Brazos River Authority

Little Brazos River Tributaries Bacteria Assessment

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Brazos River Authority

*Project funded by the Texas State Soil and Water Conservation Board

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Project Background and Overview

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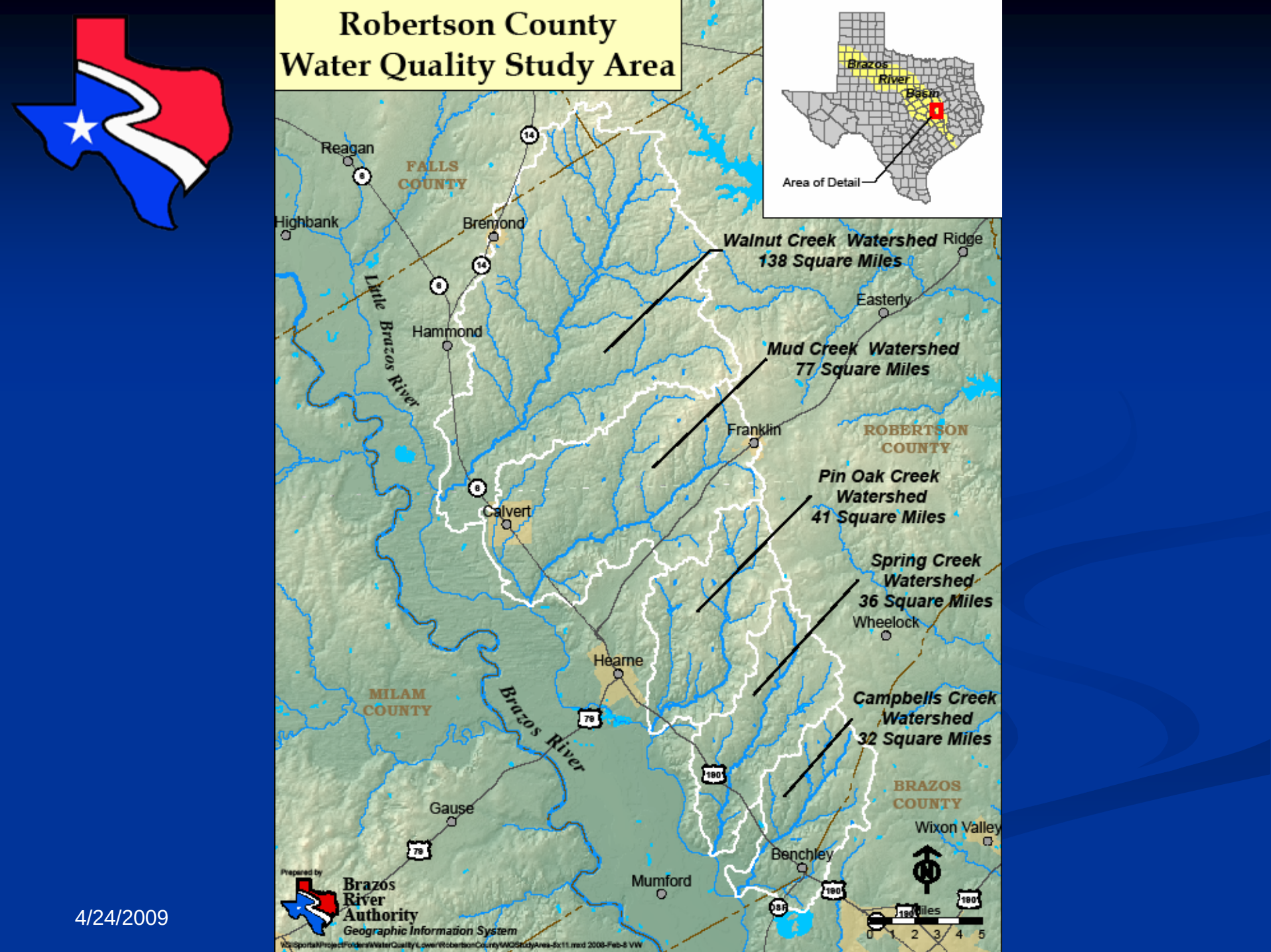
What is the purpose of the Project?

- States are required by the Clean Water Act to maintain established water quality standards for all waterbodies
- Water quality data collected on Walnut, Mud, Pin Oak, Spring, & Campbells Creeks suggests that the E.coli bacteria concentrations in these creeks exceeds the state's water quality standard for contact recreation
  - The creeks were placed on the 303(d) List in 2002
  - The numeric criteria for contact recreation is currently 126 cfu/100mL (colony forming units/ 100 milliliters water)

Robertson County Water Quality Study Area



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What is E.coli?

- E. coli are bacteria that are commonly found in the intestines of humans and animals.
- E.coli is used by state and federal regulators as an indicator of fecal contamination signifying the possible presence of harmful pathogens.
- There are different types (strands) of E. coli and not all types are harmful to people.
- Pathogens from fecal contamination are only introduced to the body through ingestion.
- Most common symptoms of infection in humans are diarrhea, vomiting, and stomach cramps

What are some of the possible sources of E.coli in water?

- Wastewater effluent
- Septic systems
- Livestock
- Wildlife (birds, deer, raccoons, skunks, etc)
- Feral Hogs (not considered wildlife)
- Pets

Project Goal

- Collect information necessary for stakeholders and agencies to make a decision on how to address these impairments at the end of this project (May 2010)
- Possible Outcomes include:
  1. waterbodies are achieving current water quality standards
  2. waterbodies are achieving revised water quality standards based on TCEQ triennial review process,
  3. adequate data exists to support a UAA to change water quality standards
  4. adequate data exists to develop a Watershed Protection Plan
  5. adequate data exists to develop a TMDL and I-Plan for TCEQ adoption.

Project Partners - Roles and Responsibilities

Project Lead & Funding:

Texas State Soil and Water Conservation Board

Water Quality Monitoring, Data Collection, & Public Participation

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Land Use Analysis & Water Quality Modeling:

Texas Water Resources Institute and Texas AgriLife Research Department of Biological and Agricultural Engineering

Bacterial Source Tracking:

Texas Water Resources Institute and Texas AgriLife Research Department of Soil and Crop Sciences

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Historic Water Quality Data and Monitoring

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Data Collection:

- 1998 – Hwy 6 sites were selected as part of a holistic planning effort to assess water quality in the central Brazos Basin
  - The BRA monitored for fecal coliform bacteria only until 2002
  - In 2002 the TCEQ changed the WQ standard from fecal coliform to E.coli.
  - BRA began monitoring for both E.coli in 2002 and collected both and fecal coliform and E.coli samples until 2004
- 2004 – The 5 creeks were listed as “impaired for bacteria” for having fecal coliform concentrations that exceeded state WQ Standards based exceedences of both E.coli and Fecal coliform concentrations

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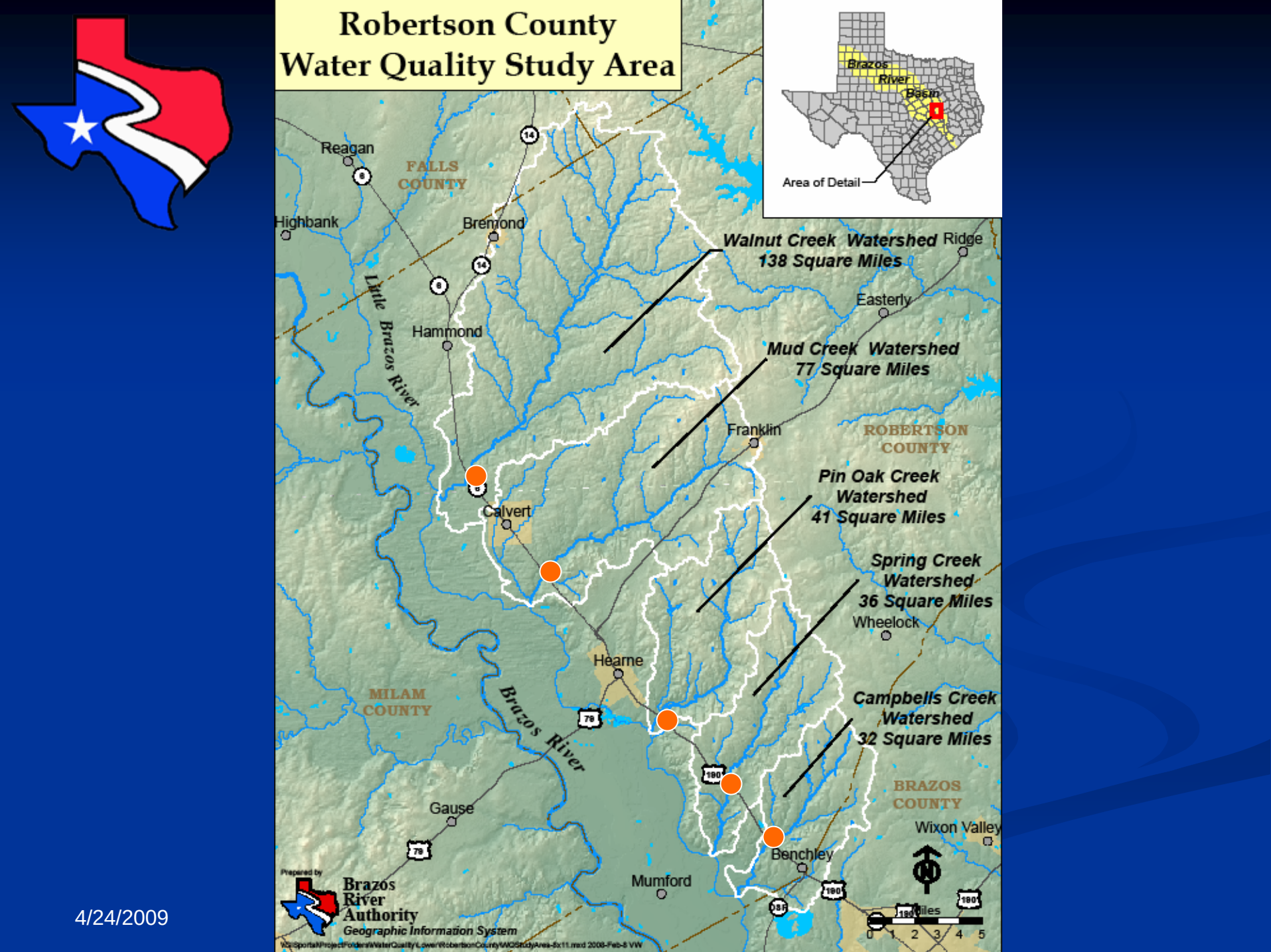

