Fiscal Year (FY) 2015 CWA § 319(h) Scope of Work

1. **Title:**	Cypress Creek Watershed Protection Plan (WPP) Implementation (Years 1-3)
2. **Goals:**	• To implement activities to reduce nonpoint source pollution (NPS) and protect flow in Cypress Creek and its tributaries, as outlined in the Cypress Creek WPP (Phases I and II of the Cypress Creek Project) • To implement activities which prevent increases in NPS in Cypress Creek and its tributaries • To continue to conduct regular partner and stakeholder meetings to encourage citizen participation, provide partners with updates on progress, and seek stakeholder input and recommendations on needed activities • To increase decision-makers' capabilities to preserve water quality through local permitting, ordinances and implementation of Best Management Practices (BMPs) • To increase accuracy of tools available for decision makers to calculate effects of land use changes and development activities on NPS loadings • To coordinate and facilitate stakeholders and partners in identifying and implementing management measures which improve water quality, develop proposals to acquire funding for implementation of management measures, and to manage and track implementation projects while promoting adoption of BMPs • To continue to collect needed water quality monitoring data required for modeling efforts and determination of future management measures) • To collect needed data for monitoring impact of BMPs (improvements in water quality) • To coordinate and conduct water resources and related environmental outreach and education efforts across the watershed • To coordinate site-specific retrofits for Low Impact Development (LID) and provide these as community education projects and demonstration sites for watershed management • To increase capacity to forecast future NPS impacts under changing hydrological settings and management scenarios
3. **Tasks:**	1) Project Administration 2) Quality Assurance and Data Acquisition 3) Monitoring 4) Comprehensive NPS Collaboration/Assessment 5) Installation of Demonstration BMPs 6) Education, Outreach and Community Support 7) Final Reporting

CYPRESS CREEK
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The Meadows Center for Water and the Environment
Texas State University

4. **Measures of Success:**	• Data of known and acceptable quality are generated and used in modeling and decision making activities • Technical assistance is provided to the Cypress Creek Stakeholders and community • Completion of an initial basin-wide NPS Collaboration/Assessment plan that contains recommendations for management measures that mitigate NPS and address stormwater issues • Creation of a comprehensive NPS collaboration and plan to manage NPS pollution in stormwater that will be used by the cities and counties to guide future development, provide information for any necessary revisions of ordinances and select and install the most effective BMPs • Completion of demonstration BMP installation and coordination of pre-installation and post-installation activities, including educational and technical materials and monitoring • Expansion of local education and outreach activities aimed at water quality degradation prevention • Enhancements made to the Cypress Creek Decision Support System including updated land use layers, updated development and build-out scenarios and improved capabilities for site specific development • Review of city and county ordinances to increase effectiveness and improve adoption of LID practices • Maintain project webpage to communicate water quality data, provide information to stakeholders, and provide access to education and outreach information • Progress toward achieving milestones and publish an addendum to the WPP
5. **Water Body Type:**	X Surface Water X Groundwater Surface Water/Groundwater Interactions
6. **Counties:**	Hays County
7. **Segment ID Number:**	Segment 1815
8. **Segment Water Quality Status on the 2012 Texas Integrated Report:**	Parameters(s) of Concern: depressed dissolved oxygen, impaired fish community, impaired habitat, impaired macrobenthic community

9. **Activities:**	
a. *Data Collection & Analysis:*	X Routine Monitoring X Storm Event Monitoring X Specialized Monitoring X Modeling X Data Analysis X Geospatial Analysis/Map Development X BMP Effectiveness Monitoring X Load Calculations ☐Other: Concisely describe the activity.
b. *Planning:*	X Stakeholder Process ☐Watershed Characterization ☐WPP Development X Other: Expanding relationships within the watershed to form an official CCWPP Partnership and interlocal agreements to continue WPP implementation activities and oversight; analyzing cost-benefit results for selected BMPs, structural controls, alternatives, and existing ordinances
c. *Implementation:*	X Implement BMPs of a WPP ☐Implement BMPs of a Total Maximum Daily Load (TMDL) Implementation Plan (I-Plan) X Implement Low Impact Development (LID) BMPs X Implement demonstration BMPs ☐Other: Concisely describe the activity.
d. *Education:*	X Social Marketing X Technology Transfer ☐Other: Concisely describe the activity.
10. **Project Period:**	Upon signature approval of both parties – August 31, 2019

11.	**Organization:**	Texas State University, The Meadows Center for Water and the Environment
12.	**Project Leader:**	Meredith Miller, Emily Warren
13.	**Title:**	Senior Program Coordinator, The Meadows Center for Water and the Environment Associate Director, The Meadows Center for Water and the Environment
14.	**Federal ID No:**	746002248
15.	**E-mail Address:**	MBMiller@txstate.edu, EmilyW@txstate.edu
16.	**Mailing Address:**	Texas State University The Meadows Center for Water and the Environment 601 University Dr.
17.	**City:**	San Marcos, TX
18.	**County:**	Hays
19.	**State:**	TX
20.	**Zip Code:**	78666
21.	**Telephone No:**	512-245-6697, 512-245-4476
22.	**Fax No:**	512-245-7371

23. **Applicant Qualifications:**

Texas State University's Meadows Center for Water and the Environment Description, Experience and Technical Capacity

As a vital part of Texas State University, The Meadows Center for Water and the Environment's (The Meadows Center) faculty and staff have brought multi-disciplinary expertise to complex, real-world, water-related challenges. Since 2002, The Meadows Center has brought together departments and research centers to both engage in scholarly inquiry and to provide practical science-based solutions to these challenges. Our future depends on water. As such, the Meadows Center mission is *to develop and promote programs and techniques for the study and management of water resources for human needs, Ecosystem health, economic development, and public education.*

The Meadows Center has a proven record of successful watershed management activities, including data collection, monitoring, modeling, science-based and interdisciplinary watershed characterizations, facilitating stakeholder and community input, planning for improved water quality and quantity, engaging decision makers for policy improvements, and successfully implementing management techniques to improve watershed.

The Meadows Center has been in a leadership position on numerous Clean Water Act (CWA) Section 319(h) funded programs, including the Cypress Creek WPP, Texas Stream Team, and the Upper San Marcos WPP. The Meadows Center has been instrumental in watershed management projects like the Edwards Aquifer Habitat Conservation Plan, the Transboundary Waters Assessment Programme, and the Regional Framework for Sustainable Use of the Rio Bravo. The Meadows Center has also laid the scientific groundwork for future watershed management in the Pedernales River, the Blanco River, the Red River, and others.

Specific work has included terrestrial and aquatic portions to better understand watershed functions and corresponding planning and management needs. Activities have included surveys and assessments of macroinvertebrates, fishes, riparian plants, macrophyte/instream vegetation, wildlife habitat, land cover and land uses, hydrogeomorphologic characteristics, human demographics and development patterns, and resulting water quality. The Meadows Center has developed WPPs, Species' Conservation and Protection Plans, and Habitat Conservation Plans, including: all technical research activities and stakeholder facilitation; tools like Decision Support Systems (DSS) to assist communities and decision makers with water quality planning and assessment with regard to future development and water use; and assistance with development of federal, state, and private proposals for watershed protection funding.

Due to its long history working with the Texas Commission on Environmental Quality (TCEQ) and other state and federal agencies, the Meadows Center has a proven track record of successfully managing grants and fulfilling grant deliverables in a timely manner.

Key Staff:

Dr. Thomas Hardy will provide general oversight of the monitoring, modeling, and analysis portions of this project. Dr. Hardy holds a Ph.D. in Civil and Environmental Engineering, B.S. and M.S. degrees in Biology and a B.S. in Secondary Education. Dr. Hardy is a member and Certified Fisheries Scientist of the American Fisheries Society, the American Society of Civil Engineers, the American Society of Photogrametry and Remote Sensing, the American Water Resources Association, the International Association for Hydraulic Research and the International Aquatic Modeling Group. He is on the Executive Committee of the International Aquatic Modeling Group and President-Elect of the Ecohydraulics Section of the International Association for Hydraulic Research. Dr. Hardy was the Associate Director of the Utah Water Research Laboratory at Utah State for 10 years and is currently the Chief Science Officer of The Meadows Center for Water and the Environment at Texas State University. Dr. Hardy oversees research on the development, testing, validation, and application of multi-disciplinary methodologies for impact assessments in water resource systems and in particular in the ecohydraulics and instream flow assessments. He has accumulated extensive research and consulting experience since 1977 involving aquatic ecosystems modeling, trophic level dynamics, benthic and macro-invertebrate studies, river and reservoir water quantity and quality modeling, remote sensing and image processing, and development and application of impact assessment methodologies in natural systems. He is a recognized national and international expert on instream flow modeling and multi-disciplinary impact assessments.

Dr. Andrew Sansom will provide strategic guidance and liaising with the community. He is one of Texas' leading conservationists. Dr. Sansom currently serves as Research Professor of Geography and Executive Director of the Meadows Center for Water and the Environment at Texas State University. He is a former Executive Director of the Texas Parks and Wildlife Department and Executive Director of the Texas Nature Conservancy. For his commitment to the management and protection of natural resources, Mr. Sansom is a recipient of the Chevron Conservation Award, The Chuck Yeager Award from the National Fish and Wildlife Foundation, The Pugsley Medal from the National Park Foundation, the Seton Award from the International Association of Fish and Wildlife Agencies and the Lifetime Achievement Award from the Nature Conservancy. He is a Distinguished Alumnus of Austin College and Texas Tech University. Dr. Sansom has dedicated his life to environmental conservation. He has served on the Board of Trustees of the Texas Historical Foundation, Bat Conservation International, KLRU Public Television in Austin, The National

Audubon Society, The Institute of Nautical Archaeology and The Texas Travel Industry Association. He joined the staff of the National Recreation and Park Association in Washington D.C. in l969. He served as Environmental Coordinator for the White House Conference on Youth, Special Assistant to Secretary of Interior Rogers C.B. Morton, Director of Conservation Education at the Federal Energy Administration and Deputy Director of the Energy Institute at the University of Houston. His published works have appeared in *Texas Monthly*, *The Texas Observer*, *Houston City Magazine*, *Politics Today*, *Texas Highways*, *Texas Parks and Wildlife* and *Texas Town and City*. He is the author of five books, *Texas Lost*, *Texas Past*, *Scout the Christmas Dog*, *Water in Texas* and *Southern Plains Bison: Resurrection of the Lost Texas Herd*.

Ms. Emily R. Warren, MSES, MPA will provide general oversight for this program, including internal reporting, reporting to TCEQ and US Environmental Protection Agency (EPA) as appropriate, and oversee budgets and subcontract execution. She is the Associate Director of The Meadows Center for Water and the Environment and since 2003, she has served as the principle manager for The Meadows Center's operations and programs. She has overseen numerous local, regional, and international projects and has coordinated with governmental agencies, non-governmental organizations, and environmental groups. Ms. Warren has worked as the Deputy and Operations Director for U4I, as the Policy and Regulatory Coordinator for Texas Parks and Wildlife Department, as the Assistant Land Steward for the Sycamore Land Trust, and as a Field Botanist with the Army's Office of the Environment in Indiana. In addition to her work with The Meadows Center, Ms. Warren currently serves as a program and management consultant to the United Nations Development Programme's Global Medical Waste Project and is the Operations Consultant for U4I. Ms. Warren holds a master's degree of Science in Environmental Science and a master's degree in Public Affairs.

Ms. Meredith Miller, MS will serve as the Project Manager and Quality Assurance Officer. She joined the Meadows Center for Water and the Environment in 2007 and has worked in several capacities ranging from water conservation research to international watershed management. Her research activities involve instream flows, endangered species habitat studies, water conservation/efficiencies research and watershed protection/restoration efforts. Ms. Miller contributes to several water management and conservation projects, including a comprehensive bi-national management plan for the Rio Grande River basin, in collaboration with the United Nations Environment Programme, the Global Environment Facility, EPA, and The Mexican Federal Government, as well as the UNEP and GEF funded Gulf of Mexico Large Marine Ecosystem Project. She received her BSA from the University of Georgia in Agricultural & Applied Economics in 2004 and her MS in Biology (Aquatic Resources) from Texas State University–San Marcos in 2008. She is currently the Senior Program Coordinator for the Meadows Center. She serves as an International Project Advisor for the International Watershed Studies Program and oversees the Center's Watershed Services Programs and Texas Stream Team, the state-wide water quality citizen science program. Her previous positions include coordinating research at the Warnell School of Forest Resources and the Anthropology Coastal Resources Lab at the University of Georgia.

William Butler, MA will serve as an additional Quality Assurance Officer. Mr. Butler is currently a GIS and Research Associate at the Meadows Center, as well as the Citizen Science and Monitoring Coordinator for Texas Stream Team. He will assist with data management, reporting, and related project activities. Mr. Butler also will conduct water quality monitoring, training, education and outreach activities. Previous positions include GIS Technician at Drilling Info, Inc., and Grant Technician at Texas Stream Team. Mr. Butler holds a Master of Arts from Kansas State University in Geography and a Bachelor of Science from Texas State University in Physical Geography, with focuses in environmental science, geomorphology, biogeography, and mountain geography.

Laura Parchman, BS will provide Geographic Information Systems (GIS) expertise. Ms. Parchman began working for The Meadows Center for Water and the Environment as a graduate student research assistant and is currently the Data and GIS specialist with the Texas Stream Team program. Ms. Parchman maintains the geographic and water quality information for Texas Stream Team, and provides project management, mapping and modeling activities for the Meadows Center. Ms. Parchman served nearly nine years in the United States Navy and was stationed in Monterey, CA; Oahu, HI, and Misawa, Japan.

