



SAN ANTONIO
RIVER AUTHORITY

Bacterial Source Tracking

Friday, March 29, 2019

COMMITTED TO SAFE, CLEAN, ENJOYABLE CREEKS AND RIVERS

Why Bacterial Source Tracking (BST)?

- Working Hypothesis...
 - Agricultural impact in rural waterways
 - Human impact in urban waterways
- Shift in thought?



San Antonio River – Brackenridge Park



Why BST?



To better understand the sources of bacterial loading contributing to the impairments throughout the San Antonio River watershed with current focus on Brackenridge Park and San Pedro Creek



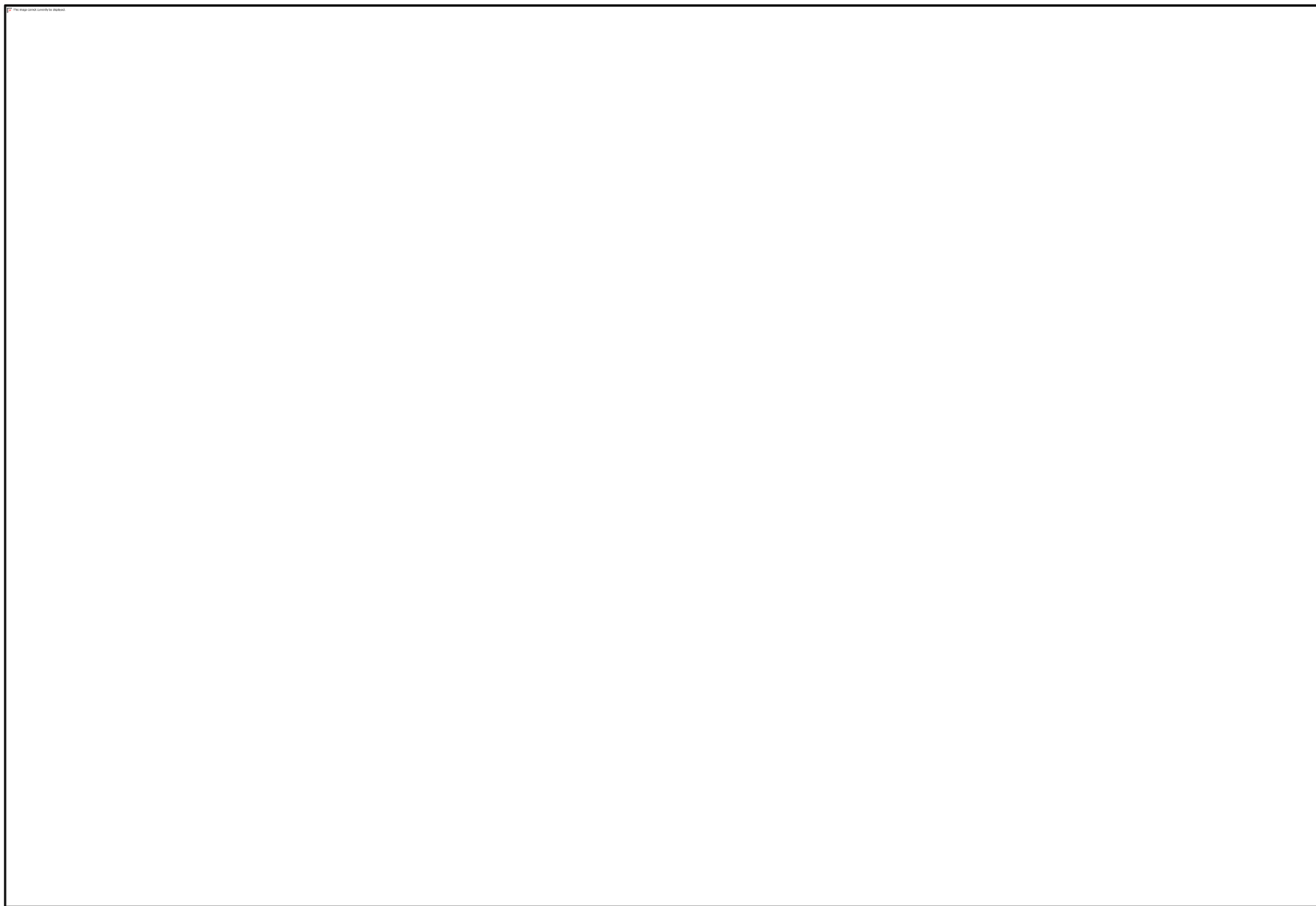
Phase V – Brackenridge Park

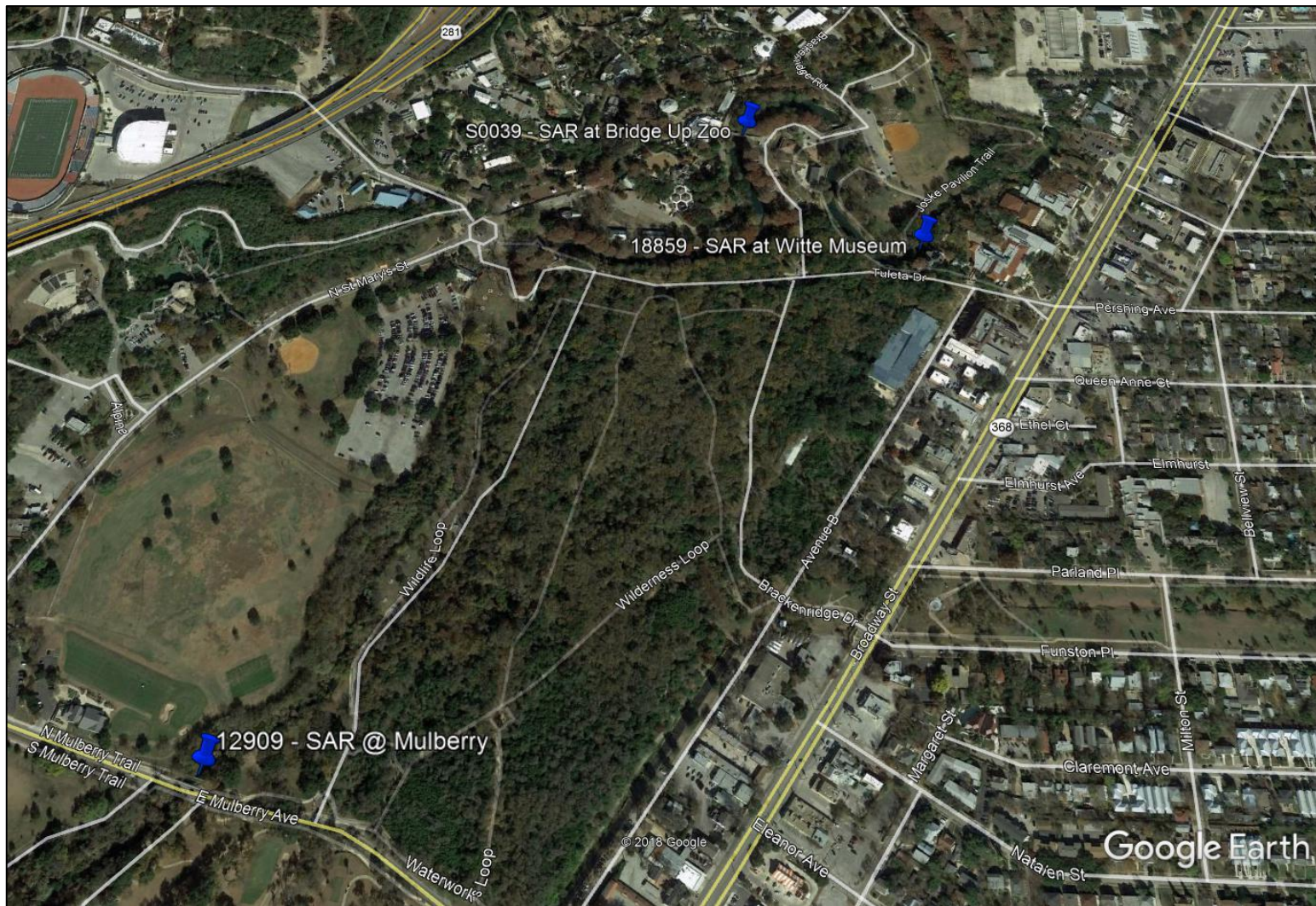
Station ID	Site Description	Ambient Samples		Stormwater Samples	
		Rookery ¹	Non-Rookery ²	Rookery ¹	Non-Rookery ²
TCEQ_18859	SAR at Witte Museum	1	1	1	1
SARA_S0039	SAR at Bridge Upstream of Zoo	1	1	1	1
TCEQ_12909	SAR at Mulberry	1	1	1	1
SARA_S0069	San Pedro Creek Downstream Tunnel Inlet	1	1	1	1

1 – Anticipated between November 2018-March 2019

2 – Anticipated after March 2019









Initial Sample Results

Station ID	Site Description	December 3, 2018	
		<i>E. coli</i> ¹	Flow ²
TCEQ_18859	SAR at Witte Museum	39	74
SARA_S0039	SAR at Bridge Upstream of Zoo	110	74
TCEQ_12909	SAR at Mulberry	152	69
SARA_S0069	San Pedro Creek Downstream Tunnel Inlet	216	5.4

