

Sanibel Golf Course Nutrient and Lake Management Recommendations Annual Report Card



October 2019



This report was specifically prepared for:

The Sanctuary Golf Club

Introduction

Stormwater runoff from urban landscapes and golf courses is a major source of nutrients contributing to algae blooms and water quality impairments in Florida. Poor water quality not only impacts wildlife habitat and the quality of life for island residents, but it can directly impact our local economy by reducing property values and the overall experience of visitors to our island. As a result, protecting Sanibel's water quality is of paramount concern to the City of Sanibel.

The Florida Department of Environmental Protection (FDEP) is the state agency responsible for protecting Florida's waters. Waters that do not meet the state's water quality standards are deemed "impaired" under the Florida Impaired Waters Rule (Ch. 62-303, F.A.C.). To address these impairments, the FDEP is developing Total Maximum Daily Loads (TMDL) for each waterbody that does not meet minimum water quality standards. The TMDL is the maximum amount of a pollutant that a waterbody can assimilate on a daily basis without causing an imbalance in the natural flora and fauna. As part of the TMDL process, all local governments with impaired waterbodies within their jurisdiction will be required to participate in a Basin Management Action Plan (BMAP) process and will be required to address pollutant sources that are contributing to the impairment. In August 2017, the FDEP established a TMDL for the Sanibel Slough to address nutrient impairment in both the East and West Basins of the Slough system. To meet the target conditions set in the TMDL, a 26% reduction in existing total nitrogen (TN) loads and a 34% reduction in the existing total phosphorus (TP) loads are necessary in the West Basin. In the East Basin, a 54% reduction in existing TN loads and a 74% reduction in existing TP loads are necessary to achieve target conditions.

The City of Sanibel has taken several measures to improve water quality throughout the island. These measures include acquisition of environmentally sensitive lands, mangrove protection, native plant protection and sod limitations, beach and dune protection, conversion from septic to central sewer, responsible development through reductions in impervious surfaces and onsite stormwater management, implementation of the National Pollutant and Discharge Eliminations System Program, island-wide water quality monitoring, adoption of an urban fertilizer ordinance, and nutrient and lake management recommendations

for golf courses. In June 2017, the City launched the Sanibel Communities for Clean Water (SCCW) program, which aims to educate residents in regards to the role they play in protecting water quality, and what actions they can take to improve water quality in their community. While the City has taken a very proactive role in improving water quality, the Sanibel Slough and many residential and golf course lakes on Sanibel remain "impaired" for nutrients such as nitrogen and phosphorus. Managing stormwater runoff from golf courses on Sanibel is critical to ensuring that fertilizer and other chemicals used to maintain turfgrass do not inadvertently impact sensitive areas such as lakes, wetlands, and coastal waters. While we realize that each golf course is unique and was designed and permitted to function in a very specific way, all of the golf courses on Sanibel have the potential to discharge into natural waterbodies, either directly or indirectly. As a result, the City has taken additional measures to ensure that water leaving golf course lakes meet the water quality standards of the receiving waters.

In October 2008, in an effort to improve the quality of water discharged from Sanibel's golf courses, City Council adopted a list of Nutrient Management Recommendations that were based on the Florida Department of Environmental Protection's *Best Management Practices (BMPs) for the Enhancement of Environmental Quality on Florida Golf Courses (2008)*. These recommendations provide specific guidance for golf course managers on how to reduce fertilizer use and improve water quality within their respective golf course lakes. Since their adoption, City staff has worked closely with each golf course to provide technical assistance to help implement these recommendations.

The City Natural Resources staff met with the Sanctuary Golf Club superintendent Kyle Sweet in September 2019 to review the status of implementing the City's Golf Course Nutrient and Lake Management Recommendations. As a result of that meeting, the City has updated the annual "report card" for the Sanctuary.

A report card is provided annually to each golf course to help track progress and guide implementation of the City's recommendations. The report card uses a point system to evaluate performance. Each recommendation or best management practice (BMP) is scored from 0 to 5, based on the completeness of implementation. Out of 13 BMPs, a maximum of 65 points can be earned. The score is calculated as follows: 0–80%, Not in Compliance; 81–90%, Partially in Compliance; and 91–100%, Full Compliance.

The Sanctuary Golf Club earned **60 out of 65 points**, for a score of **92%**. This is a **1.5% improvement since 2011, but a 3% decrease from 2018**. The Sanctuary is in **"Full Compliance"** with the City's BMP recommendations.

