South Venice Water Quality

Summary of Data Collected in Support of the South Venice Civic Association Water Quality Task Force

Sarasota County Water Resources

5/27/2014

Introduction

The South Venice Civic Association's Water Quality Task Force is undertaking an effort to naturalize the canals within its area in order to bring life to the waterways. Since March 2013, the Sarasota County Water Resources section has been collecting water quality samples from the four canals slated for enhancement to quantify existing conditions and to measure improving trends from the proposed work. The sampling locations are shown in Figure 1. Locations were chosen at the head (upstream), middle and tail (downstream) of each of the canals: Siesta Waterway, Briarwood Waterway, Woodmere Creek North and Woodmere Creek South. Due to increased interest in the Venice Gardens lake system by the Venice Gardens Community Association and the Water Quality Task Force and their effect on the Briarwood Waterway, sampling has begun at four (4) sites in the lake system and will include that data in future updates.
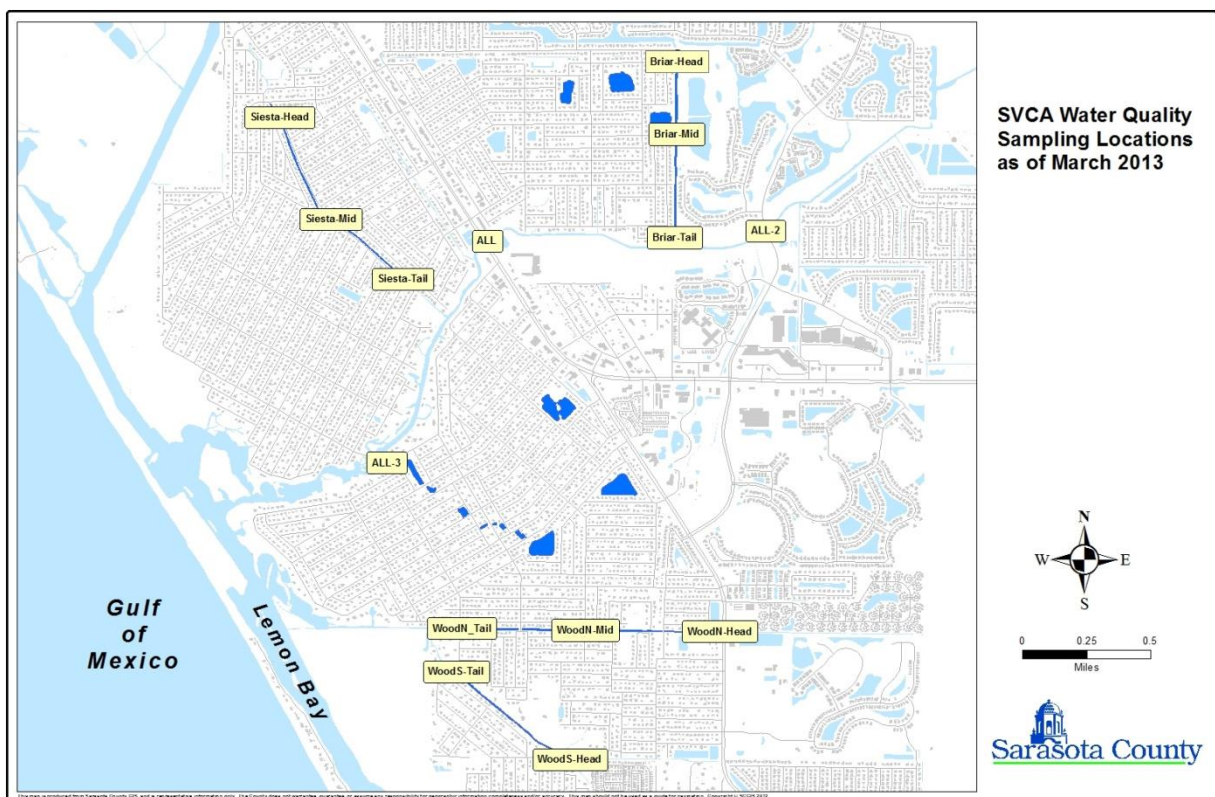

Figure 1- Map of sampling locations relevant to the South Venice initiative

Sampling includes noting the general conditions, collecting *in situ* water quality characteristics and taking water samples for analysis by a certified laboratory. The list of analytical parameters is in Table 1. Parameters with an asterisk (*) have recently had updated criteria promulgated by the state of Florida's Department of Environmental Protection (FDEP) and approved by the US Environmental Protection Agency.

PARAMETERS	
Field	**Laboratory**
Temperature	Ammonia
Specific Conductance	Nitrate + nitrite
Salinity	Total Kjeldahl Nitrogen
pH	Total Nitrogen*
Dissolved Oxygen (DO)	Orthophosphate
DO Percent Saturation*	Total Phosphate*
Depth	Corrected Chlorophyll a*
	Apparent Color
	Biochemical Oxygen Demand
	Turbidity
	Total Suspended Solids
	Fecal Coliform

Table 1 – Analytical Parameters

Criteria are set depending on the class of waterbody they apply to. Florida has 5 classes: Drinking water supplies (Class I), shellfish harvesting areas (Class II), recreational (both marine and fresh) (Class III), agricultural supplies (Class IV) and industrial (Class V). The majority of the waterbodies in Florida, including those around South Venice, are either Class III Marine or Class III Freshwater.

Standards were set for freshwater waterbodies and the estuarine waters (bays) since there was an abundance of data available. The tidal creek portion (between the upstream fresh and downstream saltwater segments) lacked sufficient data for FDEP to create new nitrogen, phosphorus and dissolved oxygen standards and they declined to do so. The chlorophyll standard for tidal creeks is 11 micrograms per liter (ug/l).The criteria for nutrients, chlorophyll a and percent saturation of dissolved oxygen are listed in Table 2. Most sampling locations occur in the tidal creek portion of the watershed. As criteria have not been established for these areas, both the freshwater and estuarine criteria will be displayed for comparison.

