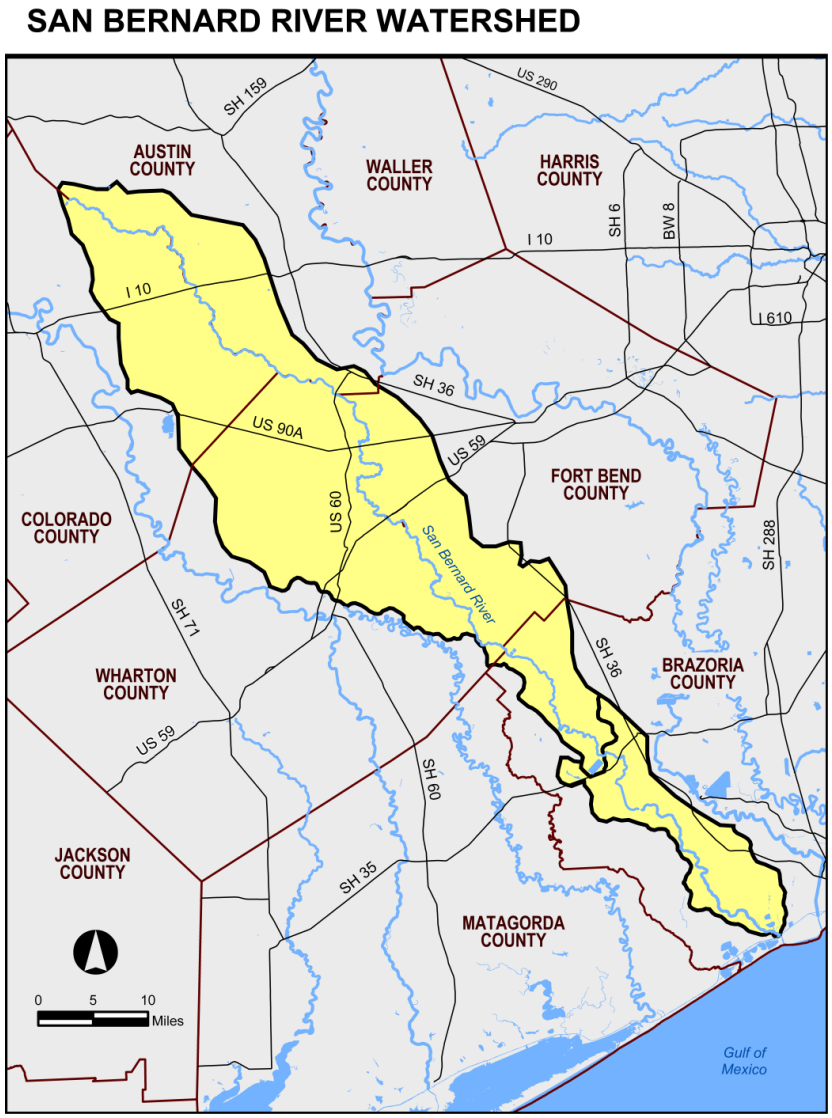
San Bernard Watershed Protection Plan

Aubin Phillips

April 2013

San Bernard Watershed

- Approximately 900 square miles
- Flows 125 miles to the Gulf of Mexico
- Majority of the land cover is rural uses
- Only about 5% of the watershed is developed land



Project Purpose

- Portions of river have been designated as unsuitable for recreational activities due to high bacteria levels
- Areas of excessive nutrients and low dissolved oxygen - which may negatively affect fish and other aquatic life
- The WPP is a voluntary process