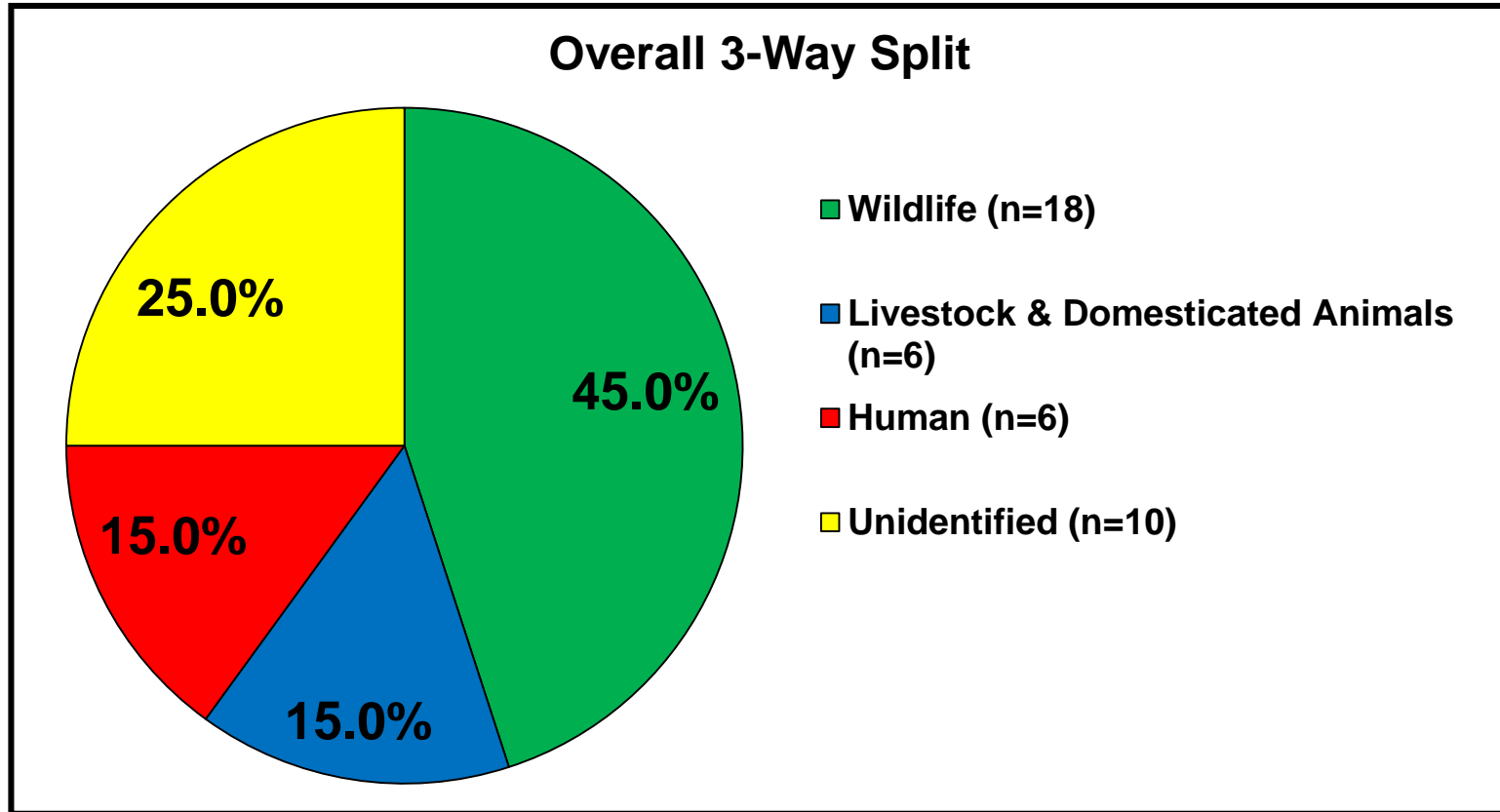
1 – *E. coli* reported in cfu/100 mL

Primary contact recreation standard of 126 cfu/100 mL

2 – Flow reported in cubic feet/second (cfs)