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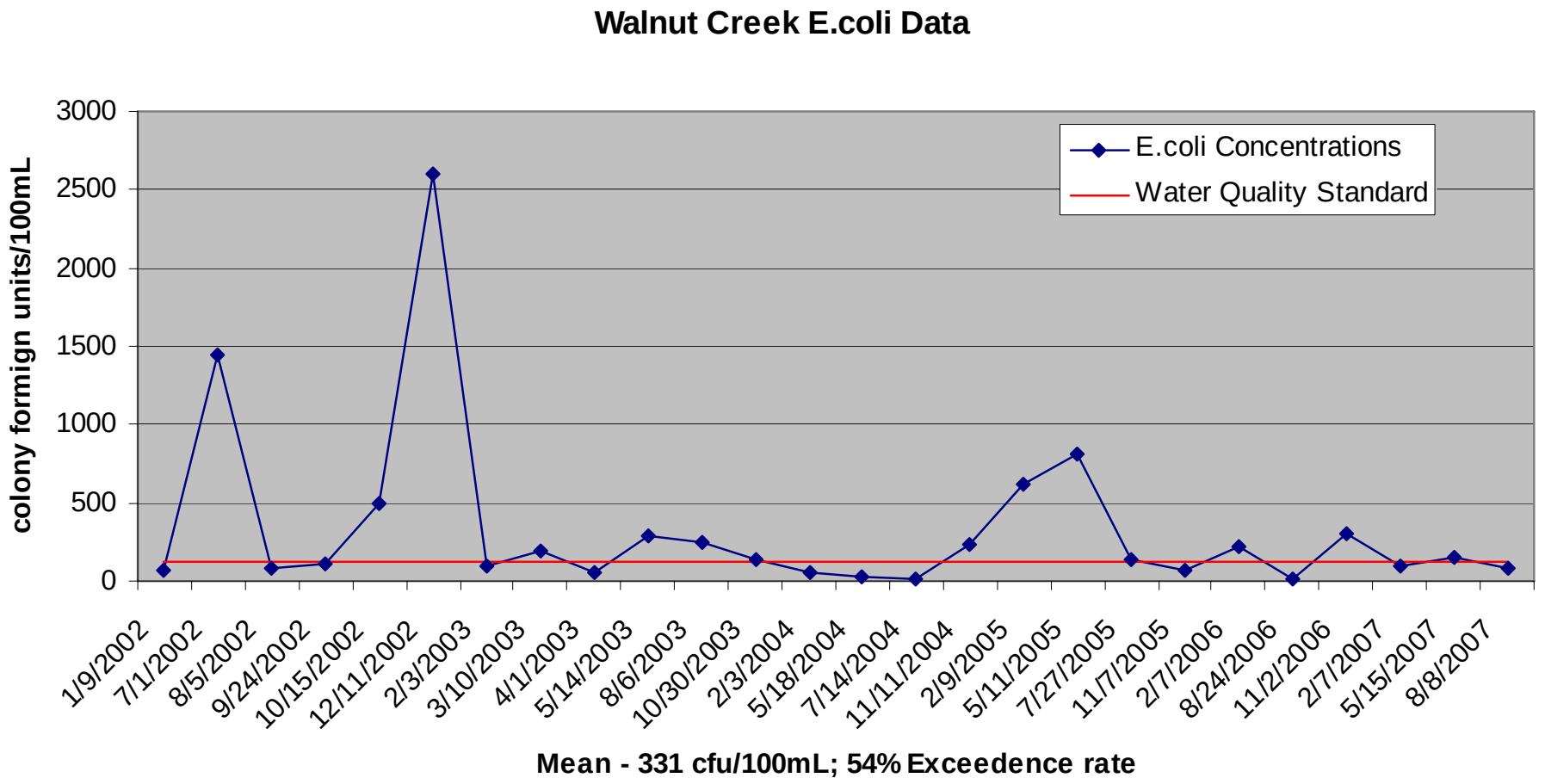

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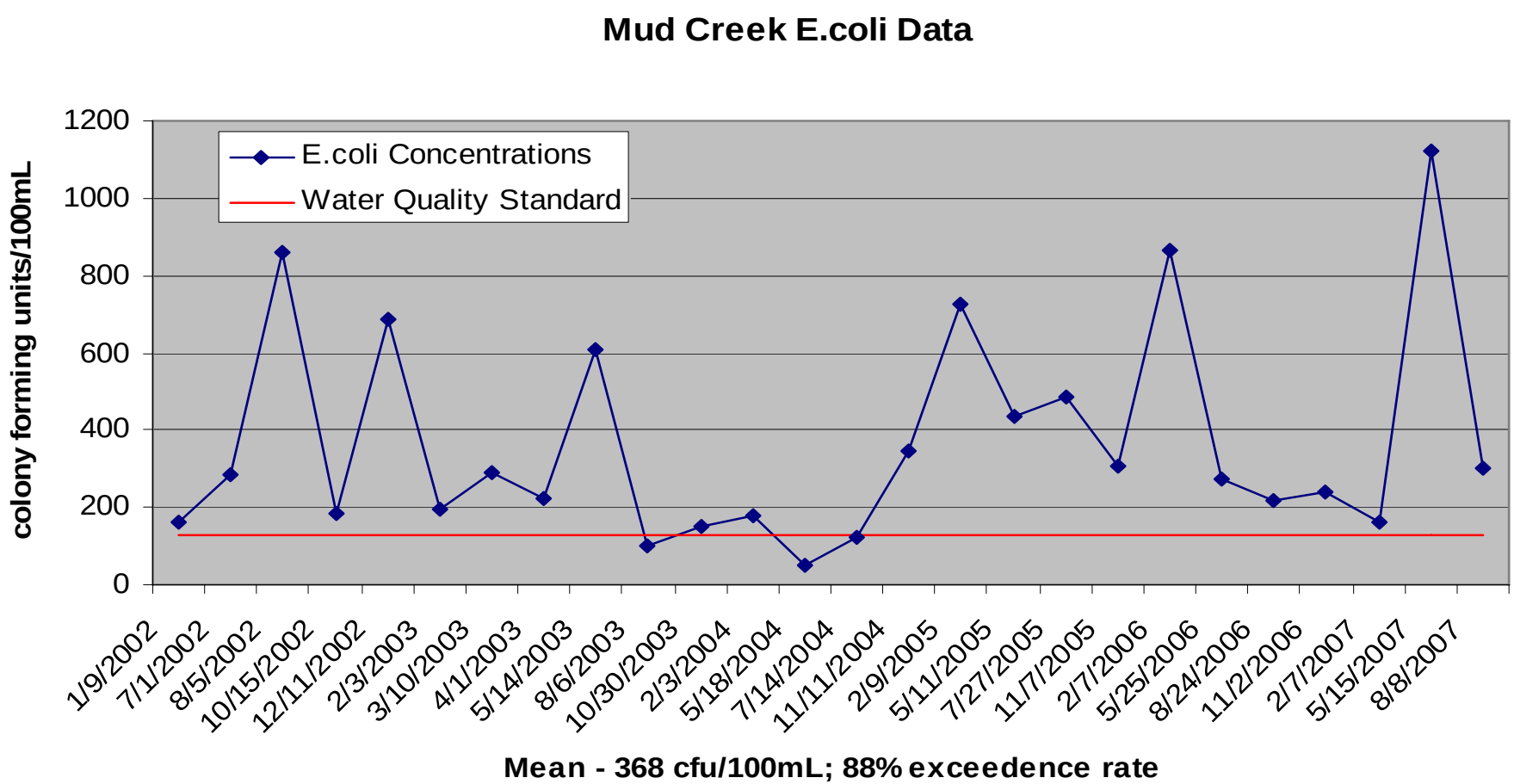

