NONPOINT SOURCE SUMMARY PAGE
for the FY04 CWA, Section 319(h) Agricultural/Silvicultural
Nonpoint Source Program
Project #04-17

1. **Title of Project:** Development of the Plum Creek Watershed Protection Plan

2. **Project Goals/Objectives:** The purpose of this project is to coordinate the development of a Watershed Protection Plan for the Plum Creek Watershed and to facilitate beginning phases of implementation.

3. **Project Tasks:** The tasks of this project are (1) Coordinate the synthesis of the Plum Creek Watershed Protection Plan for the Plum Creek Watershed Partnership Steering Committee and working in concert with federal, state, and local agencies and organizations and other stakeholders, (2) Conduct data analysis and selective modeling to support development of the Plum Creek Watershed Protection Plan, and (3) Support and assist efforts to begin implementation of the Plum Creek Watershed Protection Plan through stakeholder facilitation, resource acquisition and tracking of established milestones.

4. **Measures of Success:** (1) Development and submission of a completed Watershed Protection Plan for Plum Creek, and (2) initial implementation of a Plum Creek Watershed Protection Plan.

5. **Project Type:** Statewide ( ); Watershed Implementation/Education (X); Watershed Planning/Assessment (X); Watershed Protection ( )

6. **Status of Water Body:** According to the 2004 Texas Water Quality Inventory and 303(d) List, Plum Creek (Segment 1810) is impaired by elevated bacteria concentrations and exhibits elevated nutrient levels.

7. **Project Location:** The Plum Creek Watershed (Segment 1810) (entirety of HUC 1210020304) in Caldwell and Hays Counties.

8. **NPS Management Program Reference:** State of Texas Agricultural/Silvicultural Nonpoint Source Management Program

9. **NPS Assessment Report Status:** Impaired (X); Impacted ( ); Threatened (X); TMDL ( ); Other ( ).

10. **Key Project Activities:** Hire Staff (X); Monitoring ( ); Regulatory Assistance ( ); Technical Assistance (X); Education (X); Implementation (X); Demonstration ( ); Other ( )

11. **NPS Management Program Elements:** Milestones from the *2005 Texas Nonpoint Source Pollution Assessment Report and Management Program*, which will be implemented include: (1) coordinating with Federal, State and Local Programs to most effectively address NPS pollution, and (2) committing to technology transfer, technical support, administrative

support, and cooperation between agencies and programs for the prevention of NPS pollution.

12. **Project Costs:** Federal ($440,503); Non-Federal Match ($294,028); Total Project ($734,531)

13. **Project Management:** Texas AgriLife Extension Service. Cooperating Entities: Texas State Soil and Water Conservation Board (TSSWCB) and Texas AgriLife Research.

14. **Project Period:** Three years from the date of project approval (September 2006 to August 2009).

Development of the Plum Creek Watershed Protection Plan
Texas AgriLife Extension Service

WORKPLAN 04-17

Problem/Need Statement: State and federal water resource management agencies have embraced the watershed approach for managing water quality. The watershed approach involves assessing sources and causes of impairment and utilizing this information to develop and implement watershed management plans. To date, most watershed plans have been developed in conjunction with a TMDL. In addition, most plans have involved substantial resource investment and required multiple years. Few plans have been developed in the U.S., and none in Texas, which fully satisfy EPA's nine element guidance.

Given the more than 400 watersheds in Texas that are in immediate need of planning efforts due to known impairments, strategies for more cost effective and time efficient watershed plan development are needed. Limited modeling approaches may be valuable and should be compared to other, more aggressive methods to establish value thresholds. Successfully implemented plans may be able to prevent or resolve potential and existing water quality problems prior to the development of a TMDL.

