

Summary of Results

Walk the WBID Exercise for Turkey Creek (WBID 1578B)



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Purpose and Contents

This report summarizes the results of the Walk the WBID exercise for the Turkey Creek watershed, located in eastern Hillsborough County, on November 30th, 2011. 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 septic tanks, sewer and stormwater infrastructure, and potential sources that are contributing fecal coliform bacteria to the creek.

The Walk the WBID exercise is a low-cost and effective effort to begin addressing fecal coliform pollution in Turkey Creek to meet 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 is Hillsborough County Public Works; other participants include: Florida Department of Environmental Protection [FDEP], Hillsborough County Health Department [DOH], City of Plant City, Florida Department of Agriculture and Consumer Services [FDACS], Environmental Protection Commission of Hillsborough County [EPC], University of Florida Institute of Food and Agricultural Services [IFAS], 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 Turkey Creek Watershed

Turkey Creek is located in eastern Hillsborough County, within the Alafia River Basin (Figure 1). The northern segment of Turkey Creek, above State Road 60, is narrow, often heavily vegetated, and highly dendritic with numerous tributaries. The southern segment, below State Road 60, flows through primarily undeveloped, reclaimed phosphate mines. Here, the Creek consolidates into a single branch, runs relatively straight, and increases in width.

During the annual dry season and periods of prolonged drought, Turkey Creek often experiences periods of reduced flow and intermittency [Figure 64]. Given the subtropical climate and periods of stagnation indicative of an intermittent stream, bacterial re-growth is believed to be an increased possibility in Turkey Creek.

The Turkey Creek watershed includes portions of unincorporated Hillsborough County and the City of Plant City. The watershed is approximately 19.08 square miles (12,213 acres). Reclaimed phosphate mines, located to the south and west of the watershed, comprise 27.46 percent [3407 acres]. Low density residential comprises 16.89 percent [2063 acres]. Agricultural land use comprises 33.77 percent [4124 acres]. Wetlands comprise 6.21 percent [758 acres].

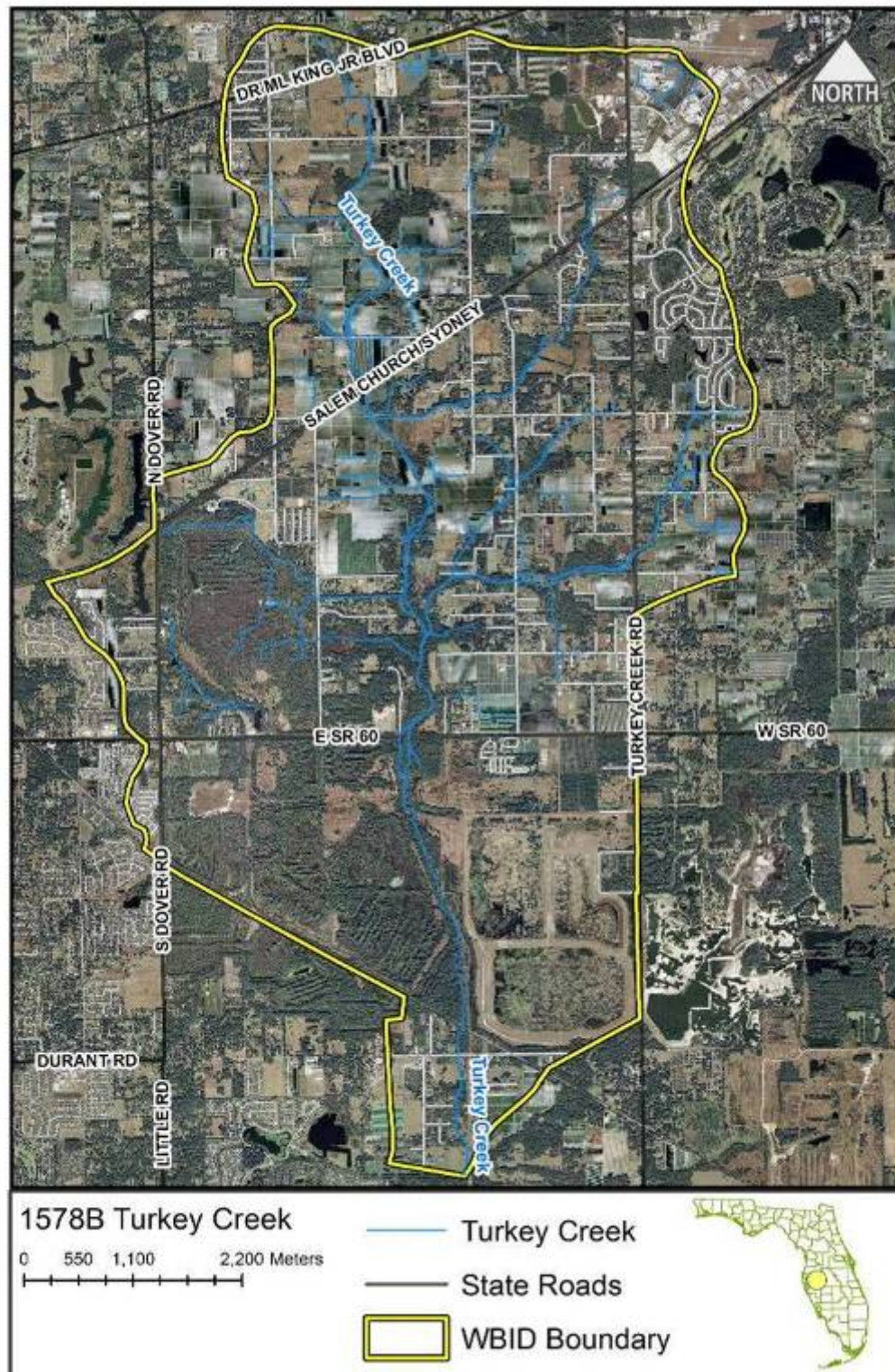


Figure 1. Aerial photo showing the boundary of the Turkey Creek watershed and major hydrologic features in the area.

Fecal Coliform Impairment of Turkey Creek

Turkey Creek (WBID 1578B) was verified impaired for fecal coliform bacteria in June 2008, based on the state's Impaired Surface Waters Rule (IWR) (see box at right), and Total Maximum Daily Loads (TMDL) 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 64 percent reduction in in-stream concentrations for Turkey Creek to meet state water quality standards. Currently, Valrico Advanced Wastewater Treatment Facility is the only point source permitted in the basin. The discharge location is approximately 27 57' 30" latitude north and 82 12' 30" longitude west. The existing system is permitted for 3.0 MGD annual average daily flow (AADF) outfall and a monthly average maximum of < 75 % detection and 25 CFU/100 mL for any single sample. Currently, the facility discharges approximately 1.6 MGD annual average daily flow. According to our review of the sampling history, the effluent is sampled almost daily and currently shows disinfection meets and exceeds the permitted standards. Additionally, wasteload allocations have been assigned to two municipal separate storm sewer systems (MS4) permittees: Hillsborough County and the City of Plant City.

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 Hillsborough County Public Works, Florida Department of Environmental Protection [FDEP], Hillsborough County Health Department [DOH], City of Plant City, Florida Department of Agriculture and Consumer Services [FDACS], Environmental Protection

Commission of Hillsborough County [EPC], and the University of Florida Institute of Food and Agricultural Sciences [IFAS].

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 Hillsborough County Environmental Protection Commission [EPC].

