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Big Cypress Creek Bacteria Assessment Study

Water Quality and Flow Monitoring

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Water Monitoring Solutions, Inc.

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OBJECTIVES

- Address Bacteria Impairments in Big Cypress, Hart, Tankersley Creeks
- Verify stream use
- Determine appropriate Water Quality Standards
- Assess Designated Uses
- Address impairments through WPP or TMDL

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Monitoring Stations

- 14 Stream Stations
- 2 WWTPs

USGS Gage on
Big Cypress Creek
at US 271 & SH 11

Rain Gauge at
Lake Bob Sandlin

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Sampling Schedule

August 2009 – May 2011

- Routine
  - Bi-monthly *E. coli*
  - Monthly *Bacteroidales*/BST
- Event-based
  - 8 storm events
    - >1” in 8 hours
    - >10% increase in flow
    - Other limitations

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Samples Assessed

- Routine *E. coli*
  - 584 samples
- WWTP *E. coli*
  - 84 samples
- Storm *E. coli* (all 16 sites)
  - 96 samples

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Continuous Flow Monitoring

- Continuous water level was recorded on each major tributary of Big Cypress Creek
- Water level was measured hourly (at least)
- Discharge was averaged over 24 hour period
- Results were averaged to determine monthly averages
- These data have provided important flow severity information and hydrological responses to rainfall events

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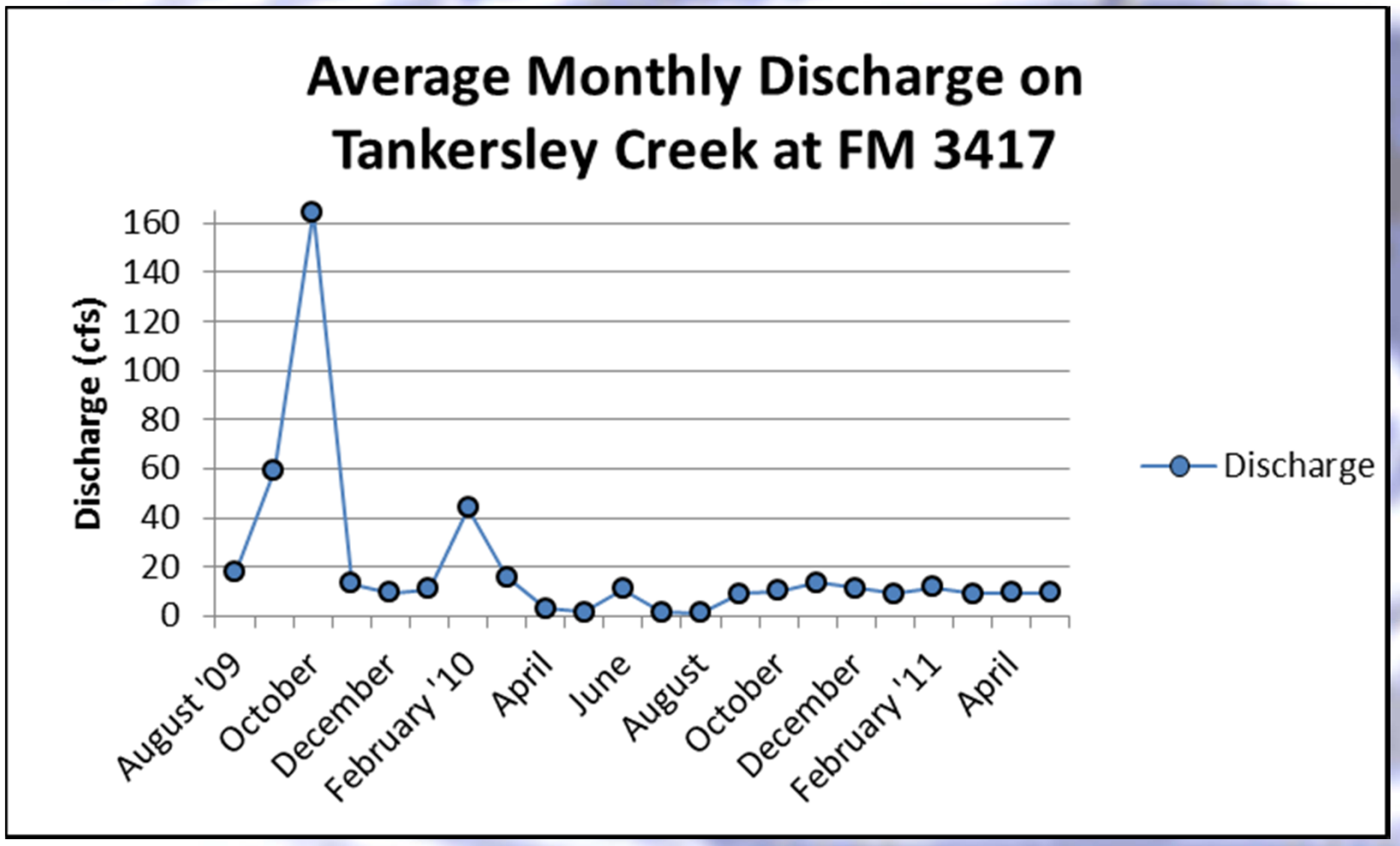
Continuous Flow Monitoring



