

Memorandum

To: Judie Zimomra, City Manager
From: James Evans, Environmental Biologist
Subject: Golf Course Fertilizer and Lake Management Recommendations Report
Date: 7/14/2011

At the direction of City Council, Vice Mayor Denham and City staff met with representatives from each of the island's golf courses on May 25th to discuss the current status of implementing the Sanibel Golf Course Fertilizer and Lake Management Recommendations. As a result of those meetings, staff has updated the golf course recommendations matrix, the shoreline vegetation maps, and developed an annual "report card" for each of the golf courses to gauge their performance towards implementing the City's Fertilizer and Lake Management Recommendations. The report cards will be provided to management staff at each of the island's golf courses on an annual basis and are intended to provide feedback on their progress and to help guide implementation of the recommendations, with the ultimate goal of improving water quality.

At this time, the Sanctuary Golf Club is in "Full Compliance" with the City's Fertilizer and Lake Management Recommendations, while the Beachview Golf Club and the Dunes Golf Club are "Not in Compliance" (see attached reports for details).

Sanibel Golf Course Fertilizer and Lake Management Recommendations Annual Report Card



July 2011



This report was specifically prepared for:

Beachview Golf and Tennis Club

Introduction

Stormwater runoff from urban landscapes and golf courses are 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. It is anticipated that over the next few years a TMDL will be developed for the Sanibel River and the coastal waters surrounding Sanibel Island.

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. While the City has taken a very proactive role in improving water quality, the Sanibel River 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 ensure that that fertilizer and other chemicals used to maintain turf do not inadvertently impact sensitive areas such as lakes, wetlands, and coastal waters. While we realize that 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. 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 an effort to improve the quality of water discharged from Sanibel's golf courses, in October 2008 City Council adopted a list of Nutrient Management Recommendations that were based on the Florida Department of Environmental Protection's *Best Management Practices 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 to help improve water quality within their respective golf course lakes. Over the past two and half years since their adoption City staff have worked closely with each of the golf courses to provide technical assistance to help implement these recommendations with varying levels of success.

On May 25, 2011, Vice Mayor Denham and City staff met with Ken Noble, Club Manager and Dan Toolen, Superintendent from the Beachview Golf Club to discuss the status of implementing the City's Golf Course Nutrient and Lake Management Recommendations. As a result of that meeting and onsite meetings with your staff, the City has updated the compliance matrix and shoreline vegetation map for the Beachview golf course (see attached documents). In addition to updating these documents, the City has also developed an annual "report card" for each of the island's golf courses to provide feedback on your progress towards implementing the City's recommendations. This report will be provided to you on an annual basis to help track progress and guide implementation of the Nutrient and Lake Management Recommendations.

This Report Card uses a point system to evaluate your performance. For each recommendation or Best Management Practice (BMP) implemented 1-5 points are awarded based on your performance. Out of a total of 13 BMPs a maximum of 65 points can be awarded. The score is calculated as follows: 0 – 80% - Not in Compliance, 81 – 90% - Partially in Compliance, 91 – 100% - Full Compliance.

The Beachview Golf Club received 37 out of a total of 65 points, resulting in a score of 57%. This indicates that the Beachview golf course is "Not in Compliance" with the City's recommendations (see report card below for details).

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.	0
Lake Management	
Within 5 years of Ordinance 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.	3
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.	0
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/1,000ft 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.	0
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.	2
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.	4
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.	2
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):	37

Areas where you are currently meeting the City's recommendations:

1.) The 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. Because aquatic shoreline vegetation is one of the easiest ways to remove nutrients, it is critical that your lakes be vegetated and a maintenance program be implemented to harvest 10-20% of the mature plants annually to help facilitate nutrient removal. At this time, a majority of the Sanibel River is buffered with native wetland vegetation and emergent shoreline vegetation; however, the lakes within the golf course have very little or no emergent or submergent vegetation. Additional efforts should be made to install vegetation along the shoreline of all golf course lakes (minimum of 30%).