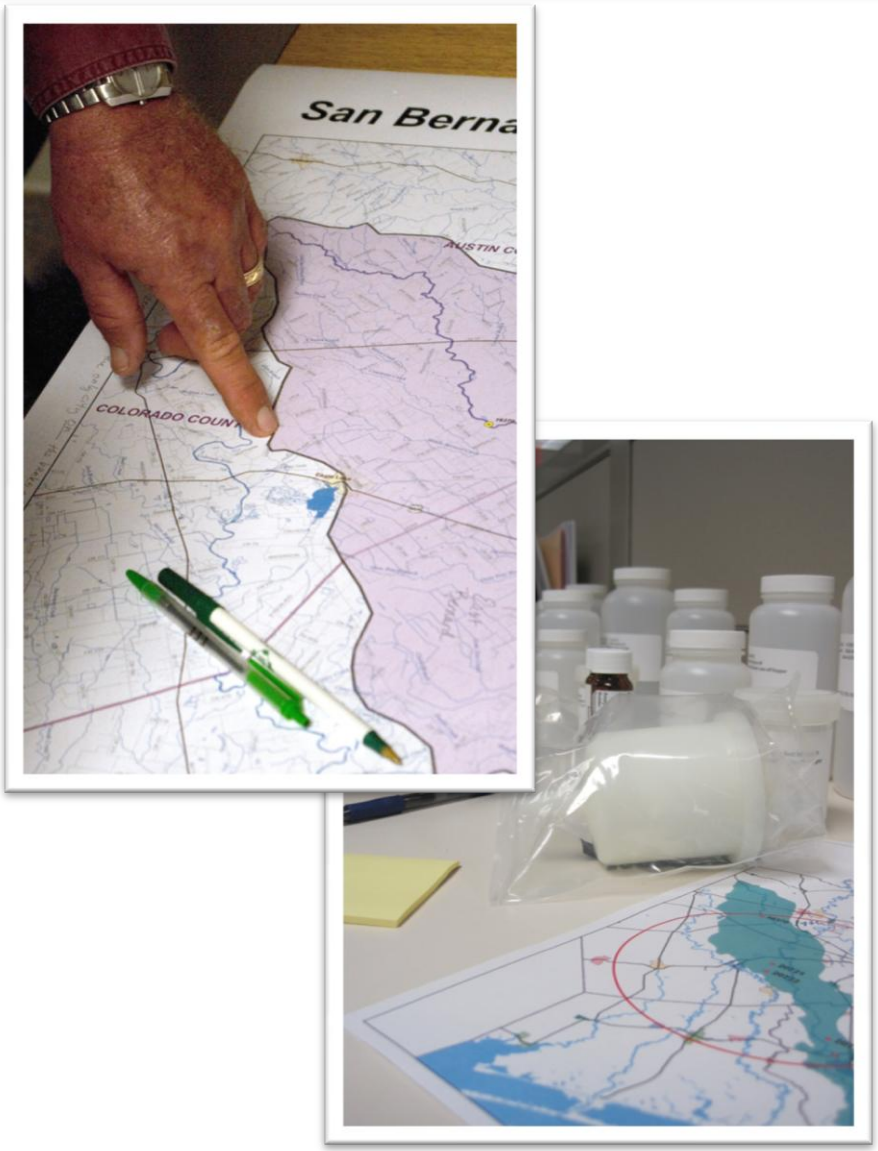
Project Purpose

- Prepare for anticipated growth and continue to protect water quality
- Help local governments incorporate Best Management Practices into their jurisdictions
- Analyze run-off pollution problems with modeling efforts
- Give water quality managers the tools needed to help make decisions to maintain or improve water quality in the region





The Planning Process



- Began in September 2009, worked through 2012
- Met with stakeholders every other month
- Continued ambient monitoring at 8 sites throughout the watershed

SELECT modeling

- Modeling is an analytical approach for developing an inventory of potential bacteria loads based on land use and geographical location
- Modeling evaluates each pollutant source and identifies areas with the greatest contamination potential

