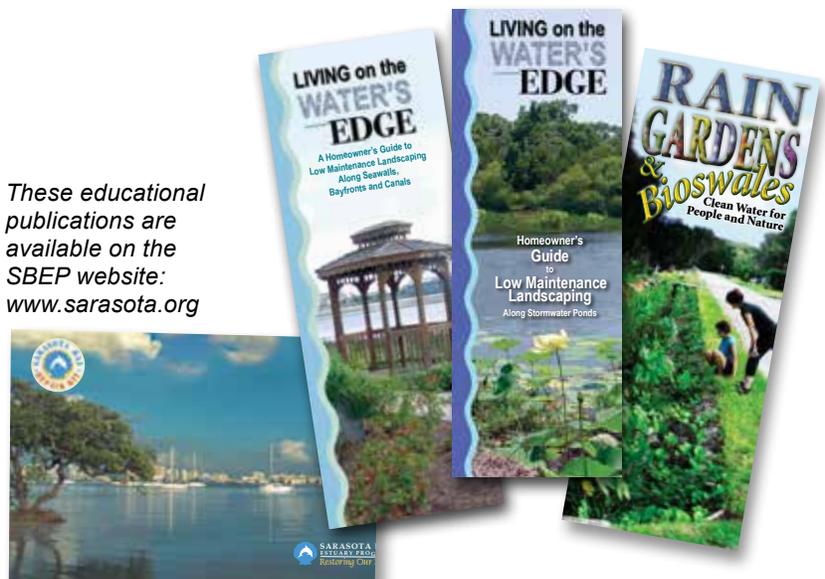
Each year, the Sarasota Bay Estuary Program Citizens Advisory Committee (CAC) develops Citizens Action Plans, which provide the public with educational materials to help them implement stormwater-reducing practices on their property. The following materials were published by the SBEP through the Citizens Action Plan:

- “The Bay Repair Kit”
- “Living on the Water’s Edge”
- “Rain Gardens and Bioswales”



These materials are distributed throughout the community. A recent (2010) educational campaign called “Pooches for the Planet” has helped reduce stormwater nutrient pollution by encouraging pet owners to pick up after their pets.

These educational publications are available on the SBEP website: www.sarasota.org



Stormwater Treatment & Prevention



Living shoreline project with educational signage at Sarasota Bayfront Park.

Fertilizer ordinances have been adopted and implemented by Sarasota (2007) and Manatee (2011) counties. These ordinances prohibit the application of fertilizers containing nitrogen or phosphorus during summer months (June through September). Pollutant-load models estimate that these ordinances in Tampa Bay result in a seven-percent reduction in nitrogen loading Bay-wide, while studies are currently looking at the effectiveness of different fertilizer ordinances in reducing nutrient runoff from residential neighborhoods. The “Be-Floridian” campaign was implemented in

2012 to educate the public on the benefits of maintaining the quality of life that we have come to enjoy.



The SBEP Protection, Involvement, Education and Restoration (PIER) Program provides hands-on environmental education.



Sarasota County provides educational literature on “How to Fertilize Like a Floridian” and follow Sarasota County code.

Recommended Fertilizer and Landscape Management Code

Fertilizer-Free Zone

No fertilizer may be applied to impervious (non-porous) surfaces, and any spillage must be removed. Fertilizer may not be applied within ten feet of any water body or wetland.

Low-Maintenance Zone

A six-foot or greater low-maintenance zone of landscape plants that prevent fertilizer runoff is recommended around any water body or wetland.

Licensing and Certification

Professional landscape contractors must complete a course in proper fertilizer management and use protective Bay practices. Proof of certification may be required in some areas.

Stormwater Treatment & Prevention

ACTION PLAN

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 reuse (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 Manatee and Sarasota 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 and prohibiting 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.

ACTION 2.1.2:

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

ACTION 2.1.3:

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



Water responsibly.



Rain garden.

University of Florida, IFAS Ext.

Stormwater Treatment & Prevention

ACTION PLAN



Capture and use rainwater for watering plants. Collecting water not only helps protect the environment, it also saves homeowners money and energy.



Cisterns provide a higher water-holding capacity than a typical rain barrel. They can be outfitted with filters or other water purification methods when the water is meant for use inside the home.

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 Development standards.

OBJECTIVE 5.0:

Achieve, maintain, or surpass state water quality standards.

ACTION 5.1:

Re-evaluate impacts of agricultural activities on Sarasota Bay and develop 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 reuse water in relation to fertilizer, irrigation, and runoff.



Pervious materials such as gravel, crushed shell, interlocking tiles, or brick allow water to seep into the ground to help filter out pollutants.

PERFORMANCE MEASUREMENTS & RESULTS



Eastern oyster cluster.

In 1995, performance measurements were established to evaluate the effectiveness of the stormwater action plan.

MEASURE #1:

Sediment and biological monitoring data to evaluate water quality improvements in priority watersheds over time.

RESULTS 1.1:

Other than Hudson Bayou, elevated toxin levels have not been found in Sarasota Bay or its tributaries.

RESULTS 1.2:

Nitrogen and *chlorophyll a* concentrations continue to decrease throughout Sarasota Bay (Figures 26 and 28).

RESULTS 1.3:

Seagrass acreage has increased to above 1950s levels (Figures 26 and 28). Increases in water clarity have resulted in the recovery of seagrass meadows.

RESULTS 1.4:

Water clarity continues to improve Bay-wide, indicated by reduced *chlorophyll a* levels (Figure 26).

RESULTS 1.5:

Sediment loads continue to decrease throughout Sarasota Bay. Oyster communities at the mouths of local tributaries are alive, thriving, and increasing. Reduced sediment loads have also contributed to the expansion of seagrass meadows.

RESULTS 1.6:

Reports of fish kills related to oxygen depletion in Sarasota Bay have not been reported since 1998.

RESULTS 1.7:

Long-term trends in Biological Oxygen Demand (BOD) have been declining (Figure 29).

Chlorophyll a Concentration in Sarasota Bay

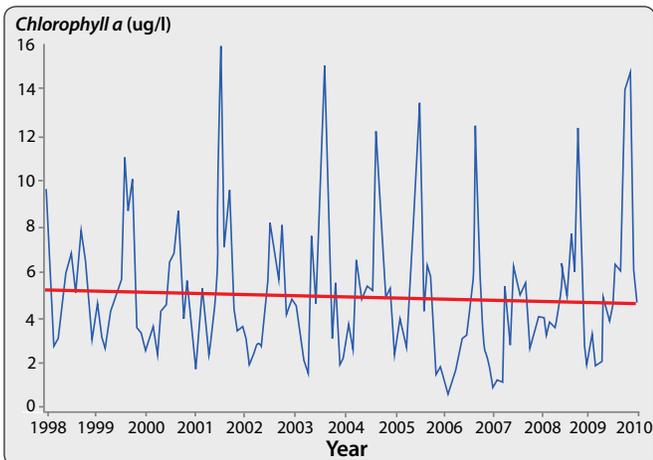


Figure 26.

Source: Janicki Environmental, 2012

Seagrass Acreage in Sarasota Bay



Figure 27.

Source: SWFMWD

Total Nitrogen Concentration in Sarasota Bay

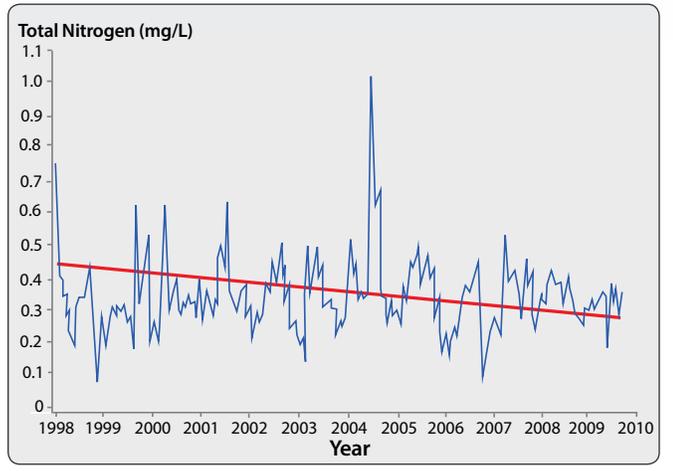


Figure 28.

Source: Janicki Environmental, 2012

Annual Variation in Biological Oxygen Demand (BOD) Loads to Sarasota Bay (1995-2010)

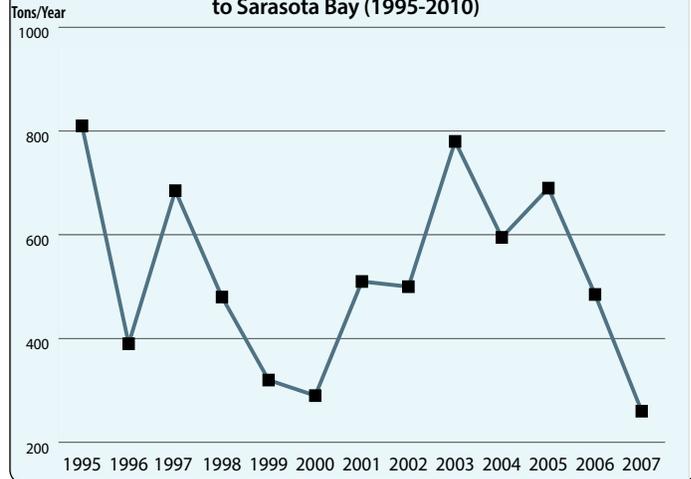


Figure 29.

Source: Janicki Environmental, 2012

MEASURE #2:

Reduction of stormwater pollutant loading through the implementation of Best Management Practices, (BMPs).

RESULTS 2.1:

Recently completed Low-Impact Development (LID) projects have demonstrated major reductions in stormwater pollutant loading to Sarasota Bay. These projects include the Dearborn Street Pilot Project in Englewood, the Honore Avenue Extension in Sarasota, and the Palmetto Green Streets project in Palmetto.

(Note: In 2005, SBEP partners, with funding from SWFWMD, developed a new pollutant loading model to estimate pollutant sources and their effects on Sarasota Bay watersheds. This model, called the Spatially Integrated Model for Pollutant Loading Estimates, (SIMPLE), was updated in 2009 by refining the input data for rain, wastewater, septic systems,

stormwater, and air pollution, as well as calibrating the model's predictive qualities by extensive water quality monitoring. This model can also evaluate the effects and effectiveness of various Best Management Practices (BMPs), such as swales, retention and detention ponds, LID, and other stormwater treatment strategies.)



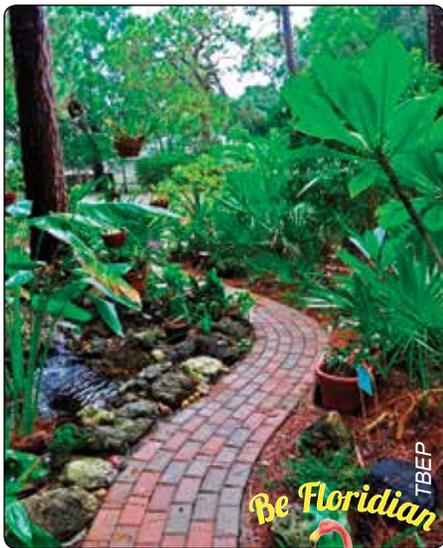
LID project, downtown Sarasota.



Low Impact Development (LID). A Green Streets project, downtown Sarasota.

Stormwater Treatment & Prevention

ACTION PLAN UPDATE



The "Be-Floridian" campaign educates the public about fertilizing and caring for Florida yards.



Minor changes to this action plan were made in 2010, related to maintaining established water quality standards and implementing Low Impact Development (LID) standards.

In the Sarasota Bay watershed, the largest single land use is residential. The intensive use of fertilizers on lawns may be a source of nutrients entering the Bay.

Fertilizer Ordinances

Fertilizer ordinances prohibiting nitrogen and phosphorous applications during the summer wet season were implemented in jurisdictions surrounding Sarasota Bay.

