



**Texas State Soil and Water Conservation Board
Section 319(h) Nonpoint Source Program
FY 2007 Project 07-07**



NONPOINT SOURCE SUMMARY PAGE for the CWA, Section 319(h) Agricultural/Silvicultural Nonpoint Source Program			
Title of Project:	Assessment of NPS Pollution from Cropland in the Oso Bay Watershed		
Project Goals/Objectives:	<p>The long-term goal of this project is to support program implementation efforts of the Texas State and Water Conservation Board (TSSWCB), the Nueces Soil and Water Conservation District (SWCD) #357, and the Texas Commission on Environmental Quality (TCEQ) established to protect and restore the water quality of the Oso Bay and Oso Creek water bodies from nonpoint source pollution. Short-term goals and objectives pursued in the project are (a) the assessment of runoff-related loadings of nutrients, selected inorganic ions, suspended sediments, and bacteria (<i>Enterococcus</i>) from the Oso Creek's watershed and (b) the development of a better understanding of the role of these runoff-related loadings on the dynamics of water quality properties in these water bodies. The Texas Agricultural Experiment Station-Corpus Christi (TAES-CC), the U.S. Geological Survey at San Antonio, Texas (USGS-SA), and the Texas A&M University - Corpus Christi (TAMU-CC), would pursue these goals and objectives cooperatively.</p>		
Project Tasks:	<p>Characterization of streamflow and water-quality constituent loadings (nutrients, major ions, and <i>Enterococcus</i> bacteria) during runoff events emerging from two tributaries (West Oso Creek on Merrett Rd. and tributary on FM 2444) that drain agricultural watersheds in the Oso Creek basin, and estimation of annual loadings of nutrients and major ions applied to croplands in these watersheds.</p>		
Measures of Success:	<ul style="list-style-type: none"> • Quantification of nutrient, selected inorganic ions, suspended sediments, and concentration of pollutant bacteria exiting cropland-dominated watersheds draining into the Oso Creek during storm water runoff events. • Improved knowledge of the role of runoff-related loadings on water quality conditions of the Oso Creek and Oso Bay and the relationship between streamflow conditions and water pollutants in the Oso Creek to support program implementation efforts of the Texas State and Water Conservation Board (TSSWCB), the Nueces Soil and Water Conservation District (SWCD) #357, and the Texas Commission on Environmental Quality (TCEQ) established to protect and restore the water quality of the Oso Bay and Oso Creek water bodies from nonpoint source pollution. 		
Project Type:	Implementation (); Education (); Watershed Planning (); Assessment (X); Groundwater ()		
Status of Water Body: 2004 Water Quality Inventory and 303(d) List	Segment ID: 2485 A	Parameter: Bacteria	Category: 5a
Project Location: (Statewide or County and Watershed Name)	Nueces County. Oso Creek watershed.		
Key Project Activities:	Hire Staff (); Monitoring (X); Regulatory Assistance (); Technical Assistance (); Education (); Implementation (); Demonstration (); Planning (); Other ()		
NPS Management Program Elements:	<p>Element 1: Explicit short- and long-term goals ... that protect surface and groundwater. Element 2: Working partnerships and linkages to appropriate state, ... federal agencies. Element 5: The state program identifies waters and their watersheds impaired by nonpoint source pollution conducting more detailed watershed assessments...</p>		

Project Costs:	Federal:	\$ 165,050	Non-Federal Match:	\$ 112,112	Total:	\$ 277,162
Project Management:	TAES-CC P.I. Carlos J. Fernandez, Ph.D. and Texas State Soil and Water Conservation Board					
Project Period:	September 1, 2007 – September 31, 2010					

Part I – Applicant Information

Applicant							
Project Lead	Carlos J. Fernandez						
Title	Associate Professor						
Organization	Texas Agricultural Experiment Station – Corpus Christi						
E-mail Address	cj-fernandez@tamu.edu						
Street Address	10345 Agnes St.						
City	Corpus Christi	County	Nueces	State	TX	Zip Code	78406
Telephone Number	361-265-9201			Fax Number	361-265-9434		

