Summary of Results

FINAL

Walk the WBID Exercise for Gottfried Creek (WBID 2049)

October 2015

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Purpose and Contents

This report summarizes the results of the Walk the WBID exercise for the Gottfried Creek watershed, located in southern Sarasota County and northern Charlotte County, completed on February 28, 2012 and subsequent follow up actions. This field reconnaissance and source elimination effort was carried out to gain a better understanding of conditions within the watershed, including the hydrology of the creek and its contributing ditches and branches, flood-prone areas, the locations of sewer and stormwater infrastructure, and potential sources that are contributing fecal coliform (FC) bacteria to the creek.

Basin Management Action Plans (BMAP) to address sources may be appropriate for some watersheds; however, they are both time and resource intensive. The Walk the WBID exercise is a low-cost, effective alternative to begin addressing fecal coliform pollution in Gottfried Creek so that it meets state water quality standards. This common-sense first step allows stakeholders to identify the location of suspected sources, establish a sampling plan to fill in knowledge gaps, carry out easy-to-implement management actions for the creek using existing programs and ongoing activities, and follow up on those actions to assess the degree of success and the additional effort needed. The exercise allows stakeholders to identify uncertainties and future options for more effective adaptive management. It also contributes to improved communication between and within agencies, and provides opportunities to increase public awareness.

The lead entity for the Walk the WBID exercise was Sarasota County; other participants were the Florida Department of Environmental Protection (FDEP), Englewood Water District (EWD), Charlotte County, the City of North Port (CONP), the Florida Department of Health, Sarasota County (DOH-Sarasota), the Florida Department of Transportation (FDOT), the Florida Department of Agriculture and Consumer Services (FDACS), Thomas Ranch, the Lemon Bay League, the Coastal Wildlife Club, the Charlotte Harbor Aquatic Preserve (CHAP), and other stakeholders.

This report includes the following information:

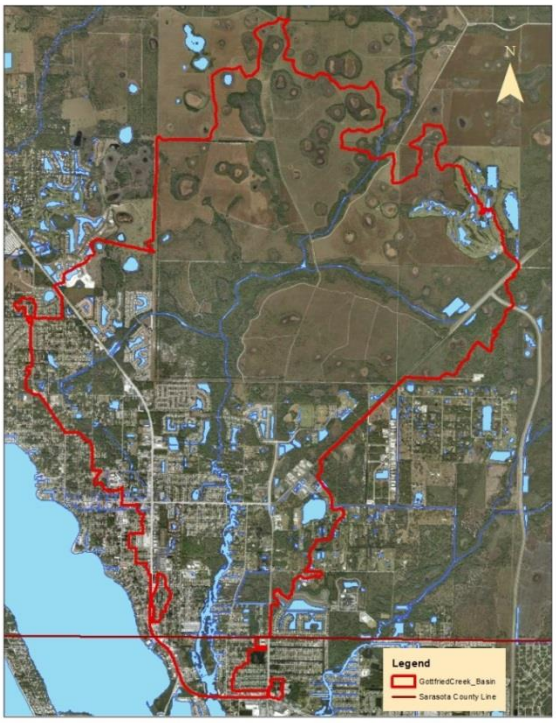
1. *Identification of the WBID;*
2. *Results of any preliminary investigation or issues identified;*
3. *List of entities and staff participating in the field efforts or other operations;*
4. *Sources and potential sources observed;*
5. *Immediate next steps and follow-up actions taken;*
6. *Follow-up actions still needed;*
7. *Sources eliminated or investigated;*
8. *Water quality results from samples taken in the field;*
9. *Monitoring sites identified or proposed; and*
10. *Any other pertinent information.*

Background

Description of the Gottfried Creek Watershed

Gottfried Creek is located in the southern portion of Sarasota County and extends into the northern portion of Charlotte County, within the Charlotte Harbor Basin (**Figure 1**). Gottfried Creek discharges into Lemon Bay, which was designated an Outstanding Florida Water (OFW) in 1987 and is classified as a Class II waterbody with shellfish propagation or harvesting as its designated use. Gottfried Creek (WBID 2049) is a Class III waterbody, with a designated use of recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife. Although the creek flows into Lemon Bay in Charlotte County, over 90% of the drainage area is in Sarasota County. The topography of the Gottfried Creek WBID 2049 watershed encompasses 7,229 acres. The dominant land use categories are urban land (urban and built-up; low-, medium-, and high-density residential) and rangeland, which accounts for about 52 percent of the total WBID area. Urban and built-up land use occupies about 1,690 acres or about 23 percent of the total WBID area. Of the 1,690 acres of urban lands, residential land use occupies about 1,156 acres. Rangeland land use occupies about 2,088 acres or about 29 percent of the total WBID area. The physiography of the Gottfried Creek watershed reflects its location within the Southwestern Florida Flatwoods or Southern Coastal Plains Eco region. Elevations in the watershed range from around 0-10 feet above sea level (FDEP, 2010). The predominant soil type is shelly sand and clay (FDEP, 2008). A major human population center exists in the southern portion of the watershed, which is the unincorporated town of Englewood.

Figure 1. Aerial map showing the boundary of the Gottfried Creek watershed and major hydrologic features in the area.



Fecal Coliform Impairment of Gottfried Creek

Gottfried Creek (WBID 2049) was verified impaired for fecal coliform bacteria in March 2010, based on the state's Impaired Surface Waters Rule (IWR) (see box at right), and Total Maximum Daily Loads (TMDLs) were adopted for both fecal and total coliform in June 2006. However, the TMDL is now only applicable to fecal coliform, since total coliform is no longer a water quality standard regulated by the state.

A TMDL represents the maximum amount of a given pollutant that a waterbody can assimilate and still meet water quality standards, including its applicable water quality criteria and its designated uses. TMDLs are developed for waterbodies that are verified as not meeting their water quality standards. They are a critical step in the watershed restoration process because they provide the targets for measuring progress in subsequent water quality restoration efforts.

The fecal coliform TMDL calls for a 74% percent reduction in in-stream concentrations for Gottfried Creek to meet state water quality standards. Currently, no point sources are permitted to discharge into the creek. Wasteload allocations have been assigned to three municipal separate storm sewer system (MS4) permittees: Sarasota County, the City of North Port, and the Florida Department of Transportation (FDOT), District 1.

Florida's Water Quality Standard for Fecal Coliform

For determining impairment for fecal coliform bacteria, the IWR states that the most probable number (MPN) or membrane filter (MF) counts per 100 milliliters (mL) of fecal coliform bacteria shall not exceed a monthly average of 200, nor exceed 400 in 10 percent of the samples, nor exceed 800 on any one day. The criteria state that monthly averages shall be expressed as geometric means based on a minimum of 10 samples taken over a 30-day period. However, there were insufficient data (fewer than 10 samples in a given month) available to evaluate the geometric mean criterion for fecal coliform bacteria. Therefore, the criterion selected for the TMDL was not to exceed 400.

Walk the WBID Exercise

Participants

All agencies with jurisdictional authority collaborated before, during, and after the event. Team members included representatives from the FDEP, Sarasota County, EWD, Charlotte County, CONP, DOH – Sarasota, FDOT, and FDACS.

Costs

The only costs to the participants in the Walk the WBID exercise were staff time and potential management actions. Processing the water quality samples associated with this effort was funded by Sarasota County.

Future management actions associated with existing city and county programs will require scheduling, coordination, and follow-up on behalf of the participating agencies. Examples of follow-up activities that may result in additional costs include system maintenance, repair, and investigation; however, it is

important to note that these activities generally correspond with jurisdictional missions and already-established programs.

Initial Steps

Before going into the field, the stakeholders met and exchanged information through a meeting organized by Sarasota County; these included FDEP staff (moderators), Sarasota County, EWD, Charlotte County, the CONP, DOH-Sarasota, FDOT, FDACS, Thomas Ranch, the Lemon Bay League, the Coastal Wildlife Club, the Charlotte Harbor Aquatic Preserve, and interested citizens.

In preparation for these meetings, each entity provided information about Gottfried Creek to better acquaint themselves with the conditions in the watershed. The information was provided in advance to FDEP, which created multiple copies of large-format maps for use in the maps on the table exercise and the field event. The information that was collected and assimilated included the following:

- *Geographic information system (GIS) data;*
- *Stormwater infrastructure maps showing the locations of inlets and outfalls, ponds, ditches, and underground conveyances;*
- *Stormwater best management practices (BMPs) being implemented;*
- *Maps of private and public sewer infrastructure showing the locations of pump stations and force and gravity mains, as well as the location and number of sanitary sewer overflows (SSOs);*
- *Locations of septic tanks and repair permits issued;*
- *Locations of specialty farms, kennels, and other animal operations;*
- *Water quality sampling information such as sampling stations, frequency, and results;*
- *Hydrology, including wetlands, streams, and ponds; and*
- *Locations of known issues or areas of special concern such as homeless populations, dog parks, landfills, and transfer stations.*

Maps on the Table Session

With a representative present from each participating agency, team members held the Maps on the Table session to identify areas of concern to visit during the Walk the WBID event, based on field knowledge from staff and a synthesis of the available information. The team members marked areas of concern on their maps and elected field representatives with infrastructure knowledge and access to facilities, and who were familiar with sampling equipment and standard operating procedures (SOPs).

Subsequently, FDEP and Sarasota County carried out a preliminary field reconnaissance to identify areas of focus, determine appropriate routes for the participants, and identify any access issues and safety concerns requiring coordination with local law enforcement.

Field Event

The Walk the WBID team used the large-format maps while conducting the field investigations. A documentation team was designated, with a team member assigned to record global positioning system (GPS) points with the coordinates of potential sources, another person to take pictures, and a primary note taker to record the information. Water quality sampling equipment was used to collect water quality information about potential sources identified in the field.