Florida-Friendly Landscaping Program

Launched in 1993 to reduce stormwater pollution, this program has provided area residents with information on practical ways to reduce stormwater pollution through improvements to residential landscape design and maintenance.

Watershed Management Plan

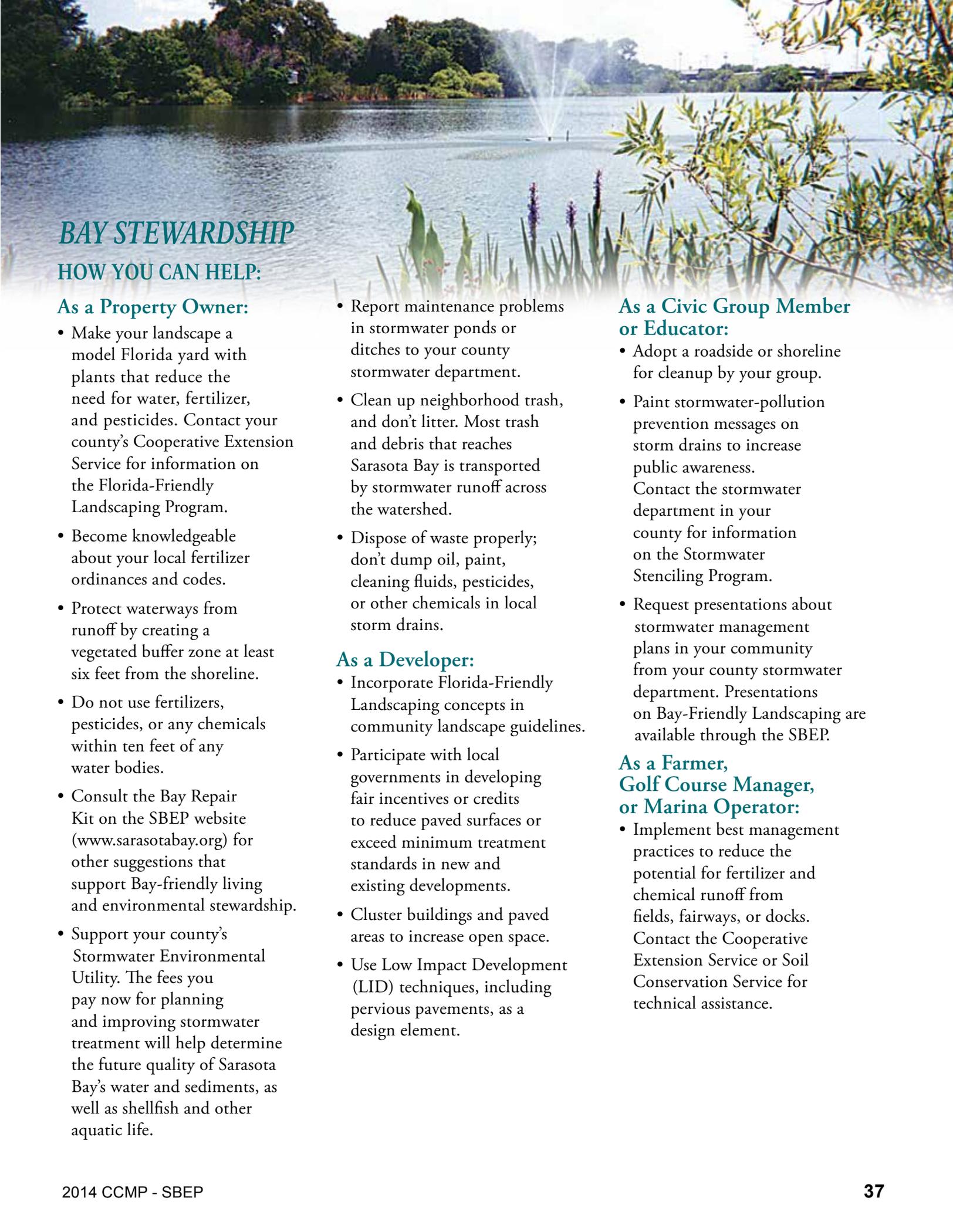
To reduce stormwater loads and help moderate stream flows, Sarasota County has produced and partially implemented watershed management plans for the Little Sarasota Bay, Roberts Bay, and Sarasota Bay basins. Stormwater master planning is currently proposed in Manatee County.

Low Impact Development

Modifications to the 2010 CCMP included improvements to existing stormwater management systems to enhance efficiency and promote Low Impact Development. Development and implementation of watershed management plans have progressed regionally. Addressing stormwater reuse was added to the CCMP in 2010. Whitaker Bayou and Indian Beach Sapphire Shores stormwater retrofits were completed in 2011 as a pilot demonstration of regional cooperation in LID.



Green roof at Island Park, downtown Sarasota.



BAY STEWARDSHIP

HOW YOU CAN HELP:

As a Property Owner:

- Make your landscape a model Florida yard with plants that reduce the need for water, fertilizer, and pesticides. Contact your county's Cooperative Extension Service for information on the Florida-Friendly Landscaping Program.
- Become knowledgeable about your local fertilizer ordinances and codes.
- Protect waterways from runoff by creating a vegetated buffer zone at least six feet from the shoreline.
- Do not use fertilizers, pesticides, or any chemicals within ten feet of any water bodies.
- Consult the Bay Repair Kit on the SBEP website (www.sarasotabay.org) for other suggestions that support Bay-friendly living and environmental stewardship.
- Support your county's Stormwater Environmental Utility. The fees you pay now for planning and improving stormwater treatment will help determine the future quality of Sarasota Bay's water and sediments, as well as shellfish and other aquatic life.

- Report maintenance problems in stormwater ponds or ditches to your county stormwater department.
- Clean up neighborhood trash, and don't litter. Most trash and debris that reaches Sarasota Bay is transported by stormwater runoff across the watershed.
- Dispose of waste properly; don't dump oil, paint, cleaning fluids, pesticides, or other chemicals in local storm drains.

As a Developer:

- Incorporate Florida-Friendly Landscaping concepts in community landscape guidelines.
- Participate with local governments in developing fair incentives or credits to reduce paved surfaces or exceed minimum treatment standards in new and existing developments.
- Cluster buildings and paved areas to increase open space.
- Use Low Impact Development (LID) techniques, including pervious pavements, as a design element.

As a Civic Group Member or Educator:

- Adopt a roadside or shoreline for cleanup by your group.
- Paint stormwater-pollution prevention messages on storm drains to increase public awareness. Contact the stormwater department in your county for information on the Stormwater Stenciling Program.
- Request presentations about stormwater management plans in your community from your county stormwater department. Presentations on Bay-Friendly Landscaping are available through the SBEP.

As a Farmer, Golf Course Manager, or Marina Operator:

- Implement best management practices to reduce the potential for fertilizer and chemical runoff from fields, fairways, or docks. Contact the Cooperative Extension Service or Soil Conservation Service for technical assistance.

Freshwater & Saltwater Wetlands

BACKGROUND

Healthy wetlands, both freshwater and saltwater, provide a number of environmental benefits to Sarasota Bay and its watershed. Healthy wetlands provide food and shelter for aquatic life, birds, and wildlife. Freshwater wetlands are excellent at storing stormwater and filtering harmful pollutants before they reach the Bay. Saltwater wetlands are especially effective in protecting shorelines from erosion, particularly in the face of rising sea levels.

An early Sarasota Bay Estuary Program evaluation of wetland status and trends in 1993 estimated that the Sarasota Bay watershed lost roughly 40 percent of its total

wetland acreage from 1950 to 1995, an average of 40 acres per year. During this same period, the average wetland size shrank from 22 acres to 5.6 acres. As wetlands shrink and become fragmented, their susceptibility to weeds, pests, and other infestations increases.

Historic land-use trends account for the majority of reported wetland loss within the Sarasota Bay watershed. In Manatee County, for instance, land development and agricultural practices began on the upstream freshwater reaches of the Manatee River, then slowly worked their way westward to Sarasota Bay. This resulted in the destruction of many freshwater wetlands early

on, but spared mangrove wetlands along the Bay before statewide protections were put in place. On the other hand, growth in Sarasota County started along the Bayfront, eventually leading to the destruction of 80 percent of the natural mangrove shoreline but sparing many freshwater wetlands.

This scenario closely mirrored statewide trends in wetland loss, whereby saltwater mangroves suffered preferential loss compared to other habitats. As a result, the Florida Legislature enacted the Mangrove Trimming and Preservation Act in 1996, which regulated the trimming of mangroves statewide. While the act recognizes a riparian right to a view, in some instances property owners may not be able to legally obtain the view they desire. The height to which a mangrove may be trimmed depends on the species and condition of the tree. Mangroves generally may not be trimmed lower than six feet. Mangrove trimming must not result in defoliation, destruction, or removal of a mangrove. Environmental permits are required for mangrove trimming in most cases. Check with your County environmental permitting department before doing any trimming of mangroves.



Bay rookery.

Freshwater & Saltwater Wetlands

PROGRESS REPORT

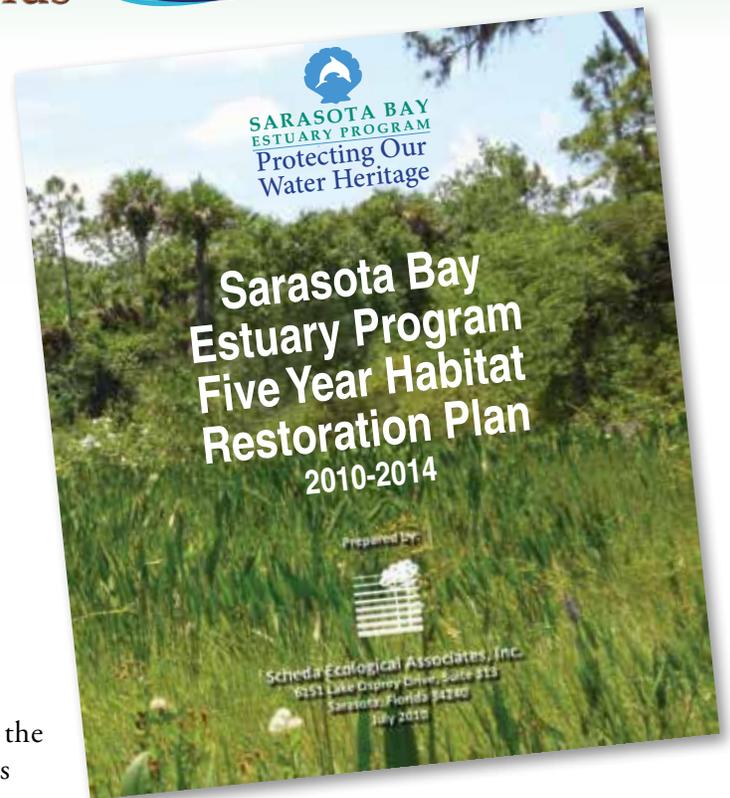
Tidal wetlands self-regulate their elevation within the intertidal zone by trapping and accumulating sediment and organic matter, thereby creating equilibrium with sea level. However, in consideration of accelerated sea level rise (SLR) over the coming decades, new wetland restoration projects are designed with this in mind. National Oceanic and Atmospheric Administration and others have developed guidelines for assessing and incorporating SLR impacts into tidal wetland restoration planning and design. The SBEP follows this process for every new project it undertakes.

The quality of existing wetlands depends on the degree of disturbance, natural and man-made, a particular wetland has endured. Natural stresses include freezes, lightning, erosion, and insect damage. Anthropogenic impacts come in the form of dredging and filling, hydrologic alterations, structures, and perhaps the most widespread impact, trimming and pruning.