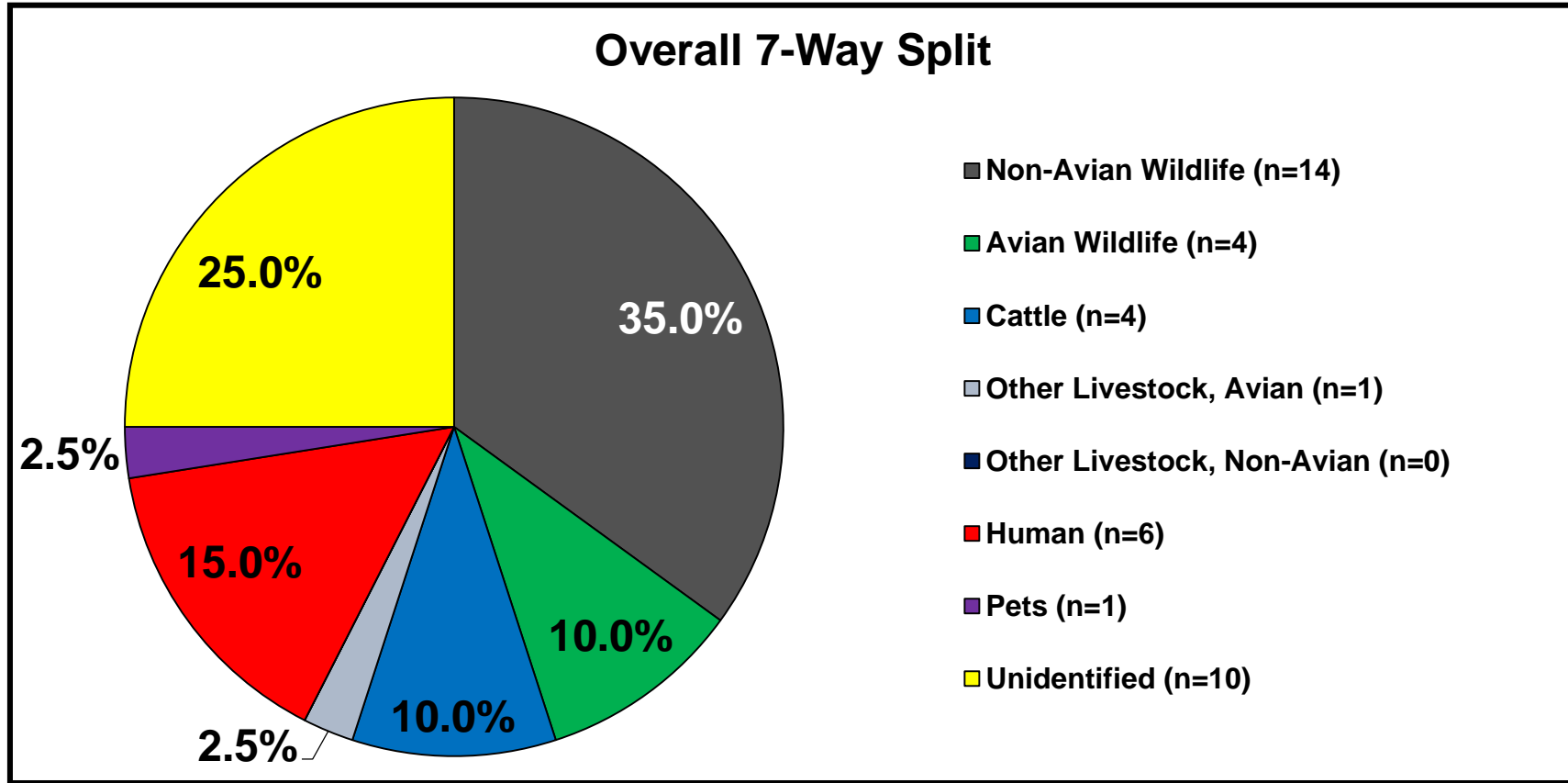
Phase 5 Results



Source classification of *E. coli* isolates (n=40) from 4 samples



Phase 5 Results



Source classification of *E. coli* isolates (n=40) from 4 samples



County Wide Results: 3-Way Split

County	# of Sites	# of Isolates	Wildlife	Livestock & Domesticated	Human	Unidentified
Bexar	10	341	53.7%	23.5%	5.6%	17.3%
Wilson	3	158	52.5%	29.8%	1.9%	15.8%
Karnes	8	336	53.0%	27.4%	7.1%	12.5%
Goliad	2	122	55.7%	30.3%	5.7%	8.2%

Source classification of *E. coli* isolates (n=957) from 94 samples



County Wide Results: 7-Way Split

County	# of Sites	# of Isolates	Non-Avian Wildlife	Avian Wildlife	Cattle	Avian Livestock	Other NA Livestock	Human	Pets	UID
Bexar	10	341	41.9%	11.7%	10.0%	6.7%	4.4%	5.6%	2.4%	17.3%
Wilson	3	158	38.6%	13.9%	5.1%	5.7%	7.6%	1.9%	11.4%	15.8%
Karnes	8	336	37.2%	15.8%	11.0%	7.1%	7.7%	7.1%	1.5%	12.5%
Goliad	2	122	44.3%	11.5%	9.0%	4.9%	8.2%	5.7%	8.2%	8.2%