2.) Reporting of fish kills and algae blooms in golf course lakes. A majority of the fish kills and algae blooms that have occurred have been reported to City staff; however, during the most recent inspection, algae blooms were present in two of the lakes that were not reported. It is important that all fish kills and algae blooms be reported so that City staff can help diagnose problems with water quality and provide recommendations to golf course staff on how to respond to and help prevent future events.

3.) Limit soluble nitrogen applications to $\frac{1}{2}$ lb/1,000 ft². Golf course staff has indicated that they currently limit application of soluble nitrogen to $\frac{1}{2}$ lb/1,000 ft². This minimizes the potential for runoff of soluble nitrogen into your lakes that would be available to algae.

4.) Require that grass buffers around environmentally sensitive areas such as lakes and wetlands be mowed 2" higher than other grass to slow and filter runoff. Until recently mowing had extended to the edge of the lake banks. Beginning in May 2011, golf course staff began leaving a 10' no-mow zone around several of the course lakes, with grass >4" along some of the lakes.

5.) Proper maintenance of washdown facilities and runoff. The washdown facilities were in good working order and all washdown water is being contained on site.

6.) Allow City staff to conduct periodic inspections of golf course facilities. Beachview's 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, the maintenance facility and washdown area appeared to be in good working order.

7.) Maintain and make available fertilizer records and copper sulfate logs. Beachview staff maintains annual fertilizer and lake management records. This data was made available to City staff.

8.) Quantify golf course water use and the source of water used. Beachview quantifies their water use and all water used to irrigate the course is reuse water provided by the City.

Areas needing improvement:

1.) Best Management Practices training for golf course staff. Beachview does not currently have a formal BMP training program. Proper training of golf course personnel is critical to ensuring that they understand the BMPs, why they are being implemented, and how they should be implemented at your golf course.

2.) Water quality monitoring and reporting. Beachview does not currently monitor water quality in any of their golf course lakes. The only water quality monitoring that occurs near the Beachview Golf Course is monthly monitoring conducted by the City of Sanibel within the Sanibel River near Casa Ybel Road and the Donax WWTP.

3.) The mapping of environmentally sensitive areas around golf course lakes. Formal mapping has not been done. Mapping should be conducted to identify environmentally sensitive areas and where BMPs would have the greatest impact on improving water quality in the golf course lakes and adjacent natural areas.

4.) Require 25-foot native plant or unfertilized grass buffers or 10-foot buffers where 25-foot is impractical around environmentally sensitive areas. Buffers have not been formally established in all areas; however, 25' buffers are maintained along a large portion of the Sanibel River as a condition of Beachview's South Florida Water Management District permit. As of May 2011, golf course staff has also begun leaving a 10' no-mow and no-fertilizer zone around several of the lakes.

5.) Require that all irrigation heads using reuse water be set back 25' from all waterbodies or 10' where 25' is impractical. The current irrigation design includes several heads that are located within 10' of golf course lakes and the Sanibel River. Buffer plantings should be considered to help reduce the potential for malfunctioning heads spraying into sensitive areas.

During our meeting with golf course staff on May 25, 2011 we established a list of interim goals to help improve compliance with the City's Nutrient and Lake Management Recommendations. These interim goals should be achieved between July 2011 and July 2012. For the Beachview golf course the 2011-2012 interim goals include:

1. Implement a formal BMP training program and require that all golf course employees complete the training by July 2012.
2. Install submerged or emergent shoreline vegetation on both sides of the Sanibel River in the area between holes #2 and #11.

3. Discontinue mowing to the water's edge along golf course lakes and create a no-fertilizer zone around all environmentally sensitive areas including lakes and wetlands.