Project Partners	
Names	Roles & Responsibilities
Carlos J Fernandez, TAES Project Leader	<ul style="list-style-type: none"> a) development of a project QAPP, b) operation and maintenance of water-quality monitoring and sampling stations, c) sample collection, processing, and shipment of samples to NWQL (nutrients and major ions) and TAMU-CC (bacteria), d) contact with property owners to obtain annual loadings of constituents in the watersheds, and e) provide quarterly progress reports to TSSWCB and USEPA.
Darwin Ockerman, USGS Project Chief	<ul style="list-style-type: none"> a) provide assistance in the development of project QAPP, b) provide assistance to TAES-Corpus Christi in relation to operation and maintenance of water-quality monitoring and sampling stations, c) obtain streamflow measurements to estimate watershed runoff, d) provide direction and assistance to TAES with regard to sample collection, processing, and shipment, in accordance with approved QAPP procedures, e) maintain of stream flow, precipitation, and water quality databases, and f) provide quarterly progress report to TAES and publishing a USGS report summarizing the results of the study.
Joanna Mott, Professor, Chair Department of Life Sciences, TAMU-Corpus Christi	<ul style="list-style-type: none"> a) providing assistance in the development of project QAPP in what refers to bacteria collection and analytical methods, b) providing direction and assistance to TAES-CC with regard to sample collection, processing, and shipment, in accordance with approved QAPP procedures, c) conducting the analysis of the collected bacteria samples, and

	d) providing quarterly progress report to TAES-CC and publishing a TAMU-CC report summarizing the results of the study.
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Part II – Project Information

Project Type							
Surface Water	<input checked="" type="checkbox"/>	Groundwater	<input type="checkbox"/>				
Does the project implement recommendations made in a Watershed Protection Plan or TMDL Report or Implementation Plan?				Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
If yes, identify the document. (Approved or Draft)		A draft TMDL Report for the Oso Bay Watershed is currently being compiled					
If yes, identify the agency/group that developed and/or approved the document.		TCEQ			Year Developed		2007

Watershed Information				
Watershed Name(s)	Hydrologic Unit Code (8 Digit)	Segment ID	305 (b) Category	Size (Acres)
Oso Creek (West Oso Creek tributary)		2485A	5a	5,145
Oso Creek (tributary at FM 2444)		2485A	5a	5,287

Project Narrative

Problem/Need Statement

Oso Bay (Segment 2485) is a secondary bay with a surface area of approximately seven square miles situated on the southern shore of Corpus Christi Bay that exchanges water with the Corpus Christi Bay and receives freshwater inflows from Oso Creek (Segment 2485A). Oso Creek is a water stream approximately 28 miles long, whose lower half is tidal and dominated by permitted discharges with a total flow of approximately 574 MGD. Land use in the Oso Creek watershed is mostly cropland (67.8%). Other land uses include urban development (13.8%), grass/shrublands (9%), wetlands/water (7.3%), forested upland (2%), and barren (0.2%).

The state of Texas requires that the water quality in Oso Bay and Oso Creek be suitable for swimming, wading, fishing, and a healthy aquatic ecosystem. Oso Bay should be also suitable for growing and harvesting clams, mussels, or oysters. As required by Section 303(d) of the federal Clean Water Act, the Texas Commission on Environmental Quality (TCEQ) identified the Oso Bay and Oso Creek as water bodies that do not meet applicable water quality standards. Two water quality impairments were found in Oso Bay, (a) concentrations of dissolved oxygen lower than the criterion established to assure a healthy aquatic ecosystem and (b) elevated concentrations of bacteria that pose a risk to people engaging in contact recreation, i.e. recreation in which people come in direct contact with water. Elevated concentration of bacteria has also been found to be the pollutant responsible of water quality impairment in Oso Creek.

In response to this bacterial pollution in Oso Bay and Oso Creek, the TCEQ conducted a total maximum daily load (TMDL) program to identify the sources of pollution and determine the pollution controls necessary to restore water quality in Oso Bay and Oso Creek. From this project, a TMDL program for bacteria has been proposed (Hay and Mott, 2006) and is under consideration for development and implementation in these water bodies. Hay and Mott (2006) found elevated concentrations of the indicator bacteria *Enterococcus* in several sampling locations in Oso Creek, with the highest values measured during wet samplings. Bacteria concentrations in dry periods were found elevated also and its source remains unknown. Hay and Mott concluded that although bacteria dry loading is small, it remains a critical element in bacteria loading in the Oso Creek and the identification of its source is crucial for developing and implementing a load reduction strategy for Oso Creek.