Parameter	Peninsular (freshwater)	Estuarine (marine)	Tidal Creek
Total Nitrogen	1.63 mg/l	0.56 mg/l	Not to cause an imbalance in flora or fauna
Total Phosphorus	0.48 mg/l	0.26 mg/l	Not to cause an imbalance in flora or fauna
Chlorophyll a	20 ug/l	0.89 ug/l	11 ug/l
% Dissolved Oxygen (daily average)	38%	42%	Not yet sure which standard applies
	Annual Geometric Mean for Nutrients; Annual Mean for Chlorophyll	Annual Arithmetic Mean for Nutrients and Chlorophyll (Criteria are specific to Lemon Bay)	

Table 2 - Recently approved FDEP criteria for nutrients, chlorophyll and dissolved oxygen

In order to track the how waterbodies are doing, the FDEP divided the watersheds into sub-units called WBIDs, assigned a class to them, and named them after the main waterbody. Figure 2 shows the WBIDs (denoted by numbers) and their class relative to the South Venice area. WBIDS in the South Venice area include 2021, 2030, 2030A, 2039, and 1983A1.
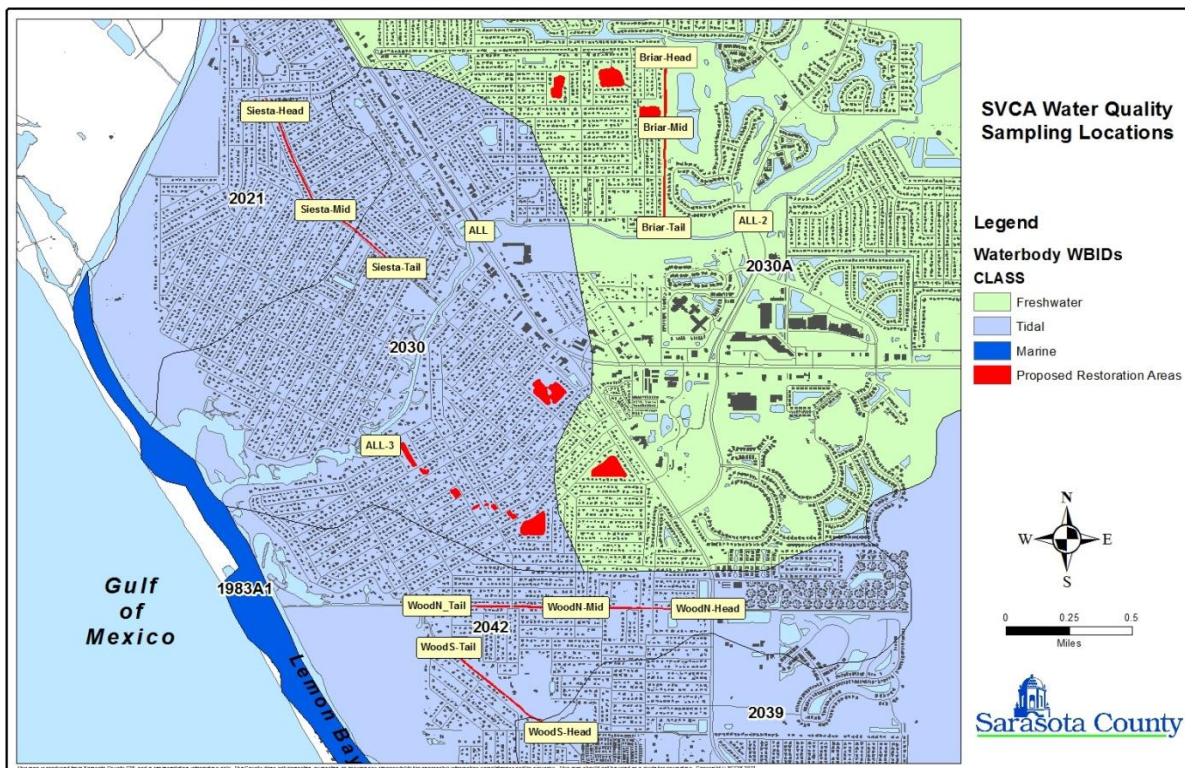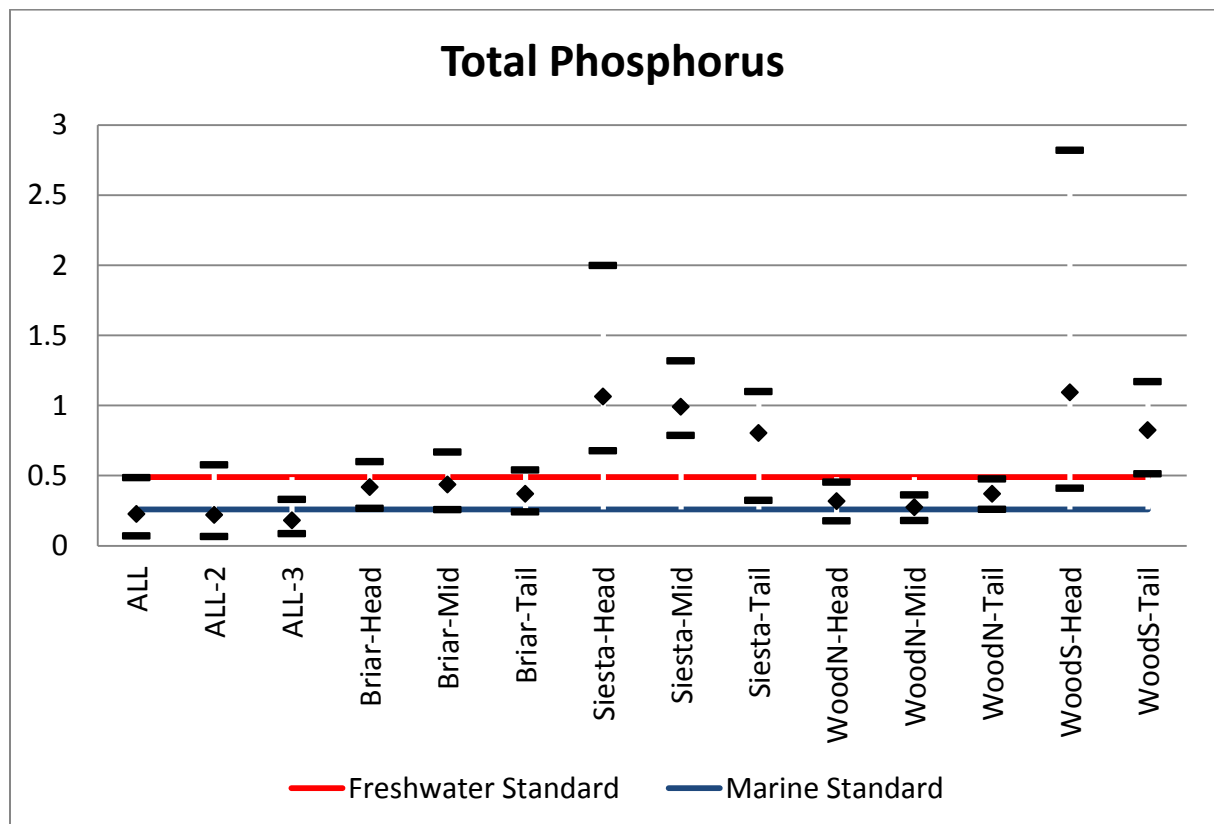

