

**Status of the Captiva Water Quality Assessment Project  
Funded through work of the Captiva Community Panel by Lee Tourism  
Development Council (TDC)**

For August 10<sup>th</sup> meeting of CCP

**Recent Background**

SCCF Marine Lab is currently well into the second year of the Captiva Water Quality Assessment Project funded through a grant obtained by the Captiva Community Panel from Lee Tourism Development Council. The first year of the study resulted in a baseline assessment of near shore surface water quality and a year one summary report to stakeholders. One main focus was to assess what are the significant contributors to high levels of bacteria and nutrients around Captiva. The first year (Year 1) effort found significantly higher concentrations of bacteria in near shore waters occurred after rain events. The second year is focusing on developing the links between periodic elevated bacteria (and to a lesser degree, nitrogen) concentrations in nearshore waters and the possible sources. A related goal is to use existing and cost effective source tracking methodologies.

In Year Two we are tracking bacteria and nitrogen concentrations using: (1) transect and source area focused sampling; (2) optical brighteners; (3) Enterococci; (4) nitrogen analyses; and (5) groundwater monitoring using the 20 or more monitoring wells we have installed in the area to characterize the relationship between groundwater quality and nearshore surface water quality. This direction follows other studies that have identified the potential for transport of pollutants in barrier island groundwater to nearshore surface waters.

**Activities: Year Two Update**

The following activities have been completed so far in the second year of the Captiva Water Quality Study:

1. Initial calibration and testing of optical brightener fluorometer on local groundwater, surface water and wastewater samples.
2. Set-up and testing of Enterolert<sup>®</sup> system for bacterial contamination analyses.
3. Installation and development of at least 20 shallow groundwater monitoring wells on Captiva Island and adjacent areas. These wells are used to detect possible contamination in the freshwater lens which exists between 2-12 feet below the surface level on Captiva and Sanibel Island.
  - a. The wells are purged and sterile sampling techniques are used to collect samples for bacteria and nitrogen analyses.
  - b. Three additional control wells were established within natural preserve areas and will be sampled to compare to results to Captiva monitoring well results.
  - c. Initially the monitoring wells are being used to assess the current characteristics of the shallow aquifer on Captiva.
  - d. The wells will also be used to estimate crude flow direction and rates. Surface water sampling is performed in conjunction with monitoring well sampling to

help determine the potential for measurable transport of contaminants from groundwater to surface water.

4. Sampling events

- a. A total of 20 surface water source tracking and investigative sampling events have taken place to date in Year 2 (10-29-09, 11-12-09, 11-17-09, 11-25-09, 12-3-09, 12-5-09, 12-10-09, 12-12-09, 12-18-09, 12-28-09, 2-17-10, 3-12-10, 3-15-10, 3-29-10, 4-26-10, 4-28-10, 5-15-10, 6-9-10, 6-23-10, 7-23-10).
  - b. A total of five groundwater assessment and source tracking sampling events in Year 2 (5-26/28-10, 6-3/4-10, 6-23-10, 7-14-10, 7-22-10).
5. Figure 1 (see below) shows the locations of monitoring wells and surface water sampling efforts so far in Year two.
  6. All data to date have been entered into the Lab's Access Water Quality Database developed specifically for this project.
  7. Analyses have been performed to help establish the potential relationship between optical brightener concentrations and pollutant sources in groundwater and surface water.
  8. Data have been collected related to Captiva septic tank system status and are being summarized.
  9. Results to date from groundwater monitoring have exhibited significant variability (Figure 2). Continued monitoring (during this year two effort) will help clarify existing conditions.

## Summary

Monitoring efforts for second year of this study are predicted to continue into November of 2010. A large amount of data are yet to be collected, and any analyses done before data collection is complete is premature and may encourage inappropriate conclusions. To date, no resounding surface water quality problems have been detected (focusing on local bacteria and nutrient sources). Continued source tracking efforts in the Year 2 of the study should give a more complete picture.

