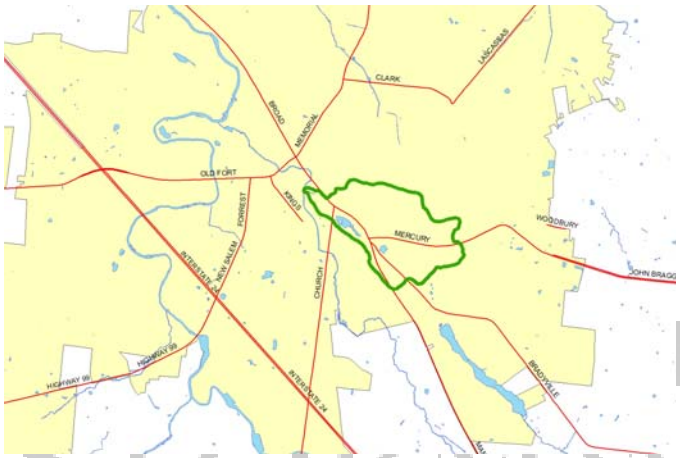
Illicit Discharge Detection Elimination 2010

Town Creek Watershed
Conducted by Murfreesboro Water and Sewer Department June 2010

MURFREESBORO
STORMWATER
PROGRAM
improving the quality of local streams

Introduction

Town Creek is a Tributary to Lytle Creek in the Stones River Watershed. It originates at Black Fox Spring near Nickajack Trace in Southeast Murfreesboro. The stream is impounded to the Northwest forming a wetland and then lake. The overflow from the lake then sinks and has positively been dye traced to both a spring and sink off of Bradyville Pike and Murfree Spring. From Murfree Spring to the confluence of Lytle Creek is known as Town Creek. For the intent of the 2010 Illicit Discharge Elimination (IDDE), the smaller Town Creek Watershed was the focus of this study. (Figure 1.).



Methodology

The 2010 IDDE used four different methods to find and eliminate possible illicit discharges. The screening was only conducted after 72 hours no precipitation.

I. **Flag Method** – A flag was placed periodically throughout the Town Creek watershed at junction boxes where there were major intersections or low elevations. The junction box was then photographed and screened for an illicit discharge. The amount of sediment and the condition of the structure was also noted.

II. **Visual Method** – The parameter of the wetlands and the length of Town Creek was visually assessed for any illicit discharges.

III. **Staggered Probing** – The wetland and Town Creek were probed for ph, conductivity, and temperature in various locations.

IV. **Station Sampling** – Nine stations were located at Murfree Spring, the wetland, and Town creek where samples were taken for e-coli.

*****In addition to the previous listed methods commercial properties in the watershed were provided literature on water quality.

I. Flag Method

Figure A. – Junction Boxes Flagged for Screening (Red Dots)