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 meetings organized by Hillsborough County Public Works; these included Florida Department of Environmental Protection [FDEP], Florida Department of Agriculture and Consumer Services [FDACS], Tampa Bay Estuary Program [TBEP], Environmental Protection Commission of Hillsborough County [EPC], Hillsborough County Health Department [DOH], Polk County, City of Plant City, City of Lakeland, and the University of Florida Institute of Food and Agricultural Sciences [IFAS]. In preparation for these meetings, each entity provided information about Turkey Creek to better acquaint themselves with the conditions in the watershed. The information was provided in advance to Hillsborough County Public Works, 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 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, 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, Hillsborough County Public Works 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; including representatives from Hillsborough County Public Works, FDEP, FDACS, EPC, DOH, City of Plant City, and IFAS; 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 north of SR 60 while in the field, referring to the maps to follow the creek. The portion of the watershed south of SR 60 flows through reclaimed phosphate mines, all private property except the stream itself, with no known possible anthropogenic sources in these areas. In addition, monitoring data indicated the source of the impairment could be found north of SR 60 [see Figures 2 and 3 below]. Team members observed the banks of all major tributaries and explored 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);*
- *Package plants;*
- *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;*
- *Stormwater drains undergoing repairs;*
- *Stormwater outfalls discharging from underground conveyances or into ponds;*
- *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 64 summarize the water quality issues and potential fecal coliform sources that the team observed during the Walk the WBID exercise on 11/30/2011, as well as the results of the water quality sampling carried out on that date.

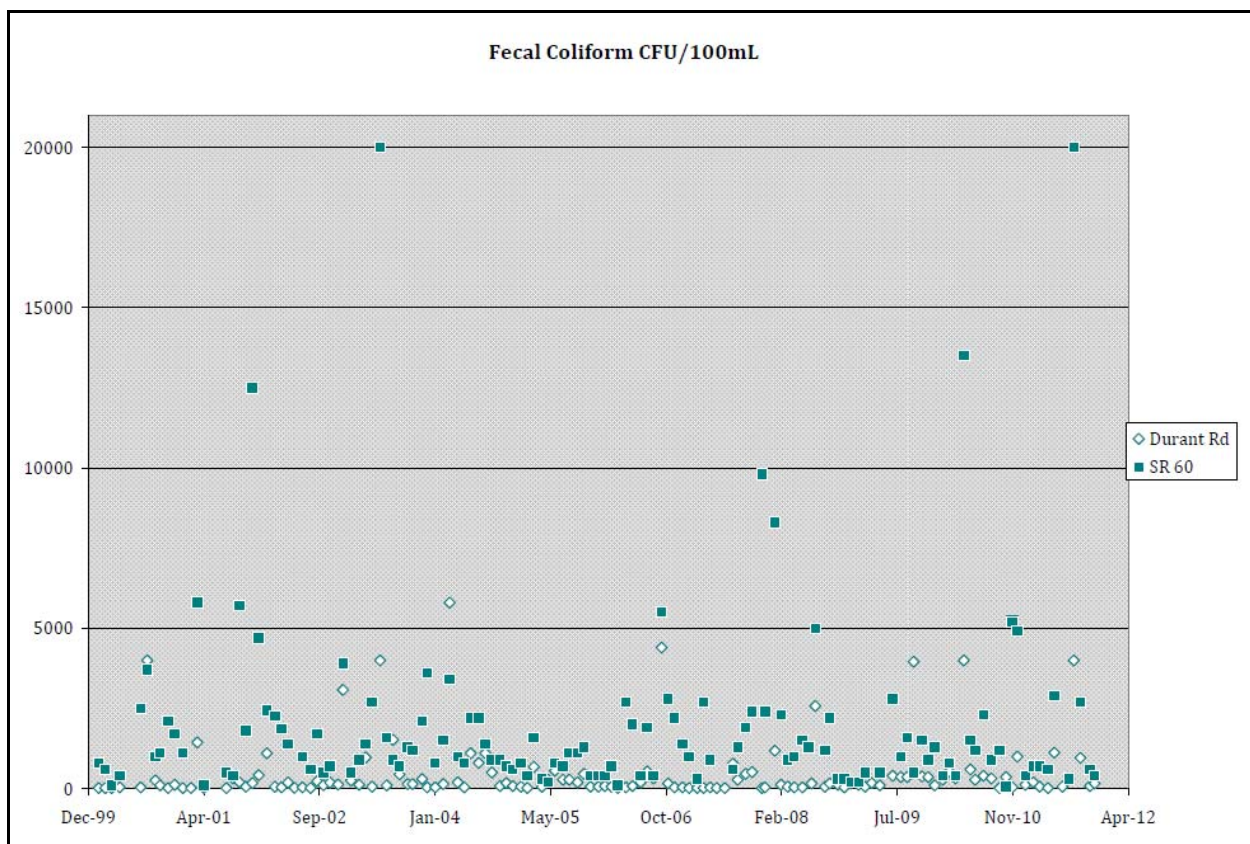


Figure 2. Fecal Coliform observations in Turkey Creek at Durant Rd and SR 60.

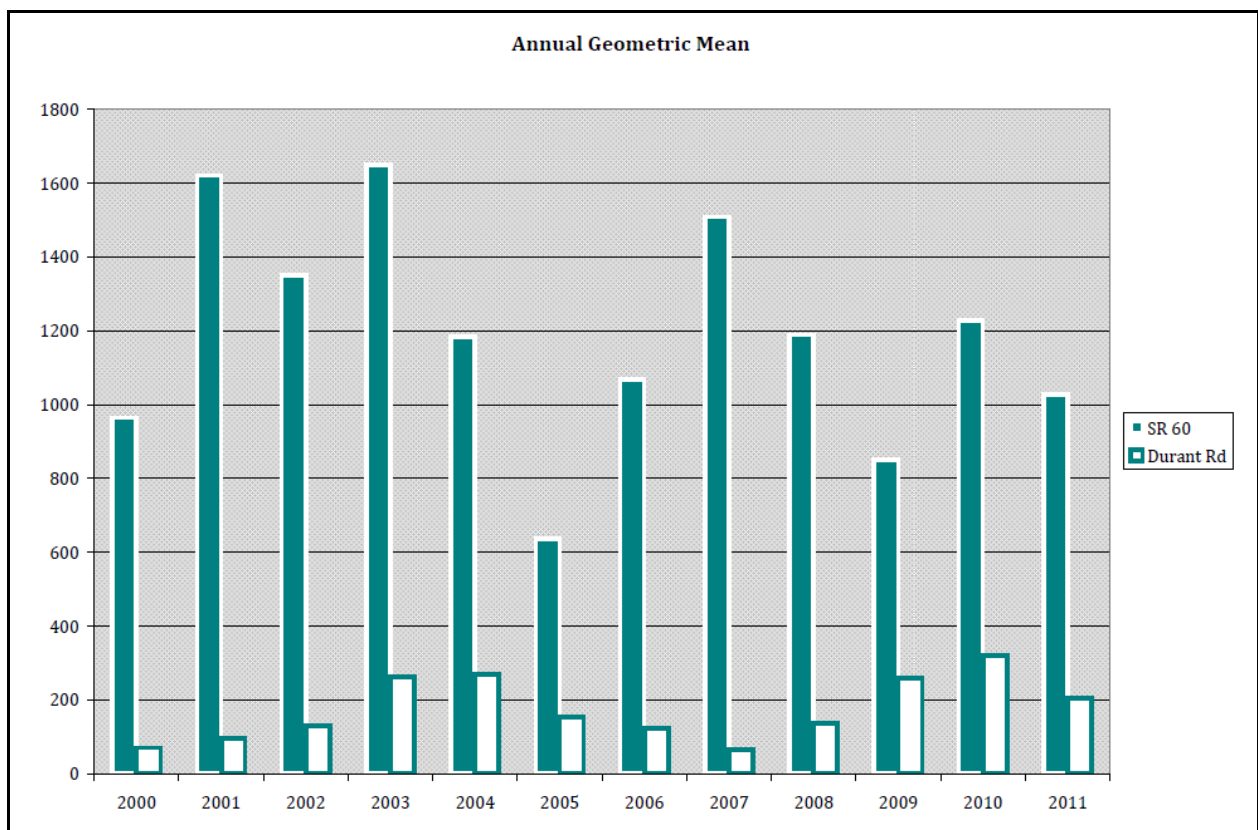


Figure 3. Annual geometric mean of Fecal Coliform observations on Turkey Creek at Durant Rd and SR 60. State water quality standards require annual mean concentrations not to exceed 400 CFU/100mL. The observed asymmetry in coliform concentrations guided the decision to focus Walk the WBID efforts north of the upstream sampling location at SR 60