Compliance with Golf Course Nutrient and Lake Management Guidelines

Adopted by Sanibel City Council October 2008 - Updated June 21, 2011

Staff Recommendation	Beachview Golf Course
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.	Staff is aware of BMPs, but no formal training for golf course employees on BMPS.
Lake Management	
Within 5 years of Ordinance 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.	Shoreline along Sanibel River in compliance as condition of their SFWMD permit. Other lakes on course do not meet 30% requirement. Staff indicated that due to economic hardship they have not been able to comply, as they do not have extra money to spend on plantings. Staff will be working with the Sanctuary Golf Course to get plugs and cuttings at no cost. Area along dog leg of the Sanibel River identified for planting in 2011.
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.	No water quality monitoring taking place, other than water quality in the Sanibel River conducted by City. They have no plans to conduct water quality monitoring in golf course lakes due to lack of funding.
Require that all fish kills and algae blooms are reported to the City's Natural Resources Department.	No fish kills or algae blooms reported. During onsite meeting and inspection golf course staff indicated that no fish kills have occurred. Macroalgae bloom present in lake along hole # 7 during inspection, which was recently treated by their lake management company.
Fertilizer Management	
Limit soluble nitrogen applications to ½ lb/1000ft ²	Staff indicated that due to lack of funding they are not applying any soluble nitrogen. Turf along course very brown during most recent inspection. Staff indicated that they have not fertilized the course since October 2010.
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.	Environmentally sensitive areas not formally mapped.
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.	Vegetation buffers exist along mainstem of the Sanibel River as a condition of their SFWMD permit. Buffers have not been fully established on lakes located in the central portion of the course.
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.	No-mow zones are being established and on some lakes have roughs between 2-6" in height; however, some lakes are still being mowed to the water's edge.
Require that all washdown facilities have runoff properly treated prior to discharge off of the site.	Washdown facility in compliance and washdown water treated prior to discharge.
Require periodic inspections of fertilizer storage areas and washdown facilities by DNR staff.	Natural Resources staff provided access to facility for inspections and compliance checks.
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.	Fertilizer logs available. Staff indicated that they do not use copper sulfate to treat lakes for algae blooms.
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.	Several irrigation heads within 25' of waterbodies, including the Sanibel River. Irrigation inspected frequently and fertigation is not used. Reuse water provided by City is used to irrigate golf course. Reuse water holding pond should be lined to prevent infiltration into the Sanibel River.
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.	All water used on golf course is reuse water and records kept.

Legend

- Shoeline Unvegetated
- Shoreline Vegetated



0 250 500 1,000 1,500 2,000 2,500 Feet

Beachview Golf Course

Updated June 21, 2011



Sanibel Golf Course Fertilizer and Lake Management Recommendations Annual Report Card



July 2011



This report was specifically prepared for:

The Dunes Golf and Tennis Club

Introduction

Stormwater runoff from urban landscapes and golf courses are 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. It is anticipated that over the next few years a TMDL will be developed for the Sanibel River and the coastal waters surrounding Sanibel Island.

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. While the City has taken a very proactive role in improving water quality, the Sanibel River 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 ensure that that fertilizer and other chemicals used to maintain turf do not inadvertently impact sensitive areas such as lakes, wetlands, and coastal waters. While we realize that 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. 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 an effort to improve the quality of water discharged from Sanibel's golf courses, in October 2008 City Council adopted a list of Nutrient Management Recommendations that were based on the Florida Department of Environmental Protection's *Best Management Practices 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 to help improve water quality within their respective golf course lakes. Over the past two and half years since their adoption City staff have worked closely with each of the golf courses to provide technical assistance to help implement these recommendations with varying levels of success.

On May 25, 2011, Vice Mayor Denham and City staff met with Sean Balliet, Club Manager and Mitch Miller, Superintendent from the Dunes Golf Club to discuss the status of implementing the City's Golf Course Nutrient and Lake Management Recommendations. As a result of that meeting and onsite meetings with your staff, the City has updated the compliance matrix and shoreline vegetation map for the Dunes golf course (see attached documents). In addition to updating these documents, the City has also developed an annual "report card" for each of the island's golf courses to provide feedback on your progress towards implementing the City's recommendations. This report will be provided to you on an annual basis to help track progress and guide implementation of the Nutrient and Lake Management Recommendations.