## Surface Water and Groundwater Monitoring Stations Utilized To Date

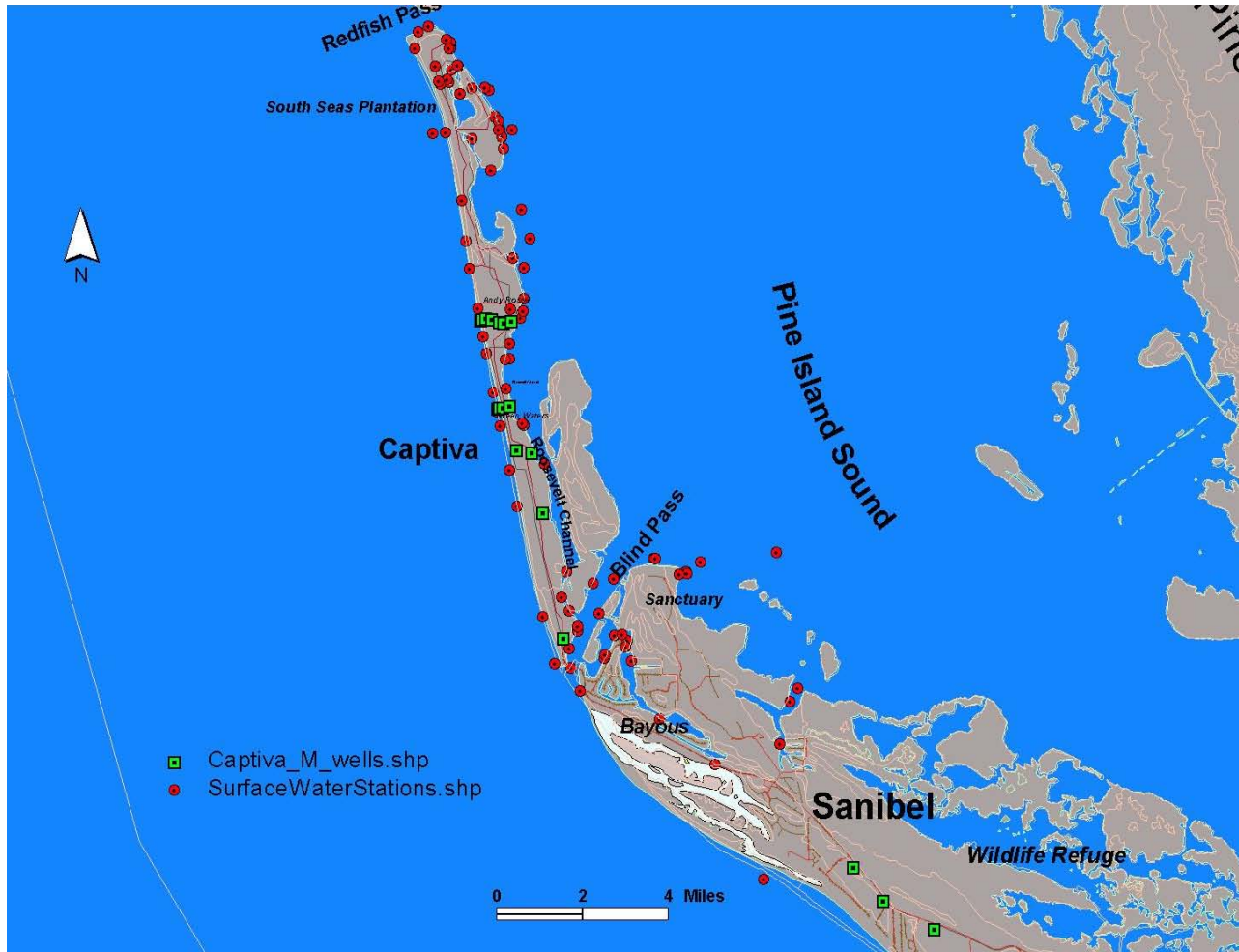


Figure 1. The green squares show the locations of groundwater monitoring wells (Year 2). The red points show locations of surface water monitoring that have occurred overall.

