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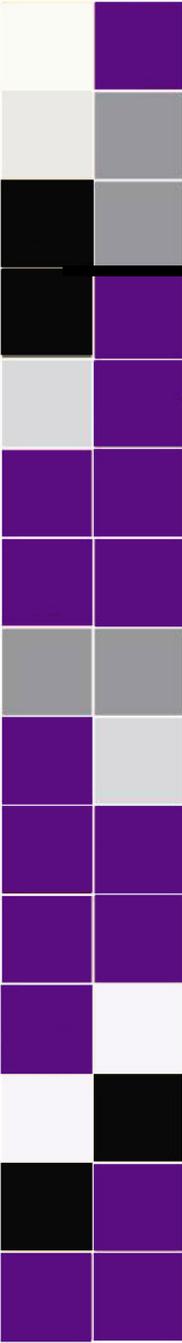
Mid Pecan Bayou

Bacteria Source Survey Findings

Study Team:
Texas AgriLife Research
&
Texas Institute for Applied Environmental Research
Stephenville, Texas

August 10, 2011





Evaluation of Bacteria Sources

- Wastewater Treatment Facilities
- Central Sewage Collection Systems
- On-site Sewage Facilities (septic systems)
- Municipal Separate Storm Sewer System
- Compliance Issues: Texas Pollutant Discharge Elimination System
- Wildlife, Livestock and non-domestic animal populations

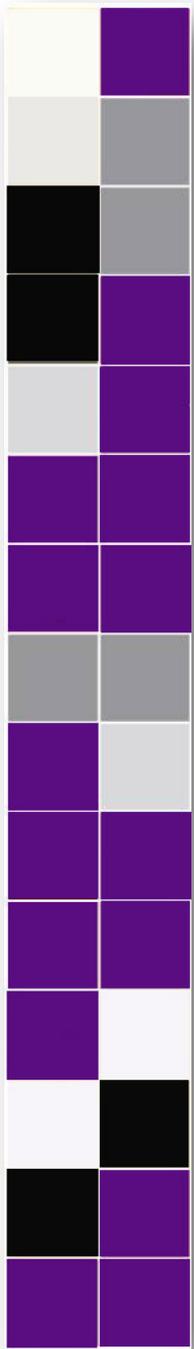


Bacteria Source Survey

Assessment:

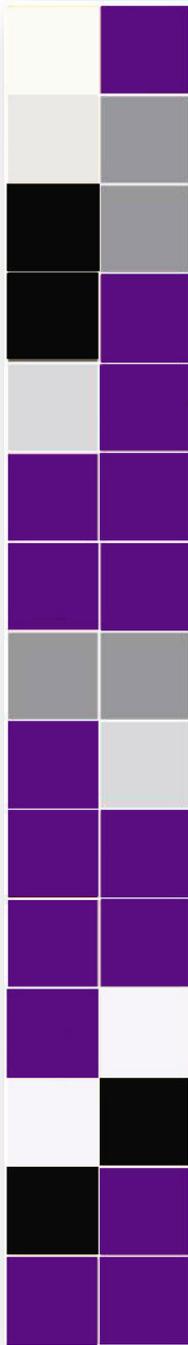
1. GIS inventory of the study area
2. Historical water quality data review
3. Boating or walking portions of the impaired segment
 - Completed first field survey





