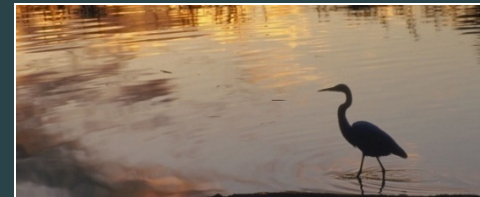
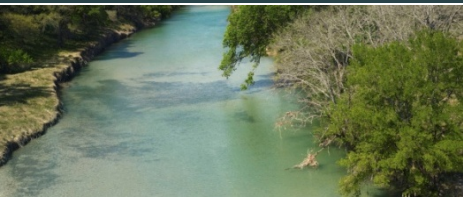


# The Mill Creek Partnership: February meeting recap



**Galen Roberts**

Texas A&M AgriLife Extension Service

*Mill Creek  
March 30, 2015*



# *Recap from January meeting*

- Affirmed Ground Rules for Partnership.
- Added a Steering Committee position.
- Finalized draft sections 1-3 of the Mill Creek WPP.
- Reviewed sections 4-5 of the Mill Creek WPP.
  - Load Duration Curve (LDC) analysis
  - Spatially Explicit Load Enrichment Calculation Tool (SELECT) analysis

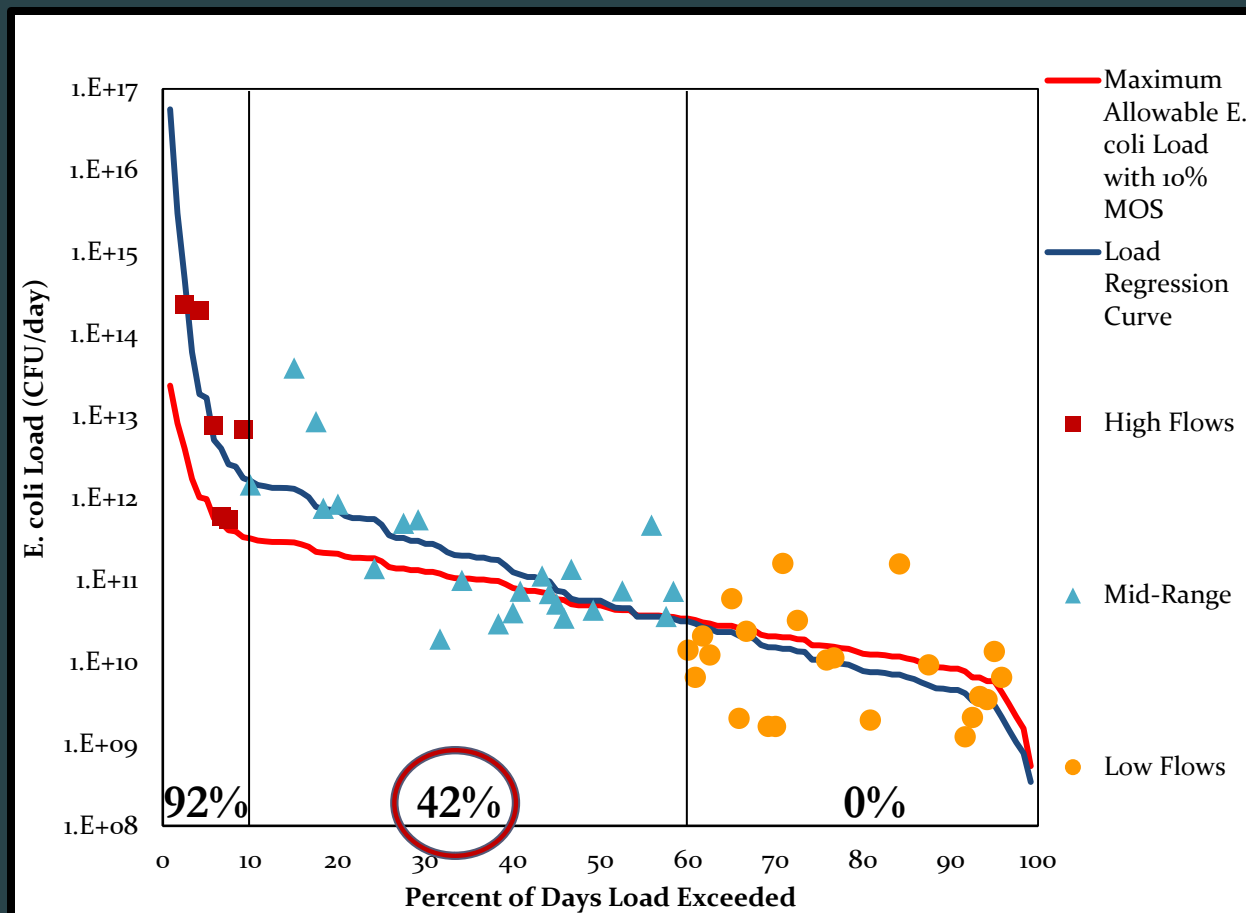
# Draft Section 4

- Load Duration Curve (LDC)
  - Visual representation of pollutant loadings under different flow conditions.
  - Uses regression analysis to determine how much pollutant reduction is needed to meet WQ standards.

$$\begin{array}{ccccc} & & \text{Bacteria} & & \\ & & \text{Concentration} & & \\ \text{Stream discharge} & \times & & = & \text{Bacteria Load} \\ \text{(cfs)} & & \text{(cfu/mL)} & & \text{(cfu/day)} \end{array}$$

# Draft Section 4

- A 42% reduction at Mid-range flows is needed.





# *Draft Section 4*

- Analytical assumptions:
  - 10% margin of safety is applied to LDC analysis.
  - Contact recreation peaks during mid-range flows.
- Interpretation of results:
  - 42% reduction is needed at mid-range flows.
  - Nonpoint sources are the primary cause of impairment.

# *Draft Section 5*

- Spatially Explicit Load Enrichment Calculation Tool (SELECT)
  - Estimates the likely distribution of potential pollutant sources across the watershed.
  - Estimates potential pollutant load from each subwatershed.

# Draft Section 5

- SELECT analysis:

- Cattle
- Horses
- Sheep and Goats
- Domestic Poultry

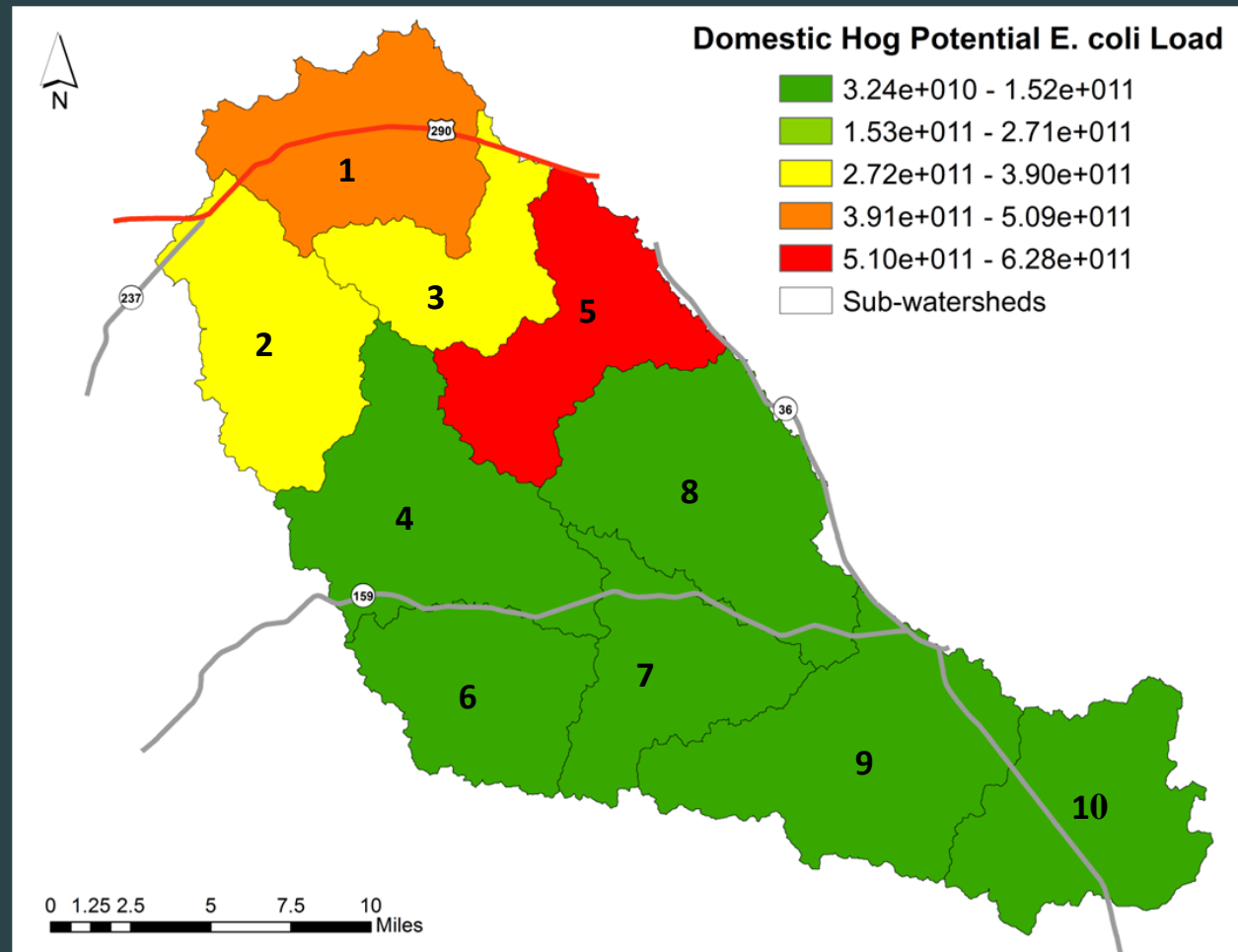
No change in  
analysis requested

- Domestic Hogs
- Septic Systems
- Domestic Dogs
- Deer
- Feral Hogs

Changes made  
based on your input

# Livestock Populations

- Domestic Hogs:
  - NASS data
  - 291 Hogs
  - Distributed to Rural Households instead of Managed Pasture

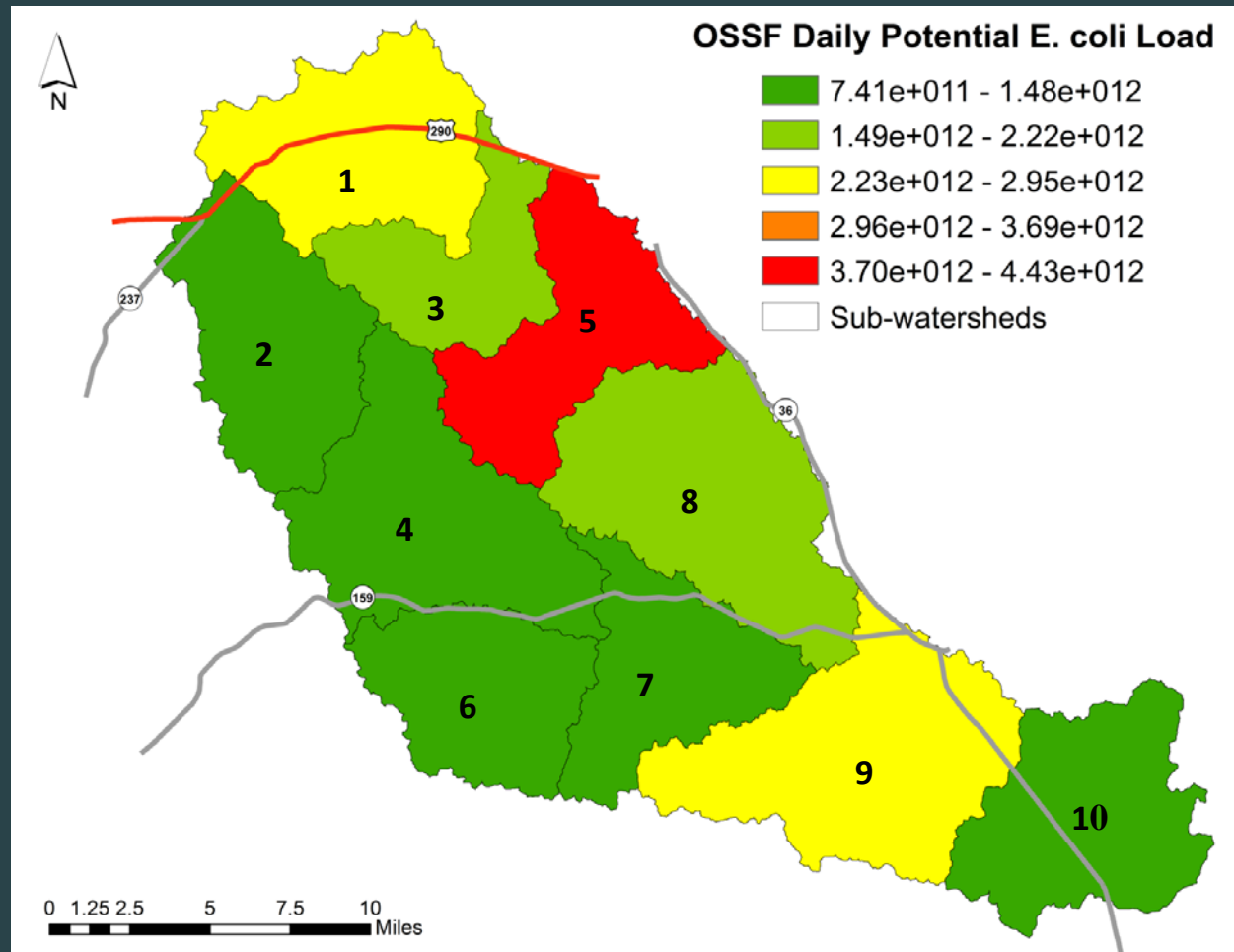


# Human & Pet Populations

- Septic Systems:

- Washington County: US Census Data (2,517)

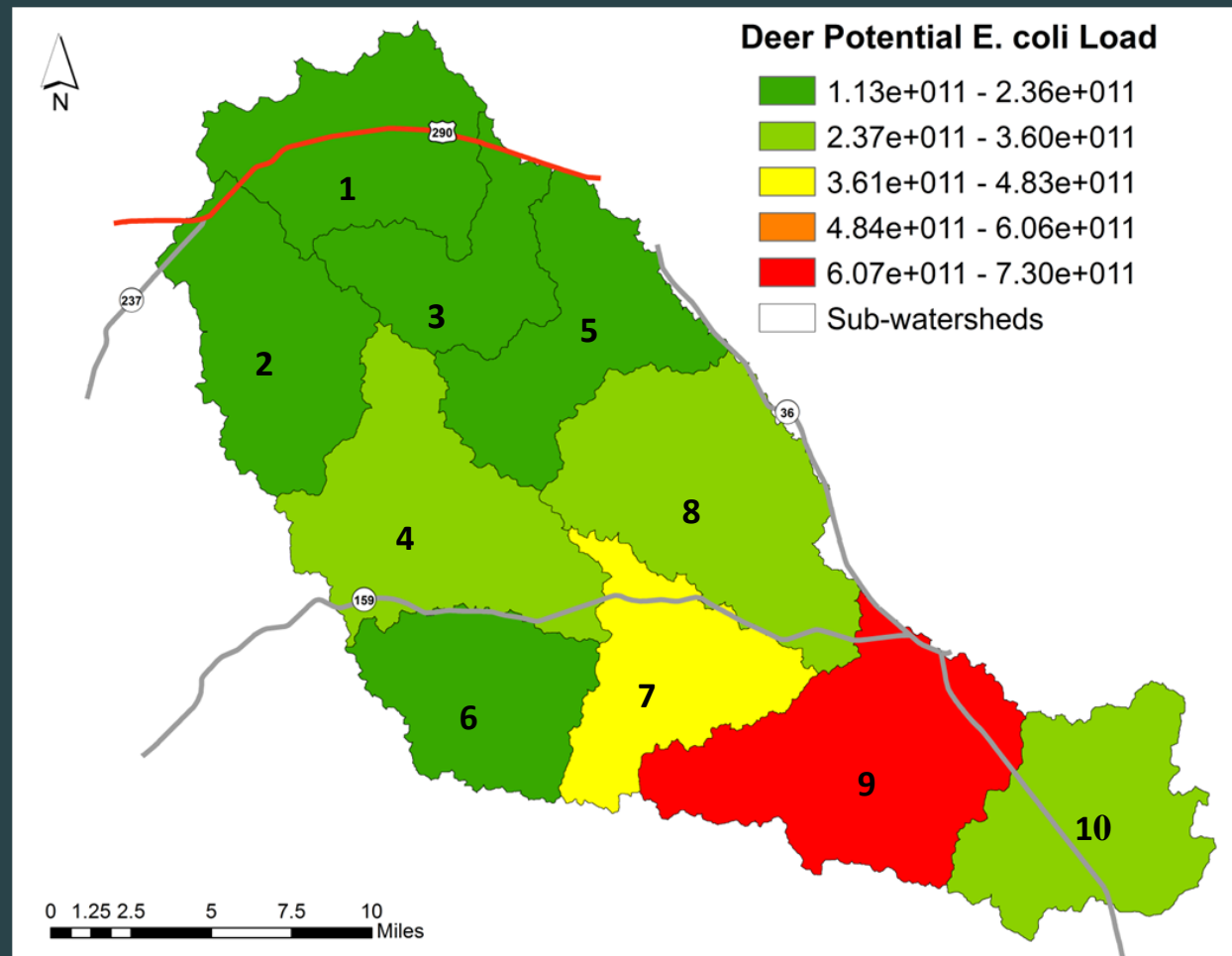
- Austin County: H-GAC data (981);  
US Census data (3,614)



# Wildlife & Nondomestic Populations

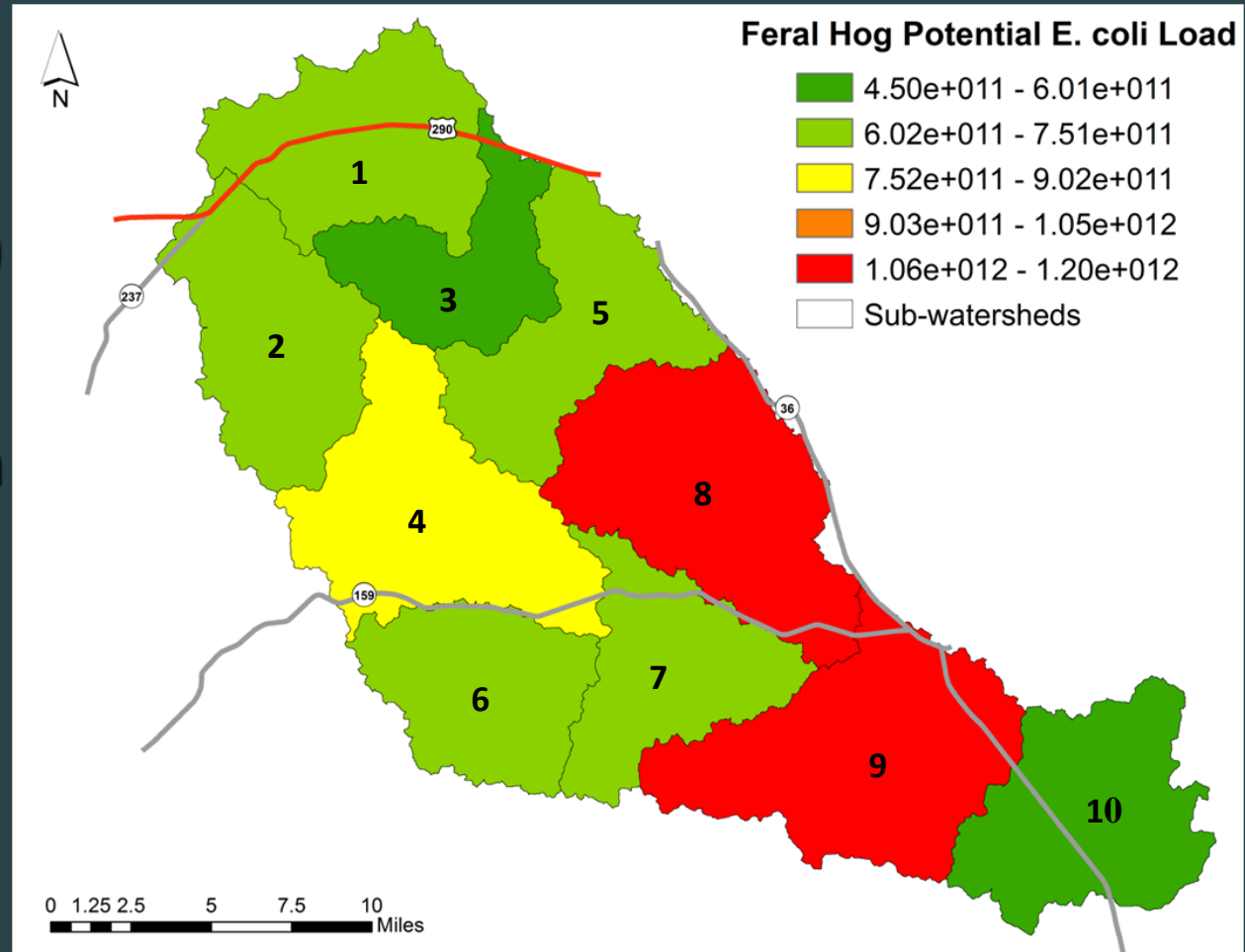
- Deer:

- 17.5 ac./deer in Austin County
- 35 ac./deer in Washington County
- Total of 12,709 deer in the watershed
- Distributed to Forestland



# Wildlife & Nondomestic Populations

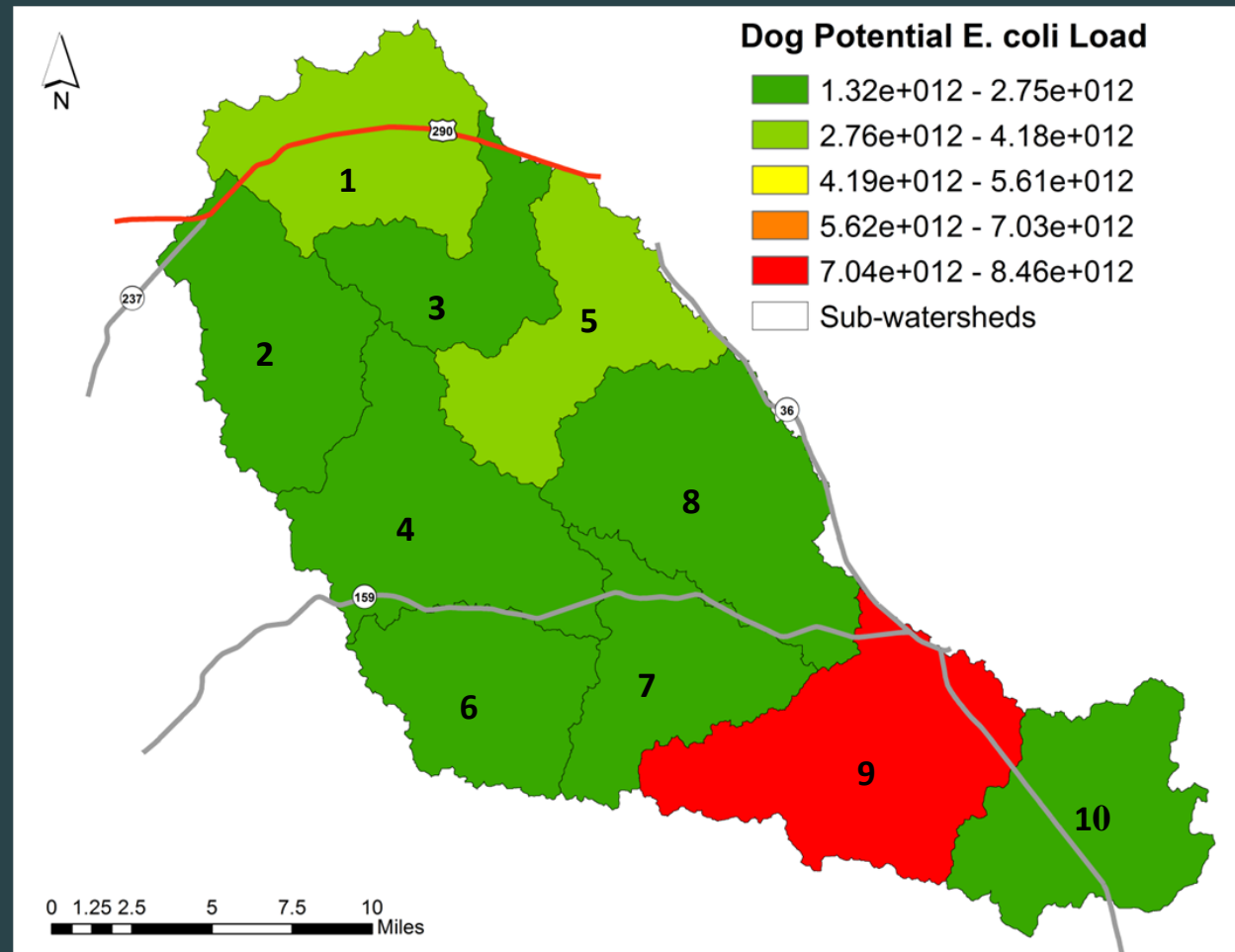
- Feral Hogs:
  - 25 ac./hog (26 hogs/mile)
  - Total of 10,537 hogs in watershed
  - Distributed along riparian corridors (500 ft.)



