SUMMARY PAGE FOR THE

FY05 CWA Section 319(h) Agricultural Nonpoint Source Pollution Abatement and Prevention Program

1. TITLE OF PROJECT: PLAN FOR TOMORROW: POULTRY LITTER APPLICATION ON NEW SITES

2. PROJECT GOALS/OBJECTIVES

As many areas with extensive animal operations are approaching soil P limits, the animal production industry is being forced to expand their application areas to 3rd party applications sites to manage their by-products. The overall watershed-wide objective of this project is to educate 3rd party applicators of poultry litter to the environmental benefits of using proper application management techniques beginning on Day 1 of application on new sites. Potential nutrient-related water quality problems, which are caused by the increase of soil P levels and by excessive litter remaining on the land surface, can be avoided if recommended practices are followed. Water quality protection and remediation cost savings will result, and legal/regulatory conflicts will be avoided.

Our objectives for individual producers are to demonstrate that poultry litter can be land applied in an environmentally friendly manner that supplies necessary crop nutrients without increasing nutrient levels in runoff and that multiple objectives (such as: profitability, resource utilization, and water quality protection) can be met with this fertilization strategy.

Preliminary data collected at the site indicate that edge-of-field PO_4-P concentrations with a 1-2 t/ac litter application rate are similar to the concentrations detected from fields with well-managed commercial fertilization. Annual mean and median PO_4-P concentrations from both a hybrid poultry litter (2 t/ac) with supplemental commercial N and a commercial N and P fertilization program were below the TCEQ nutrient screening criteria for PO_4-P; however, at rates of 3 t/ac and above, PO_4-P nutrient screening criteria were exceeded. Thus, implementation of poultry litter application with the recommended practices should keep edge-off-field PO_4-P below TCEQ nutrient screening levels.

3. PROJECT TASKS: 1) BMP Effectiveness Monitoring for Target Bacteria, 2) BMP Education, 3) Support Tool Evaluation, 4) and Watershed Assessment for Presence of Target Bacteria.

4. MEASURES OF SUCCESS: An increased use of poultry litter on cropland areas will result in less P available for runoff from historically over-utilized application sites. An increase in landowner use of litter application BMPs will result in improved water quality in nutrient threatened watersheds and prevent future impairment. An increased awareness of the availability and benefits of poultry litter fertilization on pasture and cropland will provide poultry producers alternatives for utilizing the by-product resource value. A clearer understanding of the presence of *Escherichia coli (E. coli)* bacteria in the middle Brazos watershed. The quality of runoff

water from well-managed new application sites will emphasize to producers that proper management is required to protect water resources from agricultural NPS nutrient pollution.
5. PROJECT TYPE: Statewide ( ); Watershed Implementation/Education (X) Watershed Planning/Assessment (X) Watershed Protection (X)

6. WATERBODY TYPES: River (X), Groundwater ( ), Other ( )

7. PROJECT LOCATION: Brazos River above Navasota River; Segment No. 1242
8. NPS MANAGEMENT PROGRAM REFERENCE: State of Texas Agricultural/Silvicultural Nonpoint Source Management Program, approved 25 Feb, 2001.

9. NPS ASSESSMENT REPORT STATUS: Segment No. 1242 is listed as a category 5c waterbody with a rank of D for bacteria.

10. KEY PROJECT ACTIVITES: Hire Staff ( ), Monitoring (X), Regulatory Assistance ( ), Technical Assistance ( ), Education (X), BMP Effectiveness Demonstration (X), Other (X)

11. NPS MANAGEMENT PROGRAM ELEMENTS: Implementing milestones from the "1999 Texas Nonpoint Source Pollution Assessment Report and Management Program", which will be implemented include: 1) Coordination of federal, state, and local programs; 2) TSSWCB is committed to technology transfer, technical support, administrative support, and cooperation between agencies and programs for the prevention of NPS pollution.