Figure 2 – Map or relevant WBIDs with respect to the South Venice Initiative.

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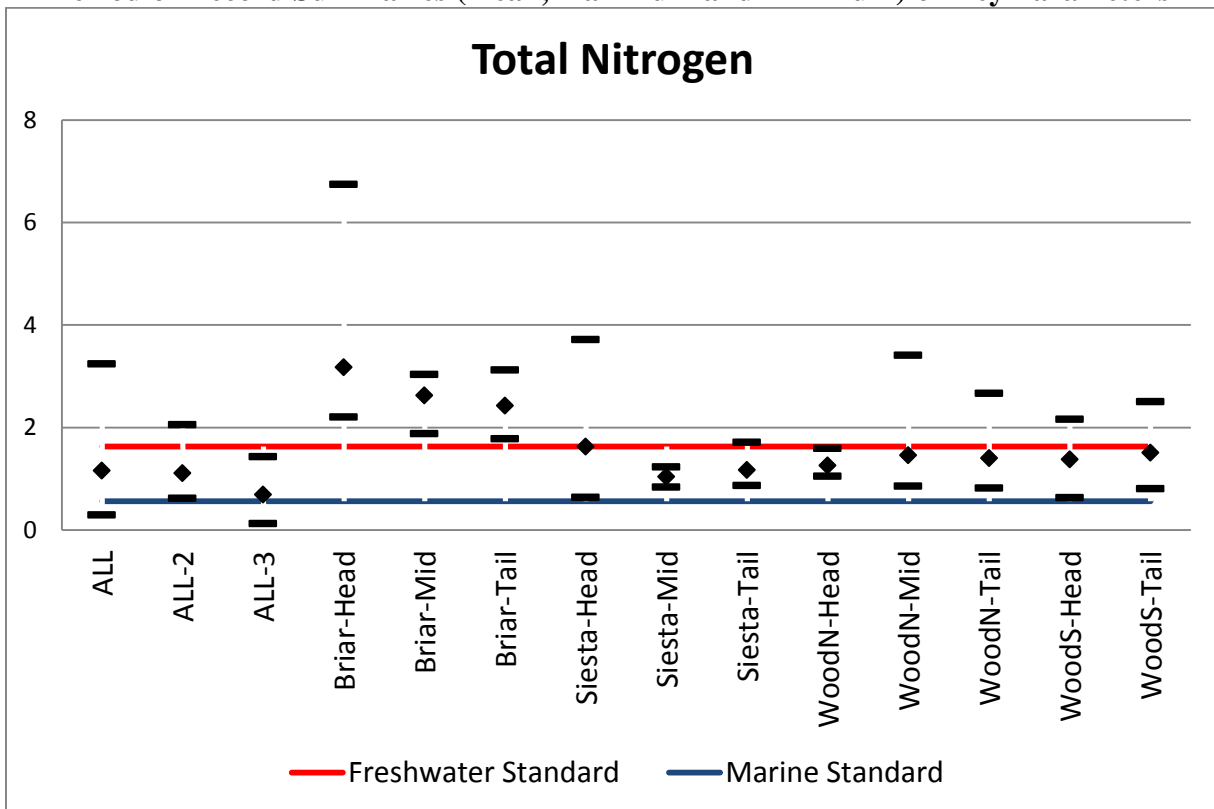| Parameter	Peninsular (freshwater)	Estuarine (marine)	Tidal Creek
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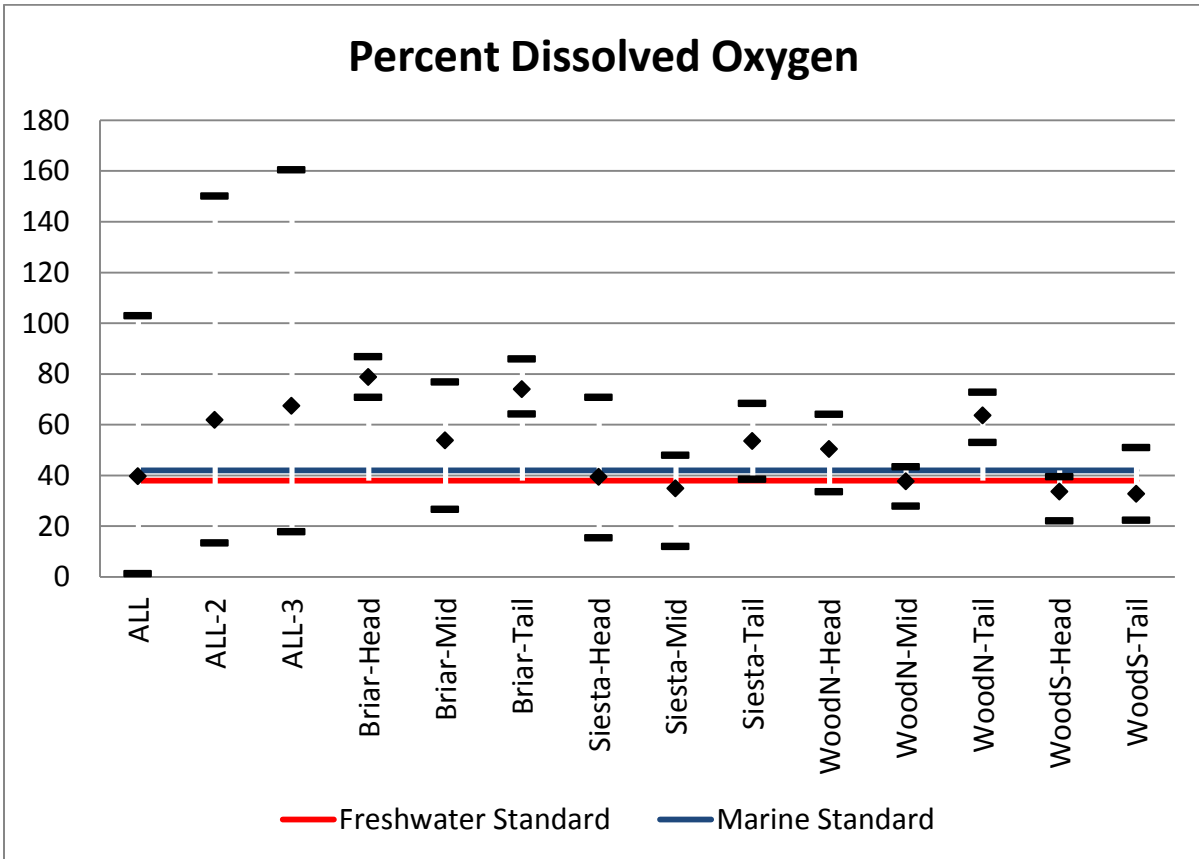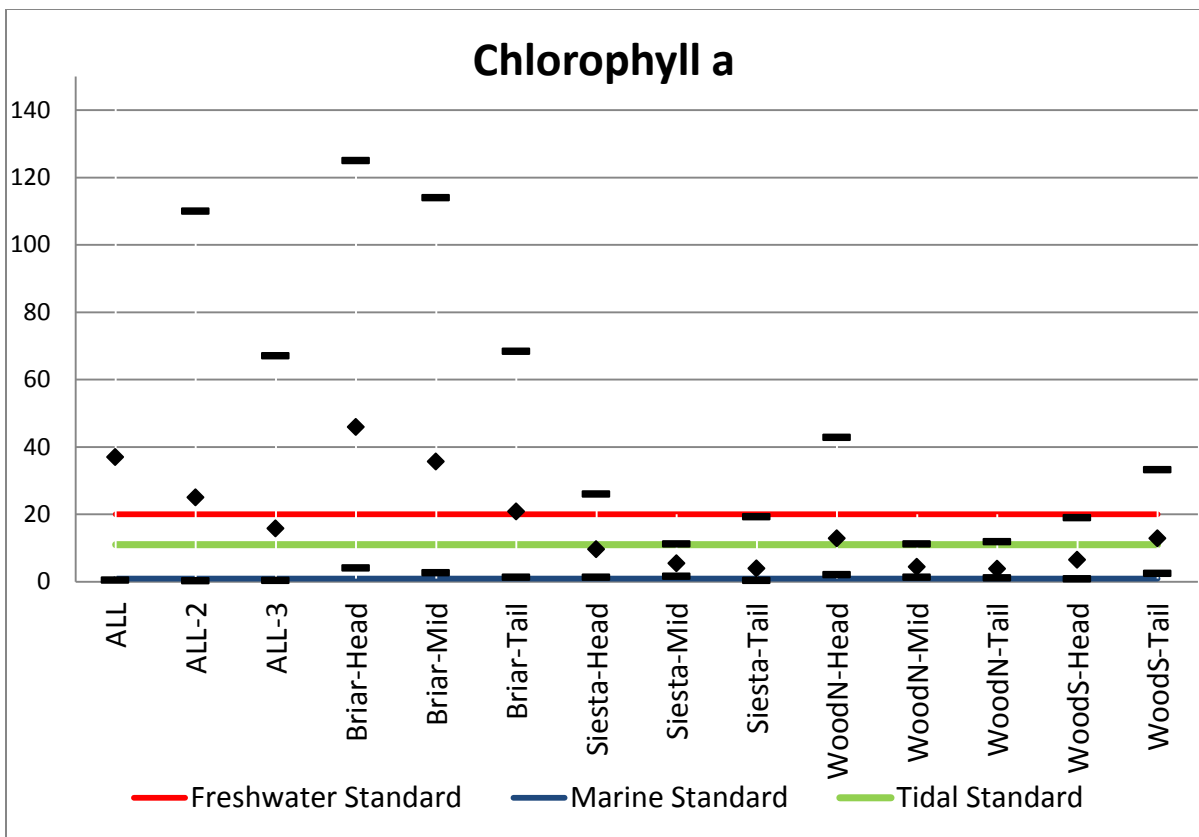**Table 3 - Recently approved FDEP criteria for nutrients, chlorophyll and dissolved oxygen**