This Report Card uses a point system to evaluate your performance. For each recommendation or Best Management Practice (BMP) implemented 1-5 points are awarded based on your performance. Out of a total of 13 BMPs a maximum of 65 points can be awarded. The score is calculated as follows: 0 – 80% - Not in Compliance, 81 – 90% - Partially in Compliance, 91 – 100% - Full Compliance.

The Dunes Golf Club received 41 out of a total of 65 points, resulting in a score of 63%. This indicates that the Dunes is "Not in Compliance" with the City's recommendations (see report card below for details).

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.	0
Lake Management	
Within 5 years of Ordinance 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.	2
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.	4
Fertilizer Management	
Limit soluble nitrogen applications to ½ lb/1,000ft 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.	0
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.	1
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.	1
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):	41

Areas where you are currently meeting the City's recommendations:

1.) Water quality monitoring and reporting. Since October 2008 your 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 your golf course lakes.

2.) Reporting of fish kills and algae blooms in golf course lakes. A majority of the fish kills and algae blooms that have occurred have been reported to City staff; however, there have been occasions where they have not been reported. It is important that all fish kills and algae blooms be reported so that City staff can help diagnose problems with water quality and provide recommendations to golf course staff on how to respond to and help prevent future events.

3.) Limit soluble nitrogen applications to ½ lb/1,000 ft². Golf course staff have indicated that they currently limit application of soluble nitrogen to ½ lb/1,000 ft². This minimizes the potential for runoff of soluble nitrogen into your lakes that would be available to algae.

4.) Proper maintenance of washdown facilities and runoff. Major improvements have been made at your maintenance area and washdown facility over the past 3 years. Prior to adoption of the City's recommendations washdown water used to clean golf course equipment was discharged into a non-conforming retention area with a ditch connecting it directly to the mangrove wetlands to the north of your facility. Following meetings with City staff, a berm was constructed along the mangroves and the retention area was excavated to increase its capacity to hold all washdown runoff.

5.) Allow City staff to conduct periodic inspections of golf course facilities. Dunes staff have been very cooperative and have 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.

6.) Maintain and make available fertilizer records and copper sulfate logs. The Dunes maintains annual fertilizer and lake management records, including copper sulfate logs. This data was made available to City staff.

7.) Quantify golf course water use and the source of water used. The Dunes quantifies their water use and all water used to irrigate the course is reuse water provided by the City.

Areas needing improvement:

1). Best Management Practices training for golf course staff. The Dunes does not currently have a formal BMP training program. Proper training of golf course

personnel is critical to ensuring that they understand the BMPs, why they are being implemented, and how they should be implemented at your golf course.

2.) The 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. Because aquatic shoreline vegetation is one of the easiest ways to remove nutrients, it is critical that your lakes be vegetated and a maintenance program be implemented to harvest 10-20% of the mature plants annually to help facilitate nutrient removal. Over the past two years the Dunes has made some progress towards planting shoreline vegetation. In 2009, 400 linear feet of spike rush was installed along #13 and #14; however, due to lake management practices that were in place, herbicide applications along the lakes resulted in the death of a majority of the plants installed. In spring of 2011, golf course staff directed the lake management company to cease spraying of all aquatic plants within the lakes. In May of 2011, 1,100 aquatic plants were installed along 1,000 linear feet of shoreline adjacent to the #12 green, #13 tee/fairway and near the clubhouse bridge. Significant progress will need to be made over the next 2 years to meet the minimum 30% shoreline vegetation requirement.