The team explored the entire waterbody while in the field, referring to the maps to follow the creek above and below ground. Team members looked at Gottfried Creek banks and in the vicinity of the waterbody for potential sources. Canals/ditches that intersected the waterbody were also walked to ensure that the waterbody and its associated branches were all included within the WBID boundary. Care was taken to ensure that only appropriate entity representatives accessed private property, unless the property owner had granted access to the entire team. Potential sources that were investigated included the following:

- *Potential illicit connections (PICs) or discharges;*
- *Public and private sanitary sewer infrastructure (such as manholes and pump stations);*
- *Signs of recent SSOs, or areas with multiple SSOs;*
- *Wastewater infrastructure located close to surface waters and/or stormwater inlets, including pump stations, manholes, and air release valves (ARVs);*
- *Septic tanks located close to surface waters and/or stormwater inlets;*
- *Failing septic tanks (as indicated by ponding and a strong smell of sewage);*
- *Evidence of homeless populations;*
- *MS4 conveyances requiring cleaning;*
- *Accumulated trash and debris on streets and parking lots;*
- *Accumulated trash and debris near to or inside stormwater drains and catch basins;*
- *Clogged or broken stormwater grates;*
- *Stormwater drains undergoing repairs;*
- *Stormwater outfalls discharging from underground conveyances or into ponds;*
- *Sewage smell from stormwater drains, indicating possible cross-connections;*
- *Unusual odors;*
- *Evidence of illegal dumping or discharge of liquids;*
- *Signs of oil and grease;*
- *Excessive sediments and signs of erosion or wash out;*
- *Stagnant water;*

- *Debris in inlets, or inlets located near wastewater infrastructure;*
- *Exposed pipes of unknown origin;*
- *Flood-prone areas;*
- *Pet waste or evidence of high-traffic pet areas;*
- *Presence of horses, cattle, or other ruminants in the water or close to the water;*
- *Evidence of wildlife such as raccoons and waterfowl;*
- *Evidence of chickens or other hobby animals;*
- *Areas with heavy tree cover and vegetated ditches preventing ultraviolet (UV) light penetration.*

Any discharges that were observed were sampled both downstream and upstream. Potential sources or other issues identified while in the field were reported to the proper jurisdiction and cataloged while in the field. A record was kept of major findings, including observations about the waterbody, potential sources, followed-up items and the responsible entity, and any areas that should be added to the monitoring plan or that required additional investigation.

Results

Figures 2 through 52 summarize the water quality issues and potential fecal coliform sources that the team observed during the Walk the WBID exercise on February 28, 2012, as well as the results of the water quality sampling that was carried out on that date.

Figure 2. Private Lift Station – Provision Eye Center.

WTW Team inspecting lift station.

Figure 3. Private Lift Station – Provision Eye Center

Action Item: Lock needed on pump well.

Figure 4. Private Lift Station – Provision Eye Center.

Action Item: Emergency signage needed

Private lift station for Provision Eye Center, located at 473 S. Indiana Avenue needed a lock on the pump well cover and contact information for notification in case of an emergency. All of the lift stations inspected are included in Appendix B.

Figure 5. Open Stormwater Canal, 201 Selma Avenue – Aerial View.

Canal collects stormwater runoff from commercial and residential district and flows eastward into Gottfried Creek (blue circle).

Figure 6. WTW Team inspecting open stormwater canal.

Canal is well maintained, open to UV light, and flows at low velocity except during significant rainfall events. No action item was necessary.

Figure 7. Aerial Crossing – Rusted out old raw potable water lines across open stormwater canal.

Action Item: Check to see if raw water lines been capped.

Figure 8. FDOT Stormwater Ponds.

Action Item: Notify FDOT to remove cattails.

The ponds were overgrown with cattails which could impair treatment capacity and efficiency.

Figure 9. Englewood Lateral Stormwater Canal at Tangerine Woods - Aerial View.

Englewood Lateral flows through Tangerine Woods, a 368 manufactured home community, from southwest to northeast and joins Gottfried Creek on the Thomas Ranch property.

Figure 10. Englewood Lateral at Tangerine Woods Boulevard – Upstream.

The canal is county maintained, open to sunlight, and shallow with low flow. Duckweed is only present periodically, and not considered an ongoing issue for blocking UV treatment.

Figure 11. Englewood Lateral at Tangerine Woods Boulevard – Downstream.

Surface periodically covered with duckweed.

Figure 12. WTW Team Inspecting Englewood Lateral.

The community, previously serviced by a package plant, was connected to the EWD central sanitary sewer system in 2001. No issues were observed. No action item was necessary.

Figure 13. Open Pasture – N. Indiana Avenue – Aerial View.

No cattle present; cattle routinely rotated to other pastures; property bermed; no cow patties observed.
Action Item: Determine if runoff flows to Gottfried Creek.

Figure 14. Foxwood Development – Aerial View.

The stormwater ditch flows from the stormwater pond through a natural area to Gottfried Creek.

Figure 15. Foxwood Stormwater Pond.

Ducks and wading birds observed in and around pond.

Figure 16. Foxwood Stormwater Ditch – View Toward Upstream.

The stormwater pond overflows into the ditch; irrigation pipes observed (foreground).

Figure 17. WTW Team Collecting Sample for Fecal Coliform Testing.

Action Item: Sample ditch because of strong pet waste odor.

Figure 18. Foxwood Stormwater Ditch – View Toward Downstream.

Ditch flows to through Foxwood Nature Preserve to Gottfried Creek.

Figure 19. Foxwood Stormwater Ditch.

Ditch just upstream of nature preserve.

Figure 20. Foxwood Stormwater Ditch-Wildlife Tracks.

Deer or Hog Tracks

Figure 21. Foxwood Stormwater Ditch-Wildlife Tracks.

Deer or Hog Tracks

Figure 22. Foxwood Stormwater Ditch.

Raccoon Tracks

Figure 23. Foxwood Nature Preserve Creek – View Downstream.

Foxwood stormwater ditch merges with creek at this point.

Figure 24. Foxwood Nature Preserve Creek – Large School of Mullet.

Creek is tidally influenced.

Figure 25. Foxwood Nature Preserve Creek.

Creek is shallow and heavily shaded. This segment flows to Gottfried Creek.

Figure 26. Foxwood Nature Preserve.

Evidence of wild hog activity.

Figure 27. Oak Forest Subdivision, N. Indiana Avenue.

Proper pet waste management

Figure 28. Park Forest Development, N. Indiana Avenue– Aerial View.

Sarasota County conducts monthly water quality sampling at the bridge on Gottfried Creek.

Figure 29. WTW Team at Park Forest Bridge. Air-Release Valve.

Action Item: Is ARV manually or automatically operated?

Figure 30. Gottfried Creek at Park Forest Bridge.

View Facing Upstream. : Heavily Shaded

Figure 31. Gottfried Creek at Park Forest Bridge – Mullet in Creek.

Action Item: Determine tidal stage and salinity during collection of samples.

Figure 32. Gottfried Creek at Park Forest Bridge.

View Facing Downstream: Heavily Shaded

Figure 33. FDOT Stormwater Pond Behind the Elk's Lodge, 401 N. Indiana Avenue.

Ponds are overgrown with cattails Figures 35 and 35).
Action Item: Notify FDOT to remove cattails.

Figure 34. FDOT Pond DP35-6 Behind the Elks Lodge – Northern Arm.

Pond Overgrown with Cattails.

Figure 35. FDOT Pond DO35-6 Behind Elks Lodge – Southern Arm.

Pond Overgrown with Cattails.

Figure 36. Horse Pasture on North Pine Street – Aerial View.

Improper manure disposal could impact Gottfried Creek.
Action Item: Determine if runoff could flow to the creek.

Figure 37. Horse Pasture on North Pine Street.

Overview of Pasture – View to East

Figure 38. Horse Pasture on North Pine Street.

Overview of Pasture – View to Southeast

Figure 39. Horse Pasture on North Pine Street.

Overview of Pasture – View to East

Figure 40. Horse Pasture on North Pine Street.

WTW Team

Figure 41. E. Riverview Ave. and Liberty St. – Aerial View.

The ditch, flowing from S. Indiana Avenue to Gottfried Creek is on the Sarasota/Charlotte County line.

Figure 21. Drainage Ditch South of E. Riverview Ave. and West of Liberty St.

Action Item: Contact appropriate agency for maintenance.

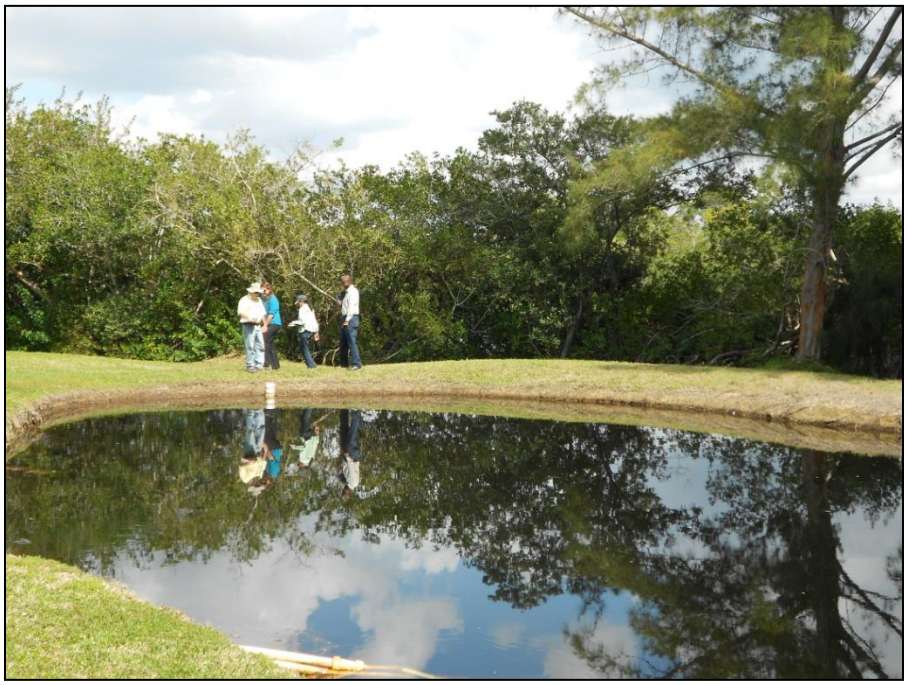
Figure 43. Gasparilla Condominium Complex, 131 Jose Gaspar Dr. – Aerial View.