Project Partner, Matt Heinemann currently serves as the Interim Watershed Coordinator to ensure continuation of the project prior to Implementation. Mr. Heinemann was appointed by the Cypress Creek Stakeholder Committee to serve in this function. Mr. Heinemann is an independent environmental consultant. He has worked with the Wimberley Valley Watershed Association, has been involved in the drafting of the Comprehensive Plan for the City of Wimberley, and has been working to help implement the TMDL for the Lower San Antonio Watershed for the Texas State Soil & Water Conservation Board (TSSWCB). He has supported efforts of the Cypress Creek WPP since inception, serving on a variety of committees, including being Chair of the Education and Outreach committee. During his professional career he has worked with a variety of governmental agencies, environmental consulting firms, and numerous businesses on topics such as outdoor education, real estate around green building, and with environmental and consulting engineering firms.

Project Partner, Tom Hegemier, P.E., D.WRE, Alan Plummer Associates, will provide technical oversight of BMP implementation and will oversee ordinance review and land management activities. Mr. Hegemier has practiced water resources planning and engineering for nearly 33 years in the central Texas and Washington, D.C. areas. His primary areas of expertise are in stormwater quality management, floodplain management, geomorphic assessments, hydrology, hydraulics, drainage infrastructure design, stormwater program operations, and water supply planning. By working in the public and private sectors, he understands the importance of completing projects that serve the public, are cost effective, and have low maintenance requirements. He works at Alan Plummer Associates, Inc. Austin, Texas and is a former manager of the Lower Colorado River Authority Highland Lakes Watershed Ordinance Program that offers low impact and conservation development incentives to expand the use of sustainable measures in protecting water quality and enhancing water supplies. Recent projects he has led apply low impact, green infrastructure, and sustainability principles to retrofit the downtown area of San Marcos, Texas to protect endangered species within the San Marcos River and springs, a federally managed area under the Edwards Aquifer Habitat Conservation Plan. He was recently named to the Stormwater Magazine Editorial Advisory Board and is the chair of the Central Texas Land Water Sustainability Forum.

Technical and Financial Management Capability

Texas State University's Office of Sponsored Programs at Texas State University ensures that externally-funded programs are administered in accordance with applicable State and Federal laws, regulations, Office of Management and Budget Circulars and specific terms and conditions. University Policy and Procedure Statement (UPPS) UPPS No. 02.02.02 (Sponsored Programs – Post Award) identifies the general guidelines for the administration of sponsored programs, including Budgetary Controls (Section 07). Section 10 of this UPPS defines the fiscal responsibilities of the Office of Sponsored Programs, Principal Investigator, Department chairs, school directors, deans, vice presidents, and administrators for all externally funded projects. Furthermore, UPPS No. 03.01.09 (Fiscal Responsibilities of Account Managers), UPPS No. 03.01.05 (University Income Recognition and Associated Cash-handling Procedures) and UPPS No. 02.02.01 (Applying for Sponsored Programs, Section 06.02) provide specific policy guidelines for the fiduciary responsibilities of the Principal Investigator.

24. **Project Partners and Roles:**

Texas Commission On Environmental Quality (TCEQ)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects and TSSWCB.
The Meadows Center for Water and the Environment	Leadership, coordination assistance; in-kind contributions, program management and water quality monitoring; water quality analysis; stakeholder facilitation; modeling and BMP implementation expertise
Texas State University (TXSTATE)	Provide state oversight of all fiscal and contract management; provide match contributions; provide university technical resources and subject matter expertise
Texas Stream Team	Provide education and outreach support and materials; training and support of citizen science-based water quality and environmental monitoring; technical support and assistance with water quality analyses
Wimberley Valley Watershed Association	Community leadership; routine water quality monitoring through the Clean Rivers Program (CRP); in-kind and match funding assistance; technical assistance; participation in stakeholder committee activities
City of Woodcreek	Community leadership; in-kind and match support; technical assistance; participation in stakeholder committee activities and land/facilities for demonstration BMPs
City of Wimberley	Community leadership; in-kind and match support; technical assistance; participation in stakeholder committee activities; land and facilities for demonstration BMPs
Hays County	Community leadership; in-kind and match support; technical assistance; participation in stakeholder committee activities; land and facilities for demonstration BMPs
Guadalupe-Blanco River Authority	Provide technical assistance regarding water quality data collection, interpretation and analyses; provide subject matter expertise regarding pollution estimation/reduction and BMP implementation; participation in stakeholder committee activities; water quality analyses services; in-kind support for technical matters and QAPP development
Citizens Alliance for Responsible Development/ Cypress Creek Watershed Volunteer Advisory Group	Provide education and outreach assistance; in-kind support including technical review of documentation, data analyses, modeling review, GIS efforts and compilation and assessment of hydrological information; community support for implementing WPP activities; subject matter expertise in water quality and source water topics; and participation in Ground- and Source Water to Surface Water Interaction data collection activities
Wimberley Lions Club	Provide in-kind support through the execution of a 3-year speaker series on water topics in the City of Wimberley, including advertisement, facilities rental, filming subject matter experts and hosting speaker series videos on their website
Southwest Research Institute	Provide advice on future Ground- and Source Water to Surface Water Interaction Modeling; Will assist with data collection and analysis; subject matter expertise regarding collection of water quality and groundwater data and analysis

Halff and Associates	Surface water modeling; NPS collaboration/assessment; technical assistance regarding stormwater, water quality and BMP selection topics; in-kind support to develop and maintain QAPPs
Alan Plummer Associates, Inc.	In-kind support and technical assistance with ordinance review and LID/green infrastructure
TRC Solutions	Surface water modeling; NPS collaboration /assessment; technical assistance regarding stormwater, water quality and BMP selection topics; in-kind support to develop and maintain QAPPs
Edwards Aquifer Authority	Assistance with Ground- and Source Water data compilation and analyses
Barton Springs Edwards Aquifer Conservation District	Assistance with Ground- and Source Water data compilation and analyses
US Fish and Wildlife Service	Staff at the San Marcos Aquatic Resource Center/National Fish Hatchery and Technology Center, in partnership with Texas Stream Team, will assist in the sampling, identification and classification of macroinvertebrates, as well as habitat and ecosystem health assessments (rapid and specialized bioassessments).
UT Jackson School of GeoSciences	Staff (Dr. Suzanne Pierce and graduate research assistants) will partner with the Meadows Center for Water and the Environment and the Cypress Creek Stakeholder Committee (including city and county staff members) to enhance the functionality of the Cypress Creek Decision Support System; technical assistance and subject matter expertise
Friends of Blue Hole	Provide assistance with outreach and education and general program support
Hays Trinity Groundwater District	Provide technical assistance for groundwater monitoring and data collection
The Nature Conservancy	Provide education and support to landowners to manage land for conservation within the watershed.
Wimberley Water Supply Company	Provide assistance withy education and outreach and technical expertise regarding water conservation and municipal drinking water supplies
Aqua Water Supply Company	Provide assistance withy education and outreach and technical expertise regarding water conservation and municipal drinking water supplies

25. **Implements a WPP or TMDL I-Plan :**	Yes X No ☐ Document Title: Final CCWPP for Submission to TCEQ and EPA 4-2-14 (link) Developing Organization: Texas State University (The Meadows Center for Water and the Environment) and project stakeholders State Agency Overseeing Plan: TCEQ Year Finalized: 2014 Measures to Implement: In the WPP, several categories of BMPs were identified as candidates for implementation over incremental time horizons. BMPs to be implemented in the first 3 years include, at a minimum: rain gardens, rainwater harvesting, riparian buffers, rock berms/gabions, education/outreach activities, NPS collaboration/assessment and water quality/land use modeling. Additional potential BMPs for implementation are listed in Appendix C and will be revised during this three year period.
26. **Addresses Groundwater Constituents of Concern: (See Appendix D of Texas NPS Management Program)**	Yes ☐ No X Aquifer(s): List the aquifer(s) identified in Appendix D Constituents of Concern: List the Groundwater Constituents of Concern listed in Appendix D.
27. **Implements the Texas Coastal NPS Pollution Control Program: Boundary Map**	Yes ☐ No X Measures to Implement: Identify concisely the locations in the document (such as the section, page number, and BMP number) that reference measures proposed to be implemented. Will the project address failing on-site sewage facilities (OSSFs) in the Coastal Zone? Yes ☐ No ☐

28. **Implements the Texas NPS Management Program:**	Check the appropriate boxes correlating to the program Components, Objectives, and Milestones of the Texas NPS Management Program. The Components are described in Chapter 1. The Long- and Short-Term Objectives are in Chapter 2. The Milestones are found in Chapter 2 and Appendix E of the Texas NPS Management Program. Long-Term Objectives: 1X☐ 2X 3X☐ 4☐ 5☐6X 7X8X☐ Short-Term Objectives: Data Collection and Assessment: A XB XC D E X Implementation: A XB XC☐ D X Education: A XBX C X DX E☐ F☐ GX Components(Ch. 1): 2 X 3 X 4X 5 X 6 X 7☐ 8X☐ 9☐ Milestones: Priority Watershed Milestones (Ch. 2): Stakeholder Participation X Water Quality Monitoring X Modeling X Plan Development ☐Implementation X NPS Program Milestones (Appendix E): X Milestone/Measurement: • Section 319(h) Grant Program Application • Watershed Coordination • Implement WPPs • Load Reductions • Effectiveness Monitoring Priority Waterbodies: 1815 – Cypress Creek

29. **Project is in an area covered under a Municipal Separate Storm Sewer System (MS4) Permit:**	Yes ☐ No ☒ MS4 Permit Holder: Enter the name of the organization that holds the MS4 permit. Does the proposed project fund activities required under an MS4 Permit or the associated SWMP: Yes ☐ No ☐

30. **Water Body Information**

Watershed or Aquifer Name	Segment ID	Hydrologic Unit Code (HUC) (10 or 12 Digit) only	Size
Cypress Creek Watershed	1815	121002030202	24,320 acres

The Cypress Creek Watershed is home to a unique set of rural and urban communities, ecosystems, and a long-standing reliance on groundwater for both drinking supply and recreational uses. Cypress Creek flows through unincorporated portions of Hays County and the cities of Wimberley and Woodcreek. It meets the Blanco River near the Wimberley town center. Nearly five and a half miles upstream of the confluence, near the City of Woodcreek, is Jacob's Well, the headwaters of the perennial Cypress Creek. Jacob's Well is an expression of underground water stored in the Trinity Aquifer that discharges at the land surface. The artesian spring perennially feeds water to the lower third of the creek. Above the artesian headwaters flows in the Cypress Creek (Dry Cypress) are driven by rain events. Once the water is in the creek bed, part of it flows back underground into the aquifer. Flow between land surface and the subsurface creates a complex interaction between groundwater and surface water in the Cypress Creek.

Although water quality in the Cypress Creek is primarily meeting water quality standards, data reveal both spatial and temporal trends that may be due to climate variability, nonpoint source pollution and changes in land use and/or management in the watershed. Water quality parameters vary considerably from site to site throughout the perennial part of the stream. In general, the three upper most water quality monitoring sites (Jacob's Well, RR12 north, and Blue Hole) tend to be highly influenced by inflow of groundwater in terms of their water chemistry, while the lower two sites (RR12 downtown and the Blanco confluence) tend to cluster closer together and show more of an influence of local stream conditions and runoff from contributing watersheds. Issues of concern include excess sediment in the creek, high bacteria concentrations and occasionally very high nutrient levels which are exacerbated by low flows.

Problem/Need Statement:

The Cypress Creek Watershed is experiencing increasing demands as the urban-development envelope expands into previously minimally developed areas. Hays County is one of the fastest growing counties in the country and is listed as the 31st fastest growing county in the United States. Projections prepared by the Office of the State Demographer and the Texas State Data Center at the University of Texas show that the county's population could grow from 97,589 in 2000 to 509,876 in 2040. While this projection is for the entire county, much of this growth will occur within the Cypress Creek Watershed and adjacent aquifer recharge and contributing zones of the lower Trinity Aquifer.

Although the urban portions of the basin are likely contributing significant pollutants to Cypress Creek, much of the growth in the watershed is expected to occur in rural areas of the watershed. Substantial amount of the future development will be mid-sized subdivisions in currently undeveloped areas. Such developments near the creek could impact run off, sedimentation and over time contribute to bacterial and other pollutant loadings. Due to the region's karst geology and flashy hydrology, the Cypress Creek Watershed and adjacent lower Trinity Aquifer recharge and contributing zones are particularly susceptible to numerous nonpoint source pollutants originating from development, septic systems, spray and subsurface effluent irrigation systems, fertilizer applications, and leaking petroleum storage tanks. Unless regional decision-makers have science-based tools and strategies to inform urban planning for future development and population growth, Cypress Creek's water quality will be increasingly impaired for pathogens, nutrients, sedimentation, siltation, organic enrichment, and depressed oxygen levels. Understanding the interaction between surface water and source or groundwater is a critical need. Consultations with subject matter experts have identified long term water level monitoring and groundwater quality monitoring as important gaps in available data that could be used to better understand the relationship between NPS pollution and surface water and groundwater interactions. Decision-makers will also have to pay more attention to stormwater management and flood mitigation as the region continues to grow.