3.) The mapping of environmentally sensitive areas around golf course lakes. Formal mapping has not been done. Mapping should be conducted to identify environmentally sensitive areas and where BMPs would have the greatest impact on improving water quality in the golf course lakes and adjacent natural areas. City staff is conducting water quality monitoring at the Dunes weir and within Tarpon Bay and Lady Finger Lakes to determine if runoff or seepage from the Dunes lakes is influencing nutrient concentrations in Tarpon Bay.

4.) Require 25-foot native plant or unfertilized grass buffers or 10-foot buffers where 25-foot is impractical around environmentally sensitive areas. Buffers have not been established; however, Dunes golf course staff has identified areas where buffers can be installed and will not impact playability of the course. Staff has also indicated that they plan to increase buffers in several areas as funds become available.

5.) Require that grass buffers around environmentally sensitive areas such as lakes and wetlands be mowed 2" higher than other grass to slow and filter runoff. Until recently, mowing extended to the edge of the lake banks and lake edges were weed wacked. Beginning in May 2011, golf course staff began leaving a narrow no-mow zone around several of the course lakes.

6.) Require that all irrigation heads using reuse water be set back 25' from all waterbodies or 10' where 25' is impractical. The current irrigation design includes several heads that are located within 10' of waterbodies and sensitive wetland areas. On past inspections, City staff has observed irrigation heads spraying reuse water, which also contained fertilizer (fertigation), directly into course lakes. Dunes staff were made aware of the problem and have since conducted an

extensive audit of the irrigation system and have corrected the problem with the malfunctioning heads; however, major modifications would be needed to move heads a minimum of 10' from all waterbodies.

During our meetings with Dunes staff on May 25, 2011 we established a list of interim goals to help improve compliance with the City's Nutrient and Lake Management Recommendations. These interim goals should be achieved between July 2011 and July 2012. For the Dunes golf course the 2011–2012 interim goals include:

1. Implement a formal BMP training program and require that all golf course employees complete the training by July 2012.
2. Continue planting submerged or emergent shoreline vegetation along the golf course lake adjacent to holes #13 and #14, identified on the map provided by the Dunes golf course staff.
3. Address all malfunctioning irrigation heads that are spraying into lakes and plant vegetation where appropriate to reduce potential for overspray into lakes.