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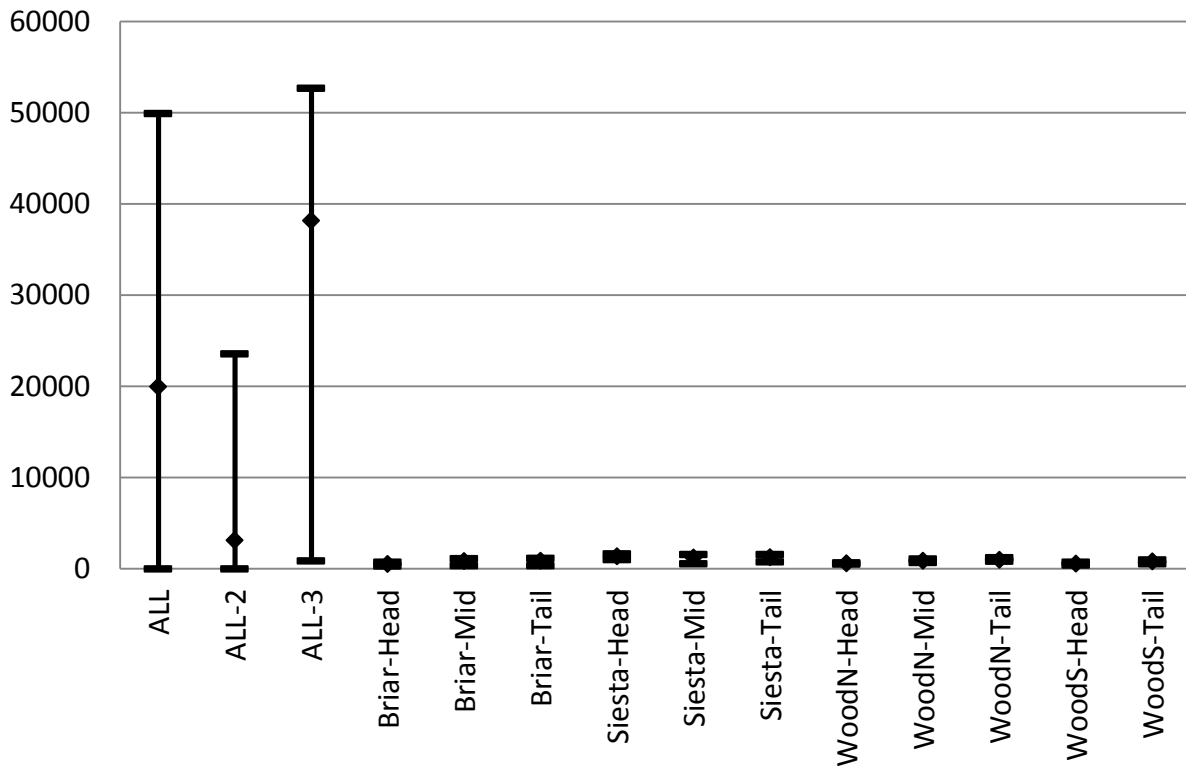
Data Summary