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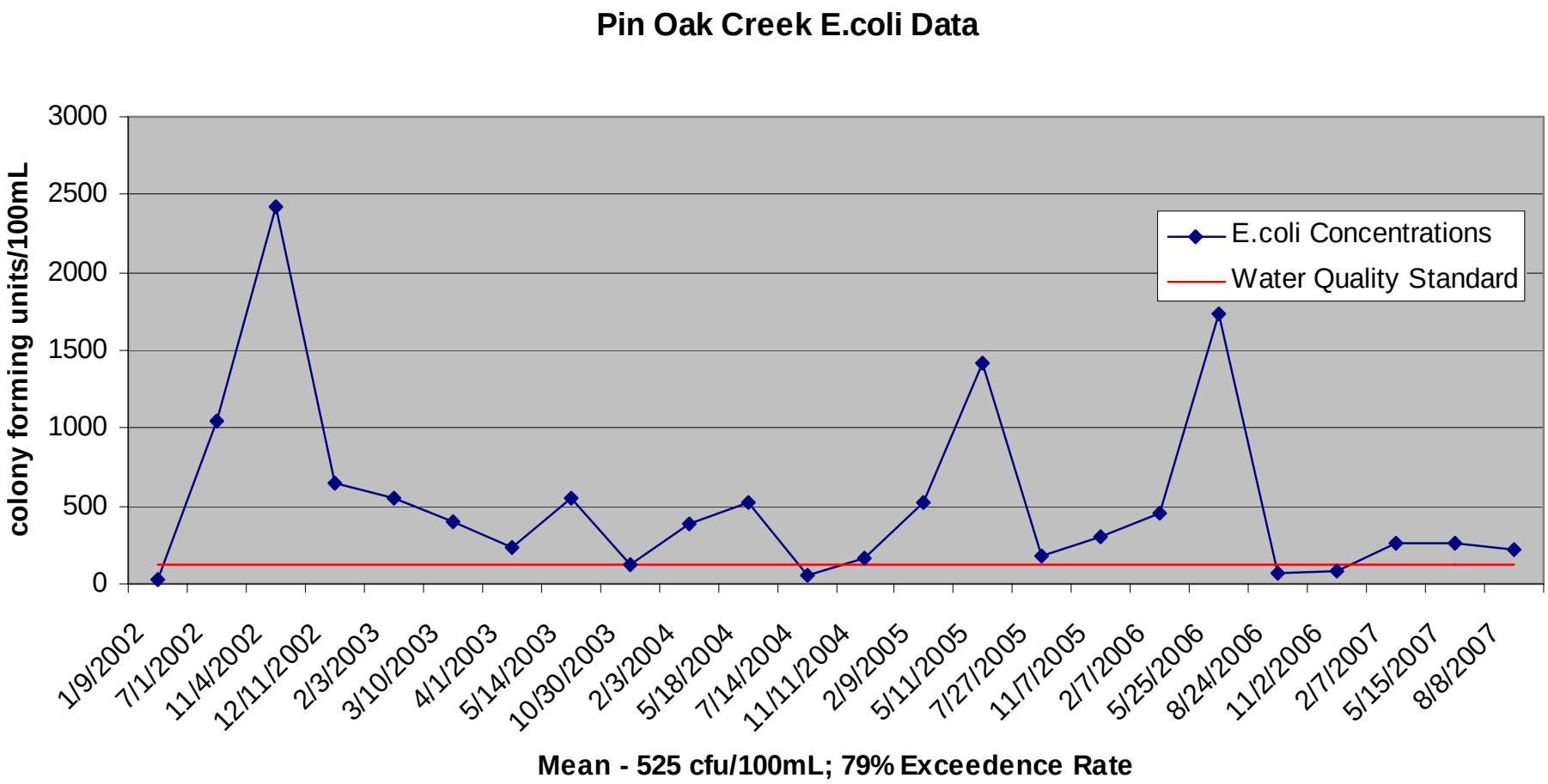

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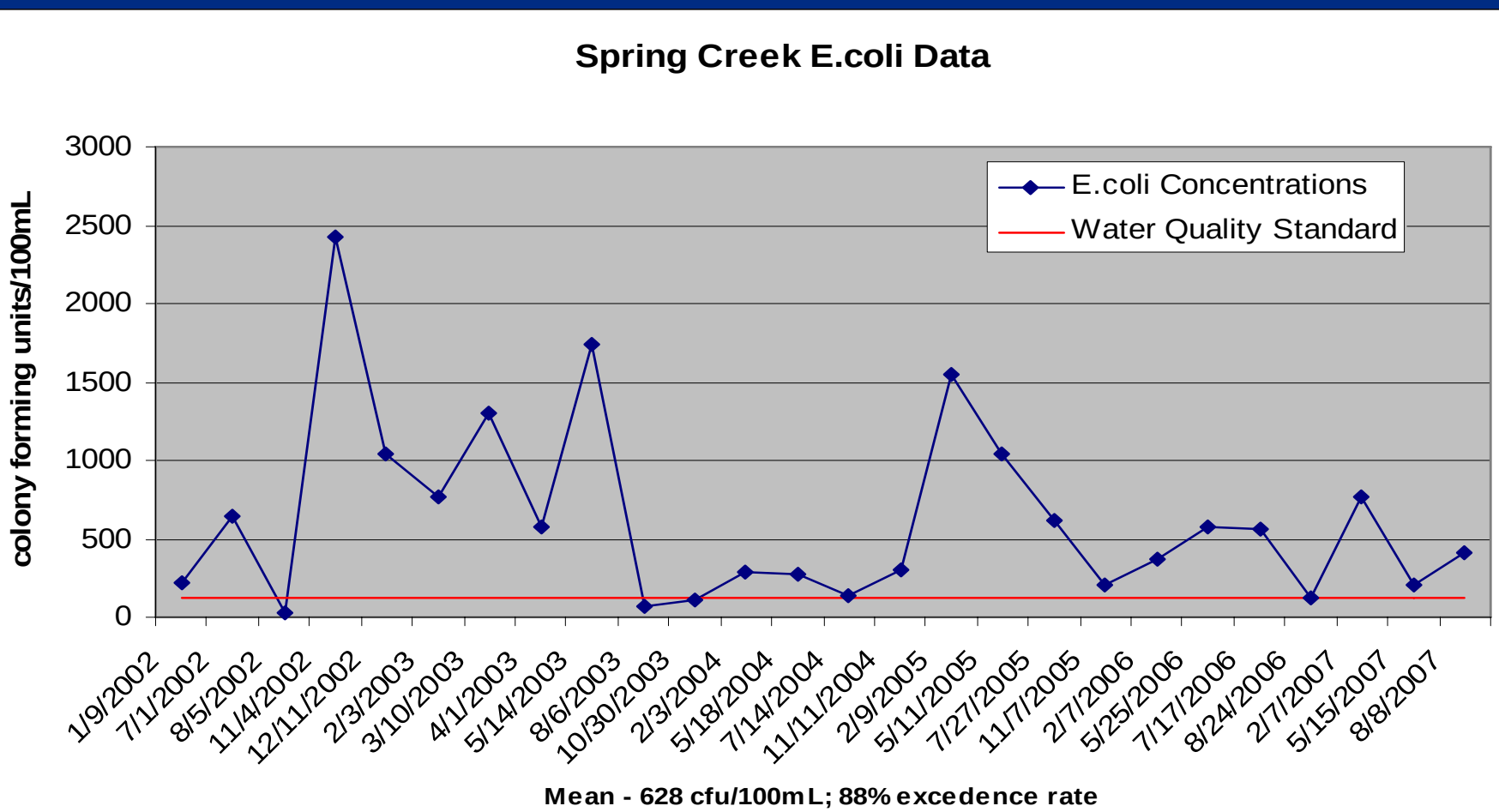