BMP Matrix / Staff Recommendation	Score
Education	
Require that each superintendent ensure that all course employees are trained in the <i>Best Management Practices for the Enhancement of Environmental Quality on Florida Golf Courses</i> (FDEP 2007), including water quality related issues and environmentally sensitive areas around the golf course.	5
Lake Management	
Within 5 years of adoption, a minimum of 30% of the littoral zone of each golf course lake must be planted and maintained with submerged or emergent aquatic vegetation on a minimum of 3' centers.	5
Require that golf courses monitor the water quality in their lakes 2x/year (wet season/dry season) and provide the data to the City's Natural Resources Department. Minimum parameters should include dissolved oxygen (DO), total nitrogen (TN), total phosphorus (TP), chlorophyll a (chl-a), and copper (Cu). If nutrient or heavy metal concentrations are excessive, City staff will meet with golf course management staff to review and determine a mitigation plan.	5
Require that all fish kills and algae blooms are reported to the City's Natural Resources Department.	3
Fertilizer Management	
Limit soluble nitrogen applications to ½ lb/1000 ft ²	5
Identify and map environmentally sensitive areas within the golf course and identify no fertilizer buffer zones around all of the waterbodies and map drainage patterns.	5
Require 25-foot native plant or unfertilized grass buffers around environmentally sensitive areas such as lakes and wetlands, where practical. When a 25-foot buffer is impractical, a minimum 10-foot buffer is required.	4
Require that grass buffers around environmentally sensitive areas such as lakes and wetlands be mowed 2" higher than the other grass to slow and filter overland flow to waterbodies.	3
Require that all washdown facilities have runoff properly treated prior to discharge off of the site.	5
Require periodic inspections of fertilizer storage areas and washdown facilities by DNR staff.	5
Require that all golf courses on the island maintain annual fertilizer and copper sulfate logs and make them available to the City's Natural Resources Department.	5
Irrigation and Fertigation	
Require that all reuse water be setback 25-feet from all waterbodies and that all irrigation heads using reuse water or fertigation (application of fertilizer through an irrigation system) be setback 25-feet from a waterbody. When a 25-foot buffer is impractical, a minimum 10-foot buffer is required.	5
Require that golf courses quantify their water use and differentiate between reuse and potable water supplies. This information can be used to account for the nutrients in reuse water when making fertilizer calculations.	5
Total Points (out of a maximum of 65 points):	60

Areas currently meeting the City's recommendations:

1. *Best Management Practices training for golf course staff.* In May 2011, the Sanctuary developed a formal BMP training program for golf course personnel. On September 19, 2018, 18 employees participated in the annual training and have acknowledged that they have been trained and understand the basic principles of the *Best Management Practices for the Enhancement of Environmental Quality on Florida Golf Courses*.
2. *Planting of shoreline vegetation along golf course lakes to facilitate nutrient removal.* Within 5 years of adoption of the City's recommendations, all golf courses are supposed to have a minimum of 30% of the shoreline of each lake vegetated with submerged or emergent aquatic plants. All of the Sanctuary golf course lakes have achieved the minimum 30% standard, with many of the lakes closer to 75%, and a few nearly 100% vegetated.
3. *Water quality monitoring and reporting.* Since October 2008, the Sanctuary golf course has been collecting water quality data on a semi-annual basis and has provided the results to City staff. This data is used by staff to help track water quality in the golf course lakes. In 2015, after recognizing some redundancy in the water quality data, the City recommended that the Sanctuary reduce its sampling to two lakes deemed representative of the other lakes on the course and that have potential to impact adjacent waterbodies, unless future conditions warrant sampling of the other lakes.
4. *Limit soluble nitrogen applications to ½ lb/1,000 ft².* Golf course staff has documented that they currently limit application of soluble nitrogen to ½ lb/1000 ft². This minimizes the potential for runoff of soluble nitrogen into golf course lakes available to algae.
5. *Identify and map environmentally sensitive areas around golf course lakes.* Formal mapping was completed in November 2011. A map showing drainage patterns and all environmentally sensitive areas was provided to City staff on June 14, 2012.
6. *Require 25-foot native plant or unfertilized grass buffers or 10-foot buffers where 25-foot is impractical around environmentally sensitive areas.* At a minimum, 10-foot buffers have been established around most of the environmentally sensitive areas, including lakes and wetland areas.
7. *Proper maintenance of washdown facilities and runoff.* The Sanctuary uses a self-contained, re-circulating system that reuses washdown water. At the time of the staff inspection, all facilities were in good working order and there were no signs of washdown water being discharged from the site.
8. *Allow City staff to conduct periodic inspections of golf course facilities.* The Sanctuary staff has been very cooperative and has provided full access to the golf course and all of its facilities for annual inspections. During the most recent

inspection, all fertilizer and chemicals were properly stored and the maintenance facility and washdown area appeared to be in good working order.