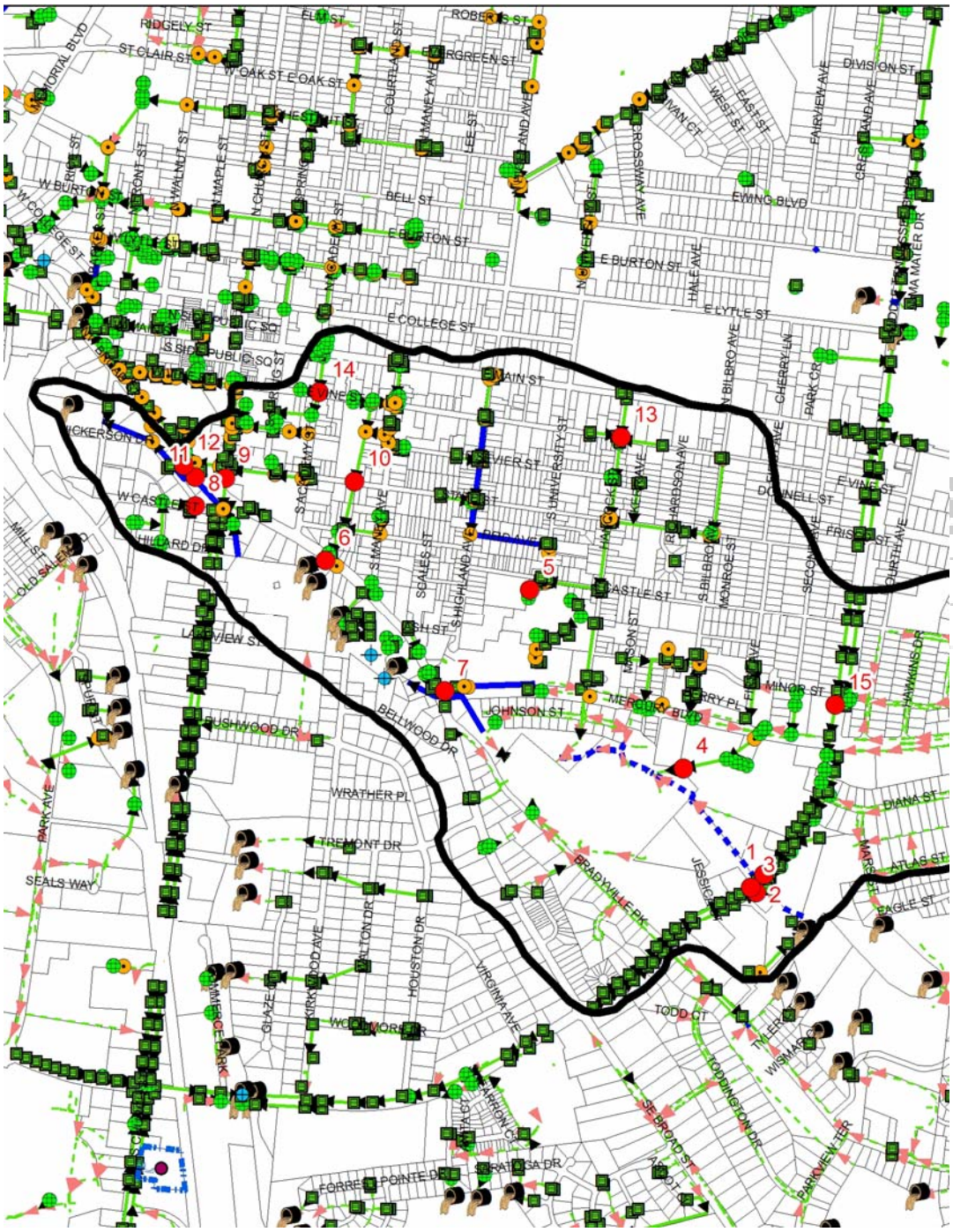
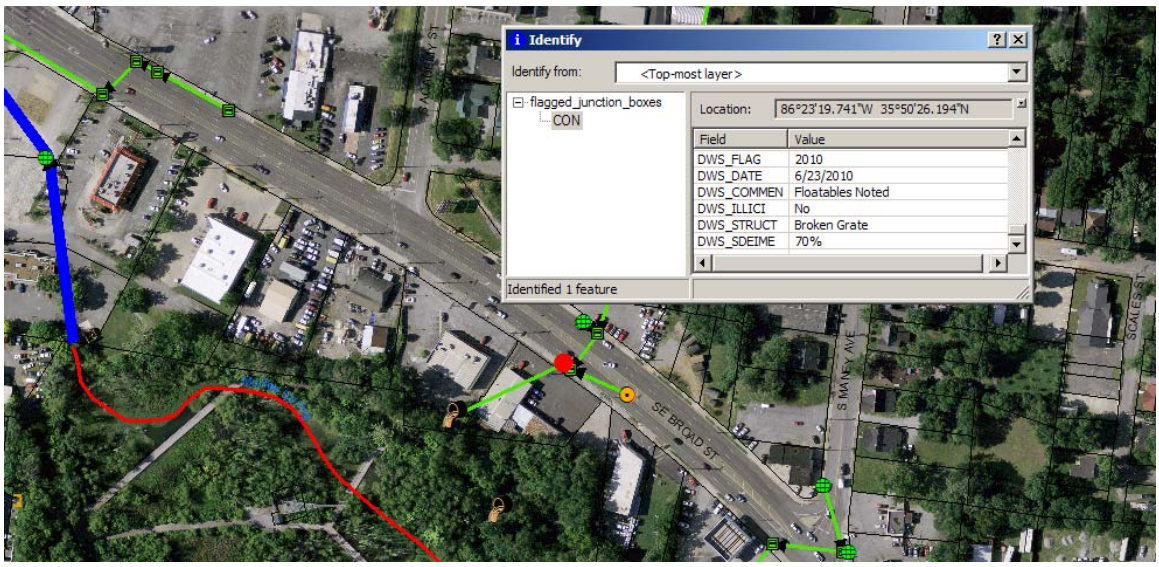