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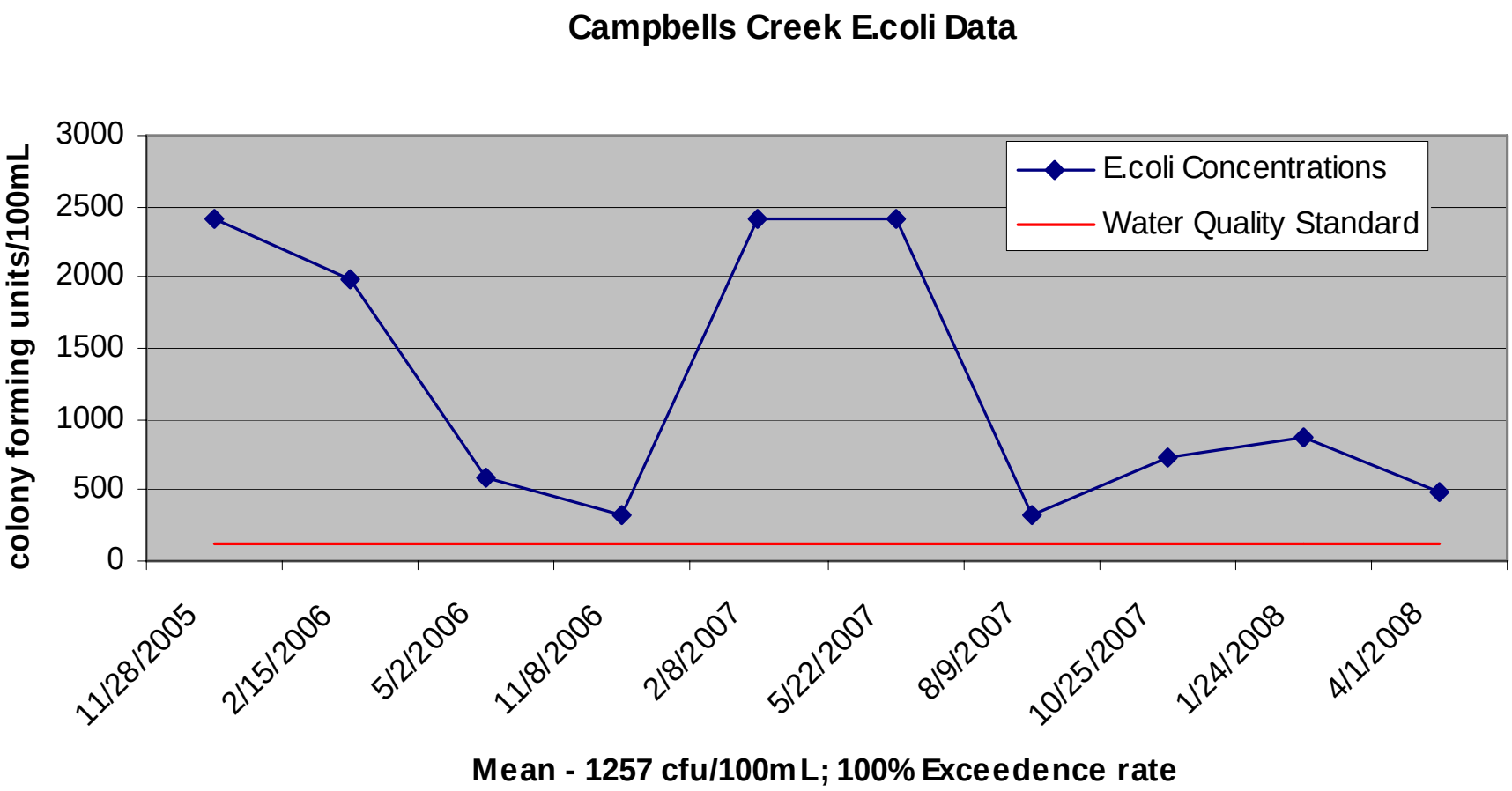

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Project Update

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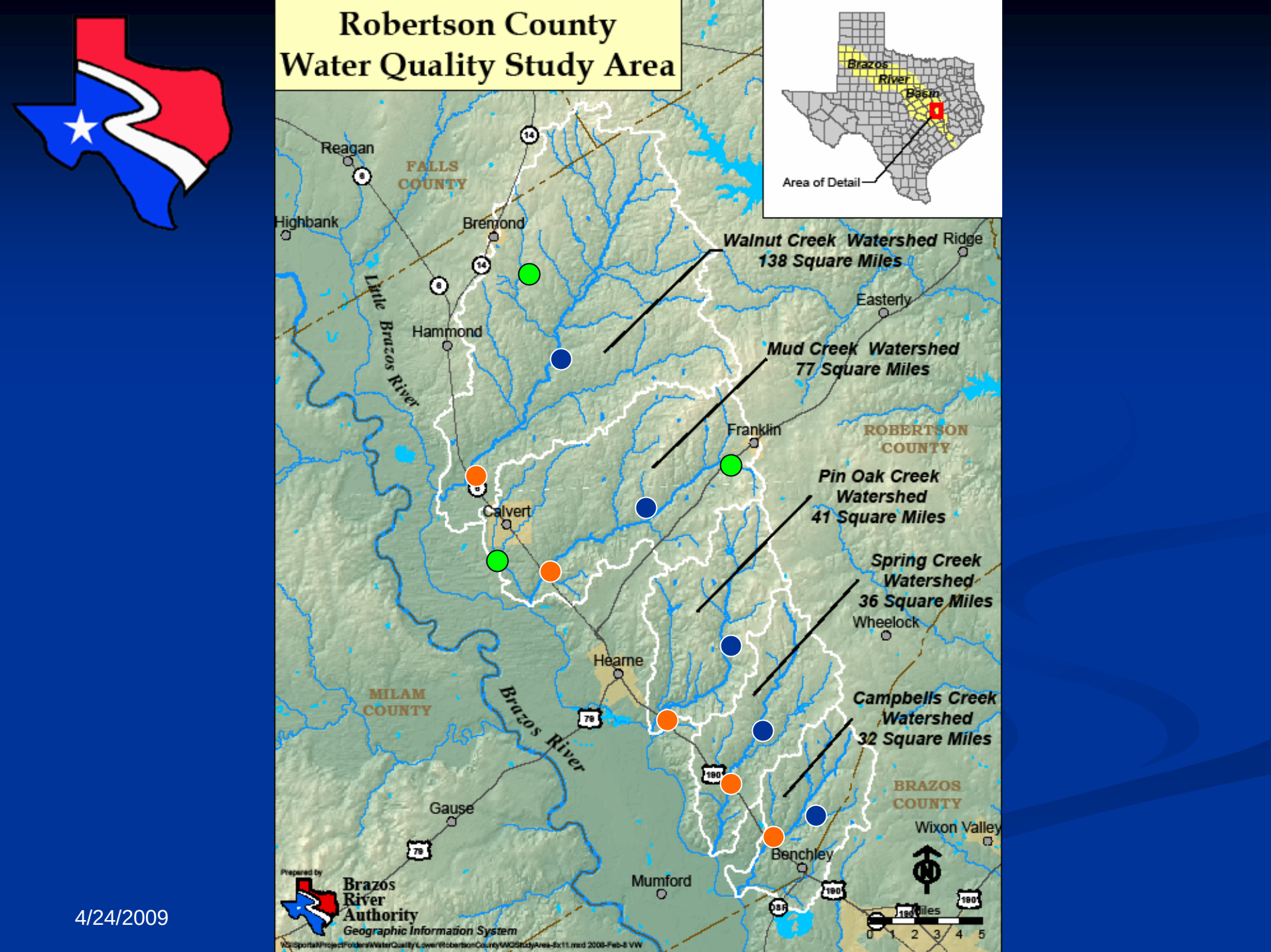

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Monitoring and Data Collection

- Location of new routine sites:
  - Walnut Cr @ Nesbit Rd
  - Mud Cr @ CR 260
  - Pin Oak Cr @ CR 391
  - Spring Cr @ Jackrabbit Lane
  - Campbells Cr @ Jackrabbit Lane
- Started collecting data on Dec 9, 2008.
- Proposed wastewater monitoring sites at Franklin, Calvert and Bremond WWTPs (no data collected)