SELECT forecast results

Percent Contributions by Source							
	2010	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
OSSFs	3.3%	3.2%	3.1%	2.7%	2.2%	1.6%	1.1%
WWTPs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Urban Runoff	8.4%	7.3%	5.9%	4.2%	2.7%	1.6%	0.9%
Dogs	16.0%	14.5%	12.3%	9.6%	6.9%	4.6%	2.8%
Cattle	47.5%	41.3%	32.7%	23.2%	14.7%	8.4%	4.6%
Horses	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
Sheep/Goat	5.5%	4.8%	3.8%	2.7%	1.7%	1.0%	0.5%
Wildlife	19.1%	28.7%	42.1%	57.6%	71.8%	82.8%	90.2%
Deer	0.6%	0.5%	0.4%	0.3%	0.2%	0.1%	0.1%
Feral Hogs	13.9%	24.1%	38.5%	54.9%	70.2%	81.8%	89.6%
Geese	4.6%	4.0%	3.2%	2.3%	1.5%	0.9%	0.5%

Modeling Challenges

- The model does not account for mitigation processes such as settling, vegetative filtering, temperature, solar inactivation, or other biological factors that bacteria might undergo before reaching the stream

What SWAT Modeling Tells Us

- Major causes and sources of water quality impairments
- Which sources contribute most to water quality
- Which Best Management Practices will help lower bacteria levels

Soil & Water Assessment Tool | SWAT

SWAT Modeling Conclusions

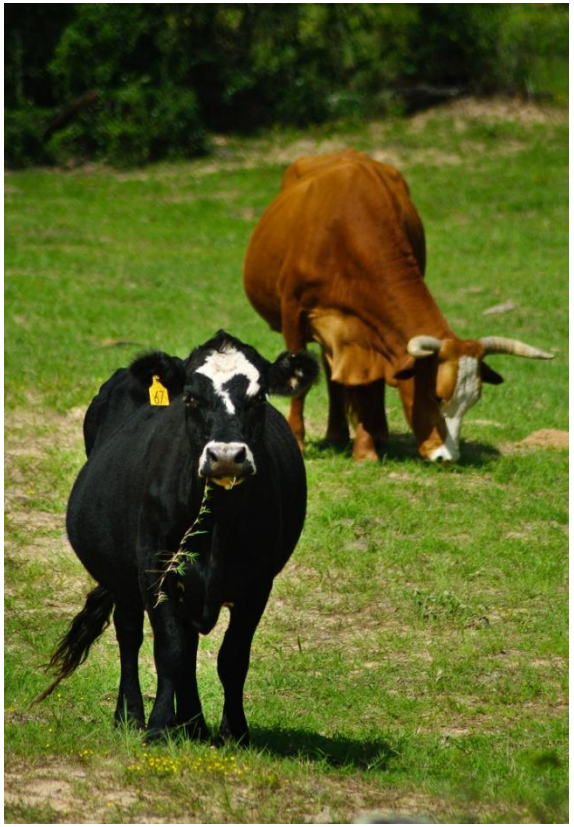
- **Wastewater treatment plants** do play a role in maintaining the elevated bacteria concentrations in the current baseline model.

SWAT Modeling Conclusions

- **Septic systems** proved to be a significant factor in the elevated concentrations. The difference in bacteria concentrations with and without failing septic systems suggests that there is a significant impact from the systems.

