Texas State Soil and Water Conservation Board
State General Revenue Nonpoint Source Grant Program
FY 2021 Workplan 21-54

SUMMARY PAGE			
Title of Project	Kickapoo Creek in Henderson County Watershed Protection Plan		
Project Goals	To facilitate and produce a Watershed Protection Plan (WPP) for Kickapoo Creek watershed that meets the Environmental Protection Agency's (EPA's) nine elements for watershed-based plans. This includes • Effectively administering the project financially and technically to meet deliverables, • Ensuring that data used and generated by the project are of known and acceptable quality, • Developing a WPP following EPA's nine elements for watershed-based plans following a stakeholder driven process, • Providing monitoring data that meets data quality objectives to facilitate the development of the WPP, • Obtaining approval by stakeholders of the WPP and producing the final WPP, and • Producing a final report summarizing all project activities.		
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) WPP Development; (4) Monitoring to Facilitate WPP Development (5) Water Quality Characterization and Pollutant Source Identification		
Measures of Success	• Development, and production of a WPP that meets the nine key elements set forth by EPA for watershed-based plans that facilitates load reductions in bacteria along Kickapoo Creek and addresses other water quality concerns within the watershed • Production for timely and acceptable deliverables for each project task		
Project Type	Implementation ( ); Education (X); Planning (X); Assessment (X); Groundwater ( )		
Status of Waterbody on *2020 Texas Integrated Report*	Segment ID 0605A	Parameter of Impairment or Concern Bacteria & depressed dissolved oxygen	Category 5c (bacteria), 5c (depressed DO)
Project Location (Statewide or Watershed and County)	Kickapoo Creek Watershed in Henderson and Van Zandt Counties in Texas		
Key Project Activities	Hire Staff ( ); Surface Water Quality Monitoring (X); Technical Assistance ( ); Education (X); Implementation ( ); BMP Effectiveness Monitoring ( ); Demonstration ( ); Planning (X); Modeling ( ); Bacterial Source Tracking ( ); Other ( )		
2017 Texas NPS Management Program Reference	• Component 1: LTG 1, 2, 3, 6, 7, 8 • Component 1: STG 1B, 1C, 1E, 2A, 2B, 2C, 2D, 3A, 3B, 3D, 3G • Component 2, 3, 7		
Project Costs	$233,241		
Project Management	• Texas Institute for Applied Environmental Research		
Project Period	March 1, 2021 – May 31, 2023		

Part I – Applicant Information

Applicant							
Project Lead	Leah Taylor						
Title	Sr. Project Director						
Organization	Texas Institute for Applied Environmental Research						
E-mail Address	ltaylor@tarleton.edu						
Street Address	201 St. Felix Street						
City	Stephenville	County	Erath	State	TX	Zip Code	76401
Telephone Number	(254) 968-0513			Fax Number	(254) 968-9336		

Applicant							
Project Lead	Dr. Narayanan Kannan						
Title	Research Scientist						
Organization	Texas Institute for Applied Environmental Research						
E-mail Address	kannan@tarleton.edu						
Street Address	201 St. Felix Street						
City	Stephenville	County	Erath	State	TX	Zip Code	76401
Telephone Number	(254) 968-9691			Fax Number	(254) 968-9336		

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 Institute for Applied Environmental Research (TIAER)	Provide project oversight, QA/QC, facilitate development of watershed stakeholder group and public outreach efforts, conduct data inventory and evaluation. Coordinate with Angelina & Neches River Authority regarding stakeholder involvement and data collection (historical and direct).
Angelina & Neches River Authority (ANRA)	Provide laboratory analyses for bacteria samples, guide and support gathering of historical water quality and sources information, and assist TIAER with communication and educational efforts with local stakeholders.
Watershed stakeholders including, but not limited to, landowners, soil and water conservation districts, city officials, county officials, not for profit organizations, and other federal, state, and local governments	Work with TIAER and ANRA to gain and provide needed information for the characterization of this watershed.

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 *Texas Coastal NPS Pollution Control Program*; or (f) the *Texas Groundwater Protection Strategy*?				Yes		No	X
If yes, identify the document.	N/A						
If yes, identify the agency/group that developed and/or approved the document.	N/A			Year Developed	N/A		

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2020 IR	Size (Acres)
Kickapoo Creek in Henderson County	120200010201-0201, 0202, 0203, 0204, 0205, 0206	0605A	5c	178,867

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.