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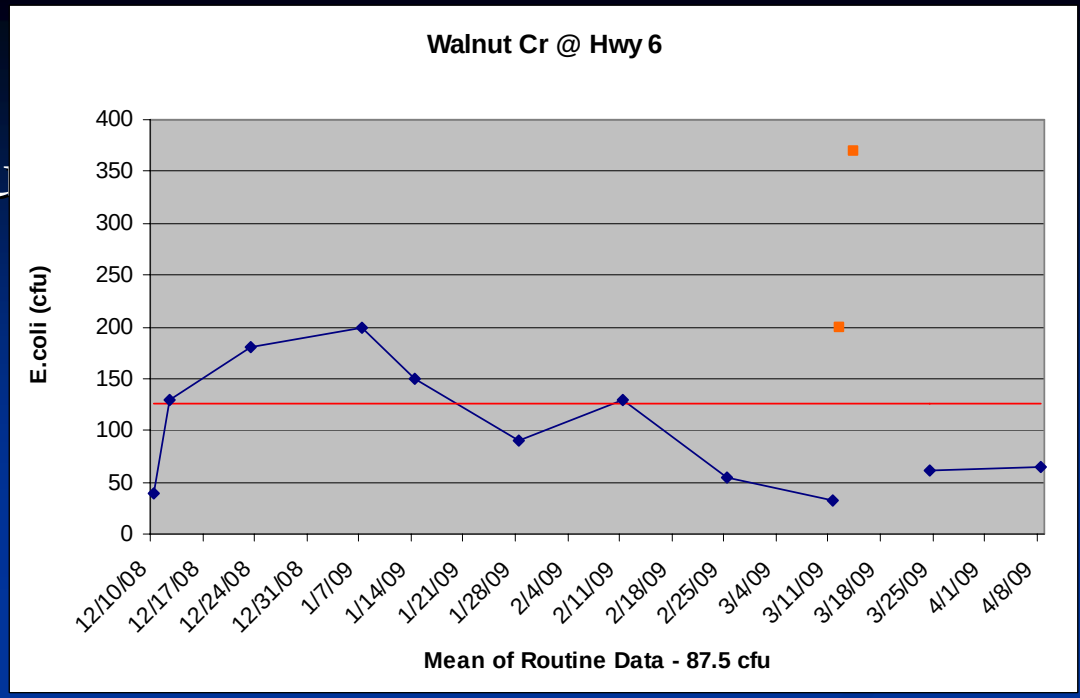
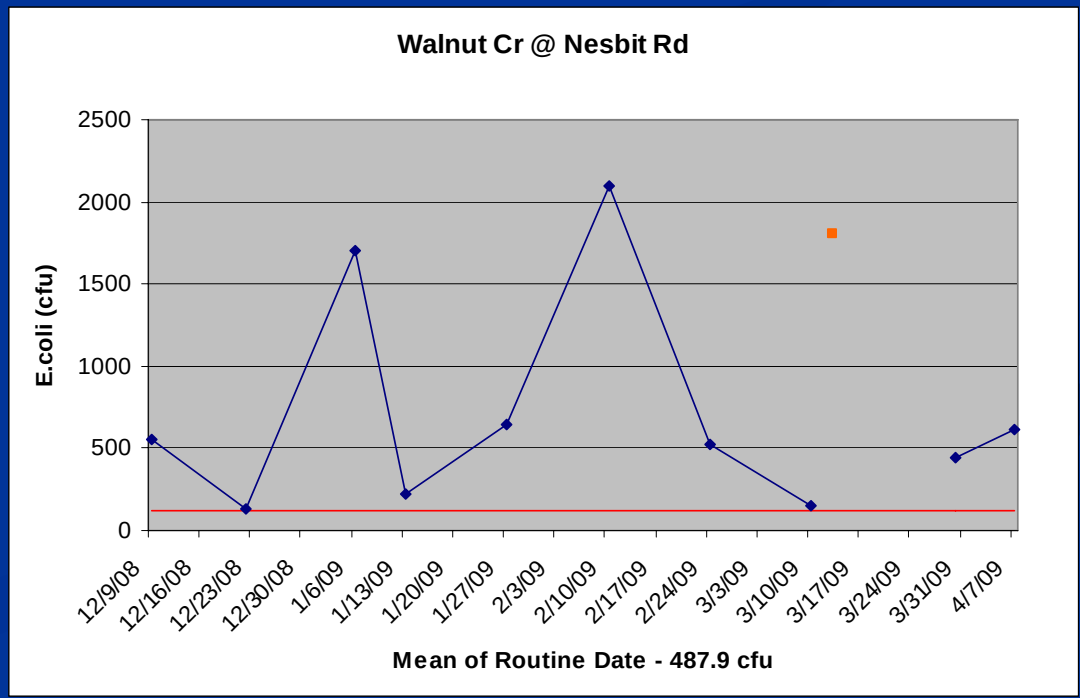
Walnut Creek Data





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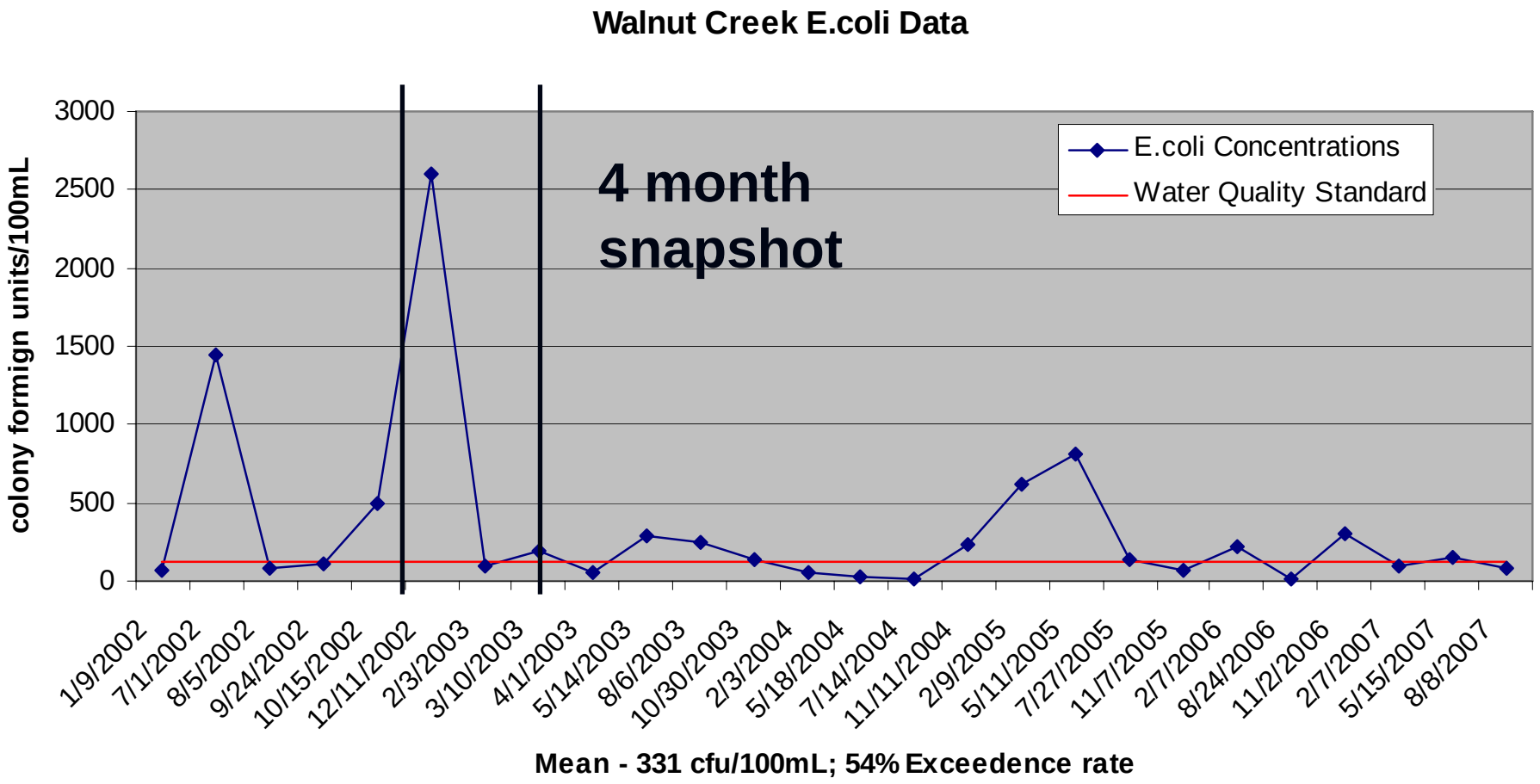