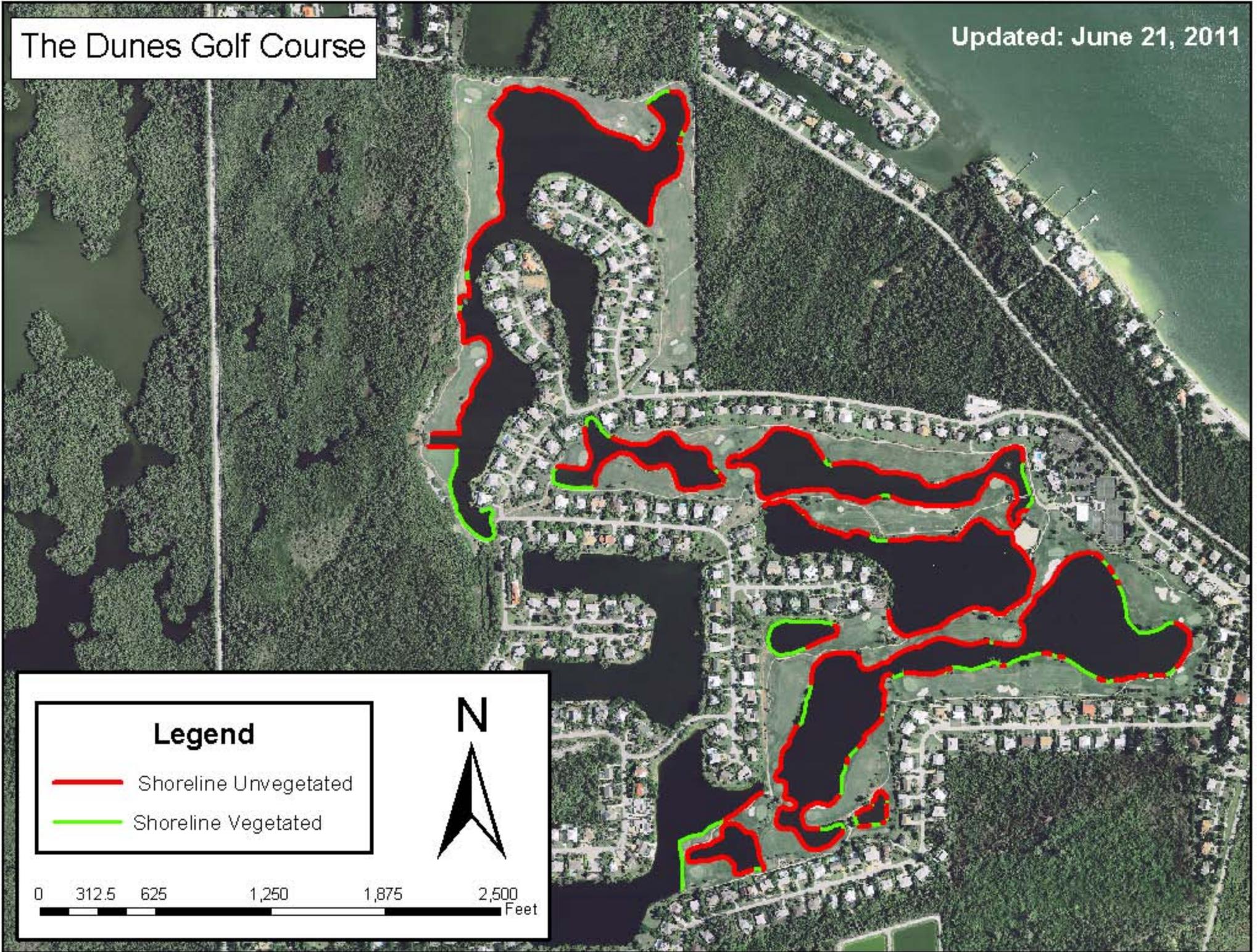
Compliance with Golf Course Nutrient and Lake Management Guidelines

Adopted by Sanibel City Council October 2008 - Updated June 21, 2011

Staff Recommendation	Dunes Golf Course
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.	No formal training for golf course employees on BMPS.
Lake Management	
Within 5 years of Ordinance 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.	Not currently in compliance with staff recommendation. Several thousand linear feet of spike rush and bull rush were planted in 2009, but very few have survived. The lake management company sprayed herbicide on littoral zone plants in the past. Dunes has recently stopped spraying aquatic vegetation in lakes. In May 2011, 1,100 aquatic plants were planted along 1,000 linear feet of shoreline adjacent to #12 green, #13 tee/fairway and by clubhouse bridge. Have plans to install additional plantings. The Dunes HOA is also developing a plan to plant their lakes and address no-fertilizer zones near storm drains.
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.	Data provided twice a year to the City's Natural Resources Department. Dunes staff reviews water quality with Natural Resources Department staff annually.
Require that all fish kills and algae blooms are reported to the City's Natural Resources Department.	All fish kills have been reported. Aerators have been installed in response to fish kills.
Fertilizer Management	
Limit soluble nitrogen applications to 1/2 lb/1000ft ²	Currently limit soluble nitrogen applications to 1/2 lb/1000 ft ² since 2009
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.	Not in compliance. There are very few areas with buffer zones around waterbodies. "No fertilizer zones" have not been established.
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.	Minimum buffer zones of 10' not established. New Golf Course Superintendent currently working on establishing buffers and "no fertilizer zones". Recently stopped mowing to water's edge and no longer weed wacking along banks.
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.	Recently stopped mowing to water's edge. Leaving 1.5" rough along lake edges at some lakes.
Require that all washdown facilities have runoff properly treated prior to discharge off of the site.	In compliance and inspected by the Natural Resources Department Annually.
Require periodic inspections of fertilizer storage areas and washdown facilities by DNR staff.	In compliance and inspected by the Natural Resources Department Annually.
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.	Logs maintained by Lake Management Company Aquagenix. Logs need more detail of application rates.
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.	Irrigation system heads need updated. Heads applying reuse water and/or fertigation occasionally malfunction and may be contributing to poor lake water quality. Need to fix heads and install buffers to redirect water from malfunctioning heads.
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.	All water used is reuse water.