Complex property is adjacent to Gottfried Creek.

Figure 44. Gasparilla Condominium – Private Lift Station.

No Violations Noted.

Figure 45. Gasparilla Condominium Stormwater Pond.



WTW Team Inspecting Berm Around Pond.

Figure 46. Gasparilla Condominium Stormwater Pond.

Pond Overflows Berm Directly to Creek.

Figure 47. Gasparilla Condominium Stormwater Pond.

Alligator Inhabiting Pond

Figure 48. Gasparilla Condominium Stormwater Pond.

Flock of White Ibis on Pond Berm
No issues observed. No Action Item necessary.

Figure 49. South Oxford Stormwater Ditch.

Ditch runs parallel to S. Oxford then flows west to Gottfried Creek

Figure 50. South Oxford Stormwater Ditch.

Evidence of Hog Activity in Ditch

Figure 51. North Oxford Stormwater Ditch-Aerial View.

Figure 52. North Oxford Stormwater Ditch.

Action Item: Contact appropriate agency for maintenance.

Pre-Field Event Inspections

Prior to the Walk the WBID event, pre-field event inspections were carried out of several areas that could not be walked on February 28, 2012 because of access and/or time limitations.

On December 16, 2011, FDEP and Sarasota County staff conducted a shoreline inspection via boat of areas of the creek not accessible by land (**Appendix A- Figures A.1. – A.31.).** The purpose was to identify existing and potential sources of fecal coliform bacteria. Stormwater outfalls and pipes and hoses of unknown origin or purpose were documented and photographed. Two sites appeared to be potential sources of bacteria, and samples were collected for fecal coliform. The bacteria results were 120 CFU/100mL (below the water quality standard of 400 CFU/100mL) and 550 CFU/100mL (slightly above the water quality standard of 400 CFU/100mL). The low results were not an indication of a significant bacteria source. A portion of a canal at the mouth of the creek was not inspected because of time limitations. A shoreline inspection of that canal was conducted on July 2, 2012 (**Appendix A – Figures A.32.-A.57**.). During this inspection, staff spoke to the resident of 300 Bay Heights Rd. regarding the private lift station located on the property. Staff spoke about the importance of properly maintaining the lift station to prevent bacterial contamination of the creek. The resident assured staff that the lift station was properly maintained and a contractor would be called immediately if any problems arose.

During December 2011 and January 2012, Sarasota County staff conducted inspections of all known public and private lift stations (L/S) in the Gottfried Creek Basin. Locations were verified and documented, photos were taken, and obvious violations were noted. Inspection notes and photographs are contained in **Appendix B**. Seven private lift stations were found to lack emergency signage and one private lift station was missing a lock on the lid. Sarasota County Air and Water Quality was contacted on March 12, 2012 and provided the locations of the lift stations, photos, and property ownership. Property owners were notified via letters to install appropriate emergency signage and a lock on the one lift station lid. Follow-up inspections were conducted to confirm compliance. Two public lift stations were found to lack emergency signage. Contact was made with EWD on March 13, 2012 and signs were ordered and installed immediately.

Additional Post-Field Event Inspections

Subsequent to the original Walk the WBID event, a post-field event inspection was carried out of two areas that were not walked on February 28, 2011.

Thomas Ranch

On May 10, 2012, representatives from the FDEP, Sarasota County, FDACS, and Thomas Ranch conducted a tour of the ranch (**Figure 53)**, a portion of which (about 2088 acres) occupies the upper third of the Gottfried Creek Basin. Thomas ranch, an 11,000 acre working ranch, runs a low-density livestock grazing operation with approximately 800 head of cattle. The remaining acreage is located in the City of North Port where a portion contains residential, commercial, and retail development. There were no immediate plans for further development of the ranch property during the inspection.

The headwaters of Gottfried Creek originate in a wetland system in the northern portion of the ranch and within the City of North Port. The main stem (#38-424) flows in a southerly direction through the ranch and is intersected by two branches. The first branch (east branch #38-463) collects stormwater runoff from South River Road and flows westward until it meets the main stem about 1.4 miles downstream. A broadcast weir structure was constructed downstream of this confluence to control the base flow of the creek **(Figure 59)**. The second branch (Englewood Lateral #36-461) originates west of North Indiana Avenue near the downtown district and flows to the northwest then eastward through the Tangerine Woods manufactured home development where it intersects the main stem on the ranch property just downstream of the weir structure. The stormwater conveyance system for that branch consists mainly of roadside ditches/swales and driveway culverts.

The purpose of the tour was to view the expanse of the ranch property, identify areas of any intense wildlife concentrations, view stream characteristics of the main stem and branches, inspect the weir structure, and learn about the cattle operation. The area of the ranch within the watershed boundaries is undeveloped, fenced rangeland with areas of open pasture, scrub, grassland, wetlands, and forests. The main stem of the creek and branches were very narrow and shallow with access almost totally restricted by heavy tree, shrub, and vegetation growth. All were completely dry above the weir structure. The Englewood Lateral and the main stem below the weir structure contained less than 1 foot of water. Information gained from the Maps on the Table exercise about the weir structure was that the water retained by the weir might become so stagnant that it could provide a suitable medium for the growth of bacteria that would be flushed to the creek during a significant rainfall event. As a result of drought conditions, the creek was completely dry upstream of the weir, preventing observation of the water quality or sampling of any water retained upstream of the weir.

While no evidence was found of any sizeable wildlife populations inhabiting the ranch, evidence was found of feral hog activity both on the property and in several areas of the creek **(Figures 56 and 66-69)**. No bird colonies were found in the areas of the ranch that were visited.

The Cattle operation included approximately 800 head of cattle that were separated into smaller herds and routinely rotated among different pastures. The thick vegetation along the banks of the creek restricted cattle access to the creek. The creek bed is also dry most of the year, limiting its availability as a water supply. Therefore, fresh water is provided in round troughs dispersed throughout the ranch **(Figures 74 and 75).**

Florida Department of Agriculture and Consumer Services staff made an appointment to meet with ranch staff at a later date to offer details about the FDACS BMP Program for ranch operations that included waste and manure management and to enlist the ranch into the program. Several attempts were made by FDACS staff to meet with ranch staff about the BMP program; however, no meeting was ever scheduled. Subsequently, ranching activities ceased on the property in May 2014 when the ranch was sold to a developer who plans to construct 11,000 homes on the 9,650 acre tract over the next 20 to 25 years (**Appendix E**). Protection of the water quality of Gottfried Creek will be a county priority during development of the property.

Figure 53. Thomas Ranch Aerial Overview.

Figure 54. Mulching and Chipping Operation.

Figure 55. Thomas Ranch Rangeland.

Figure 56. Thomas Ranch – One of Many Wetlands.

Figure 57. Thomas Ranch – Feral Hog Activity.

Figure 58. Thomas Ranch -Tree Line along Main Creek.

Figure 59. Thomas Ranch- Weir on Main Stem.

Figure 60. Thomas Ranch Aerial – Location of Weir.

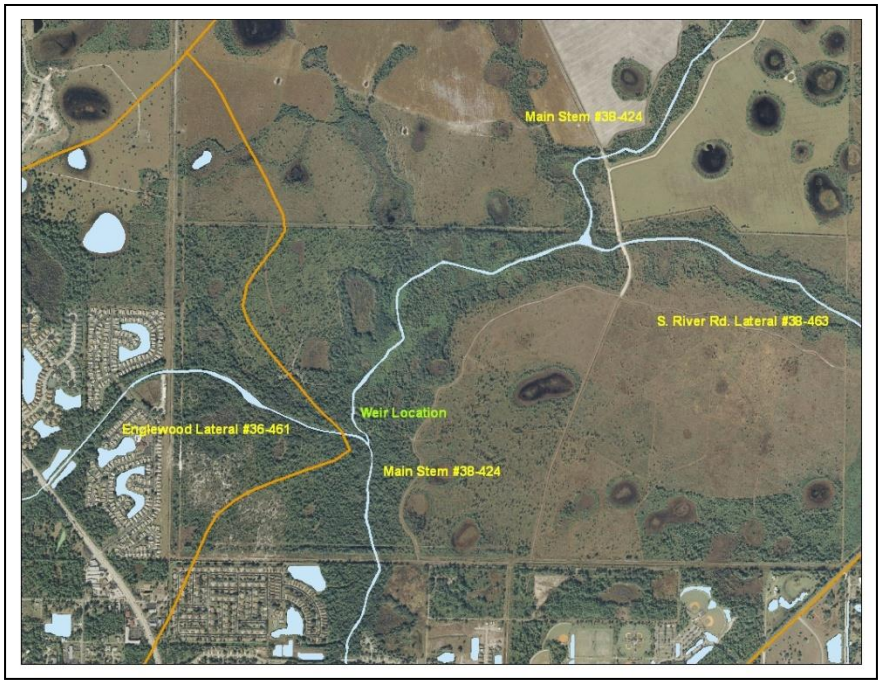


Figure 61. Thomas Ranch-Creek Upstream of Weir.

