Buck Creek Project

Water Quality Monitoring 2006 Annual Stakeholders Meeting

Presented by:

Phyllis Dyer

Research Technician II

Texas Agricultural Experiment Station

Vernon, Texas

Site 3 July 2005

Buck Creek Project
Texas Agricultural Experiment Station

Project Staff

John Sij – Project Leader

Phyllis Dyer – Research Technician II

Perry White – Student Lab Assistant

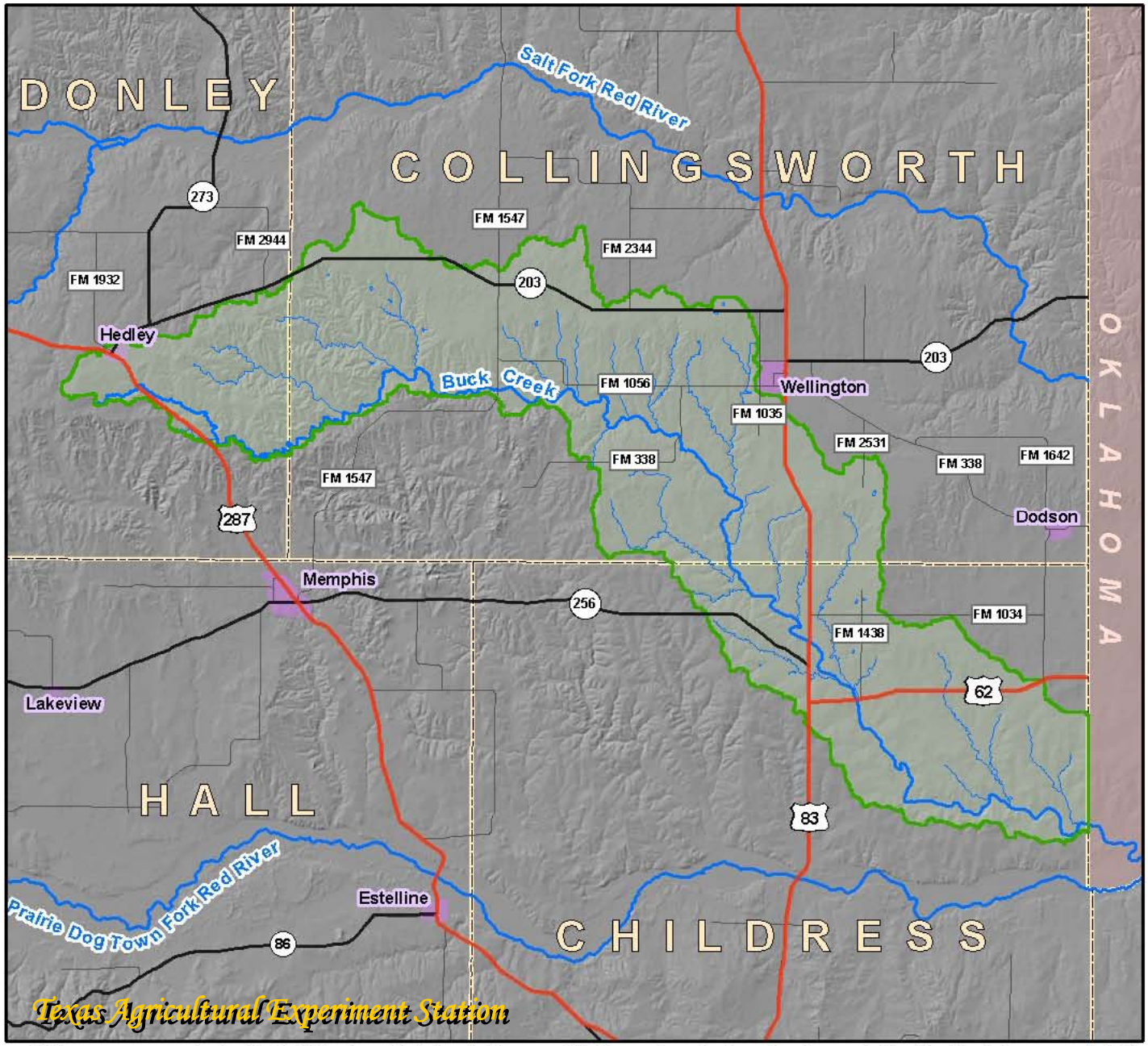
Kurt Lemon- Research Associate

Josh Butler- Agriculture Research Tech I

Participating agencies:

- **USEPA- U**nited **S**tates **E**nvironmental **P**rotection **A**gency
- **TSSWCB- T**exas **S**tate **S**oil and **W**ater **C**onservation **B**oard
- **TWRI- T**exas **W**ater **R**esources **I**nstitute
- **SWCDs- S**oil and **W**ater **C**onservation **D**istricts:
  - ✓ **Salt Fork SWCD**
  - ✓ **Donley County SWCD**
  - ✓ **Hall-Childress SWCD**
- **TAES-T**exas **A**gricultural **E**xperiment **S**tation
- **TCE-T**exas **C**ooperative **E**xtension
- **TCEQ- T**exas **C**ommission on **E**nvironmental **Q**uality
- **RRA-R**ed **R**iver **A**uthority

Buck Creek Watershed



Texas Commission on Environmental Quality
Total Maximum Daily Loads Program
Mail Code 150
P.O. Box 13087
Austin, Texas 78711-3087

Buck Creek - Segment 207A

North and Northeast Texas -
Bacteria from Non Point Sources

- U.S. Highways
- State Highways
- Ranch Roads
- Major Streams
- Stream Traces
- Watershed
- City Boundaries
- County Boundaries

0 2 4 8 Miles

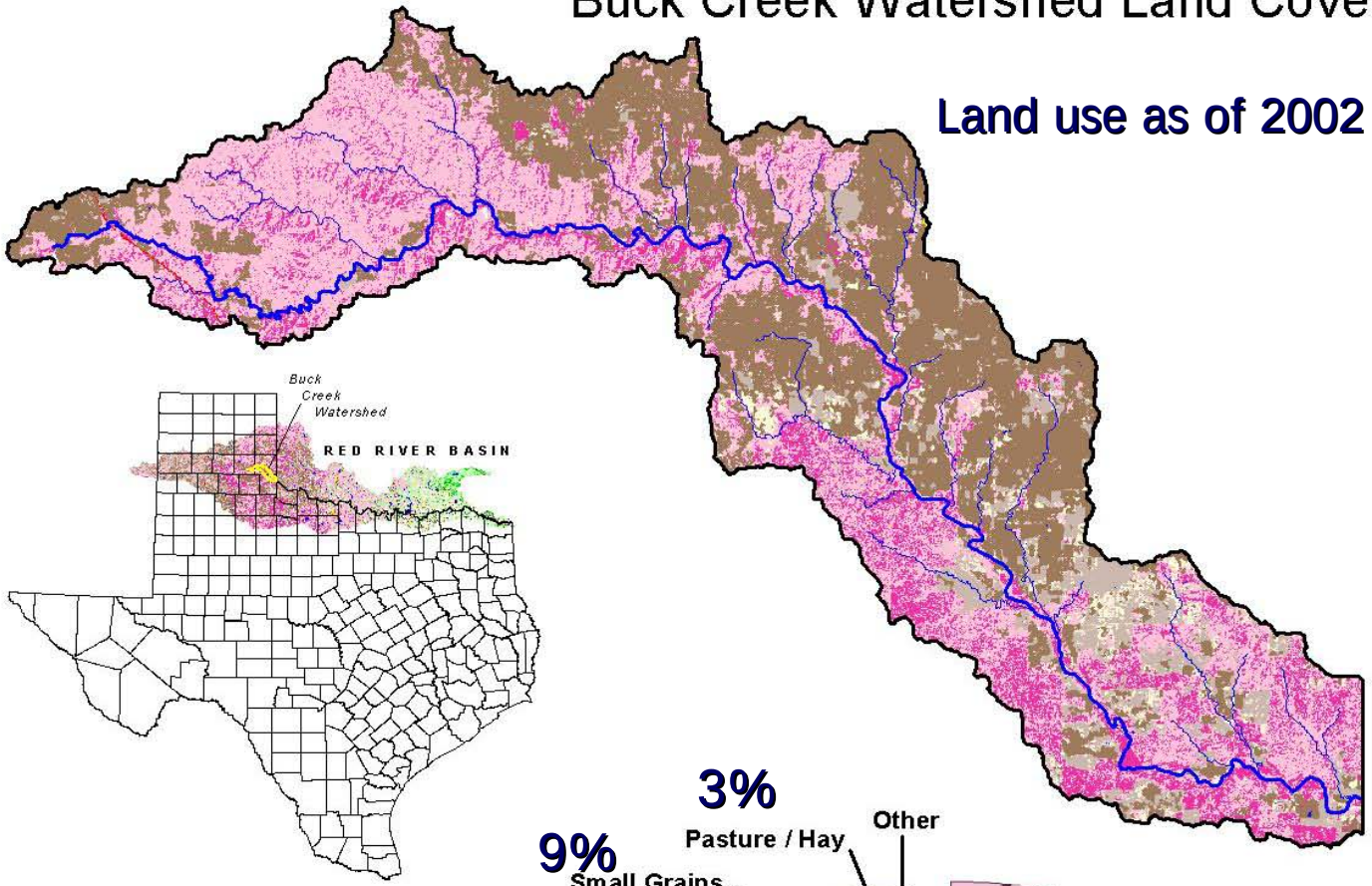
Texas Statewide Mapping System (TSMS) Projection

