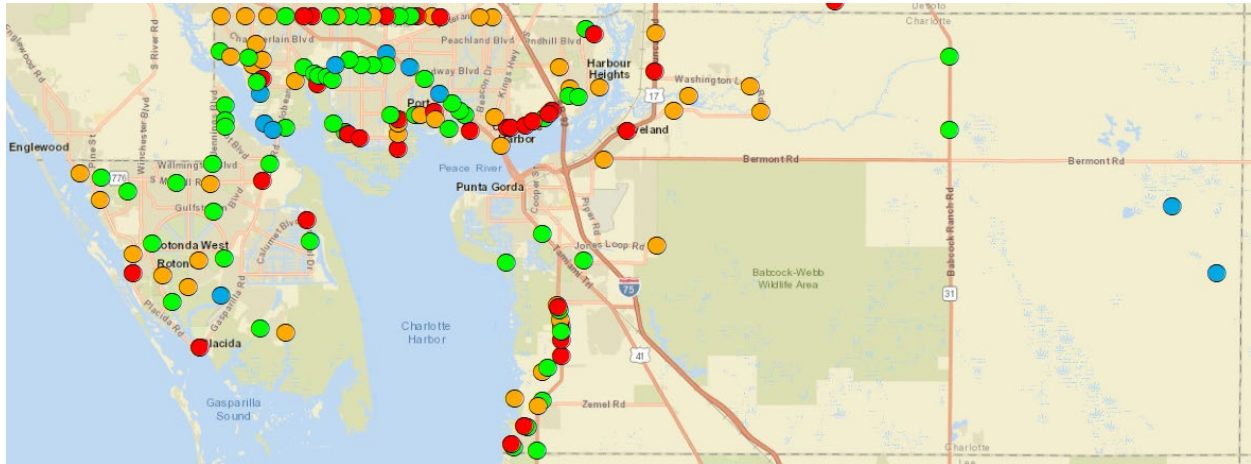


DRAFT Charlotte County Water Quality Monitoring Initial Implementation: Site Selection Strategy

Revised 03/04/2022



The purpose of this document is to provide supplemental information for the [draft Charlotte County water quality monitoring program site selection map](#). Note this is NOT a final, complete monitoring plan; rather, this document was authored to describe the considerations and questions taken into account when determining the initial proposed list of locations for sample collection. This and the map should be considered living documents that will continue to evolve as questions, corrections, and feedback are provided by stakeholders and the public. The current version of this document may be found at the [One Charlotte, One Water web page](#).

While the Charlotte County Board of Commissioners have requested county staff to devise and implement a water quality monitoring program, the specific details of the program contained herein are based on recommendations from staff and stakeholders and should not be interpreted as directives by the Commissioners.

The initial goal the monitoring program is to create what will serve as the starting point for a long-term monitoring network in Charlotte County. It is expected that the locations, frequency, and analytes will change based on:

1. Data collected during the initial months of the program;
2. New and evolving understanding of water quality dynamics in the Harbor;
3. Additional recommendations by the scientific community and other stakeholders, and;
4. Directives provided by the Board of County Commissioners.

How to Use the Map

The map contains the following information; select a feature on the map to view detailed information such as sample frequency, parameters measured, etc:

- Surface water sample locations (circles labeled with an “S”), color coded based on proposed priority for funding:
 - Green- Higher priority: locations receive water from a relatively large drainage area, are representative of a direct path of discharge to Charlotte Harbor or the Caloosahatchee, or are the most representative locations among other options for characterizing water quality in the area.
 - Orange- Medium priority: Typically, these are locations that represent runoff not captured by high-priority areas, but reside within “smaller” drainage areas; consider sampling as part of a short-term study or include in the ambient program if funding allows.
 - Red- locations that were considered but later determined to be duplicative of green sites, represent a small drainage area, or are located in drainageways that do not directly discharge into the harbor.
 - Blue- locations under consideration that have not been ground truthed to determine suitability.

Select a site to view information regarding its location and proposed priority.

- Monitoring conducted by Charlotte County or other agencies (stars)- These represent surface water sampling locations that are active and expected to continue to be visited into the future.