9. *Maintain and make available fertilizer records and copper sulfate logs.* The Sanctuary staff maintains annual fertilizer and lake management records, including copper sulfate logs. This data was made available to City staff. The amount of nitrogen applied to greens and roughs was more in 2019 than the previous year; however, nitrogen applications to tees and fairways were slightly less than 2018. No phosphorus was applied to tees, fairways, or roughs; amounts applied to greens increased slightly from 1.91lbs to 2.1lbs/1000ft²/year. In 2015, the Sanctuary began primarily using a liquid copper algicide (Captain XTR)* rather than traditional copper sulfate; however, over the last three years traditional copper sulfate has been phased back in to their lake management at an increasing rate as the Captain XTR treatments were no longer producing the desired results. In 2018, 25lbs of traditional copper sulfate was applied to all lakes in June, July, and August for a total of 75lbs. Over the past reporting year, applications of copper sulfate have again increased significantly. Copper sulfate applications occurred in September, October, and November of 2018 and February, May, and July of 2019 for a total of 275lbs. In 2019, there were no treatments with liquid copper algicide; all algicide applications were performed with copper sulfate. The Sanctuary should make efforts to reduce their reliance on copper-based algicides to minimize harm to non-target organisms (e.g. zooplankton, juvenile fish). Efforts include the installation or expansion of plant buffers to increase filtration, installation of floating vegetation to compete with algae resources (i.e. light, nutrients), and removal of turf along the waters' edge to limit fertilizer runoff. **Although generally more expensive, dosage rates of liquid copper can be targeted to specific algal types, allowing for selectivity of more desirable but less abundant algae, and potentially reducing the frequency and quantity of repeat algicide applications.*
10. *Require that all irrigation heads using reuse water be set back 25 feet from all waterbodies or 10 feet where 25 feet is impractical.* All irrigation heads at the Sanctuary are set back a minimum of 10-feet from all waterbodies and staff conducts routine audits of the irrigation system to ensure proper operation.
11. *Quantify golf course water use and the source of water used.* The Sanctuary quantifies all water use. Water used to irrigate the course includes reuse water provided by the City and onsite wells permitted by the SFWMD. From September 2018-August 2019, the average nightly irrigation was 375,430 gallons, a decrease of ~1,000 gallons from 2018 and a decrease of ~8,000 gallons from 2017. Rainfall during the same period was 45.29", 15.79" more than 2018.

Areas for improvement:

1. *Ensure that grass buffers around environmentally sensitive areas such as lakes and wetlands be mowed 2" higher than other grass to slow and filter runoff.* Grass in the primary rough is allowed to grow 1.5" higher than grass on greens, fairways and tees (playable areas). Grass outside of these areas is not fertilized and is generally mowed 2.5" higher than the playable turfgrass. However, in 2018 and 2019, City staff noted the addition of new turf along the shorelines of several lakes throughout course, which is being maintained at a low height to the waters' edge. According to the Sanctuary staff, shoreline plantings had been removed from these areas and replaced with sod to improve playability. The Sanctuary continues to maintain turf at a low height along waters' edge. Areas such as this must be mowed a minimum of 2" higher than the grass in the playable areas to increase the likelihood of filtering nutrients from stormwater runoff. If changes are made to the course by adding sod, it is important that the grass buffers around environmentally sensitive areas be maintained at a higher height in order to reduce the potential for excess nutrients entering the lake.
2. *Reporting of fish kills and algae blooms in golf course lakes.* No fish kills or algae blooms were reported in 2019; however, several lakes were experiencing algae blooms at the time of inspection (September 2019). These blooms were not previously reported to City staff. This same observation has been made at the time of every report card inspection since 2014. This lack in reporting continues to be a pattern, and therefore, points have been deducted from this category. Efforts should be made to report **all** blooms to Natural Resources staff so that we may provide technical assistance on how to mitigate future blooms.
3. *Continue to increase native plant or unfertilized grass buffers around environmentally sensitive areas such as lakes and wetlands to achieve a minimum 25-foot buffer, or 10-foot buffer where 25 feet is impractical.* The City encourages continued efforts by the Sanctuary to increase the size of native plant buffers around the course's environmentally sensitive areas. Since 2005, the Sanctuary has removed more than one acre of paved cart paths, replacing impervious pavement with shell path and native planting areas. The Sanctuary continues to experiment with native and "Florida friendly" groundcovers within existing buffer areas. Over the last reporting year, Sanctuary staff installed vegetative shoreline buffers approximately 6-8ft in width consisting of railroad vine, dune sunflower, and golden creeper along lake banks that were sparsely vegetated (mostly mulch), which adds additional stormwater filtration.
4. *Continue to reduce reliance on copper sulfate to treat algae blooms.* Review of the lake treatment reports show that over the last two years traditional copper sulfate has been phased back in to their lake management at an increasing rate. City staff would like to review these applications with the golf course staff and look for opportunities to reduce reliance on these products.

Manual removal of algae and other nuisance aquatic vegetation should be considered as a non-chemical method to control algae and remove nutrients from the system.

5. *Brazilian pepper removal.* Monitor and continue to treat Brazilian pepper regrowth from all areas of the golf course. The presence of Brazilian pepper on the property is a violation of the City's Brazilian Pepper Eradication Program.

Additional Noteworthy Efforts:

- The Sanctuary regularly conducts plant tissue and soil sampling for the greens on the course. Grass clippings are analyzed for 12 nutrients and the data used by golf course personnel to make adjustments to the nutrition program as needed.
- An additional 3,000 sqft of turf was removed from the course, and an additional 400 sqft of cart path was removed and replaced with crushed shell.
- During a recent bloom of clumping algae in Lake 4, Sanctuary staff mechanically removed the algal biomass, which likely resulted in an export of nutrients from the waterbody.