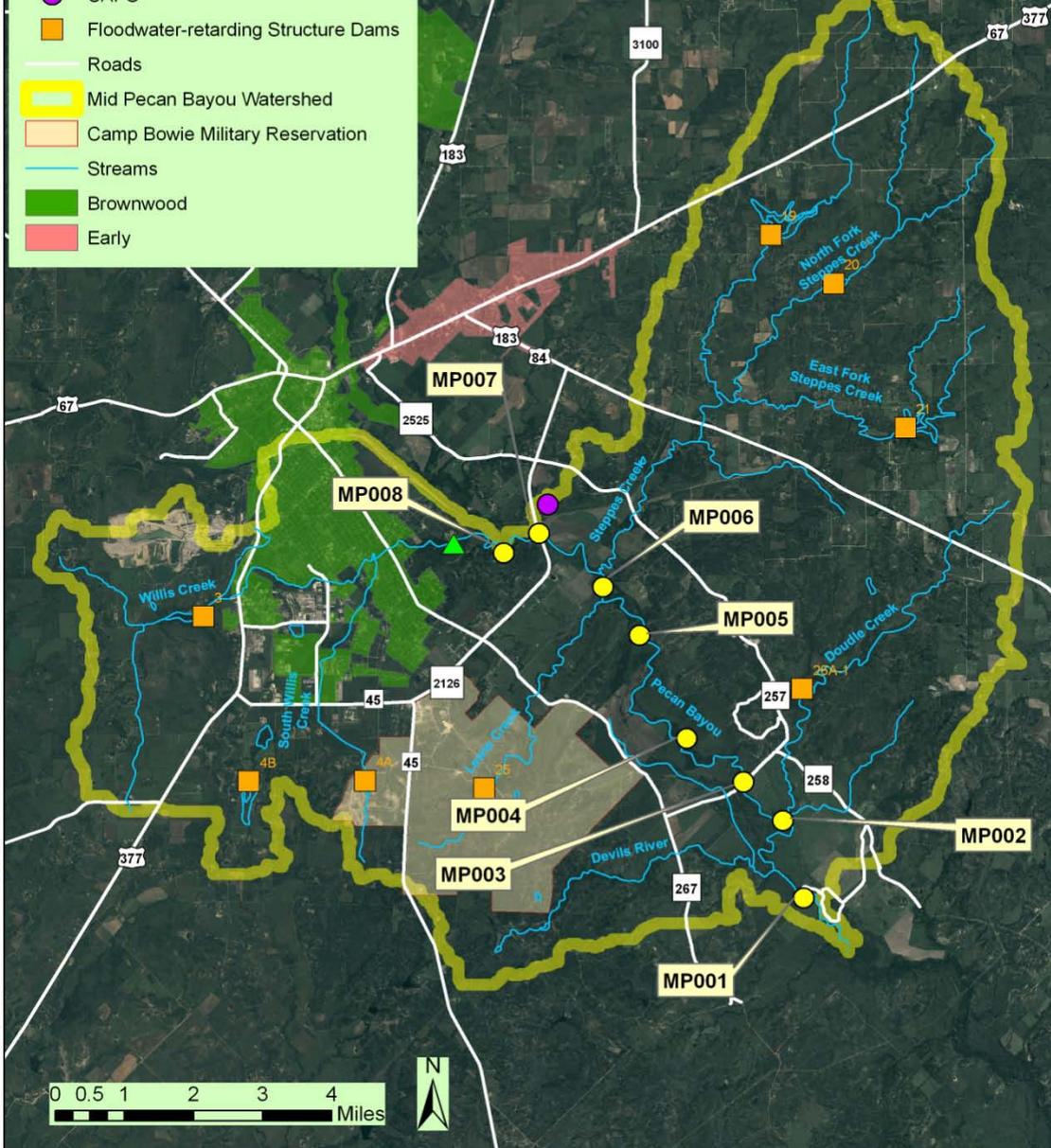
GIS Inventory





Mid Pecan Bayou Segment 1431

- Monitoring Sites
- Permitted Discharger
- CAFO
- Floodwater-retarding Structure Dams
- Roads
- Mid Pecan Bayou Watershed
- Camp Bowie Military Reservation
- Streams
- Brownwood
- Early



