

**Texas State Soil and Water Conservation Board
Clean Water Act §319(h) Nonpoint Source Grant Program
FY 2021 Workplan 21-12**

SUMMARY PAGE			
Title of Project	Implementing and Tracking Success of Agricultural Management Measures in Four Texas Watersheds		
Project Goals	<ul style="list-style-type: none"> • Implementation of agricultural BMPs in targeted watersheds • Facilitate expanded implementation of agricultural management measures identified in the project area's Watershed Protection Plans • Conduct a digital agricultural demonstration to better illustrate to the agricultural community the value, benefits, and protection that the featured BMPs can have on their land • Coordinate and/or conduct water resources and related environmental outreach/education efforts across the project watersheds 		
Project Tasks	(1) Project Administration; (2) Development and Distribution of Educational Materials; (3) Facilitation and Participation in Education Programs; (4) Demonstration of Stocking Strategies on Forage Production		
Measures of Success	<ul style="list-style-type: none"> • Facilitate and promote watershed protection plan implementation with regard to agricultural management measures • Deliver educational materials to key stakeholders across the four watersheds. • Increase in the number of Conservation Plans and Water Quality Management Plans adopted • Increase watershed stewardship among stakeholders 		
Project Type	Implementation (X); Education (X); Planning (); Assessment (); Groundwater ()		
Status of Waterbody on <i>2020 Texas Integrated Report</i>	<u>Segment ID</u>	<u>Parameter of Impairment or Concern</u>	<u>Category</u>
	0612	Bacteria	5c
	1213A	Bacteria, Nitrate	5b, CS
	1902	Bacteria, Macrobenthic Community, Habitat, Nitrate, Total Phosphorus	5c, CN, CS
	1913	Nitrate, Total Phosphorus	CS
	1209	Bacteria, Nitrate, Total Phosphorus	5a, CN, CS
	1209C	Bacteria, Chlorophyll-a, Nitrate, Total Phosphorus	NS, CS
	1209E	Bacteria	5b
	1209G	Depressed Dissolved Oxygen, Bacteria	CS, CN
	1209H	Bacteria, Depressed Dissolved Oxygen	5c, 5b, CS, NS
	1209I	Bacteria, Depressed Dissolved Oxygen	5b, 5c, CS, NS
	1209J	Bacteria	5c
	1209K	Bacteria	5b
1209L	Bacteria, Nitrate	NS, CS	
Project Location (Statewide or Watershed and County)	Attoyac Bayou: Nacogdoches, San Augustine, Shelby, Rusk Big Elm Creek: Bell, Falls, McLennan, Milam Mid and Lower Cibolo Creek: Bexar, Comal, Guadalupe, Karnes, Wilson Navasota River: Brazos, Grimes, Leon, Limestone, Madison, Robertson		
Key Project Activities	Hire Staff (); Surface Water Quality Monitoring (); Technical Assistance (); Education (X); Implementation (X); BMP Effectiveness Monitoring (); Demonstration (X); Planning (); Modeling (); Bacterial Source Tracking (); Other ()		

2017 Texas NPS Management Program Reference	<ul style="list-style-type: none"> • Component 1 LTG 1, Objectives 1, 3, 6, 7 • STG 2, Objective D • STG 3, Objective A, B, D, G 					
Project Costs	Federal	\$389,101	Non-Federal	\$259,401	Total	\$648,502
Project Management	<ul style="list-style-type: none"> • Texas A&M AgriLife Extension Service, Texas Water Resources Institute 					
Project Period	September 17, 2021 – August 31, 2025					

Part I – Applicant Information

Applicant							
Project Lead	T. Allen Berthold, PhD						
Title	Assistant Director						
Organization	Texas A&M AgriLife Extension Service, Texas Water Resources Institute						
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Street Address	578 John Kimbrough Blvd. 2260 TAMU						
City	College Station	County	Brazos	State	TX	Zip Code	77843
Telephone Number	979-845-2028			Fax Number	979-845-8554		

Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects and TCEQ.
Texas A&M AgriLife Extension Service, Texas Water Resources Institute (TWRI)	TWRI will manage the project, develop and distribute educational resources, participate in in-person education programs, and coordinate the production of a field day and produce it digitally.
Texas A&M AgriLife Research & Extension Center at Overton	Faculty at the Overton Center will assist with the development and distribution of educational materials as well as the production of a digital field day, as a product of their ongoing efforts to provide education on proper grazing practices.

Part II – Project Information

Project Type							
Surface Water	X	Groundwater					
Does the project implement recommendations made in: (a) a completed WPP; (b) an adopted TMDL; (c) an approved I-Plan; (d) a Comprehensive Conservation and Management Plan developed under CWA §320; (e) the <i>Texas Coastal NPS Pollution Control Program</i> ; or (f) the <i>Texas Groundwater Protection Strategy</i> ?				Yes	X	No	
If yes, identify the document.	Attoyac Bayou WPP Mid and Lower Cibolo WPP Navasota River WPP Big Elm Creek WPP						
If yes, identify the agency/group that developed and/or approved the document.	Texas Water Resources Institute		Year Developed	2014 2020 2017 TBD			

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2020 IR	Size (Acres)
Attoyac Bayou	120200050301-307; 401-406; 501	0612	5c	364,481
Big Elm Creek	120702040201-207	1213A	5b, CS	207,106
Mid and Lower Cibolo Creek	12100304202-206; 301-305; 401-405	1913, 1902	5c, CS, CN	377,144
Navasota River	120701030201-204; 0307, 0309; 0401-0407; 0501-0510; 0601-0604; 0701-0707; 0801-0804	1209, 1209C, 1209E, 1209G, 1209H, 1209I, 1209J, 1209K, 1209L	5a, 5b, 5c, CN, CS	1,002,056

Water Quality Impairment

Describe all known causes (i.e., pollutants of concern) and sources (e.g., agricultural, silvicultural) of water quality impairments or concerns from any of the following sources: *2020 Texas Integrated Report*, Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.