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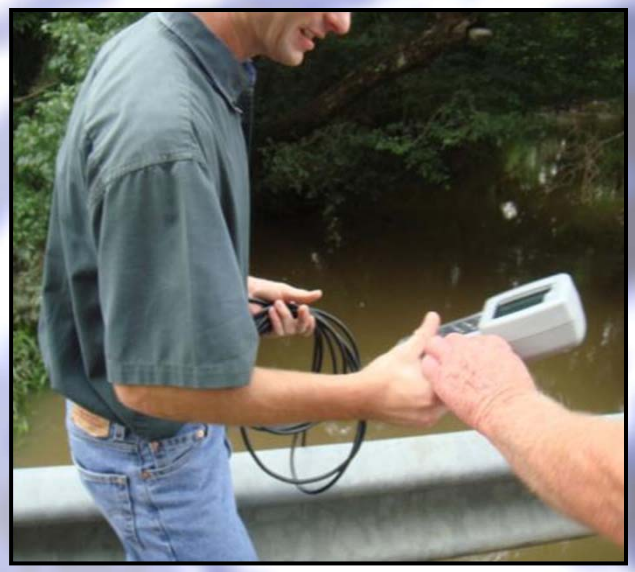
Water Quality Sampling



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Considerations

- All geomeans exceeded the state standard (except Mt. Pleasant WWTP)
- Land use in the watershed
- *E. coli* standards and stream classifications for designated use
- Climate

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Summary of *E. coli* Data

Station Name	Station ID	Routine Sample Geomean	Storm Sample Geomean
Dragoo Creek at SW 35th Street	18326	191	260
Tankersley Creek at FM 899	10264	215	1575
Pilgrims Pride Processing WWTP	16468	180	15
Tankersley Creek at FM 127	10263	370	1267
Tankersley Creek at FM 3417	10261	366	1592
Evans Creek at US 67	20704	385	1316
Hart Creek at US 67	10273	431	2074
Hayes Creek at US 67	20705	234	1502
Hart Creek at SH 49	10272	338	1519
City of Mt. Pleasant WWTP	16467	3	1
Hart Creek at Titus CR SE-12	10266	424	1519
Big Cypress Creek at US 271	10310	256	1132
Walkers Creek at US 271	16454	236	767
Unnamed trib of BCC at Dukes Chape	20706	440	1665
Prairie Branch at FM 2348	20707	225	1767
Big Cypress Creek at SH 11	10308	198	1086

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Relationships of Interests

Statistical analysis was be performed to determine significance:

- *E. coli* value v. Discharge
- *E. coli* value v. Water Temperature
- *E. coli* value v. Days Since Significant Rainfall