The 2020 Texas Integrated Report indicates the following bacteria and depressed dissolved oxygen impairments:

Segment 0605A: Kickapoo Creek in Henderson County

	Impairment	2020 Category	Year First Listed
0605A_01	bacteria	5c	2000
	depressed dissolved oxygen	5c	2006
0605A_02	bacteria	5c	2000

Segment 0605A was first listed on the 2000 Texas Integrated Report of Surface Water Quality for elevated bacteria concentrations. The 2020 303(d) list continues to identify assessment units 0605A_01 and 0605A_02 for elevated bacteria concentrations. Both assessment units of Kickapoo Creek in Henderson County are classified as 5c for bacteria. Based on the Recreational Use Attainability Analysis (RUAA) conducted by TIAER in 2014, Kickapoo Creek is actively used for recreation within private property. Local residents and landowners interviewed have given accounts of swimming, wading, and fishing on the water body. In addition, the assessment unit 0605A_01 is impaired for depressed dissolved oxygen with a category 5c requiring additional data and evaluation.

No concerns along Segment 0605A are listed in the 2020 Draft Texas Integrated Report, although the 2014 Texas Integrated Report and the Clean Rivers Program 2018 Basin Highlights Report by the Angelina & Neches River Authority list ammonia and depressed dissolved oxygen (DO) as a concern. Data used for the 2020 Draft Texas Integrated Report for assessment of bacteria included 3 samples for AU 0605A_01 and 24 samples for AU 0605A_02. The geometric mean of these data for *Escherichia coli* bacteria was 307 colony forming units per 100 milliliters (cfu/100 mL) for AU 0605A_01 and 287 cfu/100 mL for AU 0605A_02. For DO, only three 24-hr monitoring events were included in the assessment and only one indicated average DO concentrations below the average criterion of 3

mg/L and the minimum criterion of 2 mg/L. The period of record for samples assessed in the 2020 Draft Texas Integrated Report spanned the 7-year period between December 2011 and November 2018.

Within the 2020 Draft Texas Integrated Report, point source discharges from municipal wastewater facilities were identified as sources contributing to the DO and bacteria impairments within Kickapoo Creek. As part of a Recreational Use Attainability Assessment for Segment 0605A, it was determined that two permitted municipal wastewater treatment facilities (WWTFs) discharge within the Kickapoo Creek watershed, the City of Brownsboro WWTF (TX0062707) with a permitted average daily flow of 0.156 million gallons per day (MGD) and the City of Murchison WWTF (TX0072087) with a permitted average daily flow of 0.08 MGD. A third small WWTF (TX0133086), run by the RPM Water Supply Corporation (permitted average daily discharge of 0.01 MGD), does not discharge directly into Kickapoo Creek but to Battle Creek, which merges with Kickapoo Creek in a braided fashion as part of Kickapoo Cove of Lake Palestine. Depending on flow conditions and patterns, Battle Creek may be considered a tributary of Kickapoo Creek or a separate creek into Lake Palestine. Also, of the approximately 567 households in the watershed, about 89 percent were estimated to be outside municipal service areas for wastewater, so on-site sewage facilities from rural households may also be a contributing source.

Nonpoint sources via runoff across the landscape are also potential sources of bacteria and of organic loadings that may decrease instream DO. The Kickapoo Creek in Henderson County watershed area covers about 178,000 acres and is primarily rural with hay or pasture production used for cattle production as the dominant land cover followed by variety of forested vegetation. Only about five percent of the watershed is developed land representing the cities of Murchison (estimated population 600), Edom (estimated population 392), and Brownsboro (estimated population 1,279). The watershed is located just west of the City of Chandler (estimated population 2,805), but does not encompass Chandler. The rural nature of the Kickapoo Creek watershed indicates the need to consider agricultural and silivicultural nonpoint source contributions as well as WWTF discharges and on-site sewage facilities from rural households in evaluating the watershed's impairments.

The development of a WPP builds on a current characterization project for the watershed lead by TIAER. Many of the tasks associated with a WPP, such as the development of a stakeholder group have been addressed in the current project. The current project is also addressing, with stakeholder input, loadings and sources for the development of an educational component leading to the definition of needed control practices. The next step is to carry forward this education component into a WPP characterizing the problem, loads and sources, but also describing the management measures and technical and financial assistance needed to improve water quality.