Impairments

SegID 0612: Attoyac Bayou: From a point 3.9 km (2.4 mi) downstream of Curry Creek in Nacogdoches/San Augustine County to FM 95 in Rusk County

Parameter	Category	Year
Bacteria	5c	2004

0612_01: From the lower boundary approximately at confluence with Granberry Branch upstream to confluence with Polly Branch

0612_02: From a point immediately upstream of Polly Branch confluence upstream to confluence with Bear Bayou
 0612_03: From a point immediately upstream of Bear Bayou upstream to upper boundary at FM 95

SegID 1213A: Big Elm Creek: From the confluence with Little River in Milam county, 4.5 km northeast of the City of Cameron, upstream to its headwaters in McLennan County, 0.7 km west of Moody

Parameter	Category	Year
Bacteria	5b	2010

1213A_01: Portion of Big Elm Creek from the confluence with the Little River upstream to confluence with Little Elm Creek

SegID 1902: Lower Cibolo Creek: From the confluence with the San Antonio River in Karnes County to a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County

Parameter	Category	Year
Bacteria	5c	2004

1902_01: From the confluence with the San Antonio River in Karnes County upstream to the confluence with Mulifest Creek

1902_02: From the confluence with Mulifest Creek upstream to the confluence with Pulaski Creek
 1902_03: From the confluence with Pulaski Creek upstream to the confluence with Clifton Branch

SegID 1209: Navasota River Below Lake Limestone: From the confluence with the Brazos River in Grimes County to Sterling C. Robertson Dam in Leon/Robertson County

Parameter	Category	Year
Bacteria	5a	2002

1209_05: Portion of Navasota River from the confluence with Camp Creek upstream to Lake Limestone Dam in Robertson County

SegID 1209E: Wickson Creek: Perennial stream from the confluence with an unnamed first order tributary (approximately 1.3 km upstream of Reliance Road crossing) upstream to the confluence with an unnamed first order tributary approximately 15 meters upstream of Dilly Shaw Road

Parameter	Category	Year
Bacteria	5b	2006

1209E_01: Perennial stream from the confluence with an unnamed first order tributary (approximately 1.3 km upstream of Reliance Road crossing) upstream to the confluence with an unnamed first order tributary approximately 15 meters upstream of Dilly Shaw Road

SegID 1209H: Duck Creek: From the confluence with the Navasota river in Robertson County to Twin Oak Reservoir dam in Robertson County

Parameter	Category	Year
Bacteria	5c	2006
Depressed Dissolved Oxygen	5b	2012

1209H_01: Portion of Duck Creek from confluence with Navasota River upstream to confluence with Mineral Creek in Robertson County

1209H_02: Portion of Duck Creek from confluence with Mineral Creek in Robertson County upstream to Twin Oak Reservoir dam in Robertson County

SegID 1209I: Gibbons Creek: From confluence with Navasota River in Grimes County to SH 90 in Grimes County

Parameter	Category	Year
Bacteria	5b	2002
Depressed Dissolved Oxygen	5c	2016

1209I_01: Portion of Gibbons Creek from confluence with Navasota River upstream to confluence with Dry Creek in Grimes County

1209I_02: Portion of Gibbons Creek from confluence with Dry Creek upstream to Gibbons Creek Reservoir dam in Grimes County

SegID 1209J: Shepherd Creek: From the confluence with Navasota River in Madison County to a point 0.7 mi upstream of FM 1452 in Madison County

Parameter	Category	Year
Bacteria	5c	2002

1209I_01: From the confluence with the Navasota River in Madison County to a point 0.7 mi upstream of FM 1452 in Madison County

SegID 1209K: Steele Creek: From confluence with Navasota River in Robertson County to a point 2.4 mi upstream of FM 147 in Limestone County

Parameter	Category	Year
Bacteria	5b	2002

1209K_02: From confluence with Navasota River in Robertson County to a point 2.4 mi upstream of FM 147 in Limestone County

Concerns

SegID 0612: From a point 3.9 km (2.4 mi) downstream of Curry Creek in Nacogdoches/San Augustine County to FM 95 in Rusk County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

0612_01: From the lower boundary approximately at confluence with Granberry Branch upstream to confluence with Polly Branch

0612_02: From a point immediately upstream of Polly Branch confluence upstream to confluence with Bear Bayou

0612_03: From a point immediately upstream of Bear Bayou upstream to upper boundary at FM 95

SegID 1213A: From the confluence with Little River in Milam county, 4.5 km northeast of the City of Cameron, upstream to its headwaters in McLennan County, 0.7 km west of Moody

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1213A_01: Portion of Big Elm Creek from the confluence with the Little River upstream to confluence with Little Elm Creek

<u>Parameter</u>	<u>Level of Concern</u>
Nitrate	CS

1213A_01: Portion of Big Elm Creek from the confluence with the Little River upstream to confluence with Little Elm Creek

SegID 1902: From the confluence with the San Antonio River in Karnes County to a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1902_01: From the confluence with the San Antonio River in Karnes County upstream to the confluence with Mulifest Creek

1902_02: From the confluence with Mulifest Creek upstream to the confluence with Pulaski Creek

1902_03: From the confluence with Pulaski Creek upstream to the confluence with Clifton Branch

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	CN

1902_05: From the confluence with Elm Creek upstream to a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County