SWAT Modeling Conclusions

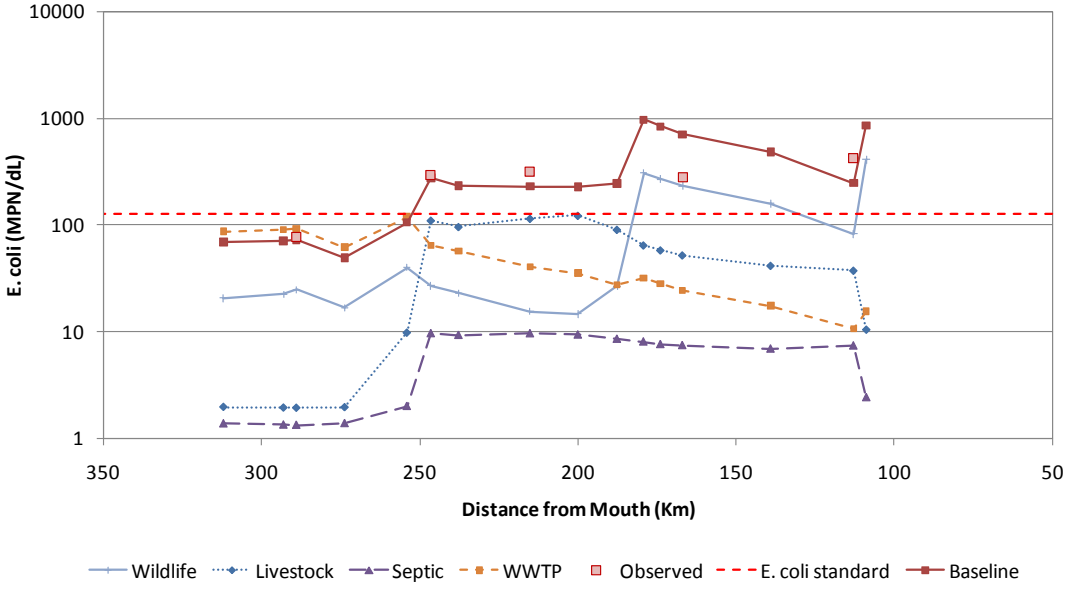
- **Livestock** is another key factor that maintains the elevated bacteria. Livestock have more impact on the upper reaches of the watershed than other locations.



SWAT Modeling Conclusions

- **Wildlife and domesticated animals** are a key source of bacteria in the region. Eliminating their contributions does not permit the San Bernard to meet water quality standards.

SWAT Modeling Results



- All bacteria sources in the watershed play a role in maintaining the bacteria levels in the River
- Improving water quality in the River can be achieved in multiple ways