While current regulations focus on preventing (or mitigating) wetland loss, the SBEP developed a comprehensive wetland restoration plan to prioritize habitat restoration projects within the watershed. This plan was developed to meet the Freshwater and Saltwater Wetlands Action Plan goals in the CCMP; its objectives are to restore or create

18 acres of intertidal wetlands and 11 acres of non-forested freshwater wetlands annually. The restoration plan was first developed in 2005 as a guide and planning tool to identify, prioritize, and implement restoration projects on a five-year cycle. The plan was updated in 2010. Overall, projects are prioritized based on three important considerations:

- critical habitat restoration and/or creation
- water quality or quantity improvements
- historic habitat restoration and/or preservation.



Perico Preserve restoration project.

2014 CCMP - SBEP



Emerson Point Preserve.

Freshwater & Saltwater Wetlands

PROGRESS REPORT *(continued)*

Together, these considerations help to achieve the overall goal of “Restoring the Balance” of wetland types within the watershed. (Copies of the latest SBEP Five Year Habitat Restoration Plan are available upon request or may be downloaded from the SBEP website.)

Actual restoration activities differ among projects, but generally involve removing exotic

vegetation, excavating intertidal lagoons and waterways to create juvenile fish nurseries, and altering land elevations to create proper hydrologic conditions to support native habitat. The newly prepared lands are then planted with native trees, grasses, and other appropriate vegetation, often with the help of volunteers.

Since 1993, nearly 70 habitat restoration projects have been completed under the direction of the SBEP, with the participation of many program partners, agencies, conservation groups, and volunteers. These projects include ecological parks, preserves, reefs, and shorelines.

A map showing the project locations can be found at the end of this report. A list of recently completed projects is provided on page 15 (*Figure 21*).

Volunteers may participate in many restoration projects through the Bay Guardian Program, a family-friendly volunteer program established by the SBEP to engage residents of all ages in the ongoing effort to restore and protect Sarasota Bay. Sarasota Bay

Guardians is the largest and most active local volunteer program focused solely on the welfare of Sarasota Bay and its watersheds.

The Bay Guardians program also provides an opportunity for volunteers to connect with other residents who care about Sarasota Bay wildlife and habitat, typically through six or seven Bay Guardian events annually.

The SBEP also partners with local schools, scouting packs, church groups, and other organizations in the private and public sector to support volunteer outings. Most of these projects involve planting native plants, removing exotic plants, and removing debris and trash from local parks and preserves. Each volunteer outing is an opportunity to learn about local habitat and wildlife, reinforcing environmental stewardship as an ongoing community priority.



Bay Guardians at North Water Tower Park removing invasive air potato vines.



Bay Guardians clean-up project at Quick Point Preserve and removing exotic vegetation at BayWalk Creek.



Freshwater & Saltwater Wetlands

ACTION PLAN

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 Sarasota 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.

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.



Restoration project at Bowlees Creek.



North Lido Park restoration project.

Freshwater & Saltwater Wetlands

ACTION PLAN *(continued)*



Sandy Hedgepeth

Sandhill cranes.

ACTION 1.9:

Provide cooperative consultations (as requested) to the private and public sectors on development proposals and regulatory issues that impact wetlands (see Governance Action Plan on page 66, Objective 4.0).

ACTION 1.10:

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

ACTION 1.11:

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 removal of trash and exotic plants.

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.



SBEP

The SBEP's Citizens Advisory Committee (CAC) enjoyed a field trip to Celery Fields with Sarasota Audubon.

Freshwater & Saltwater Wetlands

PERFORMANCE MEASUREMENTS & RESULTS

In 1995, performance measurements were established to evaluate the effectiveness of wetland improvements.

MEASURE #1:

Restore or create a minimum average of 18 acres per year, not including activities associated with mitigation.

RESULTS 1.1:

Since 1995, the SBEP has restored 1,550 acres of intertidal wetlands in Sarasota Bay.

MEASURE #2:

Restore or create an average of 11 acres of non-forested wetlands per year, not including open water systems, stormwater treatment facilities, or activities associated with mitigation.

RESULTS 2.1:

The SBEP and its government partners have restored 250 acres of wetland habitat at Celery Fields in Sarasota County.

RESULTS 2.2:

Natural filtration of pollutants has been accomplished on 1,550 acres of intertidal habitat and 250 acres of freshwater habitat.

RESULTS 2.3:

Natural hydroperiods (the rate of water rise and fall) have been re-established in several tributaries to the Bay, including Phillippi Creek and Catfish Creek. A project is also scheduled for Cow Pen Slough.

MEASURE 3:

Will measure net gains in wetland acreage and monitor the maintenance or enhancement of quality in existing wetlands.

RESULTS 3.1:

No mapping has been completed to date.



Bay Guardians planting native plants at the new tidal tributary at North Lido Beach Park.



Bay Guardians' removal project of invasive air potato vines at North Water Tower Park.



North Water Tower Park.

Freshwater & Saltwater Wetlands

ACTION PLAN UPDATE

Since 1995, the SBEP supported a Bay-wide effort to restore intertidal and freshwater wetlands. These projects restore habitat for juvenile fish, crabs, wading birds, and other marine life. They also provide a valuable education opportunity for the public through volunteer planting (Bay Guardians), informative tours, and news coverage by the media.



Around the Bend Nature Tour educates about Florida's history and conservation.

This emphasis on wetlands restoration and enhancement continues to be expanded through the work of a wetlands coordinator appointed by local governments. The coordinator supports a proactive campaign to restore and enhance both freshwater and saltwater wetlands, while encouraging private-sector involvement in the form of volunteer plantings, adopting wetlands, and private land trusts for wetlands conservation.

The coordinator also plays a key role in pursuing grants and other funding for wetland restoration.

Both Manatee and Sarasota counties are still developing priorities for acquiring additional environmentally sensitive lands. Property near the Bay should be considered to be a high priority. No major changes in the wetland action plan were made in 2010.

The SBEP Bay Guardians volunteer program was established in 2010, as a family-friendly volunteer program managed by the SBEP in partnership with Around the Bend Nature Tours, a local eco-tourism business with expertise in environmental education. The Bay Guardians provides an outlet for adults and students to be part of the ongoing effort to restore and protect Sarasota Bay.



Jiggs Landing restoration project.



BAY STEWARDSHIP

HOW YOU CAN HELP:

As a Property Owner:

- Protect wetlands on or adjacent to your property by limiting landscape maintenance near wetlands, including fertilizing, mowing, or using pesticides.
- Provide a buffer zone of Florida native plants between maintained areas and wetlands.
- Remove non-native, invasive plants such as Brazilian peppers, Australian pines, and Melaleuca trees from wetland habitat.
- Avoid pruning mangrove trees if they are located along your shoreline. Mangrove pruning is regulated by the State of Florida.
- Explore opportunities to create a natural shoreline along your property.
- Explore opportunities to protect wetlands through conservation easements or living trusts.

As a Civic Group Member or Educator:

- Visit a wetland to learn more about these vital ecosystems.
- Contact the SBEP about opportunities to protect or restore a wetland area through planting, trash removal, or the removal of exotic plants.
- Contact the SBEP about grant opportunities for your neighborhood or school through the annual SBEP Bay Partners Grant Program.



Bay Guardians at Emerson Point Preserve.



Fisheries & Other Living Resources

BACKGROUND



The future of the Bay's fisheries depends on the community's ability to restore and protect productive seagrass beds and juvenile habitats such as tributaries and mangrove shorelines.

A healthy Sarasota Bay, diagnosed by abundant and diverse fish populations, a productive recreational fishery and ample fish habitat, contributes positively to the local economy and adds to the quality of life for residents and visitors alike. Recreational fishing is excellent, with the shallow waters offering trout, redfish, snook, and other delicious sport fish, while commercial fishermen net striped mullet during roe season. Sarasota Bay is also home to Cortez village, one of the oldest commercial fishing centers in Florida. The future of the Bay's fisheries depends on the community's ability to restore and protect productive seagrass beds and juvenile habitats such as tributaries and mangrove shorelines. Conservative harvest is also important in maintaining the vitality of the fishery.

Fisheries managers recognize that fish stocks depend on healthy ecosystems. Fisheries regulations now include provisions to identify habitats essential to fish populations and take steps to ensure that those habitats remain healthy and continue to support sustainable fisheries. This emphasis on habitat health and productivity brings a broader ecosystem perspective to

traditional fishery management. Insertion of essential fish habitat provisions into fisheries management has been an enormous undertaking.

Seagrass is perhaps the most important fisheries habitat in Sarasota Bay; a considerable amount of research demonstrates the importance of seagrass to healthy fisheries. Seagrass meadows are highly productive habitats supporting an abundance of fish and invertebrate species. Many fisheries species are linked to seagrass at some stage of their life cycle, while other important food species are found in seagrass beds.

Healthy oyster reefs, either natural or restored, also provide excellent habitat for fish and invertebrates. In addition, oyster reefs provide a number of ecosystem services beneficial to a healthy Bay, supporting a higher abundance and diversity of fish than surrounding unstructured habitats. Some fish species are reef residents throughout their lives, while other species are either part-time or transient residents. Healthy oyster reef habitats yield substantial fish and crab biomass each year.

Fisheries & Other Living Resources

PROGRESS REPORT

In 1995, the Sarasota Bay Estuary Program concluded that loss of seagrass habitat due to poor water quality contributed to lower fish catches in Sarasota Bay. Preliminary studies found no evidence of over-fishing by either commercial or recreational anglers. The SBEP focused on restoring vital habitats rather than addressing fisheries management issues. An early SBEP study showed that propeller damage to seagrass beds caused by boats running aground could be reduced by simply improving channel markings.

Today, the focus of this Action Plan remains on improving fisheries habitat by:

- Increasing seagrass acreage through water quality improvement projects
- Creating more hard bottom habitats through the construction of artificial reefs and oyster bars
- Ramping up projects to create and restore wetlands (see Freshwater & Saltwater Wetlands chapter, page 38) with recent focus on a concept called “living shorelines.”

Seagrass

Increased seagrass habitat has occurred by improving water clarity, thus allowing for better light penetration through the water and providing grasses the ability to grow and spread naturally. In Sarasota Bay, water quality improvement projects have contributed to a 46-percent increase in total seagrass habitat since 1988. This recent seagrass expansion served as the basis for establishing new water quality standards for nutrients. The SBEP began developing numeric nutrient criteria in 2009, setting seagrass targets for each of the five Bay segments and proposing limits on nitrogen and phosphorus concentrations to achieve and meet these targets. The standards the SBEP developed and recommended for adoption were incorporated into state regulations by the FDEP in 2010 and federal regulations by the EPA in 2012.

Seagrasses are now 46 percent above 1998 levels, with continuous coverage up 180 percent (*Figure 4, page 8*).



Shoal grass.



Many fisheries species are linked to seagrass at some stage of their life.



Living shorelines project, Bayfront, Sarasota.



Seagrass beds and freshwater submerged aquatic vegetation are important feeding sites for manatees.

Fisheries & Other Living Resources

PROGRESS REPORT *(continued)*



Deployment of a artificial reef ball into Sarasota Bay.



Small artificial reef balls on the Bay bottom.



Sealife growth on artificial reefs.



The SBEP has partnered with both counties to establish a network of artificial reefs within Sarasota Bay proper to provide habitat for Bay-dependent fish, particularly juveniles of offshore reef species.

Artificial Reefs

Sarasota and Manatee counties have had very successful artificial reef programs for several decades. The SBEP has partnered with both counties to establish a network of artificial reefs within Sarasota Bay proper to provide habitat for Bay-dependent fish, particularly juveniles of offshore reef species such as gag grouper and snapper. Six existing Bay reefs (three in each county) have been supplemented with special reef material several times over the past decade. In 2006 and 2010, reefs were enhanced with numerous “reef balls,” semi-spherical concrete structures with holes throughout to attract fish. The reef balls were deployed in a variety of configurations to optimize habitat efficiency.

In 2013, new reef modules were engineered, constructed, and deployed on these same reefs. The centerpiece of these new modules was the “deep cover,” a mausoleum-like structure intended to harbor numerous gag grouper safely. Monitoring of these reefs has shown high utilization by fish and crabs.