<u>Parameter</u>	<u>Level of Concern</u>
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Macrobenthic Community	CN
1902_02: From the confluence with Mulifest Creek upstream to the confluence with Pulaski Creek	
<u>Parameter</u>	<u>Level of Concern</u>
Habitat	CS
1902_03: From the confluence with Pulaski Creek upstream to the confluence with Clifton Branch	
<u>Parameter</u>	<u>Level of Concern</u>
Nitrate	CS
1902_03: From the confluence with Pulaski Creek upstream to the confluence with Clifton Branch	
1902_04: From the confluence with Clifton Branch upstream to the confluence with Elm Creek	
1902_05: From the confluence with Elm Creek upstream to a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County	
<u>Parameter</u>	<u>Level of Concern</u>
Total Phosphorus	CS
1902_04: From the confluence with Clifton Branch upstream to the confluence with Elm Creek	
1902_05: From the confluence with Elm Creek upstream to a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County	
SegID 1913: From a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County to the Missouri-Pacific Railroad bridge west of Bracken in Comal County	
<u>Parameter</u>	<u>Level of Concern</u>
Nitrate	CS
1913_01: From 100 meters downstream of I10 up to unnamed tributary approximately 0.3 mi upstream of Weir Road, Bexar County, Texas	
1913_02: From the confluence with unnamed tributary approximately 0.3 mi upstream of Weir Road, Bexar County, Texas up to 100 meters upstream of the Cibolo Creek Municipal	
<u>Parameter</u>	<u>Level of Concern</u>
Total Phosphorus	CS
1913_01: From 100 meters downstream of I10 up to unnamed tributary approximately 0.3 mi upstream of Weir Road, Bexar County, Texas	
1913_02: From the confluence with unnamed tributary approximately 0.3 mi upstream of Weir Road, Bexar County, Texas up to 100 meters upstream of the Cibolo Creek Municipal	
SegID 1209: From the confluence with the Brazos River in Grimes County to Sterling C. Robertson Dam in Leon/Robertson County	
<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS
1209_05: Portion of Navasota River from the confluence with Camp Creek upstream to Lake Limestone Dam in Robertson County	

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	CN
1209_01: Portion of Navasota River from confluence with Brazos River upstream to confluence with Rocky Creek in Grimes County	
<u>Parameter</u>	<u>Level of Concern</u>
Nitrate	CS
1209_01: Portion of Navasota River from confluence with Brazos River upstream to confluence with Rocky Creek in Grimes County	
<u>Parameter</u>	<u>Level of Concern</u>
Total Phosphorus	CS
1209_01: Portion of Navasota River from confluence with Brazos River upstream to confluence with Rocky Creek in Grimes County	
SegID 1209C: Perennial Stream from the confluence with the Navasota River upstream to the confluence of an unnamed tributary 0.5 km upstream of FM 158	
<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS
1209C_01: Perennial Stream from the confluence with the Navasota River upstream to the confluence of an unnamed tributary 0.5 km upstream of FM 158	
<u>Parameter</u>	<u>Level of Concern</u>
Chlorophyll-a	CS
1209C_01: Perennial Stream from the confluence with the Navasota River upstream to the confluence of an unnamed tributary 0.5 km upstream of FM 158	
<u>Parameter</u>	<u>Level of Concern</u>
Nitrate	CS
1209C_01: Perennial Stream from the confluence with the Navasota River upstream to the confluence of an unnamed tributary 0.5 km upstream of FM 158	
<u>Parameter</u>	<u>Level of Concern</u>
Total Phosphorus	CS
1209C_01: Perennial Stream from the confluence with the Navasota River upstream to the confluence of an unnamed tributary 0.5 km upstream of FM 158	
SegID 1209E: Perennial stream from the confluence with an unnamed first order tributary (approximately 1.3 km upstream of Reliance Road crossing) upstream to the confluence with an unnamed first order tributary approximately 15 meters upstream of Dilly Shaw Road	
<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1209E_01: Perennial stream from the confluence with an unnamed first order tributary (approximately 1.3 km upstream of Reliance Road crossing) upstream to the confluence with an unnamed first order tributary approximately 15 meters upstream of Dilly Shaw Road

SegID 1209G: From the confluence with the Navasota River in Brazos County to the confluence with Moores Branch and Rocky Branch in Robertson County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	CN

1209G_01: From the confluence with the Navasota River in Brazos County to the confluence with Moores Branch and Rocky Branch in Robertson County

<u>Parameter</u>	<u>Level of Concern</u>
Depressed Dissolved Oxygen	CS

1209G_01: From the confluence with the Navasota River in Brazos County to the confluence with Moores Branch and Rocky Branch in Robertson County

SegID 1209H: From the confluence with the Navasota river in Robertson County to Twin Oak Reservoir dam in Robertson County

<u>Parameter</u>	<u>Level of Concern</u>
Depressed Dissolved Oxygen	NS, CS

1209H_01: Portion of Duck Creek from confluence with Navasota River upstream to confluence with Mineral Creek in Robertson County

1209H_02: Portion of Duck Creek from confluence with Mineral Creek in Robertson County upstream to Twin Oak Reservoir dam in Robertson County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1209H_02: Portion of Duck Creek from confluence with Mineral Creek in Robertson County upstream to Twin Oak Reservoir dam in Robertson County

SegID 1209I: From confluence with Navasota River in Grimes County to SH 90 in Grimes County

<u>Parameter</u>	<u>Level of Concern</u>
Depressed Dissolved Oxygen	NS, CS

1209I_01: Portion of Gibbons Creek from confluence with Navasota River upstream to confluence with Dry Creek in Grimes County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1209I_01: Portion of Gibbons Creek from confluence with Navasota River upstream to confluence with Dry Creek in Grimes County

1209I_02: Portion of Gibbons Creek from confluence with Dry Creek upstream to Gibbons Creek Reservoir dam in Grimes County

SegID 1209J: From the confluence with Navasota River in Madison County to a point 0.7 mi upstream of FM 1452 in Madison County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1209J_01: From the confluence with Navasota River in Madison County to a point 0.7 mi upstream of FM 1452 in Madison County

SegID 1209K: Portion of Steele Creek from confluence with Willow Creek upstream to headwaters in Limestone County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1209K_01: Portion of Steele Creek from confluence with Willow Creek upstream to headwaters in Limestone County

SegID 1209L: From the confluence with Carters Creek in College Station, upstream to its headwaters located 0.4 miles east of Fin Feather Lake in Brazos County

<u>Parameter</u>	<u>Level of Concern</u>
Bacteria	NS

1209L_01: From the confluence with Carters Creek in College Station, upstream to its headwaters located 0.4 miles east of Fin Feather Lake in Brazos County

<u>Parameter</u>	<u>Level of Concern</u>
Nitrate	CS

1209L_01: From the confluence with Carters Creek in College Station, upstream to its headwaters located 0.4 miles east of Fin Feather Lake in Brazos County