The following series of graphs depict the data gathered since March 2013 through March 2014. Sampling occurs monthly in Alligator Creek (15 samples) and every other month in the other waterways (7 samples). The first series show the mean (average), minimum and maximum for the sampling period to data and provide a comparison between each of the waterways. The second are time-series graphs depicting all the data collected to date for each waterway. For those parameters with applicable criteria, both the freshwater and marine standards are shown.

Total Nitrogen

Total Phosphorus

Chlorophyll a

Freshwater Standard — Marine Standard — Tidal Standard

Percent Dissolved Oxygen

Freshwater Standard — Marine Standard

Specific Conductance

Fecal Coliform

Total Nitrogen

Legend: ALL-2, ALL, ALL-3, Freshwater Standard, Estuarine Standard

Total Nitrogen

Legend: Siesta-Head, Siesta-Mid, Siesta-Tail, Freshwater Standard, Estuarine Standard

Total Nitrogen

Legend: Briar-Head, Briar-Mid, Briar-Tail, Freshwater Standard, Estuarine Standard

Total Phosphorus

Total Phosphorus

Total Phosphorus

Chlorophyll a

Chlorophyll a

Chlorophyll a
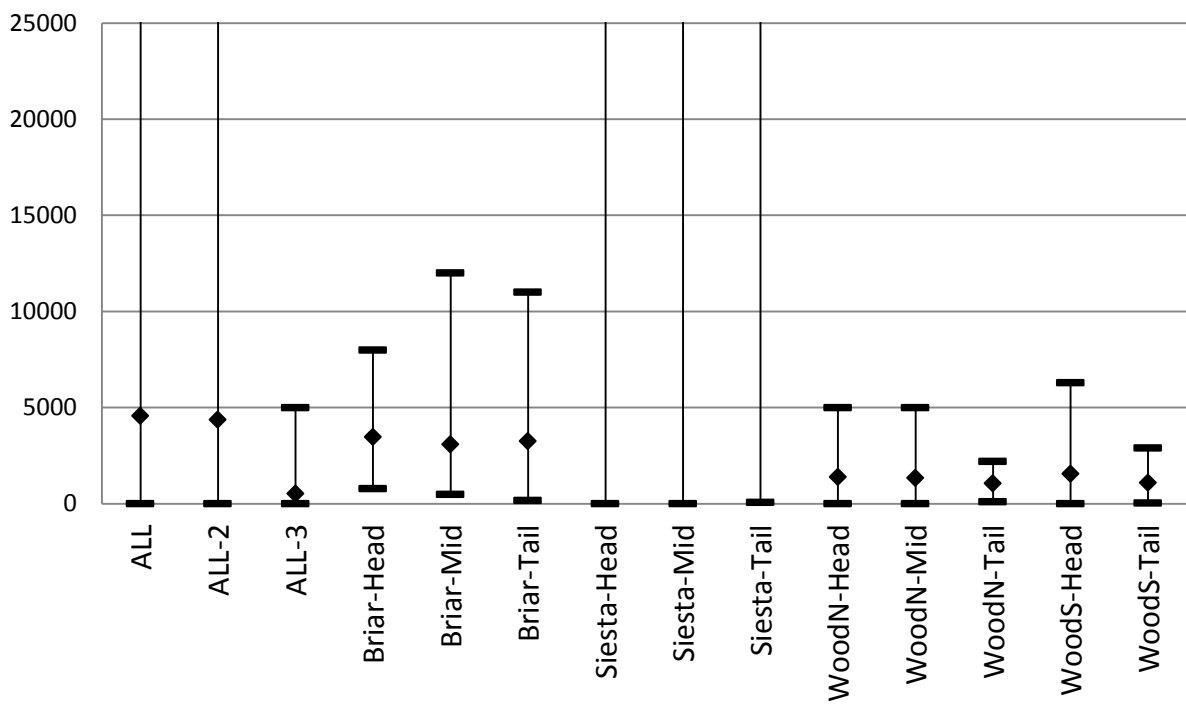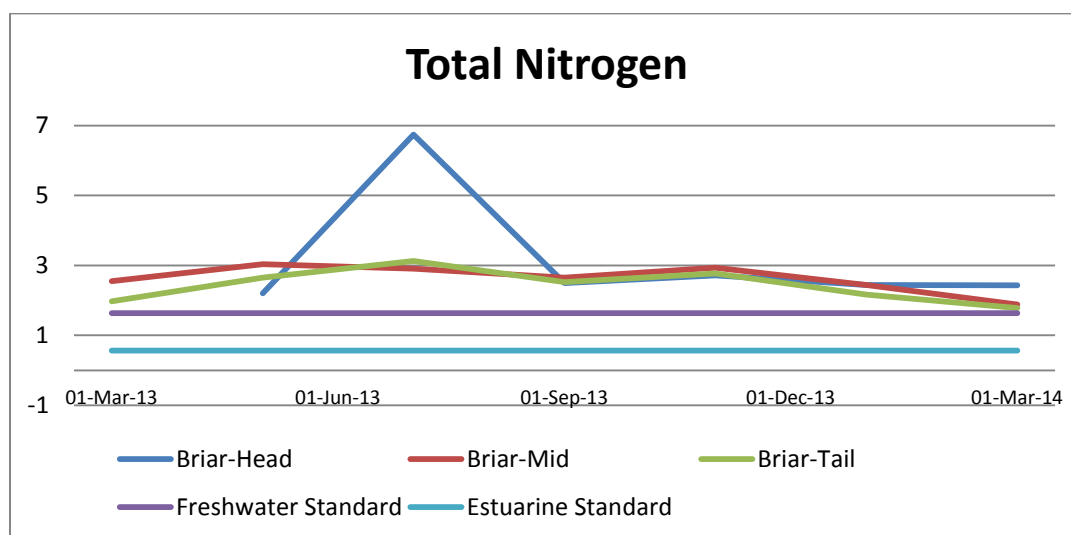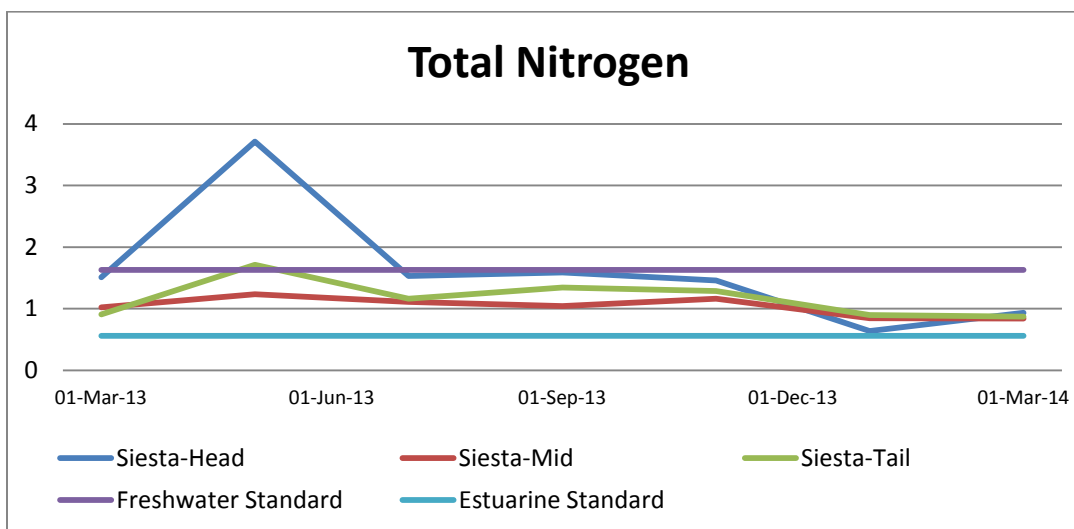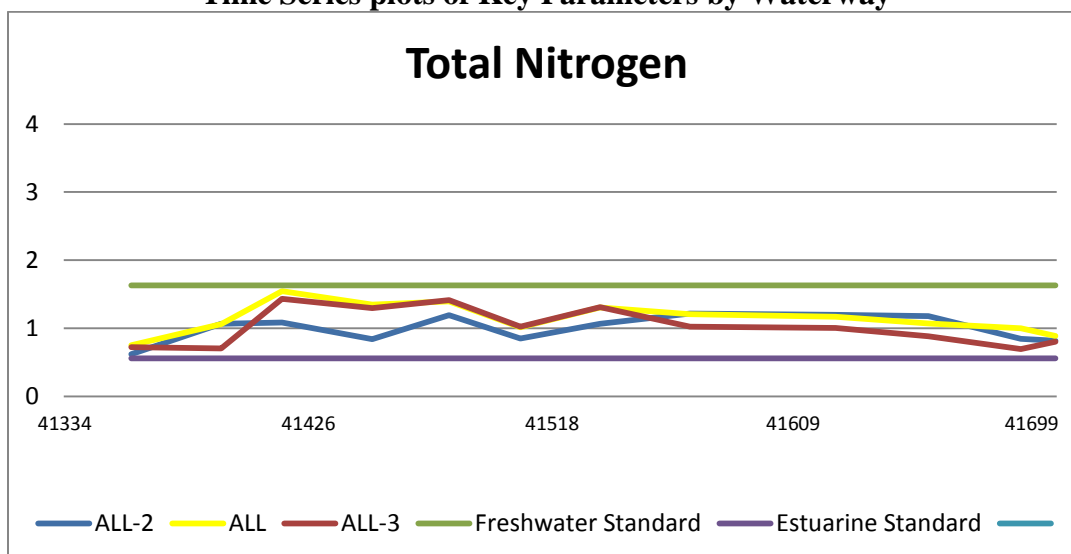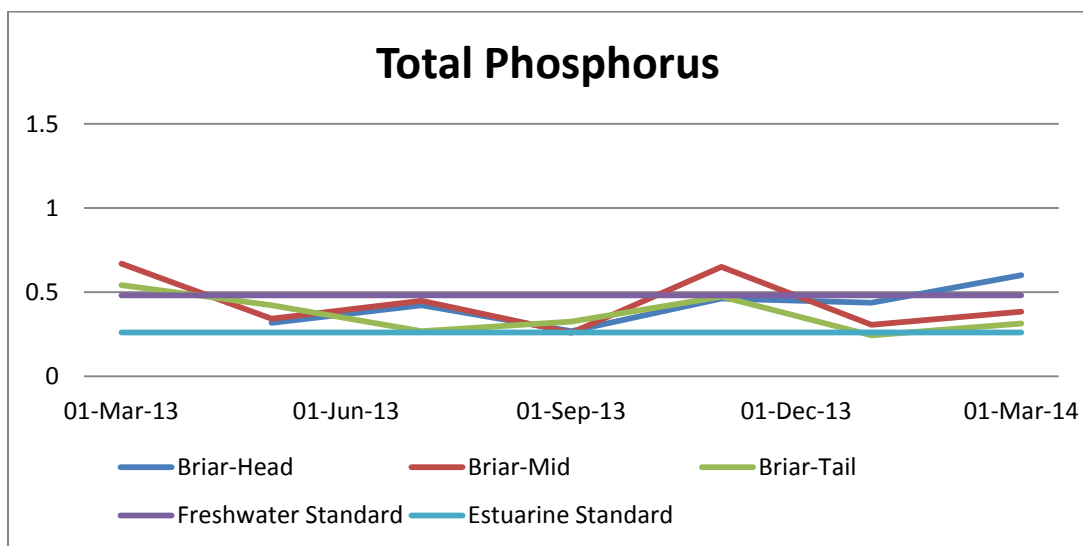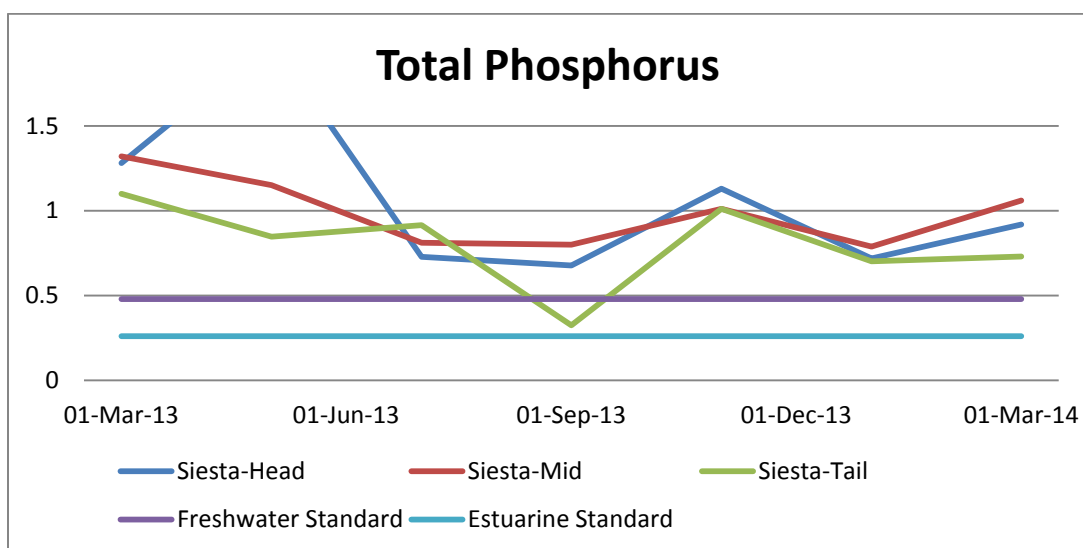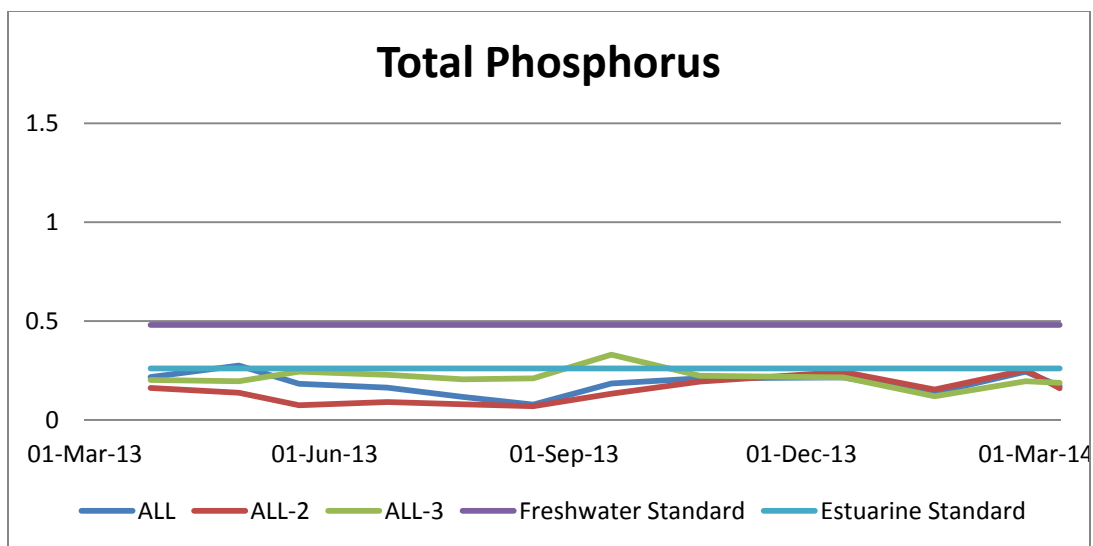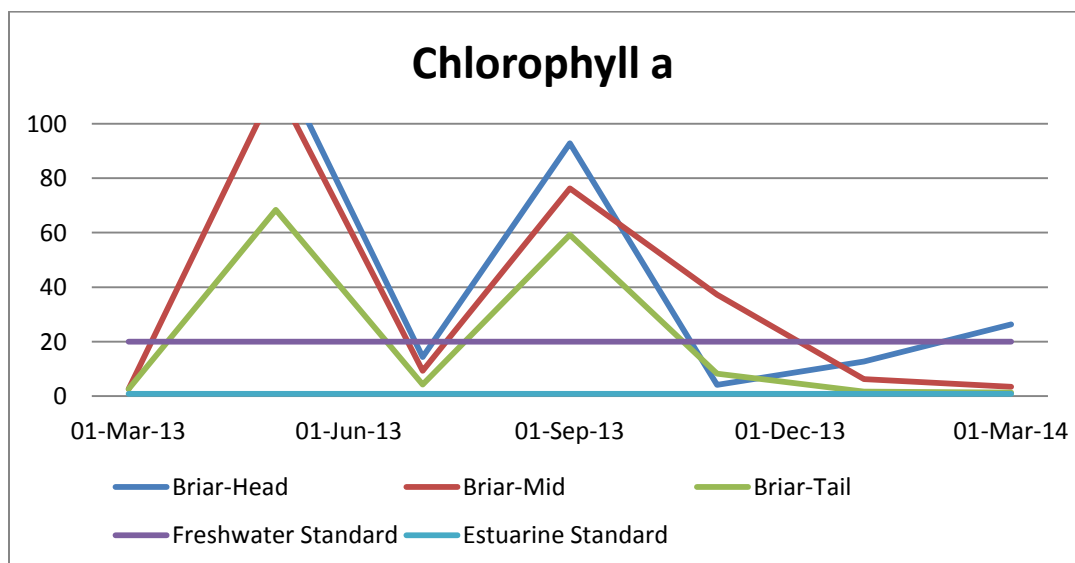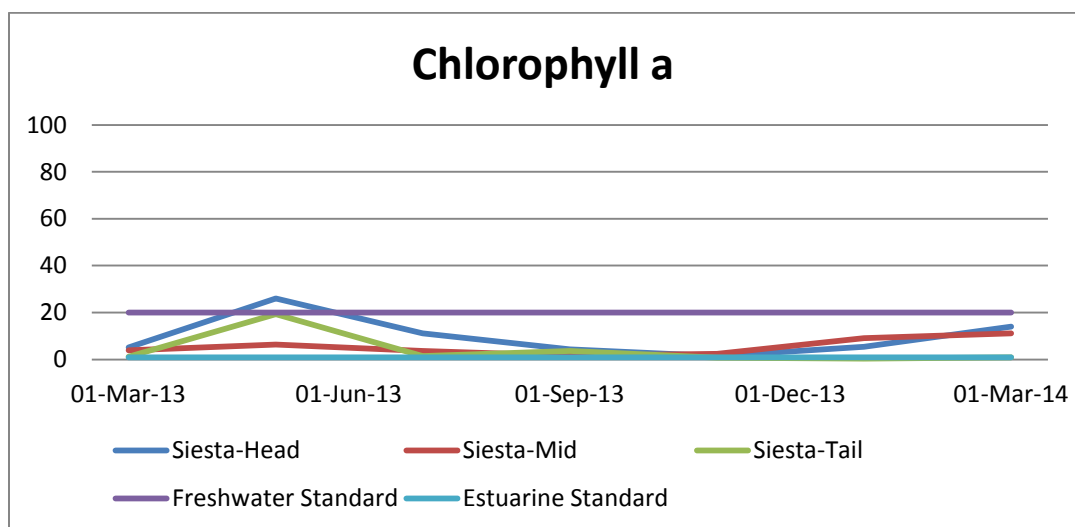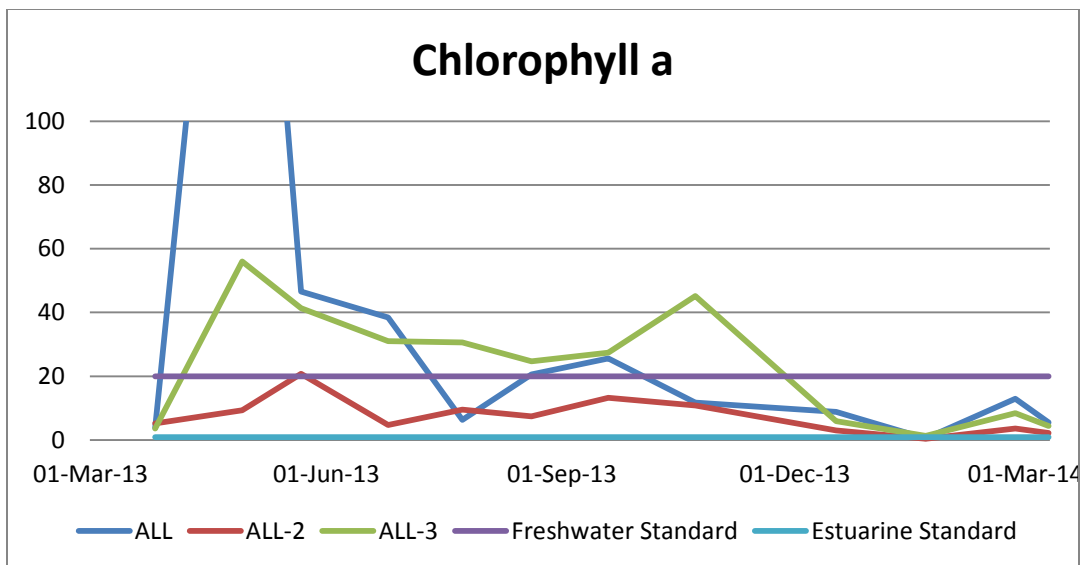
Discussion