Figure 62. Thomas Ranch-View Farther Upstream of Weir.

Figure 63. Thomas Ranch-Creek Downstream of Weir.

Figure 64. Englewood Lateral at Confluence with Gottfried Creek-Below Weir.

Figure 65. Gottfried Creek Downstream of Confluence with Englewood Lateral.

Figure 66. Thomas Ranch-Banks of Creek Heavily Vegetated.

Figure 67. Thomas Ranch-Evidence of Feral Hogs Rubbing on Tree.

Figure 68. Thomas Ranch-Animal Scat.

Figure 69. Thomas Ranch-Evidence of Hogs Rooting in Creek.

Figure 70. Thomas Ranch-Evidence of Hogs Rooting in Creek.

Figure 71. Thomas Ranch-Gottfried Creek Upstream of Park Forest Bridge.

Figure 72. Thomas Ranch-Scrub Land.

Figure73. Thomas Ranch-Small Herd of Cattle.

Figure 74. Thomas Ranch-Pole Barn, Corrals, Watering Trough.

Figure 75. Thomas Ranch-Round Watering Trough for Livestock.

Figure 76. Thomas Ranch-Anita Nash, Beth Alvi, Kathy Meaux, Noel Marton.

Figure 77. Thomas Ranch-Eric Anderson – Ranch Manager.

Ranchettes/Small Farms

On May 10, 2012, after the tour of Thomas Ranch, representatives from the FDEP, Sarasota County, and FDACS conducted a tour of an area of small ranchettes and horse farms in the southeastern portion of the WBID (**Figure 78)** on Crestwood Rd. and Morningside Dr. The lots range in size from 5 to 10 acres, and some property owners provide boarding services, horseback riding lessons, trail rides, horsemanship and dressage training, jumping instruction, horse training and sales, or maintain private horse facilities (***Figures 79-81 and 84-89).*** There is also a cat and dog kennel (***Figure 82)*** on Morningside Dr. and an exotic bird breeder (***Figure 83)*** on Crestwood Rd. Stormwater runoff from the properties, which could contain fecal coliform bacteria, flows westward through a large open stormwater canal to Gottfried Creek. The large pond on the north side of Crestwood Rd. collects stormwater runoff from several parcels and discharges to the open stormwater canal previously mentioned. During the survey, no obvious issues were observed. However, it was determined that the community could benefit from a public meeting conducted by FDACS and Sarasota County to provide information about the importance of proper manure management and waste disposal. The workshop was added as a follow-up WTW action item.

Figure 78. Crestwood Rd. and Morningside Dr. Ranchettes – Aerial View.

Ranchette Parcels Are Highlighted in Blue

Figure 79. Morningside Dr. Ranchette.

Figure 80. Morningside Dr. Barn.

Figure 81. Morningside Dr. Barn and Pasture.

Figure 82. Critter Cottage Cat and Dog Kennel.

Figure 83. Exotic Bird Breeder.

Figure 84. Saddle Up Equestrian Center.

Figure 85. Branded Heart Stables.

Figure 86. Branded Heart Stables Barn.

Figure 87. Crestwood Stables Entrance.

Figure 88. Crestwood Stables Barn.

Figure 89. Crestwood Stables Training Arena.

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Next Steps and Follow-up Actions

Intractable Contributions and Natural Conditions

- Figures 15, 20, 21, 22, 26, 47, 48, 50, 56, 66, 67, and 68 show evidence of wildlife in close proximity to the Gottfried Creek watercourse, including: raccoon prints, waterfowl, feral hogs, and feces.

- Bacterial re-growth is probable in ditches and natural watercourses given the sediments observed. See Figures 18, 20, 21, 22, 25, 64, 66, 69, 70, and 71.

- Natural canopy cover is not a contributor, but does prevent UV rays from reaching the water column. UV rays kill pathogens and fecal coliforms. See Figures 23, 25, 31 and 32.

- Natural tannins from decomposing plant material in the water also shade out UV rays. See Figures 10, 11, 12, 16, 23, 25, and 32.

Follow-Up Actions, Results, and Plans for Future Proactive Prevention Actions

The recommended next steps and follow-up actions in the Gottfried Creek watershed are shown in Table 2.

Table 1. Next steps and follow-up actions for reducing fecal coliforms in Gottfried Creek.

No.	Related Figure(s)	Action Item	Entity	Date Initiated/Completed	Outcome
1	2,3	Lift Station Lock & Signage	Sarasota County Air & Water Quality	3-1-2012/9-1-2012	Inspected by staff; letter sent 8-13-2012; follow up inspection 9-15-2012
2	7	Raw Water Lines	EWD	2-28-2012/3-12-2012	Raw water lines had been capped
3	8	Stormwater Ponds	FDOT	2-28-2012/4-1-2012	Cattails removed from ponds; regular maintenance
4	13	15 acre parcel on N. Indiana Ave. Determine cattle rotation schedule	FDOT	2-28-2012	Cattle graze only a few months during the year
5	13	15 acre parcel. Determine direction of stormwater runoff flow and discharge point	Sarasota County	2-28-2012/7-16-2012	Runoff percolates or flows through Arlington Cove in shallow swales; No direct discharge to Gottfried Creek.
6	17	Foxwood stormwater ditch - sample	Sarasota County	2-28-2012	Sample results: 10 CFU/100mL
7	28	Air Release Valve	EWD	2-28-2012/2-28-2012	ARV - manual and not automatic
8	29	Park Forest sample site: Compare fecal coliform data to salinity, turbidity, and TSS	Sarasota County	2-28-2012/9-14-2012	Data compared; See Action Item #8 Section
9	33	Stormwater ponds – Elk's Lodge		2-28-2012/4-30-2012	FDOT cleaned out ponds
10	36-40	Horse Pasture – N. Pine; Determine if runoff would reach creek	Sarasota County	2-28-2012/4-1-2012	Runoff treated by retention ponds and wetlands
11	41	Unmaintained ditch	Charlotte County	2-28-2012/5-1-2012	Ditch cleaned out.
12	51	Unmaintained ditch – N. Oxford	Sarasota County	2-28-2012/4-15-2012	Ditch cleaned out; regular maintenance schedule established
13	53	Thomas Ranch - BMP Program	FDACS	6-14-2012	FDACS unsuccessful in meeting with Ranch Manager; Ranch sold 5-2014.
14	78-89	Ranchettes – manure management	Sarasota County-FDACS	5-10-2012/1-23-2013	Workshop held
15	A-8	Stormwater Pipe - sample	Sarasota County	Sampled 12-16-2011	Results: 120 CFU/100mL
16	A-9	Stormwater ditch – Deer Creek MHP	Sarasota County	Sampled 12-16-2011	Results: 550 CFU/100mL
17	90-100	Follow up action – volunteer monitoring station bacteria levels	Sarasota County	7/2, 7/16, 7/30, 2012	See Sampling Investigation Section
18		Follow up action – volunteer monitoring station	Sarasota County	10/5/2012	See Sampling Investigation Section
19		Follow-up action – volunteer monitoring station	Sarasota County	4/23/2013	See Sampling Investigation Section
20		Follow-up action – volunteer monitoring station	Sarasota County	6/3/2013	See Sampling Investigation Section
21	N/A	Public Education – Pet Waste	Sarasota County	1-1-2013/5-30-2013	Pet waste brochure designed and distributed; replaced on "as-needed basis.
22	A-60	Private Lift Station @ 300 Bay Hts. Rd.	Charlotte County Sarasota County	2-28-2012/7-2-2012	Staff spoke with resident about proper maintenance of lift station.
23	29	County sampling site @ Park Forest Blvd. – protocol when fish present	Sarasota County	2-28-2012/4-1-2012	Document numbers and location of fish; sample upstream to avoid sampling stirred up sediments.

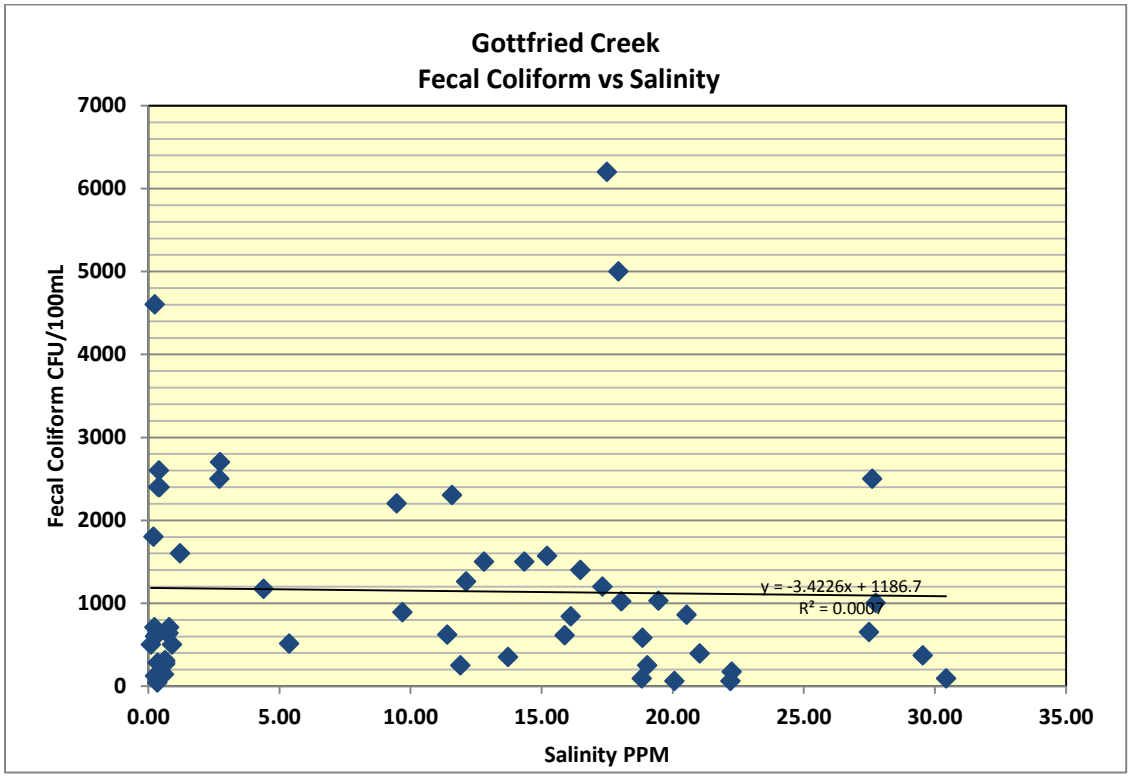
Action Item 8 – Park Forest Data Comparison