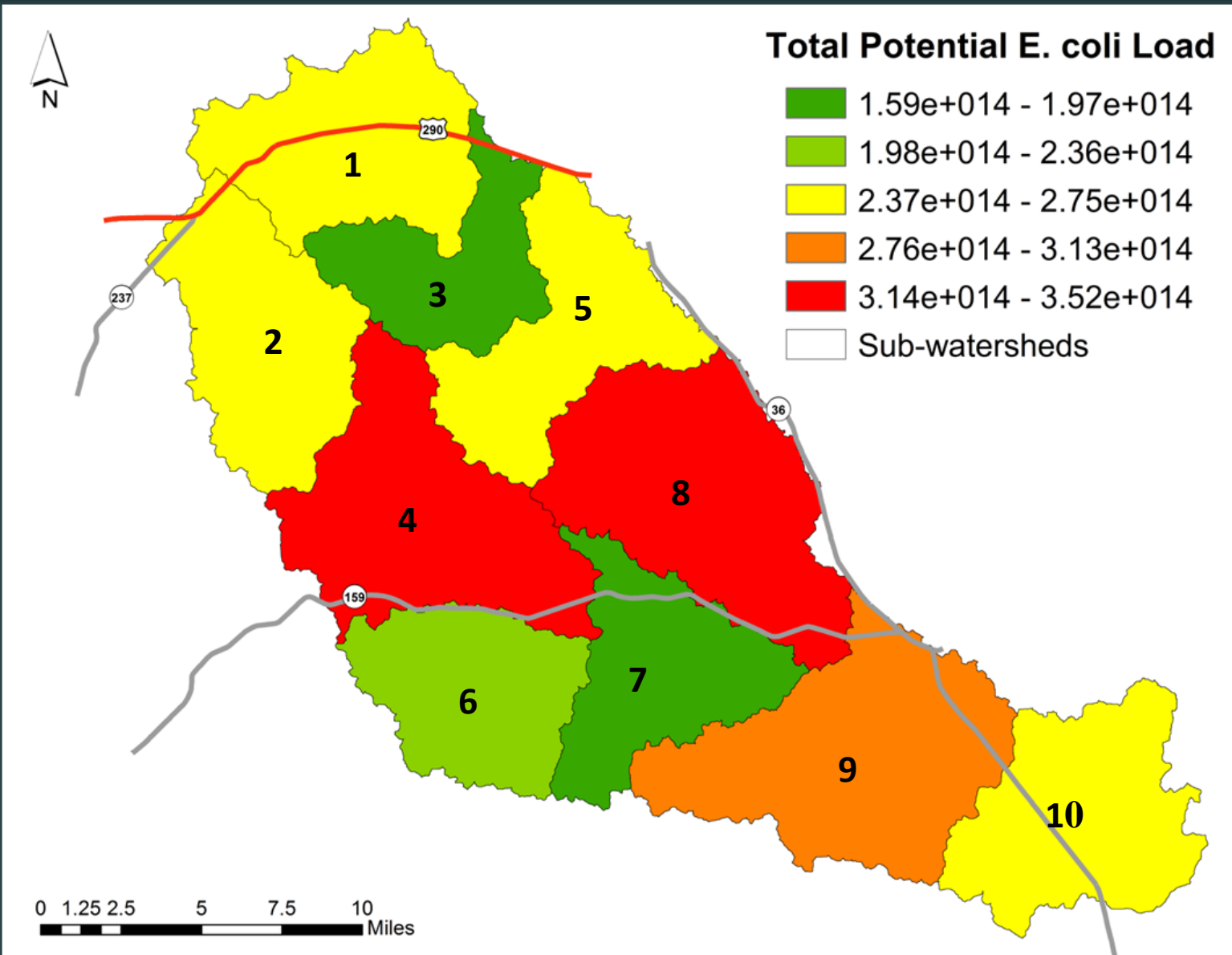


# Human & Pet Populations

- Dogs:
  - 1.25 Dogs per Household
  - US Census shows 7,289 households
  - 9,111 dogs in watershed



# Total Potential Load from ALL Sources



# *Relative Ranges for ALL Sources*

(CFU/day)

1.00E+15

1.00E+14

1.00E+13

1.00E+12

1.00E+11

1.00E+10

1.00E+09

domestic  
poultry

domestic  
hog

horse

deer

sheep

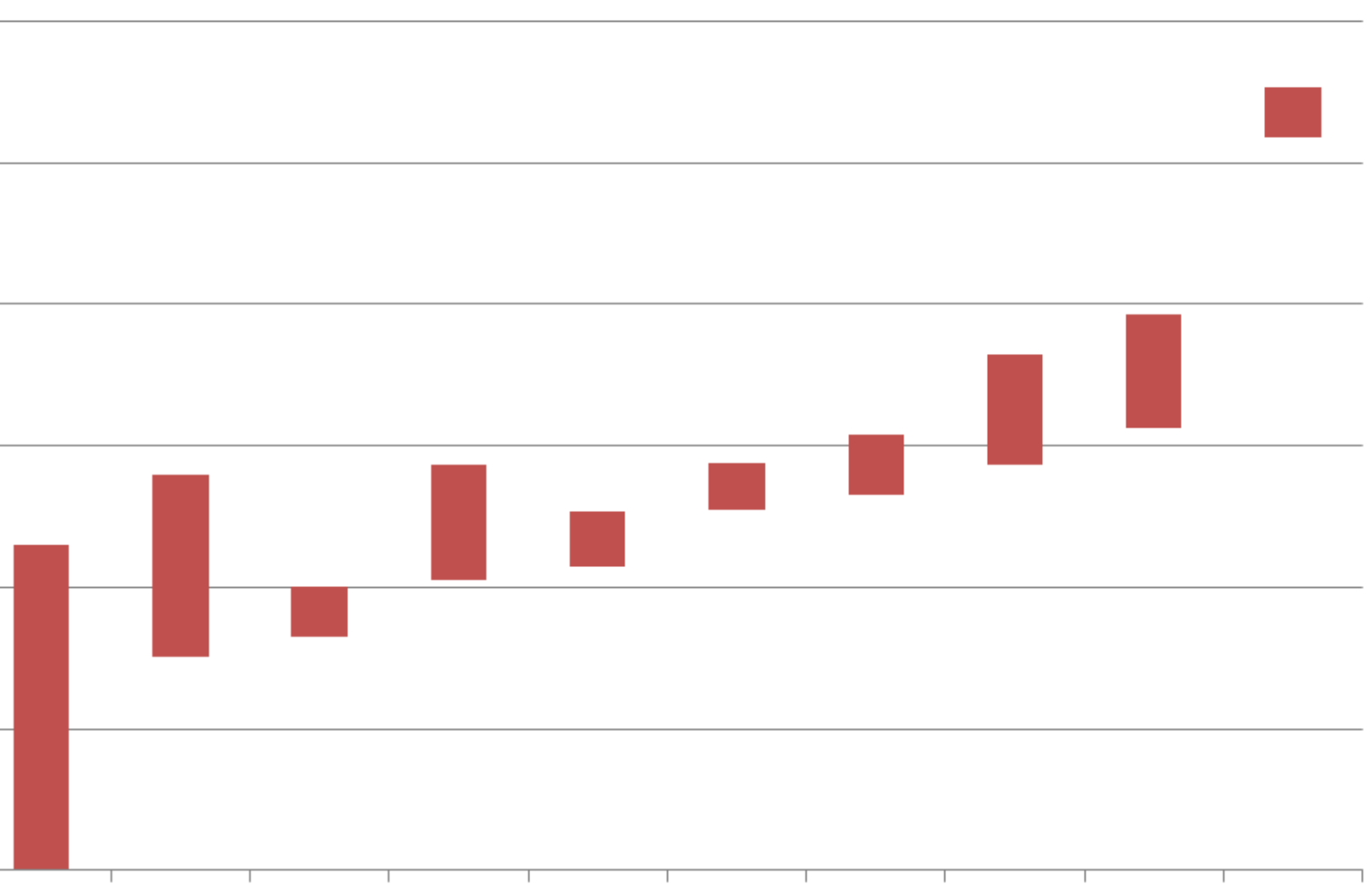
goat

feral hog

septic

dog

cattle



# MILL CREEK WATER QUALITY MONITORING UPDATE



**March 30, 2015**

# What do we monitor for?

- Field Parameters
- Flow
- Conventional Parameters
- Bacteria





# Field Parameters?

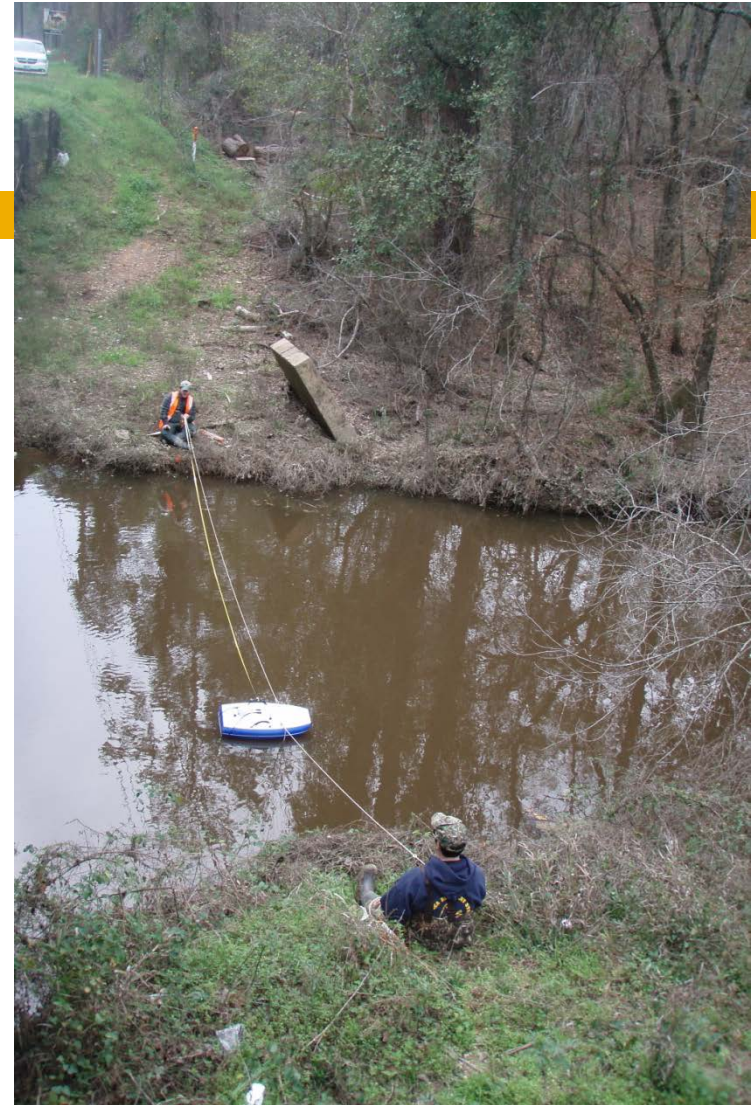
- Temperature
- Transparency (Secchi depth)
- Specific conductance
- Dissolved oxygen
- pH
- Total depth to bottom
- Water color, odor, clarity
- Evidence of primary contact recreation
- Days since last precipitation





# Flow

- Instantaneous flow (cfs)
- Flow severity (normal, low, high?)





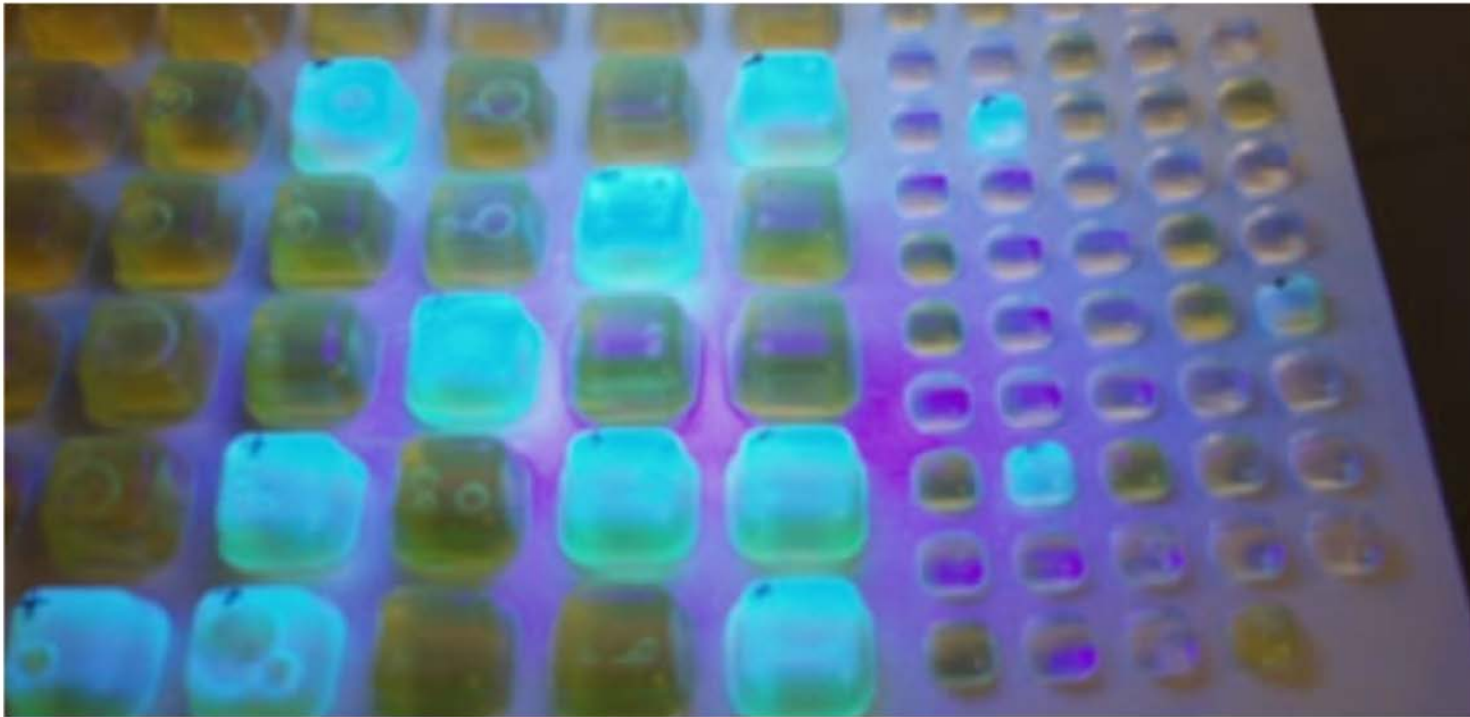
# Conventional & Nutrient Parameters?