## Preliminary Groundwater Monitoring Results from Year 2

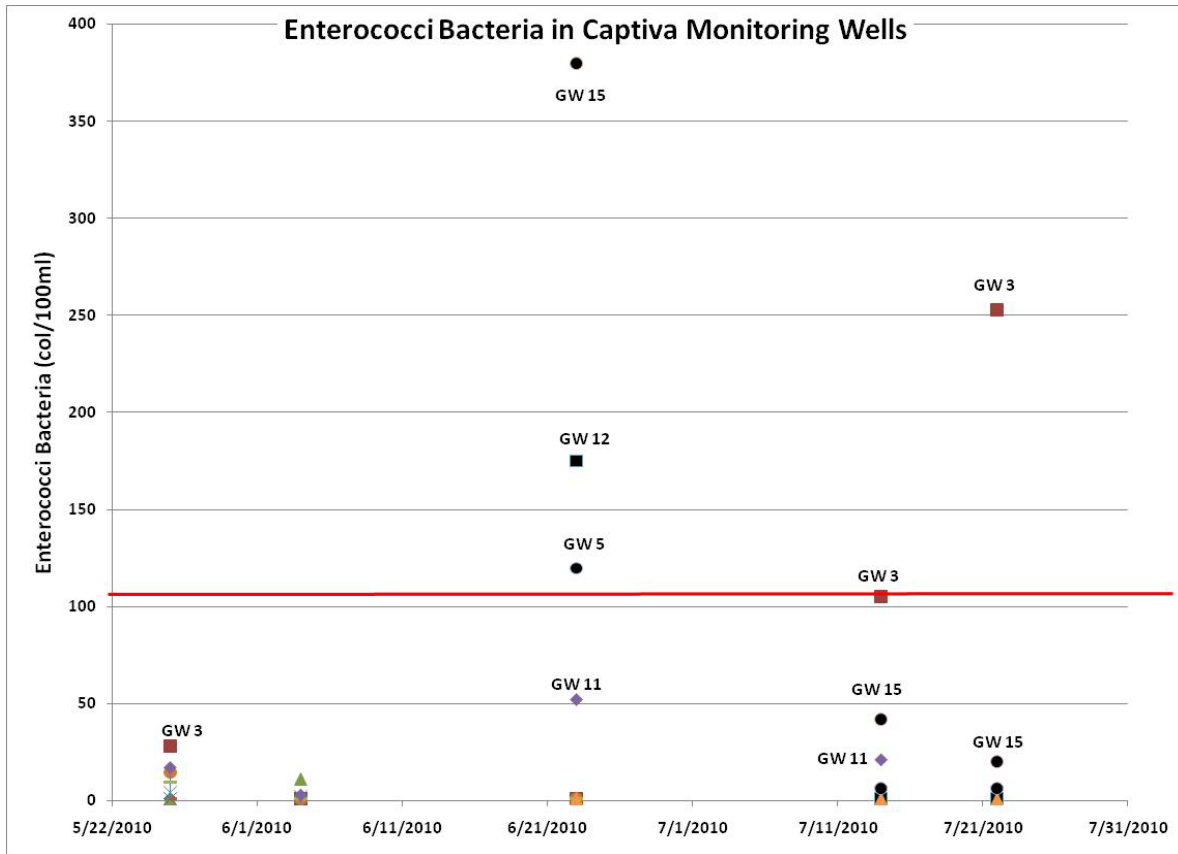


Figure 2. The above points represent preliminary monitoring well samples for Enterococci bacteria. The specific well identification number is shown next to samples which had elevated levels of Enterococci bacteria. The red line represents the Florida Water Quality Criteria of 104 Enterococci colonies per 100 milliliter of sample. Any sample concentrations greater than this are of special concern. Any samples having greater than 35 colonies per 100 milliliters are noteworthy when evaluating any data. In this graph, we can see that wells GW15, GW3, GW12, GW5 and GW11 periodically have had elevated bacteria levels.