BMPs That Can Be Implemented Now

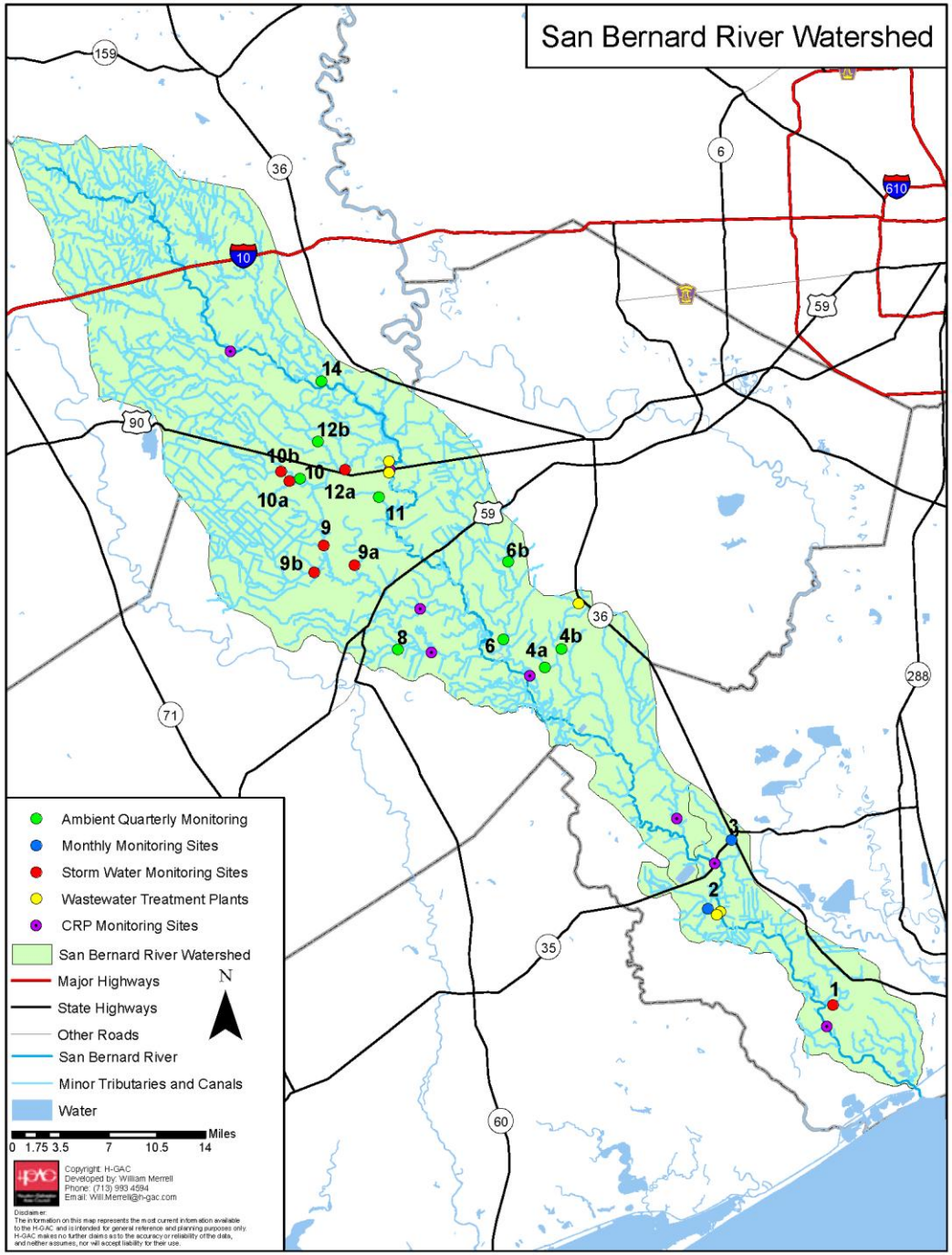
- OSSF Inspections
- Farm Plans
- Good Housekeeping on Residential Property
- Feral Hog Hunting
- River Clean Up Projects
- Waste Collection Days
- School Programs

Sources of Funding

- OSSFs
  - Texas AgriLIFE Extension programs
  - SEP Funding
- Cattle and Agriculture
  - TSSWCB WQMPs
- Feral Hogs
  - Texas AgriLIFE extension
  - Texas Parks and Wildlife
- Additional funding available for implementation once the plan is approved

Work Continuing in 2013

- Additional Monitoring Through a 319(h) Grant with TSSWCB
  - Increasing 8 quarterly monitoring sites to monthly, plus additional 4
  - Additional quarterly monitoring at 15 new sites
  - Wet weather flow monitoring at 15 new sites
  - WWTP monitoring at 3 sites
- Continued Stakeholder Involvement through and Executive Summary
- Pre-BMP monitoring at 3 sites with autosamplers
- Currently awaiting EPA approval


San Bernard River Watershed
159
36
6
610
10
59
90
14
12b
10b
10
12a
10a
11
9
9a
9b
6b
8
6
4a
4b
288
71
3
2
35
1
60
Ambient Quarterly Monitoring
Monthly Monitoring Sites
Storm Water Monitoring Sites
Wastewater Treatment Plants
CRP Monitoring Sites
San Bernard River Watershed
Major Highways
State Highways
Other Roads
San Bernard River
Minor Tributaries and Canals
Water
N
Miles
0 1.75 3.5 7 10.5 14
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Developed by: William Merrell
Phone: (713) 993 4584
Email: Will.Merrell@h-gac.com
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Other Projects

- Regional OSSF inventory
  http://www.h-gac.com/community/water/ossf.aspx
- Watershed signage projects
- Recreational Use Attainability Analysis (RUAA)

Contact Information

Aubin Phillips, AICP

aubin.phillips@h-gac.com

832-681-2524

www.h-gac.com/go/sanbernard