- TSS
- Hardness
- Chloride
- Sulfate
- Turbidity
- $\text{NH}_3\text{-N}$
- $\text{NO}_2\text{+NO}_3\text{-N}$
- TKN
- Total Phosphorus
- Ortho Phosphate Phosphorus
- Chlorophyll  $\alpha$



# Bacteria

- *E. coli*



# Parameters & Monitoring Schedule

Quarterly sampling (full suite of lab parameters) [3 months out of 10]	Monthly monitoring (other than quarterly)	Storm water (biased flow) monitoring
TSS	TSS	<del>TSS</del>
Chloride (mg/L as CL)	<del>Chloride (mg/L as CL)</del>	<del>Chloride (mg/L as CL)</del>
Sulfate (mg/L as SO4)	<del>Sulfate (mg/L as SO4)</del>	<del>Sulfate (mg/L as SO4)</del>
Turbidity, NTU	<del>Turbidity, NTU</del>	<del>Turbidity, NTU</del>
Nitrogen, Ammonia, Total (mg/L)	Nitrogen, Ammonia, Total (mg/L)	Nitrogen, Ammonia, Total (mg/L)
Nitrogen, Kjeldahl, Total (mg/L)	Nitrogen, Kjeldahl, Total (mg/L)	Nitrogen, Kjeldahl, Total (mg/L)
Nitrite+Nitrate-N, total one lab determined value (mg/L)	Nitrite+Nitrate-N, total one lab determined value (mg/L)	Nitrite+Nitrate-N, total one lab determined value (mg/L)
Phosphorus, Total, Wet Method	Phosphorus, Total, Wet Method	Phosphorus, Total, Wet Method
Orthophosphate phosphorus, diss, mg/L, Field Filtered <15 min	Orthophosphate phosphorus, diss, mg/L, Field Filtered <15 min	Orthophosphate phosphorus, diss, mg/L, Field Filtered <15 min
Orthophosphate phosphorus, diss, mg/L, Filtered >15 min	Orthophosphate phosphorus, diss, mg/L, Filtered >15 min	Orthophosphate phosphorus, diss, mg/L, Filtered >15 min
Chlorophyll-a, spectrophotometric method	Chlorophyll-a, spectrophotometric method	<del>Chlorophyll-a, spectrophotometric method</del>
Pheophytin, spectrophotometric method	Pheophytin, spectrophotometric method	<del>Pheophytin, spectrophotometric method</del>
<i>E. coli</i> , , Colilert, IDEXX method MPN/mL	<i>E. coli</i> , , Colilert, IDEXX method MPN/mL	<i>E. coli</i> , , Colilert, IDEXX method MPN/mL
<i>E. coli</i> , Colilert, IDEXX, holding time	<i>E. coli</i> , Colilert, IDEXX, holding time	<i>E. coli</i> , Colilert, IDEXX, holding time

September			
	October		
	November		
	December		
January			January
	February		
	March		March
	April		
May			
	June		

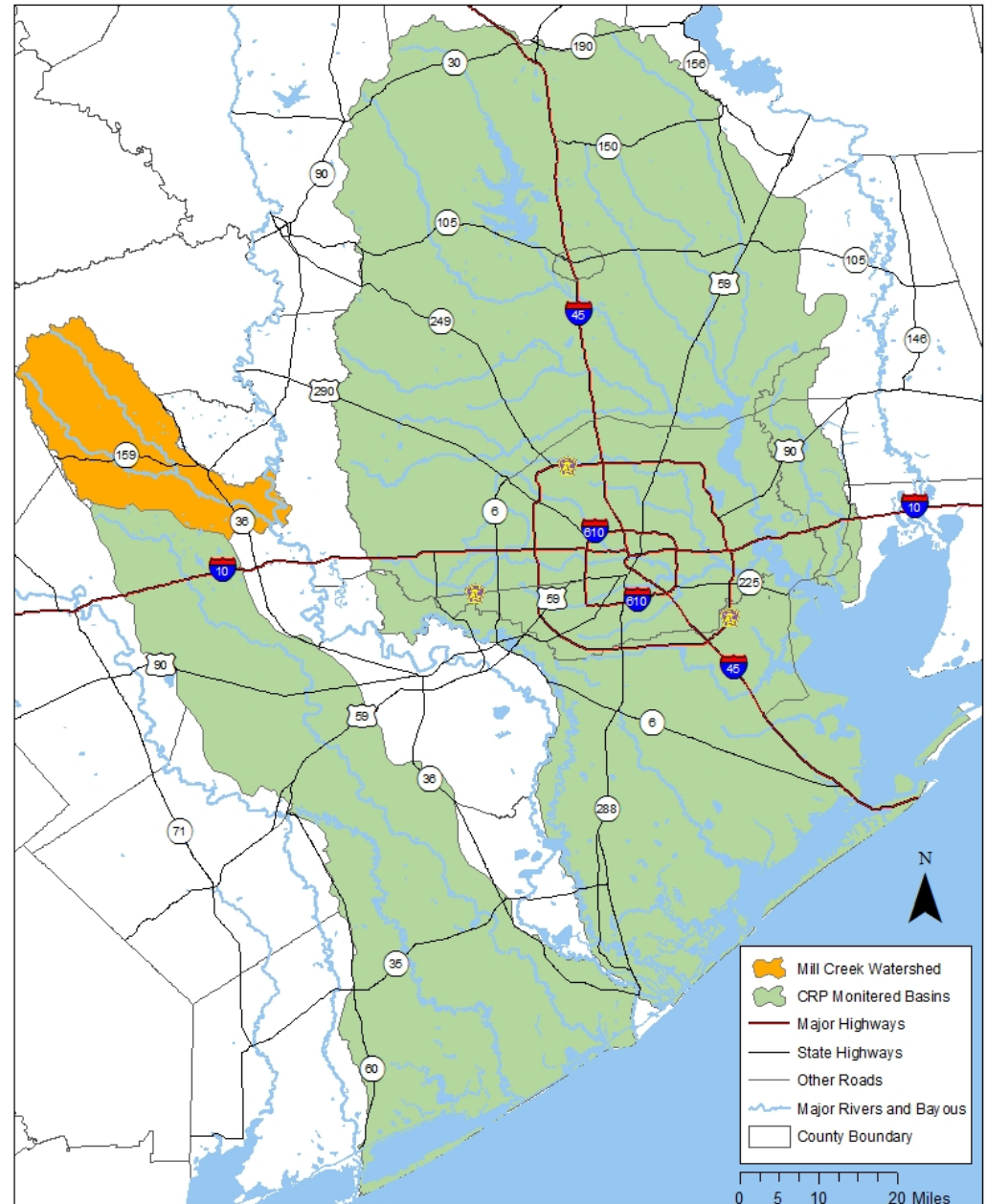
# Mill Creek

Brazos River Basin  
Segment 1202K

Austin County  
(Member government)

Washington County

## Water Quality Monitoring by H-GAC



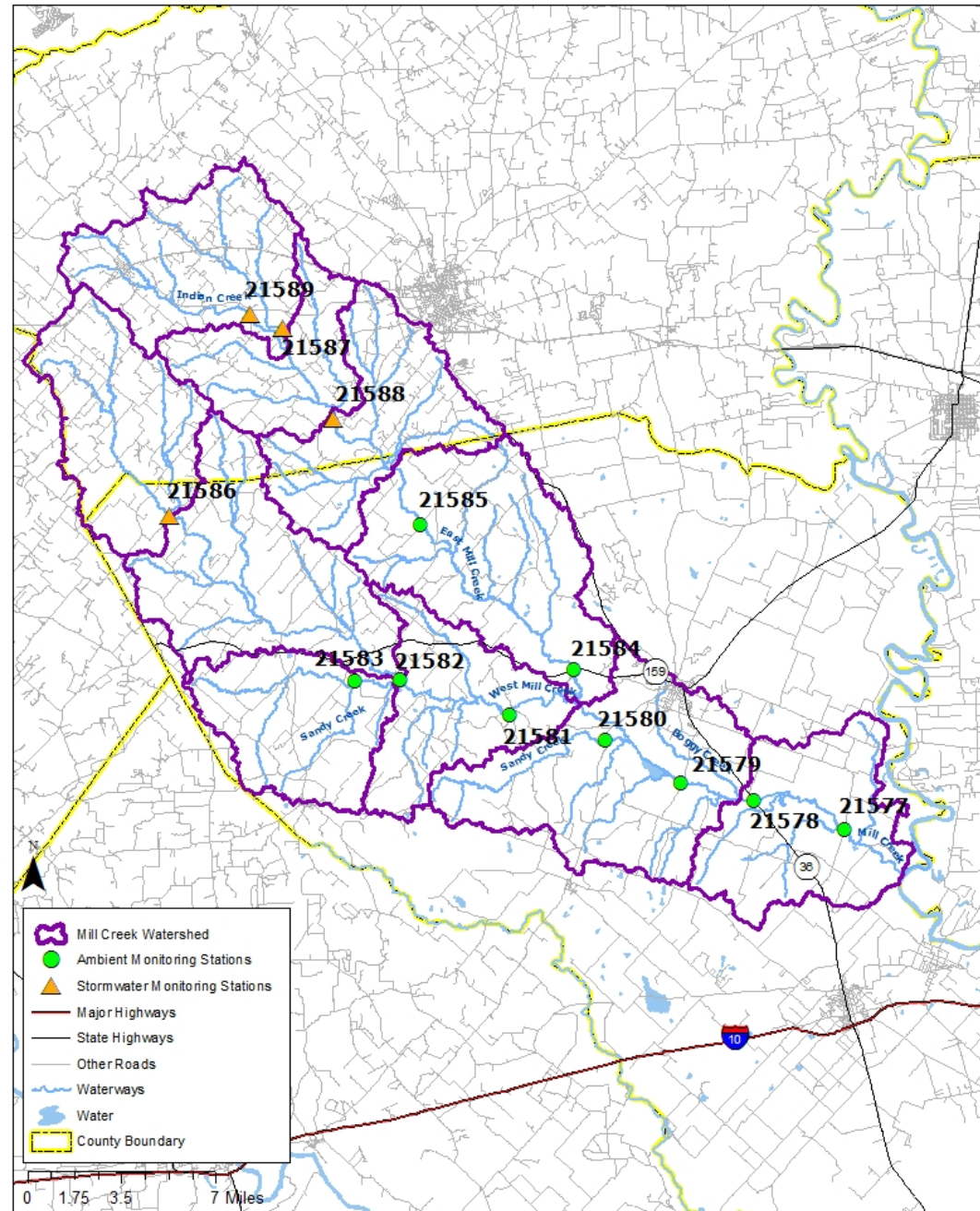


# Mill Creek

12 sites

Monthly for 10 months

## Mill Creek Monitoring Stations



# Site 21589 – Indian Creek at CR2/Beckermann Rd (Stormwater)





# 21587 – East Fork Mill Creek at CR 28A / Indian Creek (Stormwater)





# Site 21588 – East Fork Mill Creek at FM 332 (Stormwater)





# Site 21586 – West Fork Mill Creek at Wolfe Rd

(Stormwater)