★ CHAP Volunteer WQ Monitoring Network

★ Charlotte County

★ Charlotte Harbor Aquatic Preserves

★ City of North Port

★ City of Punta Gorda

★ FDEP

★ FDOH

★ Florida Lakewatch

★ Manchester Waterway Civic Association

★ Peace River Manasota Regional Water Supply Authority

★ SWFWMD

★ Sarasota County

★ USGS

- Waterways (blue lines) are derived from county data and the USGS National Hydrography Dataset.
- Watersheds delineated by Charlotte County, represented by black boundaries.

- FDEP Waterbody IDs (WBIDs) verified as impaired for a constituent, which are represented by orange boundaries.

As of this writing, this map does NOT include short-term monitoring efforts (such as [FDEP's status monitoring network](#)). Also note that CHNEP's Coastal Charlotte Harbor Monitoring Network is not displayed on the map, as sample collection locations for that effort are randomized (60 sites throughout the harbor per month). More information on CHNEP's monitoring efforts may be obtained [at their website](#).

Program Objectives

1. Establish a network of monitoring sites throughout the County to identify long-term trends and ambient water quality conditions within:
 - Waters discharging to Charlotte Harbor, the Caloosahatchee River, and other lands and waters of Charlotte County;
 - Waters entering Charlotte County (where warranted/possible).
2. Where funding allows, and/or as directed by Commissioners and the public, examine the following:
 - Groundwater monitoring to assess condition of waters in drainage areas that may impact surface waters in the near-term (understanding the slow rate of percolation within groundwater);
 - Surface water monitoring within impaired WBIDs to evaluate current conditions in comparison to data that caused those WBIDs to be categorized as impaired;
 - Implementation of flow monitoring where warranted (and logistically/financially feasible). This information can be used in conjunction with sample data to estimate general nutrient loading characteristics of waterways being monitored.
3. Present sample results to the public in a manner that clearly describes water quality trends in relation to applicable water quality criteria.

Note: This document and the proposed initial iteration of the monitoring program is designed primarily to address Objective #1 above.

Proposed Monitoring Process

Surface grab samples will be collected monthly at a depth of 0.5 meters. Samples will be analyzed for the following:

- Total Phosphorus
- OPO4
- NH3/NH4
- NOx
- TKN
- Chlorophyll-a (corrected)
- Color
- Turbidity

- Total Suspended Solids
- pH
- Dissolved Oxygen (mg/L and % Sat)
- Specific Conductance/Salinity
- Temperature
- Bacteria (either E. coli or Enterococci, as applicable)

This monitoring program will emphasize that samples in tidally-influenced areas should be collected during ebb tide conditions. It is recognized that this can be logistically challenging as ebb tide may not occur during regular business hours. In addition, relationships will need to be established between available tide charts for the area and the actual timing of tidal fluxes at each of the locations. Nonetheless, effort should be made to collect during ebb tide conditions as much as possible.

In addition to the above, the RFP will be written to allow for the collection and analysis of metals, organics, gross alpha, and other priority pollutants. These can be requested as needed based on information collected during monthly sampling, specific impairments within a given WBID, etc.

Next Steps

The proposed timeline for initial implementation of the program is as follows:

Winter 2021/2022- Enter into a contract (via competitive RFP process) for surface water sample collection and analysis.

Winter/Spring 2022- Begin monthly surface water sampling prior to onset of the wet season in 2022.

Fall 2022- Contract with external party to conduct data analysis and review of current monitoring program and recommend adjustments.

Funding Considerations

Funding for sample collection and analysis will be provided by each of the three stormwater MSBUs (Mid, South, and West Counties). In addition, \$50,000 from the General Fund is being allocated to provide for at-large sample collection (e.g. within Charlotte Harbor Proper) and funding support as needed. Note that funding provided by each stormwater MSBU must be spent on efforts within that MSBU's service area; details on available budget for each region are provided in the next section. Funding allocations for each region were determined based on short and long-term budgetary needs related to stormwater maintenance and improvements, as well as continued funding of existing water quality monitoring efforts (such as [CHNEP CCHMN](#)).