Sources

SegID 0612: From a point 3.9 km (2.4 mi) downstream of Curry Creek in Nacogdoches/San Augustine County to FM 95 in Rusk County

Attoyac Bayou: AUDID 0612_01

E.coli

Non-point sources: Unknown

Attoyac Bayou: AUDID 0612_02

E.coli

Point sources: Municipal Point Source Discharges

Non-point sources: Unknown

Attoyac Bayou: AUDID 0612_03

E.coli

Point sources: Municipal point source discharges

Non-point sources: Unknown

SegID 1213A: From the confluence with Little River in Milam county, 4.5 km northeast of the City of Cameron, upstream to its headwaters in McLennan County, 0.7 km west of Moody

Big Elm Creek: AUDID 1213A_01

E.coli, Nitrate

Non-point sources: Unknown

SegID 1902: From the confluence with the San Antonio River in Karnes County to a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County

Lower Cibolo Creek: AUDID 1902_01

E.coli

Point sources: Unknown

Unknown: Unknown

Lower Cibolo Creek: AUDID 1902_02

Macrobenthic Community, E.coli

Point sources: Unknown

Unknown: Unknown

Lower Cibolo Creek: AUDID 1902_03

Habitat, Nitrate, E. coli

Unknown: Unknown

Lower Cibolo Creek: AUDID 1902_04

Nitrate, Total Phosphorus

Point sources: Unknown

Unknown: Unknown

Lower Cibolo Creek: AUDID 1902_05

Nitrate, Total Phosphorus, E. coli

Point sources: Unknown

Unknown: Unknown

SegID 1913: From a point 100 meters (110 yards) downstream of IH 10 in Bexar/Guadalupe County to the Missouri-Pacific Railroad bridge west of Bracken in Comal County

Mid Cibolo Creek: AUDID 1913_01

Nitrate, Total Phosphorus

Unknown: Unknown

Mid Cibolo Creek: AUDID 1913_02

Nitrate, Total Phosphorus

Unknown: Unknown

SegID 1209: From the confluence with the Brazos River in Grimes County to Sterling C. Robertson Dam in Leon/Robertson County

Navasota River Below Lake Limestone: AUDID 1209_01

E. coli, Nitrate, Total Phosphorus

Non-point Sources: Municipal (Urbanized High Density Area), On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Point Sources: Municipal Point Source Discharges

Navasota River Below Lake Limestone: AUDID 1209_05

E. coli

Non-point Sources: Municipal (Urbanized High Density Area), On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Point Sources: Municipal Point Source Discharges

SegID 1209C: Perennial Stream from the confluence with the Navasota River upstream to the confluence of an unnamed tributary 0.5 km upstream of FM 158

Carters Creek: AUDID 1209C_01

E. coli, Nitrate, Total Phosphorus, Chlorophyll-a

Non-point Sources: Unknown, Animal Feeding Operations, Rangeland Grazing, Unspecified Urban Stormwater
Point Sources: Municipal Point Source Discharges

SegID 1209E: Perennial stream from the confluence with an unnamed first order tributary (approximately 1.3 km upstream of Reliance Road crossing) upstream to the confluence with an unnamed first order tributary approximately 15 meters upstream of Dilly Shaw Road

Wickson Creek: AUDID 1209E_01

E. coli

Non-point Sources: Unknown

SegID 1209G: From the confluence with the Navasota River in Brazos County to the confluence with Moores Branch and Rocky Branch in Robertson County

Cedar Creek: AUDID 1209G_01

E. coli, Dissolved Oxygen Grab

Unknown: Unknown

SegID 1209H: From the confluence with the Navasota river in Robertson County to Twin Oak Reservoir dam in Robertson County

Duck Creek: AUDID 1209H_01

Dissolved Oxygen Grab

Non-point Sources: Unknown, Natural Sources

Duck Creek: AUDID 1209H_02

Dissolved Oxygen Grab, E. coli

Non-point Sources: Unknown, Natural Sources

SegID 1209I: From confluence with Navasota River in Grimes County to SH 90 in Grimes County

Gibbons Creek: AUDID 1209I_01

Dissolved Oxygen Grab, E. coli

Non-point Sources: Unknown, Natural Sources

Gibbons Creek: AUDID 1209I_02

E. coli

Non-point Sources: Unknown

SegID 1209J: From the confluence with Navasota River in Madison County to a point 0.7 mi upstream of FM 1452 in Madison County

Shepherd Creek: AUDID 1209J_01

E. coli

Non-point Sources: Unknown

SegID 1209K: Portion of Steele Creek from confluence with Willow Creek upstream to headwaters in Limestone County

Shepherd Creek: AUDID 1209K_02

E. coli

Non-point Sources: Unknown, Natural Sources

SegID 1209L: From the confluence with Carters Creek in College Station, upstream to its headwaters located 0.4 miles east of Fin Feather Lake in Brazos County

Burton Creek: AUDID 1209L_01

E. coli, Nitrate

Point Sources: Municipal Point Source Discharges

Project Narrative

Problem/Need Statement

The water quality issues vary slightly from one project area to another. However, the main issues are elevated bacteria concentrations, depressed dissolved oxygen, and elevated nutrient levels. Therefore, contact recreation use is not supported, excessive nutrients are possibly contributing to high levels of Chlorophyll-a, and in some instances the microbenthic community is impaired. In the absence of nutrient criteria for these waters, the elevated nutrient levels are listed as concerns.

TWRI has been involved in all of the project areas for multiple years and have assisted stakeholders with development of their WPPs. Through the WPP development process, potential sources of the impairments were identified through input from stakeholder groups, review of available data, and modeling the potential sources of impairments. A common potential source of loading in all the projects of bacteria, nutrients, and oxygen depleting substances was runoff from agricultural operations. Management measures to address these potential loadings were developed and integrated in all of the WPPs. TWRI has been working with stakeholders in all the project watersheds to get on-the-ground implementation of agricultural BMPs since completion of the WPPs.