The Dunes Golf Course

Updated: June 21, 2011



Legend

- Shoreline Unvegetated
- Shoreline Vegetated



0 312.5 625 1,250 1,875 2,500 Feet

Sanibel Golf Course Fertilizer and Lake Management Recommendations Annual Report Card



July 2011



This report was specifically prepared for:

The Sanctuary Golf Club

Introduction

Stormwater runoff from urban landscapes and golf courses are 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. It is anticipated that over the next few years a TMDL will be developed for the Sanibel River and the coastal waters surrounding Sanibel Island.

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. While the City has taken a very proactive role in improving water quality, the Sanibel River 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 ensure that that fertilizer and other chemicals used to maintain turf do not inadvertently impact sensitive areas such as lakes, wetlands, and coastal waters. While we realize that 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. 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 an effort to improve the quality of water discharged from Sanibel's golf courses, in October 2008 City Council adopted a list of Nutrient Management Recommendations that were based on the Florida Department of Environmental Protection's *Best Management Practices 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 to help improve water quality within their respective golf course lakes. Over the past two and half years since their adoption City staff have worked closely with each of the golf courses to provide technical assistance to help implement these recommendations with varying levels of success.

On May 25, 2011, Vice Mayor Denham and City staff met with Kyle Sweet, Golf Course Superintendent, from the Sanctuary Golf Club to discuss the status of implementing the City's Golf Course Nutrient and Lake Management Recommendations. As a result of that meeting and onsite meetings with your staff, the City has updated the compliance matrix and shoreline vegetation map for the Sanctuary golf course (see attached documents). In addition to updating these documents, the City has also developed an annual "report card" for each of the island's golf courses to provide feedback on your progress towards implementing the City's recommendations. This report will be provided to you on an annual basis to help track progress and guide implementation of the Nutrient and Lake Management Recommendations.

This Report Card uses a point system to evaluate your performance. For each recommendation or best management practice (BMP) implemented 1-5 points are awarded based on your performance. Out of a total of 13 BMPS a maximum of 65 points can be awarded. The score is calculated as follows: 0 – 80% - Not in Compliance, 81 – 90% - Partially in Compliance, 91 – 100% - Full Compliance.

The Sanctuary Golf Club received 59 out of a total of 65 points, resulting in a score of 91%. This indicates that the Sanctuary is in "Full Compliance" with the City's recommendations (see report card below for details).

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 Ordinance 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.	4
Fertilizer Management	
Limit soluble nitrogen applications to ½ lb/1000ft 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.	2
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.	4
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):	59

Areas where you are 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. As of May 24, 2011, all employees have been through the training and signed off 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.) The 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. At this time, all of the Sanctuary Golf Course lakes have a minimum of 30% of the shoreline vegetated with emergent or submergent aquatic plants.

3.) Water quality monitoring and reporting. Since October 2008 your 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 your golf course lakes.

4.) Reporting of fish kills and algae blooms in golf course lakes. All fish kills and algae blooms have been reported to City staff.

5.) Limit soluble nitrogen applications to $\frac{1}{2}$ lb/1,000 ft². Golf course staff has indicated that they currently limit application of soluble nitrogen to $\frac{1}{2}$ lb/1000 ft². This minimizes the potential for runoff of soluble nitrogen into your lakes that would be available to algae.

6.) Require 25-foot native plant or unfertilized grass buffers or 10-foot buffers where 25-foot is impractical around environmentally sensitive areas. Minimum 10' buffers have been established around most of the environmentally sensitive areas, including lakes and wetland areas.