Project Narrative

Problem/Need Statement

The bacterial impairment of Kickapoo Creek in Henderson County is classified 5c indicating that additional information will be collected and/or evaluated for one or more parameters before a management strategy is selected (Figure 1). A Recreational Use Attainability Analysis (RUAA) was completed on Kickapoo Creek by TIAER in 2014. Findings of the RUAA (https://www.tceq.texas.gov/waterquality/standards/ruaas/ruaasneches) were submitted by TSSWCB to TCEQ for a potential recommendation of a change in standard from primary recreation to secondary recreation. Upon reviewing RUAA findings, TCEQ did not recommend a change in the recreational standard for Kickapoo Creek, so it remains classified for primary contact recreation.

The DO impairment for Kickapoo Creek in Henderson County is classified 5c indicating that additional data or information are needed before a management strategy is selected. The DO impairment is based on three 24-hr DO monitoring events, and at least 10 samples are required as adequate data for assessment. To provide additional data to aid with assessment of the indicated DO impairment, TIAER conducted 24-hr DO monitoring during the previous characterization project.

Project Narrative

General Project Description (Include Project Location Map)

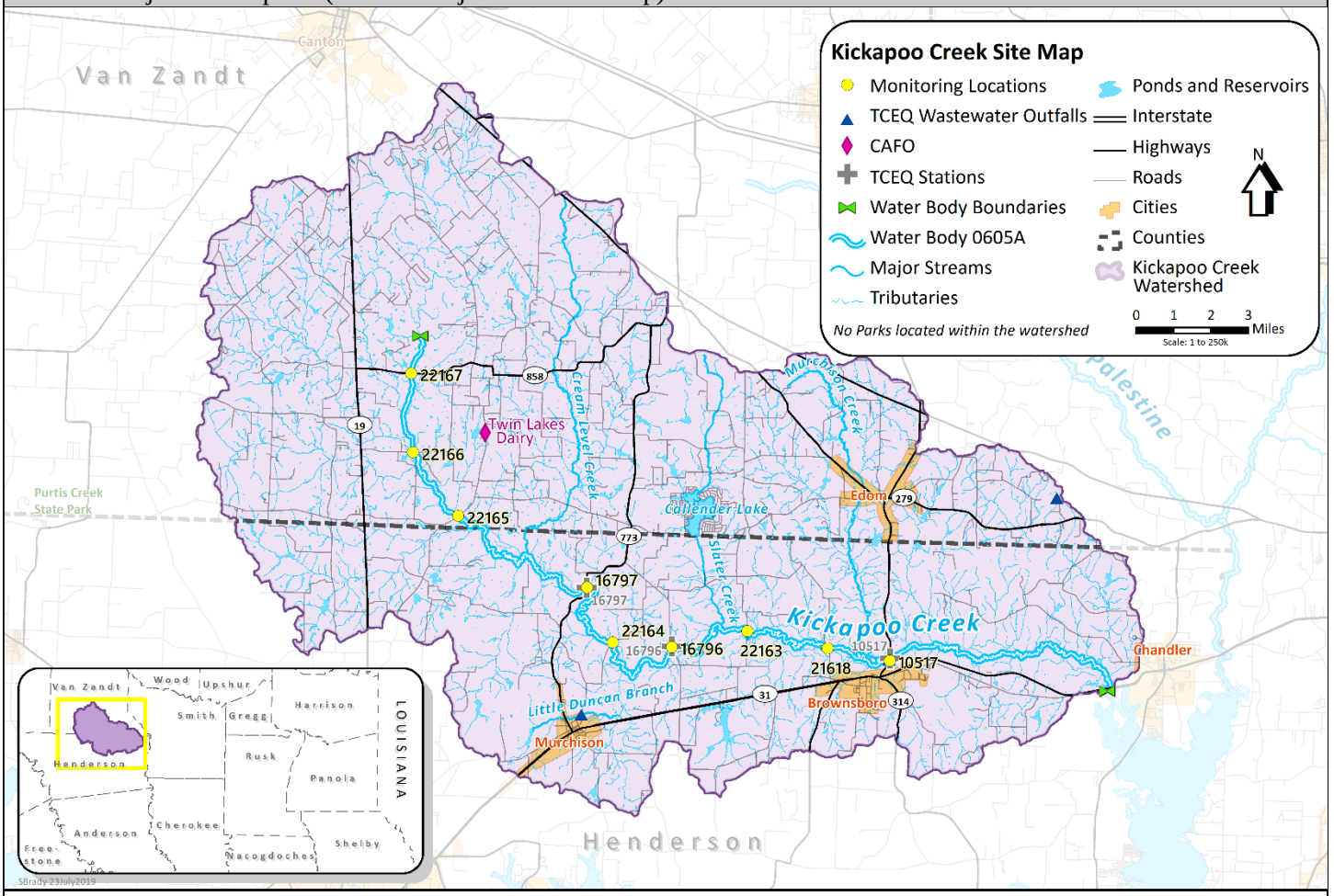

Figure 1 Kickapoo Creek in Henderson County (0605A) Watershed

The purpose of this project is to develop a stakeholder driven WPP for the Kickapoo Creek in Henderson County watershed that meets the nine essential elements outlined by EPA as fundamental to a successful watershed based plan. The project will build on a current 319 project, Characterizing the Kickapoo Creek in Henderson County Watershed, for which TIAER is the lead partnering with the Angelina-Neches River Authority. The current project satisfies Elements A and B of the EPA guidance by characterizing sources of pollution and determining the load reductions as needed to meet water quality standards. The current project has also established the stakeholder group and process. This proposal seeks to address Elements C through I and develop a WPP to achieve the needed pollutant load reductions.

The WPP will be assembled in accordance with EPA's 9-element criteria. Monitoring of the watershed will also continue to provide stakeholders with feedback on current conditions as a mechanism to engage stakeholders as well as track changes in water quality conditions spatially and temporally.

The water quality data currently available for Kickapoo Creek watershed that will be used in our analysis is shown in Table 1.

Table 1 Water Quality data availability for the Kickapoo Creek watershed (* Instantaneous discharge)