A major component of each of these agricultural management measures includes education and outreach about proper stocking strategies, practices that can be adopted to improve grazing, and sources of technical and financial assistance for these practices. The most common method of delivering education and outreach has been through traditional in-person programs, but as agricultural producer demographics begin to change and shift to a younger age bracket, the need to reach them digitally has increased. More agricultural producers are using digital sources of information now more than at any time in our history and there has been an overall cultural shift to using digital resources in response to Covid-19. In order to effectively reach them, we must create digital media that they can easily access on their desktop computers, tablets, and mobile devices. Additionally, we need to deliver information that is easy to digest using a method that is proven to facilitate behavioral change.

Rogers (2003) describes a process, the Innovation-Decision Process, that all individuals go through when they are deciding whether to adopt an innovation or practice. The stages of this process are 1) Knowledge, where an individual first learns of an innovation, 2) Persuasion, where several attributes persuade an individual to adopt, 3) Decision, where an individual decides to adopt or not, 4) Implementation, where an individual implements the practice if they have decided to adopt, and 5) Confirmation, where an individual decides to continue the practice or go back to a method in which they were operating before.

As watershed managers, we can only influence the first two stages of Rogers Innovation-Decision Process. We make agricultural producers aware of practices by first raising awareness and introducing an innovation in an area of their operation. Following this, we can help in persuading producers to adopt practices by showing them that 1) it is better than what they were doing before, 2) it fits within the current method of operation, 3) it is easy to adopt, 4) they can try it on a partial basis before deciding to fully adopt, and 5) they can see that it works, which often times comes through field demonstrations.

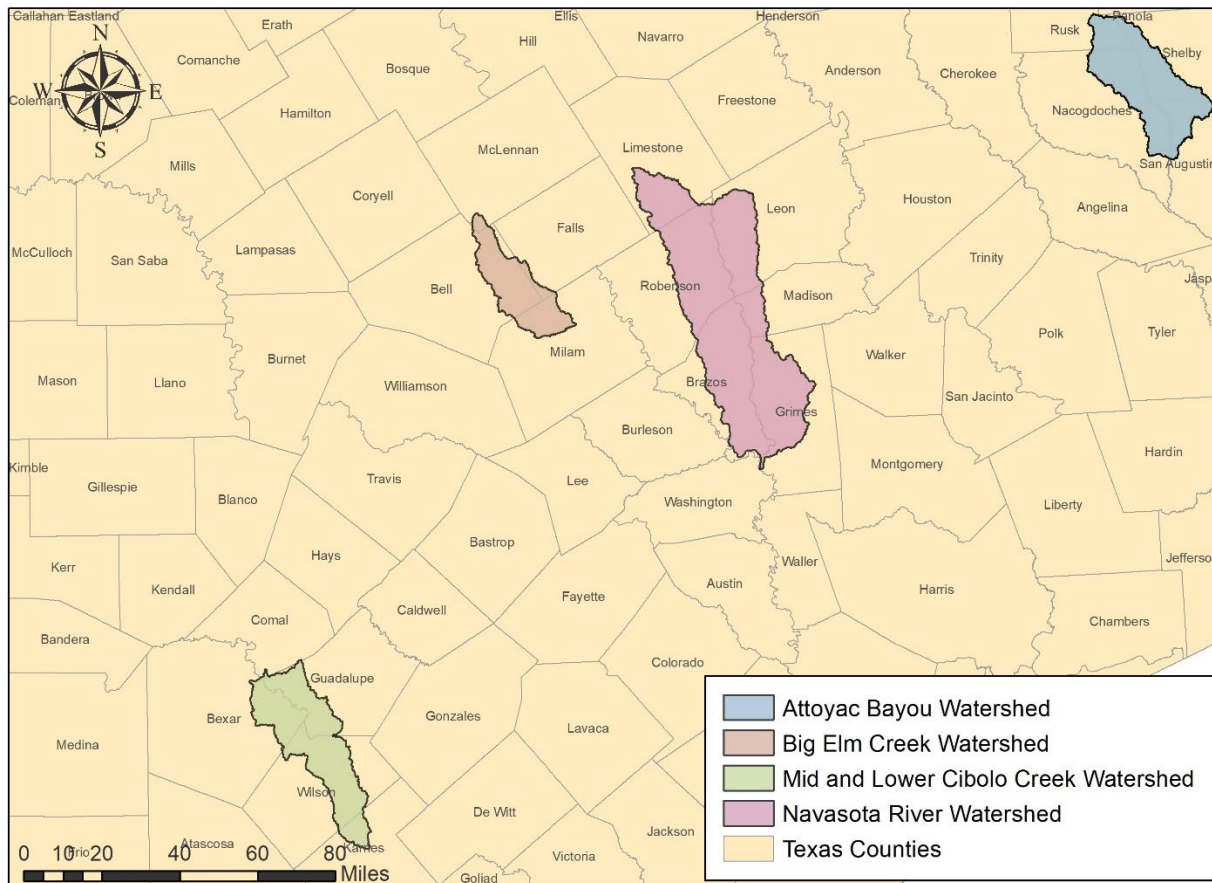
Following these key attributes to encourage producers to adopt BMPs that improve water quality is crucial to WPP implementation success. Grazing management practices are similar from one watershed to the other, so a cost-effective approach would be to use the same content across watersheds and have that content follow a proven behavior change theory.

As such, TWRI proposes to develop content that facilitates behavior change amongst the grazing community and delivers that content in various places where agricultural producers receive information to increase a positive impact, not only in the watersheds of interest, but across the state.

Rogers, E. M. (2003). Diffusion of innovations. New York: Free Press.

Project Narrative

General Project Description (Include Project Location Map)



TWRI will facilitate collaborative efforts among project partners to implement agricultural management measures for the project watersheds. Until now, TWRI’s approach to implementation of agricultural management measures has been to approach each project watershed independently of other watersheds. Currently, individual watershed coordinators assist stakeholders with development of the WPP, and then enter implementation. Though the watershed coordinators are part of TWRI, efforts to implement agricultural management measures have been solely at the discretion of each watershed coordinator. This new approach/method will be at a larger, coordinated multiple-watershed scale that, once developed, could be used as a statewide tool or approach to greater implementation of agricultural BMPs.