Source classification of *E. coli* isolates (n=957) from 94 samples



Future of Phase V

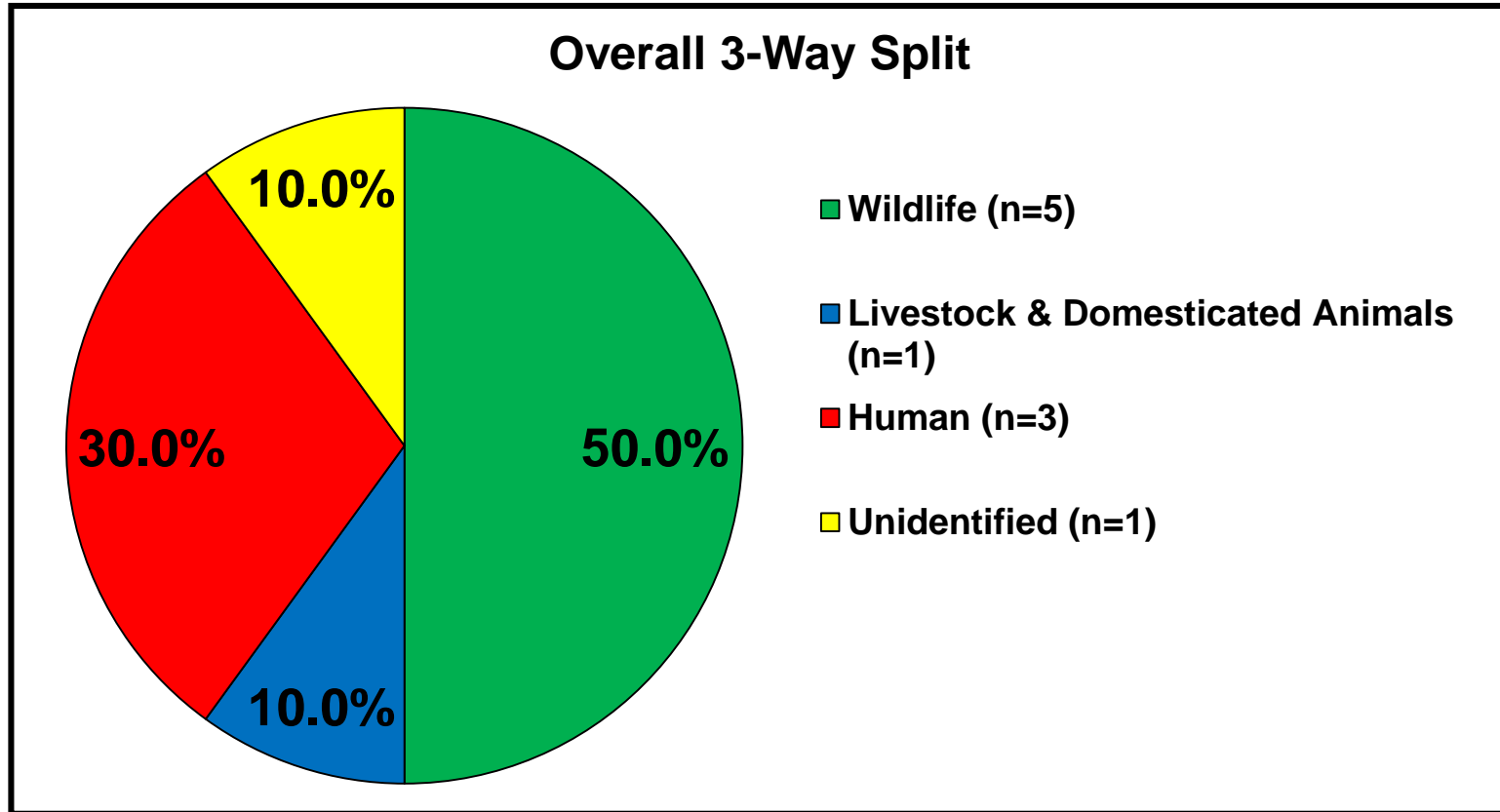
- Added station TCEQ_20117 – San Pedro Creek at Croft Trace
 - Intent to capture upstream affect of *E. coli* levels in the SPC Culture Park to identify relationship
- No stormwater samples to date
- Ambient rookery sample scheduled for late April



Questions?