In relation to the impaired water quality condition identified in Oso Bay, there are concerns about nutrient enrichment from the Oso Creek watershed runoff loadings affecting the concentration of dissolved oxygen in Oso Bay. It has been reported that nutrient and chlorophyll a parameters exceeded TNRCC Water Quality screening criteria within Oso Creek and it has been suggested that nutrient loadings ultimately may affect water quality parameters such as dissolved oxygen and pH (Nicolau, 2001). NPS pollution from nutrient enrichment has been identified on the *2002 State of Texas Clean Water Act 305(b) Water Quality Assessment*. Nutrient enrichment may cause algal blooms and consequently, low levels of dissolved oxygen.

The project currently conducted by the TAES-CC in cooperation with the USGS and managed by TSSWCB (Project 02-13) "Estimation of Water-Quality Constituents Loadings from Agricultural Croplands in the Oso Creek Watersheds" has provided data on runoff-related loadings of nutrients, selected inorganic ions, sediments, pesticides, and bacteria (*Enterococcus*) that have not been available from other agricultural runoff studies that have previously been conducted in the area. For example, runoff samples have been collected

during the fall after a very unusual season characterized by dominance of fallow lands in the sub basins as a result of extensive crop stand failures due to severe spring drought and, later, samples were collected during unusual large winter runoff events. However, although this project, which is scheduled to finish in 2007, has produced quality data, the crop production conditions in 2006 characterized by dominance of fallow lands have been extreme and far from representing an average year. Additional monitoring and data collection are needed to attain better characterization and quantification of nutrient and bacteria loadings emerging from the Oso Creek watershed.

Project Narrative

General Project Description (Include Project Location Map)

This proposed project would consist of TAES-Corpus Christi, USGS-San Antonio, and Texas A&M University-Corpus Christi working cooperatively in the Oso Creek watershed to characterize streamflow and runoff constituent loads and monitor water-quality conditions in two tributaries of the Oso Creek. These data would be used then to (a) assess runoff-related loadings of nutrients, selected inorganic ions, suspended sediments, and polluting bacteria from the Oso Creek watershed, (b) develop a better understanding of the role of these runoff-related loadings on the dynamics of water quality properties in Oso Creek and Oso Bay water bodies, and (c) support program implementation efforts of the Texas State and Water Conservation Board (TSSWCB), the Nueces Soil and Water Conservation District (SWCD) #357, and the Texas Commission on Environmental Quality (TCEQ) established to protect and restore the water quality of the Oso Bay and Oso Creek water bodies from nonpoint source pollution.

The primary specific objectives of this project are to collect, analyze and characterize hydrologic and water-quality data from two tributaries that drain agricultural watersheds in the Oso Creek basin. Rainfall, streamflow, and water quality data including concentrations of nutrients, selected inorganic ions, suspended soil sediments, and bacteria (*Enterococcus*) will be collected during storm runoff events. This data collection will provide improved characterization and assessment of water-quality constituent loadings emerging from the Oso Creek watershed. Annual loadings of nutrients and selected ions applied to croplands in the watersheds will be estimated from data obtained from farmers operating in the watersheds and used for comparison with annual runoff-related constituent loadings. This comparison will allow assessment of the impact of cropland loadings on the water quality of runoff draining in the Oso Creek watershed. These efforts to monitoring runoff water-quality in the Oso Creek watershed will provide data to quantify and further understand the impact of non point sources contributing to the impairment conditions identified as low dissolved oxygen and high concentrations of bacteria.

