Carters Creek Watershed Assessment Update
Lucas Gregory
Texas Water Resources Institute
May 23, 2014
Routine Monitoring

Type and Frequency

- Monthly ambient water quality monitoring
- Occurs at 4 locations
- Will continue for 2 years
- 96 samples anticipated
- Data will be submitted to TCEQ for future water quality assessments

- 14 sampling events completed to date

Data Collected

Field Data
- Temperature
- pH
- DO
- Conductivity
- Flow

Lab Data
- E. coli (1603 Method)
Stormwater Monitoring

Type and Frequency

• Automated sample collection
• Occurs at 2 locations
• Goal of 10 storm events sampled at each site
• Data will be submitted to TCEQ but **WILL NOT** be used in future water quality assessments

Data Collected

• Field Data
  • Temperature
  • pH
  • DO
  • Conductivity
  • Flow

• Lab Data
  • E. coli (1603 Method)
Reconnaissance Monitoring

Types and Frequency
• Volunteer data collection using the Texas Stream Team monitoring protocol
• Monthly at 10 locations
• Data will be submitted to the Texas Stream Team database
• Not used in water quality assessments

• 14 sampling events completed to date

Data Collected
• Field Data
  • Temperature
  • Water Transparency
  • Total Depth
  • DO
  • pH
  • Conductivity

• Lab Data
  • E. coli (IDEXX Method)
# Water Quality Monitoring Sites

## Table 1. Carters Creek Watershed Monitoring Sites

<table>
<thead>
<tr>
<th>TCEQ Station #</th>
<th>Site Name/Location</th>
<th>Sampling Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>11785</td>
<td>Carters Creek @ Bird Pond Road</td>
<td>monthly</td>
</tr>
<tr>
<td>11782</td>
<td>Carters Creek @ SH 6 (upstream of Burton Creek confluence)</td>
<td>monthly</td>
</tr>
<tr>
<td>21259</td>
<td>Carters Creek @ William D. Fitch</td>
<td>monthly</td>
</tr>
<tr>
<td>11783</td>
<td>Burton Creek @ SH 6 (downstream of WWTF)</td>
<td>monthly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TCEQ Station #</th>
<th>Site Name/Location</th>
<th>Sampling Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>11785</td>
<td>Carters Creek @ Bird Pond Road</td>
<td>during storm events</td>
</tr>
<tr>
<td>11783</td>
<td>Burton Creek @ SH 6</td>
<td>during storm events</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TST Station #</th>
<th>Site Name/Location</th>
<th>Sampling Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>80908</td>
<td>Burton Creek @ SH 6 (downstream of WWTF)</td>
<td>monthly</td>
</tr>
<tr>
<td>80909</td>
<td>Carters Creek @ Briarcrest Dr.</td>
<td>monthly</td>
</tr>
<tr>
<td>80910</td>
<td>Unnamed tributary of Burton Creek @ Maloney Ave.</td>
<td>monthly</td>
</tr>
<tr>
<td>80911</td>
<td>Bee Creek @ Appomattox Dr.</td>
<td>monthly</td>
</tr>
<tr>
<td>80912</td>
<td>Burton Creek 65 m downstream of Tanglewood Dr.</td>
<td>monthly</td>
</tr>
<tr>
<td>80913</td>
<td>Carters Creek below CCWWTF outfall</td>
<td>monthly</td>
</tr>
<tr>
<td>80914</td>
<td>Wolfpen Creek @ Raintree Park</td>
<td>monthly</td>
</tr>
<tr>
<td>80915</td>
<td>Briar Creek @ Hwy 6</td>
<td>monthly</td>
</tr>
<tr>
<td>80916</td>
<td>Carters Creek above CCWWTF outfall</td>
<td>monthly</td>
</tr>
<tr>
<td>80917</td>
<td>Hudson Creek @ SH 30/Harvey Rd.</td>
<td>monthly</td>
</tr>
</tbody>
</table>
Use of Information

• Will hopefully provide insight into potentially problematic areas of the watershed

• Comparative analysis of all water quality data will be done

• Watershed GIS and survey info will be considered in the data analysis

• Information conveyed to watershed stakeholders for use in future decision making regarding watershed management
VOLUNTEER WATER QUALITY DATA
Volunteer Effort

**Trainings**
- 9 training events conducted
- 85 volunteers trained
- 155 volunteers on contact list
- 384.5 hours contributed during trainings
- More trainings to be held in the near future

**Monitoring**
- 14 monitoring events conducted
- 1 – 1.5 hours per event
- 2 – 3 volunteers per site per event
- 378 volunteer hours contributed through monitoring
Carters Creek @ Briarcrest

Carters Creek Water Quality Data
thru April 30, 2014

Geomean = 220.7 cfu/100 mL
Briar Creek @ SH 6

Carters Creek Water Quality Data
thru April 30, 2014

Geomean = 30 cfu/100mL

Station ID
Unnamed Tributary @ Maloney

Carters Creek Water Quality Data thru April 30, 2014

Geomean = 309.0 cfu/100mL
Burton Creek @ Tanglewood

Carters Creek Water Quality Data thru April 30, 2014

Geomean = 420.3 cfu/100mL
Burton Creek @ SH 6

Carters Creek Water Quality Data
thru April 30, 2014

Geomean = 385.5 cfu/100mL
Hudson Creek @ SH 30

Carters Creek Water Quality Data
thru April 30, 2014

Geomean = 178.4 cfu/100mL

E. coli (cfu/100 mL)
Wolfpen Creek @ Raintree Park

Carters Creek Water Quality Data thru April 30, 2014

Geomean = 377.5 cfu/100mL
Carters Creek Upstream of WWTF

Carters Creek Water Quality Data thru April 30, 2014

Geomean = 514.6 cfu/100mL

E. coli (cfu/100 mL)

Station ID 80916
Carters Creek Downstream of WWTF

Carters Creek Water Quality Data thru April 30, 2014

Geometric mean = 881.1 cfu/100mL
Bee Creek @ Appomattox Dr.