SAR at Witte Museum



Source classification of *E. coli* isolates (n=10) from 1 sample

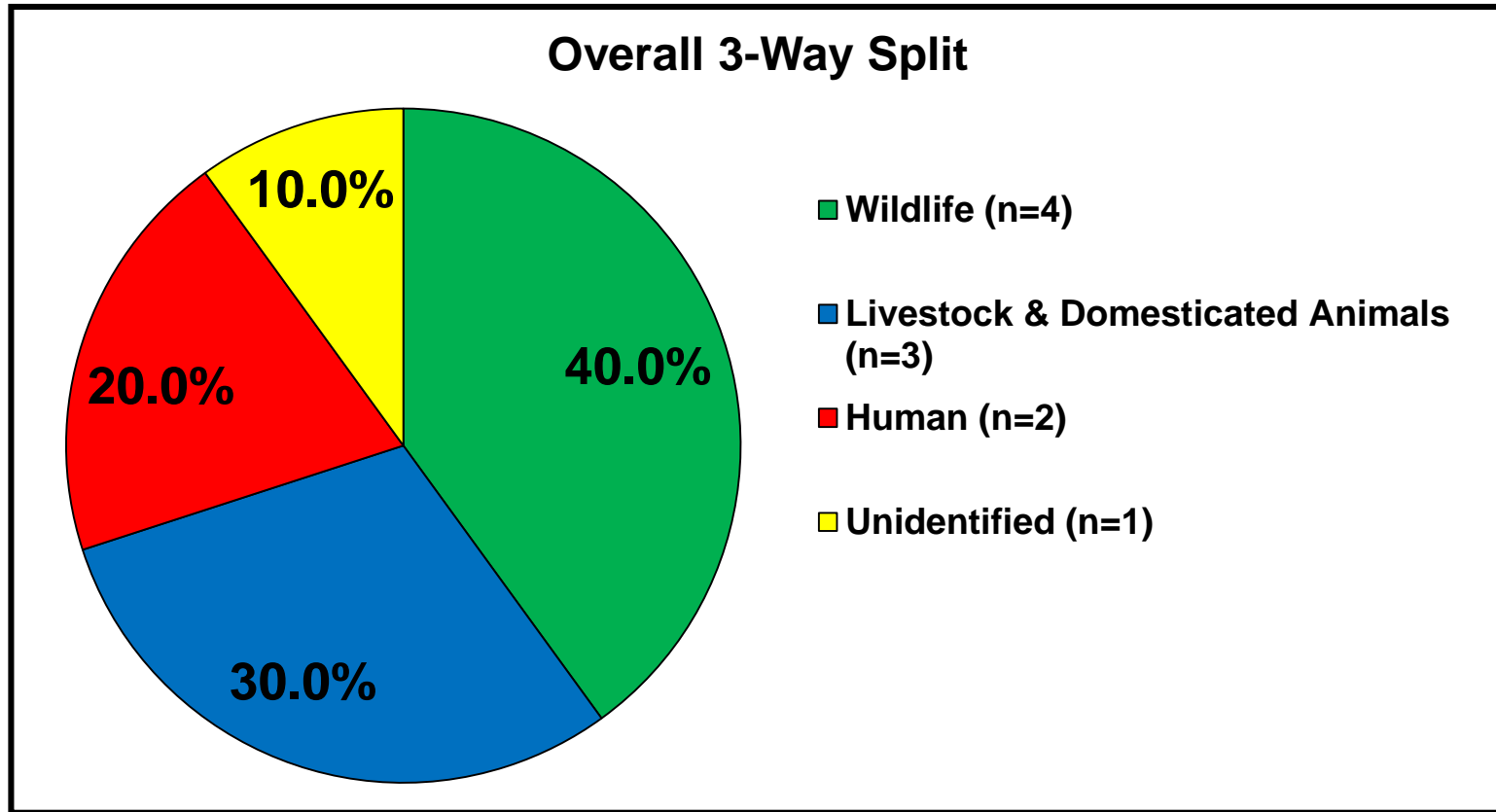


SAR at Witte Museum

3-Way ID	7-Way ID	Source of Closest Match
Humans	Humans	Human
Domesticated Animals	Cattle	Cattle
Humans	Humans	Sewage
Humans	Humans	Human
Wildlife	Avian Wildlife	Turkey
Wildlife	Non-Avian Wildlife	Opossum
Wildlife	Non-Avian Wildlife	Opossum
Wildlife	Non-Avian Wildlife	Fox
Unidentified	Unidentified	Raccoon
Wildlife	Avian Wildlife	Pigeon