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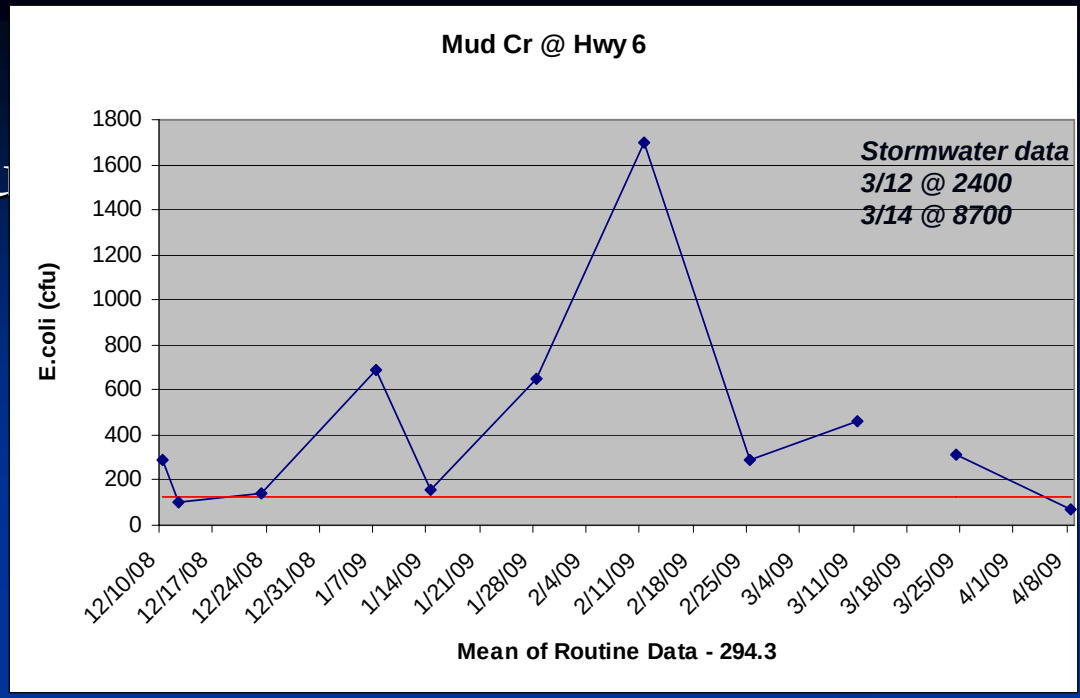
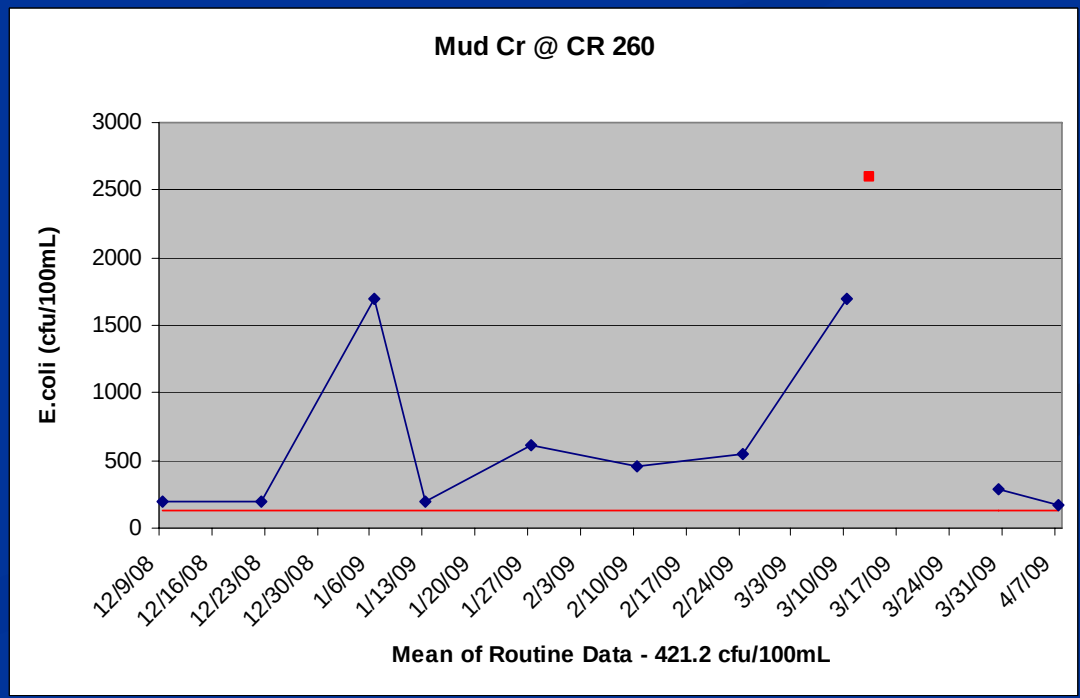
Mud Creek Data





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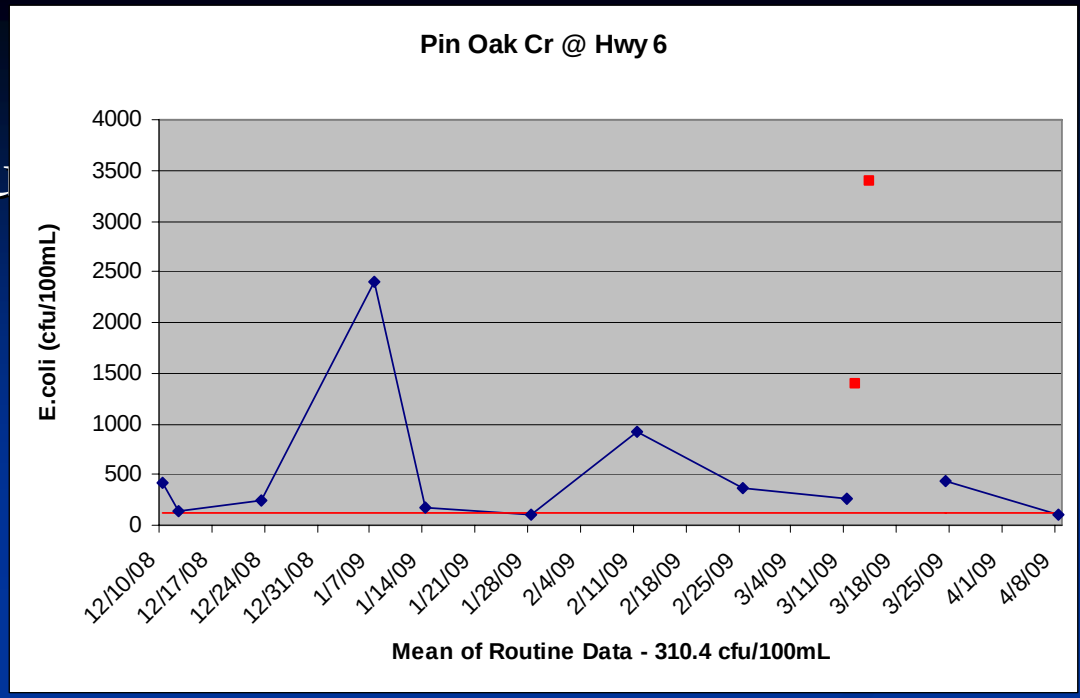
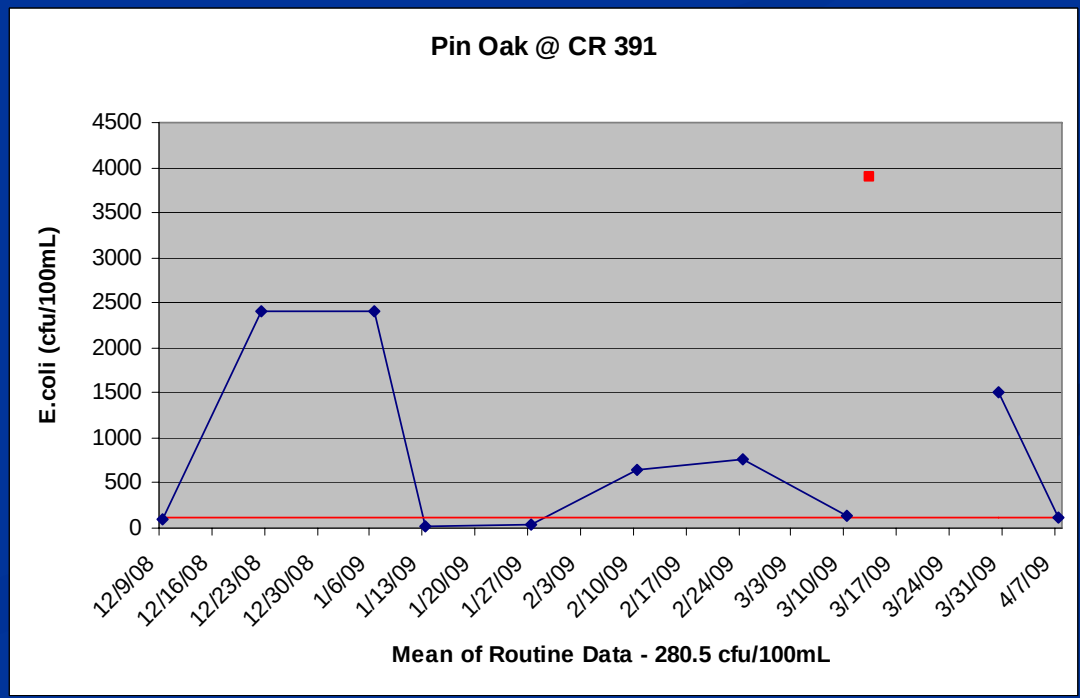
Pin Oak Creek Data