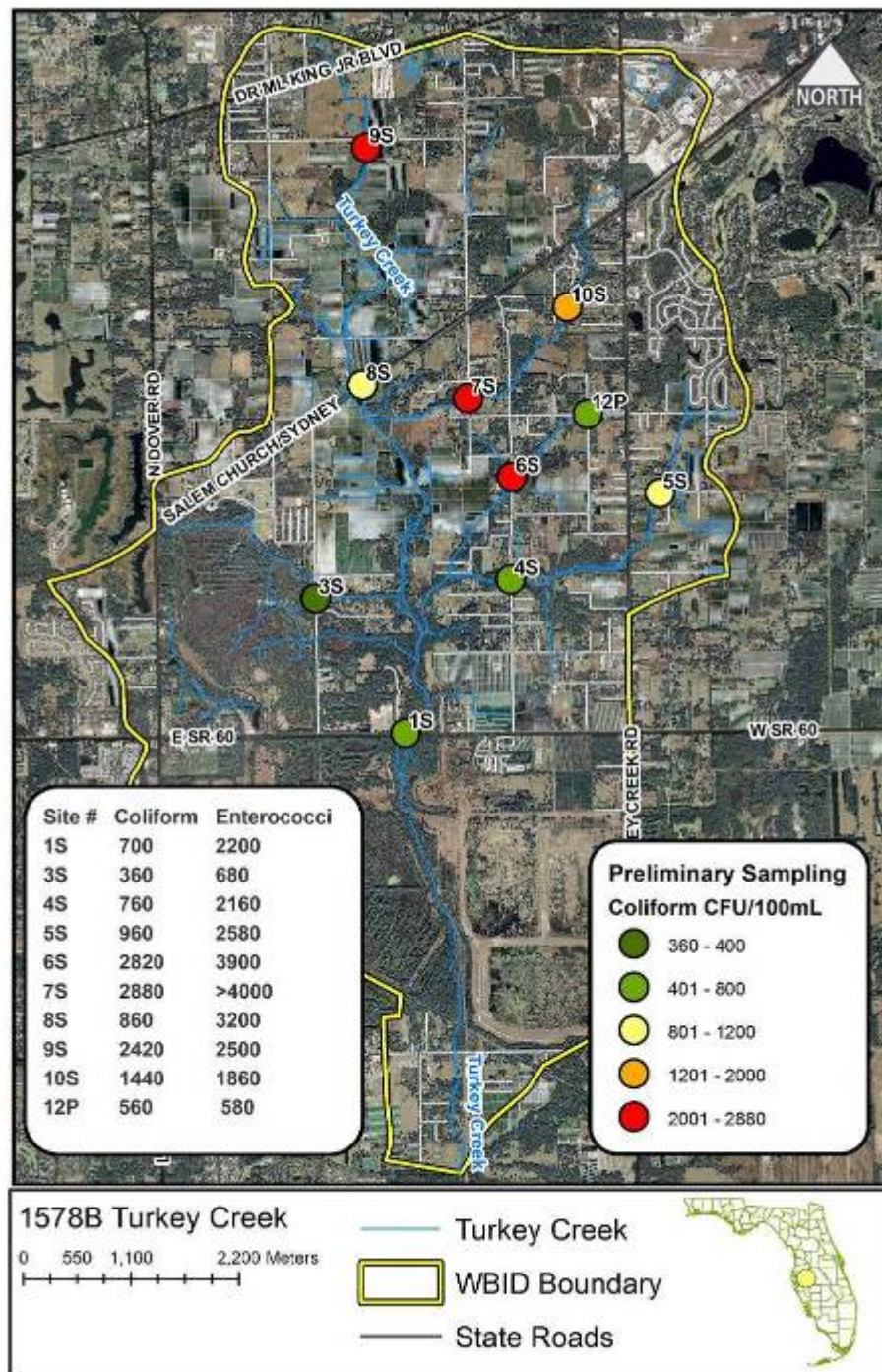


Figure 4. Results of the preliminary coliform sampling conducted November 1st, 2011.



Figure 5. Walk the WBID Group [back left to front right]: Samuel Douglas [Hillsborough County], John McGee [Hillsborough County], Byron Bartlett [EPC], James Watson [DOH], Michael Dreyer [DOH], Jessica Stempien [FDACS], Anita Nash [FDEP], Jemy Hinton [IFAS], Anthony Betts [Hillsborough County], and Al Miller [City of Plant City].



Figure 6. Valrico AWT Facility outfall located behind Keith Waller Park. Discharge was minimal at the time of the visit. However, a slight oily sheen was visible on the surface, along with areas of orange discoloration associated with iron oxidizing bacteria.

Post Field Note: Review of frequent sampling history at Valrico AWTF showed effluent contains low bacteria concentrations (commonly meets and exceeds permit requirements).



Figure 7. Evidence of wildlife was found adjacent to the Valrico AWWTF outfall.



Figure 8. Convergence of several ditches and a cross drain running under Sydney Dover Rd south of Walden Sheffield Rd. Oily sheen, wildlife tracks, and litter visible in the creek. Spoke with adjacent landowner, George Williamson Farm, regarding hydrology and water quality. George Williamson Farm participates in the FDACS BMP enrollment program.

Post Field Note: Water sample taken during the Walk [Figure 61: Sample 31867]. Results show moderate coliform contamination [1000 CFU/100mL].



Figure 9. Close up of oily sheen and raccoon tracks at cross drain shown in Figure 8. Oily sheen appeared to be a natural condition attributed to sediment characteristics.



Figure 10. Erosion from a strawberry field toward the cross drain in Figure 8. While the photo depicts a discrete instance, erosion from agricultural lands was commonly observed during the Walk. Erosion causes sedimentation in ditches and creeks, which may create favorable conditions for fecal coliform bacteria.



Figure 11. Migrant farm worker housing located off of Sydney Dover Rd south of Downing St. Closer inspection was not possible due to limited access; however, this example is typical of lower quality migrant housing. Similar migrant housing conditions were observed throughout the Walk.

Post Field Note: DOH Farm Worker Housing Program inspects all migrant housing twice quarterly during occupancy.



Figure 12. High quality migrant farm worker housing located at G & F farm [Sydney Dover Rd]. Property manager allowed access for inspection of migrant housing, OSTDS drain field, and on-site BMPs. No potential sources were observed here. This is an example of the requirements for new migrant housing.



Figure 13. Septic system drain field serving migrant housing on Higgins Farm. The drain field is cordoned off and appears well functioning.



Figure 14. Turkey Creek at Downing St. Preliminary sampling at this location [Figure 4: Site 9S] indicated coliform contamination [2420 CFU/100mL]. Creek is considerably overgrown with invasive vegetation. Migrant farm worker housing can be seen along the bank. Migrant housing at this location has a history of poor sanitation and deficient OSTDS. However, improvements to the OSTDS have recently been made according to EPC and DOH.

Post Field Note: Super-saturation and ponding of the septic drainfield was observed during a post Walk inspection of migrant housing at this location by EPC [12/14/2011]. The owner was notified of the violation and recommended actions were detailed by EPC. EPC will increase inspection frequency to ensure proper functionality.



Figure 15. Lift station 24 operated by the City of Plant City. No history of discharge and appears to be functioning appropriately. Emergency number is posted, and notification light appears operational. Additionally, all lift stations in the Turkey Creek watershed are inspected weekly and equipped with telemetry notification.



Figure 16. Outfall from Walden Lakes community located on Trapnell Rd west of Timberlane Dr. The outfall drains the southern half of Walden Lakes subdivision. Significant erosion was present.