The majority of the WPPs that TWRI is currently engaged in all have increased implementation of agriculture management measures as a requirement for successfully addressing a contact recreation impairment or nutrient concerns.

Successful and long-lasting implementation of agricultural BMPs requires completion of multiple steps. Following Roger’s Diffusion of Innovation Theory, the steps necessary for successful implementation of BMPs should address the relative advantage, compatibility, complexity, trialability, and observability of the management practices. The proposed new approach is a full package that addresses each of the key steps for successful implementation. TWRI, with the assistance of project partners, will develop educational materials covering effective BMPs for the agricultural community. Then, through cooperative outreach methods, the materials will be distributed and marketed specifically to the agricultural producers. The culmination of the project will be the educational field day, or demonstration day, where the producers across all of the watersheds, will have the opportunity to see the implementation of these BMPs in a

digital format. It is believed that this process will have the greatest impact on greater implementation of BMPs and a resulting impact on the receiving streams water quality.

This proposal will be for a multi-faceted approach. Key components include Education, Outreach, and Demonstration.

The education component will involve the development of educational materials that will describe the BMPs, estimated cost of initial implementation, available financial/technical assistance, profitability estimates, and maintenance costs.

Outreach will consist of the methods used to contact the agricultural community utilizing the educational materials developed. This will include:

- Direct mailings
- Newspaper
- Videos
- Social media

TWRI will work with project partners to organize one education program in each watershed per year that discusses stocking strategies and grazing management. The program may include elements of riparian education, beef cattle management and production, or other ranching topics. Visual demonstrations will be provided with these trainings, such as a rainfall simulation/runoff demonstration, to better illustrate the effects of BMP utilization.

Finally, demonstration of the BMPs will be showcased during the Digital Field Day. This will be the culmination of extensive coordination with project partners, especially faculty at the Texas A&M AgriLife Research and Extension Center in Overton. The Overton Center has the distinct honor of currently conducting the longest continuous stocking experiment in the United States. Through this Digital Field Day, producers will be able to see the value of rotational grazing and the potential to improve forage production, ultimately improving water quality. To extend the reach and impact of this event, it will be produced in an online, digital format, that can be viewed on desktop computers, tablets, and mobile devices.

Tasks, Objectives and Schedules						
Task 1	Project Administration					
Costs	Federal	\$23,346	Non-Federal	\$15,564	Total	\$38,910
Objective	To effectively administer, coordinate, and monitor all work performed under this project including technical and financial supervision, and preparation of status reports.					
Subtask 1.1	TWRI will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 1 st of January, April, July and October. QPRs shall be distributed to all Project Partners.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 1.2	TWRI will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 1.3	TWRI will host coordination meetings or conference calls, at least quarterly, with Project Partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. TWRI will develop lists of action items needed following each project coordination meeting and distribute to project personnel.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 1.4	TWRI will develop a Final Report that summarizes activities completed and conclusions reached during the project and discusses the extent to which project goals and measures of success have been achieved.					
	Start Date	Month 30		Completion Date	Month 48	
Deliverables	<ul style="list-style-type: none"> • QPRs in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Final Report in electronic and hard copy formats 					

Tasks, Objectives and Schedules						
Task 2	Development and Distribution of Outreach and Educational Materials					
Costs	Federal	\$171,205	Non-Federal	\$114,136	Total	\$285,341
Objective	To raise awareness amongst the agricultural community on stocking strategies and best management practices that improve grazing land management (as well as sources for technical and financial assistance), ultimately improving water quality, through the use of materials across all watersheds in a method consistent with behavioral change theory.					

Subtask 2.1	<p>TWRI will develop and distribute outreach materials with the goal of raising awareness about grazing best management practices that can be adopted to improve water quality, as well as technical and financial resources for these practices. Materials may include the following but will be developed by using content from existing materials such as best management practice one pagers on the Lone Star Healthy Streams website or other Extension materials available. These include:</p> <ul style="list-style-type: none"> - direct mailing post cards – one post card with consistent messaging - newspaper articles – up to three - short videos – up to six - social media schedules – 10 per year <p>All materials will be produced on a general level such that they can be used across multiple project watersheds. However, local contact information to SWCD/NRCS offices will be included and specific to the county where materials are being distributed. Number of contacts will be reported in quarterly progress reports.</p> <p>In order to reach as many landowners as possible in a cost-efficient manner, TWRI will coordinate with local stakeholders to develop a schedule of delivery for outreach materials within a given year. However, over the course of the project, materials will be distributed using the schedule below for each of the four watersheds. Number of contacts will be reported in quarterly progress reports (see Task 1).</p> <p>Year 1</p> <ul style="list-style-type: none"> - direct mailing post cards – delivered three times - newspaper article – one article - short videos distributed via social media – six videos total - grazing BMP social media schedules – 10 per year <p>Year 2</p> <ul style="list-style-type: none"> - direct mailing post cards – delivered once - newspaper article – one article - short videos distributed via social media – six videos total - grazing BMP social media schedules – 10 per year <p>Year 3</p> <ul style="list-style-type: none"> - direct mailing post cards – delivered once - newspaper article – one article - short videos distributed via social media - six videos total - grazing BMP social media schedules – 10 per year <p>distribution of demonstration video from Task 4 – distributed across four watersheds</p>				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center;">Start Date</td> <td style="width: 25%; text-align: center;">Month 1</td> <td style="width: 25%; text-align: center;">Completion Date</td> <td style="width: 25%; text-align: center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Subtask 2.2	<p>TWRI will work with local watershed coordinators and NRCS/SWCDs to measure success of the outreach effort and will report on an annual basis. Metrics may include number of inquiries into conservation plans/WQMPs (henceforth called plans), site visits by local technicians/conservationists, number of plans developed, web analytics, and social media views and engagements.</p>				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center;">Start Date</td> <td style="width: 25%; text-align: center;">Month 1</td> <td style="width: 25%; text-align: center;">Completion Date</td> <td style="width: 25%; text-align: center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Deliverables	<ul style="list-style-type: none"> • Educational Videos – 6 total • Direct mailing post card – 1 total • newspaper articles – 1 annually • 10 social media schedules/yr – submitted quarterly • Measures of success – submitted annually 				