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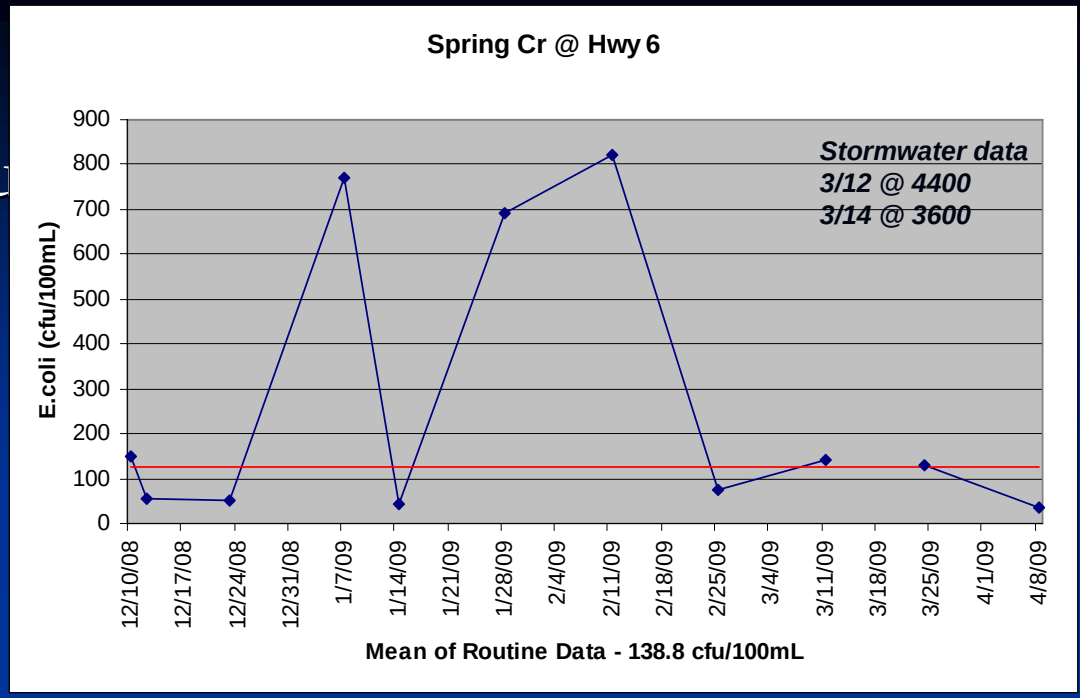
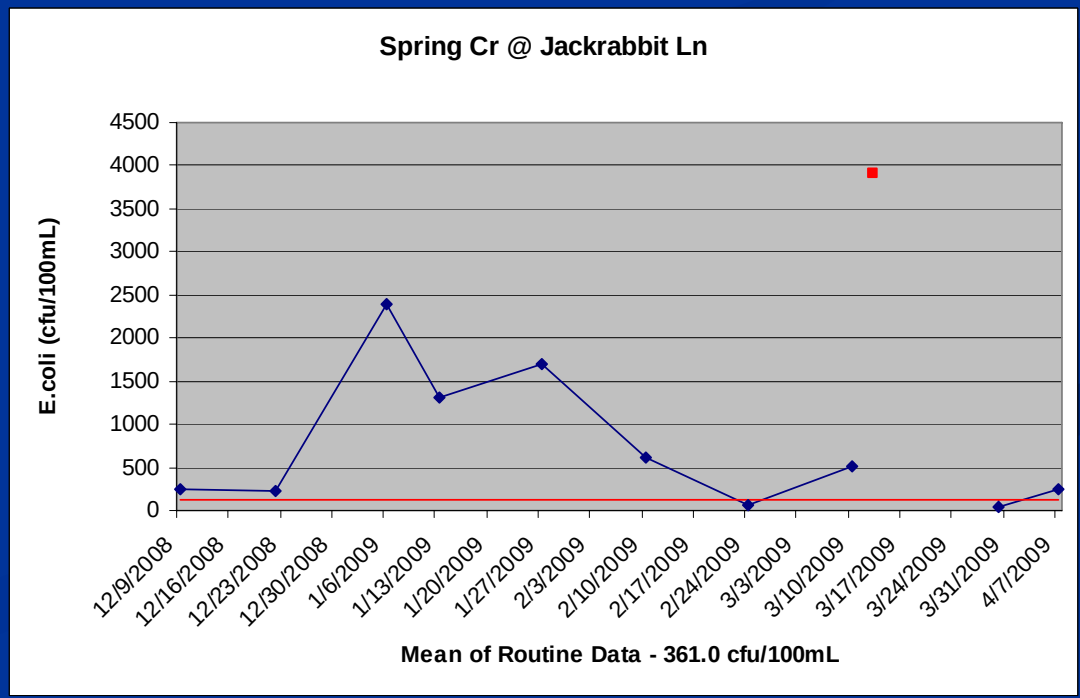
Spring Creek Data





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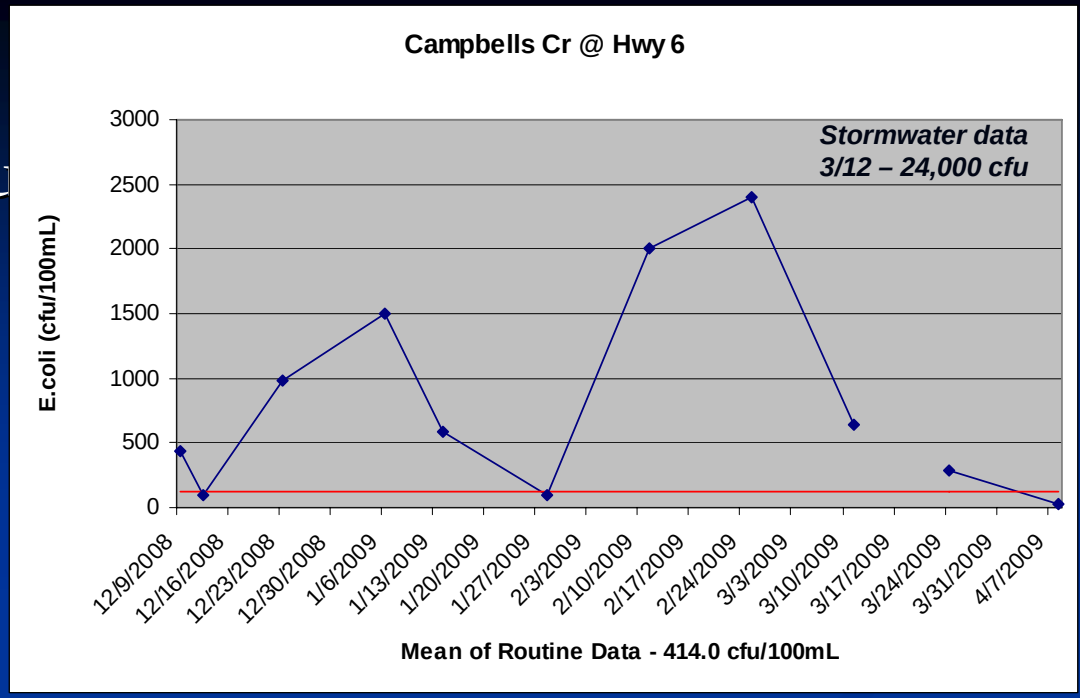
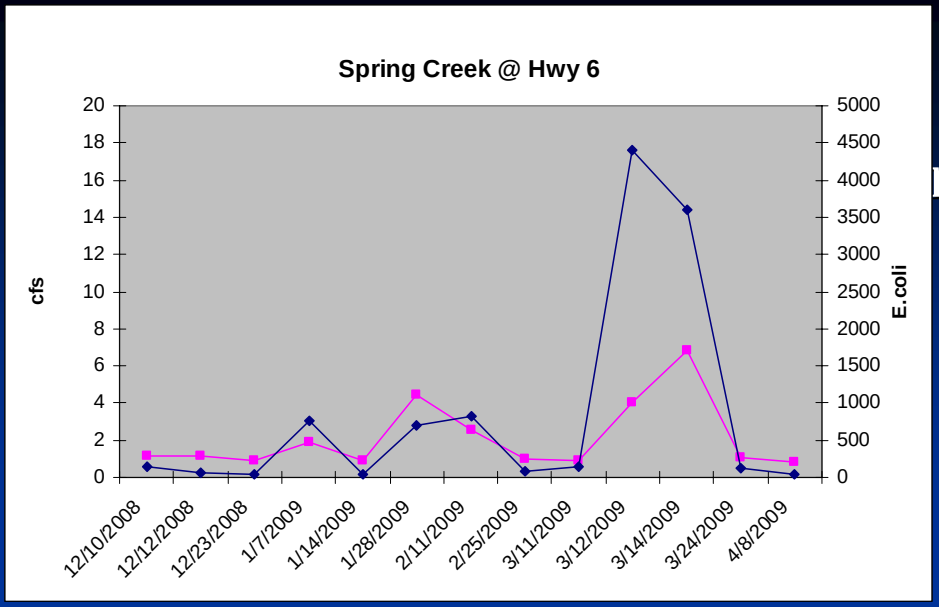
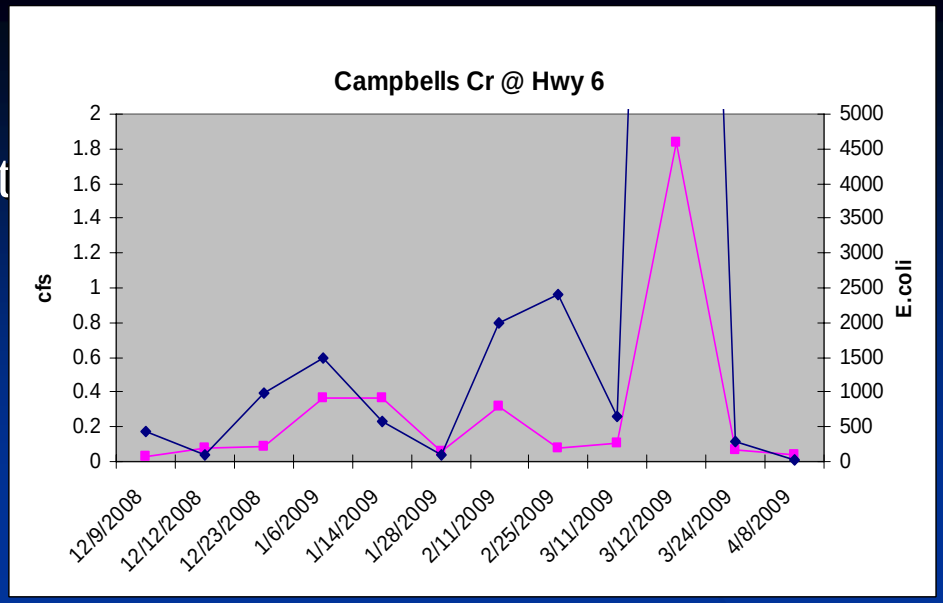
Campbells Creek Data