Post Field Note: Water Sample taken during the Walk [Figure 61: Sample 31867]. Results show no coliform contamination [<100 CFU/100mL].



Figure 17. Wet detention pond in Walden Lakes subdivision. Control structure discharges directly to the outfall pictured in Figure 16.



Figure 18. Ditch downstream of Walden Lakes outfall [east on Trapnell]. Water flows to the cross drain where it joins the easternmost tributary of Turkey Creek.



Figure 19. Ditch along Trapnell Rd upstream of Walden Lakes outfall. Low flow in the ditch; however, water is cloudy and gray. Small trailer park adjacent; however, no obvious signs of influence.

Post Field Note: Follow up inspection of ditch showed higher flow, and water was less discolored [01/24/12]. Runoff appears to be primarily from adjacent strawberry field and an unlikely source for anthropogenic fecal coliforms.



Figure 20. Cattle grazing in a wetland at the intersection of Trapnell Rd and Turkey Creek Rd. Discharge from the wetland area is observed to the ditch along Trapnell Rd, which flows a short distance to a major tributary. Preliminary water sample taken just downstream [Figure 4: Site 12P] showed moderate fecal contamination [560 CFU/100mL]. FDACS and/or IFAS to contact landowner.



Figure 21. Tributary at Forbes Rd just north of Trapnell. Segment of creek walked. Somewhat overgrown. Preliminary sampling at this location [Figure 4: Site 7S] showed considerable coliform contamination [2880 CFU/100mL].

Post Field Note: Water sample taken during the Walk [Figure 61: Sample 31869]. Results again show significant coliform contamination [6900 CFU/mL]. Hillsborough County and EPC have arranged for additional water quality monitoring in this location to facilitate future assessment and pollutant removal. Two quarterly sampling locations have been added north of SR 60.



Figure 22. Follow up inspection on 01/24/12 found sheep farm just upstream from Figure 21 and adjacent to the creek. IFAS will contact landowner to distribute educational brochure.

Post Field Note: [01/24/12] During follow up inspection, nearby resident indicated septic system located on adjacent parcel [3428 S Forbes Rd] may have unpermitted modifications and chronic failures.

Referred to DOH for nuisance complaint investigation.

Post Field Note: Approximately three weeks later, DOH inspection indicated no evidence of a sanitary nuisance.



Figure 23. Potential illicit connections on Caruthers Ave. near Sydney Rd. Pipes protrude from the parcel into the roadside ditch. Referred to EPC for enforcement.

Post Field Note: EPC determined discharge is composed entirely of stormwater and, therefore, a legal connection according to Hillsborough County's Stormwater Ordinance.



Figure 24. Potential illicit connection on Caruthers Ave near Turkey Creek crossing. Pipe is adjacent to a strawberry field and enters the roadside ditch.

Post Field Note: IFAS visited the site and discussed with landowner, Lane Wetherington. Mr. Wetherington indicates pipe no longer in use and original purpose is unknown.



Figure 25. Turkey Creek at Caruthers Ave. Some overgrowth of invasive vegetation.



Figure 26. Dog tethered adjacent to Turkey Creek at Caruthers Road.

Post Field Note: Approximately two hundred and fifty educational flyers designed and distributed by Hillsborough County [Appendix I].



Figure 27. Small housing area, possibly migrant workers, located on Sydney west of Caruthers Ave. Several PVC pipes are protruding from the house, which appears consistent with the discharge of washing machine grey water. DOH spoke with the land manager during the Walk and will return to inspect the pipes.

Post Field Note: Subsequent DOH inspection revealed pipes had been removed and no sanitary nuisance observed.



Figure 28. Sediment eroding from strawberry field adjacent to Starlite Mobile Home Park. Sedimentation was evident throughout the ditch system and small tributary here, which flows a short distance to Turkey Creek.

Post Field Note: Farm participates in BMP enrollment program. FDACS and IFAS made post-Walk contact with the landowner to discuss observations. New farmer is leasing the parcel and has been enrolled in the BMP program since the Walk. Adjacent farmer is currently implementing additional water quality BMPs which are expected to provide improvements.



Figure 29. Evidence of sedimentation downstream of Figure 28. Additionally, numerous wildlife tracks are evident in the mud.



Figure 30. System of conveyances near Jerry Smith Rd and SR 60. The farmers here attribute erosion and sedimentation illustrated in Figures 28 and 29 to the privately owned culvert shown here. Further research is necessary to resolve all concerns and develop an appropriate solution. IFAS and FDACS are in regular contact with the farmers.



Figure 31. Pipes crossing a ditch in Starlite MHP. These pipes appear to be a part of the onsite wastewater treatment facility. No leaks were witnessed. However, the mobile home park is largely abandoned, in disrepair, and has a history of deficient wastewater treatment plant.



Figure 32. Another unknown pipe crossing a ditch in Starlite MHP. This pipe is not connected properly with a high likelihood of leaking should effluent or other liquids be transported. No leaks witnessed while onsite.



Figure 33. Close up of pipe in Figure 32, which shows the disconnection at the pipefitting.



Figure 34. Several dogs tethered adjacent to the ditch in Starlite MHP. Numerous other dogs seen in similar conditions during the visit to Starlite.

Post Field Note: Approximately two hundred and fifty educational flyers designed and distributed by Hillsborough County [Appendix I].



Figure 35. Several wastewater cleanouts were uncapped throughout Starlite MHP. While many of the homes appeared abandoned, i.e. system not in use, there is potential for illegal inhabitation, and cleanouts are often in close proximity to stormwater conveyances.

Post Field Note: EPC inspection indicated cleanouts were uncapped as a result of malfunctioning wastewater treatment plant. Wastewater cleanouts have since been properly capped per their request.

EPC conducts twice yearly inspection. Hillsborough County will conduct monthly inspections until hazardous conditions appear to be resolved.



Figure 36. Unknown pipe extending from underneath a mobile home at Starlite MHP. Appearance is consistent with the discharge of washing machine grey water.



Figure 37. Another unknown pipe extending from underneath a mobile home at Starlite MHP into a stormwater conveyance.



Figure 38. Saturated soil adjacent to a mobile home in Starlite MHP. The location could be indicative of an underground leak or spill; however, the puddle had no detectable odor.



Figure 39. Follow up inspection on 01/24/12 showed saturation in Figure 38 persists and has increased considerably. Standing water present and continues down the street. The water contained no detectable odor or discoloration. Referred to EPC for investigation.

Post Field Note: EPC inspection on 01/25/12 determined the saturation was a result of an underground potable water leak. The property owner was informed of the problem. Subsequent inspection [04/09/12] indicates no visible saturation. EPC indicates owner has addressed potable water leak.



Figure 40. Trash accumulation at a discharge point in Starlite MHP. Overall, the park was poorly maintained and trash strewn throughout, including inside stormwater conveyances.



Figure 41. Discarded toilets were among the trash dumped in Starlite MHP.



Figure 42. Mattress found in the ditch at Starlite MHP. The ditch is part of a system of conveyances which drain the park toward Turkey Creek.



Figure 43. Close up of ditch in Starlite MHP. The ditch is considerably overgrown, and water is murky and discolored.

Post Field Note: Hillsborough County inspection [05/10/12] indicates considerable vegetation maintenance has been conducted around one effluent pond and throughout some conveyances. Vegetation should be maintained in the future, as necessary.



Figure 44. Follow up inspection was conducted on 01/24/12 to resolve observations made in Figure 38. Re-inspection also revealed deteriorating conditions in the ditch shown in Figure 43. Water was cloudy/murky with a strong sewage odor and algal mats. Referred to EPC for immediate investigation.

Post Field Note: EPC inspection on 01/25/12 verified the observation. Water sampling confirmed the coliform hazard [$>200,000$ CFU/100mL]. EPC report identified sewage discharges to the ditch to originate from the uncapped wastewater cleanouts [Figure 35]. Landowner was notified, and the condition no longer exists. Further investigation will be conducted to confirm continued compliance.