# Site 21584 – East Fork Mill Creek at FM 159/Old Nelsonville Road





# Site 21583 – Sandy Creek at New Breman Road





# Site 21582 – West Fork Mill Creek at Tiemann Road





# Site 21585 – East Fork Mill Creek at Bleiblerville Road



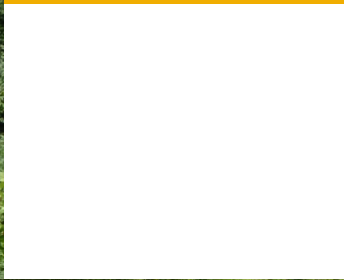


# Site 21581 – West Fork Mill Creek near John Schoelikopf Road





# Site 21580 – Sandy Creek at Mill Creek Road





# Site 21579 – Mill Creek downstream of FM 2429





# Site 21578 – Little Boggy Creek at Hwy 36



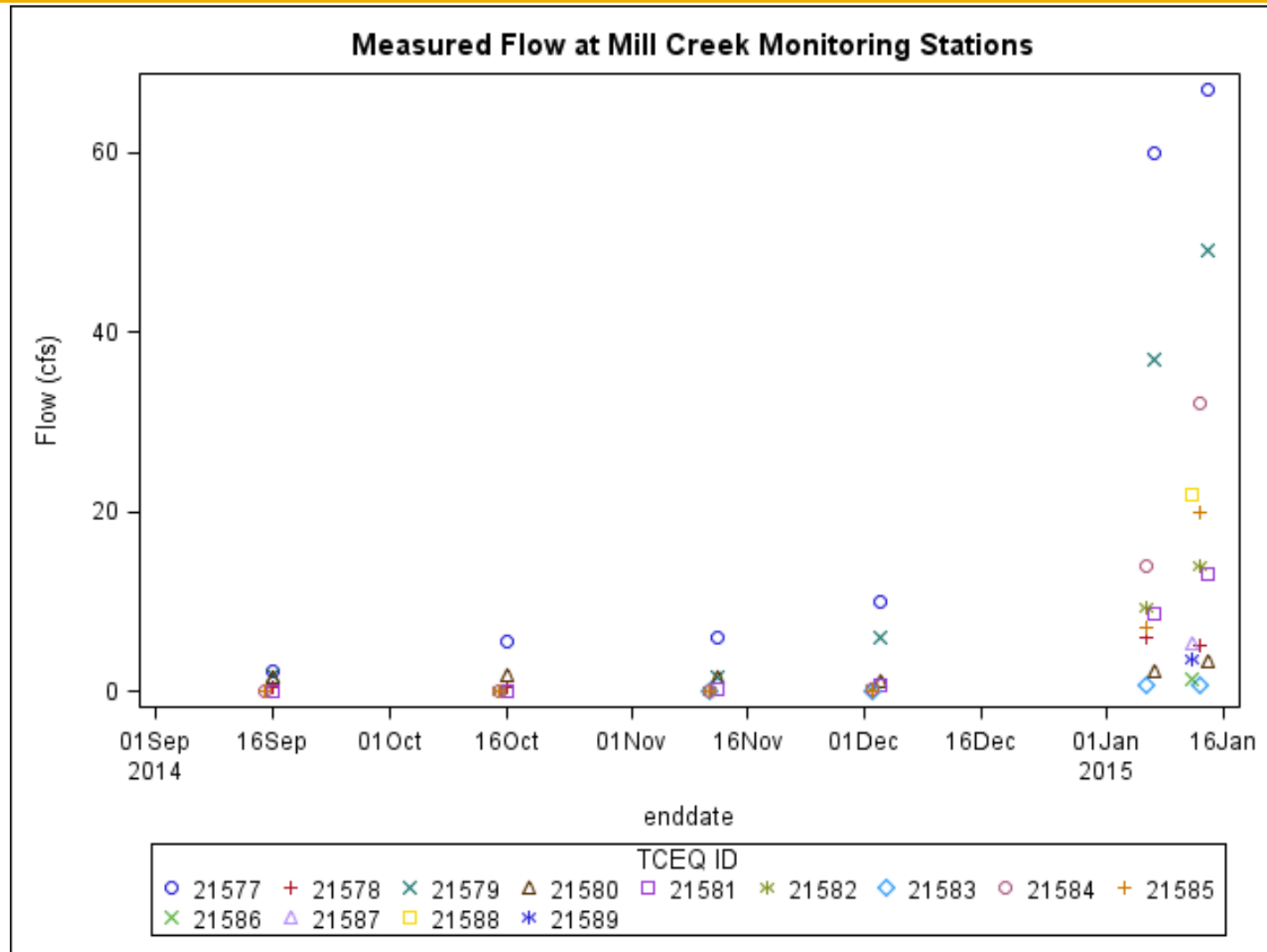


# Site 21577- Mill Creek at FM 331

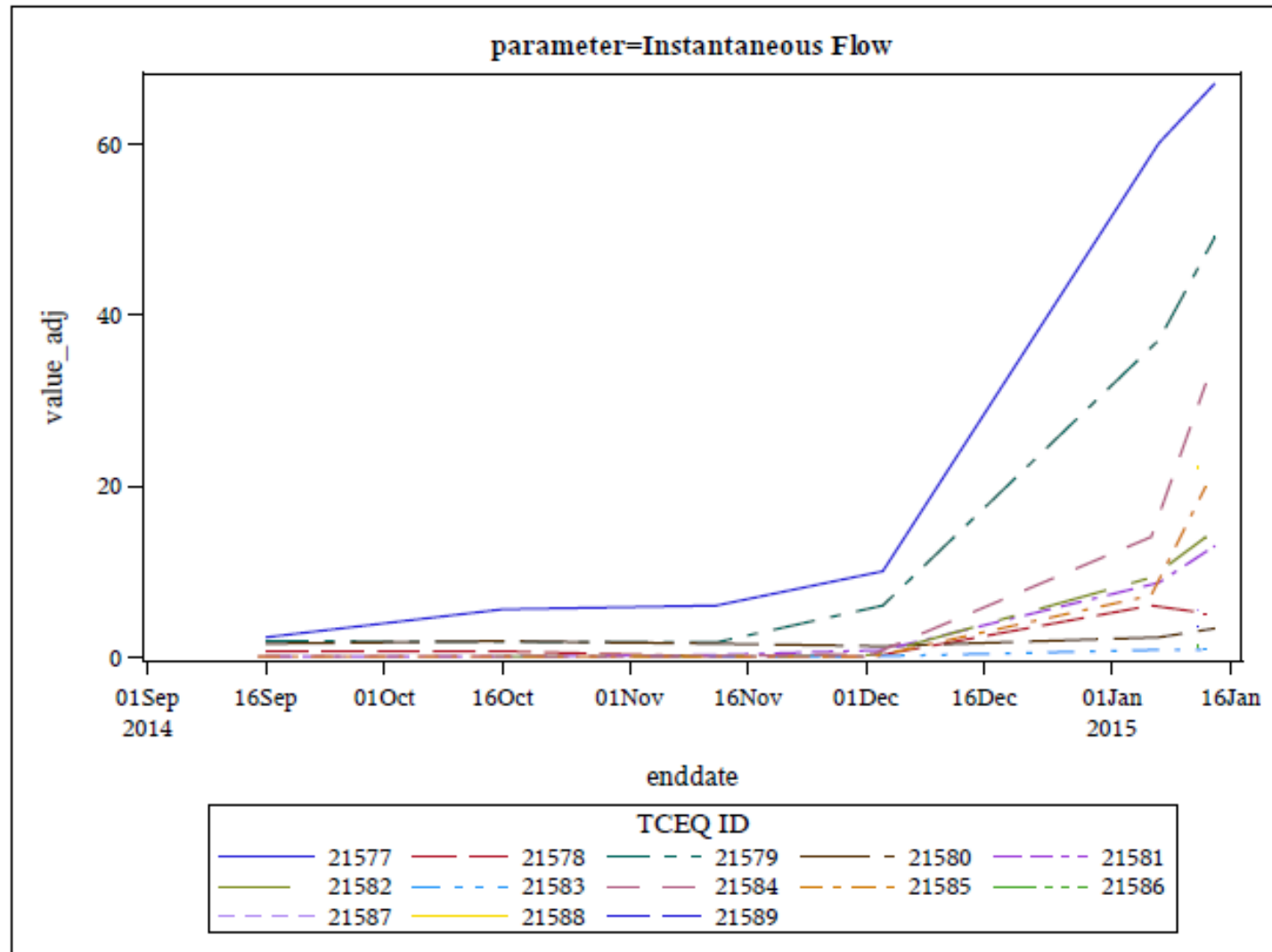




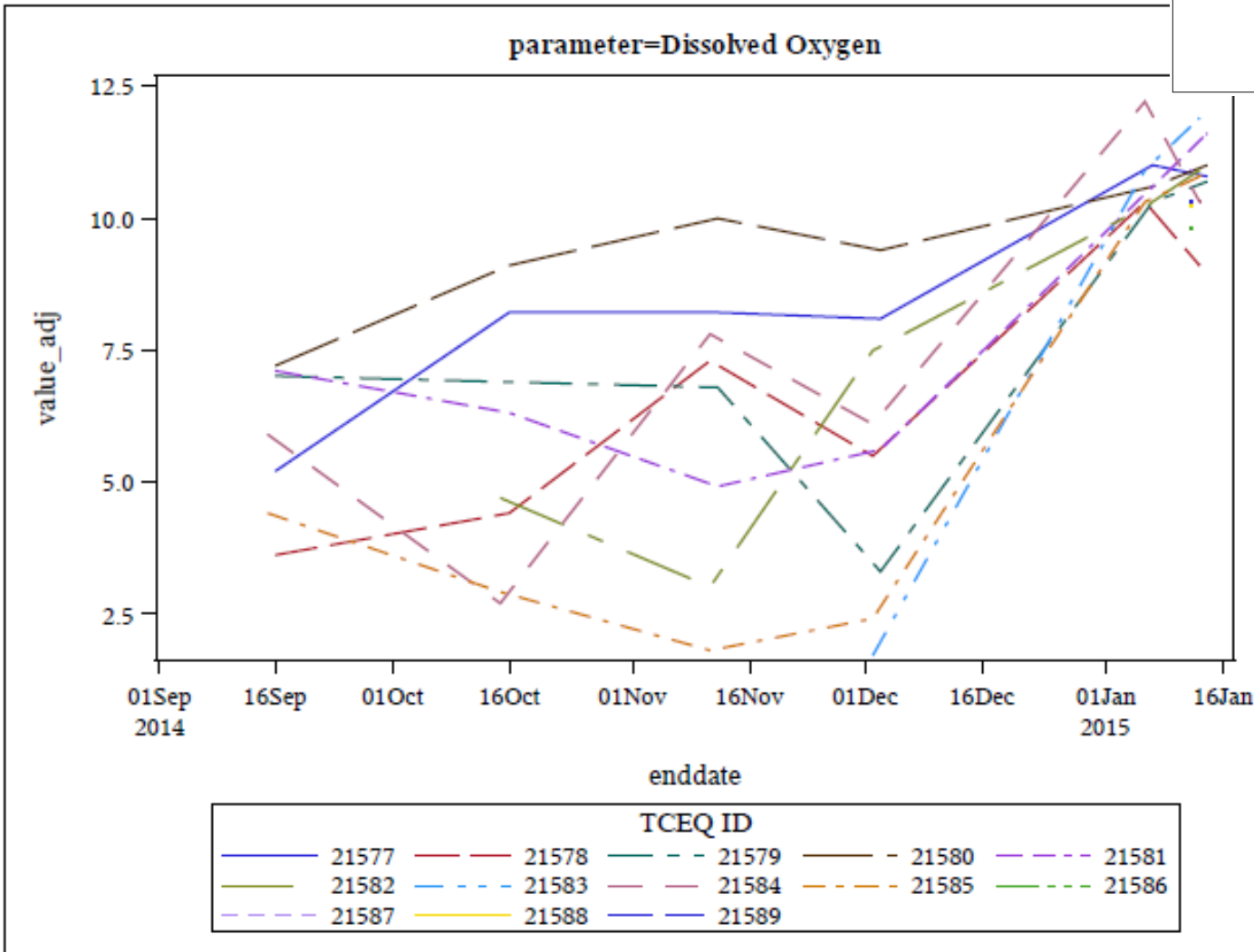
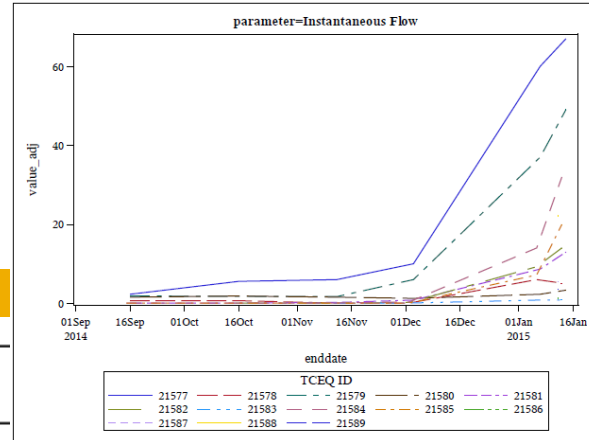
# Results - Flow



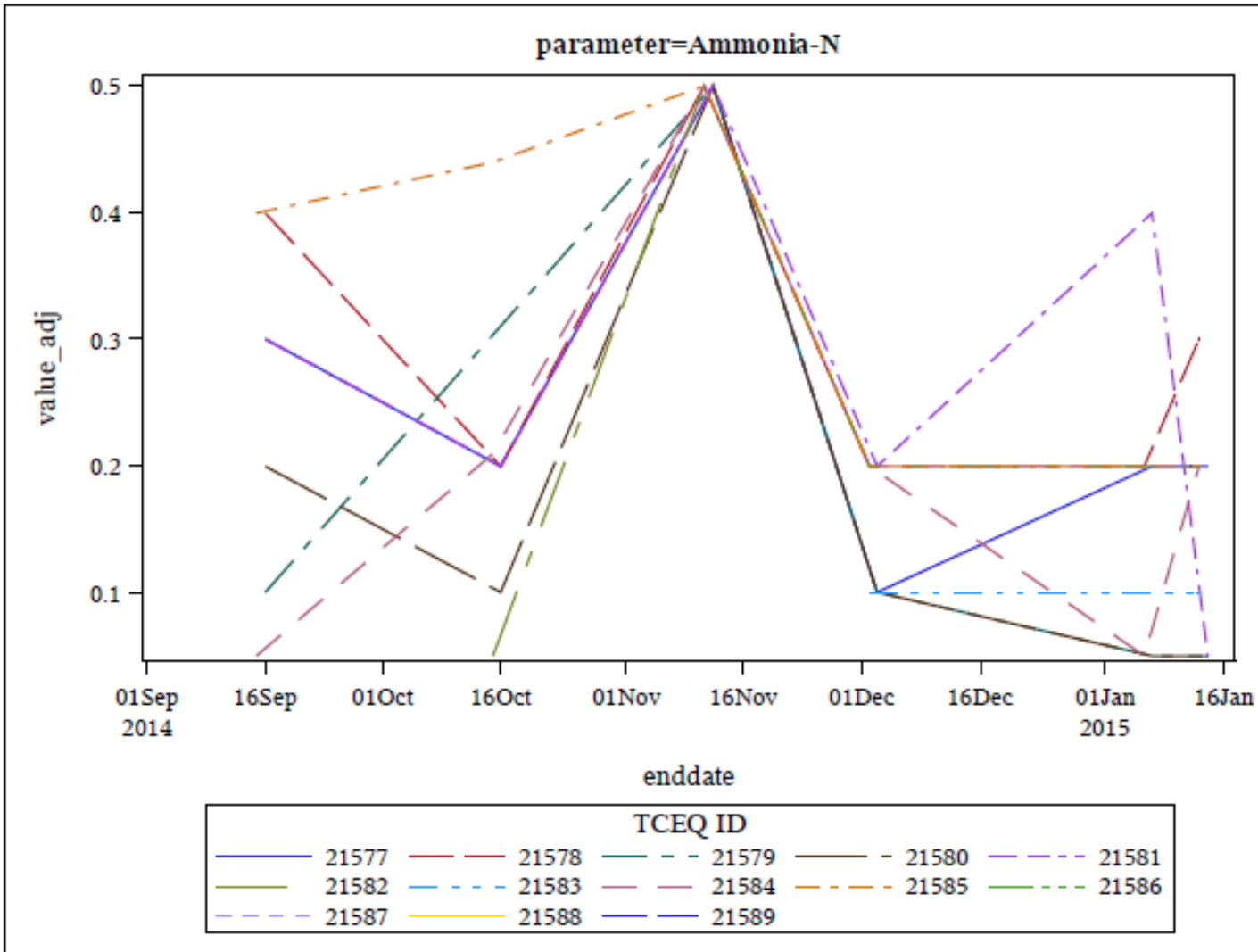
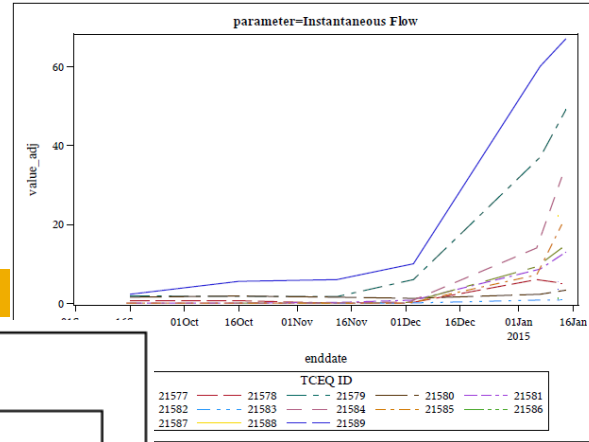
# Results - Flow