Monitoring Station Description	Station ID	Period of data availability						
		Flow*	**TSS**	**Nitro-gen**	**Phos-phorus**	**DO**	**BOD**	**Bacteria**
Kickapoo Creek at FM 858	22167	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020
Kickapoo Creek at Van Zandt CR 4206	22166	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020
Kickapoo Creek at FM 1861	22165	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020
Kickapoo Creek at FM 733 near Murchison	16797	2008-2018 2019-2020	2008-2016 2019-2020	2008-2016 2019-2020	2008-2016 2019-2020	2000-2016 2019-2020	1999-2000 2019-2020	2008-2017 2019-2020
Kickapoo Creek at Henderson CR 3806	22164	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020
Kickapoo Creek at FM 1803	16796	-- 2019-2020	2005-2008 2019-2020	2005-2008 2019-2020	2000-2008 2019-2020	2000-2008 2019-2020	1999-2000 2019-2020	2005-2008 2019-2020
Kickapoo Creek upstream of Henderson CR 3520	22163	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020	2019-2020
Kickapoo Creek at Henderson 3514	21618	--- 2019-2020	--- 2019-2020	2015-2017 2019-2020	2015-2017 2019-2020	--- 2019-2020	--- 2019-2020	--- 2019-2020
Kickapoo Creek at FM 314 near Brownsboro	10517	1978-1986 2019-2020	1997-2010 2019-2020	1997-2010 2019-2020	1999-2010 2019-2020	1997-2010 2019-2020	1998-2000 2019-2020	2000-2010 2019-2020

As a part of the proposed project, additional data will be collected and they will also be used in the watershed characterization process. Direct water quality monitoring will be conducted to supplement existing data and allow better targeting of sources by increasing the frequency and number of locations where specifically bacteria data are collected. Routine water quality data will be collected monthly at 9 stations within the watershed for up to 18 months. Sampling

will include routine field parameters (water temperature, pH, DO, conductivity, and instantaneous flow) and collection of water samples for analysis of *E. coli*, ammonia (NH_3-N), total suspended solids (TSS), volatile suspended solids (VSS), nitrate-nitrogen+nitrite-nitrogen (NO_2-N+NO_3-N), total Kjeldahl nitrogen (TKN), ortho-phosphorus (PO_4-P), total phosphorus (TP), biochemical oxygen demand (BOD), and chlorophyll-a (CHLA). Water samples will be delivered to the Angelina & Neches River Authority Laboratory (ANRA) within the appropriate holding time for analysis of bacteria. All other laboratory analyses will be conducted by TIAER's laboratory. To provide additional data to aid with assessment of the indicated DO impairment, 24-hr DO monitoring will occur in conjunction with routine monthly at up to three locations. The direct data from this project will be evaluated along with historical data to indicate current conditions and trends.