Tasks, Objectives and Schedules						
Task 3	Facilitation and Participation in Education Programs					
Costs	Federal	\$77,820	Non-Federal	\$51,880	Total	\$129,700
Objective	To deliver in-person programs as well as demonstrate to agricultural producers the benefits of good grazing management and the impacts to runoff under various pasture scenarios, demonstrating additional phases of behavioral change theory.					
Subtask 3.1	TWRI will work with collaborating entities to organize one education program in each watershed per year that discusses stocking strategies and grazing management. The program may include but is not limited to 1) Riparian Education and 2) Lone Star Healthy Streams (Beef Cattle component), or the Ag in the Evening Program Series. In addition, a rainfall simulation/runoff demonstration will be given to better illustrate the effects of BMP utilization.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 3.2	Using a rainfall simulation/runoff demonstration as described in subtask 3.1 as well as other materials, TWRI will participate in at least one in-person county extension program per watershed per year about grazing management to help landowners make the connection between good grazing management and water quality.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 3.3	TWRI will assist education program leads in the administration of program evaluations that may determine intentions to adopt, knowledge gained, anticipated monetary gain, or other metrics that may be useful to enhance future programs.					
	Start Date	Month 1		Completion Date	Month 48	
Deliverables	<ul style="list-style-type: none"> Press releases, agendas, and other materials available for programs Program evaluations 					

Tasks, Objectives and Schedules						
Task 4	Demonstration of Stocking Strategies on Forage Production					
Costs	Federal	\$116,730	Non-Federal	\$77,821	Total	\$194,551
Objective	To demonstrate to producers the benefit of proper stocking strategies on forage production which leads to improvements in water quality, a final step in behavioral change theory					
Subtask 4.1	TWRI will work with the Texas A&M AgriLife Research and Extension Center in Overton, TX where the longest continuous stocking rate experiment in the United States is being conducted. At this site, information will continue to be collected that demonstrates to producers the benefits to improving forage growth for their operations, which ultimately improves water quality. At this site, information such as forage height, regrowth rate, animal performance, and other information of interest to producers will be collected and distributed in the digital field day (subtask 4.2).					
	Start Date	Month 1		Completion Date	Month 24	
Subtask 4.2	Using information from subtask 4.1, TWRI will work to collect raw video footage necessary to create an in-depth, stocking rate/rotational grazing field day video that can be used across multiple watersheds. This video will be shared through targeted social media, websites, CEA and Watershed Coordinator newsletters, the Overton website, the ForageFax website, and other avenues necessary to reach landowners.					
	Start Date	Month 18		Completion Date	Month 48	
Deliverables	<ul style="list-style-type: none"> Grazing demonstration measurements Draft and final digital field day Distribution schedule for digital field day 					

Project Goals (Expand from Summary Page)

The primary goal of the proposed project is to increase landowner adoption of best management practices through a cost-effective approach that aligns with changing landowner and producer demographics as well as the Covid-19 era. To achieve this goal, TWRI will develop and deliver educational materials directly to landowners through mail, newspaper, radio, social media, and in person. The educational material will include concise and relevant information for landowners explaining why program participation is important and how to participate. We estimate that this project will repeatedly put best practice information directly in the hands of high priority landowners that may otherwise not receive information through just one method of outreach and education.

Measures of Success (Expand from Summary Page)

Overall, this project will be successful when educational materials are delivered to key stakeholders across the four watersheds. Through the distribution of the educational materials to the stakeholders, we anticipate that the number of Conservation Plans and Water Quality Management Plans will increase.

2017 Texas NPS Management Program Reference (Expand from Summary Page)

Components, Goals, and Objectives

Long-Term Goal One– Protect and restore water quality affected by NPS pollution through assessment, implementation, and education.

- Objective 1 – Focus NPS abatement efforts, implementation strategies, and available resources in watersheds and aquifers identified as impacted by nonpoint source pollution.
- Objective 3 – Support the implementation of state, regional, and local programs to reduce NPS pollution, such as the implementation of strategies defined in TMDL I-Plans, WPPs, and other water planning efforts in the state.
- Objective 6 – Develop partnerships, relationships, memoranda of agreement, and other instruments to facilitate collective, cooperative approaches to manage NPS pollution.

Objective 7 – Increase overall public awareness of NPS issues and prevention activities.

Short-Term Goal Two – Implementation

- Objective D – Implement TMDL I-Plans, WPPs, and other state, regional, and local plans developed to restore and maintain water quality in water bodies identified as impacted by NPS pollution.

Short-Term Goal Three – Education

- Objective A – Enhance existing outreach programs at the state, regional, and local levels to maximize the effectiveness of NPS education.
- Objective B – Administer programs to educate citizens about water quality and their potential role in causing NPS pollution.
- Objective D – Conduct outreach through the CRP, AgriLife Extension, SWCDs, and others to enable stakeholders and the public to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen.
- Objective G – Implement public outreach and education to maintain and restore water quality in water bodies by NPS pollution.

Estimated Load Reductions Expected (Only applicable to Implementation Project Type)

Load reductions from this project will vary based on landowner response to education efforts. Expected load reductions from landowner adoption of conservation plans and WQMPs are described in each of the WPPs where educational efforts will be targeted.

**EPA State Categorical Program Grants – Workplan Essential Elements
 FY 2018-2022 EPA Strategic Plan Reference**

Strategic Plan Goal – Goal 1 Core Mission: Deliver a cleaner, safer, and healthier environment for all Americans and future generations by carrying out the Agency’s core mission.