Artificial reef locations are shown on the map on page 16.

Fisheries & Other Living Resources



Fish sampling in Sarasota Bay.

Oyster Habitat

The SBEP began exploring opportunities to create new oyster habitat in the 1990s. Through the Technical Advisory Committee, a comprehensive process of identifying potential restoration sites ultimately led to the selection of two locations suitable in terms of water quality, circulation, and substrate- for establishing new oyster beds. Construction of a pilot reef began at White Beach in Little Sarasota Bay in 2005. Monitoring showed that oysters successfully recruited and grew to sub-adult size in two years, which led to a more ambitious project at White Beach and the Gladiola Fields in Sarasota

Bay proper. Using fossilized shell from local mines, five quarter-acre reefs were built at each location between 2010 and 2013. Oyster habitat monitoring began in 2011. Fish utilization is being determined annually by sampling reef-dependent fish assemblages through a partnership with the Florida Fisheries Independent Monitoring (FIM) program; reef-dwelling invertebrates are also being assessed.

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.

Fisheries

While SBEP continues to restore fisheries-dependent habitats, a paucity of data exists on these same fish populations; this lack of information prevents us from assessing whether habitat restoration efforts are having a positive impact, and jeopardizes our ability to manage and protect existing fish populations. The SBEP also thought it important to monitor local fish populations to determine any regional differences in overall fisheries composition compared to adjacent estuaries (Tampa Bay and Charlotte Harbor). For these reasons, in 2009 the SBEP invited the state FIM program to Sarasota to include the Bay in its routine fisheries monitoring. This program



Oyster beds

Fisheries & Other Living Resources

PROGRESS REPORT *(continued)*

has already provided a wealth of scientifically based information on Sarasota Bay fisheries, and certain patterns are starting to emerge. (Please contact the SBEP office to receive copies of the annual FIM reports for Sarasota Bay).

Each year, the FIM program collects more than 100,000 fish from Sarasota Bay; pinfish and bay anchovies dominate the annual catch. General patterns in fish community structure from the first three years (2009 to 2011) tend to separate into three groupings: small Sarasota embayments (Roberts, Little Sarasota, and Blackburn bays); larger Bay segments closely linked to the Gulf of Mexico and receiving little direct freshwater inflow (Sarasota Bay); larger Bay segments not linked closely to the Gulf and receiving large amounts of freshwater inflow (Palma Sola Bay and others in adjacent estuaries). Preliminary analyses show that Sarasota Bay fish contained low levels of mercury, a toxic metal that bio-accumulates in fish tissue; these levels were similar to levels in fish from Tampa Bay and Charlotte Harbor.



Hermit crab.

Shellfish

Shellfish – such as oysters, clams, and scallops – are directly affected by lost or deteriorating bottom habitat, perhaps even more so than finfish. In Sarasota Bay, shellfish harvesting is limited to an area bayside of Longboat Key; this area is designated as “conditionally approved” based on water quality conditions. It is not expected that other areas in Sarasota Bay will ever be open for shellfish harvesting, particularly along the mainland shorelines, because of the higher likelihood of bacterial contamination from urban sources, primarily stormwater runoff. However, restoring shellfish populations is still important in terms of water quality, because these “filter feeders” have a great capacity to cleanse impurities from the water.

The bay scallop, another locally important shellfish species, was considered in the “Comprehensive Conservation Management Plan 2014” as far back as 1995. The SBEP promoted early efforts to relocate mature, adult scallops to Sarasota Bay to form “spawner sanctuaries,” with the intent that they would spawn and populate the Bay with offspring. Later, local shellfish hatcheries were brought in to produce millions of baby scallops to seed the Bay. To date, these and other efforts have met with marginal success. A considerable roadblock to scallop restoration continues to be the persistent outbreaks of red tide since 2006, which effectively kill scallops along with finfish. A comprehensive strategy to understand all the mitigating factors



Bay scallop.

(water quality, habitat, circulation, predation, etc.) that go into a successful bay scallop restoration strategy for Sarasota Bay is currently being developed through a partnership with Mote Marine Laboratory.

Tidal Creeks

Finally, the SBEP is currently managing a comprehensive study of local and regional tidal creeks that will ultimately result in a management plan for protecting these creeks, which provide valuable juvenile fisheries habitat. The study is designed to understand the relationship between water quality conditions (particularly nutrients) and their response variables (chlorophyll, algae, and dissolved oxygen). These water quality relationships are then combined with the unique nursery habitat characteristics these tidal tributaries provide, thus creating a total picture of what is necessary to protect this vulnerable life stage of our more important recreational fish species.

Fisheries & Other Living Resources

ACTION PLAN

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 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.



Mangrove snappers.



Turtlegrass.

ACTION PLAN *(continued)*



Clams.



Hermit crab.

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.

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 Treatment & Prevention Action Plan on page 32, Objective 2.0).

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.

Bottom Habitats

OBJECTIVE 5.0:

Protect seagrasses from scarring by boat propellers.

ACTION 5.1:

Improve channel marking on the Intracoastal Waterway and connector channels.

Fisheries & Other Living Resources

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 Treatment & Reclamation Action Plan on page 24 and Stormwater Treatment & Prevention Action Plan on page 32).

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.

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 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.)



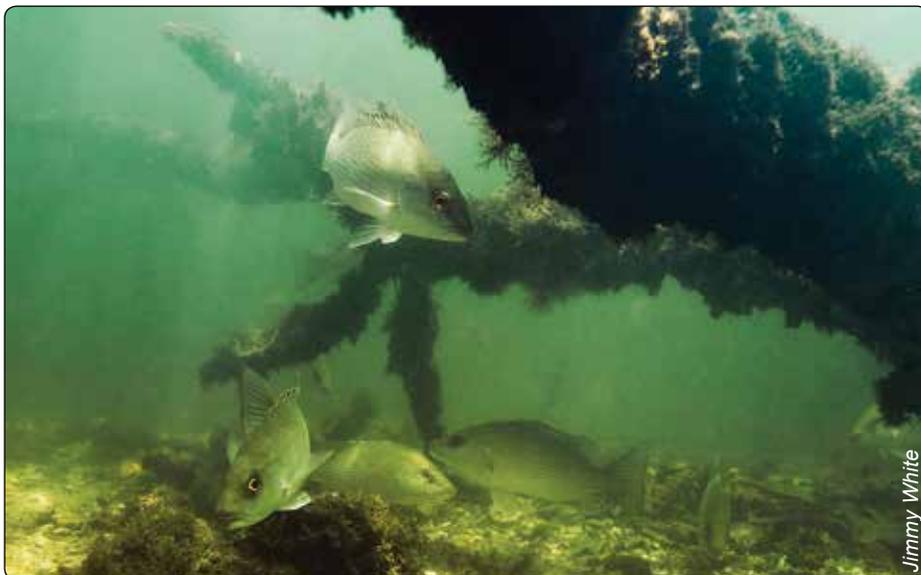
Amberjack.

Barry Fackler



Turtlegrass.

National Oceanic & Atmospheric Administration



Beneath the mangroves.

Jimmy White

Fisheries & Other Living Resources

PERFORMANCE MEASUREMENTS & RESULTS



James Sweiderk

Stone crab.

In 1995, performance measurements were established to evaluate fisheries and other living resources of Sarasota Bay.

MEASURE #1:

Biological monitoring will show improvements in quality and quality of fisheries and habitats.

RESULTS 1.1:

Fisheries-independent monitoring has shown good species diversity and quantities in Sarasota Bay.

RESULTS 1.2:

Data collected on restoration sites show reasonable productivity.

RESULTS 1.3:

Anecdotal reports indicate increases in the quantity of finfish available to recreational anglers. The FIM data suggests an abundance and diversity of finfish in Bay waters. The appearance of scallops may suggest improving water quality conditions.



Manatee County / Fred Loveland

Snook catch.

RESULTS 1.4:

Recreational fishing opportunities have increased with the 32 ecological parks that have been established throughout Sarasota Bay.

RESULTS 1.5:

Nine artificial reefs have been created for angler use, and 4,000 acres of seagrass have increased habitat for fish species.

RESULTS 1.6:

Oysters appear to be increasing in numbers in the Bay.

MEASURE #2:

Biological monitoring will show increases in scallop populations.

RESULTS 2.1:

Scallop populations in the Bay were re-identified and increased in significant numbers in 2008, but have been marginally present since.



James Sweiderk

Sarasota Bayfront.

Fisheries & Other Living Resources

ACTION PLAN UPDATE

In 1995, it was acknowledged that for Sarasota Bay fisheries to recover, water quality and habitats, particularly for juvenile fish, must be improved. Water quality and seagrass throughout the Bay have responded favorably to implementation of the wastewater and stormwater action plans outlined in 1995, while wetland restoration and establishment of reef habitats resulted in improved juvenile habitats. Success in implementing the CCMP has resulted in major changes in the objectives outlined in the fisheries action plan.

These changes focus on the identification of critical habitats in the tributaries, along with the delineation of shoreline and other vital habitats in the tidal creeks and tributaries. It is expected that the changes will focus residents on supporting changes in seawalls and other shoreline habitats, including the use of living shorelines as an alternative to hardened shorelines.

Since many of the elements related to protection of seagrasses had been completed, such as channel markings and improved circulation, these elements were deleted from the updated CCMP. The establishment of water quality

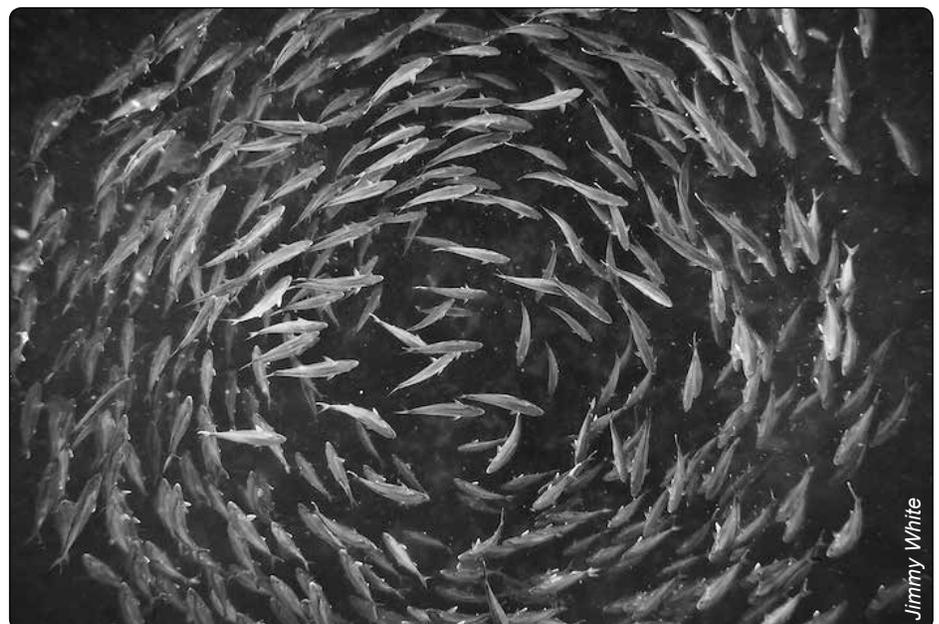
standards related to maintenance of seagrass and water quality targets also resulted in modification of this action plan. Water quality standards have been adopted into state and federal law to protect seagrasses and maintain full aquatic life support and use.

The Sarasota County Commission decision to withdraw the permit application to reopen Midnight Pass also resulted in deletion of elements of the action plan related to the consideration of its reopening.

Programs sponsored by the SBEP and its major government partners have increased the Bay's productivity through the re-establishment of vital juvenile fish habitat.



Loggerhead sea turtle.





BAY STEWARDSHIP

HOW YOU CAN HELP:



As a Recreational Angler:

- Practice catch and release, keeping only fish within the legal size limits.