Based on initial estimates obtained from various laboratories in the region, the median per-site cost for sample collection and analysis of the parameters described in the previous section is approximately \$3,000/year. The number of sites selected for this initial monitoring effort should allow some amount of "buffer" in the budget to account for:

1. Collection and analysis of blank samples, which are required by FDEP per their sample collection SOPs;
2. As-needed short term monitoring efforts, such as source tracking studies;

3. Monitoring/assessment efforts that are not included in the initial iteration of the monitoring plan but could be incorporated in future iterations (or now if there is substantial support/demand):
- Groundwater Monitoring
 - Biological Surveys/assessments
 - Monitoring within Charlotte Harbor proper
 - Flow monitoring for load calculations at monitoring sites
 - TN analysis of atmospheric deposition

Alternatively, the first several months of monitoring could include as many sites as possible (while still allowing for reclaim monitoring and blank sample collection), with the understanding that monitoring coverage will eventually be reduced to accommodate the other monitoring needs above).

Regional Monitoring Questions and Considerations- West County

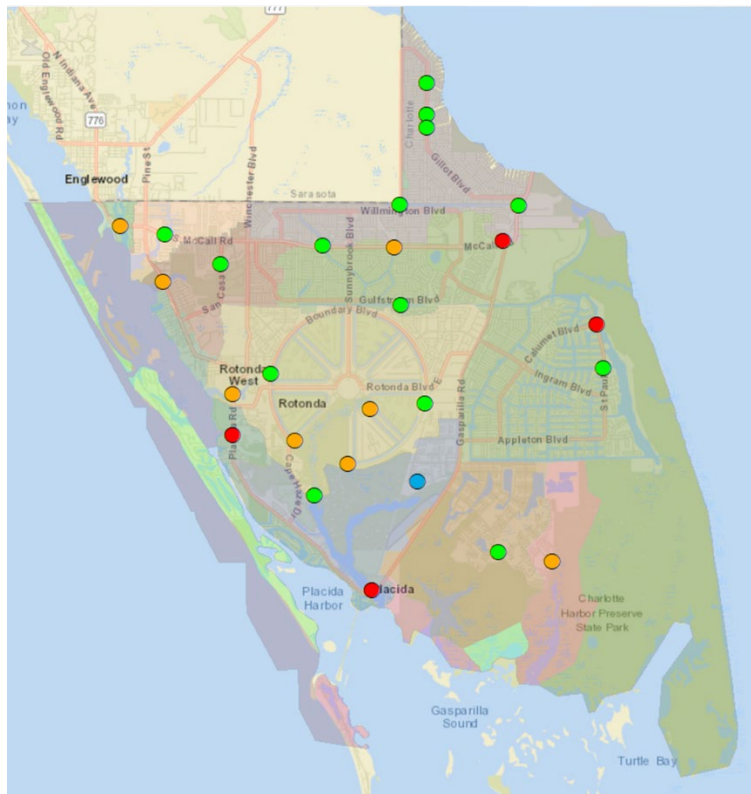


Figure 1: Overview of Candidate Monitoring Locations, West County

Available Budget: \$82,000

Proposed Max # Surface WQ Sites to Be Considered: 23

Current # Proposed Sites: 14 high priority and 8 mid priority

1. Water movement through portions of the region north of Rotonda is somewhat unclear, as many of the canals appear to be influenced by tidal movement via multiple connections to the harbor and Gulf of Mexico. As such, sites have been selected within the interior to try to characterize potential runoff from the surrounding landscape.
2. Quarterly monitoring is conducted in South Gulf Cove for the following parameters: NH₃, TKN, NO_x, OPO₄, TP, Fecal Coliform; see Figure 2 below. The most recent water quality report presented by CHEC recommended adding Chl-a, color, and turbidity monitoring to the current efforts. Similarly, volunteers with Florida Lakewatch collect samples approximately monthly within the Rotonda area; see Figure 3 below. This information is utilized by FDEP for determining if WBIDs should be placed on the Planning List (per FL Statute 1004.49, Lakewatch data cannot be used to verify impairments). Data collected includes TKN, NO_x, TP, Chlorophyll-a, and water clarity (via secchi). The current iteration of the site selection strategy proposes to supplement the above described efforts by monitoring locations in and around Rotonda and South Gulf Cove.