Figure B. – All observations were entered into the Geographic Information Systems.



ID	Date	Time	Condition	Sediment %	Flow (suspect)
1	5/25/2010	9:48 am	Good	1%	No
2	5/25/2010	9:45 am	Good	10%	No
3	5/25/2010	9:51 am	Good	0%	No
4	5/25/2010	10:03 am	Good	0%	No
5	5/25/2010	10:11 pm	Good	0%	No
6	5/25/2010	10:30 am	Fair	0%	Yes
7	5/26/2010	10:30 am	Good	0%	No
8	5/25/2010	10:18 am	Good	5%	No
9	5/25/2010	11:37 am	Good	0%	Yes
10	5/25/2010	11:18 am	Good	0%	No
11	5/25/2010	10:07 am	Good	0%	No
12	5/25/2010	9:52 am	Good	20%	No
13					
14	5/25/2010	11:27 am	Good	0%	No
15	5/25/2010	9:58 am	Good	0%	No

5. Trash Present
6. Tracked to new grass watering a couple of blocks away and possible car washing locations.
9. Flow found could not be conclusively tracked flow but it is thought to be condensation from AC units.

II. Visual Method

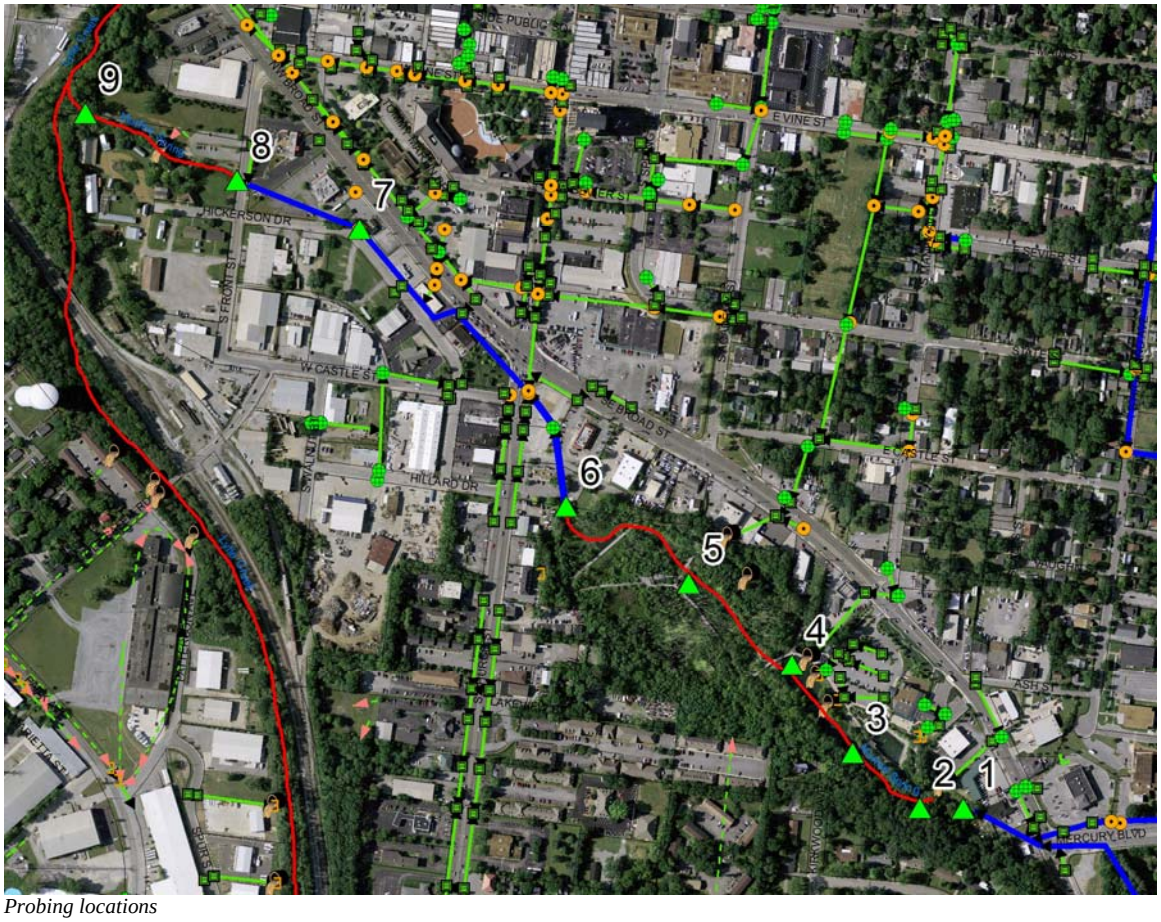
On May 28, 2010 staff members of the Murfreesboro Water and Sewer Department visually screened Town Creek, Murfree Spring, and wetland area for illicit discharges. While some areas were inaccessible, at least one problem area was noted. Trash was noted submerged under sediment throughout the wetland area. There was one suspected illicit discharge from an automotive shop possibly draining car fluids on gravel within close proximity of the wetland. Further investigation was made into the property and outreach material was given to the property owner.