Figure 45. Follow up inspection [04/09/12] found sanitary nuisance illustrated in Figure 44 has been resolved.



Figure 46. Conveyance in Starlite MHP containing considerable amounts of trash.

Post Field Note: EPC investigation [02/27/12] confirmed routine garbage collection has ceased at Starlite MHP. Some residents are burning refuse. Potential trash accumulation and transport to Turkey Creek is accelerated as a result.

Post Field Note: Subsequent inspection [04/09/12] indicated routine garbage collection has resumed. However, trash persists in conveyances throughout.



Figure 47. Another conveyance in Starlite MHP containing considerable amounts of trash.



Figure 48. Trash dumped in a stormwater conveyance within Starlite MHP.



Figure 49. Treated effluent from Starlite MHP's OSTDS is discharged to this pond. Overall, the pond and conveyance systems are overgrown and contain considerable amounts of trash and sediment, possibly contributing to bacterial growth.

Post Field Note: Starlite MHP is in receivership as of the date of the Walk; however, continued efforts will be made to resolve hazards observed. Currently, most actions are pending resolution of numerous code violations and existing lawsuits; however, several code violations have been resolved with individual homeowners located within Starlite MHP.



Figure 50. Likewise, the ditch/tributary, which runs behind Starlite MHP to Turkey Creek, is similarly overgrown and harboring trash and excess sediment.



Figure 51. Potential illicit connections to ditch/tributary along the northern edge of Starlite MHP. PIC is located near the northern terminus of Marge Owens Rd.



Figure 52. Makeshift building constructed over the ditch/tributary along the northern edge of Starlite MHP. The tributary runs underneath the elevated building. The building appears to be primarily for storage and is located approximately 500 meters from Turkey Creek's main branch near the northern terminus of Marge Owens Rd.



Figure 53. Potential illicit connection into tributary at Jerry Smith Rd between Trapnell & Sydney. The trajectory of the pipe appears to lead to a mounded septic system. No discharge witnessed while onsite. Referred to DOH for nuisance complaint investigation.

Post Field Notes: EPC notified residents of the potential hazard. Pipe has subsequently been removed [07/31/12]. Upon removal, residents indicate pipe was only a seven foot section and not connected to the OSTDS.



Figure 54. Citrus in Turkey Creek tributary at Jerry Smith Rd between Trapnell & Sydney. Citrobacter is known to cause Type I errors in fecal coliform testing.



Figure 55. Tributary at Jerry Smith Rd near Touchstone Rd. Dense vegetation and litter present, including a discarded tire. Preliminary sampling at this location [Figure 4: Site 6S] showed considerable coliform contamination [2820 CFU/100mL].

Post Field Note: Trash is regularly removed by Hillsborough County Public Works during ROW mowing. The major thoroughfares in the Turkey Creek area, including: Dover, Sydney Washer, Sydney, and Forbes Roads, are currently scheduled for mowing [04/15/12].



Figure 56. In addition, animal tracks observed in the mud at Figure 55.



Figure 57. White PVC pipe extends from camper/RV into the ground adjacent to tributary at Connell Rd. Referred to DOH for nuisance complaint investigation.

Post Field Note: DOH inspection revealed no compliance violations and no sanitary nuisance.

Landowner stated pipe connects to septic tank.



Figure 58. Open dumpster in parking lot of J.S. Robinson Elementary. Stormwater has the potential to transport pollutants from open dumpsters to surface waterbodies.

Post Field Note: Hillsborough County Public Works informed Principal Wilkerson of the concern and requested the lids remain secured [12/14/11]. Lids were secured during follow up visit [04/09/12].

Post Field Note: [02/01/12] During the decommission of the WWTP at J.S. Robinson Elementary, EPC staff discovered the onsite contractor pumping sludge from the percolation pond into a ditch/tributary of Turkey Creek. Discharge was terminated and clean up actions completed.



Figure 59. Septic drain field at Crawford 3B's Mobile Home Park is super-saturated and ponding. The effluent was observed adjacent to the Turkey Creek tributary. EPC notified the owner of the concern during the Walk and directed to resolve the violation. Re-inspection should confirm proper functionality.

Post Field Note: EPC has re-inspected and found trace deficiencies. Inspection frequency increased and enforcement will be pursued if problems persist.



Figure 60. Location of potential illicit connections identified during the Walk.

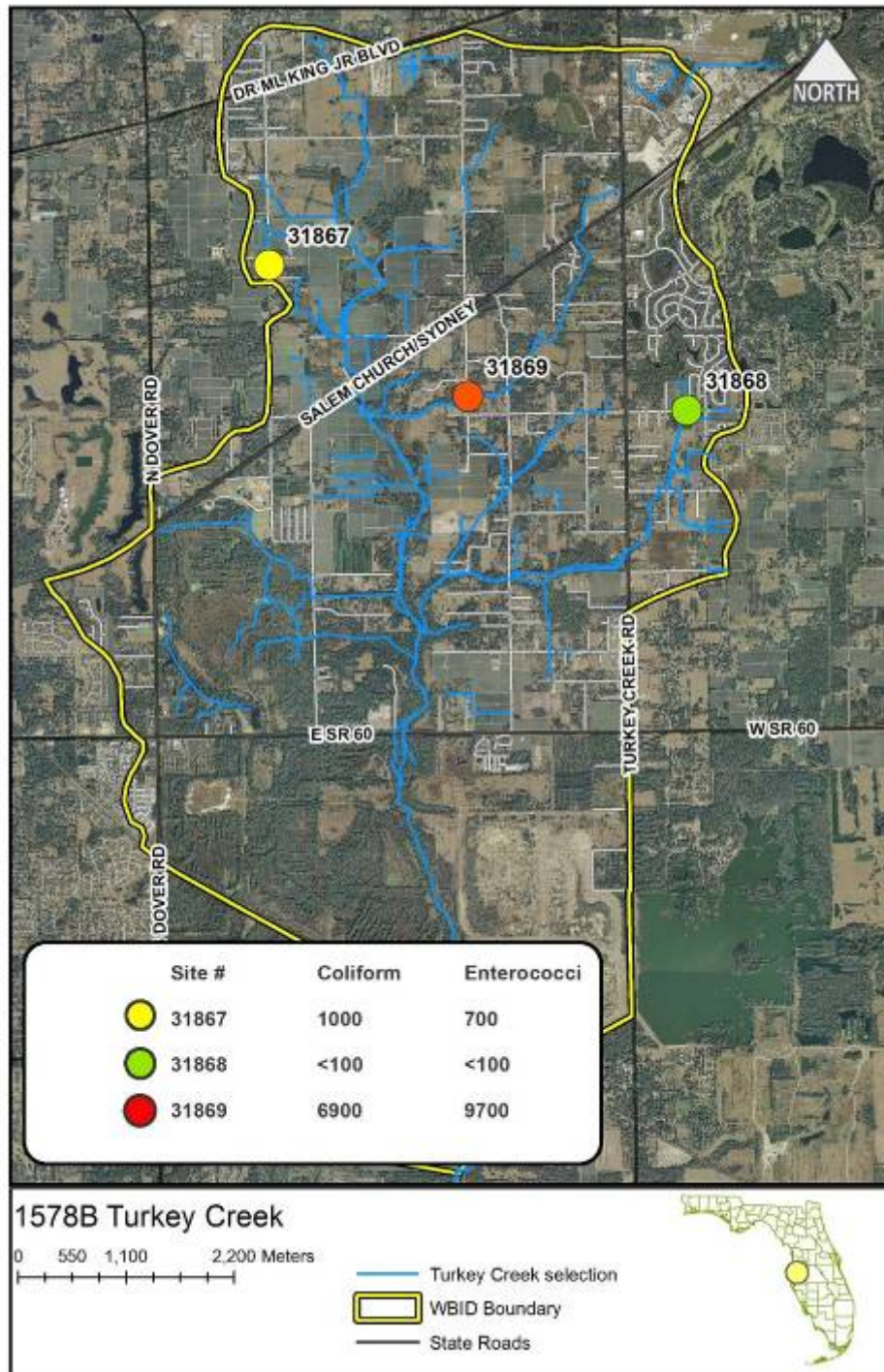


Figure 61. Laboratory results of water samples taken during the Walk.