Sarasota County conducts monthly sampling at station 21FLFTM SARABY0022FTM, which is also one of the stations sampled by the FDEP to establish impairment and adopt the fecal coliform TMDL. During the WTW Field Exercise on February 28, 2012, the site was inspected by the WTW Team. While observing a large school of mullet at the site (**Figure 31**), the team realized that creek waters were tidally influenced up to and possibly upstream of that point. Since the creek is very narrow and shallow at the site, it was suggested that large schools of fish such as mullet reaching the site during a high tide could potentially stir up sediments causing a spike in fecal coliform values.

The Action Item #8 Task entailed analyzing the data and comparing fecal coliform values to salinity, turbidity, and total suspended solids in order to determine if a correlation existed among the parameters. Fecal coliform was also compared to rainfall.

There is no significant correlation between fecal coliform and salinity (**Figure 108**). While there are a couple of high fecal coliform values at a higher tide (6200 fecal/17.50 ppt; 5000 fecal/17.94 ppt), there is an inverse relationship between fecal coliforms and salinity most of the time. In addition, fecal coliform bacteria do not survive very long in salt water. The results are an indication that marine life is probably not a factor in causing re-suspension of fecal coliform enriched sediments into the water column.

Figure 90. Fecal Coliform vs. Salinity



There is a closer correlation between fecal coliform and turbidity (**Figure 109**). Forty percent of the samples displayed a positive relationship, while 60% displayed an inverse relationship.

Figure 91. Fecal Coliform vs. Turbidity

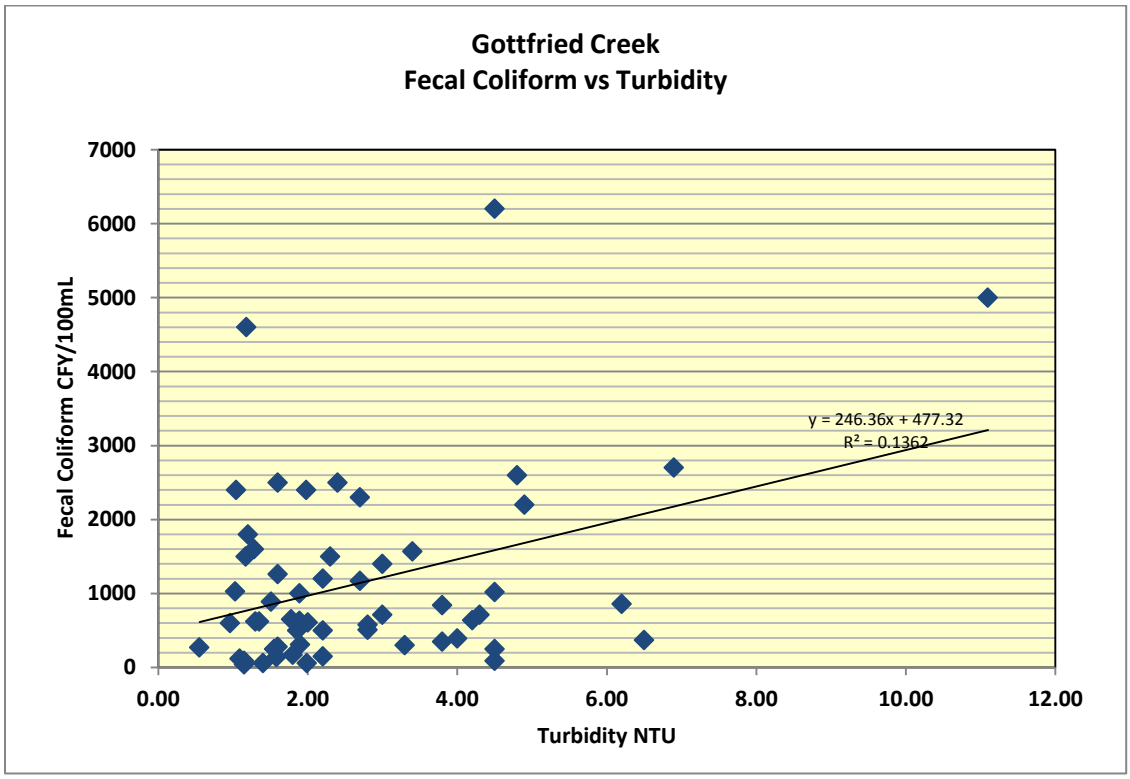
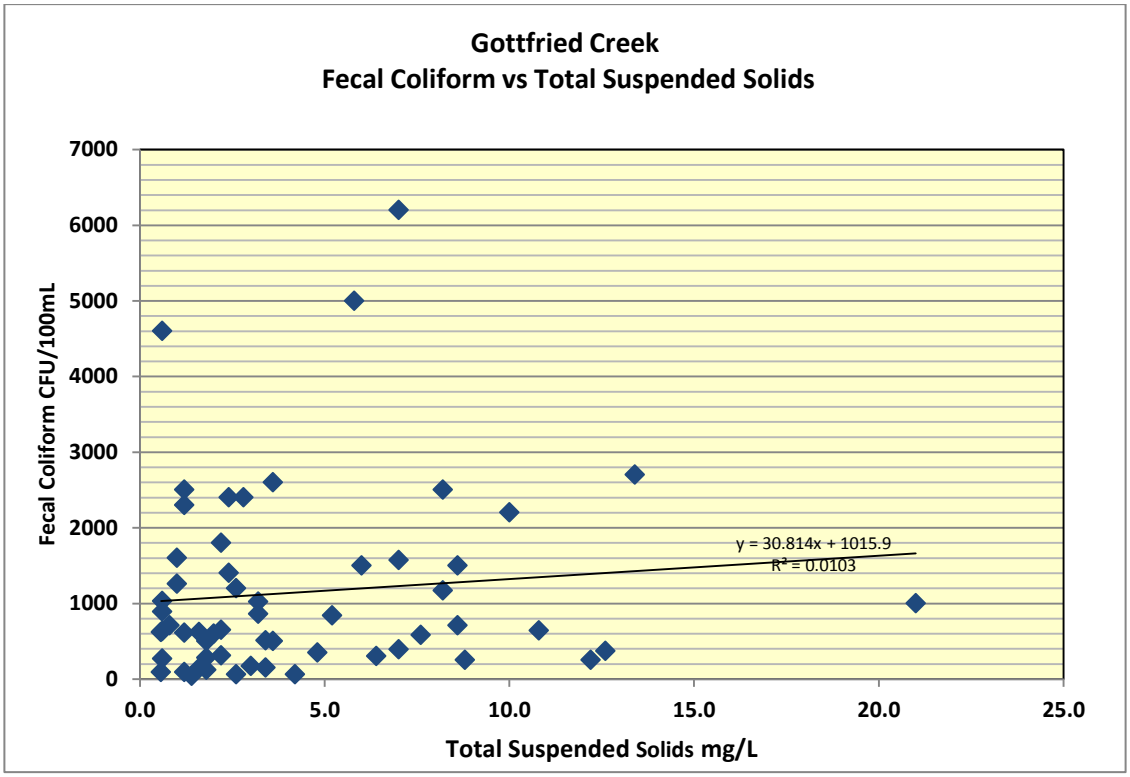
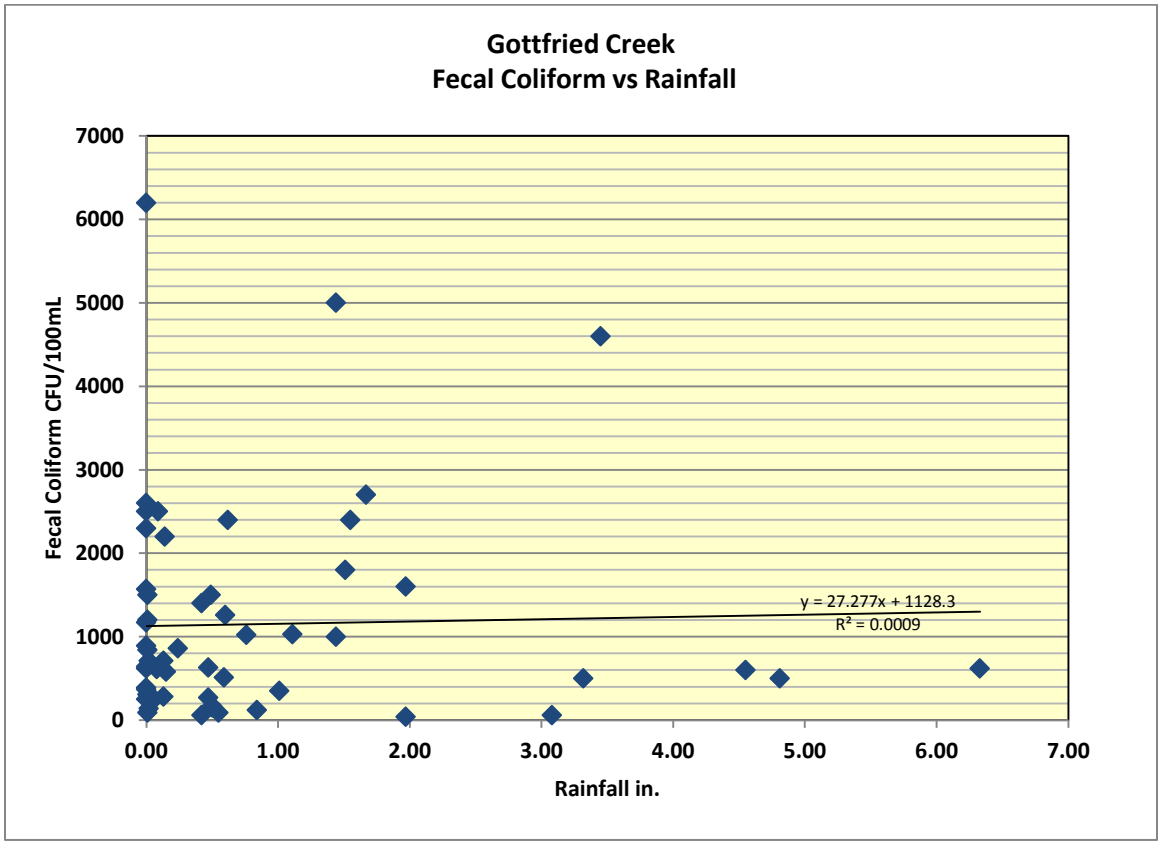