Runoff Water Quality

For the assessment of runoff-related loadings of nutrients, selected inorganic ions, suspended sediments, and bacteria (*Enterococcus*) from the Oso Creek drainage area, two sub-watersheds would be selected for monitoring. Monitoring stations have already been established on these sub-watersheds. The Texas Agricultural Experiment Station-Corpus Christi (TAES-CC) and the USGS-SA have conducted storm runoff and water-quality monitoring during 2006 and 2007 under TSSWCB Project 02-13. One of these stations is located on the upper reaches of West Oso Creek, at CR-30 (Merrett Road), draining approximately 5,145 acres of agricultural croplands. The other station is located on an Oso Creek tributary at FM 2444 and drains an estimated 5,287 acres of predominantly agricultural cropland (Fig. 1). These two stations were instrumented for the collection of rainfall, water level, stream velocity, and stream discharge on a continuous basis. Automatic water-samplers also collect runoff samples during storm events. The selection of these two sites would allow taking advantage of the existing infrastructure and expand the pool of data already collected from these two watershed sections for a more complete assessment of the contribution of cropland runoff constituents to the water quality condition of Oso Bay. Furthermore, the Oso tributary watershed at FM 2444 is urbanizing. Extended monitoring at this site will yield valuable data on hydrology and water quality to compare with baseline data now being collected. Also, because the West Oso Creek watershed is not experiencing urban development, an extended data collection at this site would also be useful for comparison with the developing watershed of the Oso tributary at FM 2444 in a paired watershed approach. Another

benefit of continuing the monitoring at these sites is to study the effects of changing agricultural practices on water quality, such as reduced tillage practices.

Streamflow monitoring and water quality sampling program will include continuous measurement of rainfall and streamflow, and automatic collection of water samples during the runoff events for water quality analysis. Four runoff-event samples also will be collected at each station. Locations of data collection sites are shown in Fig. 1. The automatically collected water samples will be analyzed for sediment, nutrients, and major ions. In addition, discrete water samples will be collected from these two sites during runoff events to assess runoff-related bacteria (*Enterococcus*) concentrations. Four rainfall samples also will be collected and analyzed for nutrients and major ions. The streamflow and water-quality data will be used to calculate constituent loads and Event Mean Concentrations (EMCs) from storm events as well as annual loadings for each tributary site.

Estimates of annual loadings of nutrients and selected ions applied to the two watersheds will be obtained from farmers operating in these watersheds. For this activity, the Nueces SWCD #357 will provide information related to individual farm boundaries, field, land use, and acres, soil maps, nutrient management plans, erosion worksheets, and contact information of farmers.