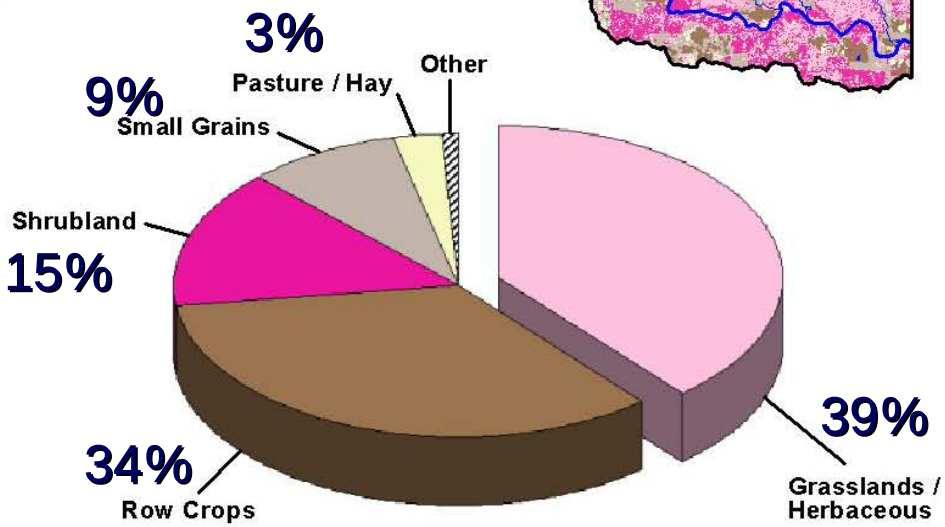
Map Created on May 31, 2002

This map was generated by the Total Maximum Daily Loads Program of the Texas Commission on Environmental Quality. No claims are made to the accuracy or completeness of the data or to its suitability for a particular use. For more information concerning this map, contact William Pugatch, GIS Specialist, TMDL Program, at (512) 239-5559 or send an e-mail to wpugatch@tceq.state.tx.us.

Buck Creek Watershed Land Cover

Land use as of 2002





Land Cover Breakdown

Grasslands / Herbaceous	38.83 %
Row Crops	34.04 %
Shrubland	14.77 %
Small Grains	8.67 %
Pasture / Hay	2.80 %
Bare Rock / Sand / Clay	0.36 %
Low Intensity Residential	0.20 %
High Intensity Residential	0.11 %
Open Water	0.09 %
Commercial / Industrial / Transportation	0.08 %
Deciduous Forest	0.02 %
Evergreen Forest	0.01 %
Mixed Forest	0.01 %
Emergent Herbaceous Wetlands	< 0.01 %

Protecting Texas by Reducing and Preventing Pollution

TCEQ

Texas Commission on Environmental Quality
Total Maximum Daily Load Program (Mail Code 150)
P.O. Box 13087
Austin, Texas 78711-3087

Map Created On September 1, 2002

0 2 4 6 8 Miles

Texas State Mapping System (TSMS) Projection

LEGEND

Source: The streams layers were obtained from the National Hydrography Dataset produced by the United States Geological Survey. The Land Cover layer was obtained from the Source Water Assessment and Protection Team at the TCEQ.

- Buck Creek
- NHD Stream Traces

Land Cover

- Open Water
- Low Intensity Residential
- High Intensity Residential
- Commercial / Industrial / Transportation
- Bare Rock / Sand / Clay
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrubland
- Grasslands / Herbaceous
- Pasture / Hay
- Row Crops
- Small Grains
- Emergent Herbaceous Wetlands

N

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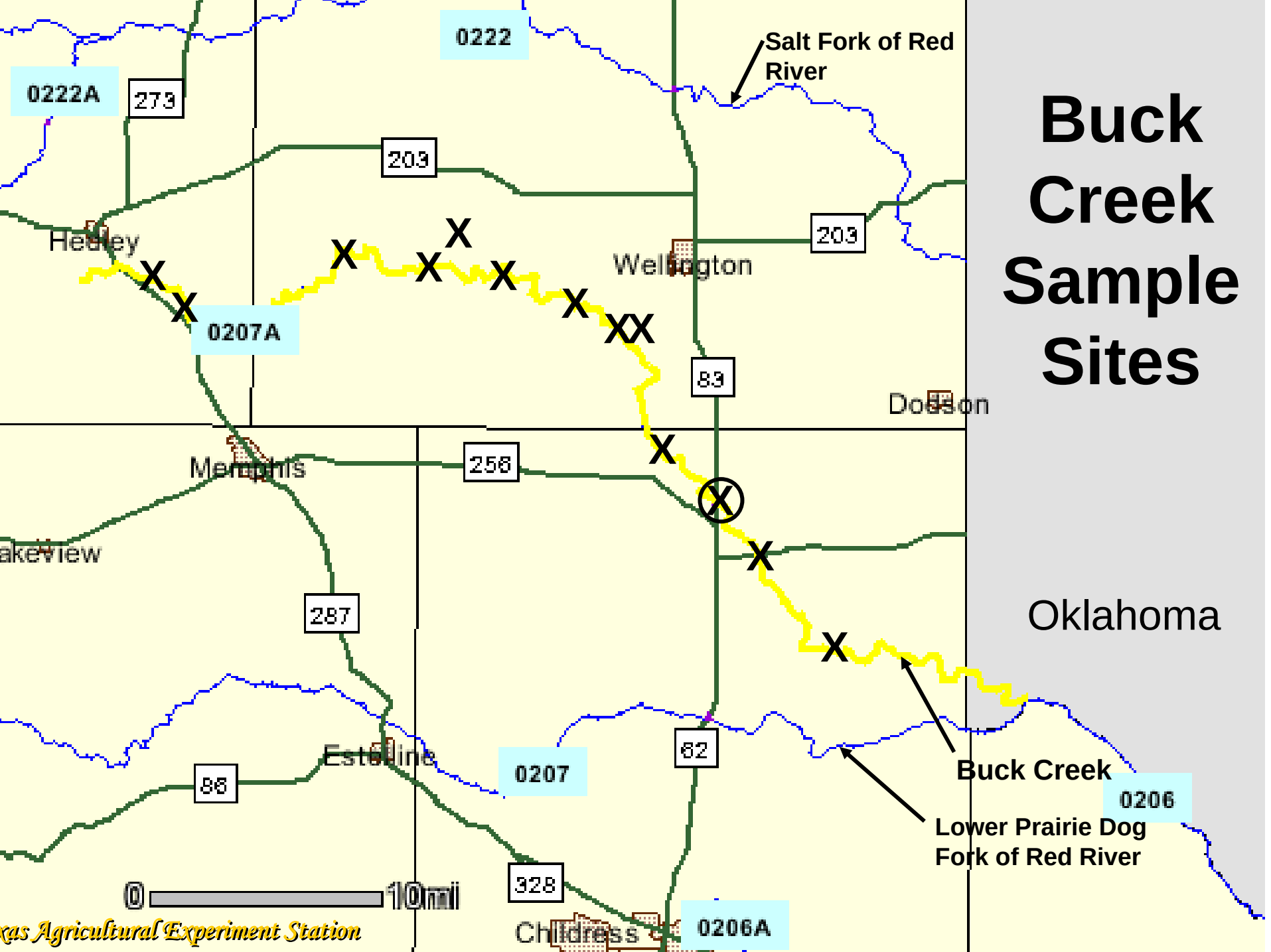
Texas Agricultural Experiment Station