As a part of TSSWCB CWA §319(h) Project 04-19, *Regional Watershed Coordinator*, the TSSWCB Wharton Regional Watershed Coordinator established the Regional Watershed Coordination Steering Committee (WCSC) in January 2005. Over the course of the next twelve months, the WCSC quantified criteria to prioritize watersheds in southeast and south central Texas for Watershed Protection Plan (WPP) development. The first watershed selected for plan development was Plum Creek.

To support Project 04-19, Project 05-05 (*A Community-based Water Quality Curriculum which Enhances Stakeholder Involvement in Watershed Protection Plan Initiatives: A Pilot Project*) was developed and implemented. This project has worked in concert with the TSSWCB Regional Watershed Coordinator to initiate WPP development for Plum Creek. The team participated in multiple meetings with local groups and organizations and conducted a media blitz to introduce the project, gain support, and encourage involvement; organized and conducted 3 major public meetings to develop the watershed steering committee and workgroups; and has since convened 3 meetings of the steering committee and 1 each of the 5 topical workgroups.

However, there is a clear need for additional support to achieve both local and multi-agency goals in Plum Creek. Project 04-19 has regional objectives that are much broader than a single watershed. Likewise, Project 05-05 has targeted responsibilities for curriculum development which will support efforts in Plum Creek, but are not directly focused on plan development and implementation. Thus, this proposal defines a complementary project which will provide critical, dedicated technical support both for development and initial implementation of the Plum Creek Watershed Protection Plan.

General Project Description: The purpose of this project is to work in concert with federal, state and local agency partners to coordinate a stakeholder driven process for development of a Watershed Protection Plan in the Plum Creek Watershed which satisfies EPA's nine element guidance.

This project will be a partnership among the primary federal and state agencies directly involved with or linked to water resource management in Texas. The project will work in cooperation with the Plum Creek Technical Advisory Group (PCTAG) which is composed of representatives from the Texas State Soil and Water Conservation Board (TSSWCB), US Environmental Protection Agency (USEPA), Texas Commission on Environmental Quality (TCEQ), Texas Department of Agriculture (TDA), Texas Parks and Wildlife Department (TPWD), USDA Natural Resources Conservation Service (NRCS), USDA Farm Service Agency (FSA), United States Geological Survey (USGS), Guadalupe-Blanco River Authority (GBRA), Texas AgriLife Extension Service and other state and federal agencies, as appropriate, to achieve project objectives. Extension in concert with the TSSWCB will provide leadership for synthesis of the Watershed Protection Plan for Plum Creek, and will have primary responsibility to facilitate the watershed steering committee and coordinate efforts of the associated workgroups. To achieve this goal, a Program Specialist will be employed and dedicated to the project effort. Each PCTAG agency will be asked to provide a point of contact which will be used to solicit data and information as necessary and appropriate to address planning needs in response to workgroup, steering committee, and/or partner agency requests.

To address pollutant source assessment needs, a three-phase data analysis and modeling effort will be conducted by the TAMU Spatial Sciences Laboratory. The primary purposes of this effort will be to gather basic information to facilitate and support stakeholder decision-making processes as a part of the Watershed Protection Plan development process. At the same time and in the process of plan development, an attempt will be made to determine the level of model-based information necessary to satisfy EPA's nine elements.

Phase 1 will involve a data analysis effort to classifying the current land use for the watershed. This will be done through "heads-up digitizing" of the 2004-2005 National Agriculture Imagery Program (NAIP) aerial photos of the area in ESRI's ArcGIS 9.x software. Individual land use/cover classes will be identified and delineated in shapefile format on screen and verified through field sampling. The results of this effort will be used in the remaining phases of work.