This proposed project will use GIS analyses being conducted under the current characterization project to help in identifying sources of pollutants. The data being used for conducting the GIS analysis include, the most recent version of National Land Cover Database (NLCD 2016) (https://www.mrlc.gov/data), the soil map and the associated data from Soil Survey Geographic Database (SSURGO) and National Elevation Dataset (NED) (https://catalog.data.gov/dataset/usgs-national-elevation-dataset-ned). For details on livestock operations, cropping system, and irrigation we will use 2017 Agricultural Census data (https://www.nass.usda.gov/AgCensus). Types and population of wild animals and domestic pets in the watershed will be estimated and included in the analysis, because they are important sources of bacterial impairment of the Kickapoo Creek. Quantity and quality of municipal and industrial wastewater discharged to Kickapoo Creek will be obtained from the EPA Enforcement and Compliance Data website (https://echo.epa.gov/) or from TECQ permit information.

There was one USGS monitoring station recording daily streamflow for Kickapoo Creek near Brownsboro, TX. It was operational from January 1968 to July 1989 only, and no flow observations are available for this watershed for nearly three decades. For estimation of pollutant load reductions, it was decided to use Load Duration Curve (LDC) approach which require streamflow data at many locations along the Kickapoo Creek. Therefore, as a part of the ongoing watershed characterization project, streamflow data was estimated for Kickapoo Creek at nine locations (where the water quality is currently monitored) using a drainage area ratio approach. For this project, the estimated streamflow data for the Kickapoo Creek in the ongoing effort will be used with updated data for the most recent three years.

To aid in assessing conditions under which exceedances to bacteria water quality standards occur, LDCs will be developed. The LDC approach (USEPA 2007), although not based on pollutant fate and transport mechanisms, provides simple ways of understanding the water quality data and interpret information. It uses time series of flow data along with water quality data (observations monitored at infrequent intervals/water quality criterion) to obtain pollutant loads. The approach allows for characterizing the water quality during different seasons or flow regimes (high flow, low flow, moist conditions etc.) within a year. The duration curve approach also provides a way to link water quality impairments with watershed processes that are important to identify the pollutant sources and estimate the load reductions (USEPA 2007).

The GIS overlay of relevant data will help to shed more light on the pollutant sources identified by the LDC. For example, if the LDC points out that the source of nutrient pollution is from a non-point source, an over lay of the drainage area of a particular water quality monitoring station with land cover data can point out the dominant pollutant source as forested area (manure nutrient discharge from wild animals in the forest) or cultivated crop land (land applied fertilizer/manure for the crop).

To address the depressed DO problem, various graphical, statistical, and qualitative analyses will be performed to investigate relationships of DO to various water quality and streamflow variables. The concentration of nutrient forms can provide an indication of nutrient enrichment and conditions favorable for eutrophication, whereas, parameters such as ammonia nitrogen (NH_3-N) (which oxidizes to nitrate (NO_3-N), carbonaceous biochemical oxygen demand (CBOD), volatile suspended solids (VSS), and total organic carbon (TOC) can provide indications of the amount of oxygen-demanding substances in the water. Various descriptive and inferential statistics will be computed to provide insights into DO conditions in the Kickapoo Creek and any reasonable cause-and-effect relationships that may exist between these parameters and DO. Further, to provide a DO spatial continuum along the Kickapoo Creek, data from all the nine

stations will be analyzed together. DO concentrations will also be correlated with season and water temperature because of the inverse relationship of the saturation concentration of DO to water temperature.
The current Kickapoo Characterization project also has established the stakeholder group and process. This project proposes to seek to address Elements C through I and then develop a plan of action and WPP to achieve the needed pollutant load reductions. The plan of action is to be developed through an inventory and evaluation of existing water quality management practices and programs. The evaluation will identify program needs and opportunities. The plan of action will be designed to address these needs and opportunities. The WPP will be assembled in accordance with EPA's 9-element criteria. Monitoring of the watershed will also continue to provide stakeholders with feedback on current conditions as a mechanism to engage stakeholders as well as track changes in water quality conditions spatially and temporally. The water quality monitoring plan developed for the project will be designed based on stakeholder feedback regarding information and locations they are interested in that will aid in their development of the WPP.