# Results – Dissolved Oxygen

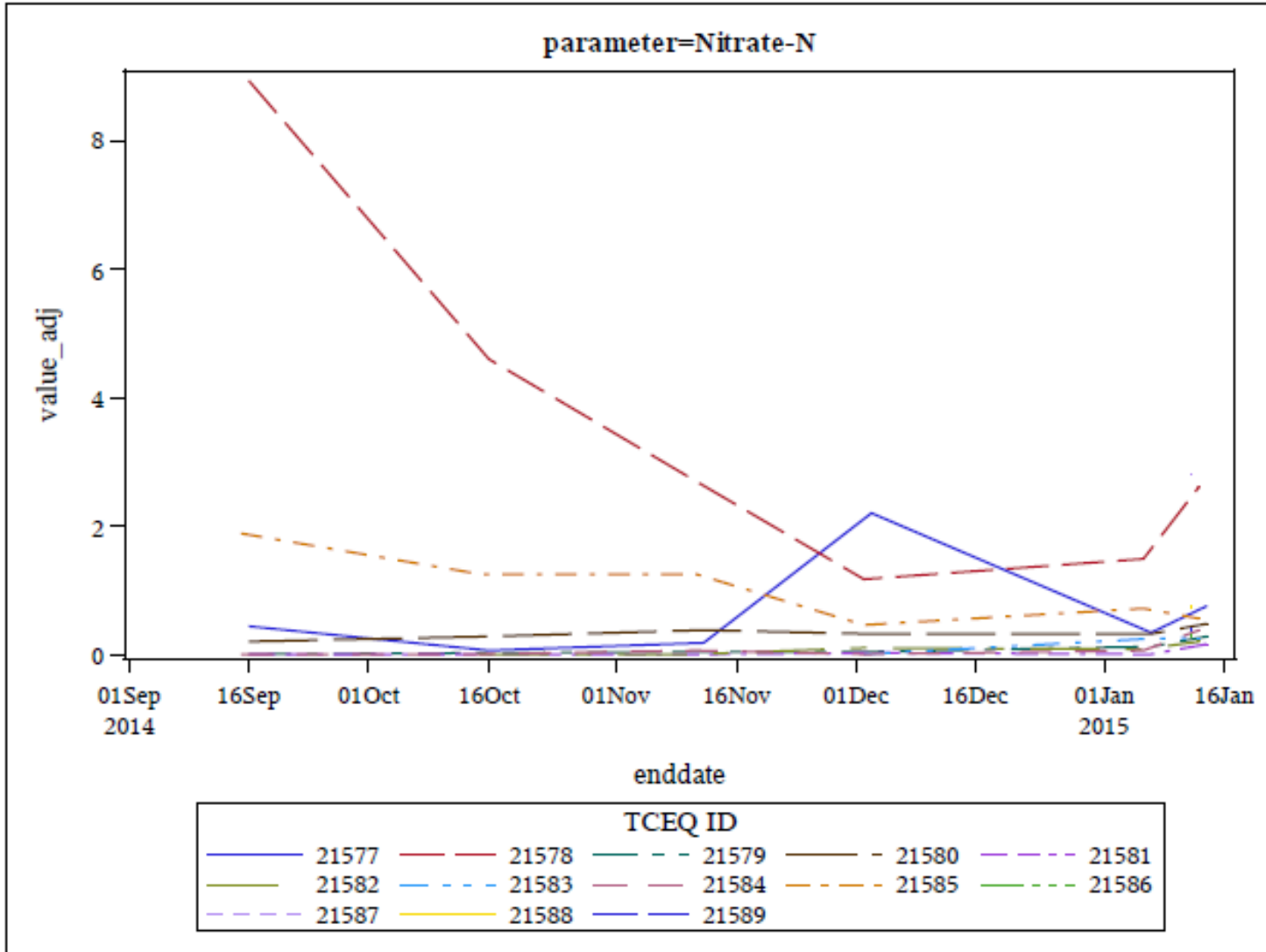
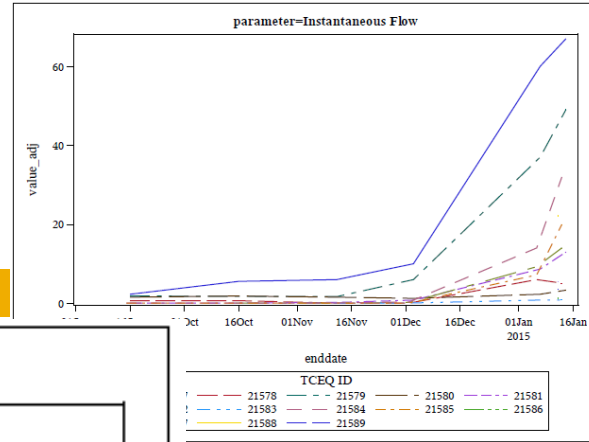


# Results - Ammonia

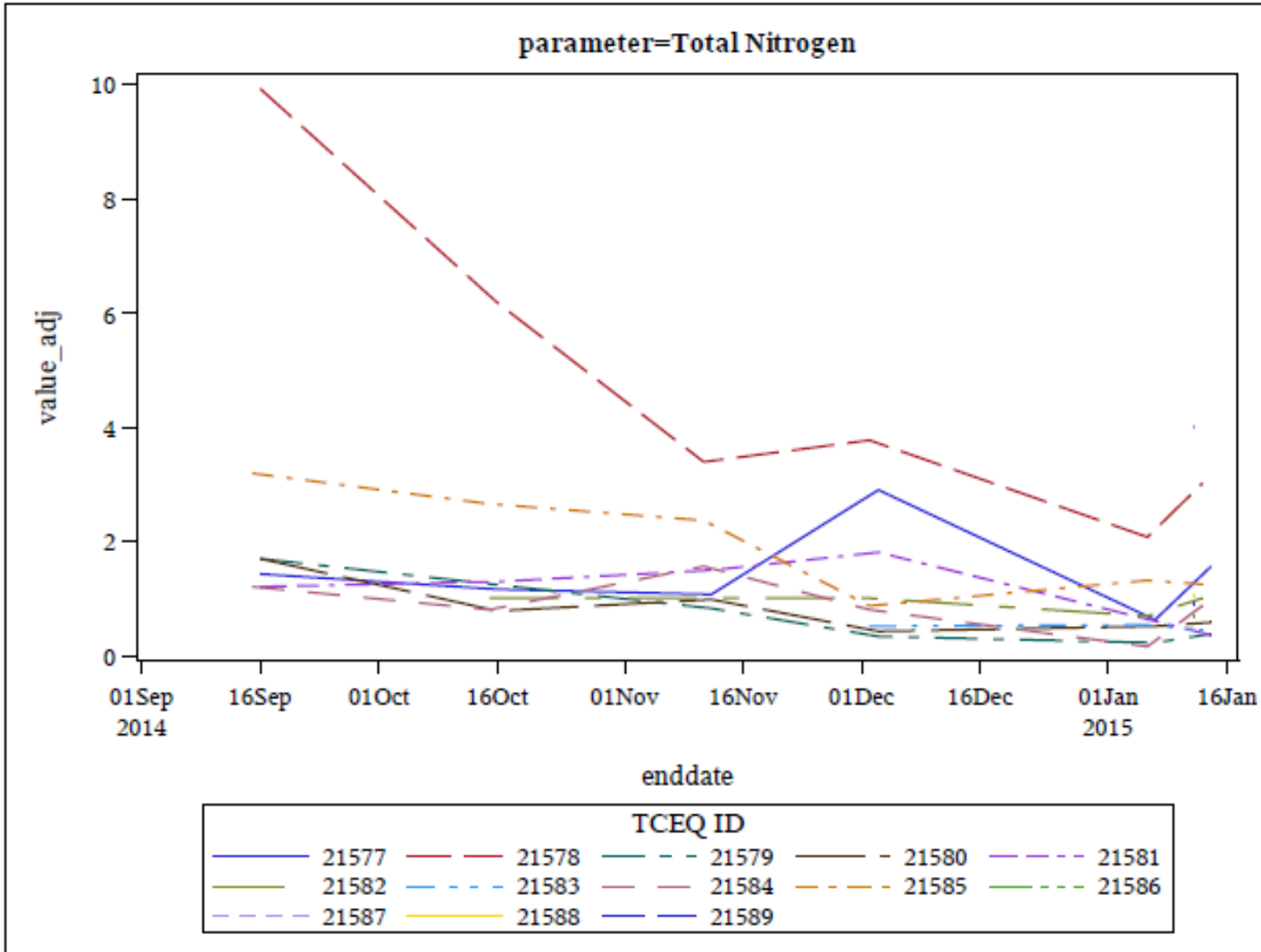
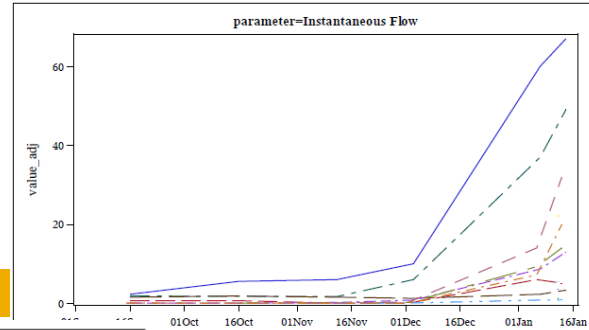




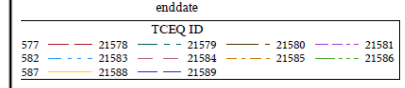
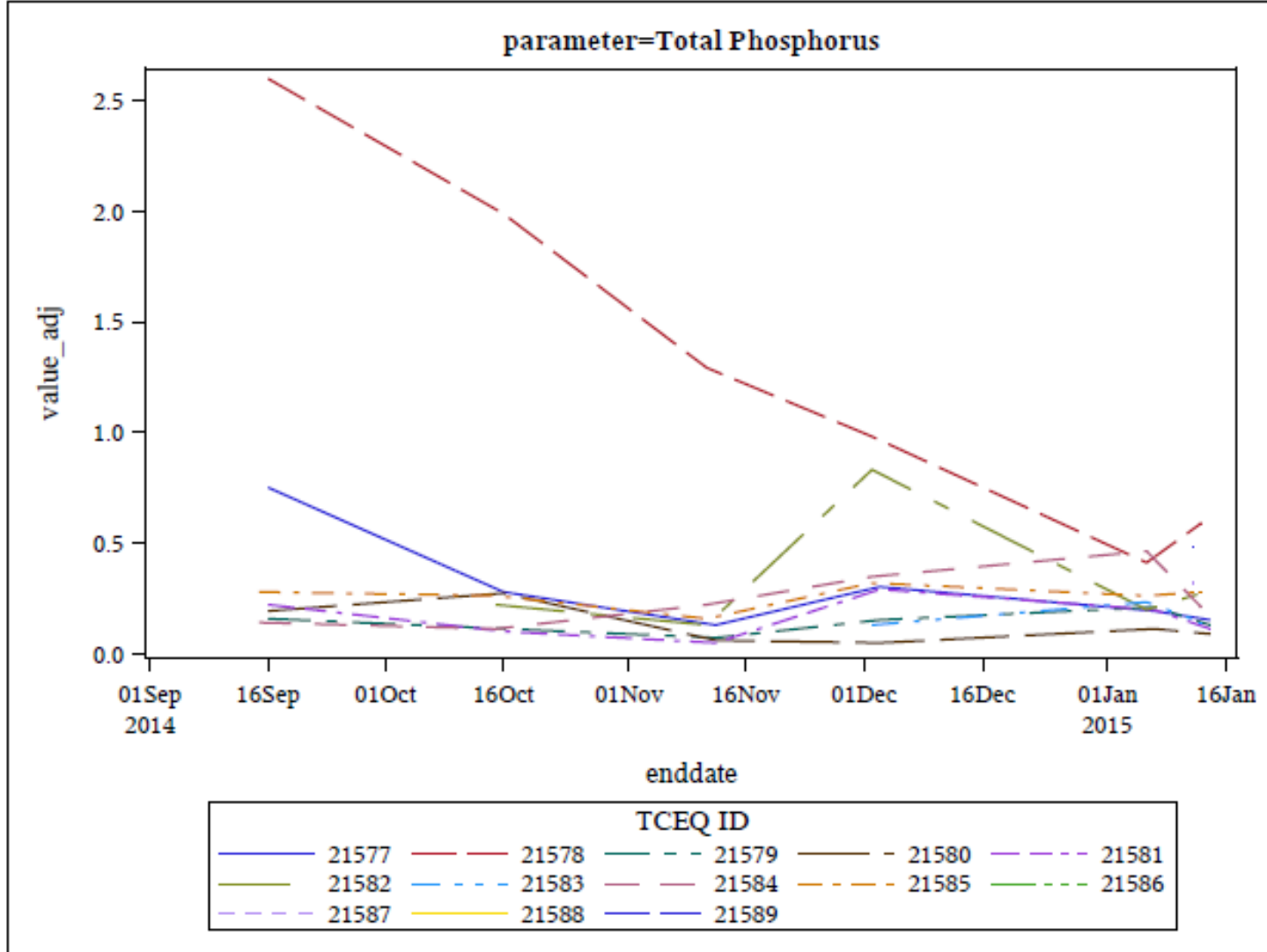
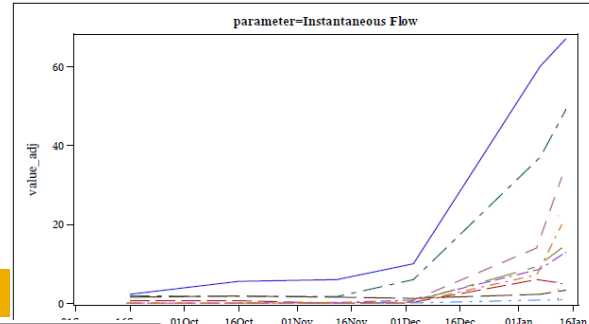
# Results - Nitrate



