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.
**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 backup 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.

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.

**Fruitville Wastewater Treatment Plant, Sarasota County.**

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.**

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.
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.

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.
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 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)

![Map of Southern Water Use Caution Area](Image)

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.

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.
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.
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.
**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.

**Sarasota Central County Water Reclamation Facility.**

**Cistern system.**