Bruce Ross screening Town Creek in the piped segment

523 S Church St – Suspected Illicit Discharge

III. Staggered Probing

On May 28, 2010 MWSD staff used a probe to measure ph, temperature, and conductivity in the Town Creek watershed along set probing locations. The locations were evenly spaced along the stream and wetlands to detect any anomaly readings so a theoretical problem could be traced. All readings remained within a common range therefore indicating no suspect in-flow. One flow located near Murfree Spring that has already been sampled for e-coli and suspected for illicit discharge had a high conductivity reading.



Probing locations

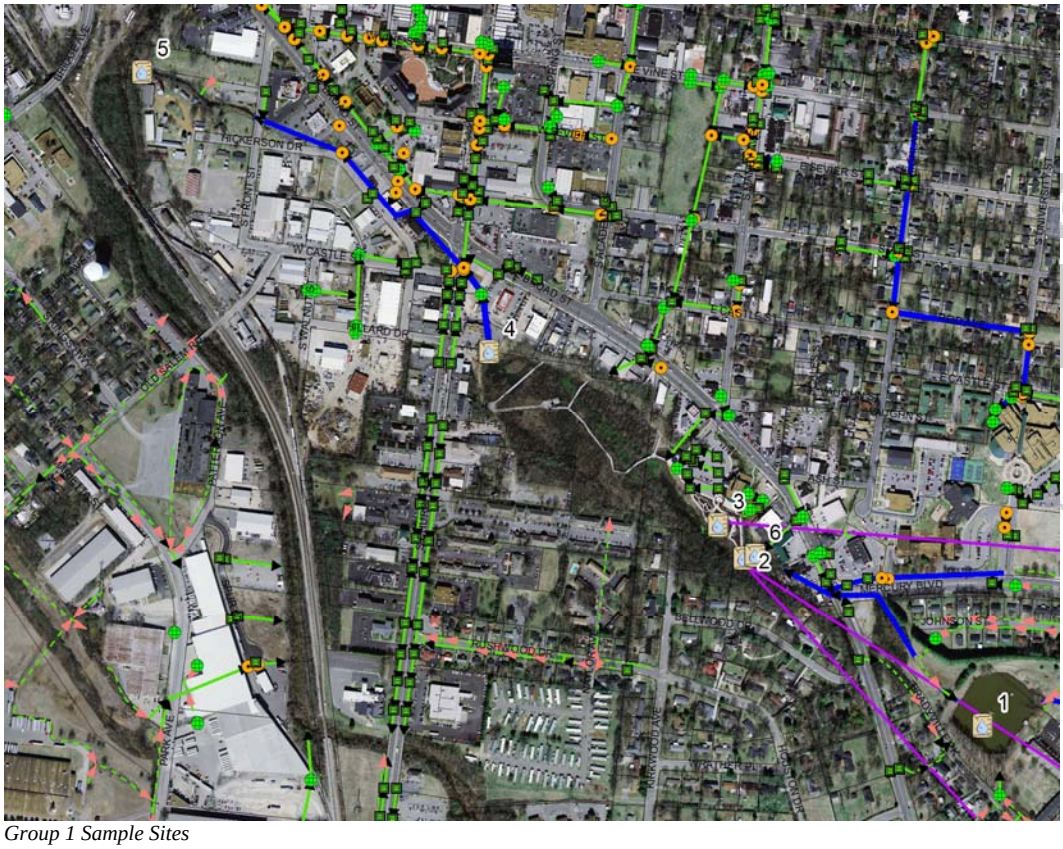
Bruce Ross measuring ph, temperature, and conductivity