Figure 2: Current South Gulf Cove monitoring locations. Samples are collected quarterly.

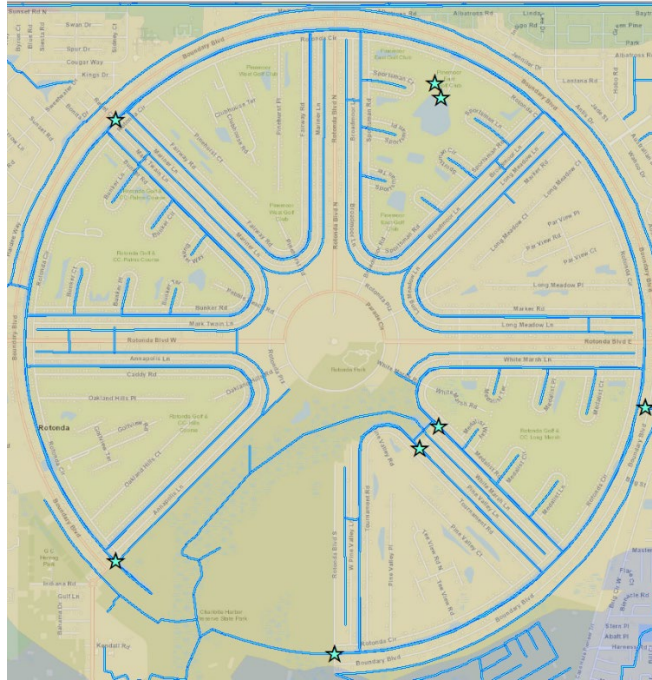


Figure 3: Florida Lake Watch monitoring locations at Rotonda.

3. While the Charlotte Harbor Aquatic Preserves is conducting monthly monitoring at multiple locations around the gulf islands, no monitoring is currently allocated towards characterizing runoff from those areas (see Figure 4 below). It is currently unclear if specific locations within the interior of the barrier islands should be subject to regular WQ monitoring, either because they are sources of freshwater/stormwater discharge to the Gulf, or are tidally-influenced areas with the potential to receive significant quantities of runoff from the surrounding landscape.

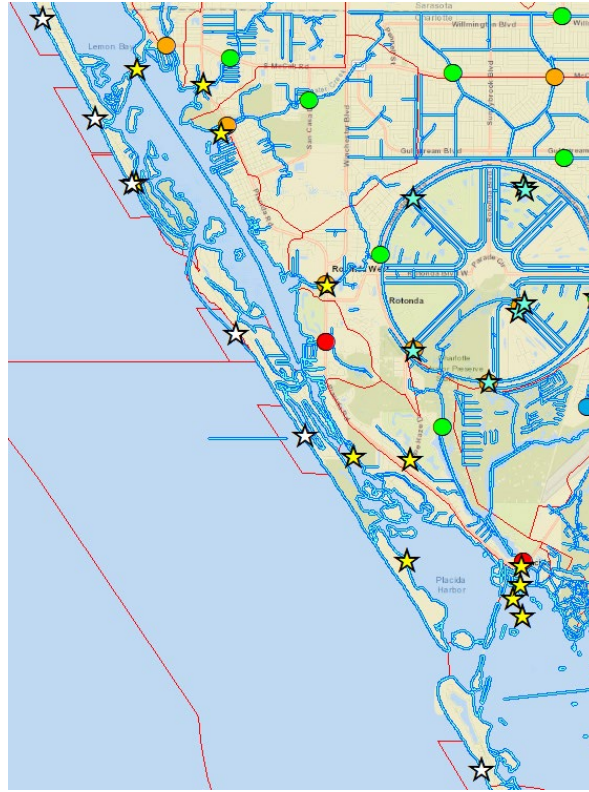


Figure 4: Current (stars) and proposed (circles) monitoring along the Gulf Coast. White stars are bacteria monitoring sites, yellow stars are locations monitored by the Charlotte Harbor Aquatic Preserves, and blue stars are Lakewatch monitoring sites.