In 2010, a stakeholder group was convened and a watershed characterization for the Cypress Creek Watershed was completed (Phase I of the Cypress Creek Project). Phase II of the project included the development of a WPP. The community-approved Cypress Creek WPP is an important tool that can be used by the region's leaders to help manage the Cypress Creek Watershed. The crux of the plan is that it has broad-range support among the key governmental entities and local non-governmental organizations. This support is a result of the Plan's basis in science, community involvement, and its adaptive nature. The community is now entering the third phase of the project, Implementation, during which the initial activities outlined in the WPP will be implemented. The community seeks to implement high priority activities in the Plan, including demonstration BMPs from which they will learn what methods provide the most water quality benefits, review of codes and regulations, additional modeling and monitoring, education, outreach and other practices to improve NPS pollution.

Water from Jacob's Well flows into Cypress Creek through Woodcreek and Wimberley, and provides inflows to the Blanco River several miles downstream. The Blanco River provides recharge to both the Trinity and Edwards aquifers. During the dry conditions of July 2000, Jacob's Well ceased to flow for the first time in recorded history, degrading fish, wildlife, and water quality. Cypress Creek was listed on the 303(d) list for low dissolved oxygen levels in 2000. Texas Water Development Board (TWDB) groundwater availability models clearly show water deficits in and around this area.

Land use in the watershed is predominantly open rangeland, with combined residential, commercial, and transportation uses in the watershed accounting for only 13.5% of total area. Continuing urban development in the watershed is associated with increases in impervious surface cover which is currently estimated at 9% and is concentrated in the lower portions of the watershed around Wimberley, Woodcreek and Woodcreek North. In June 2014, Woodcreek increased its permitted impervious cover limits to 30% within the city limits and extra-territorial jurisdiction, but not without considerable debate about the impact this would have on water resources.

In ecologically and hydrologically sensitive areas such as urbanizing watersheds located in karst topography, the effects of impervious cover increases can be significant. Assuming similar pollutant concentrations,

larger volumes of runoff per unit area associated with impervious surface cover result in larger loads of pollutants for urban areas versus rural areas. Installation of drainage systems and concrete channels can result in pollutant loadings being delivered to the creek faster and in greater concentrations than in undeveloped areas with natural drainage systems.

The likely sources of NPS pollution in the Cypress Creek Watershed include on-site septic treatment, residential landscaping, fertilizer and pesticide application, land clearing for new construction, pet and livestock wastes, runoff from roads and parking lots, grazing activities, and recreational use of the creek. On-site septic treatment remains the primary method of wastewater treatment in many areas of the watershed, and an increase in septic systems due to new construction is likely, particularly in unincorporated and rural areas in the watershed.

Water quality is currently monitored under the Clean Rivers Program at five sites along Cypress Creek from Jacob's Well to the confluence with the Blanco and at four sites along the Blanco River. Measured Parameters include temperature (oC), dissolved oxygen (mg/L), specific conductance (umhos/cm), pH (SU), total nitrogen (mg/L), total phosphorous (mg/L), total suspended solids (mg/L), ammonia (mg/L), Escherichia coli (E. coli) (colonies/100mL), and fecal coliform. These efforts will be continued in order to monitor changes in water quality, track improvements in pollutant loads and provide data necessary technical assistance to the cities and county to determine potential site level impacts of development (Decision Support System).

Overall water quality in the Cypress Creek is relatively high, though data reveal spatial and temporal trends that may be due to climate variability, changes in land use, or management. Median temperatures are lowest at Jacob's Well and at Blue Hole, where spring flows provide fresh inflows of groundwater to the creek. Low dissolved oxygen values (below 4.0 mg/L) were recorded at both RR12 and at Blue Hole during the summer of 2006, when flow dropped to less than 0.5 cubic feet per second (cfs). Dissolved oxygen is particularly sensitive to flow volumes, especially when temperatures are high, and therefore it is critical to maintain flow in the creek in order to maintain a healthy aquatic system. Biomonitoring can be used to track changes in DO and will be offered by project partners GBRA and USGS at no cost to the project. Biomonitoring analyses could provide useful information regarding causes and effects of low dissolved oxygen in the creek. Automated continuous water quality monitoring also will improve the ability to track water quality conditions and how well BMPs mitigate the effects of land based pollutants.

Nutrient constituents like nitrogen and phosphorous, which are of concern in residential and urbanizing areas, remain below screening levels, though relatively high concentrations have been measured at all sites. More significantly, there is an increasing variability in values measured. The data exhibits higher high and lower low values during the last eight years than in the previous record. This increasing variability indicates that land management factors play a role in the observed change.

Bacteria levels, both E. coli and fecal coliform, are of concern because they affect contact recreation in the creek, and may be indicative of contamination from septic systems or animal wastes in the watershed. High values (>2400) of E. coli have been recorded at Ranch Road 12 upstream, Blue Hole and at the Blanco confluence, and high values of fecal coliform (>2400) at the downtown square in Wimberley. Even at Jacob's Well, bacteria levels above 1000 colonies/100mL have been recorded.

31. **Project Goals:**

o To continue to conduct regular partner and stakeholder meetings to encourage citizen participation, provide partners with updates on progress, and seek stakeholder input and recommendations on needed activities; to develop an official Cypress Creek Partnership to continue implementation activities; regular meetings will be held during 3 year project period

o To coordinate management measures which improve water quality, develop proposals to acquire funding for implementation of additional management measures, and to manage and track implementation projects while promoting adoption of BMPs, partners agree to hire a Watershed Coordinator

o To implement activities to reduce NPS and prevent increases in NPS, city and county partners will enhance tools for quantifying pollutant load mitigation

o To increase decision-makers' capabilities to preserve water quality through local permitting and discover additional ways to quantify water quality impacts through land management authorities

o To continue to collect needed data for monitoring water quality; partners will support ongoing monitoring activities and enhance monitoring efforts to evaluate performance of BMPs (improvements in water quality) and provide information required for modeling efforts and improving stakeholders' understanding of surface water and groundwater interchanges on water quality.

o To coordinate and conduct water resources and related environmental outreach/education efforts across the watershed, partners will promote the project on their respective websites as well as a central project website and to additionally host trainings on LID, green infrastructure, and riparian stewardship

o To coordinate site-specific retrofits for LID and provide these as community education projects and demonstration sites for watershed management, partners will evaluate messaging, design, and to promote innovation

o To increase accuracy of tools available for decision makers to calculate effects of future land use changes and development activities on NPS loadings

o To obtain necessary information to create a comprehensive, watershed level plan to mitigate the effects of stormwater and NPS pollution

o Water quality goals include: no increase in instream Nitrogen concentrations, E. coli concentrations of no more than 126 colony forming units (cfu)/100ml and 5.0 mg/L maximum concentration of Total Suspended Solids (TSS)

32. **General Project Description:**

Adverse effects on water quality resulting from on-going development within the Cypress Creek Watershed already have been observed. The Cypress Creek Watershed Protection Plan (CCWPP) Stakeholder Committee selected a suite of BMPs to mitigate current, as well as future potential water quality impairments in the watershed. A subset of the BMPs was prioritized for immediate implementation, while others will be implemented over a number of years, as required to mitigate nonpoint source pollution from future development and other activities in the watershed. Milestones to track the WPP implementation progress were identified for years 1 through 3 (#35. Additional Information – Section D contains a table of "Summary of Implementation Year 3 Milestones" from p.18 CC-WPP). Additional management measures and milestones from later years of implementation are presented in Appendix B of this document.

Monitoring and data collection undertaken during the course of this project will be used track water quality and better understand current and trending nonpoint source contributions to Cypress Creek. Routine and continuous water quality monitoring data will be used to develop a baseline for tracking water quality and WPP progress. Routine water quality monitoring will be performed by TST and GBRA, under their respective QAPPs. Groundwater data also will be collected to reduce gaps in knowledge. Partnerships with HTGCD and the Well Owner's Network will allow for inexpensive collection of water quality data and water level in wells in the watershed. Water quality data analysis of groundwater will be performed using the methodology outlined in TST's QAPP.. Additional data will be collected outside the scope of this project, including water quality data and biomonitoring data collected under Texas Stream Team's QAPP, and data acquired from GBRA. These data will be analyzed using professionally accepted protocols, will fall under existing Texas Stream Team and GBRA QAPPs (and USFWS guidelines) and will be used to augment project data to better understand Dissolved oxygen and other water quality trends. Water quality monitoring to assess efficacy of implemented BMPs also will be performed in the latter portion of this project. Staff at the Meadows Center has undergone initial training and will seek additional training to develop specific and industry accepted data collection methods.

These data will be used to improve the reliability and enhance the capability of the existing Decision Support System (DSS) which was developed in 2010 using data collected for the watershed characterization. The purpose of the DSS was to calculate potential water quality impacts of site scale development, providing decision makers with additional tools and more accurate information. Decision Support Systems (DSS) are computer-based tools that interact with large geographically-based datasets and have easy-to-use interfaces to facilitate decision making. The Cypress Creek DSS was based on the best information at that time and provided static large-scale scenarios in the future. Cypress Creek decision-makers and interested stakeholders were trained to use the DSS and quickly recognized the potential application of this tool during implementation. They also recognized enhancements that would support more effective decision-making to reduce nonpoint-source pollution impacts for future development, particularly with respect to scaling the geographic scope. Stakeholders requested that the DSS be enhanced to forecast potential changes to nonpoint source pollution loads from site level developments in the watershed. The Jackson School of Geosciences modeling experts will work with the stakeholders and city and county staff to shape the type of outputs created by the DSS and will train stakeholders to use the DSS to make decisions about BMPs and mitigation measures that should be coupled with proposed development. The model will become open source and all related model resources will be available for other water quality protection efforts.

DSSs have been effectively used in various watersheds throughout the country and world for reducing nonpoint source pollution. The power of these tools is related to the cohesive and seamless integration of GIS, models (like SWAT), and the user interface – which results in more precise and cost-effective decision making. One example is in Klamath Basin in Oregon, where users can access the integrated system over the web to choose pre-selected land development patterns to create a 'what if' scenario using an easy-to-follow interface. The hydrologic model simulates effects of the scenario on annual runoff volume, flood peaks of various return periods, and ground water recharge. Other examples include the Midwest Spatial Decision Support System Partnership in EPA Region 5 and includes Minnesota, Wisconsin, Michigan, Illinois, Indiana, and Ohio (http://www.iwr.msu.edu/mwdssp/) and Vermont's WebL2W DSS (http://www.cgit.vt.edu/pdf/web_enabled_spatial_decision.pdf, http://scholar.lib.vt.edu/theses/available/etd-10142002-145152/unrestricted/RegmiAppendix.pdf).

Recognizing the effectiveness and power of DSS', the goal of these efforts was to develop, promote, and disseminate web-based spatial decision support systems to help manage watersheds and the same can be accomplished in the Cypress Creek Watershed.

In a similar vein, this project proposes to build upon a several-hundred-thousand dollar modeling endeavor by the US Army Corps of Engineers and the Guadalupe Blanco River Authority, led by Halff and Associates, to develop a more detailed hydrologic drainage model to estimate peak flows for individual drainage areas. This information will be used as part of a nonpoint source collaboration to comprehensively understand and mitigate pollution from stormwater, resulting in a comprehensive assessment that includes BMPs that reduces nonpoint source pollution. The results from this study can be used to improve the DSS. Appendix D of this proposal outlines existing general stormwater management, LID and green infrastructure goals at the city level that will be paired with the NPS collaboration/assessment and other project activities. Key stakeholders will be involved in the planning and execution of this task. Any measures implemented as a result of recommendations from the NPS collaboration/assessment will be identified and tracked.

Site specific BMPs installed during the implementation phase will serve as demonstration projects highlighting to developers and citizens the effectiveness of BMPs, including preventative, stormwater and LID measures. Educational signage, materials and reports/documents will be coupled with rainwater harvesting, rain gardens and other BMPs and also will include a self-guided tour of LID and green infrastructure demonstrations throughout the watershed. Monitoring will assess the efficacy of these BMPs at removing pollutants. Although they are small in scale and not expected to contribute significant reductions in pollution, monitoring these BMPs will allow for testing of the BMP effectiveness monitoring protocols developed for this project. These demonstrations will serve to instill confidence in the community for the overall direction of the Cypress Creek Project (CCP).

Of those prioritized, BMPs and preventive practices will seek to eliminate or reduce pollutants at their sources. This project will focus on opportunities for urban BMPs and Low LID, including: stormwater controls, rainwater capture, and rain gardens / bio-filtration systems. Project partners and stakeholders agreed to examine opportunities to incorporate LID management practices into updated development and redevelopment standards, to develop new code language and rules, and to examine proposed engineered alternatives that enhance water quality and mitigate stormwater impacts. Engineers and technical resources will be brought to bear on stormwater, source water, and technical information delivered in workshop settings for evaluation, recommendations on preferred alternatives, and references for new standards.

Because this is an increasingly urban watershed, a review of existing ordinances will assist the cities and county encompassed within the watershed to quantify the effectiveness of ordinances pertaining to water quality. Project partners and the Stakeholder Committee will work with city and county staff to interpret the findings of this comprehensive assessment and to entertain the incorporation of additional LID and green infrastructure components. A design workshop will be held with the development and engineering community for LID and green infrastructure application in new and re-development projects and a LID practices technical guidance document will be created for use by the development community. Finally, engineering consultants, Alan Plummer Associates, Inc., will facilitate a process plan for the cities and

counties to fast-track development proposals with LID and green infrastructure components.