Figure 92. Fecal Coliform vs. Total Suspended Solids



There is also a closer relationship between fecal coliform and TSS (**Figure 110**). Thirty-five percent of the samples displayed a positive relationship, while 65% displayed an inverse relationship.

Figure 93. Fecal Coliform vs. Rainfall



Fecal coliform values did not correlate well with rainfall (**Figure 111**). Only 30% of the samples that exceeded 400 CFU were collected after a 7-day antecedent rainfall period where rainfall amounts were ≥ 1 inch; 70% of the samples that exceeded 400 CFU were collected after a 7-day antecedent rainfall period where rainfall amounts were ≤1 inch.

Gottfried Creek is very narrow, shallow, and heavily shaded at the sampling station. While it is tidally influenced, there isn't much flushing that high up in the system. The dense canopy doesn't afford adequate UV light treatment. Fecal coliform values did not correlate well with rainfall or salinity. They did correlate slightly with TSS and turbidity, which is an indication that fecal coliform enriched sediments that are re-suspended into the water column during sampling could be contributing to the higher bacteria levels.

Action Item 14 - Ranchette and Small Farm Workshop

As a result of the inspection conducted on May 10, 2012, a workshop was held on January 23, 2013 to provide property owners information about proper waste management and disposal. An invitation/flyer was sent directly to each property owner and posted in the immediate area one-month prior to the

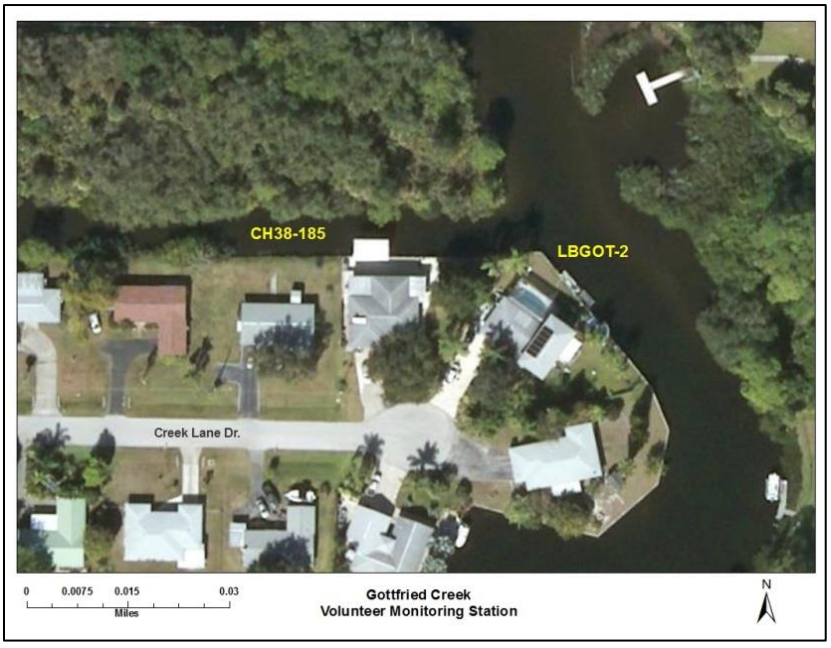
workshop. A second reminder was sent out one week before the workshop. County staff provided an introductory presentation that provided the purpose of the workshop, background TMDL information,

Information about the Gottfried Creek fecal coliform TMDL, and both natural and manmade bacteria sources, etc. Dr. Robert Kluson, UF/IFAS Sarasota County Extension, was the guest speaker and provided an excellent presentation about Best Management Practices for small farms and ranchettes. The following educational literature was also available: Property sketch sheet with instructions for documenting potential bacteria sources; Good Neighbor Guidelines for On-farm and Offsite Application of Livestock Waste; Small Acreage Farm & Ranch BMPs for Protecting Florida's Water; Good Horse Sense – Protecting Water Resources; and Managing Horse Manure by Composting. Unfortunately, turnout was lower than expected. Consequently, post-workshop letters with the property sketch sheet and all of the brochures were sent out to all property owners inviting them to contact staff with questions or assistance in completing the property sketch sheet. **Appendix C** contains copies of the invitations/flyers, presentations, informational brochures, and follow-up letter to the property owners.

Action Items 17-20– Volunteer Sampling Site Investigation

In addition to the preceding post-inspections, Sarasota County was asked to conduct an investigation to determine a possible explanation for consistently elevated fecal coliform values at a FDEP volunteer sampling station (LBGOT-2). The station is located at the volunteer's residence which is on a corner lot bordered by Gottfried Creek and canal CH38-185 which flows from the west to the creek (**Figure 90).**

Figure 94. Volunteer Water Quality Monitoring Station



On July 2, 2012 Sarasota County staff collected 4 samples during an outgoing tide: GOT-7 downstream of the volunteer station; GOT-8 upstream of the sampling station; GOT-9 in CH38-185 approximately 50 ft. upstream of the Creek; and GOT-10 farthest accessible point upstream in CH38-185 (**Figures 91-96)**.

Figure 95. Gottfried Creek Sample Sites 7-2-2012

The sample results were: GOT-7: 60 CFU/100mL; GOT-8: 250 CFU/100mL; GOT-9: 200 CFU/100mL; and GOT-10:300 CFU/100mL. The values did not exceed surface water quality standards on that date. It was determined that further investigation of the surrounding area was needed to try to determine a potential bacteria source.

Figure 96. Sample Site GOT-7.

Figure 97. Sample Site GOT-8

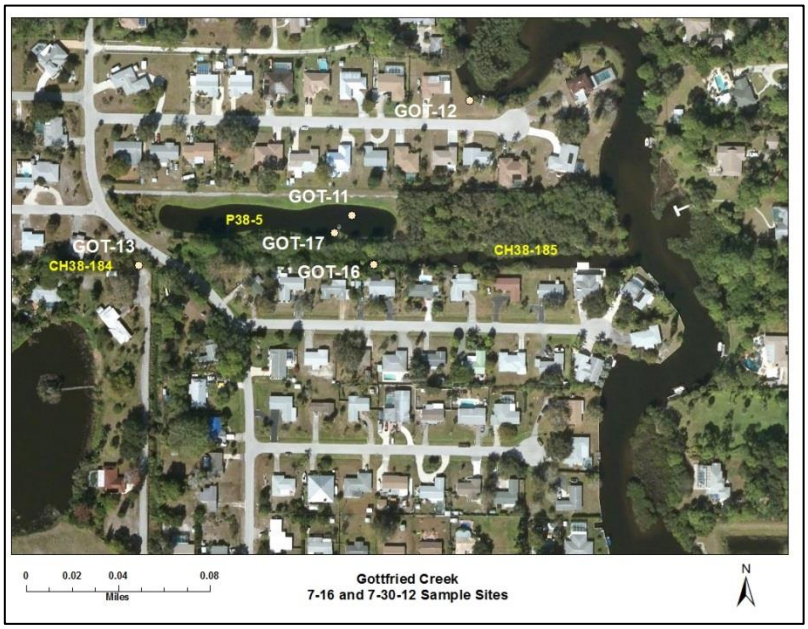
Figure 98. Sample Site GOT-9.

Figure 99. Sample Site GOT-10.

Figure 100. County Staff Collecting Sample.

A review of aerial maps showed that stormwater pond DP38-5 located adjacent to and north of canal CH38-185 collected and treated stormwater runoff from the surrounding area that ultimately discharged to the canal near the western end. Also, a stormwater ditch CH38-184, upstream of the pond and canal, flowed from the west to pond CP38-5 during periods of high flow. It bypasses pond DP38-5 during periods of low flow and flows directly into the west end of canal CH38-185. On July 16, 2012 county staff collected samples from stormwater pond P38-5 (GOT-11), ditch CH38-184 (GOT-13) upstream of the pond, and Gottfried Creek (GOT-12) upstream of the volunteer station **(Figure 97**).

Figure 101. Gottfried Creek Sample Sites 7-16 and 7-30-2012.