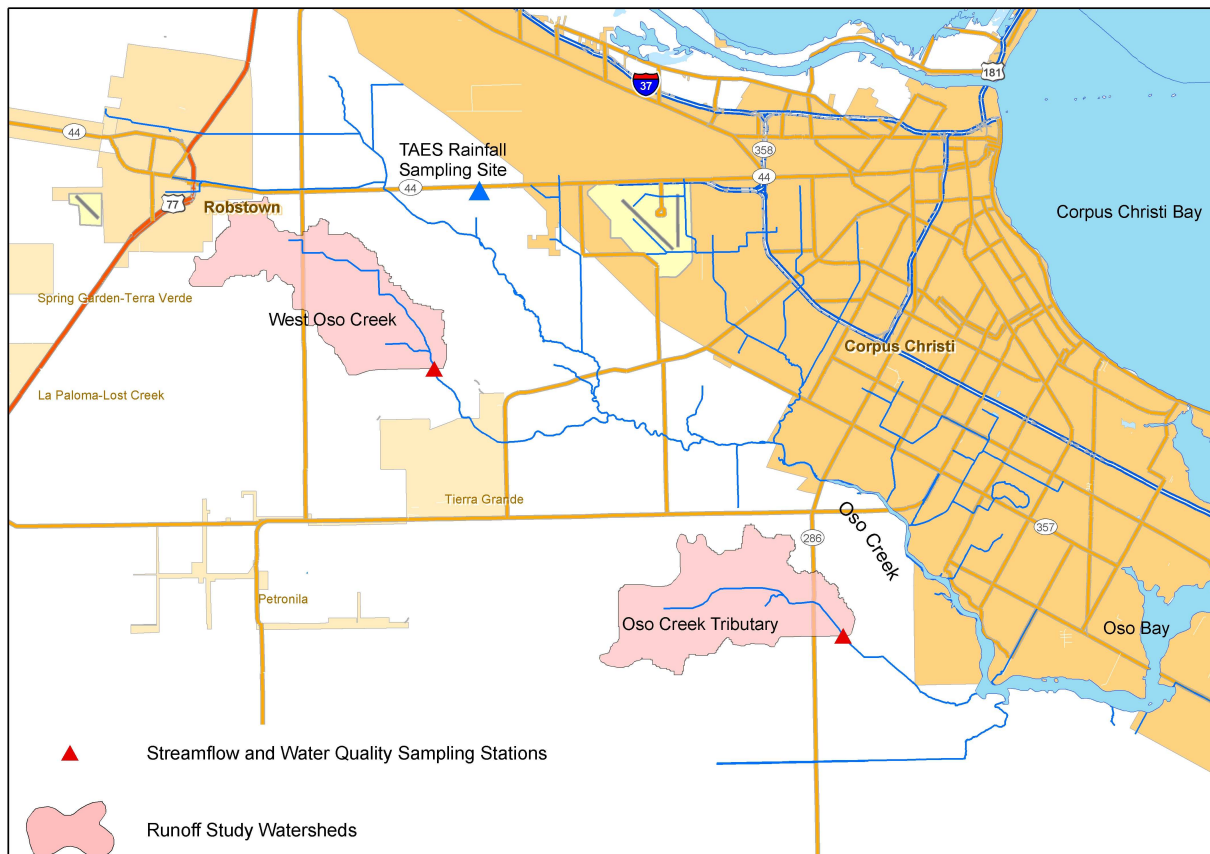


Figure 1. Map of Oso Creek Study Area

In this project, Texas Agricultural Experiment Station – Corpus Christi will be responsible for a) development of a project QAPP, b) operation and maintenance of water-quality monitoring and sampling stations, c) sample collection, processing, and shipment of samples to NWQL (nutrients and major ions) and TAMU-CC (bacteria), d) contact with property owners in the watershed, and e) providing quarterly progress reports to TSSWCB and USEPA.

The United States Geological Survey – San Antonio will be responsible for a) providing assistance in the development of project QAPP, b) providing assistance to TAES-Corpus Christi in relation to operation and maintenance of water-quality monitoring and sampling stations, c) obtaining streamflow measurements to estimate watershed runoff, d) providing direction and assistance to TAES with regard to sample collection, processing, and shipment, in accordance with approved QAPP procedures, e) maintaining of stream flow, precipitation, and water quality databases, and f) providing quarterly progress report to TAES and publishing a USGS report summarizing the results of the study.

TAMU-Corpus Christi will be responsible for a) providing assistance in the development of project QAPP in what refers to bacteria collection and analytical methods, b) providing direction and assistance to TAES-CC with regard to sample collection, processing, and shipment, in accordance with approved QAPP procedures, c) conducting the analysis of the collected bacteria samples, and d) providing quarterly progress report to TAES-CC and publishing a TAMU-CC report summarizing the results of the study.

Capacity of the Performing Entities

The Texas Agricultural Experiment Station (TAES) was created in 1887 as an integral part of the Land Grant System to serve the people of Texas by developing modern farming and ranching methods. TAES has grown to fulfill a much broader mission with the highest levels of ethics, accountability, effectiveness and competence. TAES now fulfills a critical role as Texas’ agricultural, life sciences, and natural resources research agency. One of the primary goals of the Texas Agricultural Experiment Station nowadays is to sustain healthy ecosystems and conserve our natural resources. The Texas A&M University Agricultural Research and Extension Center at Corpus Christi (referred in this project proposal as TAES – CC) has conducted a successful project assessing surface runoff water quality from watersheds in the Coastal Bend (Eddleman and Falconer, 2000) and cooperated in other similarly successful projects with the US Geological Survey (Ockerman and Petri, 2001). The project leader of this proposed project (Dr. C.J. Fernandez) is currently TAES Project Leader of the TSSWCB’s Project 02-13 “Estimation of Water-Quality Constituents Loadings from Agricultural Croplands in the Oso Creek Watersheds” and the Coastal Bend Bays and Estuaries Program’s Project 0539 “Estimation of Pesticide Loadings in Surface water Runoff from Agricultural Croplands in the Oso Creek Watershed”. Dr. Fernandez is the Crop Physiology and Cropping Systems Management project leader at the TAES-CC.