Strategic Plan Objective – Objective 1.2 Provide for Clean and Safe Water to ensure waters are clean through improved water infrastructure and, in partnership with states and tribes, sustainably manage programs to support drinking water, aquatic ecosystems, and recreational, economic, and subsistence activities.

Part III – Financial Information

Budget Summary				
Federal	\$	389,101	% of total project	60%
Non-Federal	\$	259,401	% of total project	40%
Total	\$	648,502	Total	100%
Category		Federal	Non-Federal	Total
Personnel	\$	153,082	\$ 126,026	\$ 279,108
Fringe Benefits	\$	42,646	\$ 29,881	\$ 72,527
Travel	\$	10,275	\$ 0	\$ 10,275
Equipment	\$	0	\$ 0	\$ 0
Supplies	\$	38,858	\$ 0	\$ 38,858
Contractual	\$	0	\$ 0	\$ 0
Construction	\$	0	\$ 0	\$ 0
Other	\$	93,488	\$ 0	\$ 93,488
Total Direct Costs	\$	338,349	\$ 155,907	\$ 494,256
Indirect Costs (≤ 15%)	\$	50,752	\$ 53,640	\$ 104,392
Unrecovered IDC	\$	0	\$ 49,854	\$ 49,854
Total Project Costs	\$	389,101	\$ 259,401	\$ 648,502

Budget Justification (Federal)		
Category	Total Amount	Justification
Personnel	\$ 153,082	<p>TWRI Assistant Director: \$83,118 annually @ 3 months (8.33% per year) – \$22,042 Extension Forage Specialist: \$101,736 annually @ 1.44 months (4% per year) – \$12,956 TBD Program Manager \$64,970 annually @ 3 months (8.33% per year) – \$16,728 Program Specialist IV: \$77,500 annually @ 12.6 months (35% per year) – \$86,356 Graduate Student worker: \$15/hr, 20 hrs/week for 50 weeks – \$15,000</p> <p>*named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in aggregate, will not exceed total effort estimates for the entire project. *cell phone allowances for project calls/emails during & after business hours & travel are occasionally factored into salaries & fringe, but again, will not exceed overall dollar amount.</p>
Fringe Benefits	\$ 42,646	<p>Fringe for faculty and staff is calculated at 18.5% salary plus \$771 per month. Fringe for students is calculated at 11% salary plus \$558 per month.</p> <p>*named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in aggregate, will not exceed total effort estimates for the entire project. *cell phone allowances for project calls/emails during & after business hours & travel are occasionally factored into salaries & fringe, but again, will not exceed overall dollar amount.</p>
Travel	\$ 10,275	<p>TWRI travel to watersheds to participate in programs</p> <ul style="list-style-type: none"> - State vehicle mileage for 18 trips at 162 miles round trip per trip @ state rate (\$1,458) - Per diem at state rate for 2 people, 12 days (\$1,320) - Lodging at state rate for 2 people, 6 nights (\$1,152) <p>Overton travel to watersheds</p> <ul style="list-style-type: none"> - Mileage for 3,000 miles to project sites and watersheds throughout the project @ state rate (\$1,500) <p>Overton travel to field days, regional conferences and planning meetings @13 trips for 1 person</p> <ul style="list-style-type: none"> - Per diem for 29 days at state rate (\$1,672) - Lodging for 17 nights at state rate (\$1,902) - Rental car for 24 days at state rate (\$621) - Airfare (\$650)
Equipment	\$ 0	N/A
Supplies	\$ 38,858	<p>Project supplies, including, but not limited to: printer, paper, pens, toner, fuel, field supplies, etc. (\$5,458), electric fencing (\$4,500), fertilizer (\$28,500) Webinar Supplies (microphone and headset) – \$200, Cordless lapel microphone – \$200</p>
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A

Other	\$ 93,488	Communications Services (videos, social media, articles) – \$23,400 Printing: 14,987 cards for 5 mailings total – \$11,990 Postage: 14,987 cards for 5 mailings total – \$13,488 Rainfall Simulator – \$3,250 Education Demonstration Setup and Maintenance (input costs, equipment rental, practice input costs) (\$10,270/yr) - \$30,810 Video Camera – \$3,500 Professional Zoom License – \$1,200 Video Editing Software – \$1,000 Computer – \$1,500 Portable tripod – \$350 Facility Rental – \$3,000
Indirect	\$ 50,752	15% of Total Direct Costs (TDC)

Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel	\$ 126,026	<p>TWRI Director: \$209,180 annually @ 4.56 months (12.66 per year) – \$84,278 Professor: \$133,778 annually @ 2.16 months (6% per year) – \$25,554 Extension Forage Specialist: \$101,736 annually @ 1.8 months (5% per year) – \$16,194</p> <p>*named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in aggregate, will not exceed total effort estimates for the entire project.</p>
Fringe Benefits	\$ 29,881	<p>Fringe for faculty and staff is calculated at 18.5% salary plus \$771 per month. Fringe for students is calculated at 11% salary plus \$558 per month.</p> <p>*named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in aggregate, will not exceed total effort estimates for the entire project.</p>
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 53,640	<p>Texas A&M AgriLife Extension Service’s federally negotiated indirect cost rate (IDC) is 30% of modified total direct costs (MTDC). Texas A&M AgriLife Research’s federal negotiated indirect cost rate is 51.5% MTDC. MTDC includes up to \$25,000 of each subcontract and excludes tuition, facility rental and equipment over \$5,000.</p> <ul style="list-style-type: none"> - AgriLife Extension – TWRI Director, Extension Forage Specialist: \$123,961 MTDC * 0.3 = \$37,188 - AgriLife Research – Professor: \$31,946 * 0.515 = \$16,452 - \$37,188 + \$16,452 = \$53,640
Unrecovered IDC	\$ 49,854	<p>Unrecovered IDC: 30% MTDC – 15% TDC</p> <ul style="list-style-type: none"> • IDC on MTDC: \$335,349 MTDC * 30% = \$100,606 • IDC on TDC: \$338,349 TDC * 15% = \$50,752 <p>Total Unrecovered IDC: \$100,606 – \$50,752 = \$49,854</p>