Phase II will focus on ranking the sources of bacteria and estimating the fate and transport of *E. coli* and nutrients (N and P) using a spatially-explicit Geographic Information System (GIS) methodology. For this approach, the watershed will be divided into sub-watersheds and pollutant loads from various sources, i.e. agriculture, urban, and wildlife, will be identified and quantified for each. Existing water quality data for the watershed and data generated through a proposed new CWA §319(h) Project (03-19; Surface Water Quality Monitoring to Support Plum Creek Watershed Protection Plan Development) led by the Guadalupe-Brazos River Authority (GBRA) will be used for assessment. From this information, total pollutant loading for the watershed can be calculated and contributing components will be ranked based on percentage and estimated production. In addition to the GIS methodology, Load Duration Curves (LDCs) will be developed to determine the amount of reductions for each pollutant (*E. coli*, NH_3, NO_3,

PO_4 and TP) required to meet water quality standards and screening criteria at the three monitoring stations. The findings from this phase of the project will be used as input data for the modeling efforts in phase III

In the final phase, the Soil and Water Assessment Tool (SWAT) will be used to model hydrologic processes, nutrient loading, and fate and transport of *E. coli* within the watershed. The SWAT model is a basin-scale, distributed-parameter model operating on a daily time step. It is capable of predicting the impact of management on water, sediment, bacteria, and agricultural chemical yields in large river basins for long periods. It is the continuation of a long-term effort on hydrologic and nonpoint source pollution modeling by the USDA-Agricultural Research Service (ARS). The model is physically based, uses readily available inputs, is computationally efficient to operate on large basins in a reasonable time, and is continuous in time and capable of simulating water quantity and quality for long periods.

The model will be run using the highest quality, readily available data for the watershed. Additional information on discharge from wastewater treatment plants and loadings from nonpoint sources will be collected and used in model setup as well. The model will then be calibrated and validated at two USGS long-term streamflow gauges on Plum Creek. Once the model is calibrated and validated for flow, nutrients and pathogens will be simulated based on the distribution sources throughout the watershed obtained from phases I and II of this project. Finally, recommended Best Management Practices (BMPs) identified by the steering committee, work groups and/or partner agencies will be evaluated for their relative impact on water quality and quantity.

The third task defined for this project will involve efforts to support implementation of the Plum Creek Watershed Protection Plan. Once the WPP is developed, the Extension Program Specialist will continue to support the PCWP through stakeholder facilitation, resource acquisition and tracking of established milestones to achieve plan goals.

Tasks, Objectives and Schedules:

Task 1: Coordinate the synthesis of the Plum Creek Watershed Protection Plan for the Plum Creek Watershed Partnership Steering Committee and working in concert with federal, state, and local agencies and organizations and other stakeholders.

Costs: $ 111,210 (Federal), $ 69,508 (State), $ 180,718 (Total)

Objective: Work in concert with stakeholders and partner agencies and organizations to develop a Watershed Protection Plan for Plum Creek.

Subtask 1.1: Extension will hire a Program Specialist to coordinate organization and development of the Plum Creek Watershed Protection Plan. (Start Date: Month 1; Completion Date: Month 3)

Subtask 1.2: In concert with the TSSWCB and the PCTAG, provide leadership for facilitation of the Plum Creek stakeholder Steering Committee and Work Groups for the purpose of plan development. (Start Date: Month 1; Completion Date: Month 18)

Subtask 1.3: Synthesize the Plum Creek Watershed Protection Plan. (Start Date: Month 1; Completion Date: Month 18)

Deliverables

- Quarterly reports documenting progress, status and future activities.
- Draft Plum Creek Watershed Protection Plan (Month 12)
- Completed Plum Creek Watershed Protection Plan (Month 18).

Task 2. Conduct data analysis and selective modeling to support development of the Plum Creek Watershed Protection Plan.

Costs: $ 103,500 (Federal), $ 83,397 (State), $ 186,897 (Total)

Objective: The Texas AgriLife Research Spatial Sciences Laboratory in collaboration with faculty in the Department of Biological and Agricultural Engineering at TAMU will conduct a phased modeling effort to development pollutant source and loading information and estimates of load reductions based on proposed BMPs identified by the Plum Creek Steering Committee and Work Groups and by partner agencies and organizations, as appropriate.