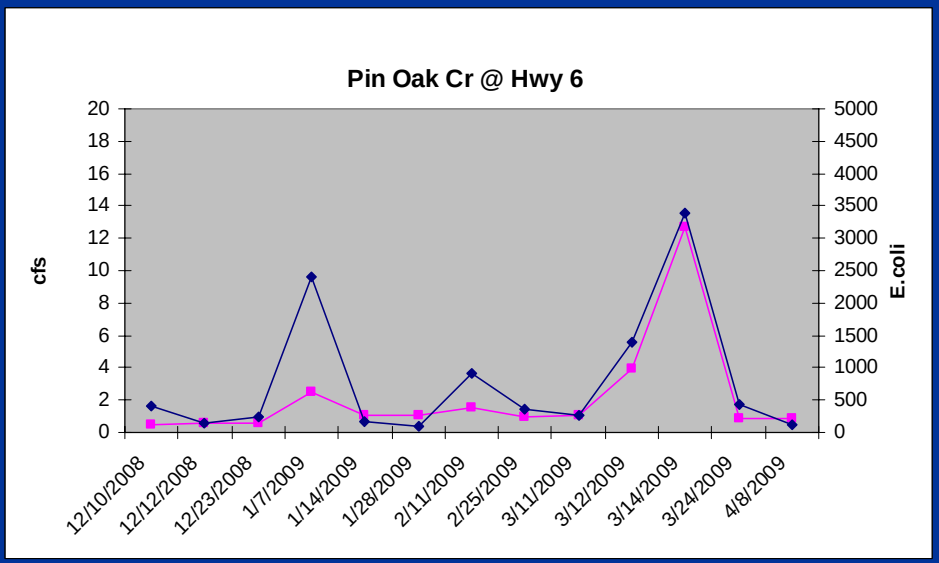


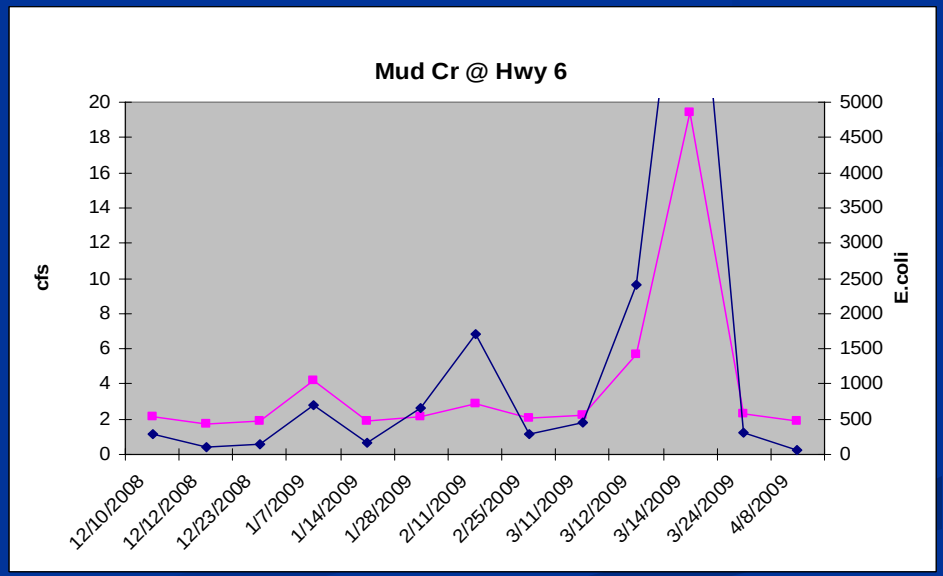
Campbells Cr @ Jackrabbit Ln

- Site has not had flow unless it rains.
- Only 1 “routine” sample has been collected
- Sample date occurred during a rainfall event. 2,400 cfu/100mL
- 2 Stormwater samples have been collected 11,000 cfu/100mL; 65,000 cfu/100mL









E.Coli

Flow

Comparing Flow and E.coli Concentrations

Stream Surveys

- The purpose of the stream surveys is to document:
  - Stream conditions
  - Wildlife Habitat
  - Possible bacteria sources or groups of sources
  - Other visible water quality concerns (example: illegal dumping)
- Campbells Creek was completed in December
  - Took 6 days to walk the entire creek (~5 miles)
- Currently working on Pin Oak Creek
- All surveys will be completed by the end of the summer or early fall

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Field Notes

033	20-Nov-08	30.75486	-96.49472	1791	hog traces
034	20-Nov-08	30.75637	-96.49259	1792	water gap holding debris
035	20-Nov-08	30.7568	-96.49237	1793	cattle tracks at stream crossing
037	20-Nov-08	30.76181	-96.48866	1794	house >1000m away
038	20-Nov-08	30.76318	-96.48762	1795	cattle crossing with feces
039	20-Nov-08	30.76307	-96.48642	1796	armadillo
040	20-Nov-08	30.76379	-96.48624	1797/1798	concrete, bricks, tires
031	20-Nov-08	30.76514	-96.48514	1799	metal tubing and tires
031	20-Nov-08	30.76514	-96.48514	1800	lots of cow tracks and feces
041	20-Nov-08	30.76616	-96.48307	1801	cattle crossing under HW6 bridge massive erosion
042	20-Nov-08	30.76649	-96.48032	1802	cattle crossing
042	20-Nov-08	30.76649	-96.48032	1802	large runoff from railroad
043	20-Nov-08	30.76681	-96.47983	1803/1804	deer
043	20-Nov-08	30.76681	-96.47983	1805	creek draining from pasture
044	20-Nov-08	30.7676	-96.47978	1806	confluence from pasture with flow
044	20-Nov-08	30.7676	-96.47978	1806	major cattle crossing
045	20-Nov-08	30.76786	-96.479	1807	foul smell and lots of tracks
046	20-Nov-08	30.76776	-96.47742	1808	feeding bins about 200m away on left
048	24-Nov-08	30.74307	-96.49728	1814/1815/1816	hay, lots of tires, printer, plumbing, wood, tons of trash

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What we found…

- Lots of cattle crossings and watering holes
- Evidence of feral hogs, deer, raccoons, armadillos, birds and other wildlife
- Lots of older tires in the creek bed
- Some Illegal dumping of household and construction wastes

What we did not find…

- One specific source of all E.coli bacteria
- Any evidence of sewerage entering the creek (closest house to the creek was ~1000 feet away).

Upcoming Project Activities

- Continued WQ Monitoring and Data Collection
  - Routine monitoring
    - Once every two weeks at 10 sites
  - WWTP monitoring
    - At 3 facilities starting in June 2009
  - Stream Surveys of Pin Oak Cr, Mud Cr, Walnut Cr, Spring Cr
    - Completion early fall of 2009
  - Bacterial Source Tracking (BST) – data collection and analysis
    - Starting in May 2009
  - Land Use Analysis will be finalized and modeling will begin

Upcoming Project Activities

- TCEQ is revising the Surface Water Quality Standards
- Proposing revisions to contact recreation use and the bacteria criteria
  - Increasing number of recreational use categories and associated criteria
- In order to implement these proposed changes certain data for a Use Attainability Analysis (UAA)

Upcoming Project Activities

- We are revising the tasks for this project to include;
  - Historical information review of the recreational uses of the waterbody
  - 2 field surveys at selected sites will document hydrological characteristics of the stream. The surveys will be performed during the period where people would most likely be using the waterbody for contact recreation.
  - Interviews of recreational users present during the field surveys and streamside landowners.

Next meeting date:

- September 2009 – Time & Date TBD
- Possible Meeting Topics:
  - Review of Stream Surveys
  - Preliminary BST Results
  - Review of UAA data
  - Final Land Use Maps
  - Others

Questions???

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Contact Information

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Project Webpage:

http://www.brazos.org/Little_Brazos_Trib.asp