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Relationships of Interests

Station Name	Station ID	*E. coli* v. Discharge*	*E. coli* v. Temperature*
Dragoo Creek at SW 35th Street	18326	Yes	No
Tankersley Creek at FM 899	10264	Yes	No
Pilgrim's Pride Processing WWTP	16468	No	N/A
Tankersley Creek at FM 127	10263	Yes	Yes
Tankersley Creek at FM 3417	10261	No	No
Evans Creek at US 67	20704	Yes	No
Hart Creek at US 67	10273	Yes	Yes
Hayes Creek at US 67	20705	Yes	No
Hart Creek at SH 49	10272	Yes	Yes
City of Mt. Pleasant WWTP	16467	No	N/A
Hart Creek at Titus CR SE-12	10266	Yes	No
Big Cypress Creek at US 271	10310	Yes	No
Walkers Creek at US 271	16454	Yes	Yes
Unnamed trib of BCC at Dukes Chapel Rd	20706	Yes	Yes
Prairie Branch at FM 2348	20707	Yes	No
Big Cypress Creek at SH 11	10308	Yes	Yes

** Yes – Statistically significant relationship; No – no statistically significant relationship was observed*

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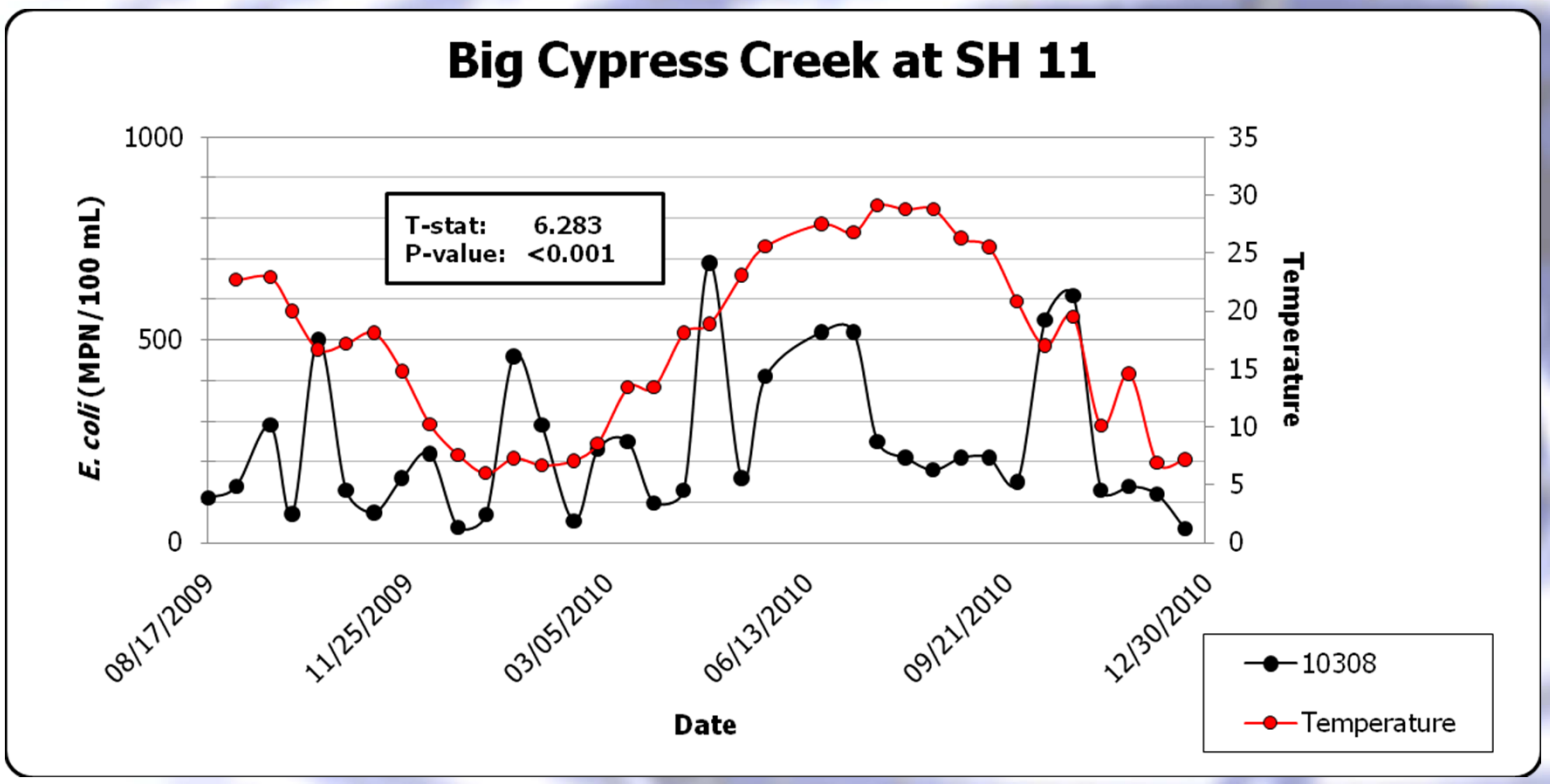
Data Analysis