ID	Ph	Temperature	Conductivity
1	7.07	17.4	490
2	7.07	17.6	457
3	6.5	17.6	447
4	7.07	17.8	458
5	7.07	21.7	458
6	7.14	18.8	455
7	7.29	19.2	458
8	7.23	19.4	459
9	7.34	19.6	457

IV. Station Sampling

Nine stations were chosen at various locations in the Town Creek Watershed for water quality sampling. The samples were processed at The City of Murfreesboro water treatment plant screening for e-coli. There is an active TMDL for Town Creek for e-coli. The objective of the sampling is to pin point the source of the e-coli contamination. The first set of sample sites revealed high e-coli readings at three places; the Chelsea Place Pond, the Discovery Center Tank, and Murfree Spring. The e-coli count went down rapidly as samples were taken downstream. Due to the knowledge of Town Creek's various recharge basins through dye tracing, another group of samples were taken to try to further locate the source.

Group 1.

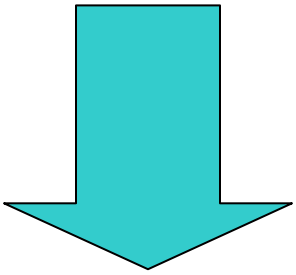


Group 1 Sample Sites

Location	E-coli
1 – Chelsea Place Pond	1764
2 – Murfree Spring	1866
3 – Discovery Center Tank	1968
4 – Town Creek at culvert entrance	896
5 – Town Creek at Lytle Creek	426
6 – Seep NE of Murfree Spring	1060