Regional Monitoring Questions and Considerations - Mid County

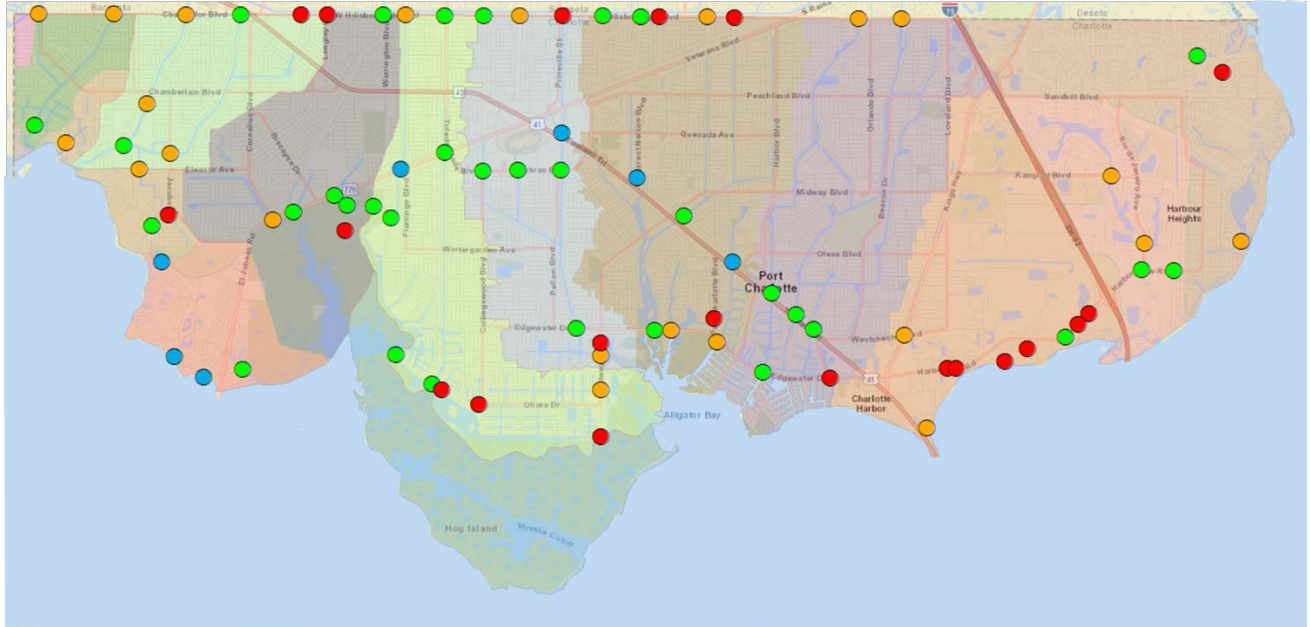


Figure 5: Overview of Candidate Monitoring Locations, Mid County

Available Budget: \$279,000

Proposed Max # Surface WQ Sites to Be Considered: 50

Current # Proposed High Priority Sites: 32

1. There are multiple points of inflow from Cocoplum Waterway (North Port) into the various drainage canals of Port Charlotte. With the exception of the Como Waterway inflow (see next paragraph), discharges from the Cocoplum to each of these canals is regulated by some form of elevation control structure. In addition, Cocoplum itself is regulated by multiple elevation control structures. The various points of inflow into Port Charlotte were thus prioritized based on model info predicting maximum discharge rates during mean annual storm events, location of those inflow points in proximity to one another, and location of each inflow point in relation to the elevation control structures on the Cocoplum. At least one inflow point will be monitored between each Cocoplum control structure. If multiple inflows are located between two Cocoplum control structures, prioritization is assigned based on the following (in order):
 - Control structures that allow for higher volume flows during storm events were prioritized over lower volume flows, or;
 - If multiple inflow points have similar volumes of flow, the furthest “downstream” inflow point on the Cocoplum was selected.

The one exception to this selection process is the inflow at Como waterway, which is prioritized because no control structure is present at that location. As such, water from the Cocoplum can enter the Como waterway throughout the year (during the extended dry periods, Cocoplum canal elevations can drop below control structure elevations at other locations and thus cease to discharge into Port Charlotte).