E. coli v. Temperature



Statistically significant relationship exists between *E. coli* value and temperature at this site

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Data Analysis

Routine Sampling Data Results With 2 or Less Days Since Significant Rainfall			
Date	**Big Cypress Creek at US 271 10310**	**Tankersley Creek at FM 3417 10261**	**Hart Creek at Titus CR SE-12 10266**
September 17 – 18, 2009	460	910	480
October 12 – 13, 2009	240	>1000	>1000
October 26, 2009	910	>1000	>1000
December 7 – 8, 2009	190	>1000	170
April 26-27, 2010	370	980	>1100
July 07, 2010	>2400	>2400	>2400
October 11, 2010	1700	>1100	>2400
October 25 – 26, 2010	870	>1200	>2400
January 17 - 18, 2011	>2400	>2400	>2400
February 01, 2011	2400	>2400	
March 1 - 2, 2011	460	2400	>2400
April 11 - 12, 2011	370	76	770

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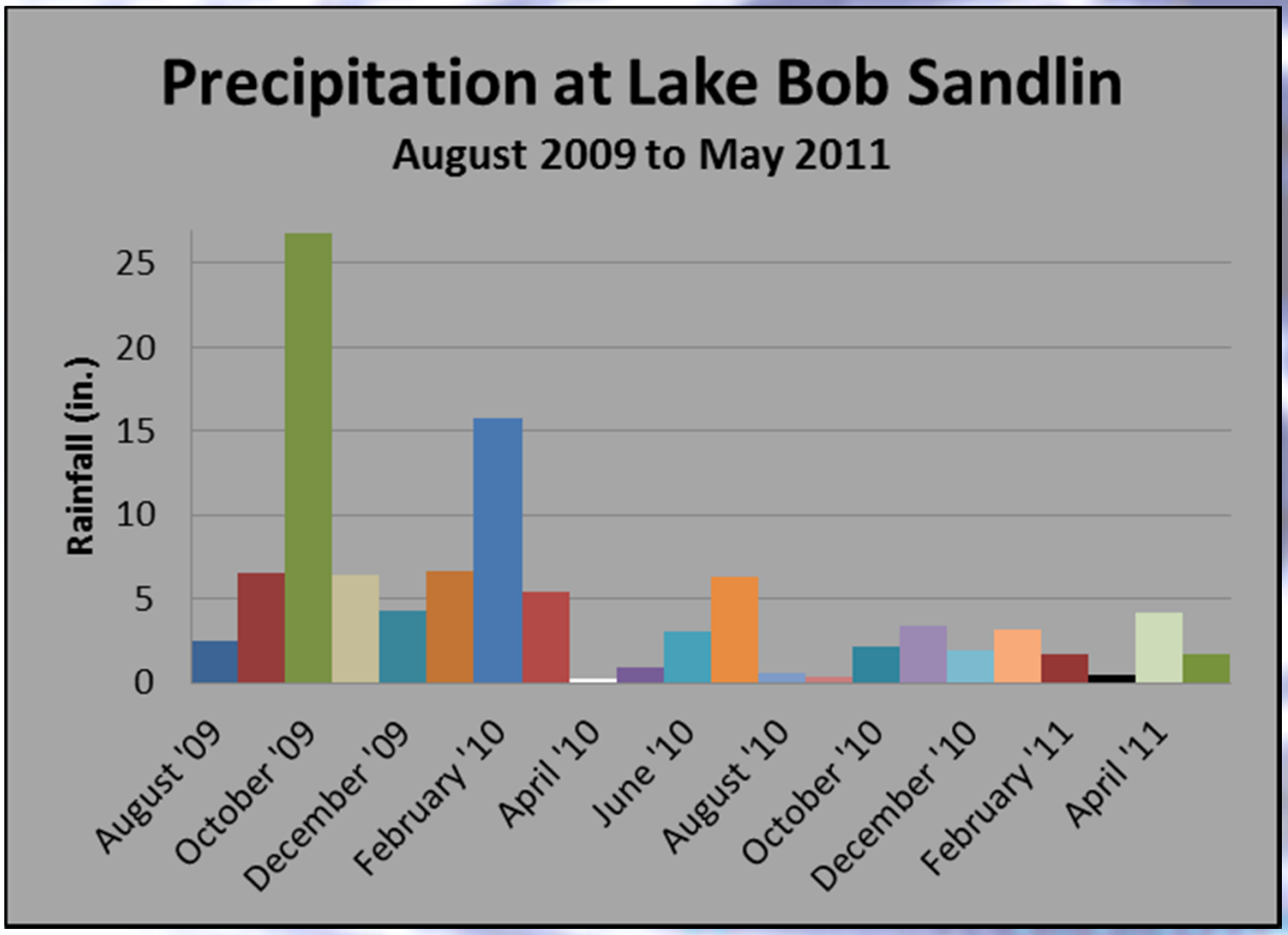
Rainfall Totals at Lake Bob Sandlin