Tasks, Objectives and Schedules				
Task 1	Project Administration			
Costs	$19,091			
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	TIAER 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 1st of December, March, June and September. QPRs shall be distributed to all Project Partners.			
	Start Date	Month 1	Completion Date	Month 27
Subtask 1.2	TIAER 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 27
Subtask 1.3	TIAER 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. TIAER will develop lists of action items needed following each project coordination meeting and distribute to project personnel.			
	Start Date	Month 1	Completion Date	Month 27
Subtask 1.4	TIAER 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 20	Completion Date	Month 27
Deliverables	• 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	Quality Assurance			
Costs	$25,074			
Objective	To develop data quality objectives (DQOs) and quality assurance/control (QA/QC) activities to ensure data of known and acceptable quality are generated through this project.			
Subtask 2.1	TIAER will develop a QAPP for activities in Task 4 consistent with the most recent versions of *EPA Requirements for Quality Assurance Project Plans (QA/R-5)* and the *TSSWCB Environmental Data Quality Management Plan*. All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the *TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)* and *Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416)*. [Consistency with Title 30, Chapter 25 of the Texas Administrative Code, *Environmental Testing Laboratory Accreditation and Certification*, which describes Texas' approach to implementing the National Environmental Laboratory Accreditation Conference (NELAC) standards, shall be required where applicable.]			
	Start Date	Month 1	Completion Date	Month 3
Subtask 2.2	TIAER will implement the approved QAPP. TIAER will submit revisions and necessary amendments to the QAPP as needed.			
	Start Date	Month3	Completion Date	Month 27
Deliverables	• QAPP approved by TSSWCB and EPA in both electronic and hard copy formats • Approved revisions and amendments to QAPP, as needed • Data of known and acceptable quality as reported through Task			

Tasks, Objectives and Schedules				
Task 3	Kickapoo Creek WPP Development			
Costs	$80,478			
Objective	To coordinate and facilitate public involvement in a local watershed stakeholder group that will provide input into the decision making process for developing a nine-element WPP			
Subtask 3.1	TIAER will work with watershed stakeholders to inventory and evaluate existing watershed management programs and identify program needs and opportunities.			
	Start Date	Month 1	Completion Date	Month 27
Subtask 3.2	TIAER will work with watershed stakeholders to assemble the WPP into a document that will satisfy EPA's nine key elements (A-I) for a watershed plan.			
	Start Date	Month 6	Completion Date	Month 27
Subtask 3.3	TIAER and project partners will present and deliver a final draft WPP to stakeholders for comment and review. Comments received will be addressed and the WPP will be sent to TSSWCB and EPA for review. The project team will work with stakeholders to address any EPA comments.			
	Start Date	Month 6	Completion Date	Month 27
Deliverables	• Draft WPP • Final WPP			

Tasks, Objectives and Schedules				
Task 4	Monitoring to Facilitate Development of WPP			
Costs	$74,462			
Objective	Continue to provide monitoring data for use by the stakeholder group in development of the WPP.			
Subtask 4.1	TIAER will conduct routine, monthly, ambient water quality monitoring at 9 sites in the Kickapoo Creek in Henderson County watershed for up to 18 months. Routine field parameters will include water temperature, pH, DO, conductivity, and instantaneous flow. Water samples will be collected for analysis of *E. coli*, NH_3-N, TSS, VSS, NO_2-N+NO_3-N, TKN, PO_4-P, TP, BOD, and ChlA. Angelina - Neches River Authority Laboratory (ANRA) will conduct *E. coli* analyses. All other laboratory analyses will be conducted by TIAER's laboratory. To provide additional data to aid with assessment of the indicated DO impairment, TIAER will conduct 24-hr DO monitoring in conjunction with routine monthly at up to three locations.			
	Start Date	Month 1	Completion Date	Month 27
Subtask 4.2	ANRA Laboratory will transfer completed lab analysis data to TIAER who will maintain a master database of collected data. Data will be submitted to TSSWCB by TIAER for submission to SWQMIS on a quarterly basis.			
	Start Date	Month 3	Completion Date	Month 27
Deliverables	• Documentation of sampling events in QPRs • SWQMIS data submissions (Data sets, Data Review Checklists) • Data Summary included in Final Report			