Buck Creek Sample Sites
Salt Fork of Red River
Buck Creek
Lower Prairie Dog Fork of Red River
Oklahoma
0222
0222A
273
203
203
0207A
83
258
287
86
0207
62
0206
328
0206A
Hedley
Wellington
Memphis
Estelline
Childress
0
10mi

Buck Creek Sampling Sites

BC-01 CR 28, Donley County
BC-02 CR 29, CR Z, Donley County
BC-03 CR 40, Collingsworth County
BC-04 SH 1547, Collingsworth County
BC-05 SH 1056, Tributary, Collingsworth County
BC-06 CR 110, Collingsworth County
BC-07 FM 338, Collingsworth County
BC-08 CR SA, Collingsworth County
BC-09 CR SA, House Log Creek, Collingsworth County
BC-10 A, B, C Scrivner Ranch, Childress County
BC-11 HWY 83, Childress County
BC-12 HWY 62, Childress County
BC-13 CR 19, Childress County

Buck Creek Project: GPS of Sites

	Latitude:	North	Longitude:	West	Elevation:
Site 1	34	50' 07.71"	100	36' 38.67"	746m
Site 2	34	48' 54.43"	100	35' 01.58"	720m
Site 3	34	51' 25.47"	100	28' 00.93"	646m
Site 4	34	50' 47.33"	100	23' 57.71"	620m
Site 5	34	51' 50.0"	100	22' 48.1"	617m
Site 6	34	50' 33.04"	100	20' 46.70"	598m
Site 7	34	49' 08.32"	100	16' 39.24"	578m
Site 8	34	47' 27.4"	100	14' 44.6"	589m
Site 9	34	47' 26.8"	100	14' 21.0"	570m
Site 10	34	43' 46.4"	100	13' 41.0"	540m
Site 11	34	42' 08.6"	100	11' 19.5"	529m
Site 12	34	40' 09.6"	100	9' 25.1"	519m
Site 13	34	36' 39.9"	100	06' 39.4"	497m

Texas Commission on Environmental Quality (TCEQ) – Clean Rivers Program

- In 1991, CRP was implemented to maintain and improve the quality of surface water resources within each river basin in Texas.
- CRP requires that water quality assessments be conducted for each river basin in Texas using an approach that integrates water quality issues within a river basin or watershed. Assessment at 5 year intervals.

Conclusions made by TCEQ

- **Requires that water quality in Buck Creek be suitable for fishing, swimming, wading, and a healthy aquatic ecosystem.**
- **Testing found that bacteria levels are sometimes elevated in the creek. Bacteria from human and animal waste may indicate the presence of disease-causing microorganisms that pose a threat to public health.**
- **People swimming or wading in the creek may be at risk.**

2002 Assessment Data for Buck Creek

Samples taken from 1 site over a five-year period for TCEQ by Red River Authority, as part of the Clean Rivers Program

Assessment Method	# of samples	# of exceedances	Geometric mean
E. coli single sample	14	3	
E. coli geometric mean	14		156
Fecal coliform single sample	20	8	
Fecal coliform geometric mean	20		240

Texas State Soil and Water Conservation Board

- Felt current data were not sufficient to provide conclusive evidence of a persistent impairment; rather, it suggests a temporal recurring phenomenon
- Recommended encouragement of public participation, establishment of targeted monitoring, and an educational outreach program
- Selected TAES-Vernon to conduct the three year study

Buck Creek Water Quality Sampling / Assessment Project

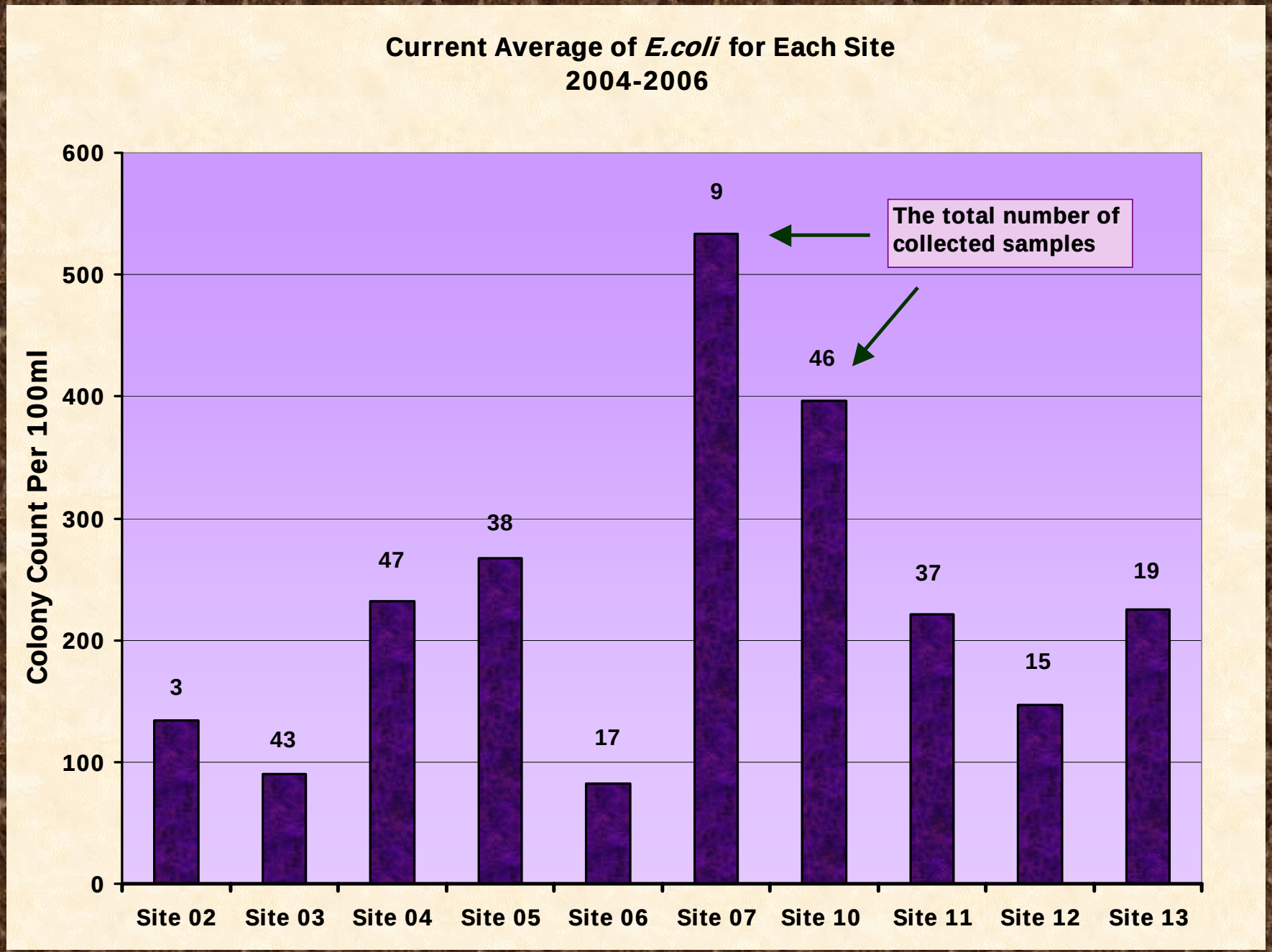
Where we are:

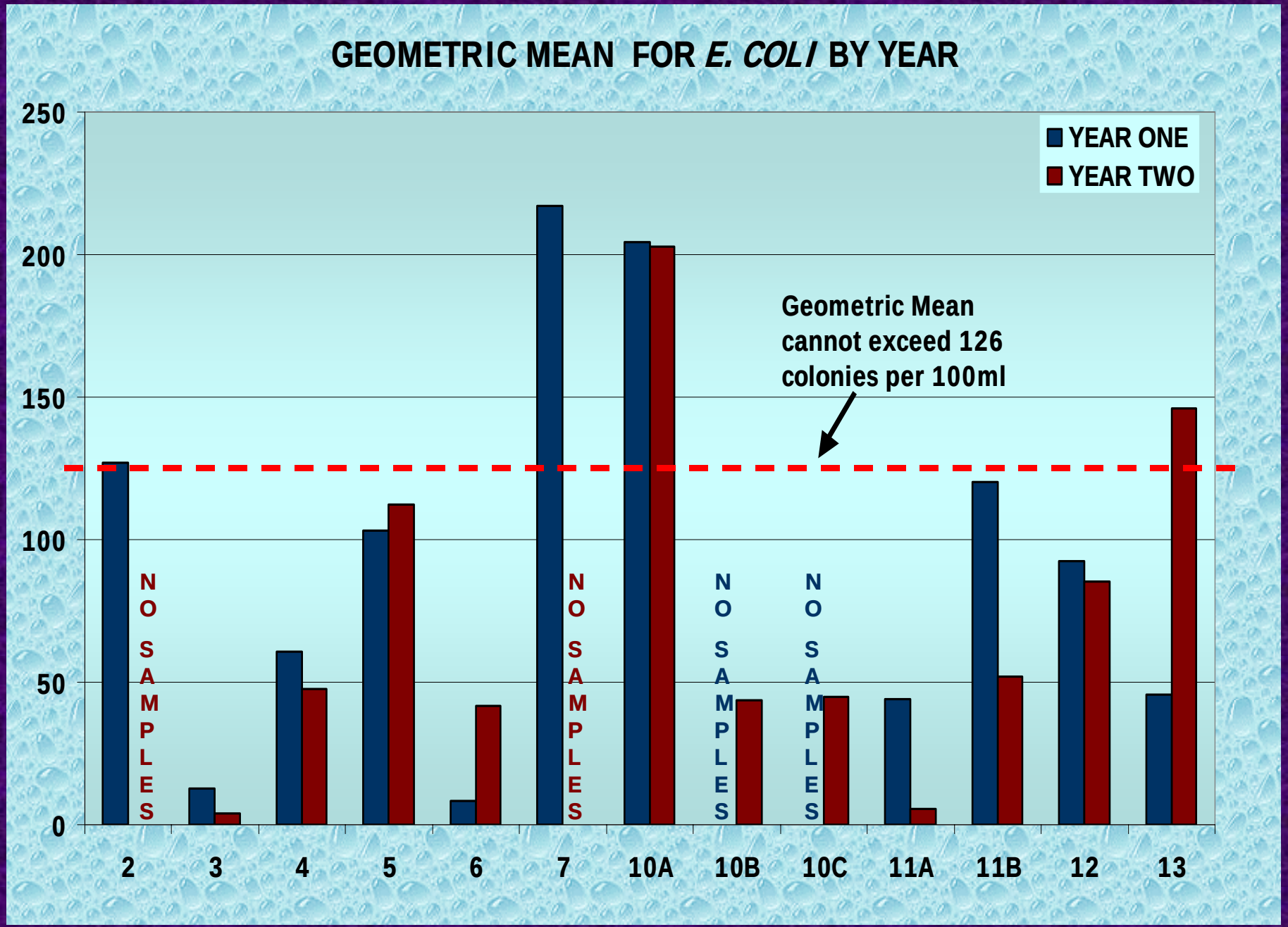
Phase 1

- ✓ Monitor Buck Creek by in-stream sampling bi-weekly to reveal extent of impairment
- ✓ Hold Stakeholders and educational meetings to give update on status
- ✓ Preparation of Final Report
- ✓ Conclude Phase 1 with presentation of Final Report to Stakeholders

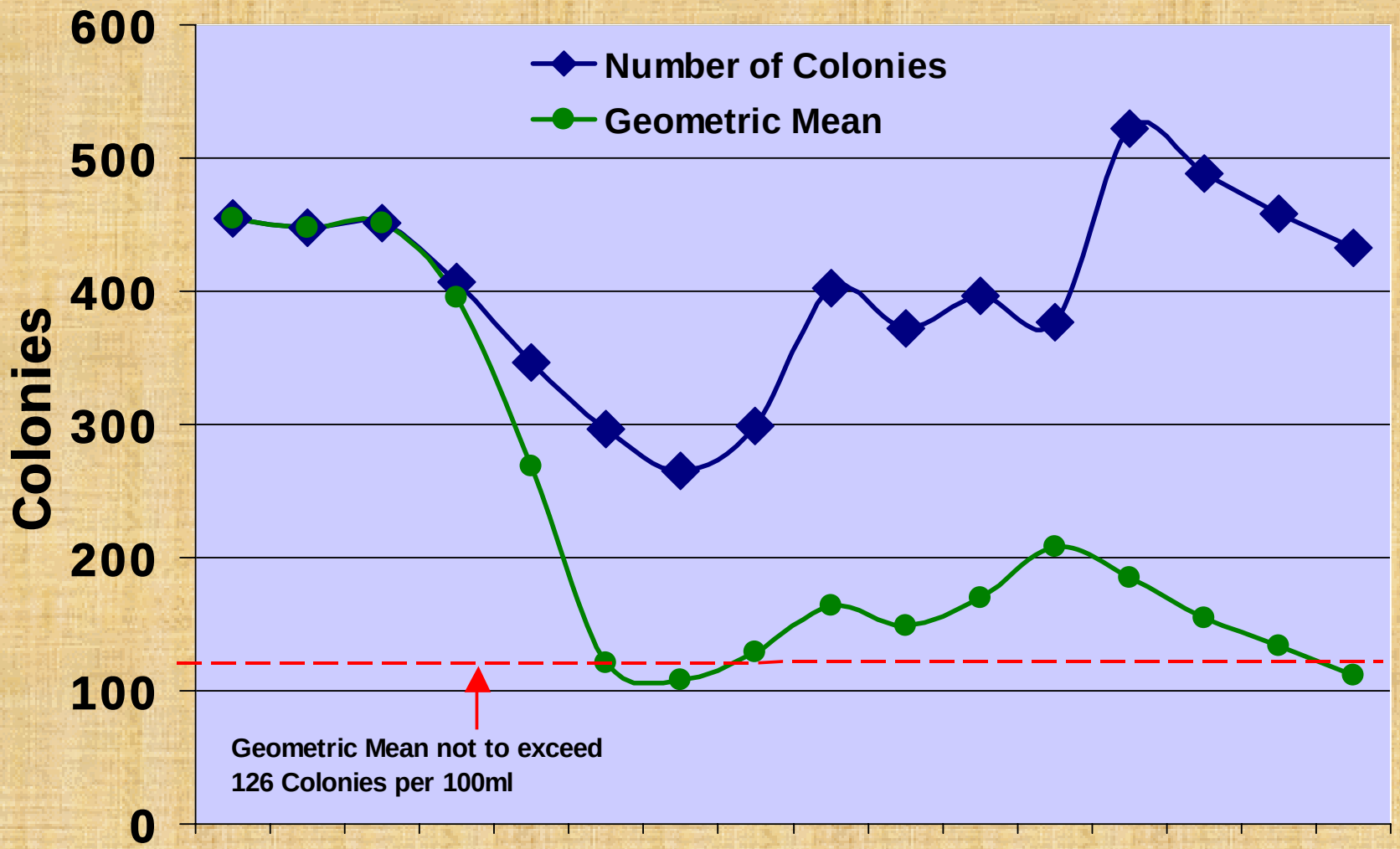
Project Overview:

- May 2004- Biweekly sampling when flowing water present
- November 2005- one year extension of current project with no additional funding
- Request to add two sites- for further study of an anomaly
- January 2006- Proposal to TSSWCB for Phase II: BST and Watershed Plan
- Summer 2006 prepare Final Report
- January 2006 submit Final Report for approval by stakeholders

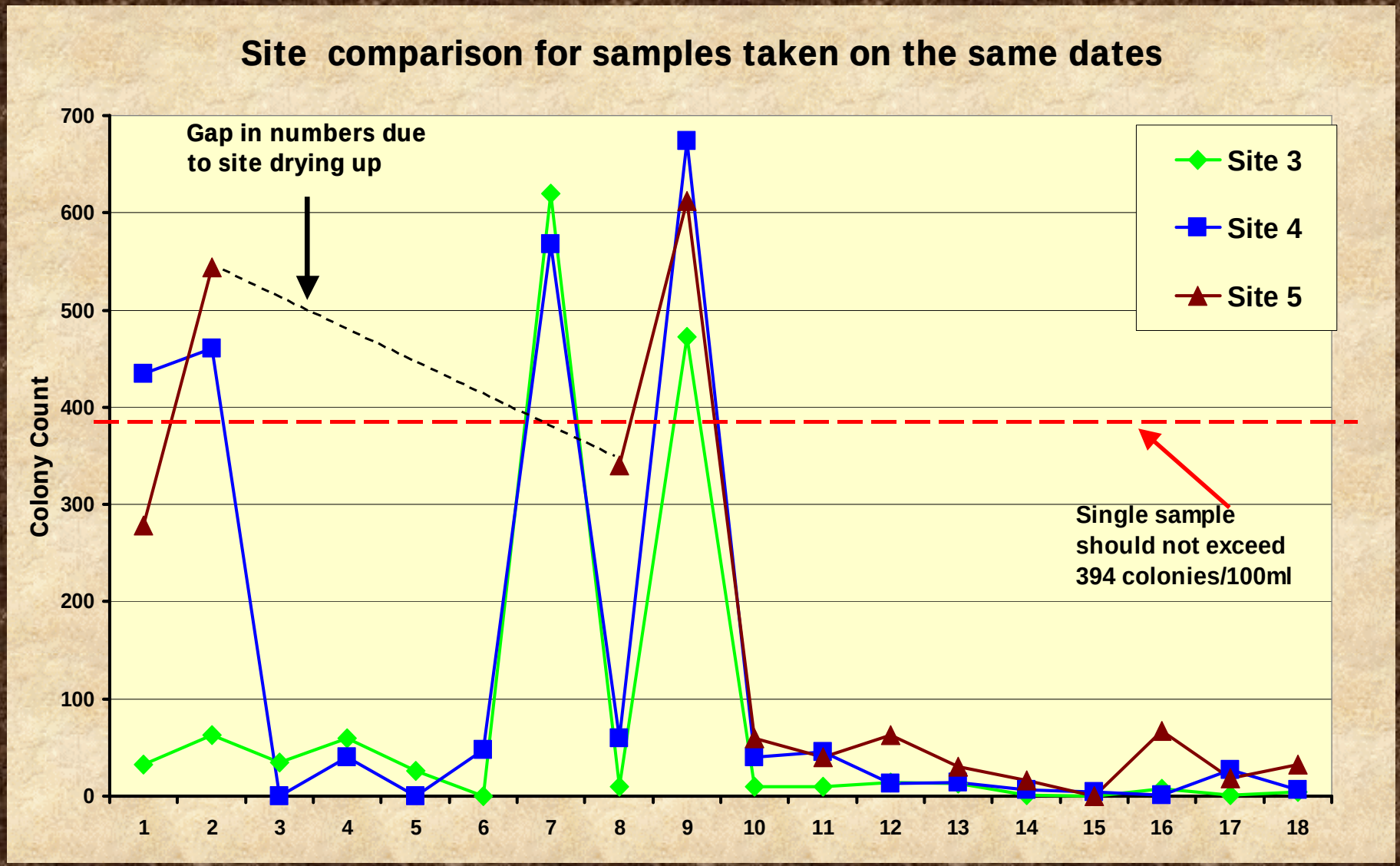

Current Average of *E.coli* for Each Site
2004-2006
Colony Count Per 100ml
600
500
400
300
200
100
0
3
43
47
38
17
9
46
37
15
19
The total number of collected samples
Site 02
Site 03
Site 04
Site 05
Site 06
Site 07
Site 10
Site 11
Site 12
Site 13