As a Boater:

- Use channel markers and current navigational charts to avoid running aground or destroying seagrass beds with motor props.
- Obey speed limits and no-wake zones to reduce turbidity (cloudiness) in the water and avoid collisions with manatees grazing underwater.
- Prevent oil, gas, and chemical spills.
- Pick up any trash or debris for proper recycling or disposal.



As a Property Owner:

- Explore replacing hardened seawalls with living shorelines featuring native plants.
- Avoid pruning mangroves.
- Help reduce nitrogen pollution by following county fertilizer ordinances.
- Practice Bay-friendly landscaping.

As a Civic Group Member or Educator:

- Promote environmental stewardship.
- Contact the SBEP about presentations that can help raise awareness about protecting local fish populations and related topics.



Recreational Use



BACKGROUND



The 1995 CCMP acknowledged the large public investment needed for restoration and the need to provide the public with access to the Bay and its resources.

The primary goal of this Action Plan is to provide increased levels of public access to the Bay and its resources without adverse impact.

Surveys conducted by the Sarasota Bay Estuary Program indicate that one primary use of Sarasota Bay is simply looking at it. The aqua-blue water color is an important aspect of people's attraction to the region. Sarasota Bay is also a popular destination for sport fishing, motor boating, sailing, wildlife observation, birding, kayaking/canoeing, and other eco-tourism opportunities. Maintaining and enhancing these recreational opportunities were envisioned as an important aspect of efforts to restore Sarasota Bay while creating a sense of place and stewardship

among area residents and visitors. The 1995 Conservation and Management Plan acknowledged the large public investment needed for restoration and the need to provide the public with access to the Bay and its resources. The CCMP also acknowledges the need to reduce conflicts among users and to educate the public to become environmental stewards.

Several fundamental objectives were to:

- Improve management of high-use areas, reducing conflicts
- Improve channel marking throughout the Bay
- Improve access
- Increase education among user groups.



Lou Newman

Least terns (above), gulls, and skimmers nest in sandy beach areas between April and August. Watch where you step, keep your distance, and enjoy them from a distance.



Caspersen Beach.

Sarasota County

Recreational Use

PROGRESS REPORT

In response, no-wake zones were established or expanded at all inlets to Sarasota Bay, along with improved marking of the Intracoastal Waterway (ICW) and access channels throughout the system. This marking also resulted in increased protection of seagrass (from scarring) and protection for manatees. Speed zones were also implemented and enforced within the ICW; and no-wake zones were established outside the ICW in many areas of the Bay.

To increase access, 32 ecological parks were created around the Bay; these parks include educational signage to enhance stewardship and vistas for viewing. The Gulf Coast Heritage Trail was unveiled, linking environmental, educational, cultural, and historical destinations around the Bay. The trail recognizes that many vista points are located within the identified destinations, increasing opportunities for Bay access. Two Scenic Highways have been designated in the region (Palma Sola and Gulf Drive). New ecotourism business opportunities are emerging throughout the region.



Palma Sola Scenic Highway sign unveiling.



The Legacy Trail, more than 10 miles in length. Trailheads offer easy access. Visit www.scgov.net for more information.



Bird Key Park, at the western foot of the Ringling Causeway Bridge, provides a great place to fish or launch a windsurf board, kayak, or canoe.



Island Park/Bayfront Park, on the shore of Sarasota Bay close to downtown Sarasota.

Recreational Use

ACTION PLAN

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.

OBJECTIVE 1.0:

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.

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 is ticketing as necessary.)

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 for public recreation, Bayfront parks, or low-impact preserves.



Monofilament recycling container.

Recreational Use

ACTION PLAN (continued)



Signs like these guide users along the Gulf Coast Heritage Trail.

ACTION 3.4:

Identify Bay vista points in local comprehensive plans and consider them in landscaping, roadbuilding, and other construction.

ACTION 3.5:

Fully implement and expand the Sarasota Bay Heritage Trail and Blueways System. (Note: Heritage Trail and Blueways are 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 FY2008.

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 Manatee/Sarasota area is commonly referred to as “paradise” by the business community, 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.)



Ringling Causeway, Sarasota.



Kayaking in Manatee County.

Recreational Use

PERFORMANCE MEASUREMENTS & BENEFITS

In 1995, performance measurements were established to evaluate by implementation.

MEASURE #1:

Public-opinion evaluation will be used to determine whether recreational experiences improve for Bay users.

RESULTS 1.1:

The SBEP and its partners have created 32 ecological parks throughout the area for the enjoyment of the public.

RESULTS 1.2:

These sites have become an increasingly prominent eco-tourism opportunity regionally. Tourism has increased to record levels in both Manatee and Sarasota counties.

RESULTS 1.3:

Boater safety has been improved by establishing no-wake zones at all inlets to Sarasota Bay. No-wake zones have also been established outside the Intracoastal Waterway in many areas, while a 25-mph limit has been established in the ICW throughout the Bay.

RESULTS 1.4:

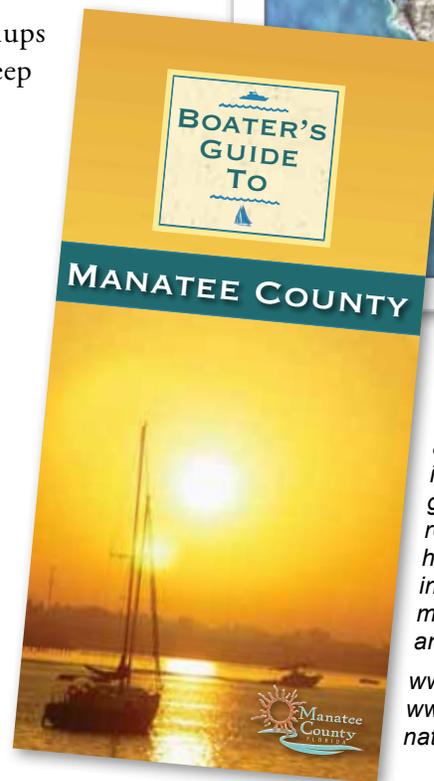
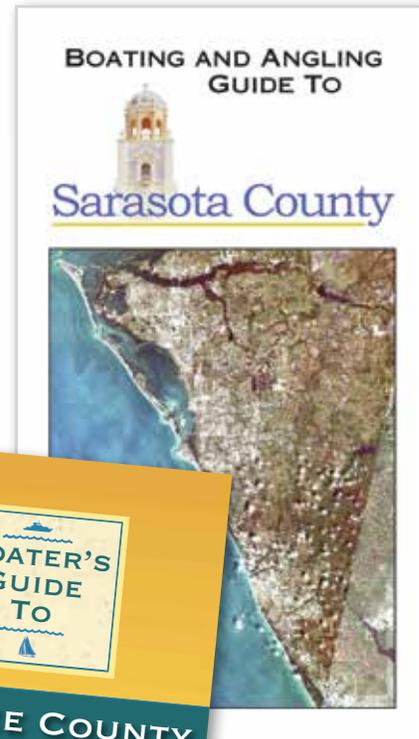
The regional economic value of Sarasota Bay and its resources has been established at \$57.9 billion.

MEASURE #2:

Roadway and Bay shoreline cleanups will yield less debris as litter-prevention campaigns become more effective.

RESULTS 2.1:

Annual coastal cleanups are conducted by Keep Sarasota and Keep Manatee Beautiful; numerous roadway cleanups are also conducted through Adopt a Highway as needed.



Boating guides to Manatee and Sarasota counties provide waterway and navigational information. These guides also promote responsible boating habits and educational information about marine life, wildlife, and natural resources.

www.scgov.net
www.mymanatee.org/naturalresources



The ten-mile Venetian Waterway Park follows along both sides of the Intracoastal Waterway.



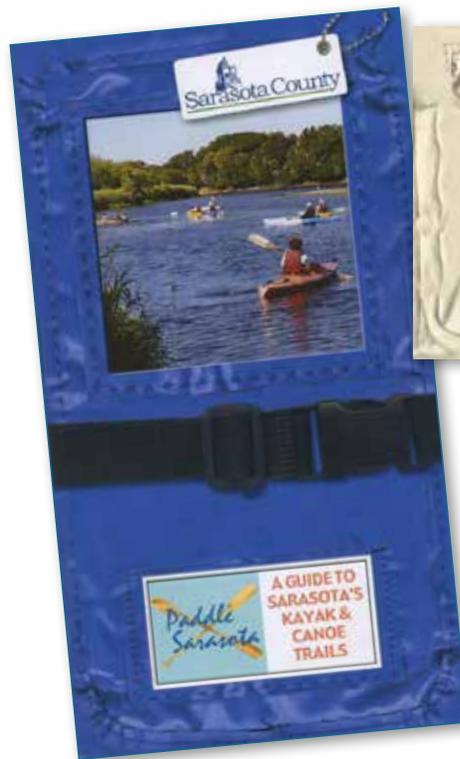
Cortez Bridge, Manatee County.

Recreational Use

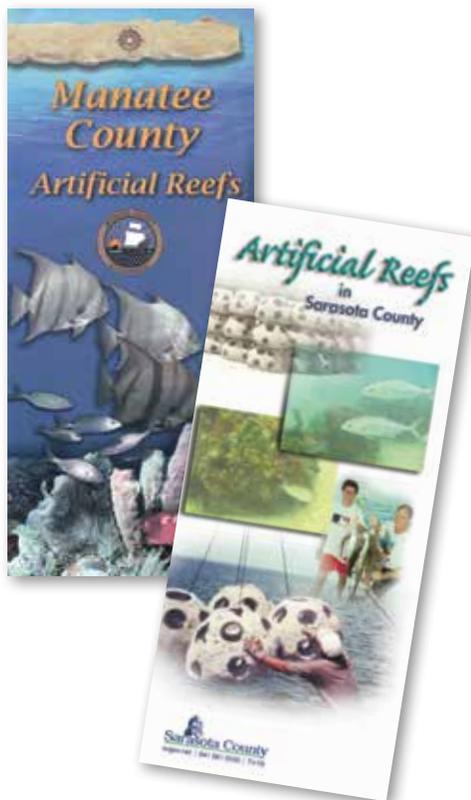
ACTION PLAN UPDATE

Although avid users of Sarasota Bay are among some of the most ardent supporters of Bay restoration, increased recreational use of the Bay can bring increased problems. Implementation of the CCMP established a balance between man and nature. Highlights of regional recreational improvements include:

- Establishment and management of the Gulf Coast Heritage Trail
- Improvements in boat launch facilities regionally with educational signage
- Establishment of 32 ecological parks around the Bay with educational signage



The Sarasota and Manatee paddle guides show launch points, and points of interest, and provide suggested paddling trips. Each guide has educational information about the area's wildlife and recreational opportunities. www.scgov.net www.mymanatee.org/naturalresources



Habitat enhancement for sealife has been achieved through the deployment of prefabricated reef modules.

Manatee and Sarasota counties have publications to locate these reefs. Or visit their websites: www.scgov.net www.mymanatee.org/naturalresources

- Creation of numerous Bay vista points
- Improved education in local school systems on the value of Bay resources
- Adoption of no-wake zones in the inlets and outside the Intracoastal Waterway
- Creation of bikeways and trails
- Creation of the Palma Sola and Gulf Drive Scenic Corridor Management Entities, resulting in improvements in access and beautification
- Implementation of the Florida-Friendly Landscaping Program.
- Creation of artificial reefs for enhanced fishing experiences
- Emergence of eco-tourism in the region
- Acquisition of Bayfront lands
- Preparation of the Bay Roamers Guide
- Expansion of kayaking, canoeing, and wave boarding as recreational sports
- Sarasota Bay Water Festival.

The Sarasota Bay region offers a unique blend of recreational experiences enhanced through the implementation of this Action Plan. Points of interest throughout Manatee and Sarasota counties are shown on "The Gulf Coast Heritage Trail" map: www.sarasotabay.org – go to "media center" and click on "brochures."