A multifaceted approach to education and outreach will serve to engage the community and key stakeholders in both the implementation of WPP activities and the expansion of pollution reduction strategies across the basin. Specific activities include public service announcements, community workshops, speaker series, newsletters, watershed tours and other outreach efforts.

WPP implementation will encourage stakeholders to holistically address all of the sources and causes of impairments and threats to both surface and groundwater resources within the watershed. To address technical and financial assistance to support implementation projects a watershed coordinator will be hired. The role of this coordinator will be to support and facilitate stakeholders and partners in implementing management measures, developing additional proposals to acquire funding, tracking projects, and encouraging adoption of BMPs. This position will also provide support for deploying highly visible demonstration areas, as well as coordinating site-specific community education projects at these demonstration sites.

33. **Additional Information:**

a. ***Project Environmental Data Operations***

Continued monitoring of water quality under various flow regimes and weather conditions is an important aspect of this project. Much data already exists for improving resource management decisions, but new data will be needed to evaluate LID implementation and BMP projects for the degree to which they: (1) reduce pollutant loads contributing to water quality impairment, and (2) serve to institutionalize LID practices at community or regional level.

The comprehensive NPS Collaboration/Assessment (to review NPS carried by stormwater) and Decision Support System require geospatial and field-verified data is needed for modeling and providing recommendations to stakeholders.

b. ***Sustainability***

Making sure that the goals of the project continue to be met through activities that are consistent with the current conditions and resources that are available will be job of the Implementation Steering Committee. The current Interim Steering Committee is aware of the change-over and is planning to hire a coordinator to assist with Implementation Tasks. As the first 3-years of funding runs out, an assessment will need to be made regarding the specific activities that can and should be continued, how many employees or volunteers will be needed, and how large (scale) the subsequent project activities will be. As the next phase of a project approaches, (perhaps in year 2) and sustainability becomes a more tangible future need, the project administrators will use feedback and evaluation to determine how and if the activities are moving in the direction of initial goals. Also, members of the project team will work on refining goals (with staff and stakeholders), objectives, the program design, and the research design. The Watershed Coordinator will provide technical assistance to the stakeholders through identification and acquisition of resources, seeking and pursuing funding opportunities, and developing additional grant proposals.

A significant level of effort on the Watershed Coordinator, The Meadows Center staff, the Stakeholder Committee and the Stakeholder Chair will be directed toward the formation of a permanent partnership in the watershed.

c. ***Project Readiness***

The project team is in place with considerable community and institutional support. Project partners and sub-contractors have committed to assisting with implementation activities and have been involved in development of scopes of work and budget parameters. Key stakeholders understand their responsibilities and the schedule is consistent with expectations established during the WPP finalization meetings. External project dependencies will be covered by hiring a Watershed Coordinator, and continuity is being kept by the Stakeholders appointed Interim Watershed Coordinator. Further, the Stakeholder Committee, project partners and the Interim Coordinator will continue to meet and move forward with securing additional sources of funding and support for implementation activities.

d. ***Milestone Table***

Table 1 provides a summary of the milestones identified by the Stakeholder Committee and approved by the community during the finalization of the WPP. Each of these milestones will be met in the first three years of implementation, along with other activities that meet general goals for the watershed and reductions in nonpoint source pollution. The Stakeholder Committee continues to meet regularly and review nonpoint source pollution and source water issues in the watershed during the interim phase (while the WPP is being reviewed by TCEQ/EPA). Stakeholders identified additional activities and qualitative measures of success after the completion of the draft WPP. The Stakeholders felt that it is important to include an Executive Summary and Community Documentation to assist with the public roll out and continued community acceptance of the WPP. They also felt that qualitative measures of success would be the completion of such documents (which will be funded with community raised dollars) and an updated WPP (or addendum) at the end of this three-year project. After the WPP was submitted, TCEQ staff shared information about the ability to use grant funds for reviewing existing ordinances and fast-tracking development proposals (as has been done in other TCEQ funded projects). Stakeholders approved of this novel approach and it was added to this proposal. Although not specifically outlined as an activity in the WPP, stakeholders determined that completion of these activities were in line with stakeholder, city and county goals to protect the watershed and would serve as a qualitative measure of success. This information is presented in Table 2.

Table 1. Watershed Protection Plan Milestones

Management Measure	Milestone Years 1-3 of Implementation	Milestones
Comprehensive Stormwater Assessment	1 Assessment	Completion of Stormwater Assessment, including selection of BMPs and locations for implementation based on findings
Riparian Buffers	1 Managed buffer area Identified	Identify and prioritize locations for implementation, commitments for streamside natural buffer management
Rainwater Harvesting Strategies	1 Demonstration Area	Establishment demonstration area, and can include adoption of use in all new development
Rock Berms/Gabions	1 Berms Demonstration Areas	Establishment of demonstration areas throughout the basin and use in all new development in urban public spaces; added to existing codes where appropriate
Biofiltration/rain garden	1 Demonstration Areas	Establishment of demonstration areas, and can include use in all new development in public spaces or added to existing codes as water quality protection measure
Existing BMP Maintenance	6 Inspections and Maintenance When Needed	Establishment of program to maintain existing BMPs for proper function
"Entering Watershed" Signs on Roadway	3 Signs	Installation of 3 "Entering Watershed" Signs on Roadway to increase community awareness
Watershed Coordinator	1 Coordinator	1 employee to implement BMPs for water quality reduction and community awareness
Enhanced Water Quality and Groundwater Modeling (CC-DSS)	1 Session	1 session in enhanced Water Quality and Groundwater Modeling (CC-DSS) to improve water quality decision making as the scenario changes

Table 2. Additional Qualitative Measures of Success Identified by Stakeholders

Management Measure	Milestone Year (1-3 of Implementation)	Milestones
WPP Executive Summary and Community Documentation	1 community oriented summary of WPP and Implementation Plan (I-Plan)	Completion of materials to complement WPP education and outreach materials and I-Plan and improve awareness of NPS issues and solutions in the community
Ordinance Review, fast-tracking green infrastructure and LID	1 developer/builder oriented guidance document for implementing green infrastructure and LID into development plans Development and trial of process to fast track permits that address NPS prevention and mitigation via LID and similar practices	Completion and availability of guidance document for builders/developers that ties to local demonstration BMPs and ordinances in Wimberley, Woodcreek and possibly in Hays County.
Updates/Addendum to WPP	Updated documents approved by the community, end of year 3	Incorporation of any necessary updates to WPP, based on modeling outcomes, analyses of additional data, etc.

Project Maps:

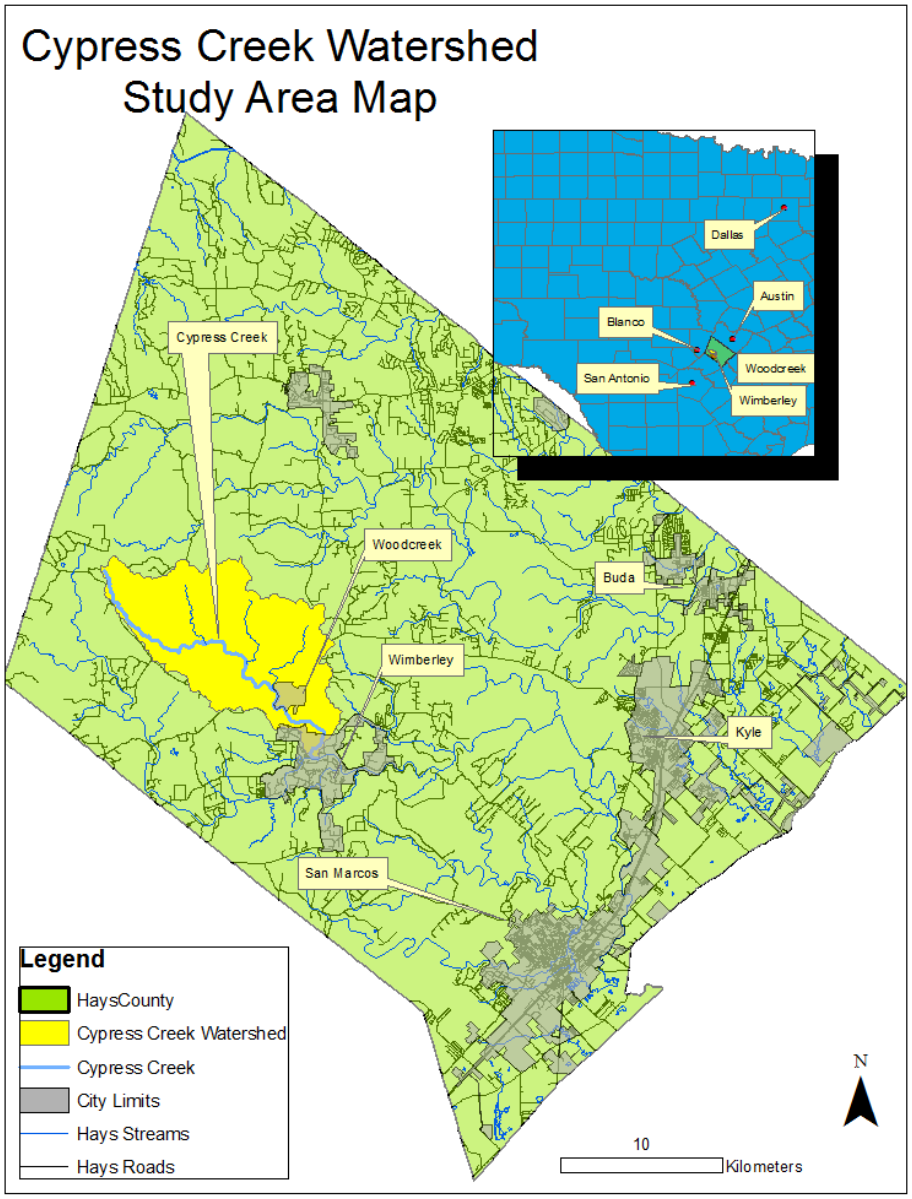

Figure 1. Cypress Creek Watershed.

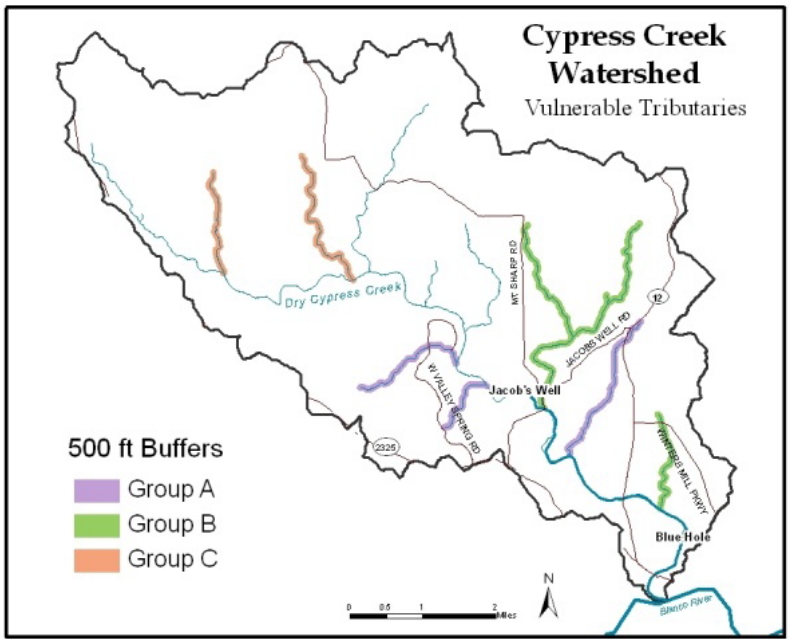

Figure 2. Tributaries Vulnerable to Nonpoint Source Pollution in Cypress Creek Watershed.

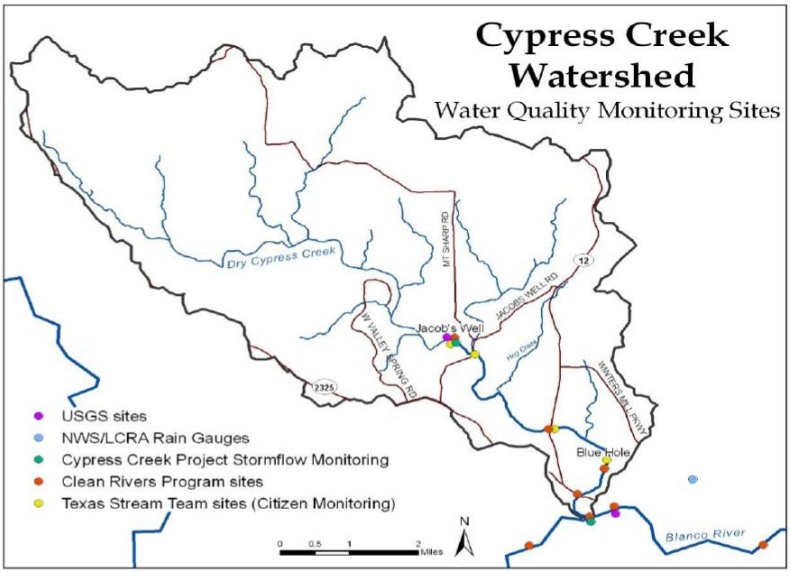

Figure 3. Existing Water Quality Monitoring Sites in Cypress Creek Watershed.