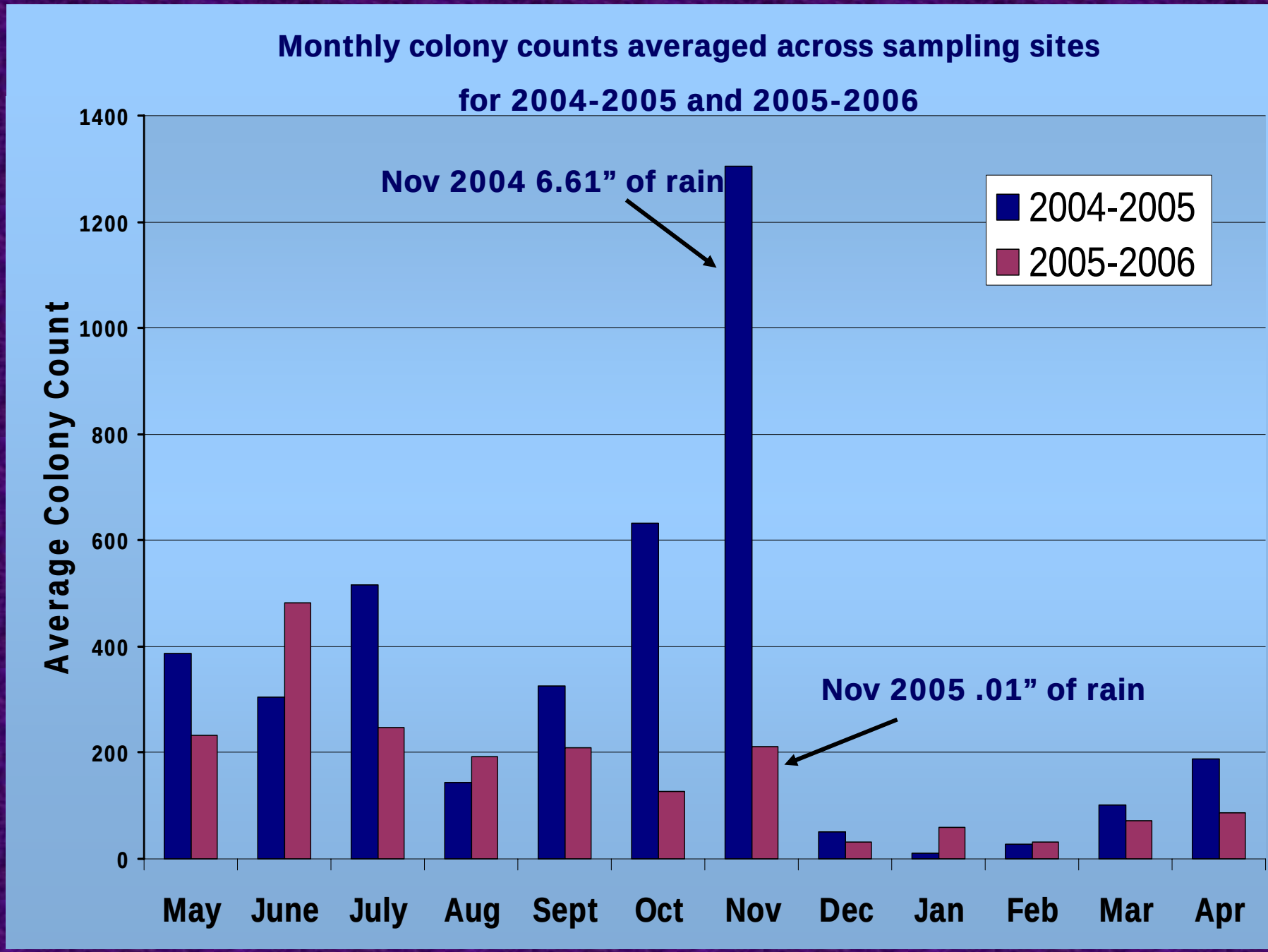

GEOMETRIC MEAN FOR E. COLI BY YEAR
250
200
150
100
50
0
YEAR ONE
YEAR TWO
Geometric Mean cannot exceed 126 colonies per 100ml
NO SAMPLES
NO SAMPLES
NO SAMPLES
NO SAMPLES
2
3
4
5
6
7
10A
10B
10C
11A
11B
12
13

SITE A: From May 2004 Through January 2005

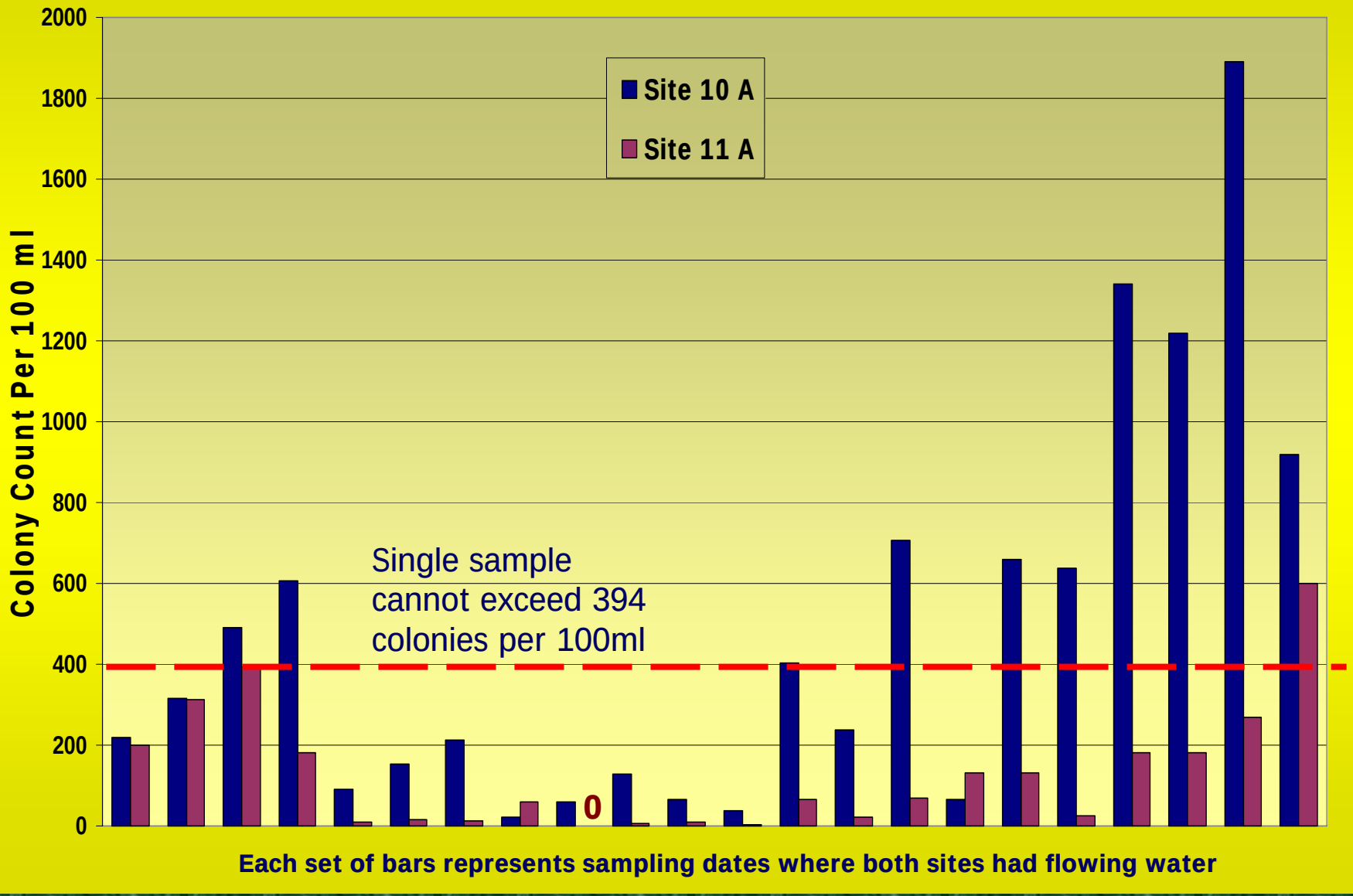


Counts between sites can vary greatly even on same day. These three sites are within 6 miles of each other.