The US Geological Survey is one of the world’s leading scientific agencies and serves the Nation by providing reliable scientific information to help manage water, biological, energy, and mineral resources and to help enhance and protect quality of life. The USGS water resources mission is to provide reliable, impartial, timely information that is needed to understand the Nation’s water resources and to help decision makers to effectively manage ground-water and surface-water resources for domestic, agricultural, commercial, industrial, recreational, and ecological uses. Darwin Ockerman is a USGS hydrologist in the Texas Water

Science Center - San Antonio Project office. Darwin has conducted agricultural and urban runoff-quality studies, watershed modeling of hydrologic and water-quality processes, and studies of effects of land use on streamflow and ground-water recharge. USGS publications (by Ockerman) related to the study of water quality in agricultural areas of South Texas are listed in the references.

Texas A&M University-Corpus Christi is committed to becoming one of the leading centers of higher education in the Gulf of Mexico region while serving the intellectual, cultural, social, environmental, and economic needs of South Texas. Dr. Joanna Mott is Professor and Chair of the Department of Life Sciences, Texas A&M University-Corpus Christi. She has over ten years experience in environmental microbiology, particularly microbiological aspects of surface water quality. Her lab routinely runs analyses for fecal indicators in water samples for several agencies including the Nueces River Authority and is responsible for monitoring 51 stations in four counties for the Texas Beach Watch Program. Dr. Mott is also recognized as an expert in bacteria source tracking and currently serves as a panel member on the State Task Force for Bacteria TMDLs. She has completed a number of projects with agencies including the TCEQ, TGLO, and the CBBEP, performing bacteria source tracking and monitoring for water segments impaired for bacteria (e.g. Copano Bay, Buffalo and Whitoak Bayous in Houston).

References

- Baird, F.C., Dybala, T.J., Jennings, Marshall, and Ockerman, D.J., 1996, Characterization of nonpoint sources and loadings to the Corpus Christi Bay National Estuary Program study area: Texas Natural resources Conservation Commission, Corpus Christi Bay National Estuary Program CCBNEP-05, 226 p.
- Brien A. Nicolau (2001). Water Quality and Biological Characterization of Oso Creek and Oso Bay, Corpus Christi, Texas. A report of the Coastal Coordination Council pursuant to NOAA Award No. NA97OZ017. Online file 67-oso-tnrccandtglo-finalrev1.pdf downloadable from <http://www.tceq.state.tx.us/>
- Hay, R and J. Mott. 2006. Oso Creek and Oso Bay Bacteria Total Maximum Daily Load Model Final Report. Online file 67-osowo2finrpt-dec06.pdf downloadable from <http://www.tceq.state.tx.us/>
- Eddleman, B.R. and L. Falconer. 2000. Assessment of Surface Quality from Agricultural Croplands in the Odem Ranch Watershed. Report CCBNEP-34. Texas Natural Resource Conservation Commission. Austin, Texas.
- Ockerman, D. J. and Livingston, C.W., 1999. Nitrogen Concentrations and Deposition in Rainfall at Two Sites in the Coastal Bend Area, South Texas, 1996-98, U.S. Geological Survey Fact Sheet, FS-146-99, U.S. Geological Survey. Austin, Texas.
- Ockerman, D. J. and B.L. Petri. 2001. Hydrologic Conditions and Water Quality in an Agricultural Area in Kleberg and Nueces Counties, Texas, 1996-98. U.S. Geological Survey Water-Resources Investigation Report 01-4101, U.S. Geological Survey, Austin, Texas. 20 p.
- Ockerman, D. J. 2002. Hydrologic Conditions and Quality of Rainfall and Storm Runoff in Agricultural and Rangeland Areas in San Patricio County, Texas, 2000-01. U.S. Geological Survey Open-File Report 02-291 U.S. Geological Survey. Austin, Texas.

Water Quality Impairment

Describe all known causes (pollutants of concern) of water quality impairments from any of the following sources: 2004 Water Quality Inventory and 303(d) List, 2004 Summary of Waterbodies with Water Quality Concerns (Secondary Concerns List) or Other Documented Sources (ex. Clean Rivers Program Basin Summary or Basin Highlights Reports).

The state of Texas requires that the water quality in Oso Bay and Oso Creek be suitable for swimming, wading, fishing, and a healthy aquatic ecosystem. As required by Section 303(d) of the federal Clean Water Act, the Texas Commission on Environmental Quality (TCEQ) identified the Oso Bay and Oso Creek as water bodies that do not meet applicable water quality standards. The 2004 Texas 3003 (d) List (May 13, 2005), identified Segment ID 2485A of the Oso Creek (lower 25 miles) with the parameter bacteria as the pollutant causing the water quality impairment and assigned the Category 5a to its water quality status. This list also identifies Segment ID 2485 Oso Bay (several areas) with the parameters bacteria as pollutant and depressed dissolved oxygen as water quality condition and assigned Category 5a and Category 5c, respectively, to their water quality status.