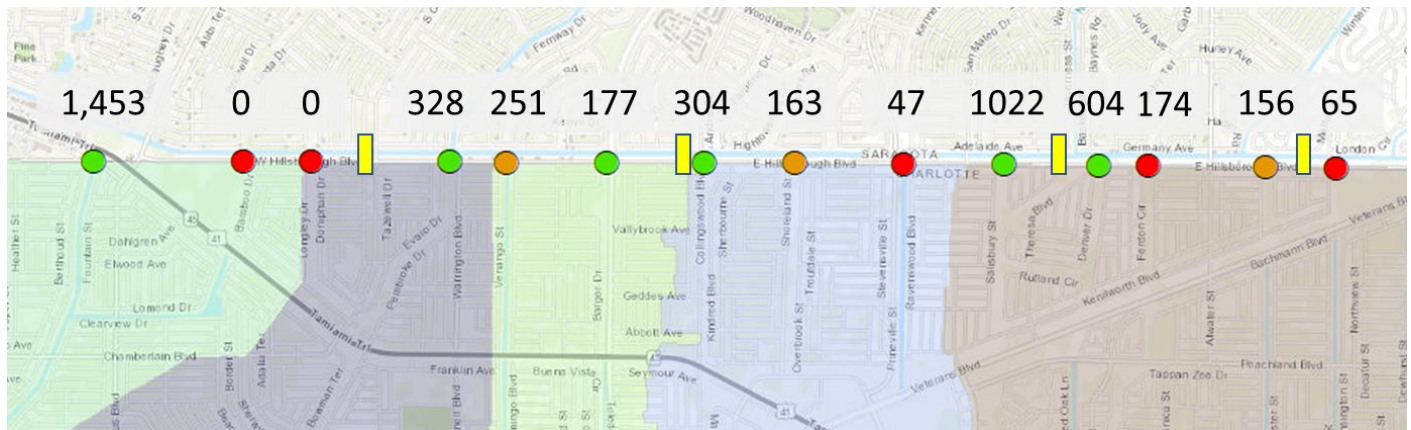


Figure 6: Cocoplum monitoring prioritization and modeled peak inflows during mean annual storm events (in cubic feet per second). Yellow rectangles indicate approximate locations of control structures within the Cocoplum.

2. The current proposed monitoring includes locations at elevation control structures within the interior of the county (see Figure 7). Some of these structures serve as a barrier between tidal and freshwater flows (primarily near Tamiami Trail); as such, collecting samples at these locations may be beneficial as it provides insight into potential contributions of constituents from Port Charlotte/North Port without the confounding variables that might be encountered when collecting samples in tidal areas. Sampling could be limited to the elevation control structures (instead of collecting samples within tidal reaches of each mid County canal, as is currently proposed), but doing so will not capture significant populated areas located in the tidally-influenced portion of Port Charlotte.

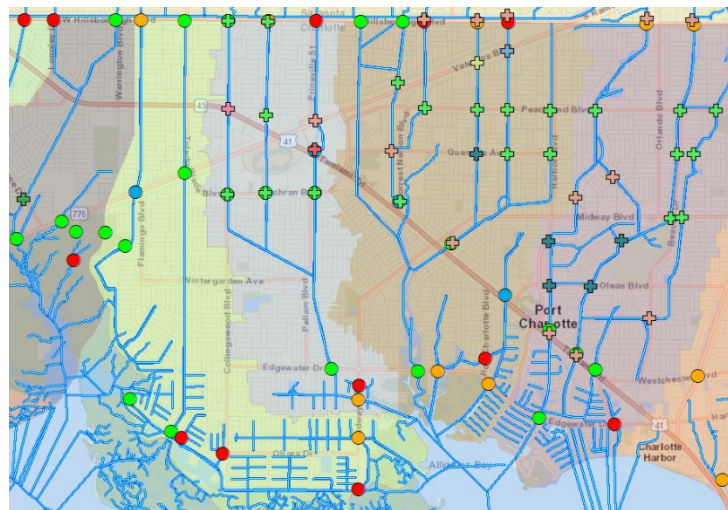


Figure 7: Proposed monitoring location and control structures in Mid-County, depicted as colored “plus” symbols.