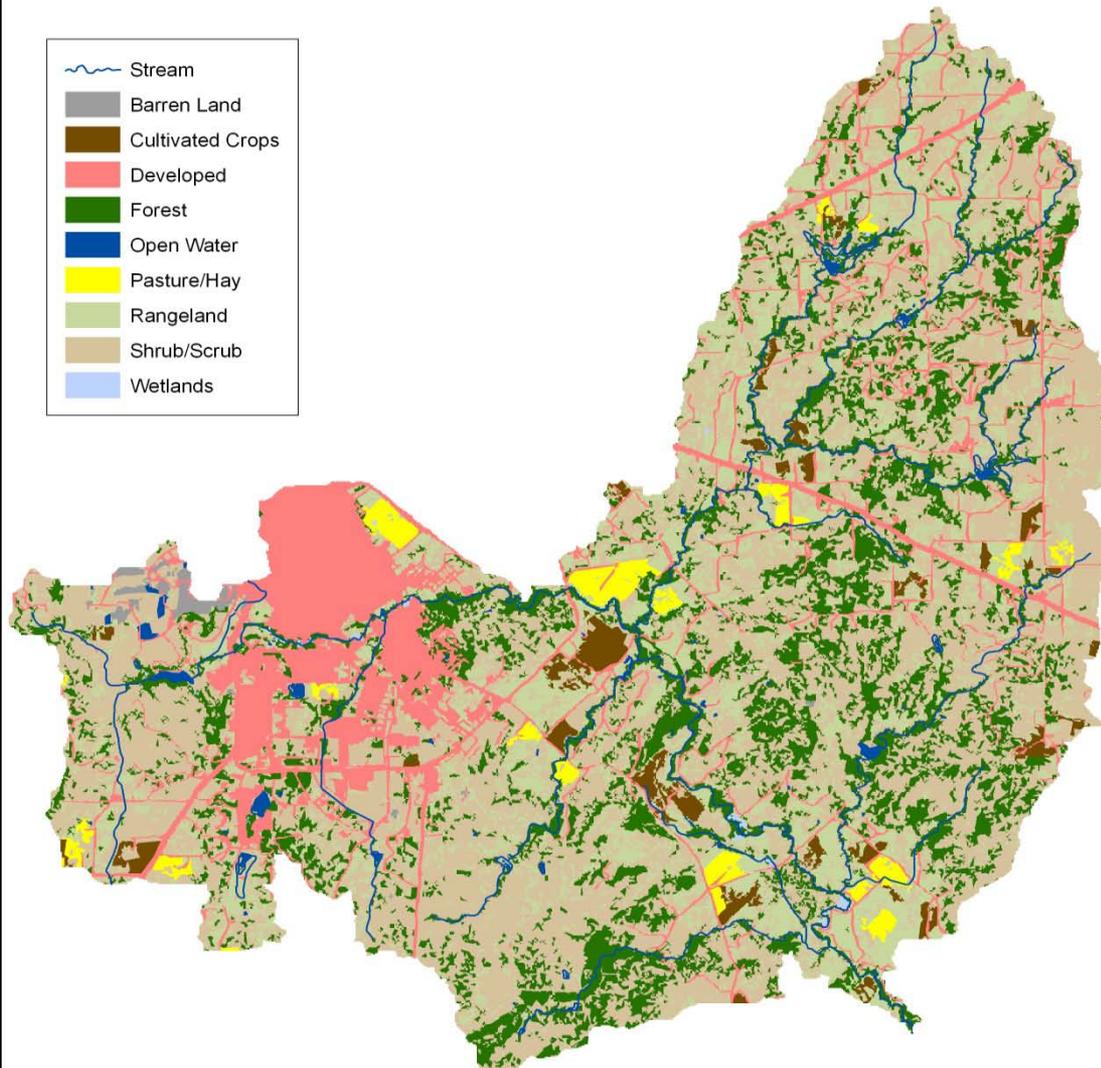
Land Use Classification

Land Use Classification	Area (Hectares)	Percent of Total
Shrub/Scrub	12,957	47
Forest	5,010	18
Rangeland	4,313	16
Developed	3,690	13
Cultivated Crops	591	2
Pasture/Hay	498	2
Open Water	148	0.5
Barren Land	113	0.4
Wetlands	43	0.2
Total	27,362	



Mid Pecan Bayou Land Use/Land Cover (Source: 2006 NLCD)

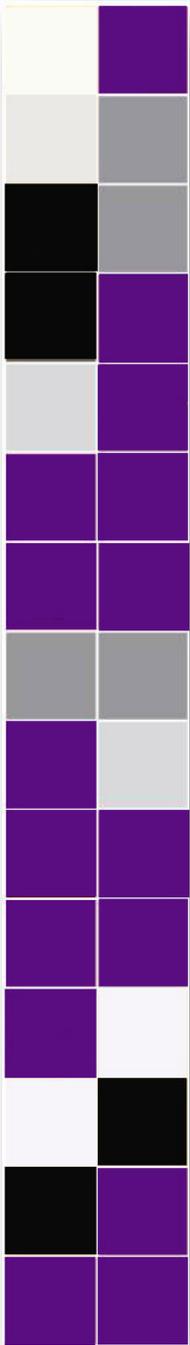
- Stream
- Barren Land
- Cultivated Crops
- Developed
- Forest
- Open Water
- Pasture/Hay
- Rangeland
- Shrub/Scrub
- Wetlands