In addition, Segment ID 2485A of the Oso Creek has been identified as NPS pollution concern for nutrient enrichment by the *2002 State of Texas Clean Water Act 305(b) Water Quality Assessment*.

Project Goals

The long-term goal of this project is to support program implementation efforts of the Texas State and Water Conservation Board (TSSWCB), the Nueces Soil and Water Conservation District (SWCD) #357, and the Texas Commission on Environmental Quality (TCEQ) established to protect and restore the water quality of the Oso Bay and Oso Creek water bodies from nonpoint source pollution. Short-term goals and objectives pursued in the project are (a) the assessment of runoff-related loadings of nutrients, selected inorganic ions, suspended sediments, and bacteria from the Oso Creek's watershed and (b) the development of a better understanding of the role of these runoff-related loadings on the dynamics of water quality properties in these water bodies. The Texas Agricultural Experiment Station-Corpus Christi (TAES-CC), the U.S. Geological Survey at San Antonio, Texas (USGS-SA), and the Texas A&M University - Corpus Christi (TAMU-CC), would pursue these goals and objectives cooperatively.

Tasks, Objectives and Schedules						
Task 1:	Characterization of streamflow during runoff events and water-quality constituent loadings emerging from two tributaries (West Oso Creek on Merrett Rd. and tributary on FM 2444) that drain agricultural watersheds in the Oso Creek basin, and estimation of annual loadings of the same constituents applied to croplands in this watersheds.					
Costs:	Federal:	\$ 165,050	State:	\$ 112,112	Total:	\$ 277,162
Objective:	Assessment of runoff-related constituent loads (nutrients, major ions, and bacteria) emerging from two Oso Creek sub basins and comparison with annual loadings of same nutrients and major ions applied to croplands in these two sub basins to assess the impact of cropland practices on water quality draining in the Oso Creek.					
Subtask 1.1:	TAES-CC with assistance from TAMU-CC and USGS-SA will update DQOs and QAPP from preceding Project 02-13, on what relates to objective above, to be approved by U.S. EPA.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.2:	TAES-CC with assistance from USGS-SA maintains water quality/quantity monitoring equipment and collects water samples.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.3:	TAES-CC with assistance from TAMU-CC will collect, prepare and ship water samples for determination of indicator bacteria <i>Enterococcus</i> concentration.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.4:	TAMU-CC will analyze water samples for determination of indicator bacteria <i>Enterococcus</i> concentration.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.5:	USGS-SA will analyze the collected runoff water samples to identify and determine concentrations of suspended sediments, nutrient, and major ions.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.6:	TAES-CC and USGS-SA will characterize the quantity and quality of surface runoff exiting the watersheds following rainfall events on the watersheds.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.7:	TAES-CC, TAMU-CC, and USGS-SA will analyze the flow and water-quality data and calculate constituent loads and Event Mean Concentrations (EMCs) from storm events.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.8:	TAES-CC, TAMU-CC, and USGS-SA will compile and analyze sampling data for runoff constituent loadings assessment.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.9:	TAES-CC will compile cropland data to estimate annual loadings of constituents in both watersheds.					
	Start Date:	September 2007		Completion Date:	September 2010	
Subtask 1.10:	TAES-CC and USGS-SA will compare runoff-related constituent loadings and annual loadings of the same constituents to assess the impact of cropland activities on runoff water quality.					
	Start Date:	September 2007		Completion Date:	September 2010	

Subtask 1.11:	TAES-CC, TAMU-CC, and USGS-SA will develop an electronic final report on what respect to objective above, which will include an executive summary of the data collected during the project.		
	Start Date:	July 2009	Completion Date: September 2010
Deliverables	<ul style="list-style-type: none"> • Approved QAPP • Quarterly Progress Reports • Final Report 		