Subtask 2.1: Develop a QAPP for Phase I, II and III modeling consistent with *EPA Requirements for Quality Assurance Project Plans (QA/R-5)* and the *TSSWCB Quality Management Plan.* (Start Date: Month 1; Completion Date: Month 2)

Subtask 2.2: Conduct Phase I efforts to classify current land use for the watershed through "heads-up digitizing" of the 2004-2005 National Agriculture Imagery Program (NAIP) aerial photos of the area in ESRI's ArcGIS 9.x software. (Start Date: Month 2; Completion Date: Month 4)

Subtask 2.3: Conduct Phase II analysis efforts to rank sources of bacteria and estimate fate and transport of *E. coli* and nutrients (N and P) within the watershed using a spatially-explicit Geographic Information System (GIS) methodology. Divide the area into sub-watersheds and identify, quantify and rank pollutant loads from various sources, i.e. agriculture, urban, and wildlife. Utilize existing water quality data and data generated by the GBRA-led monitoring project. Develop load Duration Curves to determine stream pollutant loading and estimate load reductions. (Start Date: Month 2; Completion Date: Month 8)

Subtask 2.4: Phase III modeling will be implemented, to the extent necessary and appropriate, based on the results of Phase II data and information and identified needs of the Plum Creek Steering Committee and Work Groups, and the partner agencies and organizations. Phase III modeling will involve use of the Soil and Water Assessment

Tool (SWAT) to model hydrologic processes, nutrient loading, and fate and transport of *E. coli* within the watershed. (Start Date: Month 3; Completion Date: Month 36)

Deliverables

- Approved QAPP for Phase I, II and III modeling.
- Phase I modeling results.
- Phase II modeling results.
- Phase III modeling results.

Task 3: Support and assist efforts to implement the Plum Creek Watershed Protection Plan through stakeholder facilitation, resource acquisition and tracking of established milestones.

Costs: $ 225,793 (Federal), $ 141,123 (State), $ 366,916 (Total)

Objective: Work in concert with stakeholders and partner agencies and organizations to implement the Plum Creek Watershed Protection Plan.

Subtask 3.1: Engage and facilitate the steering committee, workgroups, other stakeholders, and/or components of these groups through scheduled meetings on a monthly or as appropriate basis, and work in cooperation with partner agencies to begin implementation of the Plum Creek Watershed Protection Plan. (Start Date: Month 12; Completion Date: Month 36)

Subtask 3.2: Assist stakeholders, including the steering committee, workgroups, local government, etc., in identification and acquisition of resources to enable plan implementation. (Start Date: Month 12; Completion Date: Month 36)

Subtask 3.3: Assist stakeholders, including the steering committee and workgroups, in evaluating progress toward achieving established milestones through continued monitoring of water quality and tracking of implementation efforts. (Start Date: Month 18; Completion Date: Month 36)

Deliverables

- Schedules, agendas, attendance lists and minutes from implementation planning and evaluation meetings.
- Documentation of resource opportunities identified and resources obtained to support plan implementation.
- Quarterly, or more frequent if necessary and appropriate, updates of progress toward plan implementation.

Proposed Budget: Total ($440,503), Direct ($383,046), Indirect ($57,457)

Project Lead: Dr. Mark L. McFarland, Texas AgriLife Extension Service – Soil and Crop Sciences
Project Co-Leads: Dr. Raghavan Srinivasan and Dr. Raghupathy Karthikeyan, Texas AgriLife Research

Coordination, Roles, and Responsibilities: The Extension Program Specialist, in coordination with other Extension personnel, will be responsible for coordinating activities of the Plum Creek Steering Committee and Work Groups and for synthesis of the Plum Creek Watershed Protection Plan in concert with the TSSWCB and other partner agencies. The Extension will commission the Plum Creek Technical Advisory Group (PCTAG) which is composed of representatives from the TSSWCB, USEPA, TCEQ, TDA, TPWD, NRCS, FSA, USGS, GBRA, Extension and other state and federal agencies, as appropriate, to provide support in the acquisition, development and/or interpretation of data and information for the purposes of plan development.