0 0.5 1 2 3 4 Miles



Historical Water Quality Data



Texas Commission on Environmental Quality Criteria

Constituent	Geometric Mean (colonies/100mL)
<i>E. coli</i>	126
Fecal coliform	200



Bacteria values reported by TCEQ in determining impairment status:

Constituent	Assessment Year	Period of Record	Sample Numbers	Geometric Mean
<i>E.coli</i>	2006	1999-2004	13	242
Fecal coliform	2006	1999-2004	15	104
<i>E.coli</i>	2008	1999-2006	21	282
Fecal coliform	2008	1999-2006	26	104
<i>E.coli</i>	2010	2001-2008	26	228
Fecal coliform	2010	2001-2008	7	258

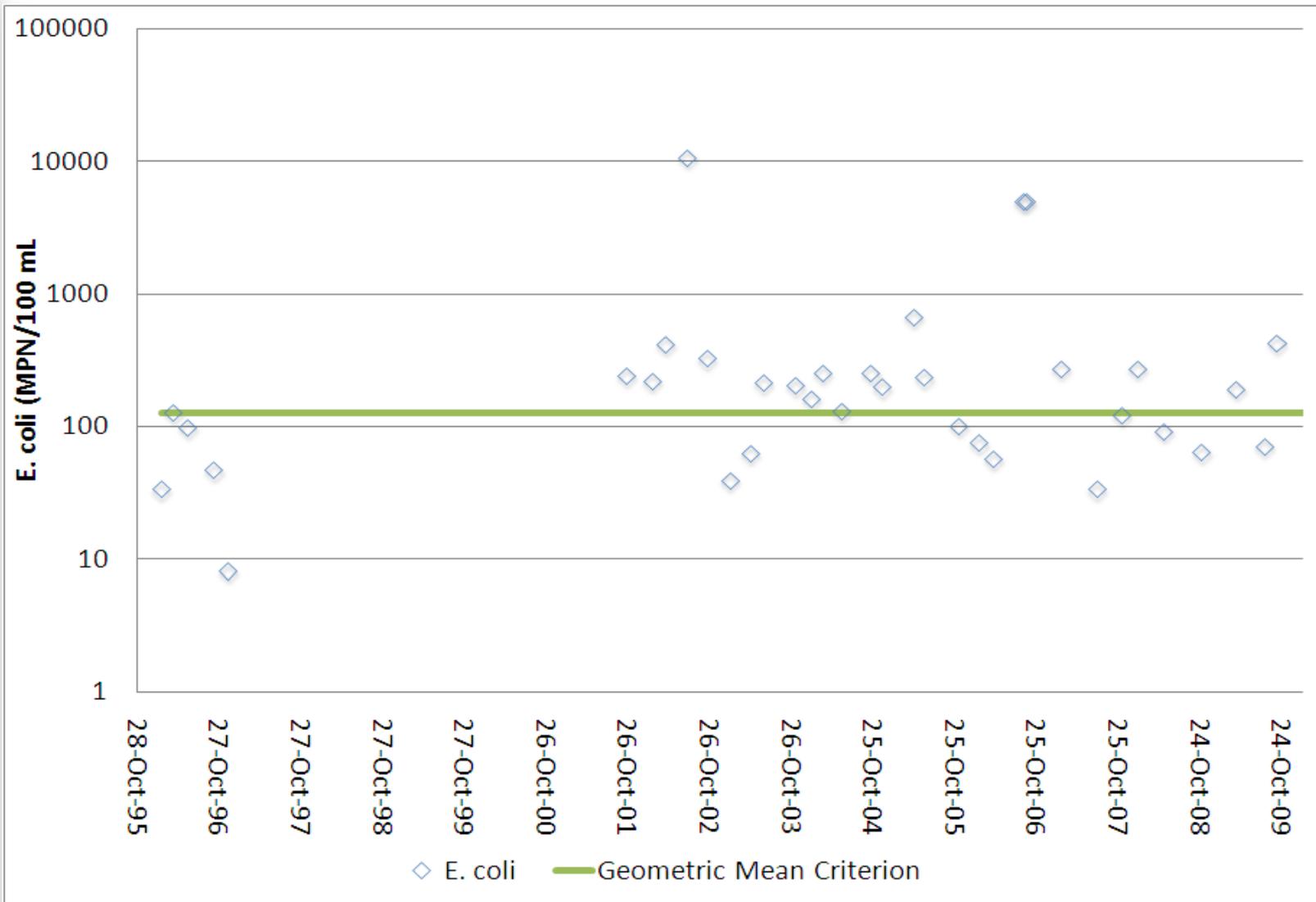
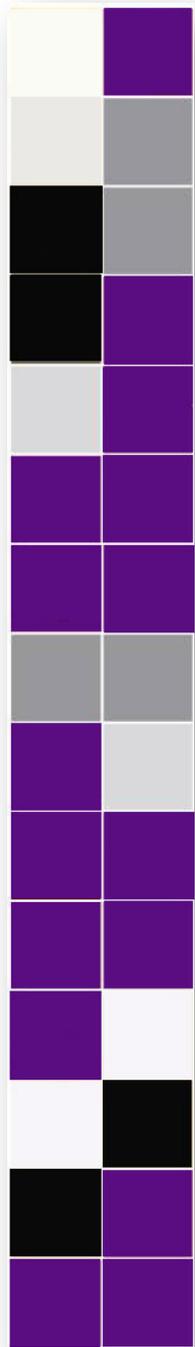
Data are from station 12504 – Pecan Bayou at FM 2126 (MP007)

