The Sanibel River Past, Present and Future

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The Sanibel Slough, known to most island residents as the Sanibel River, is a unique feature—one that is not present on most barrier islands. It is believed that the Slough was formed roughly 1,000-1,500 years ago as ridges formed across the landscape and fed water to the low lying swales creating the island's interior wetland system[1]. Historically, the Sanibel Slough was separated by low beach ridges south of Tarpon Bay, which shaped two separate east and west basins. These two distinct sub-basins coalesced only during times of high water stages. The Slough was never a true river; it was merely a catchment basin for water storage. However, in more recent years human alteration has not only changed the course of the "River", it has transformed the ecosystem and impacted the ecological health of the Slough.

In the 1940's the land around the Sanibel Slough was relatively untouched by development[2]. The interior wetlands surrounding the Slough were an open, grassy and essentially treeless ecosystem aside from a few cabbage palms that could be found on the higher ridges[1]. Cordgrass was the dominant plant in the low-lying areas along with sawgrass, bead grass, water-hyssop and sea purslane while shrubs, such as salt bush, were present at slightly higher elevations[1]. The Slough was an important refuge that provided food and habitat for much of Sanibel's native wildlife. However, as time marched on into the 1950's the Sanibel Slough would never again be the system it once was.

The transformation of the Sanibel Slough began at the peak of Sanibel Island's war on mosquitoes. Maurice Provost, an entomologist for what is now called the Mosquito Control District, studied the biology of the salt marsh mosquito on Sanibel Island[3]. At the time of his research Sanibel Island was known as "the world's greatest pest hell-hole"[3]. Provost and his research team captured 365,696 mosquitoes in one single light trap thus confirming Sanibel's mosquito problem[3]. The mosquito researchers believed the slow runoff of water into the shallow interior wetlands created the ultimate mosquito breeding grounds[3]. Provost's solution: dig the Slough deeper and connect all the parts, so the Mosquito Control District could regulate water levels and allow fish that prey on mosquitoes to have free range of the system[3]. In the mid 1950's the District began digging drainage ditches, and by 1961 the original Tarpon Bay water control structure was completed, which was the final step in connecting the entire Slough system. The result of these actions would forever change the landscape surrounding the Sanibel Slough.

[1] Clark, John. 1976. *The Sanibel Report*. Washington, D.C.: The Conservation Foundation.
[2] Anholt, Betty. 1998. *Sanibel's Story*. Virginia Beach, VA: The Donning Company Publishers.
[3] Patterson, Gordon. 2004. *The Mosquito Wars*. Gainesville, FL: University Press of Florida.

By the 1970's the Sanibel Slough's historical habitat diversity was a thing of the past. Cordgrass and saw grass disappeared from the low-lying swales, and was quickly replaced by buttonwoods, wax myrtle, and sea oxeye daises[1]. In the now deepened slough, cattails, spatterdock, hydrilla, chara and duckweed became common vegetation[1]. The alteration allowed Brazilian pepper to dominant the landscape[4], a plant that is very effective in out-competing native vegetation. These changes were all prompted by the lowering of the water table, which was a result of the Mosquito Control District's actions.

As development efforts on Sanibel escalated, the health of the Slough started to deteriorate. In 1973 development increased 70% from the previous year[4]. The Sanibel Slough experienced unregulated dredging, and vegetation was cleared on both sides to make way for development. The expansion of impervious surfaces, the lack of vegetated banks, as well as the practice of "mosquito ditching" increased the rate of stormwater runoff and reduced percolation of freshwater into the surficial aquifer for storage. In "The Sanibel Report" of 1976, John Clark reported Sanibel's surface water was substandard[1]. He attributed the degraded water quality to poorly functioning package plants, leaky septic tanks, and the excess use of fertilizers and pesticides which added a surplus of nutrients and pollutants to the Slough[1]. The nutrients that entered the Sanibel Slough evoked the proliferation of algae, which in turn led to depleted oxygen levels resulting is fish kills due to the bacterial decomposition of the algae. It became evident that something had to be done to prevent this from becoming a pattern.

Fortunately, a group of environmental stakeholders made it their goal to protect this exceptional natural resource. In 1967, the Sanibel Captiva Conservation Foundation was formed with the core mission of preserving Sanibel's unique interior freshwater system. Among SCCF's first land purchases were the wetlands along the Sanibel Slough, and the Foundation acquired 500 parcels over 40 years. In 1974, the City of Sanibel incorporated and later adopted the Sanibel Plan, a comprehensive landuse plan principally based on protecting the island's natural resources. City codes were established that put development restrictions on the slough corridor. In 1994, modifications were made to the water control structures on Sanibel bringing the water table closer to historic levels. By the early 2000's 90% of the Sanibel Slough was under conservation[4]. The stakeholders continued their efforts to restore the Slough through various projects, such as habitat restoration, and those efforts continue on today. Unfortunately even as those conservation efforts moved forward, declines in water quality and wildlife populations in the Slough have been reported as recently as the late 1990s. Restoration efforts currently underway by the City and its conservation partners are designed to restore the natural hydrology, improve water quality, and enhance wildlife habitat throughout the Slough.

Water quality in the Sanibel River is affected by a number of past and present-day factors. Today, water quality in the Sanibel Slough is considered "impaired" by the Florida Department of Environmental Protection as a result of elevated nutrient concentrations (i.e., nitrogen and phosphorus) and low

[4] Anholt, Betty. 2004. *Sanibel-Captiva Conservation Foundation: A Natural Course*. Sanibel, FL: Sanibel-Captiva Conservation Foundation.

dissolved oxygen. Nitrogen and phosphorus originating from septic tanks, stormwater runoff from lawns, landscapes, golf courses and roadways, and municipal reuse water used for irrigation have contributed to this impairment. There are also a number of natural sources of nutrients that also contribute to the productivity of the Sanibel Slough, including wetland plants and wildlife that inhabit the interior freshwater wetlands of Sanibel.