12. PROJECT COSTS: Federal ($210,002); State ($140,126); Total ($350,128)

13. PROJECT CONTRACTOR: Texas Cooperative Extension

14. PROJECT PERIOD: 1 September, 2005 – 31 August, 2008

WORK PLAN

Texas Agricultural Nonpoint Source Pollution Abatement and Prevention Project
FY05 CWA Section 319(h)
1 September, 2005 to 31 August, 2008

PROBLEM NEED/STATEMENT

A goal of common interest now and in the future of the environmental and agricultural communities should be to prevent water quality degradation, and thus avoid ecological damage and the need for intense legal and regulatory pressure. Many previous efforts between agriculture and the State of Texas have focused on solving water quality problems after a determination that agriculture contributes to the problem.

In this project, the benefits of a pro-active approach focused on achieving multiple objectives will be demonstrated on an established poultry litter application site near Riesel in Falls and McLennan Counties of Texas. Typically, a single objective such as sustainable agricultural production or short-term economic viability is the focus of agricultural producers; however, increasing concern for agriculture's contribution to water quality degradation is forcing farmers to also consider environmental protection. This type of approach that considers multiple objectives should be effective in minimizing current and preventing future water quality impairments. The approach can be effective on new poultry litter application sites, which are rapidly increasing in number in Central Texas because previous land application sites located near areas with extensive animal operations have reached or soon may reach soil P thresholds. With the increasing number of new 3rd party land application sites, it is important to demonstrate the benefits of utilizing proper conservation practices from the beginning.

This project will also assess the presence of *Escherichia coli (E. coli)* bacteria in segment 1242 of the Brazos River. Land uses in the watershed include intensive rowcrop agriculture and livestock production. Various crop protection and yield enhancing amendments are commonly used in the watershed. In addition, confined animal feeding operations related to poultry production are located in the watershed.

Table 1: Impaired Bacterial Segments within the Project Area and Effectiveness of Monitoring Sites

Segment Name	Segment #	HUC	Category	Priority
Brazos River Above Navasota River	1242	12070101 12070103	5c	D

GENERAL PROJECT DESCRIPTION

The project will be conducted with the cooperation of several state of Texas and federal agencies, including Texas Cooperative Extension (TCE), Texas Agricultural Extension Service (TAES), USDA Agricultural Research Service (USDA-ARS), SWCD State Districts (3, 5), and Midwestern State University (MSU). The responsibilities are briefly described below, but a more detailed description appears in the Project Tasks section.

Demonstration sites will be established on ten watersheds managed as typical farm and ranch fields that have received annual poultry litter application since 2001. Under the proposed project, litter application and management practices will be maintained by USDA-ARS and TAES personnel **(Task 1)**. Data on water and soil quality will continue to be collected by USDA-ARS personnel with USDA-ARS direct funding and Conservation Effects Assessment Project (CEAP) funding. These data will be used to support the demonstration efforts. TCE/TAES personnel from College Station (CS) will secure samples from runoff events at the demonstration plots maintained by USDA-ARS and TAES for analysis of the presence of bacteria in the runoff samples. TCE and TAES – CS will also collect monthly grab samples **(TASK 4)** from nine sites located along segment 1242 for analysis of the presence of bacteria. In addition, information on management practices and on-farm economics will be collected and analyzed by USDA-ARS, TAES, and MSU personnel **(Task 3)** and be used to strengthen the public participation and technology transfer components **(Task 2)**. Preliminary results indicate that poultry litter can be used in agricultural fertilization strategies without detrimental impacts on runoff water quality, but *only if* recommended management practices are followed. The importance of following these recommendations will be demonstrated by TCE personnel with assistance from SWCD personnel **(Task 2)**.

The Objectives of this Project are as follows:

1.) To educate 3rd party applicators of poultry litter to the environmental benefits of using proper application management techniques beginning on Day 1 of application on new sites.
2.) Avoid potential nutrient-related water quality problems.
3.) To demonstrate that poultry litter can be land applied in an environmentally friendly manner that supplies necessary crop nutrients without increasing nutrient levels in runoff
4.) To determine if multiple objectives (such as: profitability, resource utilization, and water quality protection) can be met with this fertilization strategy,
5.) To determine if *E. coli* bacteria are present in surface runoff from agricultural land with applied poultry litter, and
6.) To assess the presence of *E. coli* bacteria in segment 1242.