Regional Monitoring Questions and Considerations - South County

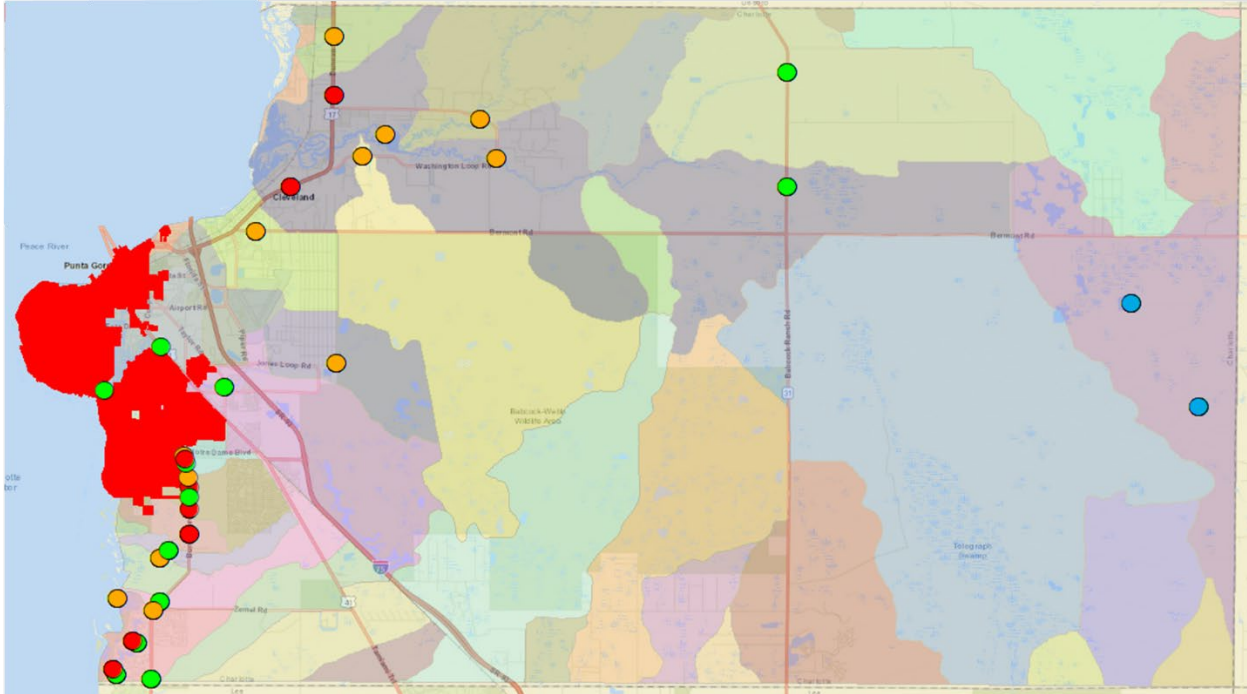


Figure 8: Overview of Candidate Monitoring Locations, South County. The City of Punta Gorda is represented by the red shaded region.

Available Budget: \$75,000

Proposed Max # Surface WQ Sites to Be Considered: 15-18

Current # Proposed High Priority Sites: 12

1. The current proposal does not account for drainage to the Caloosahatchee; this is primarily a logistical issue, as access to the eastern portion of the county is very limited. Note many of the Caloosahatchee WBIDs in Charlotte County are considered impaired for E. coli, so resolving that impairment may require obtaining access to private property. Lee County has conducted monitoring within some of these basins on their side of the county line, but that alone may not be sufficient for determining the source/ongoing presence of bacteria-related impairments. Conversations with FDEP will be needed to determine the next steps in this process; as such, this may wind up being a part of the second iteration of the monitoring plan, unless these access issues can be resolved prior to this winter.
2. Site selection at Burnt Store is based on field observations of canals/ditches with direct discharges to the harbor. Multiple other canals are present but interact with a berm or obstruction west of Burnt Store, thus forcing water to disperse within the park before it enters the harbor. Many of these locations are indicated by the red circles on the map.
3. Charlotte County does not currently have the authority to collect samples within the city limits of Punta Gorda.