34. **Tasks:**

Task 1:	**Project Administration**
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:	**Project Oversight –** The Performing Party will provide technical and fiscal oversight of the staff and/or subgrantee(s)/ subcontractor(s) to ensure Tasks and Deliverables are acceptable and completed as scheduled and within budget. With the TCEQ Project Manager's authorization, the Performing Party may secure the services of subgrantee(s)/ subcontractor(s). Project oversight status will be provided to TCEQ with the Quarterly Progress Reports (QPRs).
Subtask 1.2:	**QPRs –** The Performing Party will submit QPRs to the TCEQ Project Manager by the 15th of the month following each state fiscal quarter for review by the TCEQ Project Manager and incorporation into the United States Environmental Protection Agency's (EPA) Grant Reporting and Tracking System (GRTS). A template for the QPR will be provided to the Performing Party by the TCEQ Project Manager.
Subtask 1.3:	**Reimbursement Forms –** The Performing Party will submit Reimbursement Forms to the TCEQ Contract Manager in accordance with Special Terms and Conditions, 4., regarding Invoice Submittal.
Subtask 1.4:	**Contract Communication –** The Performing Party will participate in a post-award orientation meeting with TCEQ within 30 days of Contract execution. The Performing Party will maintain regular telephone and/or e-mail communication with the TCEQ Project Manager regarding the status and progress of the project. This will include a call or meeting each state fiscal quarter following the submittal of the quarter's QPR. Project Task status, financial status, and any other matters that require attention will be discussed during the call or meeting. The TCEQ Project Manager may request additional information from the Performing Party prior to the call or meeting. The Performing Party will submit meeting notes to the TCEQ Project Manager. The Performing Party will provide a Contract Closeout Strategy within the first quarter of the last year of the contract. The template for the Contract Closeout Strategy will be provided by the TCEQ Project Manager. Matters that must be communicated to the TCEQ Project Manager include, but are not limited to: • Notification a minimum of 14 days before the Performing Party has scheduled public meetings or events, initiation of construction, or other major Task activities. • Notification within 48 hours regarding events or circumstances that may require changes to the Budget, Scope of Work, or Schedule of Deliverables.
Subtask 1.5:	**Coordination Meeting with EPA** – The Performing Party will attend a project update and coordination meeting with EPA in Dallas upon request by TCEQ and EPA to share progress on goals, measures of success, challenges, and opportunities.
Subtask 1.6:	**Annual Report Article –** The Performing Party will provide an article for the *NPS Annual Report* upon request by TCEQ. The article will include a brief summary of the project and describe the activities of the past fiscal year.

Deliverables:	• QPRs • Reimbursement Forms • Contract communication meeting notes • Contract closeout strategy • Annual report article

Task 2:	**Quality Assurance (QA) and Data Acquisition**
Objective:	The Performing Party will document and implement data quality objectives (DQOs) and quality assurance/control (QA/QC) activities that ensure data of known and acceptable quality are used in and generated by this project. Data collected for this project will be used for monitoring, modeling and mapping activities undertaken to improve community decision makers' abilities to identify sources of, as well as, prevent and mitigate NPS pollution from urbanization and development.
Subtask 2.1:	**Quality Assurance Project Plan (QAPP) Planning Meetings –** The Performing Party will schedule a QAPP planning meeting with the TCEQ Project Manager, QA staff, technical staff, and contractors, to implement a systematic planning process based on the elements in the TCEQ NPS QAPP Shell. The information developed during this meeting will be incorporated into a QAPP. The storage location of data records, and how data should be coded, will also be determined during these meetings. The Performing Party may conduct additional meetings to determine whether changes to an existing QAPP are needed.

Subtask 2.2:	**QAPP for Monitoring and Data Acquisition–** The Performing Party will develop and submit to TCEQ a QAPP with project-specific DQOs and other components consistent with the following documents: • TCEQ NPS QAPP Shell(s) • EPA Requirements for QAPPs (QA/R5) • EPA Guidance for Geospatial Data QAPPs (QA/G-5G) • EPA QAPP Requirements for Secondary Data Research Projects • TCEQ Surface Water Quality Monitoring (SWQM) Procedures The Performing Party will develop the Monitoring and Data Acquisition QAPP in consultation with the TCEQ Project Manager, QA staff, and contractors. The Performing Party will submit the QAPP to the TCEQ 120 days or more prior to the scheduled initiation of environmental data operations/monitoring. The QAPP must be signed/fully approved by TCEQ and, if necessary, EPA, before any environmental data operations/monitoring begins. Activities covered under this QAPP: • Surface water quality data monitoring and data acquisition; • Groundwater monitoring and data acquisition; • Macroinvertebrate data acquisition; • Riparian assessments (data acquisition); and • BMP effectiveness monitoring. Monitoring activities are described in Task 3. Data acquisition activities include the following: • Routine (Quarterly) surface water quality monitoring for flow, DO, total suspended solids (TSS), conductivity, temperature, pH, *E. coli*, Ammonia, total Nitrogen (N) and total Phosphorus (P) at the following Clean Rivers Program (CRP) sites: o 12677 – Cypress Creek – Jacobs Well o 12676 – Cypress Creek – RR12 North o 12675 – Cypress Creek – Blue Hole o 12674 – Cypress Creek – RR12 in town o 12673 – Cypress Creek – confluence o Not assigned yet – Blanco River downstream from Deer Creek • This monitoring, conducted by the Performing Party staff, is covered under the GBRA (CRP QAPP. Data will be acquired to define baseline water quality and track effectiveness of WPP implementation. Note: 319(h) funds from this project will be used to fund up to 1.5 years of the CRP data collection. • Routine surface water quality monitoring for flow, DO, transparency, conductivity, temperature, pH, E. coli, nitrate-nitrogen, orthophosphate collected by Texas Stream Team (TST) citizen scientists. This monitoring will be covered under the TST QAPP.

	• Automated continuous surface water quality monitoring for flow, temperature, specific conductance, and turbidity collected at the United States Geological Survey (USGS) gage at Jacob's Well operated by GBRA. This monitoring is performed in accordance with USGS and GBRA protocols. Summaries and analyses of gage data, performed in adherence with USGS protocols will be acquired. • Trinity Aquifer groundwater well monitoring for water level and precipitation collected by Hays Trinity Groundwater Conservation District (HTGCD) and well owner's network. This monitoring will be conducted in accordance with HTGCD protocols. • Macroinvertebrate data collected at three sites upstream and downstream of the Railroad-12 bridge over Cypress Creek and at Blue Hole Regional Park. This data collection will be covered under the TST QAPP, and will be quality checked by US Fish & Wildlife Service staff. • Riparian assessments conducted at TST sites by TST citizen scientists. This data collection will be covered under the TST QAPP. Tasks covered under this QAPP: • Tasks 2, 3, and 7. • Subtasks 4.1, 4.2, 6.2, 6.5, 6.6 Tasks NOT covered under this QAPP: • All other tasks

Subtask 2.3:	**QAPP for Modeling –** The Performing Party will develop and submit to TCEQ a QAPP with project-specific DQOs and other components consistent with the following documents: • TCEQ NPS QAPP Shell(s) • EPA Requirements for QAPPs (QA/R5) • EPA Requirements for QAPP for Modeling QA/G-5M The Performing Party will develop the Modeling QAPP in consultation with the TCEQ Project Manager, QA staff, and contractors. The Performing Party will submit the QAPPs to the TCEQ 120 days or more prior to the scheduled initiation of environmental data operations associated with modeling activities. The QAPP must be signed/fully approved by TCEQ, and if necessary, EPA, before any environmental data operations associated with modeling activities begins. Activities covered under this QAPP: • Cypress Creek Watershed Stormwater/NPS (Hydrologic and Hydraulic) Modeling (expansion of US Army Corps of Engineering/GBRA modeling activities); • Cypress Creek Watershed Decision Support System (DSS) enhancement; • Updated preferred land-use scenarios. Build-out scenarios with BMPs in place (to account for load reductions), improved commercial layers, increased functionality at subwatershed and site level scales and improved source/groundwater layers; and • Data collection and compilation of existing information, including: o Well logs; o Water elevations at wells; o Discharge from Jacobs Well, San Marcos Springs, Pleasant Valley Springs, and any other measurable points of discharge; o Pumping records; and o River and streamflow measurements. Tasks covered under this QAPP: • Tasks 4 • Subtask 6.6 Tasks NOT covered under this QAPP: • All other tasks

Subtask 2.4:	**QAPP for Mapping/Geospatial Data –** The Performing Party will develop and submit to TCEQ a QAPP with project-specific DQOs consistent with the following documents: • TCEQ NPS QAPP Shell(s) • EPA Requirements for QAPPs (QA/R5) • EPA Requirements for QAPP at http://www.epa.gov/QUALITY/qs-docs/g5g-final.pdf The Performing Party will develop the Mapping/Geospatial QAPP in consultation with the TCEQ Project Manager, QA staff, and contractors. The Performing Party will submit the QAPP to the TCEQ 120 days or more prior to the scheduled initiation of environmental data operations associated with mapping activities. The QAPP will be developed by the Performing Party (or its contractor) in consultation with the TCEQ Project Manager, QA staff, technical staff, and contractors. The QAPP must be signed/fully approved by TCEQ, and if necessary, EPA, before any environmental data operations associated with mapping activities begins. Activities covered under this QAPP: • Using Geographic Information System (GIS), define and map existing drainage basins based upon the most recent topography for Cypress Creek Watershed; • Using GIS, map existing stormwater infrastructure and recording the condition of existing facilities (pipes, catch basins, manholes, outlets, etc.) within the Cypress Creek Watershed; and • Using GIS, map key environmental areas and data (i.e. potential stormwater BMP locations based on geographic features including wetlands, stream buffers and soil types). Tasks covered under this QAPP: • Subtasks 4.1 and 4.2 Tasks NOT covered under this QAPP: • All other tasks
Subtask 2.5:	**QAPP Annual Reviews and Revisions** – The Performing Party will submit documentation certifying its annual review of QAPPs no less than 90 days prior to the QAPP anniversary date. Amendments approved since the initial QAPP approval or a subsequent certified annual review (if applicable) must be submitted along with the certification. If extensive changes to a QAPP are necessary, a full revision is required. Once TCEQ certifies the annual review or approves the full revision, the QAPP effective period is extended an additional year. No work described in a QAPP will be conducted outside the effective period for the QAPP.
Subtask 2.6:	**QAPP Amendments –** The Performing Party will submit Amendments when changes to QAPPs are necessary. Amendments will be submitted 90 days prior to the scheduled initiation of changes. A justification, summary of changes and detail of changes must be provided with the Amendment. The Performing Party will ensure that changes conveyed within Amendments are not implemented until the Amendment is fully approved by TCEQ and, if necessary, EPA.

Deliverables:	• QAPP Planning Meeting Notes • Draft and Final Monitoring/Data Acquisition QAPP • Draft and Final Modeling QAPP • Draft and Final Mapping/Geospatial QAPP • QAPP Annual Reviews and Revisions • Draft and Final Monitoring/Data Acquisition QAPP Amendment • Draft and Final Modeling QAPP Amendment • Draft and Final Mapping/Geospatial QAPP Amendment

Task 3:	**Monitoring**
Objective:	The Performing Party will conduct additional monitoring and coordinate with monitoring performed by its partners during this project.
Subtask: 3.1	**Monitoring to be conducted by the Performing Party:** • Routine surface water quality monitoring for flow, DO, TSS, conductivity, temperature, pH, E. coli, Ammonia, total N and total P at a minimum of two sites not covered by CRP or TST monitoring described in Subtask 2.2. • In partnership with Hays Trinity Groundwater Conservation District, water quality monitoring for DO, transparency, conductivity, temperature, pH, E. coli, nitrate-nitrogen, and orthophosphate will be added to well monitoring effort described in Subtask 2.2. • BMP effectiveness monitoring and analyses will be conducted to evaluate performance of BMPs and to update pollution load reduction estimates. The monitoring will include: o Water quantity on one demonstration rainwater harvesting system (monthly and post-rainfall). o Sediment, nitrogen and phosphorus on one rain garden (four storm events in year three and visual assessments on a monthly basis in years two and three).
Subtask: 3.2	**Data Submittals –** The Performing Party will review, verify, and validate water quality monitoring data before it is submitted to TCEQ. • The Performing Party will submit an annual report of water quality data that is consistent with TCEQ formatting requirements for upload into the Surface Water Quality Monitoring Information System (SWQMIS); and, • The Performing Party will submit data reports and presentations for review and approval at least two weeks prior to the scheduled public release.
Deliverables	• Documentation of monitoring activities, in QPRs • Data Submittals to SWQMIS • Annual acquired and collected water quality data summary report, including analyses (See Subtask 2.2 and 3.1)