James Sweiderk

BAY STEWARDSHIP

HOW YOU CAN HELP:

As a Civic Group or Educator

- Participate in planning special management for high-use areas of Sarasota Bay.
- Safe-boating instructors can incorporate Bay resources – protection messages in existing curricula to help raise boater awareness.
- Assist local government efforts to place undeveloped Bayshore lands under protective status through acquisition, conservation easements, or other means.
- Advise local governments on ways to improve use and enjoyment of public Bayshore lands.
- Promote litter prevention among group members or students (see Stormwater Treatment & Prevention Action Plan on page 32).

As a Bay User

- Avoid boating near bird rookeries.
- Do not feed seabirds. Many injuries to seabirds occur when the birds are hooked as they pursue bait or fish on a line.
- Do not feed marine mammals; feeding interferes with their natural behavior and is illegal.

As a Business Person

- Boat rental and sales centers, travel agencies, hotels, and restaurants can distribute literature that promotes environmentally friendly Bay recreation. Contact local and state environmental agencies and Mote Marine Laboratory for available literature, decals, and other educational materials.



Lou Newman

A pair of wood storks and a great egret.



Sarasota County

Bottlenose dolphin.

Governance to Oversee Implementation

BACKGROUND

Sarasota Bay is the center of a community of 600,000 people. The Bay's economic, aesthetic, and recreational value makes it a highly valuable asset to the community. Like other coastal areas of the



CAC members visit Perico and Neal Preserves.

United States and Florida, the region continues to experience population growth. The resulting impacts of pollutants and human use could damage Sarasota Bay.

Although federal funding through Section 320 of the Water Quality Act of 1987 is critical to sustaining programmatic activities, most of the revenue for implementation has been provided by state and local governments, as well as other federal agencies. Total revenue expended on Bay restoration approximates \$700 million.

Fostering a cooperative spirit among federal, state, and local governments and private citizens, the Sarasota Bay Estuary Program pursued a variety of technical, public-outreach and early-action projects to support implementation of the comprehensive management plan for the Bay. The Conservation Conversation and Management Plan provided the operational guideline, while the annual workplans approved by the SBEP Policy Board set priorities. Large-

scale grants and loans have been made by federal, state, and regional agencies, while local funds have been provided through utility fees and property taxes. Implementation activities have been broad-reaching and extensive, with the majority of implementation activity occurring within the local governments supported by the NEP process and state agencies.

In 1995, clear direction was provided by the community:

- The Management Conference did not wish to establish another layer of bureaucracy
- The institution to be established should not have regulatory authority
- The program was not to be involved in land-use or environmental-permitting decisions.

With these policies at the forefront, the SBEP Citizen Advisory Committee took the lead in developing the Governance to Oversee the Implementation Plan in 1994, and again in 2010/2011, as presented.

Governance to Oversee Implementation

ACTION PLAN

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. The SBEP should not get involved in land-use or environmental permitting decisions.

OBJECTIVE 1.0:

Maintain an appropriate committee structure and staff to ensure effective implementation of the Sarasota Bay CCMP.

ACTION 1.1:

Implement the CCMP utilizing the Interlocal Agreement.

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.

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 the 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.

Action 2.5:

Implement the Southwest Florida Regional Ecosystem Restoration Plan.

OBJECTIVE 3.0:

Expand environmental education programs, with an emphasis on boaters.

OBJECTIVE 4.0:

Implement Land Use and Environmental Permitting policy (below).

Land Use And Environmental Permitting Policy

The Sarasota Bay Estuary Program (SBEP) is an independent special district established pursuant to an Interlocal Agreement among local, state, and federal governmental entities. The SBEP serves as a cooperative program to provide resources for the long-term health of the Sarasota Bay Estuary and its contributing water-bodies (the "Bay"). In keeping with this role, the SBEP Policy Board has maintained a policy of refraining from participation in proceedings regarding land use or environmental permitting decisions before individual government entities.

Accordingly, SBEP staff, the SBEP Management Board, and SBEP advisory committees (the Technical Advisory Committee and the Citizens Advisory Committee) are not authorized to take a position on behalf of the SBEP in any such decisions. Individuals who serve as members of such staff, boards or committees, are, of course, free to voice their own views in such proceedings, but are strongly encouraged to clarify that they do so as private citizens so as to avoid any inference that they are speaking on behalf of the SBEP.

The SBEP maintains a wide range of data, records, and reports regarding the environmental conditions of the Bay. In keeping with the requirements of Chapter 119, Florida Statutes, the Florida Public Records Act, SBEP staff will make such materials available to all individuals and organizations requesting to access, inspect, and duplicate such materials, regardless of whether such parties wish to do so in furtherance of their participation in a land use or environmental permitting proceeding. The sharing of such public records with any such individual or organization shall not be construed as an endorsement of any position taken by such individual or organization in such proceeding, nor shall it impose any obligation upon any staff member of the SBEP to participate in such proceeding to verify or explain the relevance of such records.

Governance to Oversee Implementation

PROGRESS REPORT

The SBEP Interlocal Agreement (IA) requires a re-examination of the CCMP every five years. The SBEP IA was enacted October 1, 2005, adding the Town of Longboat Key and the 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 FY2014. Independent assessments by the U.S. Environmental Protection Agency were completed in 1997, 2000, 2003, 2006, 2009, and 2013.



Joan M. Durante Park, Town of Longboat Key.

Patti Cross

PERFORMANCE MEASUREMENTS & RESULTS

In 1995, performance measurements were established to evaluate the effectiveness of implementation.

MEASURE #1:

The Management Conference shall report to the people annually on progress made toward completing actions and achieving “Measurements of Success” listed in the Sarasota Bay restoration plan.

RESULTS 1.1:

Annual work plans provide progress reports to the public and management conference on successes and achievements by action plan objective annually.

RESULTS 1.2:

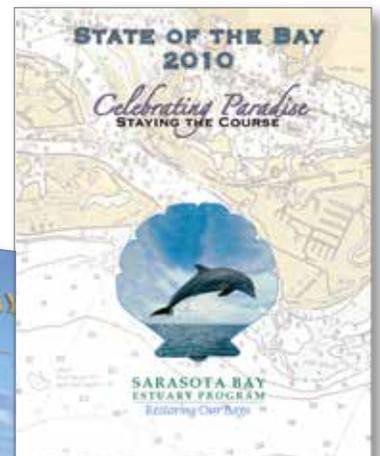
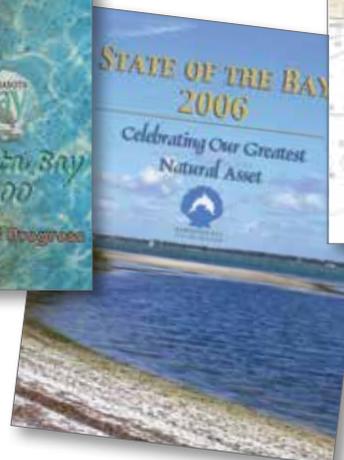
The SBEP reports on the “State of the Bay” and “Comprehensive Conservation and Management Plan (CCMP)” progress every three to five years, respectively.

RESULTS 1.3:

Sarasota Bay should continue to show improvement through monitoring of Action Plan implementation as the CCMP is implemented.

RESULTS 1.4:

Sarasota Bay and its resources continue to show improvement.



Governance to Oversee Implementation

ACTION PLAN UPDATE

During the CCMP development process (1994 to 1995) it was determined that the structure utilized throughout the planning phase was successful, and therefore should be continued during the implementation phases. In July 2004, the Management Conference was solidified per the establishment of the Sarasota Bay Estuary Program Interlocal Agreement (IA).

The IA provides a legal mechanism for the establishment of the SBEP as an independent state agency with annual funding contributions by its partners.

The Sarasota Bay Estuary Program Management Conference consists of four committees:

- Policy Board
- Management Board
- Citizen Advisory Committee
- Technical Advisory Committee.

Following is a discussion of the roles and responsibilities of each of those committees:

Policy Board

The Policy Board establishes the general policies and goals for the SBEP and sets priorities by reviewing and approving annual budgets and work plans, and evaluating progress in meeting the goals set forth by the Management Conference.

Management Board

The Management Board serves as liaison between the Policy Board and the Technical and Citizen Advisory

committees. This committee advises the Policy Board on all matters for which the various committees have direct responsibilities. The Management Board regularly reviews work plans, funding plans, work products, and all other activities of the SBEP and makes recommendations to the Policy Board on necessary actions for specific program needs. The Management Board selects and approves contractors, and approves changes in annual operating budget.

Technical Advisory Committee

The Technical Advisory Committee's (TAC) primary role is to provide technical advice and support to the SBEP. The TAC also reviews and comments on the technical content of completed projects, offers suggestions and advice on implementation policies, reviews monitoring data, and makes recommendations to the Management Board on technical issues.

Citizen Advisory Committee

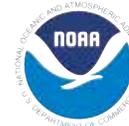
The Citizen's Advisory Committee (CAC) provides a mechanism for structured citizen input to the SBEP, and assists in disseminating information on its programs to the public. The CAC also helps establish SBEP goals and objectives, helps set funding levels, assists with public-participation activities, communicates SBEP activities to user groups, provides public input

on research priorities, reviews technical findings, and helps further develop and implement the CCMP. The CAC works closely with the SBEP staff through the Executive Director and the Public Outreach Manager to assist in developing an effective public education and participation process.

Significant progress has been made over the past two decades in solidifying the SBEP's role in the community. The Interlocal Agreement of 2004 provides for continued funding of base program activities by partnering organizations:

- U.S. Environmental Protection Agency
- Town of Longboat Key
- City of Bradenton
- City of Sarasota
- Manatee County
- Sarasota County
- Southwest Florida Water Management District
- Florida Department of Environmental Protection.

Each entity has contributed substantially to restoration, with the majority of funds for implementation of local origin. Other federal agencies (the U.S. Fish & Wildlife Service, the National Oceanic Atmospheric Agency, and the U.S. Army Corps of Engineers) have also made substantial contributions.



US Army Corps of Engineers

Citizens Participation Chapter

BACKGROUND



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 be a part to realize that vision.

Healthy ecosystems make very significant economic contributions, but often in ways that transcend conventional accounting. The regional value of Sarasota Bay resources has been estimated at \$57.9 billion.

The health of Sarasota Bay and its resources is linked to the economic vitality and quality of life experienced by residents in Sarasota and Manatee counties (valued at \$11.8 billion). The Sarasota Bay Estuary Program is committed to restoring and protecting the ecosystem that is an economic engine of the region. Citizens and visitors can help in this important work by expanding our network of environmental stewards, and joining with others who share the vision to conserve, protect, and preserve Sarasota Bay.

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 SBEP promotes community action by offering volunteer opportunities and grants. Thousands of volunteers have helped with:

- 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 Sarasota Bay.

In January 2011, the SBEP Policy Board added a Public Participation Chapter to the Comprehensive Conservation and Management Plan to encourage citizen involvement.



McIntosh Middle School students on a field trip to Celery Fields Park.



Limpkins.

Citizens Participation Chapter

STEWARDSHIP PLAN

GOAL:

To engage, educate, and encourage environmental stewardship of Sarasota Bay and its resources.

POLICIES:

To increase public awareness of the link between activities in the watershed and their impact on the Bay and its tributaries, in order to promote behavioral change and environmental stewardship.

- Actively encourage citizen involvement in supporting the policies put forth in the CCMP.
- Maintain and improve quality of life for residents in the Sarasota Bay region.
- Educate the public on the impacts of non-point source pollution on the Bay.

OBJECTIVE 1.0:

Encourage Florida-Friendly Landscaping.

ACTION 1.1:

Promote the Florida Yards and Neighborhood Program.

ACTION 1.2:

Promote Climate-Friendly Landscaping guidelines.

ACTION 1.3

Encourage gardens and native plants.

OBJECTIVE 2.0:

Encourage the use of Low Impact Development (LID) principles.

ACTION 2.1:

Promote the use of LID principles in development and redevelopment.

ACTION 2.2:

Promote and educate the community on the benefits of best management practices for roofs.