Figures 98-107 include photos of the sample site location. The water level in the pond (**Figure 101**) was low and aquatic vegetation, including hydrilla, an exotic invasive aquatic plant, had almost completely overtaken the pond bottom. The surface was covered with duck weed, which is indicative of high nutrient low flow conditions. A number of wading birds that included 2 Great Blue Herons, 1 Little Blue Herons, 2 Glossy Ibis, and 12 (4 adults and 8 juveniles) moorhens inhabited the pond. No alligators or other wildlife were observed. Sample GOT-12 was taken directly from the creek (**Figure 107**) upstream of the volunteer station. The water level in the ditch (**Figure 102**) was very low, and there was little flow. The west end of the canal is completely shaded and overgrown with heavy, entangled vegetation that consists mostly of Brazilian Pepper. A resident also reported that the canal was home to a large alligator that could be a contributor by stirring up bacteria laden sediments.

Figure 102. Stormwater Ditch DP38-184.

Sample Site GOT-13

Figure 103. Stormwater Pipe from DP38-184 to Vault.

Figure 104. Stormwater Vault

Figure 105. Stormwater Pond DP38-5

Sample Site GOT-11. View West to East

Figure 106. Stormwater Pond DP38-5.

Figure 107. Stormwater Pond DP38-5

View East to West

Pond Outlet Structure

Figure 108. Stormwater Pond DP38-5.

Figure 109. Outfall to Canal

Pond outlet structure. Sample Site GOT-17

Flow from outlet structure to canal

Figure 110. Ditch Downstream of Pond Outfall

Sample Site GOT-16

Figure 111. Gottfried Creek Upstream of Canal

Sample Site GOT-12

The sample results were: GOT-11: 6000 CFU/100mL; GOT-12: 700 CFU/100mL; and GOT 13: 12000 CFU/100mL. These indicated that the bacteria could be coming from ditch CH38-184 and pond DP38-5. The bacteria values at GOT-12 site upstream of the volunteer station were relatively low.

Since the origin of ditch CH38-184 was unknown, staff surveyed the area and determined that the ditch originated in a stormwater pond (P38-20) located on Dearborn Avenue at Sandy's Island Circle; then flowed north and eastward to pond DP38-5 and CH38-185 (**Figure 108**). The residential area around the pond had previously been serviced by OSTDs; however, central sewer service became available and most of the residences had connected. Staff put the pond on the schedule to be sampled during the next sampling event, which was on 7/30/2012. Samples were collected from ditch CH38-184 (GOT-13) upstream of pond P38-20 (**Figure 98**); the canal (GOT-16) downstream of the pond discharge site (**Figure 106**); and directly from the pond outfall structure FOT-17 (**Figures 102-104**).
An attempt was made to collect a sample from the pond P38-20; however, heavy vegetation blocked access and staff could not find any residents home that could grant permission to sample from their property.

The sample results were: GOT-13: 2700 CFU/100mL; GOT-16: 2800 CFU/100mL; and GOT-17: 19000 CFU/100mL. These results appeared to indicate that birds and wildlife in the pond could be contributing to the higher fecal coliform values. It also appears that the pond is providing some treatment since the levels in the ditch were 2,800 CFU/100mL. The shoreline on both sides of the ditch from the pond to approximately 525 upstream of Gottfried Creek is so heavily vegetated that very little sunlight can penetrate the canopy to afford adequate UV light treatment of the bacteria. This could be also contributing to the bacteria spikes in the volunteer samples. Approximately 1.41 inches of rain had also fallen in the area since July 2, 2012.

Figure 112. All Sample Sites.

Staff could not return until October to take additional samples. Samples were again collected from GOT-13, GOT-16, and GOT 17. An additional station (GOT-18) was added since staff was able to collect a sample from the stormwater pond P38-20 on Dearborn Avenue (**Figure 109**). The sample results were: GOT-13: 1700 CFU/100mL; GOT-16: 450 CFU/100mL; GOT-17: 200 CFU/100mL; and GOT-18: 170 CFU/100mL.

The bacteria levels in pond P38-20 were below standards; however, they increased in ditch CH38-134. The levels in pond P38-5 were also below standards which is an indication that runoff is receiving sufficient treatment for bacteria reduction. The levels increased slightly in canal CH38-185.

Figure 113. Pond 38-20; Sample Site GOT-18

In February 2013, FDEP staff advised that the department was considering the use of sucralose as a potential indicator of human fecal bacteria in surface water. Research has shown that sucralose (an artificial sweetener marketed as Splenda®) could be an effective indicator since it is not broken down by the body and, therefore, is released into the sanitary sewer system. It is also not broken down by the wastewater treatment process and could enter surface waters at advanced wastewater treatment effluent discharge sites. It could also enter surface waters via reclaimed irrigation water, SSOs, and failing OSTDs. One study found 47-2900 nanograms per liter (ng/L) of sucralose in domestic wastewater after treatment. FDEP staff collected sucralose samples at station LBGOT-2 during the monthly sampling event on April 19, 2013. The sample results were: LBGOT-2: 0.14 ug/L = 140 ng/L; LBGOT-2 REP: 0.15 ug/L = 150 ng/L; LBGOT-2 Blank: 0.0097 ug/L = 9.7 ng/L. The value of 140 ng/L appeared to indicate a human sewage impact. There had been no recent SSOs, and reclaimed irrigation water was not available in that area. Since there was a trace amount of sucralose in the blank sample these sample results were not considered entirely reliable.

County staff conducted sampling on April 25, 2013 to determine if there were any significant changes in the bacteria levels. The sample results were: GOT-12: 220 CFU/100mL; GOT-13: 230 CFU/100mL; GOT-16: 3700 CFU/100mL; GOT-17: 10(U) CFU/100mL; and GOT-18: 50 CFU/100mL. Only one of the sites (canal CH38-185) exceeded water quality standards. Again, this site is so heavily shaded that very little sunlight can penetrate the canopy to afford adequate UV light treatment of the bacteria.

After discussing the various sample results with FDEP staff, County staff determined that it would be prudent to coordinate efforts and collect replicate samples during the June 3, 2013 volunteer sampling event. County staff also collected sucralose samples to be analyzed by the FDEP Laboratory. During the sampling event, the volunteer advised that the next door neighbor on the canal had not yet connected to central sewer. She also stated that occasionally she could see a blue stream coming down the canal that smelled like detergent. A home upstream could have a washing machine discharging directly into the canal; but no home could be identified without observing the actual discharge. The volunteer monitor was asked to contact the County Air and Water Quality Department during the event so the matter could be investigated. The volunteer bacteria results were: LBGOT2-Creek: 50 CFU/100mL and LBGOT-2 Canal: 26 CFU/100mL. The county replicate results were: GOT-9 - Creek: 110 CFU/100mL and LBGOT2-Canal: 80 CFU/100mL. All results were comparable and well below water quality standards.

County staff also collected samples from previous sampling sites. Those results were: GOT-12: 70 CFU/100mL; GOT-13: 5400 CFU/100mL; GOT-16: 2200 CFU/100mL; GOT-17: 10 CFU/100mL; and GOT-18: 40 CFU/100mL. Again, the results indicate that the bacteria could be entering the canal from the upstream ditch (CH38-184) and growing in the canal (GOT-16).

The results from the sucrolase samples collected by county staff and analyzed by the FDEP were: LBGOT2 Canal: 370 ng/mL; GOT-17: 10 ng/L(U); and GOT-13: 10 ng/L(U). No sucralose was detected in the ditch upstream of the canal or the stormwater pond.. This is an indication that the bacteria in the ditch upstream of the canal and the stormwater pond are most likely from nonhuman sources. The bacteria in the canal could be from a human source. Sample results of all county sampling events are shown in **Table 2**.

Table 2. Sarasota County Gottfried Creek Fecal Coliform Sampling Results

Gottfried Creek Sample Results			
Date	**Station_ID**	**Site_Desc**	**Fecal Col CFU/100mL**
July 2, 2012	GOT-7	Gottfried Creek	60
July 2, 2012	GOT-8	Gottfried Creek	200
July 2, 2012	GOT-9	Canal CH38-185	250
July 2, 2012	GOT-10	Canal CH38-185	300
July 16, 2012	GOT-11	Pond P38-5	6000
July 16, 2012	GOT-12	Gottfried Creek	700
July 16, 2012	GOT-13	Ditch CH38-184	12000
July 30, 2012	GOT-13	Ditch CH38-184	2700
July 30, 2012	GOT-16	Canal CH38-185	2800
July 30, 2012	GOT-17	Pond P38-5	19000
October 5, 2012	GOT-13	Ditch CH38-184	1700
October 5, 2012	GOT-16	Canal CH38-185	450
October 5, 2012	GOT-17	Pond P38-5	200
October 5, 2012	GOT-18	Pond P38-20	170
April 25, 2013	GOT-12	Gottfried Creek	220
April 25, 2013	GOT-13	Ditch CH38-184	230
April 25, 2013	GOT-16	Canal CH38-185	3700
April 25, 2013	GOT-17	Pond P38-5	10
April 25, 2013	GOT-18	Pond P38-20	50
June 3, 2013	GOT-9	Gottfried Creek	110
June 3, 2013	GOT-12	Gottfried Creek	70
June 3, 2013	GOT-13	Ditch CH38-184	5400
June 3, 2013	GOT-16	Canal CH38-185	2200
June 3, 2013	GOT-17	Pond P38-5	10
June 3, 2013	GOT-18	Pond P38-20	40

Investigation Summary

An exact source of the elevated fecal coliform bacteria levels at the bacteria station could not be determined. Below is summary of the results.

- Stormwater pond P38-20 on Dearborn Avenue (farthest point upstream) did not appear to be a source. Most of the residences are on central sewer, and sample results were well below water quality standards.
- Bacteria are entering and being transported downstream by ditch CH38-184, which connects P38-20 with pond P38-5 and canal CH38-185. The sucralose sample collected on June 3rd did not indicate human impact.
- Bacteria levels occasionally spike in pond P38-5 most likely in response to rainfall events. Since 60% of the samples were well below water quality standards, the pond appears to provide highly effective treatment.