Spring

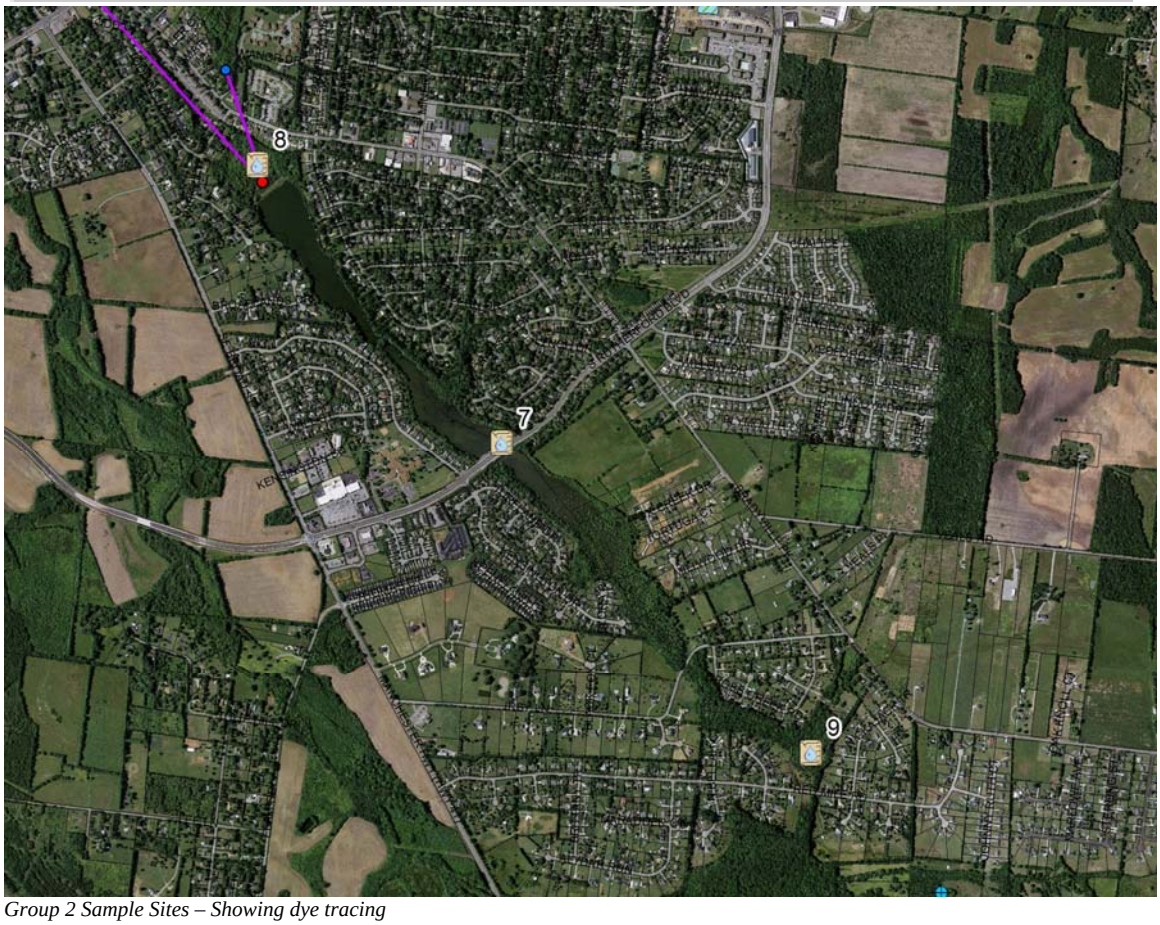
e-coli



Mouth

Group 2

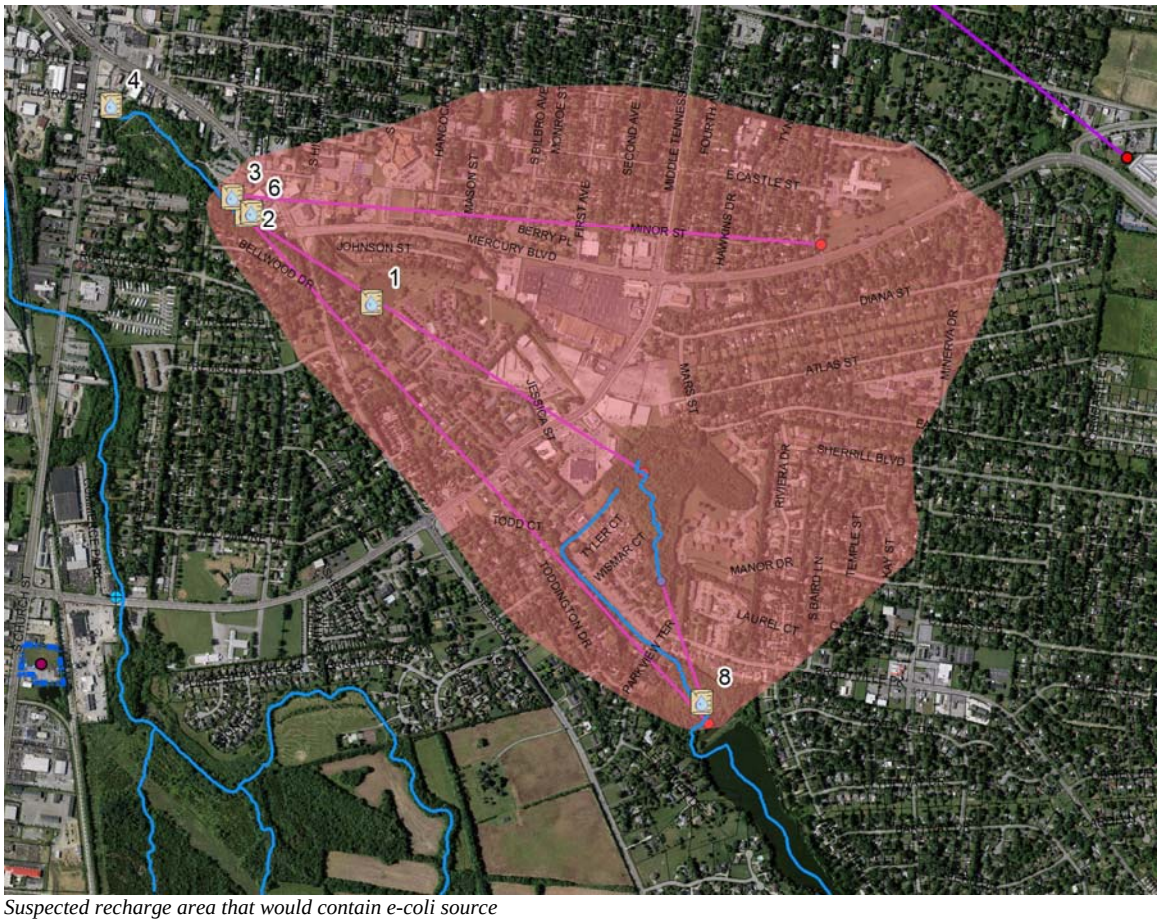
An additional 3 sites were chosen to sample along with a resample of site 3 in order to analysis whether e-coli was present in the upstream basins for each group 1 sample sites.