ACTION 2.3:

Promote smart growth principles for coastal and waterfront communities.

OBJECTIVE 3.0:

Encourage water and energy conservation.

ACTION 3.1:

Encourage use of rainwater collection systems for reuse, including rain barrels and cisterns.

ACTION 3.2:

Educate households and businesses regarding smart water-use choices, including pervious surfaces, outdoor water use, and energy-efficient appliances.

ACTION 3.3:

Participate in, and actively promote, area conferences and public events which highlight water conservation, energy efficiency, and watershed health.

OBJECTIVE 4.0:

Encourage the use of natural capital as an economic stimulus.

ACTION 4.1:

Identify the economic impact that natural capital has on the local community.

ACTION 4.2:

Promote natural capitalism as a strategy for economic development.

ACTION 4.3:

Promote eco-tourism to create local jobs while protecting important environmental values.

OBJECTIVE 5.0:

Encourage citizen engagement in assessing and measuring change as it impacts Sarasota Bay and its tributaries.

ACTION 5.1:

Encourage citizen engagement in environmental monitoring.

ACTION 5.2:

Assess and measure behavioral changes that indicate positive impact on Sarasota Bay and its tributaries.

OBJECTIVE 6.0:

Educate the public about the effects of climate change.

ACTION 6.1:

Complete an estuary-wide vulnerability assessment that will serve as a framework for future land acquisition, research, and monitoring efforts.

ACTION 6.2:

Identify critical areas to be addressed related to adaptation for the Sarasota Bay area.

ACTION 6.3:

Develop local tools to address climate change – such as best management practices for habitat restoration design – that will be resilient and achieve success in the face of a changing climate.

ACTION 6.4:

Encourage communities to mitigate and adapt to the effects of climate change.



BAY STEWARDSHIP

HOW YOU CAN 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 few simple efforts 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.

PROGRESS REPORT

In 2011, the SBEP Policy Board increased funding for the Citizen Participation Chapter:

- Marketing and Communications
- Community Involvement
- Education
- Sea Level Rise - Climate Ready Estuaries
- Publications
- Economic Valuation
- Restore Act

The following pages describe activities to fully implement the Citizen Action Plan Chapter.



MARKETING & COMMUNICATION

SBEP Website

The SBEP website (www.sarasotabay.org) is an interactive and comprehensive clearinghouse of information about SBEP projects, programs, and partners. The site includes in-depth sections addressing habitat restoration, the water connection, educational outreach, ecotourism, research, and the many ways the community can get involved in protecting and restoring Sarasota Bay. Hot links have been made to the Water Atlas website (www.sarasota.wateratlas.usf.edu) to allow citizens to more easily retrieve data and information on the Bay.

'Bay Reflections'

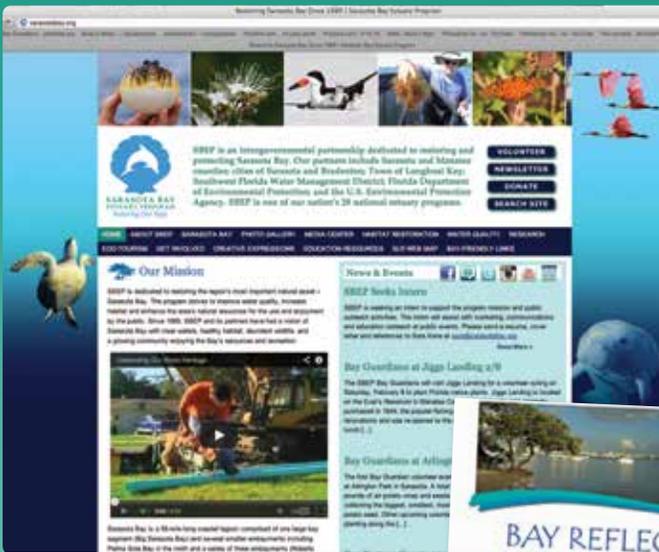
The "Bay Reflections" newsletter went paperless in 2007. This public-friendly report is produced quarterly to keep the SBEP's partners and supporters up-to-date on SBEP projects, programs, and Bay science. Sign up for Bay Reflections today at www.sarasotabay.org.

Events

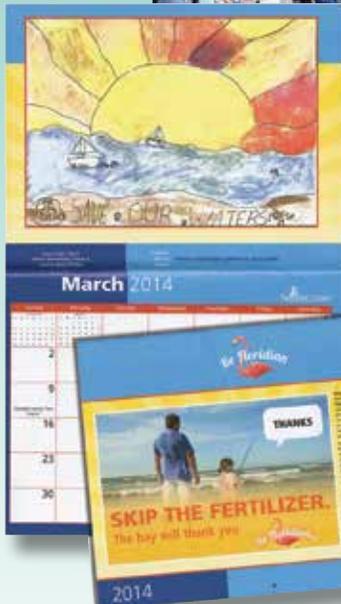
The Sarasota Bay Estuary Program hosts public events to provide fun, educational forums about Sarasota Bay. The interaction and information provided at such events raise public awareness and promote stewardship by creating environmental advocates within the community. Jointly with other government agencies and non-profit organizations, the SBEP participates in the Sarasota Bay Water Festival, Earth Day activities, native plant sales, and other community events.

Be Floridian

The "Be Floridian" campaign, developed by the Tampa Bay Estuary Program, is designed to educate citizens on fertilizer management practices plus fertilizer rules and regulations. The SBEP watershed has a prohibition on summer application of nitrogen and phosphorus (June 1- September 30).



Sarasota Bay Water Festival.



Be Floridian



Sarasota County elementary school students participate in illustrating easy landscaping techniques to keep our waterways beautiful. Chosen artwork is displayed in the 2014 "Be Floridian" calendar.

COMMUNITY INVOLVEMENT

Engaging the community through education is another critical component to the success of the National Estuary Program. The SBEP has stepped up its efforts to forge partnerships that expand the reach and scope of its educational programs. Diverse offerings for all ages promote the benefits of Bay stewardship and encourage citizens to spread the word in their local communities. These programs are having a positive impact on water quality and available habitats.

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 comprised of 28 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, while striving to influence public policies that affect the Bay and its resources.



Around the Bend Nature Tours

Students discover all sorts of living things in the grass flats of Sarasota Bay on a PIER field trip with Around the Bend Nature Tours.



SBEP

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 its tributaries.

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

- Stormwater pollution components such as fertilizer, pesticides, toxicity, litter, and pet waste
- Development practices such as smart growth, Low Impact Development, and wastewater and stormwater reuse
- Habitat issues such as tributary quality, overall habitat loss, dams and weirs, top predators, fisheries productivity, and harmful algae blooms
- Public involvement including outreach programs, education, recreational use of the Bay, and citizens' landscaping behaviors
- 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 has promulgated a Low Impact Development Manual, and Manatee County is developing a similar manual
- The region is considering options for stormwater reuse
- Tributaries and habitat quality have become the focus of SBEP activity as a part of watershed planning.

2012 Recipients of Bay Partners Grants:

- Anna Maria Elementary School
- Ballard Global Studies Magnet School
- New College of Florida
- Plymouth Harbor on Sarasota Bay
- Save Our Seabirds
- Keep Manatee Beautiful
- Mote Marine Laboratory
- Nature's Academy
- Sarasota Audubon Society

The Sarasota Bay Estuary Program provides opportunities for local residents to be part of the important effort to help restore and protect Sarasota Bay.

Bay Partners Grants Program

The SBEP provides full and partial grants every year to support projects that focus on Bay restoration, Bay-friendly landscaping, and Bay education, to encourage local groups throughout the watershed that are doing projects to support Sarasota Bay.

Types of projects eligible for funding:

- Create a wildlife garden
- Remove invasive species and replace 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 and/or bioswale
- Retrofit a Bay-Friendly Landscape
- Educate neighbors about pet waste; distribute biodegradable doggie bags.

Bay Guardians

The award-winning Sarasota Bay Guardians, the largest and most active volunteer program in the region, is managed in partnership with Around the Bend Nature Tours. The Bay Guardians program was established to engage residents of all ages in the ongoing efforts to restore and protect Sarasota Bay. It also provides participants with an opportunity to learn and make new connections with other individuals who care about Sarasota Bay habitat and wildlife.

The program involves at least six Saturday morning volunteer outings each year throughout Sarasota and Manatee counties. The SBEP also partners with local schools and groups to provide volunteer support for planting native vegetation, removing debris, and removing exotic species of plants. SBEP Bay Guardians have donated thousands of hours to support the SBEP mission. Some volunteers from prior decades are now bringing their own children to SBEP volunteer events.

For more information about getting involved with the Bay Guardians visit the SBEP website: www.sarasota.org.

Public Outreach & Environmental Education

EDUCATION

Protection, Involvement, Education, & Restoration (PIER)

The PIER field trips provide hands-on activities such as water sampling, water quality testing, conservation games, and improving plant and animal identification skills. Field trip activities directly correlate to in-class curriculum lesson plans and activities. The field trips give students the chance to experience the beauty of Sarasota Bay while learning more about local habitat, aquatic life, birds, and other wildlife.

The PIER Program is offered to public and private schools and home schoolers throughout Sarasota and Manatee counties. Nearly 45,000 students have participated since 2003.

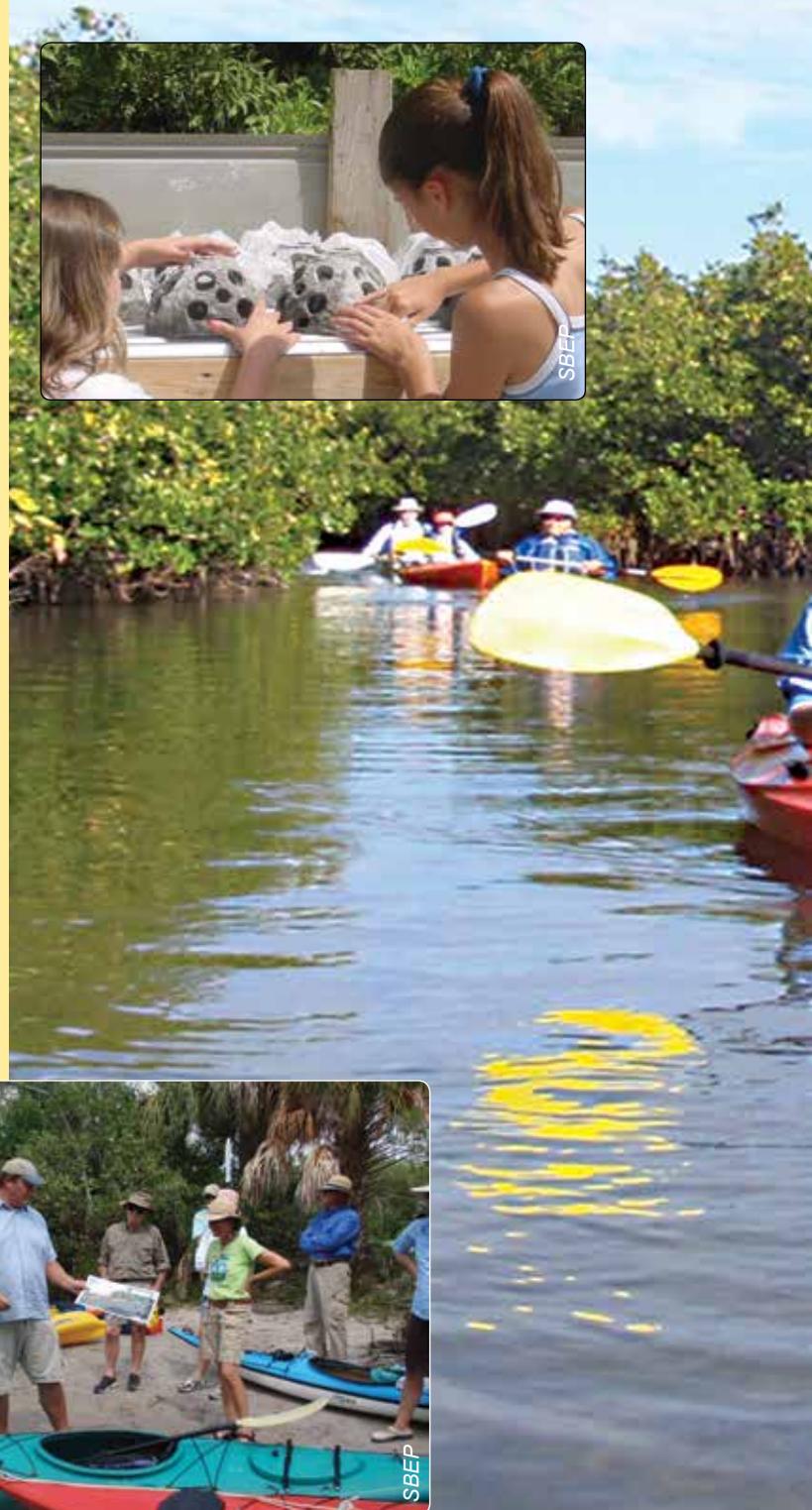
The purpose of the PIER program is to:

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

Bay Wise Kayak Tour Program

Consumers can join the SBEP for educational kayak tours throughout Sarasota Bay, to discover the plants, animals, habitats, and other features that make Sarasota Bay an Estuary of National Significance.