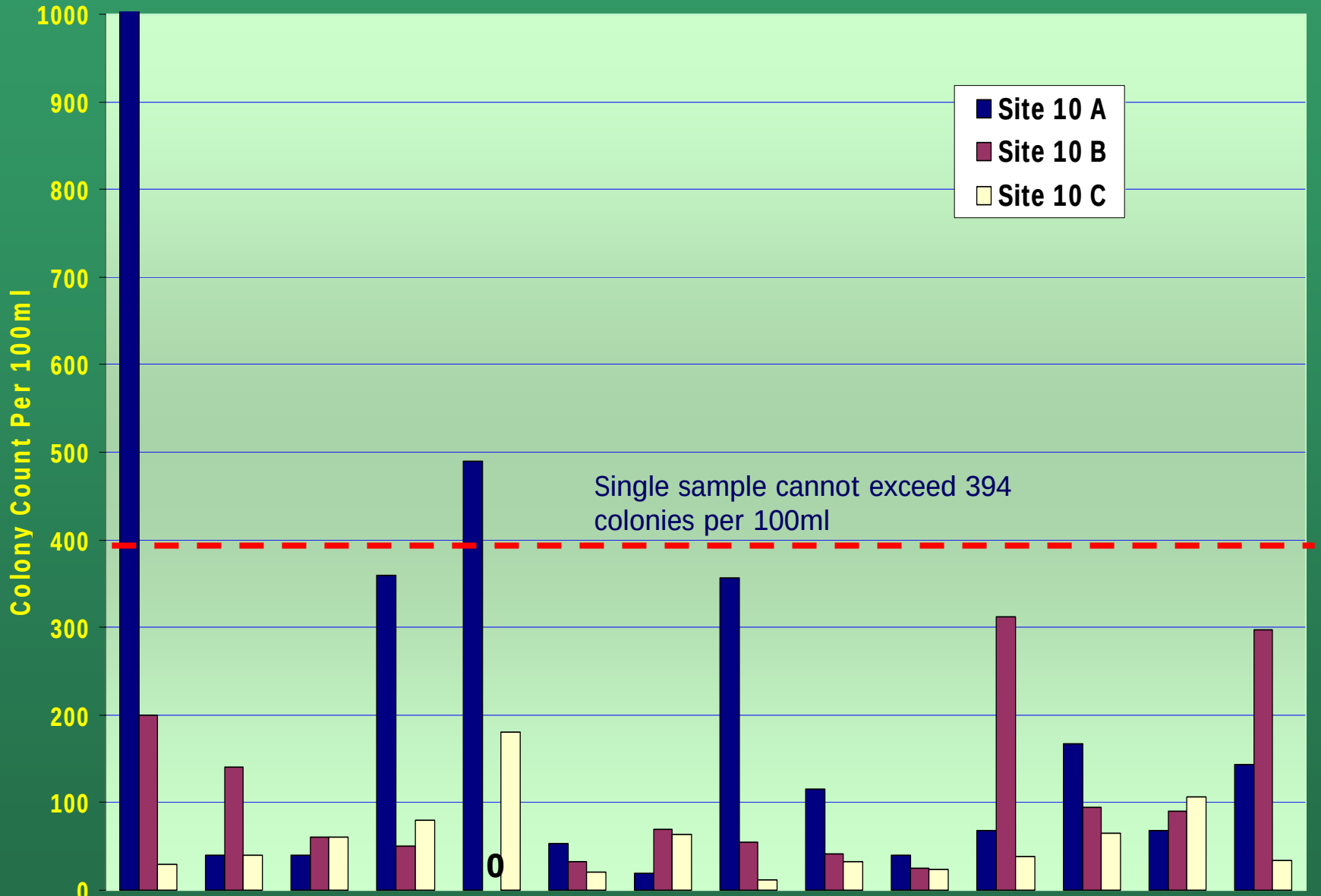


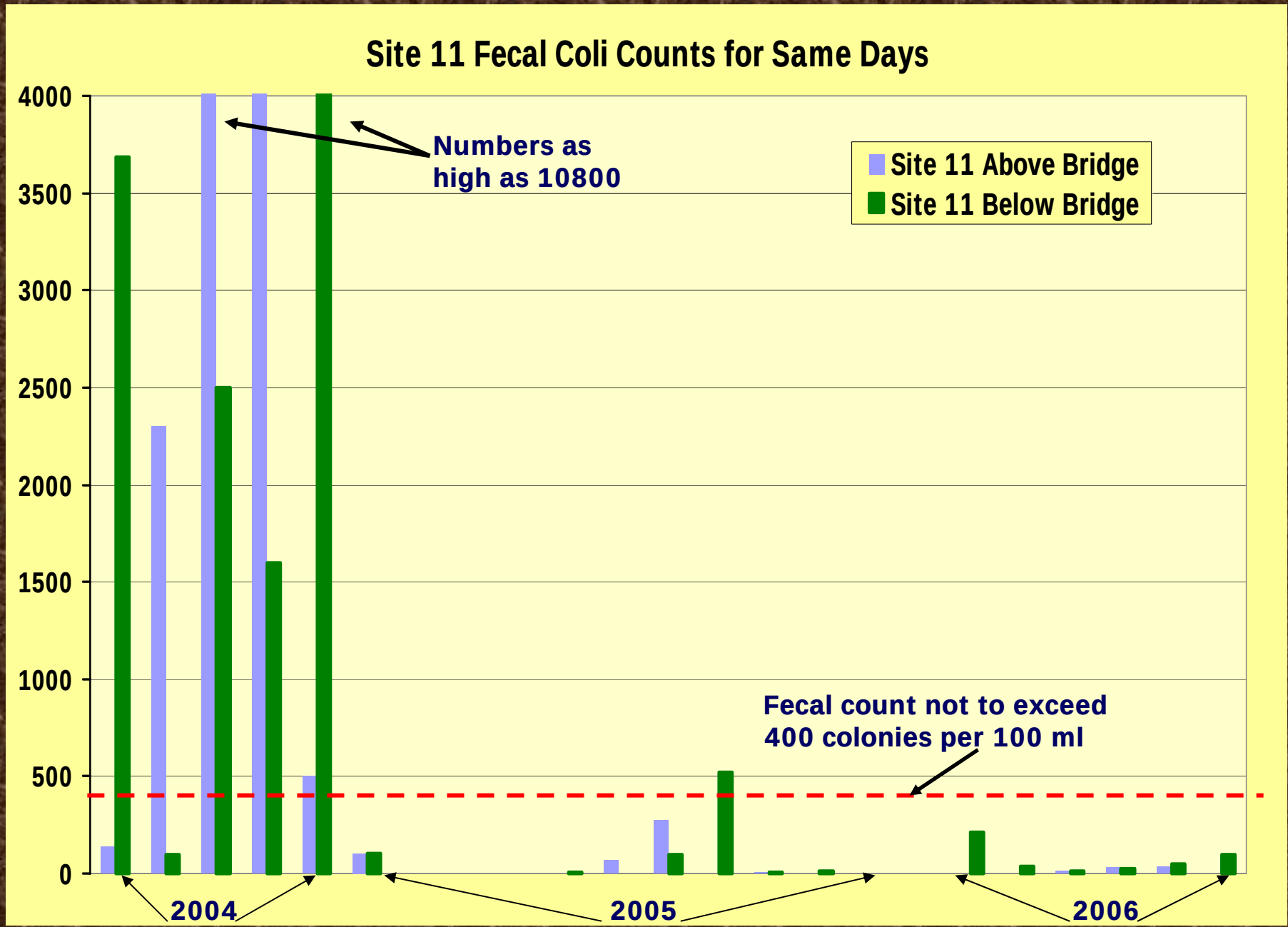

Monthly colony counts averaged across sampling sites
for 2004-2005 and 2005-2006
Average Colony Count
1400
1200
1000
800
600
400
200
0
Nov 2004 6.61" of rain
Nov 2005 .01" of rain
2004-2005
2005-2006
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr

Site Comparison for Anomaly



Colony counts vary but have been acceptable when exiting the Ranch




Site 11 Fecal Coli Counts for Same Days
4000
3500
3000
2500
2000
1500
1000
500
0
Numbers as high as 10800
Site 11 Above Bridge
Site 11 Below Bridge
Fecal count not to exceed 400 colonies per 100 ml
2004
2005
2006