SAR at Pedestrian Footbridge



Source classification of *E. coli* isolates (n=10) from 1 sample

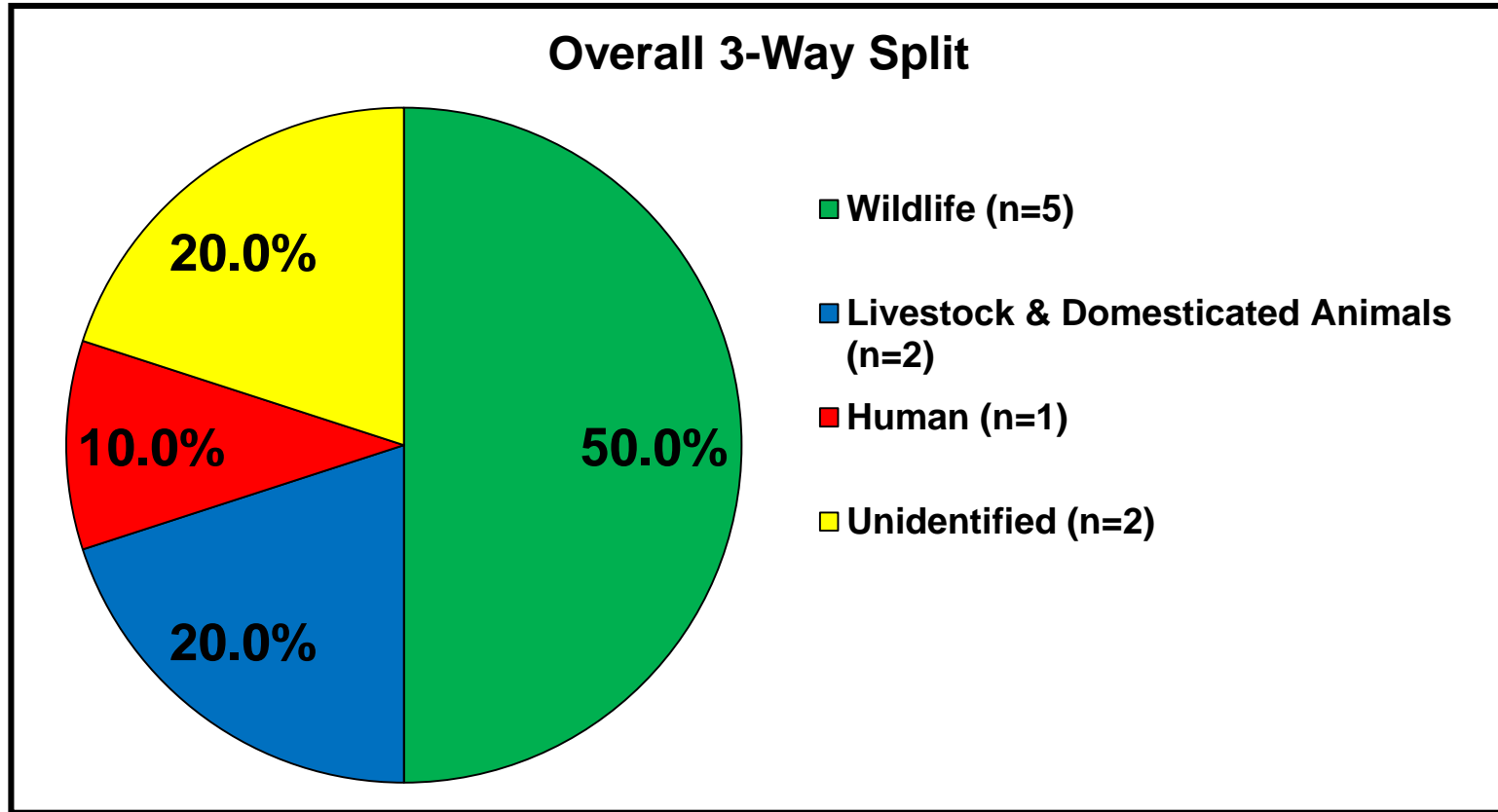


SAR at Pedestrian Footbridge

3-Way ID	7-Way ID	Source of Closest Match
Unidentified	Unidentified	Feral Hog
Domesticated Animals	Cattle	Beef Cattle
Wildlife	Avian Wildlife	Egret
Humans	Humans	Human
Wildlife	Non-Avian Wildlife	Feral Hog
Domesticated Animals	Pets	Dog
Domesticated Animals	Avian Livestock	Poultry, Chicken Litter
Wildlife	Avian Wildlife	Pigeon
Wildlife	Non-Avian Wildlife	Feral Hog
Humans	Humans	Sewage



