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.
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.”
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
Fertilizer ordinances have been adopted and implemented by Sarasota (2007) and Manatee (2012) 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.

### 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.
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, Bowles 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.

Rain garden.

Water responsibly.
ACTION PLAN

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.
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).

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

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.