The summary plots really illustrate how different each of the waterways are. It can't be stressed enough that this is a limited amount of data. For most sites, only 7 samples were taken every other month. Any conclusions should be taken as preliminary.

Conductivity is used to determine the "saltiness" of the water and is used to calculate salinity. Since most of these waters are above the tidal influence besides Alligator Creek itself, conductivity is used to characterize the waters.

The Briarwood Waterway exceeds the total nitrogen and chlorophyll a criteria. As this waterway drains the highly eutrophic lakes of Venice Gardens, this is expected. For most of the other sites and waterways, the annual means are at or near the freshwater criteria. Due to the activities covers regarding the Venice Gardens' lakes and the interest in the Briarwood Waterway for the SVCA Water Quality Task Force, future summaries will include data sampled from the lakes.

Briarwood, as well as most other sites, is above the dissolved oxygen criteria and this is a acceptable condition.

The Siesta Waterway exceeds the total phosphorus standard for freshwater along with Woodmere Creek South. These areas as well as the rest of Sarasota County are underlain with material naturally high in phosphorus which may help explain the excess. Other causes would include fertilization and septic tank effluent.

For fecal coliform, all sites except the downstream Alligator Creek Site (AL-3) exceeded the 800 counts per 100 milliliter daily standard. Although this parameter is not assessed in this manner for regulatory purposes, it can indicate areas for further investigation. The means for the Siesta Waterway are off scale as the first samples drawn were all >200,000 which increases the mean values to around 50,000. If continued sampling indicates that the excessive values were out of line, the effect on the mean will continue to diminish and eventually may be considered an outlier. There is also an effort underway to modify the bacteriological standard and the County is monitoring that effort and will make adjustments if changes come about.

The time series plots clarify the patterns previously noted. As the database grows, trends and seasonal patterns may evolve overtime. This initial sampling effort was scheduled to last a year but as the project moves forward it may become evident to continue monitoring beyond that timeframe.