SAR at Mulberry



Source classification of *E. coli* isolates (n=10) from 1 sample

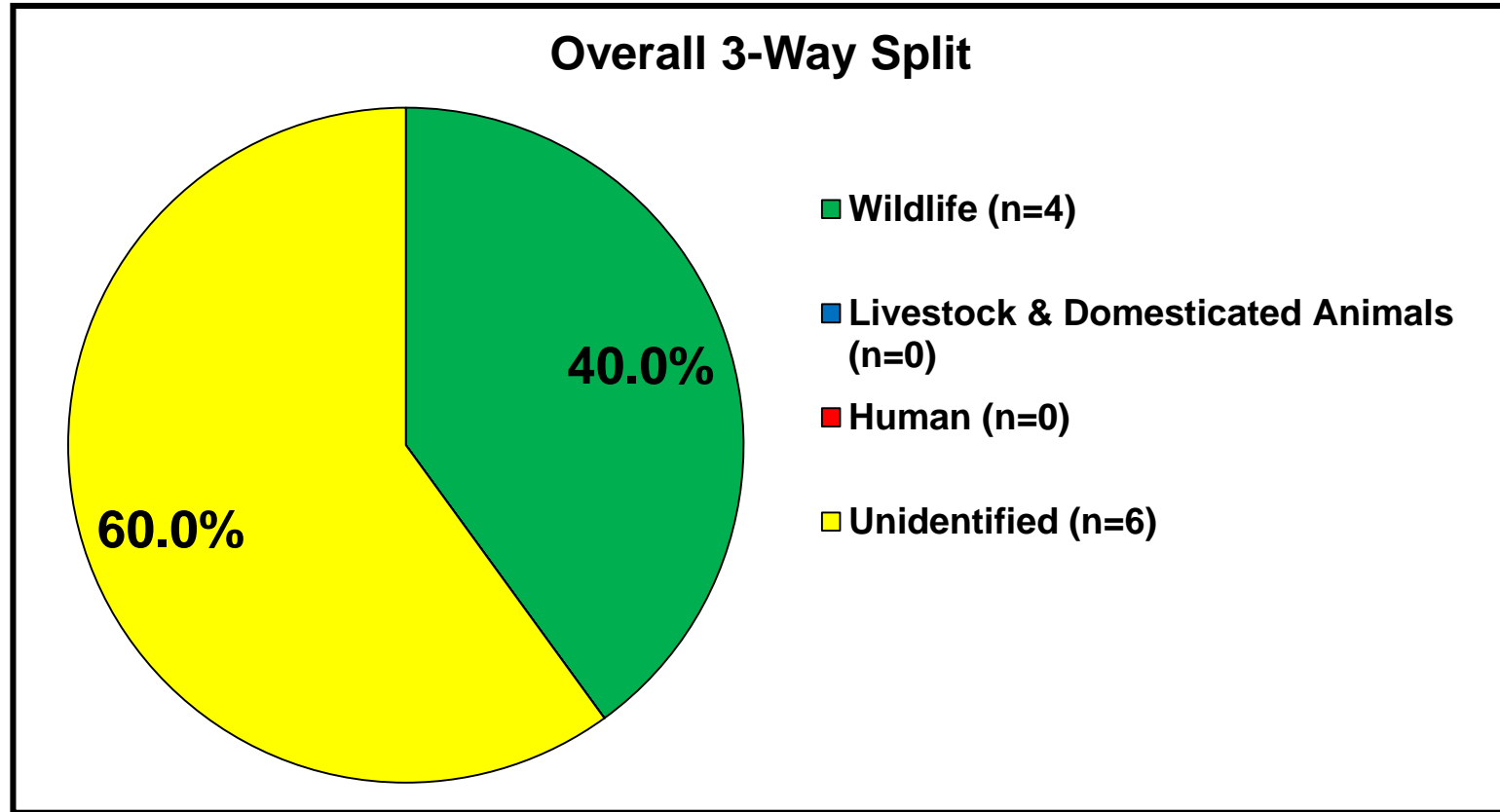


SAR at Mulberry

3-Way ID	7-Way ID	Source of Closest Match
Unidentified	Unidentified	Sewage
Domesticated Animals	Cattle	Cattle
Wildlife	Non-Avian Wildlife	Coyote
Wildlife	Non-Avian Wildlife	Bobcat
Wildlife	Non-Avian Wildlife	Javelina
Domesticated Animals	Cattle	Cattle
Unidentified	Unidentified	Grackle
Humans	Humans	Human
Wildlife	Non-Avian Wildlife	Raccoon
Wildlife	Non-Avian Wildlife	Coyote



San Pedro Creek at SPC Culture Park



Source classification of *E. coli* isolates (n=10) from 1 sample



San Pedro Creek at SPC Culture Park

3-Way ID	7-Way ID	Source of Closest Match
Unidentified	Unidentified	Cattle
Unidentified	Unidentified	Sewage
Unidentified	Unidentified	Cattle
Unidentified	Unidentified	Goose
Unidentified	Unidentified	Pig
Wildlife	Non-Avian Wildlife	Squirrel
Unidentified	Unidentified	Squirrel
Wildlife	Non-Avian Wildlife	Coyote/Fox
Wildlife	Non-Avian Wildlife	Opossum
Wildlife	Non-Avian Wildlife	Javelina