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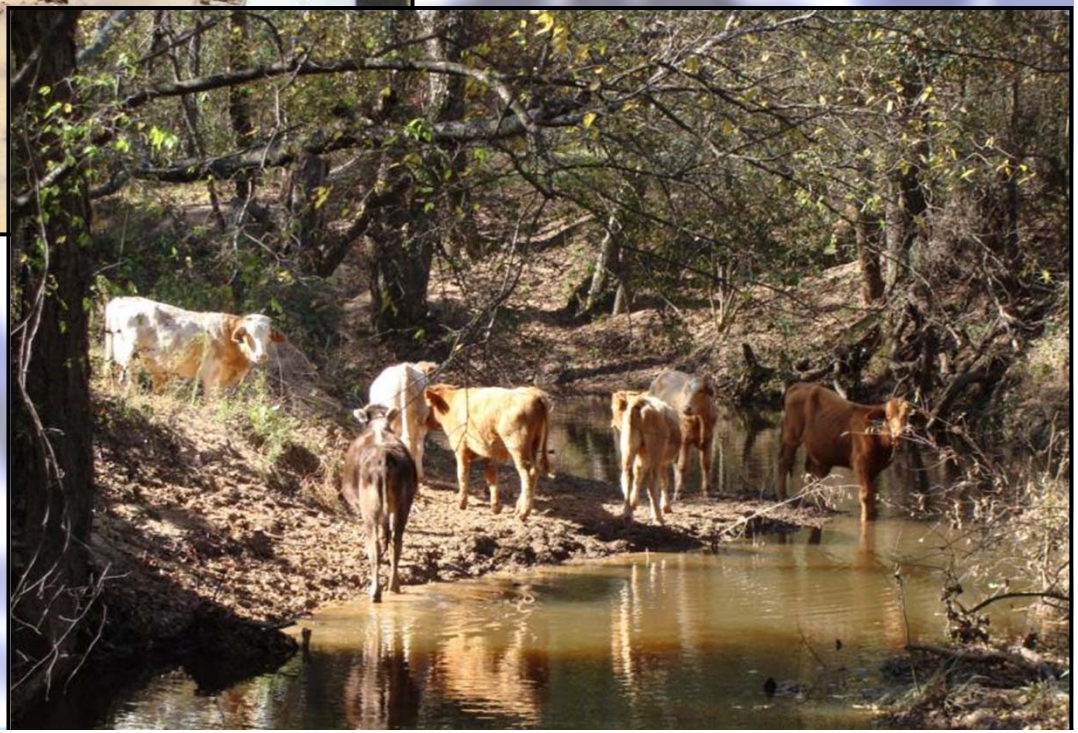
Discussion

- Rainfall affects on bacteria levels appear “normal” from early fall to early summer
- Impact if non-point sources
- Geomean variations from “wet” period to “dry” period
- Statistical significance
- Geomeans at Big Cypress Creek at SH 11

QUESTIONS?



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For Additional Information:

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