Since incorporation in 1974, the City of Sanibel has implemented projects and policies aimed at protecting and improving water quality in the Sanibel Slough and the coastal waters surrounding the island. Arguably one of Sanibel's greatest accomplishments to protect on-island water quality was the acquisition of more than two-thirds of the entire island for conservation purposes. This was made possible through a strong partnership between the City, the Sanibel Captiva Conservation Foundation and the J.N. "Ding" Darling Wildlife Refuge. The island partners work in concert to manage conservation lands for wildlife habitat and to monitor the health of the islands unique ecosystems. This includes extensive water quality monitoring within the Sanibel Slough and bayous, and the surrounding coastal waters. The partnership has also been responsible for developing and implementing a number of important water quality restoration projects.

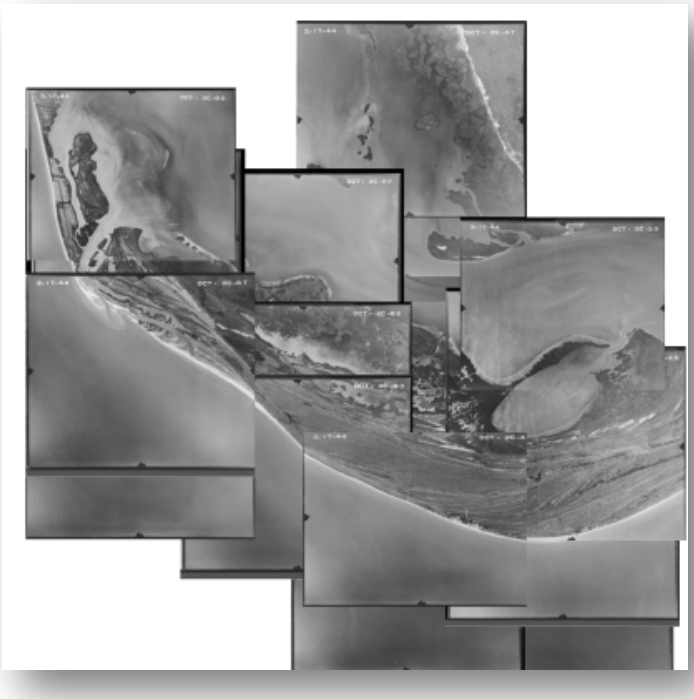
In addition to land acquisition, the City of Sanibel has implemented a number of policies and projects aimed at protecting and improving water quality. These include the protection of environmentally sensitive lands, native plant protection and sod limitations, mangrove preservation, beach and dune protection, responsible development through restrictions on impervious surfaces and requirements for onsite stormwater management, implementation of the National Pollutant and Discharge Eliminations System (NPDES) Program, conversion of the majority of the island from septic to central sewer, elimination of wastewater treatment package plants, island-wide water quality monitoring, adoption of an urban fertilizer ordinance (2007), and Nutrient and Lake Management Recommendations for Golf Courses (2008).

In 2012, the City and the SCCF Marine Laboratory began work on the *Sanibel Comprehensive Nutrient Management Plan.* The goal of the Nutrient Management Plan is to systematically identify nutrient sources throughout the island and develop a list of projects and programs needed to reduce nutrient loading to the Sanibel Slough and coastal waters. The Plan is on schedule to be completed in 2016. Information collected through the Nutrient Management Plan to date has identified specific nutrient sources contributing to the impairments in the Sanibel Slough. The primary nutrient sources identified include fertilizer runoff from residential and commercial landscapes and golf courses, legacy nutrients remaining in the soil from septic systems and wastewater treatment package plants, and municipal reuse water used for irrigation. Based on the scientific information collected, a list of projects and policy recommendations is being developed to target specific nutrient loading hotspots. This approach will ensure that resources invested to address the problem are used in the most cost-effective way to achieve the desired results.

Over the next several years the City will be implementing a number of important projects and programs. One of the projects the City will be introducing in 2016 is the Community Lakes Best Management

Practices (BMPS) Program. This program will assist homeowners living adjacent to wetlands, lakes and other waterbodies implement Best Management Practices (BMPs) aimed at protecting and improving water quality. Another important project that the City is currently working on is the Jordan Marsh Water Quality Treatment Park. This project will collect stormwater runoff from commercial and residential properties along Periwinkle Way and filter it through a series of wetland treatment areas prior to discharge into the Sanibel Slough. It will also have the ability to draw water from the Slough and route it through the treatment wetlands for further treatment. A key feature of this project is a public educational component that will help island residents and other park visitors learn about Best Management Practices that can be implemented in their neighborhoods. The City is also evaluating options for upgrades to the Donax Wastewater Facility that will help reduce nutrients in the reuse water delivered to island golf courses and residential properties. These upgrades are expected to significantly reduce nutrient loading to surface and groundwater resources. In 2016, the City received partial funding in the amount of $825k from the Florida Legislature for these upgrades.

Reducing nutrient loading to the Sanibel Slough and coastal waters will require behavioral changes in the way we manage our lawns, landscapes and wastewater systems and will involve investments in capital projects to eliminate existing nutrient sources. We want to thank the citizens of Sanibel for their commitment to protecting the island's natural resources and for continuing to support these efforts to improve water quality.



Aerial Photos of Sanibel, February 17, 1944.

Sanibel Slough near Casa Ybel Resort circa 1908.

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