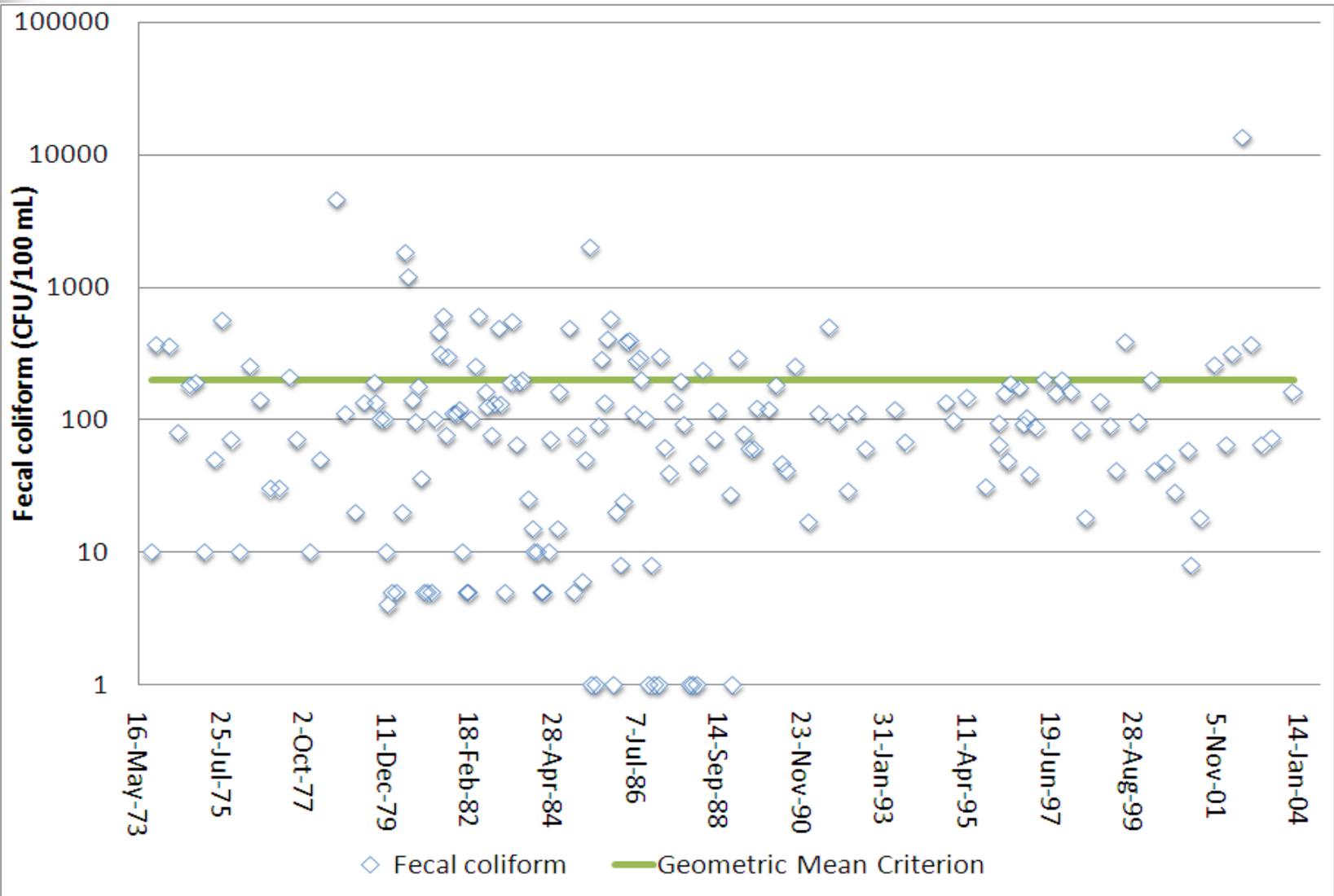


Nutrient values reported by TCEQ in determining 2010 concerns

Constituent	Number of Samples	Screening Level (mg/L)	Number of Samples That Exceed Screening Level	Mean of Samples That Exceed Screening Level (mg/L)
Nitrate	29	1.95	22	16.8
Orthophosphorus	28	0.37	21	1.70
Total Phosphorus	29	0.69	21	1.87







Bacteria Source Survey

- Point Sources
 - Brownwood Wastewater Treatment Facility
 - Concentrated Animal Feeding Operation (Brown– Tex Feedlot)



Wastewater Treatment Facility

- City of Brownwood WWTF
 - AU 1431_01
 - Treated domestic wastewater effluent
 - Discharge into Willis Creek
 - Permit – Not to exceed 4.54 million gallons/day
 - Monthly average (Feb. '05 – March '09) – 2.57 million gallons/day