Measures of Success
<ul style="list-style-type: none"> • Quantification of nutrient, selected inorganic ions, suspended sediments, and concentration of pollutant bacteria exiting cropland-dominated watersheds draining into the Oso Creek during storm water runoff events. • Estimation of annual loads of nutrients and other constituents applied to croplands in the watersheds and assessment of their impact on the quality of water draining into the Oso Creek. • Improved knowledge of the role of runoff-related loadings on water quality conditions of the Oso Creek and Oso Bay to support program implementation efforts of the Texas State and Water Conservation Board (TSSWCB), the Nueces Soil and Water Conservation District (SWCD) #357, and the Texas Commission on Environmental Quality (TCEQ) established to protect and restore the water quality of the Oso Bay and Oso Creek water bodies from nonpoint source pollution.

2005 Texas Nonpoint Source Management Program Document Reference
Goals &/or Milestone(s)
Complete development of quality assurance plans (runoff water quality and in-stream water quality) and obtain approval from U.S. EPA.
Complete the water quality and streamflow monitoring according to the procedures established in the approved QAPP.
Complete the estimation of constituent loads during storm runoff events using streamflow and water quality data.
Complete assessment of runoff related indicator bacteria concentrations
Complete estimate of annual loadings applied to croplands in the two watersheds under study
Complete assessment of water quality and the impact of cropland annual loadings of runoff waters draining into Oso Creek.
Complete final project reports (runoff water quality and in-stream water quality).

Part III – Financial Information

Budget Summary			
Federal 319(h)	\$ 165,050	% of total project	59.6 %
Non-Federal Match	\$ 112,112	% of total project (at least 40%)	40.4 %
Total \$ Cost	\$ 277,162	Total project %	100 %
Category	Federal	Non-Federal Match	Total
Personnel	\$ 27,844	\$ 66,339	\$ 94,183
Fringe Benefits	\$ 5,289	\$ 17,841	\$ 23,130
Subtotal Personnel & Fringe	\$ 33,133	\$ 84,180	\$ 117,313
Travel	\$ 0	\$ 0	\$ 0
Equipment	\$ 0	\$ 5,000	\$ 5,000
Supplies	\$ 296	\$ 0	\$ 296
Contractual			
USGS-San Antonio	\$ 99,380	\$ 0	\$ 99,380
TAMU-Corpus Christi	\$ 7,103	\$ 0	\$ 7,103
Construction	\$ 0	\$ 0	\$ 0
Other	\$ 3,610	\$ 0	\$ 3,610
Subtotal	\$ 110,389	\$ 5,000	\$ 115,389
Total Direct Costs	\$ 143,522	\$ 89,180	\$ 232,702
Indirect Costs (15%)	\$ 21,528	\$ 22,932	\$ 44,460
Total Project Costs	\$ 165,050	\$ 112,112	\$ 277,162

The §319(h) Nonpoint Source Program has a 60/40% match requirement. Your entity will be reimbursed 60% from federal funds and must contribute a minimum of 40% of the costs to conduct your project. The 40% match must be from non-federal sources and should be described in your budget detail. Indirect costs are limited to 15%. The project budget generally covers a three year period.

Budget Justification (Federal)		
Category	Total Amount	Justification
Personnel & Fringe Benefits	\$ 33,133	Covers salary including fringe benefits of new hire TAES personnel needed for this project; amount is in proportion to its % effort
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 296	Covers purchase of a variety of materials needed for maintenance of stations and water sampling, assortment of small tools, shipment costs, etc
Contractual	\$ 106,483	Covers contractual cost with USGS-SA for acquisition, maintenance, and operation of monitoring stations, data processing, water and sediments sample analyses, etc.; and contractual cost with TAMU-CC for analyses of bacteria, processing of related data, and reporting
Construction	\$ 0	N/A
Other	\$ 3,610	Computer, printer and software
Indirect	\$ 21,528	Covers TAES indirect costs according to institutional agreements
Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel & Fringe Benefits	\$ 84,180	Covers salaries of existing TAES-Personnel involved in the project in proportion to their % efforts
Travel	\$ 0	N/A
Equipment	\$ 5,000	Covers use of TAES equipment used in this project, primarily vehicles, computers, and other small equipment used in maintenance of monitoring stations and water sample collection.
Supplies	\$ 0	N/A
Contractual	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 22,932	Covers TAES indirect costs associated with matching funds