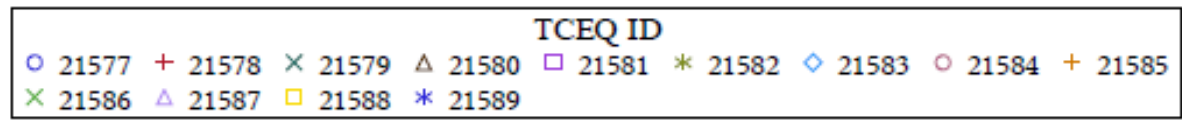
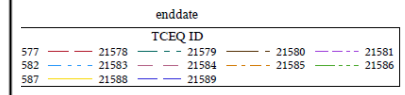
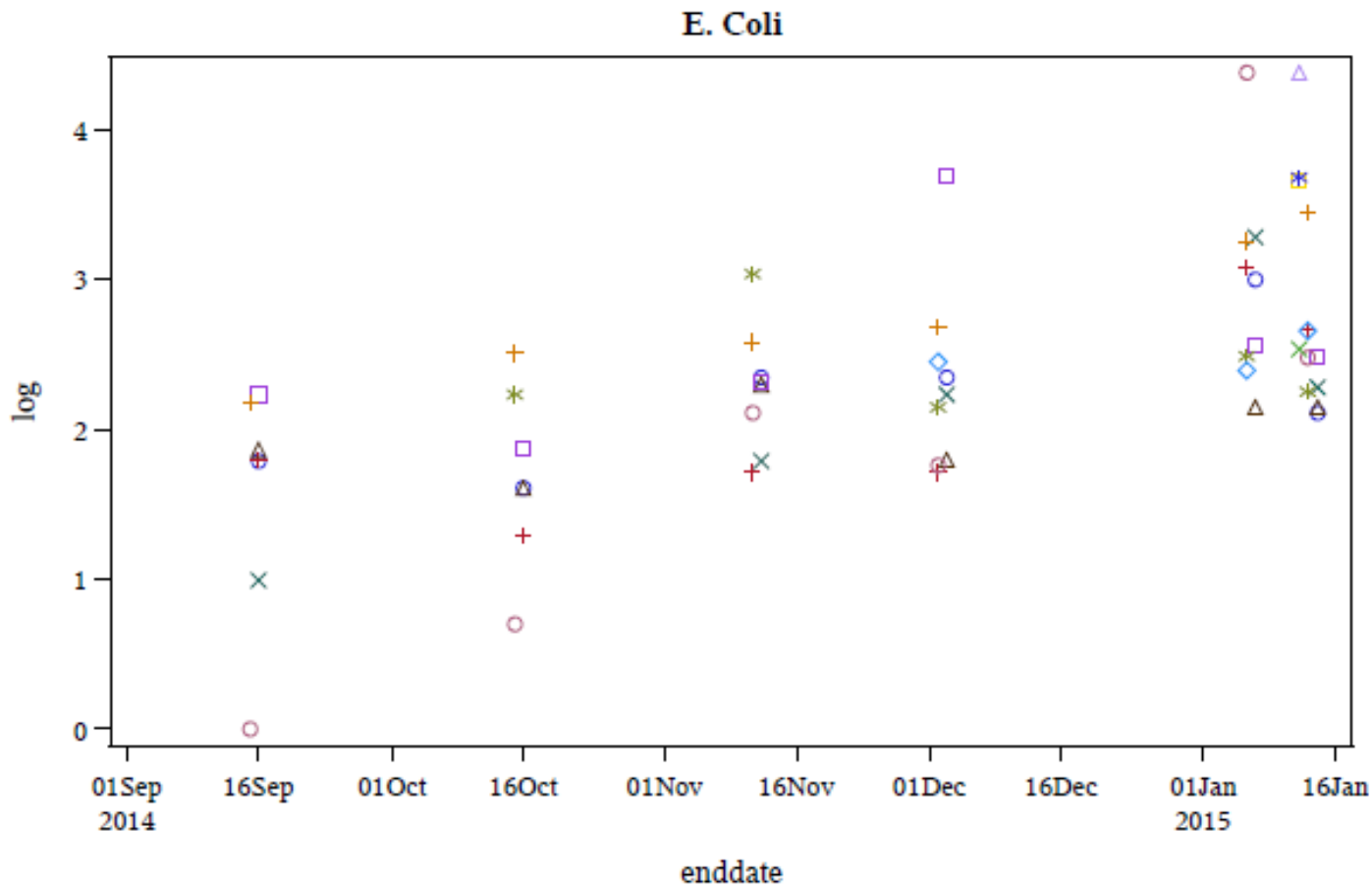
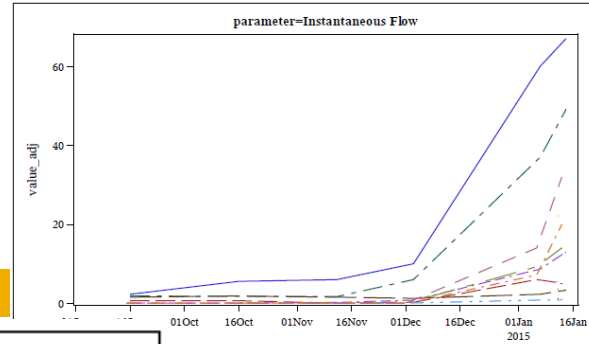
# Results – Total Nitrogen



# Results – Total Phosphorus

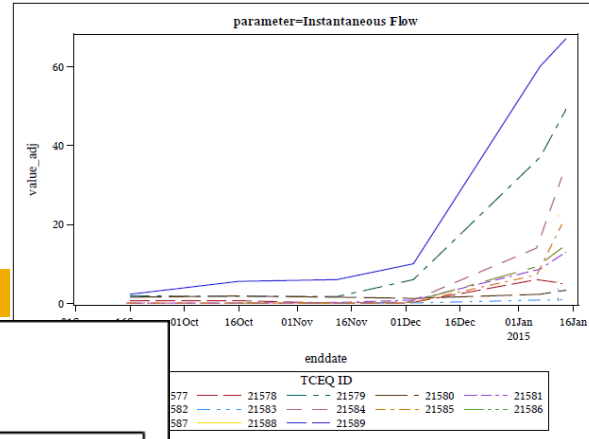


# Results – *E. coli*

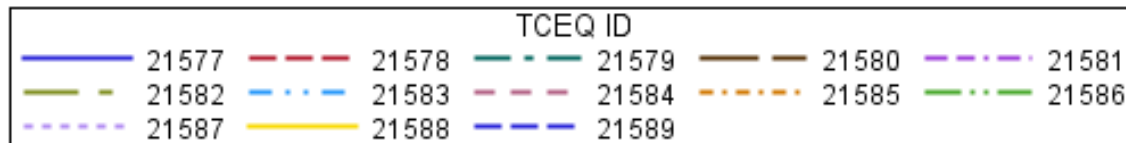
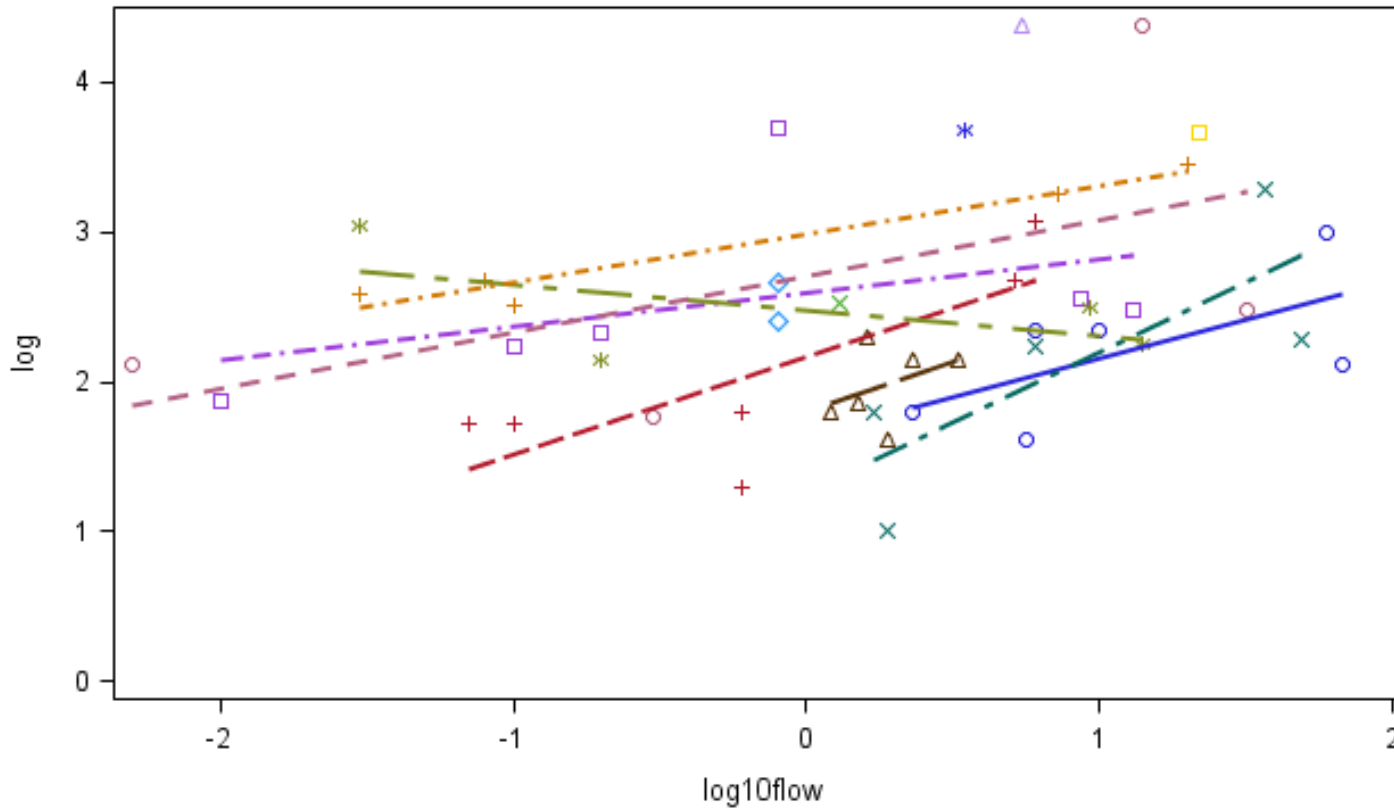