The Extension State Water Quality Coordinator will provide oversight for the project. The Director of the Spatial Sciences Laboratory in the Department of Forestry (Dr. Raghavan Srinivasan), and Dr. Raghupathy Karthikeyan, Assistant Professor in Biological and Agricultural Engineering, at Texas A&M University will provide leadership for the modeling component of the project.

Public Participation: The purpose of this project is to complete the development and support initial implementation of a stakeholder-driven Watershed Protection Plan for Plum Creek. All meetings of the Plum Creek Steering Committee and associated Work Groups will be open to the public to obtain local insight and ultimately to facilitate public support for plan implementation.

Measures of Success and Performance: Successful development and initial implementation of a Plum Creek Watershed Protection Plan which is supported by local stakeholders and satisfies EPA's nine elements.

Reference to Project in the NPS Management Program: Milestones from the *2005 Texas Nonpoint Source Pollution Assessment Report and Management Program* which will be implemented include: (1) coordinating with Federal, State and Local Programs to most effectively address NPS pollution, and (2) committing to technology transfer, technical support, administrative support, and cooperation between agencies and programs for the prevention of NPS pollution.

Project Lead
Name: Mark L. McFarland
Telephone: 979-845-2425
Organization: Texas AgriLife Extension Service

Project Costs: Federal ($440,503); Non-Federal Match ($294,028); Total Project ($734,531)

Project Period: Three years from date of approval.

BUDGET
for the
Development of the Plum Creek Watershed Protection Plan
Texas AgriLife Extension Service

04-17 "Development of the Plum Creek Watershed Protection Plan" Budget Revision 07/09/2009			
Federal 319(h)	$440,503	% of total project	60%
Non-Federal Match	$294,028	% of total project (≥ 40%)	40%
Total Project Cost	$734,531		

Category	Federal 319(h)	Non-Federal Match	Total
Personnel	209,509	147,797	357,306
Fringe Benefits	51,031	24,009	75,040
Subtotal Personnel & Fringe	260,540	171,806	432,346
Travel	20,032	0	20,032
Equipment	0	0	0
Supplies	9,958	0	9,958
Contractual	80,000	0	80,000
Construction	0	0	0
Other	12,516	0	12,516
Subtotal	122,506	0	122,506
Total Direct Costs	383,046	171,806	554,852
Indirect Costs (≤ 15%)	57,457	78,172	135,629
Unrecovered IDC	0	44,050	44,050
Total Project Costs	440,503	294,028	734,531

BUDGET Justification
for the
Development of the Plum Creek Watershed Protection Plan
Texas AgriLife Extension Service
Three year budget (from receipt of funding)

Personnel: Funds will be used to support three years of salary for a Program Specialist.

Fringe: Fringe benefits are calculated at a rate of 15.6% of salary to cover FICA, UCI, WCI and retirement. An additional amount of $435/month is calculated for group medical insurance. These estimates are in accordance with the TAMUS Office of Budget and Accounting estimating procedures established for FY 06.

Travel: Support approximately 6 trips per month at $98 per trip for the Program Specialist and other Extension personnel necessary for support of project activities.

Supplies and Other: Support the purchase of a laptop computer for the Program Specialist, signs, printing and reproduction costs, and other supplies in support of the Plum Creek steering committee and work groups.

Contractual: Will support data analysis and selected modeling efforts through a subcontract to the Texas AgriLife Research Spatial Sciences Laboratory, and publications related to the project.

Indirect Costs: Per TSSWCB RFP for CWA, Section 319(h) Agricultural/Silvicultural Nonpoint Source Program, a maximum of 15% indirect costs will be reimbursed.