Permitted Dischargers

- Confined Animal Feeding Operation (Brown-Tex Feedlot)
 - 1 permitted Large CAFO within AU 1431_01
 - Head Count – 2,500
 - April 2011 CCI indicates that CAFO is in compliance



Bacteria Source Survey

- NonPoint Sources Observed
 - Avian Nests
 - Wildlife
 - Livestock



Non Point Sources Observed



- Avian rookeries along the creek
- Swallow nests below bridge



Livestock Tracks



“Wallow” Along Bayou



- “Wallow” Along Bayou
- Hog Feces
- Hog Run



Unidentified Pipes...



Swallows & Bird Droppings



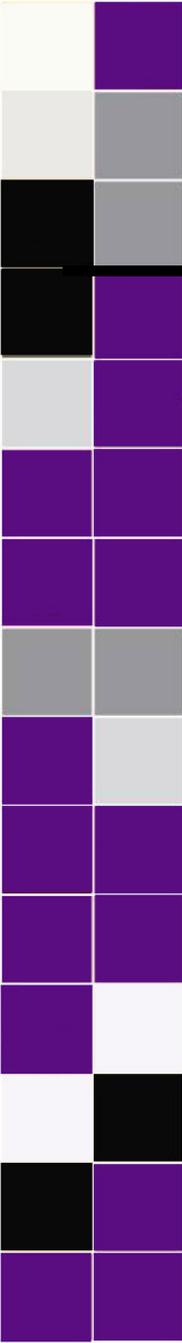
Swallows



Next Steps

- Population Estimates
 - Feral Hog
 - Livestock
- Septic System Densities
- Others?





Questions?

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