Buck Creek Water Quality Sampling / Assessment Project

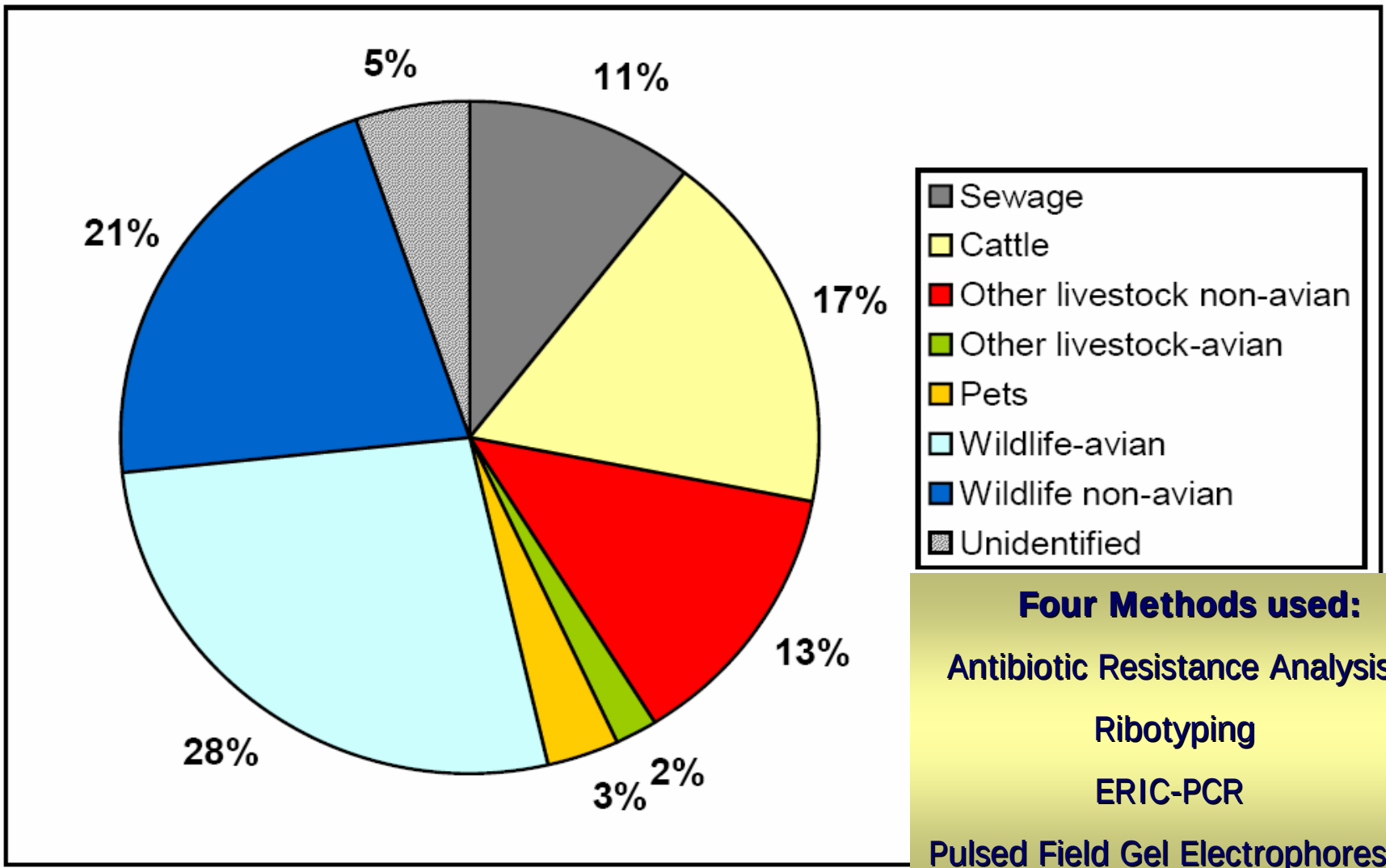
What is next:

Phase 2 Proposal has been submitted to TSSWCB for USEPA funding for:

- **B**acterial **S**ource **T**racking- **September 2006 fecal samples will be collected in the watershed for 6-8 months to identify bacterial contributors**
- **Education of stakeholders and Demonstration of B**est **M**anagement **P**ractices **for both wildlife and livestock to ensure protection of the watershed**
- **Development of a W**atershed **P**rotection **P**lan **through a stakeholder driven process**

BST Study Contribution Results for Belton Lake and Leon River

(207 *E. coli* Isolates)



Four Methods used:

Antibiotic Resistance Analysis

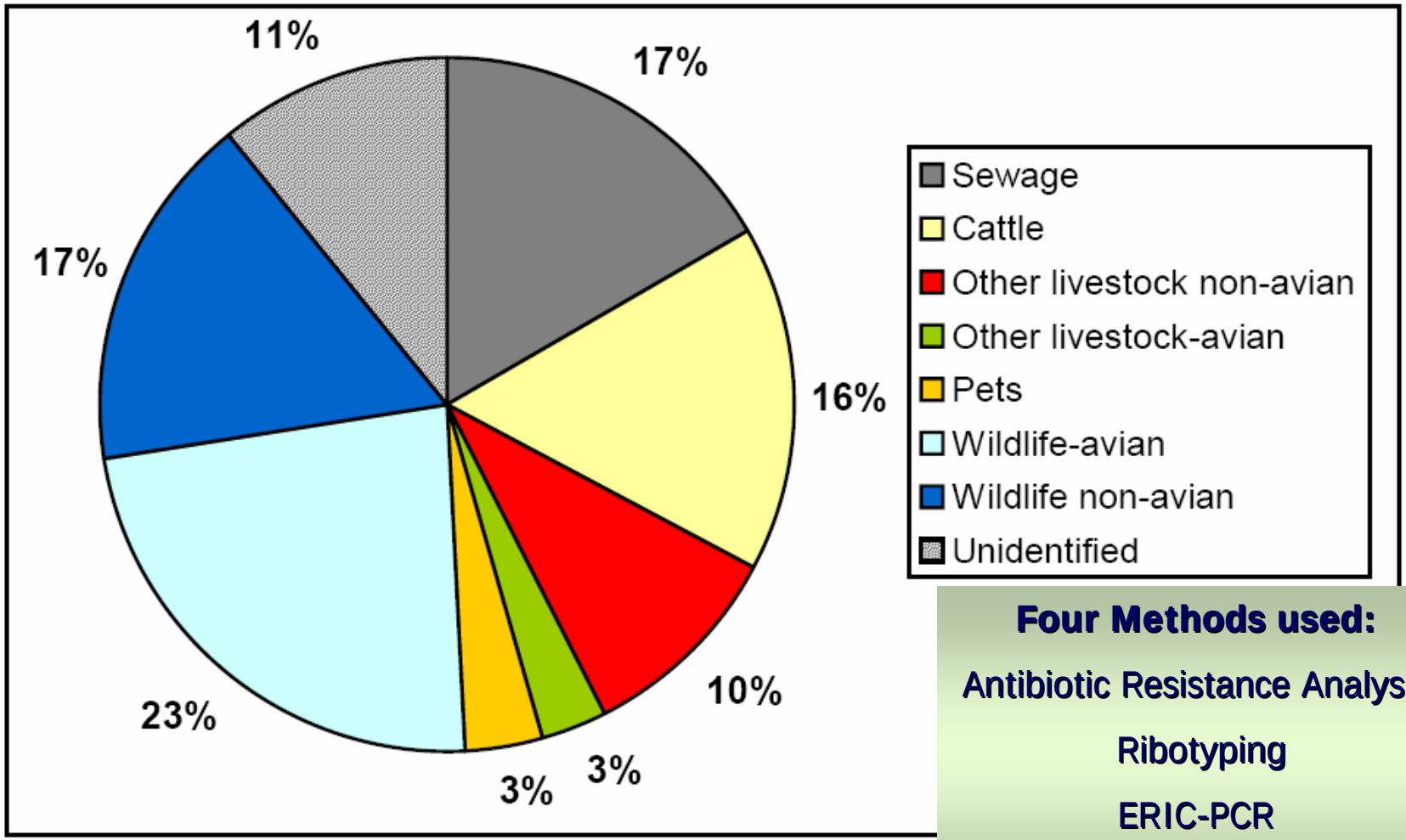
Ribotyping

ERIC-PCR

Pulsed Field Gel Electrophoresis

BST Study Contribution Results from Lake Waco and North Bosque River

(348 *E. coli* Isolates)



Four Methods used:

Antibiotic Resistance Analysis

Ribotyping

ERIC-PCR

PF Gel Electrophoresis

Potential Contributors to Bacterial Impairment

Texas Agricultural Experiment Station

Potential Contributors to Bacterial Impairment

Contact Information:

- **Buck Creek:** http://twri.tamu.edu/buckcreek
- **TAES- Vernon:** http://juniper.tamu.edu
- **TWRI:** http://twri.tamu.edu
- **Dr John Sij: Project Leader**
  (940)552-9941 x 232
- **Phyllis Dyer: Research Technician**
  (940)552-9941 x 209

Site 3: January 2006

Thank you for your continued support!!
Texas Agricultural Experiment Station
Site 10C August 2006