Task: 4	**Comprehensive NPS Collaboration/Assessment**

Objective:	Expand upon modeling activities conducted by the US Army Corps of Engineering and GBRA to improve delineation of drainage basin data and develop a more detailed hydrologic drainage model to estimate peak flows for individual drainage areas and the NPS pollutants that may be carried by these flows.
Subtask: 4.1	**Field Data Collection and Mapping-** The Performing Party and its partners/contractors will use a design-storm and compiled GIS based information to develop or enhance the hydrologic modeling via Surface Water Assessment Tool (SWAT) utilizing the Hydrologic Modeling System (HEC-HMS) results and precipitation (or equivalent modeling tools), and to evaluate the existing stormwater drainage system, as well as, identify components that are inadequate or undersized.
Subtask: 4.2	**Detailed Hydrology and BMP Modeling-** The Performing Party and its partners/contractors will evaluate effectiveness of BMPs, add additional detail to previous modeling results and prepare a list of recommended repairs, maintenance procedures, and design alternatives (including LID) to maximize the capabilities of the stormwater management practices in the watershed. The evaluation will also identify opportunities to reduce the total amount of stormwater generated by anthropogenic activities based on BMPs and LID methodology. The hydrologic methods used for this study are in accordance with published Guidelines and Specifications of Flood Hazard Mapping Partners. The hydrologic model to be used was developed using HEC-HMS (Version 3.5). Point precipitation was developed using the USGS Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas (SIR 2004-5041, Asquith).
Subtask: 4.3	**NPS Collaboration/Assessment Report-** The Performing Party and its partners/contractors will develop a comprehensive NPS Collaboration /Assessment report that includes recommendations for future stormwater projects for Hays County, Woodcreek, and Wimberley as well as all hydrologic and hydraulic data, maps, charts, graphs and other information. Recommendations will highlight BMPs that mitigate stormwater and other NPS pollution. A Draft Report will be provided to stakeholders (both the stakeholder committee and key staff from cities, county and river authorities) for review and comment. Information and recommendations provided by stakeholders will be incorporated into a Final Report, which will be presented to all participating stakeholders and results incorporated, as appropriate, into the enhanced DSS in Subtask 6.6. The report will include: • METHODOLOGY o Rainfall-runoff method o Drainage basin area delineation o Hydrologic parameter estimation • RESULTS /VALIDATION o Results (including stormflow maps) o Calibration to historical events o Sensitivity analysis • RECOMMENDATIONS o Priority/recommended mitigation o BMP type, number and siting recommendations o Cost analyses for BMPs o Water quality management scenarios The assessment will provide technical information to the cities and county and will be used to assist stakeholders in mitigating NPS related stormwater issues. It will be presented for incorporation into city and county code requirements for general water

	quality protection. Structural and nonstructural BMPs that mitigate stormwater and NPS pollution will be presented and reviewed for implementation in the watershed (at the city and county level). A set of hydrologic maps and recommendations will note the most beneficial and cost effective sites.
Deliverables:	• Maps and a hydrologic model, including: watershed delineations, input data and justifications, input data source references, model calibration and verification process and results, model sensitivity analyses, and the results of water quality management scenarios. • List of stormwater management, recommendations, and design alternatives to be included in the assessment report • Draft NPS Collaboration/Assessment report provided to stakeholders for review and comment • Final comprehensive NPS Collaboration/Assessment report that includes recommendations for future NPS/stormwater projects for Hays County, Woodcreek, and Wimberley as well as all hydrologic and hydraulic data, charts, graphs, etc. • Identification and tracking of any report recommendations implemented at city and county level

Task: 5	**Installation of BMPs at Highly Visible Demonstration Sites**
Objective:	The purpose of this Task is to install demonstrable functioning NPS pollutant control technologies which will educate stakeholders concerning the pollution reduction and water conservation benefits of simple, relatively inexpensive management measures.
Subtask 5.1:	**Rainwater Cisterns at City and County Properties –** The Performing Party will execute the following: • Retrofit buildings and structures at four sites (City of Wimberley (two), City of Woodcreek, and Hays County) with cisterns for harvesting and using rainwater for non-potable uses. This will include: installing the cisterns; connecting the cisterns to irrigation systems and plumbing; plumbing to use rainwater from cisterns; and in the case of the Hays County site, connecting the cisterns to output valves for filling fleet vehicles. • Install prominent signs at each location explaining the basic concepts underlying cistern technology and identifying the components of the actual installed system. • Incorporate information about the cisterns into materials for a self-guided public tour and complimenting literature about exhibits. • Incorporate information into a technical resources guide for developers and engineers. A guide for the general public also will be compiled. The Performing Party will work with the WC and technical experts to compile, review, and adapt existing published resources to provide best guidelines and information for local implementation. • Estimates of site/area pollutant loadings and BMP load reductions will be calculated and presented in a report (used to inform resource guides and educational materials).

Subtask 5.2:	**Rain Garden Demonstration Sites –** The Performing Party will execute the following: • Install rain gardens or equivalent BMPs at two additional sites in the watershed (minimum size of each rain garden to be 400 square feet). • Engage volunteer master gardeners and/or master naturalists to maintain the rain gardens. • Install signs at above sites featuring rain garden technology which explain the basic concepts and identify the actual system. • Incorporate information about rain gardens into materials for a self-guided public tour and complimenting literature about exhibits. • Incorporate information into a technical resources guide for developers and engineers. A guide for the general public also will be compiled. The Performing Party staff will work with the WC and technical experts to compile, review and adapt existing published resources to provide best guidelines and information for local implementation. • Estimates of site/area pollutant loadings and BMP load reductions will be calculated and presented in a report (used to inform resource guides and educational materials).
Subtask 5.3:	**Stormwater BMP –** The Performing Party, will execute the following: • Install stormwater BMP(s) at a stormwater outlet near the Wimberley Central Business District. This may include a rain garden. This BMP will be equivalent in size, scope, and pollutant removal potential to at least 500 square feet of pervious sidewalks. • Engage volunteer master gardeners and master naturalists to maintain the BMP, should a rain garden be installed. • Install signs at above sites featuring the BMP technology which explains the basic concepts and identifies the actual system. • Incorporate information about the BMP into materials for a self-guided public tour and complimenting literature about exhibits. • Incorporate information regarding the selection, development, and installation of the BMP into a technical resources guide for developers and engineers. A guide for the general public also will be compiled. The Performing Party staff will work with the WC and technical experts to compile, review and adapt existing published resources to provide best guidelines and information for local implementation. • Estimates of site/area pollutant loadings and BMP load reductions will be calculated and presented in a report (used to inform resource guides and educational materials).

Deliverables:	• Advertised and approved bid for supplying equipment and installing rainwater harvesting systems and demonstration BMPs pursuant to University and State of Texas financial and purchasing bid requirements and Contract regulations or City/County regulations (Subtasks 5.1, 5.2, and 5.3). • Contract/subcontracts for design and construction including site plans for rain gardens and other demonstration BMPs (Subtasks 5.1, 5.2, and 5.3) • Final Design Reports for all BMPs (Subtasks 5.1, 5.2, and 5.3) • Estimated site/area pollutant loadings and BMP load reductions report (Subtasks 5.1, 5.2, and 5.3) • Technical resource guides created for developers and engineers (Subtasks 5.1, 5.2, and 5.3) • Technical resource guides for the general public (Subtasks 5.1, 5.2, and 5.3) • Literature about exhibits created for a self-guided public tour (Subtasks 5.1, 5.2 and 5.3) • Photo-documentation of four cisterns installed (Subtask 5.1) • Documentation of four signs designed, manufactured and installed, including photo-documentation (Subtask 5.1) • Photo-documentation of two rain gardens, or equivalent BMPs, installed (Subtask 5.2) • Documentation of two signs designed, manufactured and installed, including photo documentation (Subtask 5.2) • Photo-documentation of a stormwater BMP near Wimberley Central Business District (Subtask 5.3) • Documentation of one sign designed, manufactured and installed, including photo documentation (Subtask 5.3)

Task: 6	**Education, Outreach and Community Support**
Objective:	Enhance the implementation of the WPP through the engagement of the community in education and outreach activities, including meetings, events, workshops, print materials, website and signage.
Subtask 6.1:	**Hire a Watershed Coordinator**— The Performing Party, pursuant to *University Policies and Procedures Statements – 04.03 Open Recruiting* and all applicable policies and regulations, in coordination with the WPP Steering Committee, will hire a Cypress Creek WC to engage and facilitate the Cypress Creek WPP and entities identified in the Cypress Creek WPP. The WC will: • Serve as the primary conduit for interaction with landowners, citizens, and other entities; • Facilitate the implementation of the WPP; • Seek additional funding, coordinate complementary activities in the basin; and • Track WPP implementation progress.
Subtask 6.2:	**Education and Outreach Website, Print Materials, and Signage –** The Performing Party will use existing outreach materials and resources adapted to local circumstances (to the extent possible) and will develop new content to execute the following (documentation to be included in QPRs): • Regularly scheduled meetings will begin monthly in the 3rd quarter of the project and will meet ad hoc until that time. Announcements, agendas, attendance, presentation materials, and notes from all community/stakeholder meetings will be included in QPRs. • Website updated and maintained, including: clearing house of information, agendas, meeting announcements, data, and updates, etc. • Development, production and dissemination of a newsletter released biannually in digital format. All newsletters will be standardized and included in quarterly reports. Newsletters will follow a similar format, between two and four pages and will be distributed electronically. • Three "Inside Cypress Creek Watershed Environmentally Sensitive Area" signs installed on county roads within the watershed. • Develop WPP Executive Summary and NPS Prevention Resource Guide – Community-friendly publication outlining WPP content and activities, offering NPS information and prevention strategies, resources and information regarding the self-guided tour of demonstration BMPs in the watershed. This document will be a compilation of text from the WPP and when possible, existing resource materials.
Subtask 6.3	**Refined WPP –** Develop update or addendum to the WPP, approved by stakeholders. The Performing Party will, in coordination with the Stakeholder Committee, annually review progress toward the milestones established in the WPP, consider adaptive management measures as necessary, and recommend changes, alterations and updates to the WPP. The WC, in coordination with the Stakeholder Committee, TCEQ and other parties will formulate a refined WPP for review at least 6 months prior to the end of the implementation period.

Subtask 6.4:	**Events and workshops –** The Performing Party will execute the following: • Community workshops: o One Workshop: Water Quality Protection for the Homeowner. o One Workshop: LID including demonstration BMPs that are effective will be presented to the community and encouraged for implementation where appropriate across the watershed. This workshop will provide a more complete understanding of how rain gardens and rainwater collection systems function, and opportunities for sponsors and partners to provide information regionally on rain garden and rain collection design, construction, maintenance, and monitoring. o Three annual Rural Landowner workshops. The Performing Party will obtain participation from Master Naturalists, Texas A&M AgriLife Extension, Texas State Soil and Water Conservation Board, Farm Bureau, Natural Resource Conservation Service, and The Nature Conservancy for these workshops. • Attendance at two community events with an informational booth. • Six youth events at Jacob's Well, including school field trips. • Four Watershed Model demonstrations by TST staff • Quarterly Speaker Series on water related topics will be hosted by the Performing Party to inform community members and decision makers about key issues in the watershed. Speaker topics range from preventing NPS pollution to understanding related ordinances. The speaker series will be advertised in local papers and on community websites and will be recorded and made available on the WPP and the Meadows Center websites. TCEQ will review and approve videos and supporting documents before they are posted on the websites.

Subtask 6.5:	**Ordinance Review and Design Plan Review Process for Fast-tracking Development Proposals –** The Performing Party will perform a comprehensive assessment of potential water quality ordinance enhancements as an initial step towards protection of water quality through a local government legal framework. This Subtask will facilitate a comprehensive review of the relevant city and county ordinances that affect Cypress Creek's water quality. The purpose of the review will be to assess the region's effectiveness at mitigating NPS pollution via watershed protection ordinances and regulations, identify potential redundancies and potential improvements, and work closely with key decision makers and stakeholders to establish new approaches that can implement sustainable drainage design. This Subtask will include the following: • Review and Outreach - Engage key decision makers to identify appropriate ordinances for review/comparison to Cypress Creek. - Conduct a review of relevant city, river authority, and county ordinances and prepare recommendations for the cities, county, and GBRA. - Engage the Stakeholder Committee and city/county officials on process and interim findings for input. - Report on ordinance findings and water quality protection measures (LID and conventional), including potential reductions in NPS contributions from future development. • Technical Component - Design a plan review process and provide technical assistance for cities and the county to fast-track development proposals with significant LID and green infrastructure components. The size, scope, type and number of development proposals will depend on the level of total proposals submitted (A minimum of 2 small and 2 large proposals for each city and county (12 total) will be evaluated, edited and finalized. If this minimum number of acceptable proposals is not submitted, the resultant cost savings will be re-directed in consultation with TCEQ). - Draft a Green Infrastructure Plan Review Guide for developers and engineers to navigate regulatory review procedures, incorporate LID and green infrastructure into development plans; and facilitate permitting from local authorities. This document will reference demonstration BMPs in the watershed as models and will highlight and clarify/complement, existing ordinances and regulations in city/county design manuals, as well as explain the fast-tracking process and requirements. This manual will utilize existing city and county documents, findings from the review process and existing informational resources adapted to local circumstances.