Group 2 Sample Sites – Showing dye tracing

Location	E-coli
Discovery Center Tank Resample	1864
9 – Black Fox Spring	82
7 – Rutherford and Black Fox Spring	486
8 – Todd's Lake Sink	268

Although group 2 samples tested high, the results were far lower than the three spring locations which allowed for a smaller recharge basin of possible source contamination based on dye tracing. MWSD will send samples to have DNA analysis done to find whether the e-coli samples have an animal or human origin. Well records will be queried to allow for pin pointing a smaller possible contamination basin. Finally, if DNA results reveal a sewage leak, the sewer system will be analyzed for leaks.



Suspected recharge area that would contain e-coli source

Summary

There were three problem areas detected in the Murfreesboro Water and Sewer Department's 2010 Illicit Discharge Detection Elimination Screening.

I. Car washing

Problem:

There were several commercial properties that had evidence of car washing that drained into nearby storm drains in the Town Creek Basin. These were identified during the flagged junction box method.

Solution:

The stormwater department distributed the department produced "Best Management Practices for Car Washes" brochures to all commercial properties.

II. Auto repair shop draining fluids

Problem:

During the visual method of the IDDE the department detected an auto repair shop possibly draining fluids in a gravel lot that drains directly to the wetlands.

Solution:

The stormwater department provided the state of Tennessee auto maintenance BMP brochure to the property.

III. TMDL for E-coli

Problem:

The Town Creek Watershed is currenly impaired for E-Coli with an unknown source.

Solution:

The Stormwater department sampled various locations in the Town Creek watershed in attempt to locate the source of the E-coli. The sampling determined that while levels of E-coli are elevated when the stream originates at Black Fox Spring and sinks downstream of Todd's Lake, the levels are extremely high at the three springs that form the wetlands and Town Creek. The levels drop rapidly but are still elevated when Town Creek enters Lytle Creek. The study estimated by querying dye trace data that the E-coli source originates somewhere between the Discovery Center and Todd's Lake. The department plans to conduct a comprehensive study to determine the source. A sample will be taken

to determine whether the contamination is from a human or animal source using DNA testing. Once the source is identified the department may query any well and septic tank data to try to further pinpoint the source and then screen the sewer system.

Miscellaneous Photos

The Wetlands at the Discovery Center

Bruce Ross taking a sample at the tank at the Discovery Center

Town Creek at Cannonsburgh

Parrot Feather at the Wetlands