The trips are free, although participants need to preregister to bring their own kayak and gear; many outfitters throughout Sarasota and Manatee counties rent kayaks. Each trip lasts between two and three hours, and space is limited to 15 individuals per outing.





Teacher-Training Workshops

SBEP recognizes the important role teachers play in expanding awareness about ecology and environmental issues. The tech kits noted below can support curriculum development and student projects. New College of Florida conducts teacher-training workshops targeted at educators from kindergarden through 12th grade.

Tech Kits

The SBEP, Around the Bend Nature Tours, and Sarasota County Parks and Recreation collaborated to produce unique Tech Kits for high school and middle school teachers. Each kit is a suitcase containing activities and related materials focused on scrub diversity, estuary exploration, and Low Impact Development.

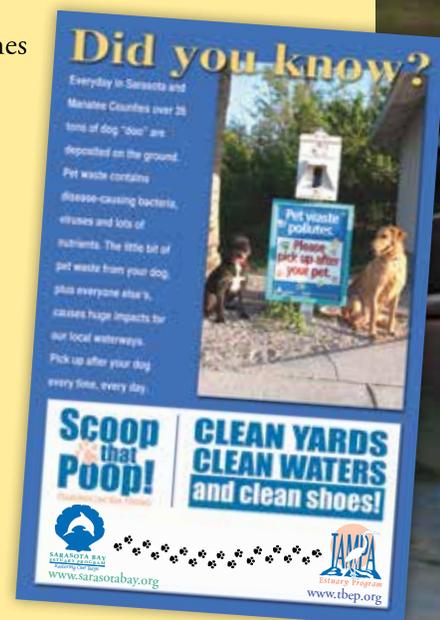
This collaborative effort was funded by a EdExplore NEXT Grant through the Arts & Cultural Alliance of Sarasota County from The Patterson Foundation.

Educators can discover how to get in-class assistance funding for Tech Kits on the Sarasota County Schools EdExplore SRQ website: <http://edexploresrq.com>

Pooches for the Planet

Pet waste is a significant source of nutrients and fecal coliform bacteria entering Sarasota Bay. Pet waste does not stay on the grass, but gets washed down storm drains and delivered untreated to the closest waterway during rain events.

To address pet-waste pollution, the SBEP has teamed up with its sister organization, the Tampa Bay Estuary Program, to bring the successful Pooches for the Planet pet-waste pollution education program to the Sarasota Bay watershed.



SEA LEVEL RISE

Climate Ready Estuaries



The Sarasota Bay Estuary Program is working with its sister National Estuary Programs to promote local residents' participation in an annual King Tide photo competition.

'Sea Level Rise – Tips for Adaptation Planning'

"Sea Level Rise – Tips for Adaptation Planning" provides information to local community leaders, planners, resource managers, and concerned individuals about basic considerations and tools to adapt to climate-related sea level rise.

The focus is on adaptation for the impacts of sea level rise, so critical human systems (such as communities, economies, and culture) and natural systems (including wetlands, coastal ecosystems, and fisheries) can continue to function effectively and be resilient in the face of climate change.

'Sea Level Rise Visualization Tool'

The SBEP and its partners developed a state-of-the-art Light Detection and Ranging (LiDAR) visualization tool to project the long-term impacts of sea level rise in the region. The visualization tool is available on the SBEP website: www.sarasotabay.org.

The visualization tool is also useful in gauging vulnerability to storm surge.

'Landscaping to Save Energy'

"Landscaping to Save Energy" 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.



All SBEP publications are available by visiting: www.sarasotabay.org click on "Media Center."



Public Outreach & Environmental Education

RECENT PUBLICATIONS

The SBEP has produced a series of brochures to educate the public about Bay issues and provide information on recreational opportunities. Many of these brochures are available at local events and on the Sarasota Bay Estuary Program website: www.sarasotabay.org

'Bay Roamer's Guide'

The "Florida's Gulf Coast • Bay Roamer's Guide" offers specific sections relevant to their areas of exploration. The field guides highlight diverse habitats and wildlife throughout the Southwest Florida region.

'Bay Repair Kit'

Each of us can play a major role in preserving and protecting our environment through our choices and actions every day. "The Bay Repair Kit" promotes practical guidelines for improving the quality of all our waterways.

'Living on the Water's Edge'

Freshwater and saltwater versions of the "Living on the Water's Edge" brochure feature landscape design suggestions and a native plant palette 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.

'Rain Gardens & Bioswales'

This brochure offers a personal opportunity to be a part of the solution to replenish underground water supplies and treat stormwater before it leaves your property. Creating and maintaining a rain garden and/or bioswale is a simple, attractive way you can help.

'Gulf Coast Heritage Trail'

The SBEP was at the forefront of recognizing the economic value of linking and promoting Sarasota Bay's cultural, historical, and environmental heritages. The Gulf Coast Heritage Trail (GCHT) 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 the fabric of our history.



SARASOTA BAY ECONOMIC VALUATION

In 2011, the SBEP Citizens Advisory Committee recommended development of an economic valuation study of the Bay. In response, the SBEP conducted the evaluation in partnership with Eckerd College. The regional economic value of Sarasota Bay has been estimated at \$57.9 billion; the local value to Manatee and Sarasota county households has been estimated at \$11.8 billion.

The overall assessment provides economic values for environmental resources of Sarasota Bay and its adjacent barrier islands. The analysis comprised:

- A benefit-transfer application to evaluate direct and indirect use values associated with coastal recreation
- A property price model application to evaluate direct-and indirect-use values associated with coastal residential real estate
- An economic impact study to evaluate the economic contribution of Sarasota Bay on the local two-county economy
- Estimates of the number of recreation trips for calculating the value of recreation use values
- A discrete choice experiment to evaluate the value of management-relevant environmental resources in the Sarasota Bay Estuary.

This project measured economic values associated with:

- Provisioning goods and services
- Regulating goods and services
- Cultural goods and services
- Supporting goods and services.

Highlights of the study include:

- The Bay provides an estimated 21,468 jobs annually with labor earnings of \$730,900,000
- \$183 million in tax revenue annually
- Based on the total number of properties influenced by proximity to the Bay across the two-county region, the total capitalized value associated with proximity to the Sarasota Bay and its tributaries is \$3.1 billion (95 percent Confidence Interval: \$2.3 billion - \$4.0 billion).
- Sarasota Bay estuarine-related recreation is valued at \$487.4 million per year (95 percent Confidence Interval: \$321.4 million - \$689.9 million)
- The results indicate that the regional value of Sarasota Bay Estuarine resources is \$57.9 billion (95 percent Confidence Interval: \$36.6 billion - \$79.0 billion). The study also estimate the value of Sarasota Bay estuarine resources to households in Manatee and Sarasota Counties as \$11.8 billion (95 percent Confidence Interval: \$7.5 billion - \$16.1 billion)

RESTORE ACT

The Southwest Florida Regional Ecosystem Restoration Plan (Regional Plan) was prepared by the three National Estuary Programs (NEPs) on Florida's Gulf Coast. The Regional Plan was developed to advise the Gulf Coast Ecosystem Restoration Council and the State of Florida regarding restoration needs in Southwest Florida as they make Gulf-wide decisions under the 2012 RESTORE Act.

The Regional Plan is based on "Gulf of Mexico Regional Ecosystem Restoration Strategy" and "The Path Forward to Restoring the Gulf Coast." The Path Forward describes how the Council will develop a Comprehensive Plan for Gulf Coast Restoration. The Regional Plan implements the Restoration Strategy precisely as envisioned.

Florida Gulf Coast NEPs used their broad community-based partnerships with citizens, scientists, resource managers, businesses, industries, and elected officials to formulate the Regional Plan. Fifty-three organizations submitted 280 restoration and related projects, totaling \$3 billion. Projects were organized according to Restoration Strategy goals and major actions, and were ranked according to RESTORE Act-prescribed criteria, quality of the applications, and a small adjustment for the submitting organizations' top two projects to provide for geographic distribution. The ranking resulted in a three-year priority plan, a ten-year plan, and a list of projects recommended for other funding sources.

The Florida Gulf Coast NEPs are required by Section 320 of the Clean Water Act to adopt Comprehensive Conservation and Management Plans (CCMPs). The CCMP are federally approved, authorized, and required by Congress. The Regional Plan implements the CCMPs utilizing partnerships as specified in the Clean Water Act.

These funds provide a unique opportunity to enhance the quality of Sarasota Bay; projects in the plan are the Capital Improvement Plan for the Bay.

The five overarching goals for Gulf Coast restoration are:

- Restore and conserve habitat
- Restore water quality
- Replenish and protect living Coastal and marine resources
- Enhance community resilience
- Restore and revitalize the Gulf economy.

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2014 PROJECT AREA MAP

Partnership
1989 - 2014

25
YEARS

SARASOTA BAY ESTUARY PROGRAM
Restoring Our Bays



Anna Maria Island, Manatee County.



Sandhill cranes.





Bottlenose dolphin.

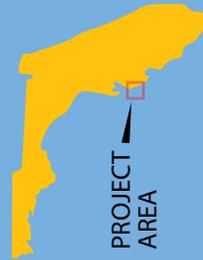
Fotosearch



Causeway Park/Tony Saprito Fishing Pier, Sarasota.

Sandy Hedgepeth

| 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 HERITAGE TRAIL |
| — | AUTO TOUR ROUTE |



PROJECT AREA

Gulf of Mexico



Refer to page 77 to learn more about The Gulf Coast Heritage Trail.



SBEP would like to thank all the photographers who contributed throughout this publication. Cover credits: Inset images - aerial: Sarasota County; sandwich terns: Lou Newman; Bay Guardians: SBEP; artificial reef: Manatee County; crew rowers: Patti Cross; Bayfront: James Sweiderk; sea oats: Sarasota County; manatee: Jimmy White; background image - Sarasota Bay: Patti Cross.

Acknowledgments

“Twenty-Five Years of Regional Partnership”

Policy Board

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Michael Moran, Southwest Florida Water Management District
Honorable Betsy Benac, Manatee County
Honorable Lynn Larson, Town of Longboat Key
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Jack Merriam, Citizens Advisory Committee
Frank Courtney, Florida Fish and Wildlife Conservation Commission
Gary Comp, Technical Advisory Committee
Felicia Burks, U.S. Environmental Protection Agency Project Manager

SBEP Technical Advisory Committee

The Technical Advisory Committee (TAC) 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

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 develops action plans to communicate SBEP activities and strives to influence public policies that affect the Bay and its resources.

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SARASOTA BAY
ESTUARY PROGRAM
www.sarasotabay.org