Subtask 6.6:	**DSS** – The Performing Party will oversee the execution of the 2009 DSS which was developed based on input from a subcommittee of the Stakeholder Committee members recruited through the Cypress Creek WPP process. The DSS requires updates to incorporate current and proposed future land use patterns and available groundwater data and to increase functionality. To the extent possible, the DSS will be integrated with code from the University of Texas's open source DSS modeling platform, named "Pythia." This will allow for the creation of a versatile and accessible platform that can be easily accessed, updated, and used by lay people or non-programmers. Additional build out scenarios with BMPs in place (to account for load reductions), improved commercial layers, and updated preferred land-use will allow increased functionality at subwatershed and site specific scales to determine potential contributions of NPS pollution and the efficacy of potential mitigation measures. Specific activities will include: • Evaluate the 2009 version of the DSS to identify possible improvements to the software implementation to improve usability and data fusion or simulation model interconnectivity; • Compile existing geospatial data to update DSS model; • Have at least two meetings with stakeholders, and city and county officials to identify potential changes to land use/land cover and model output preferences as well as important groundwater information; • Update build out scenarios with BMPs in place (to account for load reductions), commercial layers and preferred land-use scenarios; • Reassess model parameters and implement comparative analysis utility for updated land use/cover and water quality data; • Conduct simulation of changes in water quality associated with selected BMPs and projected changes in land use/cover conditions; • Extend existing DSS model capabilities to allow for sub-basin and development scale outputs assessments or scenario testing; • Hold workshops for cities and county to interpret results, provide feedback and determine additional desired model outputs; and • Hold DSS use training session for city and county officials.

Deliverables:	• WC hired
	• Regular (monthly) stakeholder meetings will be held and documented through announcements, agendas, attendance, presentation materials, and minutes
	• Website will be maintained at least monthly (documentation of website updates will be included in all QPRs)
	• Biannual newsletter published
	• WPP Executive Summary in a community friendly format published
	• Photo documentation of three installed "Inside Cypress Creek Watershed Environmentally Sensitive Area" signs
	• NPS Prevention Resource Guide prepared
	• Update or addendum to the WPP prepared
	• Materials from two hosted workshops (water quality protection and LID) documented by announcements and presentation materials
	• Three Annual Rural Landowner workshops convened and documented by announcements and presentation materials
	• Attendance at two community events documented by agendas
	• Six youth events held at Jacob's Well and documented by announcements and presentation materials
	• Four watershed model demonstrations held and documented through announcements
	• Quarterly speaker series on water related topics held and documented by agendas
	• Report with review of relevant city, river authority, and county ordinances, assessment of potential water quality ordinance enhancements, potential reductions in NPS contributions from future development and recommendations compiled and published
	• Fast Track Review Process Report detailing the design plan review process and the plan for "fast tracking" developer proposals. The report will include:
	  o An explanation of the basis for the fast track review
	  o The process utilized
	  o Issues encountered and solutions
	  o Recommended future activities
	  o Technical assistance for cities and the county to fast-track development proposals with significant LID and green infrastructure components
	• One Green Infrastructure Plan Review Guide for developers and engineers compiled and published to assist users in navigating regulatory review procedures, incorporating LID and green infrastructure into development plans, and facilitating permitting from local authorities. This document will complement existing and updated city/county design manuals.
	• 12 proposals reviewed via fast-track process (two small and two large for each city and county)
	• Two stakeholder (cities, county) meetings to determine desired inputs, functionality and outputs for updated DSS documented by meeting notes and notices
	• Report published detailing DSS review, code changes, data incorporated (all modeling code, methodology and outputs will be provided and will be open source/open data context. All relevant information will be published and available to the public)
	• DSS updates, training session, and documentation and dissemination of results and decisions made, documented by presentation materials
	• One workshop held for cities and county to interpret results, provide feedback and determine additional desired model outputs, documented by presentation materials

Task 7:	Final Report
Objective:	Produce a Final Report summarizing all activities completed and conclusions reached during the project. The Final Report will describe project activities and identify and discuss the extent to which project goals and purposes are achieved, and the amount of funds actually spent on the project. The Final Report will emphasize successes, failures, lessons learned, and include specific water quality data demonstrating water quality improvements where possible. The Final Report will summarize all the Task Reports in either the text or as appendices.
Subtask 7.1:	**Draft Final Report –** The Performing Party will execute the following: At least 30 days prior to submitting the Final Report, a Draft Final Report will be submitted, summarizing all project activities, findings, and the contents of all previous Deliverables, referencing and/or attaching them as web links or appendices. This comprehensive, technical report will provide analysis of all activities and Deliverables under this Scope of Work. The report will be structured per the following outline: • Title • Table of Contents • Executive Summary • Introduction • Project Significance and Background • Methods • Results and Observations • Discussion • Summary • References • Appendices
Subtask 7.2:	**Final Report –** The Draft Final Report will be revised to address comments provided by the TCEQ Project Manager and the EPA. The Final Report will be submitted to the TCEQ Project Manager two weeks before the expiration of the contract.
Deliverables:	• Draft Final Report • Address TCEQ/EPA comments • Final Report

35. **Measures of Success:**

- All Project Administration deliverables are of adequate quality and submitted to TCEQ in a timely manner
- Data of known and acceptable quality are generated and used in analyses, modeling and decision making activities; data is used to track changes in water quality
- Groundwater data and information is collected to support future groundwater modeling efforts
- Completion of a comprehensive stormwater management plan that will be used by the cities and counties to guide future development, provide information for any necessary revisions of ordinances and select and install the most effective BMPs
- Completion of demonstration BMP installations including supporting educational and technical materials and water quality monitoring (rainwater harvesting, rain gardens)

- At least one riparian buffer is installed on public land and one on private land
- At least one rock berm/gabion series is installed on public land and one on private land
- "Entering watershed" signs and educational materials/resources are prevalent in the watershed
- Expansion of local education and outreach activities aimed at preventing pollution throughout the watershed. The WC will keep records of the estimated number of individuals reached by education and outreach activities. The Performing Party will provide reports of outreach activities with QPRs.
- Enhancements made to the Cypress Creek Decision Support System including updated land use layers, updated development and build-out scenarios, and improved capabilities for site specific development. DSS is used by city and county staff to assess potential water quality impacts and required BMPs/Mitigation activities of proposed large developments.
- Completed Review of city and county ordinances to increase effectiveness and improve adoption of LID practices; ordinances and design criteria updated by cities and county to improve use of LID and green infrastructure
- Process in place for cities and county to "fast-track" proposals with LID and green infrastructure
- Watershed Coordinator successfully executes job responsibilities
- Productive Steering Committee, Technical Advisory Committee and Topical Work Group meetings are held as needed to maintain interest among stakeholders.
- Technical assistance is provided to the stakeholders through identification and acquisition of resources, seeking and pursuing funding opportunities, and development of grant proposals.
- Progress toward achieving milestones in the WPP is evaluated and an addendum to the Cypress Creek WPP is published that describes modifications and updates to goals and milestones, and documents success in achieving goals and milestones and success in achieving water quality improvement and load reductions.
- External funding is secured for additional implementation efforts

36. **Estimated Load Reductions and Method(s) (if applicable):**

This WPP is a preventative plan, designed to prevent NPS pollution from increasing beyond current levels and to potentially reduce current pollution in the watershed. Because this is a preventative WPP, no major water quality improvements are anticipated in the first 3 years of implementation.

Monitoring activities will improve baseline information and allow for the calculation of specific load reductions in the near future and over time as development increases in the watershed. Please refer to Subtask 2.5 for specific modeling activities. As BMPs are implemented, modeling and monitoring will allow the stakeholders to quantify potential pollutant loads reduced. This pollution prevention, through the implementation of structural and nonstructural BMPs will prevent future exceedances and impairments. The first table below shows modeled potential instream Nitrogen loadings and reductions required, based on current conditions (2012). The second table provides the same information in the expected future scenario (2035). Efforts outlined in this proposal will be tracked to determine efficacy in reducing or preventing NPS loadings to Cypress Creek.

Mean Annual Instream Concentrations and Reductions Needed at "Current Conditions" (2012)

Sub ID	Nitrogen Instream Load (Target = 1.5 mg/L)	Nitrogen Reduction Needed (mg/L)	% Nitrogen Reduction Needed*
2	1.66 mg/L	.16 mg/L	9%
4	1.63 mg/L	.13 mg/L	8%
7	1.64 mg/L	.14 mg/L	9%
32	1.86 mg/L	.36 mg/L	19%
35	1.66 mg/L	.16 mg/L	10%

* Estimated pollution load reductions needed to meet water quality goals in the watershed. This analysis is submitted to satisfy Element B of the EPA 9-element criteria for watershed-based plans.

Mean Annual Instream Concentrations and Reductions Needed at "Future Conditions" (2035)

Sub ID	Nitrogen Instream Load (Target = 1.5 mg/L)	Nitrogen Reduction Needed (mg/L)	% Nitrogen Reduction Needed
2	1.78 mg/L	0.28 mg/L	16%
4	1.68 mg/L	0.18 mg/L	11%
7	1.67 mg/L	0.17 mg/L	10%
32	1.90 mg/L	0.40 mg/L	21%
35	1.69 mg/L	0.19 mg/L	11%

* Estimated pollution load reductions needed to meet water quality goals in the watershed. This analysis is submitted to satisfy Element B of the EPA 9-element criteria for watershed-based plans.

Please refer to Section 5 (page 42) and Section 11 (page 103) in the WPP, as well as the Technical Reference Documents C, F and K (http://cypresscreekproject.net/documents/cypress-creek-watershed-protection-plan/) for additional information about required load reductions, including of lbs/yr of pollutant reduction and relevant calculations.

In the near term, monitoring to determine the effectiveness of demonstration BMPS in the watershed will provide additional information about pollution reduction potential of specific LID and green infrastructure measures. With the appropriate design, the demonstration site near downtown Wimberley will have the potential to reduce runoff during storm events at this particular site by at least 50%, TSS by at least 50%, N by 10%, and TP by at least 30% (These values are well under those presented in the New Hampshire Stormwater Manual: Appendix E. BMP Pollutant Removal Efficiency).

Stormwater runoff from 9.4 acres will be controlled. Intercepting this runoff from over 400,000 square feet of surrounding land area at >50% impervious cover, the BMP will capture, treat, and allow to slowly infiltrate over 200,000 gallons of stormwater per 1inch rain event. With the installation of rainwater collection cisterns, several pounds of nutrients and sediment will be prevented from entering stormwater runoff over the 3 year project.

37. **Estimate Timeline for Project Activities:**

Task/ Sub-task	Description	FY 17 Q1	FY 17 Q2	FY 17 Q3	FY 17 Q4	FY 18 Q1	FY 18 Q2	FY 18 Q3	FY 18 Q4	FY 19 Q1	FY 19 Q2	FY 19 Q3	FY 19 Q4	FY 20 Q1
1 (1.1-1.6)	Project Administration (subtasks 1.1-1.6 including QPRs, reimbursement forms, contract communication/notes, coordination meetings/notes and report articles) Contract Close out Strategy	x	x	x	X	x	x	x	x	x	x	x	x	x
2.1	QAPP Planning Meetings/notes	x												
2.2, 2.3, 2.4	Monitoring, modeling and mapping QAPP development (draft and final QAPPs)	x	x											
2.5	QAPP annual revision and update					x				x				
2.6	QAPP Amendments (as necessary)		x	x	x	x	x	x	x	x	x	x	x	
3.1	Monitoring activities		x	x	x	x	x	x	x	x	x	x	x	
3.2	Data submittals/ Annual water quality data summary reports				x				x				x	
4.1	NPS Collaboration/Assessment Field Data Collection and Mapping Maps & Hydrologic model		x	x	x									

Task/ Sub-task	Description	FY 17 Q1	FY 17 Q2	FY 17 Q3	FY 17 Q4	FY 18 Q1	FY 18 Q2	FY 18 Q3	FY 18 Q4	FY 19 Q1	FY 19 Q2	FY 19 Q3	FY 19 Q4	FY 20 Q1
4.2	Detailed Hydrology and BMP Modeling			x	x	x								
4.3	Comprehensive NPS Collaboration/Assessment Draft Report					x								
4.3	Comprehensive NPS Collaboration/Assessment Final Report				x	x								
4.3	Comprehensive NPS Collaboration/Assessment Identification and tracking of any report recommendations implemented at city and county level						x	x	x	x	x	x	x	x
5.1	Demonstration BMPs – Rainwater Cisterns at City and County Properties Advertised and approved bid; completed contract			x	x									
5.1	Demonstration BMPs – Rainwater Cisterns at City and County Properties Completed design, site plans, site/area pollutant loadings and BMP load reduction estimates report				x	x								

Task/ Sub-task	Description	FY 17 Q1	FY 17 Q2	FY 17 Q3	FY 17 Q4	FY 18 Q1	FY 18 Q2	FY 18 Q3	FY 18 Q4	FY 19 Q1	FY 19 Q2	FY 19 Q3	FY 19 Q4	FY 20 Q1
5.1	Demonstration BMPs – Rainwater Cisterns at City and County Properties Installed				x	x	x							
5.1	Demonstration BMPs – Rainwater Cisterns at City and County Properties Educational materials (signs, literature, resource guides and tour) completed					x	x							
5.2	Rain Garden Demonstration Sites Advertised and approved bid; completed contract			x	x									
5.2	Rain Garden Demonstration Sites Completed design, site plans, site/area pollutant loadings and BMP load reduction estimates report				x	x								
5.2	Rain Garden Demonstration Sites Installed				x	x								
5.2	Rain Garden Demonstration Sites Educational materials (signs, resource guides, literature and tour) completed					x	x							