7.) Require 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 is allowed to grow 1.5" higher than grass on greens, fairways and tees to slow water and nutrient runoff.

8.) Proper maintenance of washdown facilities and runoff. The Sanctuary Golf Club 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.

9.) Allow City staff to conduct periodic inspections of golf course facilities. Sanctuary staff has been very cooperative and have 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.

10.) Maintain and make available fertilizer records and copper sulfate logs. Sanctuary staff maintains annual fertilizer and lake management records, including copper sulfate logs. This data was made available to City staff.

11.) Require that all irrigation heads using reuse water be set back 25' from all waterbodies or 10' where 25' is impractical. The Sanctuary golf course irrigation heads are all set back a minimum of 10' from all waterbodies and according to staff periodic audits of the irrigation system are conducted to ensure proper operation.

12.) Quantify golf course water use and the source of water used. The Sanctuary quantifies their water use and water used to irrigate the course includes reuse water provided by the City and onsite wells permitted by the SFWMD.

Areas needing improvement:

1.) Identify and map environmentally sensitive areas around golf course lakes. Formal mapping has not been done. Staff has indicated that environmentally sensitive areas have been identified as part of the Sanctuary's Audubon Certification, but formal mapping has not been completed. Formal mapping should be conducted to identify environmentally sensitive areas and where BMPs would have the greatest impact on improving water quality in the golf course lakes and adjacent natural areas.

During our meeting with Sanctuary golf course staff on May 25, 2011 we established a list of interim goals to help improve compliance with the City's Nutrient and Lake Management Recommendations. These interim goals should be achieved between July 2011 and July 2012. For the Sanctuary golf course the 2011-2012 interim goals include:

1. Begin harvesting 10 – 20% annually of the established emergent shoreline vegetation in each of the lakes to help facilitate nutrient removal.
2. Complete formal mapping of the environmentally sensitive areas along the golf course.

Compliance with Golf Course Nutrient and Lake Mangement Guidelines
Adopted by Sanibel City Council October 2008 - Updated June 21, 2011

Staff Recommendation	Sanctuary Golf Course
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.	Staff developed formal BMP training program. All employees trained on 5/24/11 and have signed agreement developed by Sanctuary Golf Course Superintendent that they have been trained and understand the BMPs.
Lake Management	
Within 5 years of Ordinance 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.	All lakes meet or exceed the the 30% requirement. During staff inspection lakes look very well maintained and have the greatest coverage of emergent and submerged plants of all of the golf courses surveyed.
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.	Has been accomplished and results have been provided to Natural Resources Department staff biannually.
Require that all fish kills and algae blooms are reported to the City's Natural Resources Department.	All fish kills and algae blooms have been reported
Fertilizer Management	
Limit soluble nitrogen applications to ½ lb/1000ft ²	Currently limiting soluble nitrogen to 1/2 lb/1000 ft2.
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.	No formal mapping has been conducted, but buffer zones have been established where practical.
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.	Buffer zones around lakes and wetland course edges are rough grass and carefully managed.
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.	Grass height of roughs along sensitive areas is currently maintained at 1.5".
Require that all washdown facilities have runoff properly treated prior to discharge off of the site.	Equipment washdown facility is self-contained and inspected by Natural Resources staff annually.
Require periodic inspections of fertilizer storage areas and washdown facilities by DNR staff.	All facilities inspected by Natural Resources staff annually.
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.	Fertilizer and copper sulfate logs are maintained and provided to Natural Resources staff annually in report.
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.	Irrigation design addresses this requirement and periodic inspections are conducted.
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.	All watering of the course with reuse water is recorded and available to Natural Resources Department staff.

The Sanctuary Golf Course

Updated June 21, 2011

Legend

- Shoreline Vegetated
- Shoreline Unvegetated



0 375 750 1,500 2,250 3,000 Feet