Carter's Creek Water Quality Data thru April 30, 2014

Geomean = 216.0 cfu/100mL
ROUTINE WATER QUALITY DATA
Carters Creek Upstream of Burton Creek

Carters Creek Water Quality Data thru April 30, 2014

Geomean = 149.9 cfu/100mL

E. coli (cfu/100 mL)

Station ID

11782, 129.0
Burton Creek Downstream of WWTF

Carter Creek Water Quality Data
thru April 30, 2014
DATA COMPARISON
Burton Creek @ SH 6

Volunteer : Routine

- Volunteer
  - Standard Dev. = 303.7
- Routine
  - Standard Dev. = 376.3

- Wilcoxon Rank Sum Test
  - P-value = 0.109
  - Not a significant difference in means at alpha = 0.05 both with and without storm event data

<table>
<thead>
<tr>
<th>Station ID</th>
<th>Geomeans without storm influenced event</th>
</tr>
</thead>
<tbody>
<tr>
<td>80908</td>
<td>338.1</td>
</tr>
<tr>
<td>11783</td>
<td>413.0</td>
</tr>
</tbody>
</table>
Upstream to Downstream: All Sites

Carters Creek Watershed E. coli Summary: Upstream to Downstream

Flow Direction

E. coli (cfu/100 mL)

Station ID

80909 80915 11782 80910 80912 80908 11783 80917 80914 80916 80913 80911 80918 11785 21259

126.0
Upstream to Downstream: Carters Creek Only

Carters Creek Watershed E. coli Summary: Upstream to Downstream
### Summary by Site

<table>
<thead>
<tr>
<th>Station #</th>
<th>Geomean - All</th>
<th>Geomean - No Storm</th>
</tr>
</thead>
<tbody>
<tr>
<td>80909</td>
<td>220.7</td>
<td>188.7</td>
</tr>
<tr>
<td>80915</td>
<td>30.0</td>
<td>22.0</td>
</tr>
<tr>
<td>11782</td>
<td>149.9</td>
<td>113.5</td>
</tr>
<tr>
<td>80910</td>
<td>309.0</td>
<td>266.7</td>
</tr>
<tr>
<td>80912</td>
<td>420.3</td>
<td>370.9</td>
</tr>
<tr>
<td>80908</td>
<td>385.5</td>
<td>338.1</td>
</tr>
<tr>
<td>11783</td>
<td>484.2</td>
<td>413.0</td>
</tr>
<tr>
<td>80917</td>
<td>178.4</td>
<td>148.1</td>
</tr>
<tr>
<td>80914</td>
<td>377.5</td>
<td>330.6</td>
</tr>
<tr>
<td>80916</td>
<td>514.6</td>
<td>460.7</td>
</tr>
<tr>
<td>80913</td>
<td>881.1</td>
<td>819.7</td>
</tr>
<tr>
<td>80911</td>
<td>216.0</td>
<td>181.8</td>
</tr>
<tr>
<td>11785</td>
<td>577.9</td>
<td>523.6</td>
</tr>
<tr>
<td>21259</td>
<td>348.6</td>
<td>328.0</td>
</tr>
</tbody>
</table>
Storm Event Sampling

- Burton Creek @ Hwy 6 – 11 events sampled
- Carters Creek @ WD Fitch – 5 events sampled
- Burton site consistently higher than Carters
## Storm Data by Site

<table>
<thead>
<tr>
<th>Date</th>
<th>11783</th>
<th>21259</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/13/2013</td>
<td>48000</td>
<td></td>
</tr>
<tr>
<td>10/22/2013</td>
<td>3700</td>
<td></td>
</tr>
<tr>
<td>11/5/2013</td>
<td>5000</td>
<td></td>
</tr>
<tr>
<td>11/21/2013</td>
<td>24000</td>
<td>7600</td>
</tr>
<tr>
<td>12/21/2013</td>
<td>21000</td>
<td>2300</td>
</tr>
<tr>
<td>1/9/2014</td>
<td>3900</td>
<td>1000</td>
</tr>
<tr>
<td>2/4/2014</td>
<td>3600</td>
<td></td>
</tr>
<tr>
<td>2/5/2014</td>
<td></td>
<td>760</td>
</tr>
<tr>
<td>2/26/2014</td>
<td>9500</td>
<td></td>
</tr>
<tr>
<td>3/9/2014</td>
<td>21000</td>
<td></td>
</tr>
<tr>
<td>4/4/2014</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>4/15/2014</td>
<td>16000</td>
<td>2800</td>
</tr>
</tbody>
</table>
Initial Findings

• Data extremely variable

• Several significantly higher sites surfacing
  • Not necessarily due to fecal loading though, but might be

• No obvious sources of *E. coli*

• Stream survey still to come
THANKS!

Lucas Gregory
TWRI Project Specialist
lfgregory@ag.tamu.edu
979-845-7869