- Bacteria levels in Gottfried Creek upstream and downstream of the volunteer site are consistently low, which indicates that the canal may be the source.
- Bacteria levels are consistently elevated in canal CH38-185 (80% of samples). Four potential sources or reasons were identified: 1) The neighbor's septic system. The sucralose sample appeared to indicate a human source. Even though the septic system was not obviously failing, it could be a source through groundwater migration because of its close proximity to the creek. 2) Gray water from an upstream washing machine. Studies have shown that washing machines harbor large numbers of fecal bacteria that are discharged in the rinse water. 3) The heavily shaded west end of the canal may not allow adequate UV light penetration to kill the bacteria, allowing it to re-grow and persist in the sediments. 4) Bacteria laden sediments could be stirred up by the resident alligator, birds, fish, or other wildlife.

Since the investigation, one potential source was eliminated: the volunteer's next door neighbor connected to the sanitary sewer in 2014. The volunteer was also asked to contact county staff immediately when observing any suspected washing machine discharge so the matter can be investigated and samples taken while it is occurring.

Action Item 21 - Pet Waste Campaign

The significant impact of bacteria on of improper pet waste disposal on surface water quality has come to the forefront in the last ten years. Recent research studies have found that non-human waste (domestic pets, farm animals, and wildlife) constitutes a major source of bacterial pollution in urban watersheds. To protect water quality and public safety, many communities have established pet waste programs to educate the public about the importance of picking up after pets. Others have enacted Pet Waste Ordinances that mandate proper disposal of pet waste. During the WTW exercise, no serious pet waste disposal issues were observed. The team even observed a resident carrying a pet waste bag while walking his dog (**Figure 27**). Unfortunately, everyone is not as responsible at that pet owner. Since pet waste has been identified as a potential source of fecal coliform impairments in County waterbodies, launching a pet waste campaign in the Gottfried Creek watershed was identified as a WTW action item. A brochure was designed and distributed to appropriate businesses such as the county library, county sports complex, pet stores, animal shelters, veterinarian offices, human society, etc. **Appendix D** contains copies of the brochure and distribution list. Supplies are replenished on an as-needed basis.

Presentations

Sarasota County staff gave the following presentations (**Appendix F**) to inform the public about the WTW process: Stormwater Environmental Utility Advisory Committee, 4-12-2012; CHNEP Technical Advisory Committee, 7-11-2012; Florida Stormwater Association Conference, 12-6-2012; and the County Board of County Commissioners meeting, 6-10-2013.

Results

The Walk the Waterbody event for the Gottfried Creek fecal coliform TMDL was highly successful. It brought all of the stakeholders together to work cooperatively toward the common goal of finding and eliminating and/or minimizing sources of fecal coliform bacteria. Below is a summary of the results:

- No sources were identified during the pre-event shoreline inspection. Two suspected sites were sampled and were not a source.
- No public or private lift stations were malfunctioning or overflowing. Seven private and two public lift stations were lacking emergency signage and a lock was missing from a private lift station pump station lid. All violations were corrected.
- No point sources were found. One stormwater ditch was sampled and no issues were found
- The creek is fenced off preventing access to cattle on the Thomas Ranch.
- No obvious issues were observed during the inspection of an area of ranchettes and small farms. A post-event workshop was held to inform and educate the property owners about proper waste management and disposal.
- The entire basin, except for a small area at the southeast corner, is on central sanitary sewer.
- No SSOs were discovered during the event, and the EWD has reported no major SSOs.
- Pet waste and farm animals such as horses, cattle, chickens, hogs, and goats are probable sources of the bacteria.
- A pet waste brochure specific to Gottfried Creek was prepared and distributed throughout the basin to educate the public about the importance of proper pet waste disposal.
- Natural sources such as birds and wildlife are most likely the major contributors of fecal coliform bacteria to the creek.

Future Proactive Prevention Actions

Future proactive prevention actions by stakeholders are:

Ambient Monitoring

- Sarasota County will continue to collect monthly water quality samples from the creek.
- The monitoring data can be reviewed on the Sarasota Water Atlas site at: http://www.sarasota.wateratlas.usf.edu/

Monitoring Response

- If ambient monitoring results indicate chronic exceedances over 2000 CFU/100mL, Sarasota County will conduct a sanitary survey within a one-mile radius of the sampling site to identify anthropogenic sources of pollution. The sanitary survey, which uses WTW methods, will include looking for signs of sewage leaks, SSOs, and illicit connections, inspecting private and public lift stations, and collecting samples. Samples will be collected at the site and sites upstream and downstream to determine if the source is persistent and narrow down the potential location of the source. The investigation will continue until the source is identified or the sampling results demonstrate the source is no longer contributing.
- If the monitoring results demonstrate an increasing trend for 4 consecutive quarters, Sarasota County will sample multiple stations in the watershed to identify hot spots. If hot spots are identified, field investigations, including sample collection, will be conducted to determine potential sources.

- If Gottfried Creek remains impaired, the monitoring response plan will be revisited every 5 years and updated as needed. If no updates are needed, Sarasota County will continue implementing plan components that appear to be minimizing or reducing bacteria loading to the creek.
- Sarasota County will continue to respond to citizen concerns about fecal pollution issues in the basin and collect samples as needed.

Wastewater

- Municipal owners of wastewater collection systems within the watershed will properly maintain wastewater collection systems and report SSOs according to FDEP wastewater and stormwater regulations.
- If a need for a private lift station inspection program is demonstrated through frequent reports of SSOs resulting from poorly maintained lift stations, an annual inspection and compliance program will be developed and implemented by the appropriate agency.
- If a suspected washing machine discharge is reported in the canal at the FDEP volunteer monitoring site LBGOT-2, County staff will conduct an investigation to identify the source residence and provide assistance in eliminating the discharge.

Stormwater

- Sarasota County, FDOT, and the City of North Port will continue to prioritize their respective stormwater inventory within the watershed for inspection and maintenance, including inspection for illicit discharge and illegal connections, consistent with the Phase I MS4 permit requirements.
- Phase I MS4 permittees within the watershed will require additional erosion and sedimentation controls during site-plan review and inspect construction sites at a higher frequency as a result of prioritizing construction activity within the watershed consistent with permit requirements.
- Phase I MS4 permittees within the watershed will respond to SSOs and exfiltration/infiltration events where wastewater may enter the stormwater system immediately and consistent with requirements of the MS4 and wastewater permits.
- Charlotte County will continue to properly maintain its stormwater and wastewater collection systems.

Education and Outreach

- Phase I MS4 permittees will enhance public outreach and education efforts within the watershed regarding bacteria pollution prevention and by providing contacts for receiving concerns from the public.
- The pet waste campaign will continue through distribution of the pet waste brochure and by conducting outreach programs. Changes to municipal ordinances within the watershed will be considered where appropriate to minimize bacteria loadings.

Ongoing Protective Actions

- Changes to municipal ordinances within the watershed will be considered where appropriate to minimize bacteria loadings.
- Sarasota County and the City of North Port will continue to provide oversight of all development in the watershed in the form of development reviews, inspections, zoning compliance, permitting, and environmental regulation compliance.

Special thanks to the individuals who participated in this event; your dedication is appreciated!

Figure 114. WTW Team.

Front row from left to right: Leilani Farrell (Esciences-FDOT); Kathy Meaux (Sarasota County); Jennifer Thera (FDEP); Joanne Vernon (Charlotte County). Back row from left to right: Anita Nash (FDEP); Edgar Saint Amand (City of North Port); Tim Kirby (Sarasota County); Jay Linden (EWD); Rob Wright (Sarasota County); Hector Mendez (DOH).

Additional questions on this event should be directed toward:

Anita Nash
Environmental Consultant
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection
Office: (850) 245-8545
Email: anita.nash@dep.state.fl.us

Kathy Meaux
Senior Environmental Scientist
Water Quality Planning
Sarasota County Public Utilities, Stormwater
Office: (941) 650-1640
Email: kmeaux@scgov.net

List of Acronyms and Abbreviations

ARV	Air Release Valve
AWTF	Advanced Wastewater Treatment Facility
BMAP	Basin Management Action Plan
BMP	Best Management Practice
CC	Charlotte County
CFU	Colony Forming Unit
CHAP	Charlotte Harbor Aquatic Preserve
CONP	City of North Port
DOH-Sarasota	Florida Department of Health, Sarasota County
EWD	Englewood Water District
F.A.C.	Florida Administrative Code
FC	Fecal Coliform
FDACS	Florida Department of Agricultural and Consumer Services
FDEP	Florida Department of Environmental Protection
FDLE	Florida Department of Law Enforcement
FDOT	Florida Department of Transportation
GIS	Geographic Information System
GPS	Global Positioning System
SC	Sarasota County
SCPW	Sarasota County Public Works
IFAS	University of Florida Institute of Food and Agricultural Sciences
IWR	Impaired Waters Rule
L/S	Lift Station
MF	Membrane Filter
MGD	Million Gallons per Day
MHP	Mobile Home Park
mL	Milliliters
MPN	Most Probable Number
ng/L	Nanograms per Liter
MS4	Municipal Separate Storm Sewer System
OSTDS	Onsite Sewage Treatment and Disposal System
PIC	Potential Illicit Connection
PVC	Polyvinyl Chloride
ROW	Right of Way
SOP	Standard Operating Procedure
SR	State Road
SSO	Sanitary Sewer Overflow
U	Undetected
TMDL	Total Maximum Daily Load
ug/L	Micrograms per Liter
UV	Ultra-Violet
WBID	Waterbody Identification
WTW	Walk the Waterbody
WWTP	Wastewater Treatment Plant