Tasks, Objectives and Schedules				
Task 5	Water Quality Characterization and Pollutant Source Identification			
Costs	$34,136			
Objective	Continue the comprehensive inventory of data from the previous watershed characterization, continue to characterize the water quality of Kickapoo Creek based off data collected in Task 4, use data inventory and new data to continue identification of the causes and sources of water quality impairments in the watershed and estimate load reductions needed to meet the water quality standards for bacteria and dissolved oxygen (DO).			
Subtask 5.1	TIAER will develop a continue to build on the comprehensive data inventory for the watershed (originally created during the previous watershed characterization) by assembling all the existing information. This data inventory will include historical weather, water quality, streamflow, and estimated information on wildlife and livestock densities, population characteristics, discharges from wastewater treatment facilities (WWTFs), on-site sewage facilities (OSSFs), and other relevant information, such as soils, topography, and land cover.			
	Start Date	Month 3	Completion Date	Month 22
Subtask 5.2	TIAER will conduct water quality data analysis using GIS information collected with the data inventory of the previous watershed characterization to spatially display potential sources of water quality impairments and concerns in conjunction with water quality information. Water quality data for bacteria and streamflow data (estimated) will be used to develop LDCs for bacteria to aid in assessing flow conditions under which exceedances to bacteria and water quality standards occur. DO and saturation DO will be correlated with various water quality variables to identify the probable causes of depressed DO. A graphical analysis will also be carried out to support the interpretation of results.			
	Start Date	Month 7	Completion Date	Month 24
Subtask 5.3	Using loading data from causes and sources and LDC analysis collected in subtask 4.1, estimated pollutant loading reductions needed to meet water quality standards and other goals will be calculated.			
	Start Date	Month 10	Completion Date	Month 27

Deliverables	• Watershed Data Inventory • Maps Showing Spatial Distribution of Potential Pollutant Sources using GIS • Documentation of (a) LDC analysis and Pollutant Load Reduction Estimates for E. coli (b) Relationship of DO with various water quality parameters and identification of the probable causes of depressed DO in the Kickapoo Creek

Project Goals (Expand from Summary Page)

To develop a WPP for the Kickapoo Creek in Henderson County based on stakeholder involvement leading to a plan that will comprehensively address all water quality impairments and concerns in a sustainable manner.

Measures of Success (Expand from Summary Page)

Overall, this project will be successful when stakeholders have contributed to a consensus decision of goals, objectives, and indicators for addressing the water quality issues in the watershed. Through stakeholder involvement and public meetings, outlined in the tasks above, goals, objectives, and indicators will be tracked across meetings for consistency and overlap and presented to full stakeholder groups for a consensus decision. Further, this project will be successful when the watershed has been characterized through data collection efforts and loadings and loading reductions have been calculated. Progress will be reported in quarterly progress reports and results will be provided in a final report.

2017 Texas NPS Management Program **Reference (Expand from Summary Page)**
Components, Goals, and Objectives
• Component 1: Explicit short – and long-term goals, objectives … that protect surface and groundwater. • LTG 1: Focus NPS abatement efforts, implementation strategies, and available resources in watershed identified as impacted by nonpoint source pollution • LTG 2: Support the implementation of state, regional and local programs to prevent NPS pollution through assessment, implementation and education • LTG 3: Support the implementation of state, regional, and local programs to prevent nonpoint source pollution, such as the implementation of strategies defined in TMDL I-Plans, WPPs, and other water quality planning efforts in the state. • LTG 6: Develop partnerships, relationships, memoranda of agreement, and other instruments to facilitate collective, cooperative approaches to manage nonpoint source pollution. • LTG 7: Increase overall public awareness of NPS issues and prevention activities • LTG 8: Enhance public participation and outreach by providing forums for citizens and industry to contribute their ideas and concerns about the water quality management process • STG 1: Data Collection and Assessment: coordinate with appropriate federal, state, regional, and local entities…where additional information may be needed o Objective B: Ensure that monitoring procedures meet quality assurance requirements ….or TSSWCB Quality Management Plans o Objective C: Conduct special studies to determine sources of nonpoint source pollution and gain information to target water quality planning and BMP implementation o Objective E: Conduct monitoring to determine effectiveness of TMDL I-Plans, WPPs, and BMP implementation • STG 2: Implementation: Implement TMDL I-Plans and/or WPPs and other state, regional, and local plans/programs to reduce nonpoint source pollution by targeting implementation activities to the areas identified as impacted or potentially degraded nonpoint source pollution with respect to use criteria. o Objective A: Work with regional and local entities to determine priority areas…address nonpoint source pollution in those areas. o Objective B: Develop and implement BMPs to address constituents of concern or water bodies not meeting… as impacted by nonpoint source pollution. o Objective C: Develop and implement BMPs to address nonpoint source… or vulnerable to nonpoint source pollution o Objective D: Implement TMDL I-Plans, WPPs, and other state, regional, and local plans… as impacted by nonpoint source pollution. • STG 3: Education: Conduct education and technology transfer activities to help increase awareness of NPS pollution and prevent activities contributing to the degradation of water bodies, including aquifers, by NPS pollution o Objective A: Enhance existing outreach programs at the state, regional and local levels to maximize the effectiveness of NPS education o Objective B: Administer programs to educate citizens about water quality… nonpoint source pollution. o Objective D: Conduct outreach through the …Angelina – Neches River Authorities, Soil and Water Conservation Districts, and others to facilitate broader participation and partnerships. 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 o Objective G: Implement public outreach and education to maintain and restore water quality in water bodies impacted by NPS pollution
Component 2: Working partnerships and linkages to appropriate state … regional and local entities, private sector groups and Federal agencies.
Component 3: Combination of statewide nonpoint source programs with on-the-ground projects to achieve water quality benefits; … state and federal programs