Figure 62. Location of quarterly water quality sampling locations in the Turkey Creek basin. Two additional sampling locations were added north of SR 60 due to the Walk the WBID event.



Figure 63. The Walk the WBID event facilitated interagency cooperation through this collaborative experience. Communication between participating agencies has increased as a result.



***Figure 64. Main branch of Turkey Creek is completely dry at SR 60 during follow up visit [04/09/12].
All upstream portions inspected that day appeared in similar conditions.***

Next Steps and Follow-up Actions

Intractable Contributions and Natural Conditions

- Figures 7, 8, 9, 29, and 56 show evidence of wildlife in close proximity to the Turkey Creek watercourse, including: raccoon prints, waterfowl, and feces.
- *Citrobacter* grows on rotting fruit and can cause Type I errors in fecal coliform tests. Citrus grows wild and in residential yards throughout the watershed. See Figure 54.
- Bacterial re-growth is probable in ditches and natural watercourses given the subtropical climate and natural sediments observed. See Figures 8, 9, 19, 29, and 56.
- 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 14, 21, 25, 43, 50, and 55.
- Natural tannins from decomposing plant material in the water also shade out UV rays. See Figures 21, 54, and 55.
- Large portions of Turkey Creek experience periods of low flow, intermittency, and water stagnation. This hydrologic regime likely contributes to bacterial re-growth. See Figure 64.

Action Item List

Location	Suggested Action	Responsible Entity	Date Completed	Results
Figure 6	Determine frequency and magnitude of coliform discharges from Valrico AWTF.	FDEP	01/20/2012	Effluent from Valrico AWTF currently receives a high level of treatment. Sampling history shows effluent concentrations meet and exceed permit requirements.
Figure 10	Contact landowner for BMP enrollment.	FDACS IFAS		
Figure 14	Supersaturated drain field at migrant housing.	EPC	Ongoing	EPC will continue increased inspection frequency to ensure compliance and proper functionality.
Figure 19	Follow up inspection to verify problem persists and identify potential sources.	HCPW	01/24/2012	Follow up inspection showed improved conditions. Runoff appears to be entirely from a strawberry field and anthropogenic sources of coliforms are unlikely.
Figure 20	Contact landowner for BMP enrollment and reduce animal waste in close proximity to watercourse.	FDACS IFAS		
Figure 21	Investigate other nearby land uses along this tributary because of repeated hits.	HCPW	01/24/2012	Follow up investigation elicited several possible sources. These have been added as action items directly below [Figure 22].
Figure 22	Investigate resident complaint of potential chronic septic failures.	DOH	02/14/2012	DOH complaint inspection showed no evidence of sanitary nuisance.
Figure 22	Contact owner of sheep farm and provide educational information on Small Farm BMPs.	FDACS		
Figures 23	Investigate unknown pipes for potential illicit connections.	EPC		EPC investigation found discharge is composed entirely of stormwater and, therefore, a legal connection.
Figure 24	Investigate unknown pipes for potential illicit connections.	IFAS	06/26/2012	Landowner, Lane Wetherington, states pipe is not in use and original purpose is unknown.
Figures 26 & 34	Distribute education materials to residents in order to reduce possible pet waste contamination.	HCPW	05/07/2012	Educational flyer designed and distributed by Hillsborough County. See Appendix I.

Location	Suggested Action	Responsible Entity	Date Completed	Results
Figure 27	Inspect unknown pipes observed during the Walk.	DOH	12/21/2012	Contact with landowner was made during the Walk. Subsequent DOH inspection states pipes had been removed and no sanitary nuisance exists.
Figure 28	Contact landowner for agricultural BMP enrollment at strawberry farm.	FDACS IFAS		Landowner has been enrolled in the agricultural BMP program.
Figures 31, 32, & 33	Investigate pipes crossing the ditch to ensure proper functionality.	EPC		Starlite MHP is in receivership as of the date of the Walk; however, continued efforts will be made with the future owners.
Figure 35	Direct owner of Starlite MHP to properly secure lids to wastewater clean outs.	EPC		EPC inspection indicated cleanouts were uncapped as a result of malfunctioning wastewater treatment plant. Wastewater cleanouts have since been properly capped per their request. EPC conducts twice yearly inspection. Hillsborough County will conduct monthly inspections until hazardous conditions are resolved.
Figures 36 & 37	Determine functionality of unknown pipes in Starlite MHP.	EPC Code Enforc.		Starlite MHP is in receivership as of the date of the Walk; however, continued efforts will be made with the future owners.
Figures 38 & 39	Follow up visits to investigate source of saturation at Starlite MHP.	HCPW EPC	01/25/2012	EPC investigation determined saturation was the result of an underground potable water leak. Owner was notified. Subsequent inspection showed no evidence of saturation.
Figures 40, 41, 42, 46, 47, & 48	Direct owner of Starlite MHP to perform trash removal.	Code Enforc. FDLE		Active complaint with Hillsborough County Code Enforcement. Resolution to be determined.
Figures 43 & 49	Direct landowner to maintain vegetation throughout effluent pond and conveyances within Starlite MHP.	EPC		Hillsborough County inspection [05/10/12] indicates considerable vegetation maintenance has been conducted around the effluent pond and throughout many conveyances. Vegetation should be maintained in the future, as necessary.

Location	Suggested Action	Responsible Entity	Date Completed	Results
Figures 44 & 45	Investigate source and magnitude of potential coliform contamination to resolve hazard.	EPC		Water sampling conducted on 01/25/12 revealed significant coliform contamination [>200,000. CFU/100mL]. Owner was immediately notified. Subsequent inspection showed no evidence of sanitary nuisance.
Figure 51	Investigate potential illicit connections.	FDLE		Active complaint with Hillsborough County Code Enforcement. Resolution to be determined.
Figure 52	Contact landowner to determine function and legality of building which spans the tributary.	FDLE		Active complaint with Hillsborough County Code Enforcement. Resolution to be determined.
Figure 53	Investigate PIC which appears to be in line with septic mound.	EPC	07/31/2012	DOH inspection indicated no evidence of sanitary nuisance. EPC notified owner, and pipe was quickly removed.
Figure 55	Remove trash and discarded tire.	HCPW	Ongoing	Trash is regularly removed by Hillsborough County Public Works during ROW mowing. The major thoroughfares in the Turkey Creek area, including: Dover, Sydney Washer, Sydney, and Forbes Roads, are currently scheduled for mowing [04/15/12].
Figure 57	Investigate PVC pipe running from camper into the ground.	DOH		DOH inspection indicated no evidence of sanitary nuisance.
Figure 58	Inform Robinson Elementary of potential water quality hazard and request dumpster lids remain secured.	HCPW	12/14/2011	Informed Principal Wilkerson of the potential water quality hazard and requested the lids remain secured. Subsequent visit found lids secured.
Figure 59	Re-inspect drain field at Crawford 3B's Mobile Home Park to ensure proper function.	EPC	Ongoing	Owner was notified of the violation during the Walk. EPC has re-inspected and found trace deficiencies. EPC will increase inspection frequency, and enforcement will be pursued if problem persist.
Watershed Wide	Trash and debris can provide a medium for bacterial growth. More frequent ditch maintenance should be conducted, where feasible.	HCPW EPC		Opportunities to expand ditch maintenance through alteration of the County's wetland regulations will be explored.