# Results – Bacteria vs Flow

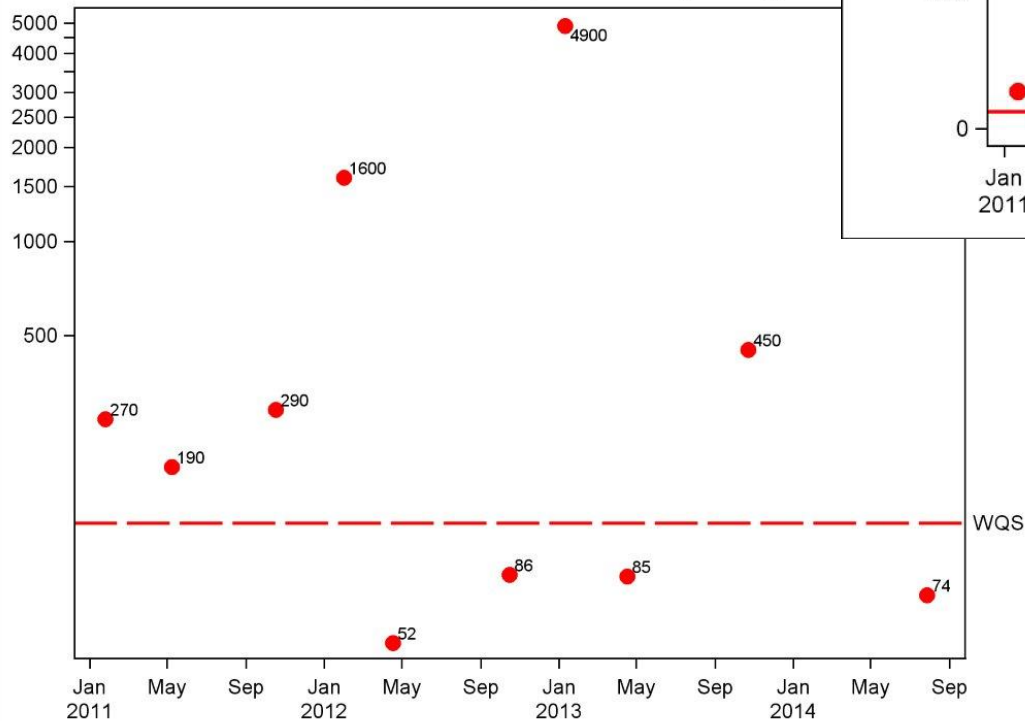


**E. Coli vs. Flow**  
Base 10 Logs

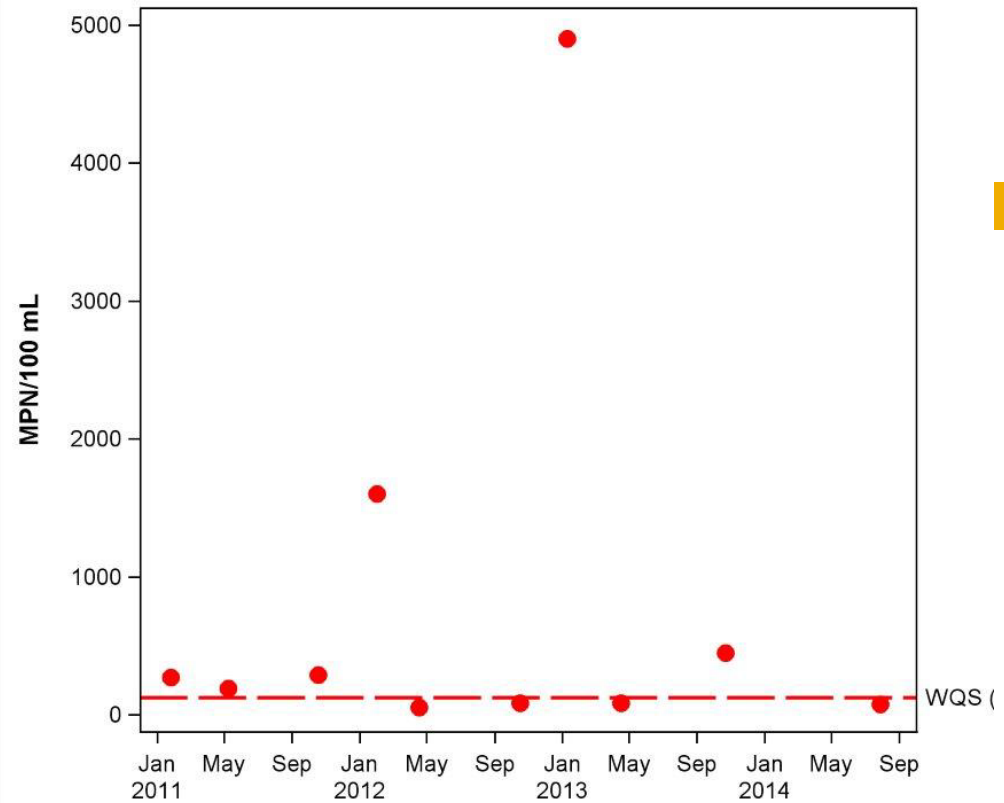


# TCEQ Reference Site

E. Coli - Station 11576 (Monitored by TCEQ)



E. Coli - Station 11576 (Monitored by TCEQ)



- Primary Contact Recreation Std.
- Geomean 126 per 100 mL
  - Single sample criterion 399 per 100 mL

# Contact Information



Houston-Galveston Area Council

Jean Wright

Senior Environmental Planner

[jean.wright@h-gac.com](mailto:jean.wright@h-gac.com)

713-499-6660

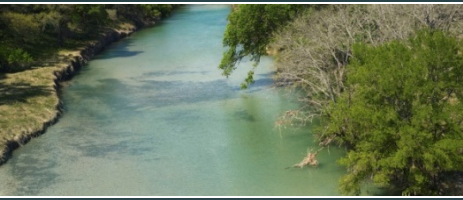
Website

<http://www.h-gac.com/home/residents.aspx>





# Proposed Management Measures for Mill Creek



**Galen Roberts**

Texas A&M AgriLife Extension Service

*Mill Creek  
March 30, 2015*



# *Management Measures*

Proposed primarily to address bacteria concerns in the watershed.

- Measures may be identified to address other types of pollution.
- All measures are voluntary.
- Heavy focus on public outreach and education.

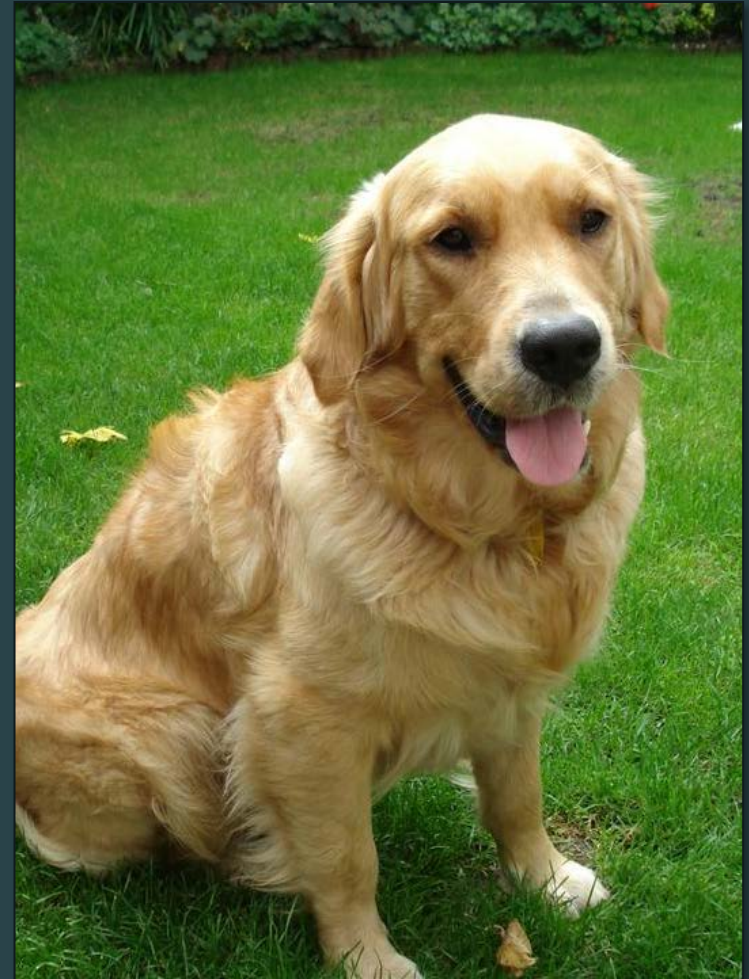
# *Management Measures*

- **Urban Nonpoint Source**
  - Dog Waste
  - Stormwater
- **Wastewater**
  - Septic Systems
  - SSO Initiatives
- **Agricultural Nonpoint Source**
  - Livestock
  - Wildlife & Feral Hogs



# *Urban Management Measures*

- Dog Waste
  - Spay/neuter programs
  - Pet waste stations
  - City pet waste ordinances
  - Public education and outreach.



# *Urban Management Measures*

- Urban Stormwater Runoff
  - Seek funding for engineering analyses and implementation of targeted control measures.
  - Implement non-structural BMPs, where possible.
  - Public education and outreach.



# *Wastewater Management Measures*

- Sanitary Sewer Collection Systems and Overflow Initiatives (SSO)
  - Development of a specialized plan to prevent discharge of wastewater before it reaches a WWTF.
- Household Hazardous Waste Collection (HHW)
  - Seek funding to bolster existing HHW collection programs.



# *Wastewater Management Measures*

- Septic Systems (OSSF)
  - Seek funding to extend sanitary sewer service to marginal areas of cities.
  - Seek funding for repair/replacement of failing OSSFs.
  - Outreach and education.



# ***Agricultural Management Measures***

- Water Quality Management Plans (WQMP)
  - Voluntary, site-specific management plans for individual agricultural operations.
  - WQMPs provide landowners access to state funding for implementation of BMPs.
  - Seek funding to employ SWCD technician to assist landowners in developing WQMPs and obtaining financial incentives.

# *Agricultural Management Measures*

- Feral hog control
  - Will seek continued funding for an Extension feral hog position to provide technical assistance to landowners throughout the region.
  - Outreach and education.
- Wildlife
  - Continue to be managed by TPWD.
  - Outreach and education.



# *Educational Initiatives*

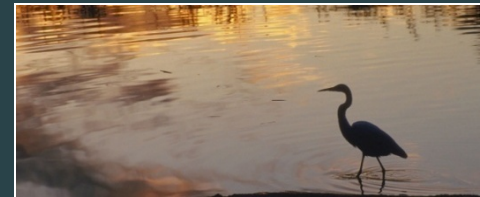
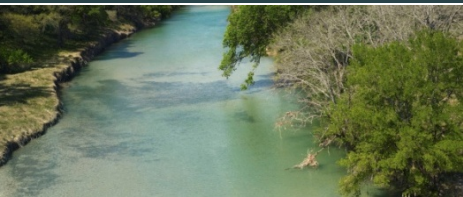
- Learning Across New Dimensions in Science (L.A.N.D.S) Program
  - Vehicle for introducing environmental science into middle school classrooms.
- BMP Demonstration Areas
  - Washington County Fairgrounds



# *Watershed Coordinator*

- Seek funding for a Watershed Coordinator position located in the watershed to coordinate implementation.
  - Provide oversight of project activities.
  - Seek funding for project partners.
  - Organize/coordinate meetings and educational programs.

# Next Steps in the Planning Process



**Galen Roberts**

Texas A&M AgriLife Extension Service

*Mill Creek  
March 30, 2015*





# *Meeting Dates and Times*

- Partnership meetings are slated for the last Monday of each month @ 6pm.
- Will be held here, at the Bleiblerville VFD.
- Next meeting:

**April 27**



# *April 27 Meeting*

- Continue discussion on management measures (*Section 6*)
  - Be thinking of what is needed/wanted.
  - Look to the Geronimo WPP for examples of BMPs.
  - Send me ideas as you have them.
- Discuss Measures of Success (*Section 7*)
- Discuss Implementation (*Section 8*)
  - Timeline
  - \$\$\$

# Website: <http://millcreek.tamu.edu>

- Clearinghouse for all information related to the Partnership
  - **Meeting info**
  - **Email list signup**
  - **Event registration**
- Maps, data, publications and useful links will all be available on the website
  - <http://millcreek.tamu.edu>

TEXAS A&M  
AGRI LIFE  
EXTENSION

## Mill Creek Watershed Partnership

[Home](#) [About](#) [Our Watershed](#) [Water Quality](#) [Watershed Protection Plan](#) [Registration](#)

### Welcome



The Mill Creek Watershed Partnership supports the development of a Watershed Protection Plan (WPP) for Mill Creek and promotes a sustainable, proactive approach to improving water quality at the local level. This partnership will serve as the forum for public input, which will drive the

development and implementation of the Mill Creek WPP. Anyone with an interest in Mill Creek can become a member of the Mill Creek Watershed Partnership by participating in meetings, signing up for email updates and becoming involved in the development of the WPP.

Public input is critical to improving and protecting the quality of Texas' waters and is a key component of any effective Watershed Protection Plan (WPP). This watershed partnership will provide stakeholders a voice in the planning process and allow for the development of a voluntary tool for addressing water quality issues in Mill Creek.





# Contact Info

**Galen Roberts**

*Texas A&M AgriLife Extension:*  
College Station

[groberts@ag.tamu.edu](mailto:groberts@ag.tamu.edu)

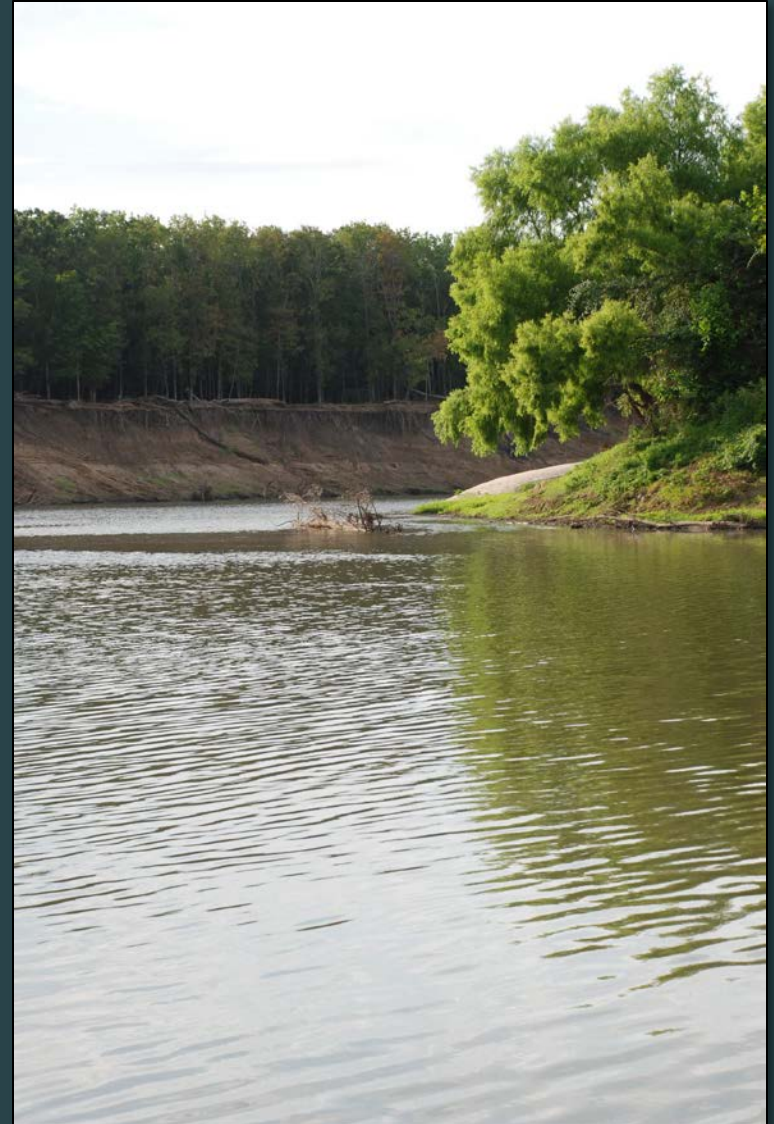
979-862-8070

**Ward Ling**

*Texas A&M AgriLife Extension:*  
College Station

[wling@ag.tamu.edu](mailto:wling@ag.tamu.edu)

979-845-6980



***SAVE THE DATE***

# Mill Creek Partnership Meeting

April 27, 2015: 6pm

Here at the Bleiblerville VFD