Task/ Sub-task	Description	FY 17 Q1	FY 17 Q2	FY 17 Q3	FY 17 Q4	FY 18 Q1	FY 18 Q2	FY 18 Q3	FY 18 Q4	FY 19 Q1	FY 19 Q2	FY 19 Q3	FY 19 Q4	FY 20 Q1
5.3	Biofiltration and Stormwater BMPs Advertised and approved bid; completed contract			x										
5.3	Biofiltration and Stormwater BMPs Completed design, site plans, site/area pollutant loadings and BMP load reduction estimates report				x	x								
5.3	Biofiltration and Stormwater BMPs Installed				x	x								
5.3	Biofiltration and Stormwater BMPs Educational materials (signs, resource guides, literature and tour) completed					x	x							
6.1	Hire Watershed Coordinator	x	x											
6.2	General education and outreach activities Meetings, website, bumper stickers, materials, newsletters, WPP related publications	x	x	x	x	x	x	x	x	x	x	x	x	
6.2	General education and outreach activities sign installation							x	x	x				
6.2	WPP Executive Summary and NPS Prevention Resource Guide												x	

Task/ Sub-task	Description	FY 17 Q1	FY 17 Q2	FY 17 Q3	FY 17 Q4	FY 18 Q1	FY 18 Q2	FY 18 Q3	FY 18 Q4	FY 19 Q1	FY 19 Q2	FY 19 Q3	FY 19 Q4	FY 20 Q1
6.3	WPP update/addendum												x	x
6.4	Education and outreach Events and Workshops	x	x	x	x	x	x	x	x	x	x	x	x	
6.5	Ordinance Review Review and Outreach activities	x	x	x	x									
6.5	Ordinance Review Final report					x								
6.5	Ordinance Review Technical components (designed and implemented plan review process/report)				x	x	x	x						
6.5	Ordinance Review Guidance report for fast track process (Green Infrastructure Plan Review Guide)				x									
6.5	Ordinance Review Up to 12 proposals submitted and reviewed for fast track process					x	x	x	x					
6.6	Enhanced DSS Evaluate existing DSS				x	x	x							
6.6	Enhanced DSS Compile data, meet with stakeholders				x	x	x							
6.6	Enhanced DSS Update DSS			x	x	x	x	x	x					

Task/ Sub-task	Description	FY 17 Q1	FY 17 Q2	FY 17 Q3	FY 17 Q4	FY 18 Q1	FY 18 Q2	FY 18 Q3	FY 18 Q4	FY 19 Q1	FY 19 Q2	FY 19 Q3	FY 19 Q4	FY 20 Q1
6.6	Enhanced DSS City, county workshop							x	x					
6.6	Enhanced DSS Report and training session									x				
7.1	Draft Final Report Address TCEQ comments											x	x	
7.2	Final Report												x	
N/A	End Date													x

38. **Budget Summary:**

Category	TCEQ Reimbursable Portion (Federal)	Grantee Match Portion (Non-Federal)	Total
a. Personnel	$319,322	$24,349	$343,671
b. Fringe Benefits	$93,607	$7,305	$100,912
c. Travel	$ 3,228	$ 0	$ 3,228
d. Supplies	$15,245	$440	$15,685
e. Equipment	$105,800	$7,200	$113,000
f. Contractual	$ 60,000	$ 0	$ 60,000
g. Construction	$ 0	$ 0	$ 0
h. Other – Professional Services	$121,027	$ 130,730	$251,757
i. Subtotal: Total Direct Costs (sum a-h)	$718,229	$170,024	$888,253
j. Indirect Costs	$86,614	$194,439	$281,,053
k. Other In-kind/ Third Party		$172,099	$172,099
l. Total Project Costs (sum i, j, & k)	**$804,843**	**$536,562**	**$1,341,405**

39. **TCEQ Reimbursable Project Costs:**

Category	Total Amount	Justification (itemized expenses)

Personnel	$319,322	1. Watershed Coordinator (100% of $52,000 for 3 years) = $156,000. 2. Associate Dir., Meadows Project Oversight (9.488% of $94,860 for 3 years) = $27,000. 3. Sr. Program Coord., Project Manager (10.139% of $68,000 for 3 years) = $20,684. 4. Watershed Coord. Support, Project Admin (28.4485% of $44,000 for 3 years) = $37,552. 5. Modeling, GIS Specialist (18.698% of $44,000 for 3 years) = $24,681. 6. Budget Specialist, Contract mgmt/reporting (5.0263% of $66,000 for 3 years) = $9,952. 7. Admin. Assistant, Project activities (12.946% of $35,000 for 3 years) = $13,593. 8. Water Quality Monitoring Coord., monitoring & analysis (8.3334% of $52,000) = $13,000. 9. Graduate Research Assistant (77.2% for 1 year @ $16,860) = $16,860
Fringe Benefits	$93,607	30% of portions of total staff salaries from above: 1. Watershed Coordinator – $46,800 (30% Fringe Rate of $156,000) 2. Associate Director – $8,100 (30% Fringe Rate of $27,000) 3. Senior Program Coordinator – $6,205 (30% Fringe Rate of $20,684) 4. Watershed Coord. Support Staff – $11,266 (30% Fringe Rate of $37,552) 5. Modeling/GIS Specialist – $7,405 (30% Fringe Rate of $24,681) 6. Budget Specialist – $2,986 (30% Fringe Rate of $9,952) 7. Admin Assistant – $4,078 (30% Fringe Rate of $13,593) 8. WQ monitoring Coord. – $3,900 (30% Fringe Rate of $13,000) 9. Graduate Research Assistant Salaries = $2,866 (17% Fringe Rate of $16,860)
Travel	$ 3,228	Approximately 165 trips to Wimberley from TXSTSTE or from Wimberley to TXSTATE: 34.025 miles @ $0.575 per mile. 55 trips per year (4-5 trips per month) for meetings, site visits, water quality monitoring and other project activities. *note: when monitoring several sites, additional mileage may incur.

Supplies	$ 15,245	1. Water quality monitoring supplies $3500 (task 3) 2. BMP installation supplies/Plants for rain gardens $7088 (task 5) 3. Paper and printing supplies for fact sheets $500 (task 5, 6) 4. Paper and printing supplies for meeting materials $700 (task 6) 5. General office supplies $1000 (task 1) 6. Materials for community and developer workshops $1000 (task 6) 7. Outreach materials $957 (task 6) 8. Sustainable print materials/brochures$500 (task 5, 6)
Equipment	$ 105,800	Rainwater harvesting cisterns, gutters and related equipment at four sites in the watershed: 1. Wimberley Nature Trail $18,000 2. Woodcreek City Hall $33,000 3. Hays Co. Material Yard $44,000 4. Wimberley Community Center $10,800
Contractual	$ 60,000	University of Texas, Jackson School of Geosciences: enhancement and updating of DSS
Construction	$ 0	n/a
Other – Professional Services	$121,027	1. Routine, Continuous, and BMP site water quality analyses, $9,044 (task 3) 2. Groundwater quality monitoring $3000 (task 3) 3. Comprehensive NPS Collaboration/Assessment $40,000 (task 4) 4. Interpretive signage materials and printing $6,483 (task 5) 5. Ordinance review and technical assistance $61,000 (task 6) 6. Assistance calculating load reductions from demonstration BMPs $1500 (task 5)
Indirect	$ 86,614	Rate applies to total direct costs excluding equipment and the portion of subcontract in excess of $25,000. Indirect cost base ($577,429).
Total	**$ 804,843**	

40. **Matching Project Costs Provided by TXSTATE:**
(Non-Federal portion that must reflect a minimum of 40% of overall project costs)

Category	Total Amount	Justification (itemized expenses)
Personnel	$ 24,349	1. Associate Director, 4.6912% time/year for 3 years, Annual salary: $94,860 = $13,350 2. Chief Science Officer, 3.1982% time/year for 3 years, Annual salary: $114,639 = $10,999
Fringe Benefits	$7,305	30% of salary allocated for (over 3 years): 1. Associate Director – $4,005 (at 30% Fringe Rate of $13,350) 2. Chief Science Officer – $3300 (at 30% Fringe Rate of $10,999)
Travel	$ 0	n/a
Supplies	$ 440	$120 printing supplies, WVWA; $320 printing and office supplies, TXSTATE
Equipment	$ 7,200	40% cost of the total cost ($18,000) for the equipment for rainwater harvesting cisterns and gutters at site #4 Wimberley Community Center. Match is provided by City of Wimberley.
Contractual	$ 0	n/a
Construction	$ 0	n/a
Other – Professional Services	$130, 730	1. GBRA funding of operation, maintenance of USGS/GBRA Water Quality Gage at Jacobs Well $80,730 (no federal funds committed) 2. Contribution toward implementation of Comprehensive NPS Collaboration/Assessment, City of Woodcreek $20,000 3. Contribution toward cost of Comprehensive NPS Collaboration/Assessment, Hays County $20,000 4. Additional hours worked toward Ordinance Review, Alan Plummer Associates , Inc., $5,000 5. TNC contribution of labor toward working with private landowners to install BMPs $5000
Indirect	$ 194,439	Texas State will provide $194,439 of the unrecovered indirect costs as match for this project. The source of the non-federal Indirect Cost Match is the 34.5% unrecovered indirect costs. The unrecovered indirect cost is the difference between TCEQ's allowable Indirect Cost Recovery rate of 15% and Texas State University's Federally Approved Rate of 49.5%. The indirect cost base ($577,429) is comprised of Personnel, Fringe, Travel, Supplies, Professional Services and the 1st $25,000 of the single contract. The total available unrecovered indirect cost is $199,213.

In-kind	$172,099	1. WVWA donated office space [$350 mo rent + $100 mo supplies/utilities for 36 mo] = $16,200 2. Stakeholder Committee member participation in meetings and implementation activities [$40/hr (4 technical members) + $23.40/hr (4 community members) x 3hr x 36 meetings] = $27,389 3. Stakeholder Committee Chair commitment to raise additional funds and assist with implementation activities. [$40/hr for 5 hr per week for 20 weeks out of the year for 3 years] = $12,000 4. WVWA Executive Director commitment to raise additional funds and assist with implementation activities/funds from external source to support grant activities if this grant is approved [Appx $48.31/hr x 11.5 hours per month x 3 years] = $20,000 5. GBRA Staff time contributions 10% staff time committed for 3 employees (20 hr per year x 3 yr): Director of WQ Services @ $50/hr =$3000; WQ Technician @ $22/hr = $1320; and E&O staff @ $32/hr = 1920. [$3000+1320+1920] = $6,240 6. Use of meeting rooms donated monthly [$150.56 per meeting x 12 meetings x 3 years] = $5,420 7. GBRA assistance with Monitoring QAPP [48 hours @ $50/hr = $2400] + [40.5% Fringe on $2400 = $972] + [25.22% indirect of ($2400+972=3372) = $850]. $2400+972+850 = $4,222 8. GBRA assistance with annual QAPP updates YR2&3 [12 hours @ $50/hr =$600] + [40.5% Fringe on $600=$243] + [25.22% indirect of ($600+243=843) =$213]. $600+243+213 = $1,056 9. GBRA monitoring and analyses of CRP site [$370 per quarter x 3 yr] = $4400 10. Halff/TRC in-kind contribution to develop modeling and mapping QAPP [$50/hr staff time x 70 hr] = $3,500 11. Wimberley staff time contribution toward NPS Collaboration/Assessment Plan activities [$40/hr x 37.5 hr] = $1,500 12. Hays County Development Services/Road Crew assistance with RWH system installation = $30,000

		13. Lions Club Water Speaker Series [9 events x ($200 room rental + $300 recording fee x (40 hr volunteer time @ $23.40/hr)=936] 9 x ($200+300+936) = $12,924 14. Wimberley Volunteer Advisory Group technical assistance with data compiling, analyses and modeling activities & bi-monthly meetings. 6 months x 3 years x [5 engineers/technical members x $72.40 state allowed hourly rate x 3 hour meetings +$150 meeting space] = 18 x ($362*3)+150)) = $22,248* 15. UT, Jackson School of Geosciences Staff and graduate student time = [$5000] * Please note that technical members contributing in-kind contributions/time cannot be federal employees
Total	**$536,562**	See notes in justifications above

41. **Budget by Task:**

Task #	Title	TCEQ Reimbursable Portion (Federal)	Grantee Match Portion (Non-Federal)	Total
1	Project Administration	$125,650	$86,448	$212,098
2	Quality Assurance (QA) and Data Acquisition	$52,457	$56,427	$108,884
3	Monitoring	$97,421	$104,794	$202,215
4	Comprehensive NPS Collaboration/Assessment	$103,896	$92,839	$196,735
5	Installation of BMPs at Highly Visible Demonstration Sites	$211,045	$55,515	$266,560
6	Education, Outreach and Community Support	$200,461	$117,018	$317,479
7	Final Report	$13,913	$23,521	$37,434
	Total	$804,843	**$**536,562	**$**1,341,405

42. **Total Budget By Year:**

Category	Year 1	Year 2	Year 3	Total
Personnel	$ 116,714	$ 116,713	$ 110,244	$ 343,671
Fringe Benefits	$ 34,069	$ 34,069	$ 32,774	$ 100,912
Travel	$ 1,076	$ 1,076	$ 1,076	$ 3,228
Supplies	$ 5,700	$ 5,000	$ 4,985	$ 15,685
Equipment	$ -	$ 113,000	$ -	$ 113,000
Contractual	$ 30,000	$ 30,000	$ -	$ 60,000
Professional Services (Other)	$ 107,757	$ 100,000	$ 44,000	$ 251,757
Subtotal	$ 295,316	$ 399,858	$ 193,079	$ 888,253
Indirect Costs	$ 93,684	$ 93,684	$ 93,684	$ 281,053
Other In-kind	$ 47,000	$ 91,099	$ 34,000	$ 172,099
Total Project Costs	$ 436,000	$ 584,641	$ 320,763	$1,341,405