Component 7: Manage and implement the NPS program efficiently and effectively, including necessary financial management

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

Category	Costs
Personnel	$ 107,940
Fringe Benefits	$ 39,730
Travel	$ 4,816
Equipment	$ 0
Supplies	$ 575
Contractual	$ 0
Construction	$ 0
Other	$ 56,295
Total Direct Costs	$ 209,356
Indirect Costs (≤ 15%)	$ 23,885
Total Project Costs	$ 233,241

Budget Justification		
Category	Total Amount	Justification
Personnel	$ 107,940	TIAER Project Manager @ $58,284/year @ 26.97% FTE (yr 1); 33.25% FTE (yr 2): $37,355 TIAER Research Associate @ $66,897/year @ 11.55% FTE (yr1); 14.57% FTE (yr 2): $19,220 TIAER Sr. Research Assistant @ $44,106/year @ 9.64% FTE (yr1); 6.00% FTE (yr 2): $7,460 TIAER Lab QAO @ $91,350/year @ 9.43% FTE (yr1); 9.71% FTE (yr 2): $18,286 TIAER Sr. Research Associate @ $57,960/year @ 9.58% FTE (yr1); 10.59% FTE (yr 2): $12,586 TIAER Sr. Research Associate @ $51,744/year @ 0.92% FTE (yr1); 2.00% FTE (yr 2): $1,625 TIAER hourly employee @ $29.41/hour for 3.73 hours/week for 52 weeks (yr 1); $29.41/hour for 3.73 hours/week for 52 weeks (yr 2): $11,408 *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 the 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.**
Fringe Benefits	$ 39,730	Salaried Employee Fringe Benefits Calculated at: 0.185 * salary +$771/mo. Hourly Employee Fringe Benefits Calculated at: 0.11 * salary *(Fringe benefits estimates are based on salary estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in the aggregate, will not exceed the overall estimated total.) *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.
Travel	$ 4,816	Travel, including fuel, by field crew (3 people) to and from sampling sites for sample retrieval and general maintenance (estimated 2 trips during year 1 and 12 trips during year 2) to sampling sites, hotel at State Rate, and meal per diem $51/day By TIAER staff, including fuel, to and from stakeholder and steering committee meetings (4 overnight trips/year for 3 people during year 1, 6 overnight trips/year for 3 people during year 2, 2 overnight trips/year during year 3), Stephenville to the Kickapoo Creek watershed, hotel at State Rate, and meal per diem $51/day)
Equipment	$ 0	N/A
Supplies	$ 575	Field supplies- waders, sample maintenance, repairs, paint/batteries/ice/water, mailing envelopes and labels, etc.
Contractual*	$ 0	N/A
Construction	$ 0	N/A

Other	$ 56,295	Vehicle Maintenance for monthly monitoring, and public meetings: $547 Project website domain through GoDaddy.com: $144 for 2 years Postage fees for 12 public meetings over 3 years: $223 TIAER Laboratory Costs: 9 stations monthly for 18 months. Cost per sample may total up to $335 per sample. It is estimated that total TIAER lab analysis will total up to $50,121. ANRA laboratory costs (9 stations monthly for 18 months for bacteria): • Laboratory Analysis for bacteria: 162 samples @ $30 each = $4,860 Facility Room Rental: $400
Indirect	$ 23,885	Total indirect calculated at 15% of modified total direct = total direct ($209,356 minus total TIAER Laboratory ($50,121) = MTDC of $159,235