Location	Suggested Action	Responsible Entity	Date Completed	Results
Watershed Wide	Exotic vegetation can block sunlight and provide a medium for bacterial growth. Additional vegetation maintenance should be explored, where feasible.	HCPW EPC		Opportunities to expand areal extent of vegetation maintenance through alteration of the County's wetland regulations will be explored.
Watershed Wide	Livestock in close proximity to watercourses and excess sedimentation were observed. Continue agricultural BMP enrollment within impacted areas.	FDACS IFAS		
Watershed Wide	Increase water quality monitoring within the impacted areas to facilitate future assessment and pollutant removal activities.	HCPW EPC	Begun: 01/01/2012	Hillsborough County and EPC have arranged for additional water quality monitoring in the Turkey Creek watershed. Two quarterly sampling locations have been added north of SR 60; one located at S. Forbes Rd and another at Sydney Rd.
Watershed Wide	Increase awareness of coliform impairment within County maintenance staff.	HCPW	Begun: 03/06/12	Emphasis on communication & awareness in Hillsborough County Public Works East Service Unit, which conducts maintenance in the Turkey Creek WBID. Annual education program trains all maintenance staff regarding stormwater pollution and illicit discharge detection.
Watershed	Poor quality migrant housing has potential to contribute to coliform contamination. Increase inspection of migrant housing, if necessary, and resolve any known sanitary issues.	DOH	Existing	DOH Farm Worker Housing Program inspects all migrant housing facilities two times a quarter during residency, i.e. housing occupied year round would receive eight inspections.

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

Additional questions on this event should be directed toward:

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Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection
Office: (850) 245-8017
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Environmental Scientist & TMDL Coordinator
Environmental Services
Hillsborough County Public Works
Office: (813) 744-5671
Email: bettsa@hillsboroughcounty.org

List of Acronyms & Abbreviations

AADF	Annual Average Daily Flow
ARV	Air Release Valve
AWTF	Advanced Wastewater Treatment Facility
BMP	Best Management Practice
CFU	Colony Forming Units
Code Enforc	Hillsborough County Code Enforcement
DOH	Hillsborough County Department of Health
EPC	Environmental Protection Commission of Hillsborough County
FDACS	Florida Department of Agricultural and Consumer Services
FDEP	Florida Department of Environmental Protection
FDLE	Florida Department of Law Enforcement
GIS	Geographic Information System
GPS	Global Positioning System
HCPW	Hillsborough County Public Works
HCRWM	Hillsborough County Right-of-Way Management
IFAS	University of Florida Institute of Food and Agricultural Sciences
IWR	Impaired Waters Rule
MF	Membrane Filter
MGD	Million Gallons per Day
MHP	Mobile Home Park
mL	Milliliters
MPN	Most Probable Number
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
TBEP	Tampa Bay Estuary Program
TMDL	Total Maximum Daily Load
UV	Ultra-Violet
WBID	Waterbody Identification
WWTP	Wastewater Treatment Plant

APPENDIX I

Educational flyer developed and distributed by Hillsborough County to a subset of Turkey Creek residents [248 residential addresses in direct proximity to Turkey Creek and its tributaries]. This information was distributed in response to Figures 26 & 34.



Help Us Reduce Coliform Pollution In Your Area

Coliforms are bacteria that come from rotting plant matter, sewage and animal waste. Coliforms can make people and animals sick.

Water samples taken from the streams of Turkey Creek have contained more coliforms than state law allows. As a result, the Florida Department of Environmental Protection and Hillsborough County are taking action to reduce potential sources of coliforms in the Turkey Creek area. There is no indication at this time that this affects well and potable (drinking) water.

Most of the Turkey Creek area is private property, so we need your help to accomplish this. You might have sources of coliforms on your property that contribute to the pollution.

We're asking all residents to evaluate their property and take steps to reduce possible coliform sources.

Potential Coliform Sources



Trash in a creek



Dog next to creek

Here's what you should do:

- Verify that your septic tank is functioning correctly. If it hasn't been cleaned in 5 years, schedule it for maintenance.
- Keep animals away from wetlands, ponds, creeks or ditches. Provide alternate water sources for them.
- Clean up animal waste and ensure that it cannot wash into wetlands, ponds, creeks and ditches.
- Ensure that drainage ditches are free of trash and rotting material.

To report concerns or find out more about coliforms and other types of water pollution, visit www.hillsborough.wateratlas.org or call 813-627-2600.

This flyer is provided by Hillsborough County Public Works Environmental Services in conjunction with the Environmental Protection Commission of Hillsborough County and the Florida Department of Environmental Protection.

2420 N. Falkenburg Road, Tampa, FL 33619 • www.hillsborough.wateratlas.org

Ayudanos a reducir la contaminación de coliformes en tu área

Coliformes son bacterias que salen de materiales de plantas en descomposición, desperdicios de alcantarillado y de animales. Los coliformes pueden causar enfermedades a los animales y a las personas.

Muestras de agua que se tomaron de arroyos en áreas de Turkey Creek han reportado un conteo mayor de coliformes que los que la ley del estado permite. Como resultado de esto, El Condado de Hillsborough y el Departamento de Protección Ambiental están tomando medidas para reducir las fuentes potenciales de coliformes en esta área. Hasta este momento, no hay señales de que el agua potable ni el agua de pozo estén afectadas con coliformes.

La mayor parte de los sectores de Turkey Creek son propiedades privadas, por eso necesitamos tu ayuda para lograr esto. Podrías tener fuentes de desarrollo de coliformes en tu propiedad que están contribuyendo a la contaminación.

Fuentes potenciales de desarrollo de coliformes



Basura acumulada en un arroyo



Perro cerca de un arroyo

Esto es lo que debes hacer:

- Verifica que tu pozo séptico esté funcionando correctamente. Si el tanque no ha sido limpiado en los últimos 5 años, necesitas programar una limpieza del mismo.
- Mantén a los animales lejos de humedales, lagunas, arroyos o zanjas. Provee fuentes alternas de agua para ellos.
- Limpia y recoge los desperdicios de tus animales y asegúrate que no caigan en humedales, lagunas, arroyos o zanjas.
- Asegúrate que las zanjas estén libres de basura y materiales descompuestos.

Para reportar tus preocupaciones o para saber más sobre coliformes y otras formas de contaminación del agua, visita la página de Internet www.hillsborough.wateratlas.org o llama al 813-627-2600.

Este aviso es provisto por los servicios ambientales del Departamento de Obras Públicas del Condado de en conjunto con la Comisión de Protección Ambiental del Condado de Hillsborough y el Departamento de Protección Ambiental del Estado de Florida.

2420 N. Falkenburg Road, Tampa, FL 33619 • www.hillsborough.wateratlas.org

APPENDIX II

Eleven page educational brochure developed by the Southwest Florida Water Management District for implementing Best Management Practices on small acreage farms and ranches. This information was distributed by FDACS and IFAS in response to Figure 22.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Small Acreage Farm & Ranch

Best Management Practices
for
Protecting Florida's Water





Do You Own a Small Acreage Farm or Ranch?

Most small acreage farms or ranches (often called ranchettes or farmettes) are rural properties, usually under 10 acres, where part of the land is used for agricultural purposes, including crops, livestock and horses.

For example, if your home is on several acres and you also have a horse on the land, your property could be considered a ranchette or farmette.



Your Role in Protecting Water Resources

As a ranchette or farmette owner, you play a significant role in protecting Florida's water resources. Some common land-use practices can potentially degrade these resources.

For example, improper irrigation techniques not only place stress on water supplies, but can also damage your property and your neighbor's property by causing erosion, flooding, etc. Storm water or irrigation water that runs off your land may carry pollutants from manure, fertilizer and pesticides into local water bodies. Uncontrolled animal access to water bodies can introduce harmful animal waste into the water supply.

Best Management Practices (BMPs) for Ranchettes and Farmettes

BMPs are tested methods, measures or practices designed to prevent or reduce harm to the environment. The BMPs listed in this brochure are practical and cost-effective ways to minimize pollutants entering water bodies, while also improving your land.



How Can BMPs Help You and Help Protect Florida's Water Resources?

- Improve crop/animal health
- Maintain better pastures
- Protect your land from soil erosion
- Manage weeds and control mud
- Increase property values
- Protect you from related code enforcement problems
- Reduce irrigation, fertilizer and herbicide costs
- Contribute to the improvement of Florida's water quality
- Contribute to the improvement of Florida's groundwater and surface water levels

Irrigation BMPs

- Wells used for irrigation should be constructed by a licensed driller
- Schedule irrigations according to soil moisture and crop water needs
- Adjust irrigation amounts to meet varying crop demands at different growth stages
- Apply irrigation uniformly and accurately; do not overspray onto impermeable surfaces



Fertilization BMPs

- Test soil to determine exact fertilizer needs
- Properly calibrate fertilizer application spreaders
- Apply fertilizer directly over root zone; for row crops, place fertilizer on top of beds; for pasture or field crops, fertilize the entire planted area
- Avoid applying fertilizer near roadways or water bodies
- Minimize overlapping fertilizer during application



Pasture BMPs

- Do not overstock your land with more animals than it can handle — follow the recommendations and guidelines of the University of Florida's Institute of Food and Agricultural Sciences
- Use high-intensity, short-duration grazing to rejuvenate poor pasture
- Allow grass to reach 6 inches before grazing; remove animals when 3 inches remain
- Mow regularly to encourage grass and discourage weeds
- If available, fertilize pastures according to site-specific soil test recommendations or the guidelines of the University of Florida's Institute of Food and Agricultural Sciences



Fencing BMPs

- Fence off or limit animal access to natural water bodies
- If needed, pipe water from streams or lakes to a trough located away from the water body
- Fence off animal access to areas that receive periodic standing water
- Use fences to divide pastures into temporary plots for rotational grazing





Stormwater BMPs

- Maintain vegetation buffers around animal confinement areas
- Locate animal confinement areas away from water bodies
- Divert uncontaminated surface and roof runoff away from animal facilities
- Construct berms to retain storm water on your land
- Maintain existing slopes away from canals and roadways
- Create drainage ditches to channel water away from water bodies and roadways and into a water retention area
- Direct storm water away from wellhead
- Ensure standing water does not pool around wellhead

Erosion Prevention BMPs

- Allow vegetative buffer strips to grow along water bodies
- Do not leave bare soil exposed to the effects of erosion
- Prevent overgrazing by confining animals for a portion of the day or using rotational grazing



Drainage BMPs

- Keep pasture and constructed ponds separate from natural water bodies
- Do not create drainagelinks between constructed ponds and nearby water bodies



Pasture Weed Control BMPs

- Frequently search for weeds
- If weeds are discovered, either pull them or use a herbicide recommended by the University of Florida's Institute of Food and Agricultural Sciences for the specific weeds
- Buy only hay that is free of weed seeds
- Plant only certified grass seed
- Mow weeds regularly before they go to seed
- Wash your vehicle after being in a weed-infested area
- If using herbicides, avoid spraying on windy days and near water bodies
- Do not spray herbicides immediately before, during or immediately after a rainfall



Manure BMPs

- Store manure in covered areas protected from weather
- Do not allow excess manure to accumulate in animal confinement areas
- Do not accumulate or store manure in low-lying areas where water collects
- Drag pastures as needed to aerate manure and soil using the recommended rates of the University of Florida's Institute of Food and Agricultural Sciences
- Spread manure at allowable rates using a spreader designed for the purpose
- Do not spread manure within 10 feet of canals or roadways
- Compost your manure to improve the fertilizer value
- For excess manure, use a manure pickup service or arrange times for gardeners or nurseries to collect composted manure
- Maintain a good deworming program for animals



Mud Prevention BMPs

- Maintain a grass strip around animal confinement areas
- Use suitable foot material (such as paving stones or rocks) in high-traffic areas
- Install gutters and downspouts on all buildings and divert them away from animal confinement areas

Septic Systems

Properly maintained septic systems help protect the environment by reducing pollution. As a homeowner, you are responsible for maintaining your septic system. You should have your septic system inspected every two to three years and pumped as needed. For more information on proper septic system maintenance, visit WaterMatters.org/publications to read the brochure entitled "Your Septic System Is Your Responsibility."

Florida-Friendly Landscaping

In addition to following these BMPs for your pasture and/or farmland, remember that a properly maintained Florida-friendly yard can help you conserve water and reduce pollution of water resources. For more information on Florida-friendly landscaping, contact your local county Extension office (telephone numbers on next page) or visit WaterMatters.org/yards/.

Need More Information?

For additional information on ranchette and farmette BMPs and Florida-friendly landscaping, visit the University of Florida Institute of Food and Agricultural Sciences Extension web site at extension.ifas.ufl.edu/ or contact your county Extension office at:

CHARLOTTE: (941) 764-4340

CITRUS: (352) 527-5700

DESOTO: (863) 993-4846

HARDEE: (863) 773-2164

HERNANDO: (352) 754-4433

HIGHLANDS: (863) 402-6540

HILLSBOROUGH: (813) 744-5519

LAKE: (352) 343-4101

LEVY: (352) 486-5131

MANATEE: (941) 722-4524

MARION: (352) 620-3440

PASCO: (352) 521-4288

PINELLAS: (727) 582-2100

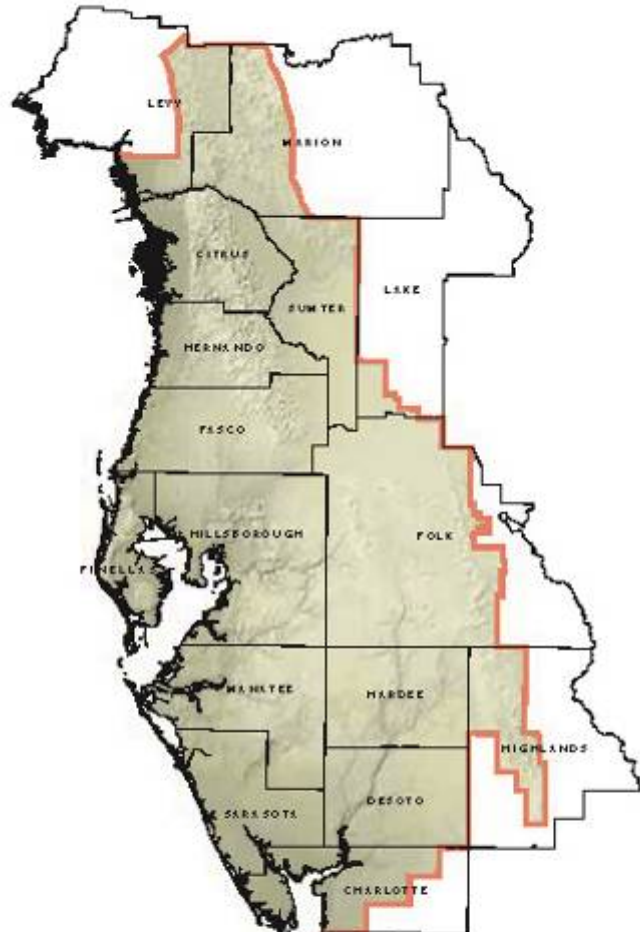
POLK: (863) 519-8677

SARASOTA: (941) 861-5000

SUMTER: (352) 793-2728

For technical assistance on implementing ranchette and farmette BMPs, contact the USDA's Natural Resources Conservation Service at (352) 338-9500, or visit their web site at www.fl.nrcs.usda.gov/.

BALANCING WATER NEEDS ... PROTECTING WATER RESOURCES



Southwest Florida
Water Management District

WATERMATTERS.ORG • 1-800-423-1476

For a variety of free publications about protecting
Florida's water resources, call 1-800-423-1476, ext. 4757,
or visit WaterMatters.org/publications/.

This information will be made available in accessible format upon request.
Please contact the Communications Department at (352) 396-7211 or
1-800-423-1476 (FL only), ext. 4757; TDD only at 1-800-231-6103 (FL only).

VSPT0043 10-06