Project Tasks, Estimated Costs, and Schedules to meet project objectives:

TASK 1: Maintain various nutrient management practices on cultivated and pasture fields to demonstrate the importance of using nutrient management BMPs for poultry litter application.

Costs: $117,328 (Federal), $61,947 (Non-federal Match), $179,275 (Total)

Subtask 1.1 - Establish demonstration watershed sites at the USDA-ARS Grassland Soil and Water Research Center near Riesel, TX. (Start Date: Month 1; Completion Date: Month 10)

Subtask 1.2 - Conduct management practices on the project demonstration watersheds. Management practices will include: tillage, weed and insect control, crop production, and fertilizer application (including both poultry litter and commercial/inorganic formulations). (Start Date: Month 3; Completion Date: Month 36)

Subtasks 1.3 - Gather and record land management and crop yield information to support the technology transfer activities. (Start Date: Month 1; Completion Date: Month 36)

Deliverables:

- Runoff water quality data from plots
- Land management information including crop yields
- Net profits or losses associated with each production system

TASK 2: Conduct demonstration, educational, and technology transfer activities on the benefits of a pro-active approach to nutrient application management related to poultry litter application.
Costs: $21,552 (Federal), $13,685 (Non-federal Match), $35,237 (Total)

Subtask 2.1 – Present information at field days in Falls and McLennan counties (where considerable interest in using organic fertilizers has been shown by the local agricultural producers).
(Start Date: Month 10; Completion Date: Month 36)

Subtask 2.2 – Present educational information generated from project during two ag. producer meetings/field days annually in the Central Texas region outside of Falls and McLennan Counties. (Start Date: Month 10; Completion Date: Month 36)

Subtask 2.3 – Present information generated from project during two state-wide Texas Plant Protection Association Annual meetings. (Start Date: Month 4; Completion Date: Month 28)

Subtask 2.4 - Conduct a pre and post test questionnaire at one of the field days annually to determine knowledge gained as a measure of effectiveness of educational and technology transfer efforts. (Start Date: Month 10; Completion Date: Month 36)

Subtask 2.5- Develop an extension publication on the “importance of doing things right” from the beginning on new application sites so that future problems are avoided. (Start Date: Month 25, Completion Date 36)

Subtask2.6 – Place Extension Publication on TCE bookstore website and on TCE Department of Soil and Crop Sciences website. (Start Date: Month 30, Completion Date 36)

Deliverables:

- Agendas from field days/meetings
- Copies of presentations presented at field days/meetings
- Copy of Extension publication

TASK 3: Demonstrate the use of a decision support tool for use in managing on-farm nutrient application to meet the multiple objectives of profitability, animal by-product resource utilization, and water quality protection.

Costs: $21,864 (Federal), $34,722 (Non-federal Match), $56,586 (Total)

Subtask 3.1 - Use the economic capabilities of CROPMAN to generate annual operating costs estimates to be used with measured data on yields and gross sales to produce on-farm profit data for each nutrient management alternative.

Subtask 3.2 - Adapt a recently developed spreadsheet-based goal programming decision support tool called Goal Oriented Algorithm for Lasting Solutions (GOALS) for use in on-farm decision making.

Subtasks 3.3 - Use profit data and GOALS to demonstrate the various economic and environmental alternatives involved in nutrient management.

Subtask 3.4 - Demonstrate the use of a decision support tool for use in managing on-farm poultry litter and other nutrient applications to meet the multiple objectives of profitability, animal by-product resource utilization, and water quality protection.

Deliverables:

- Annual on-farm profit data for each nutrient management alternative
- Economic data associated with each nutrient management alternative
- GOALS output for various scenarios

Task 4: Develop and maintain a water sampling and analysis program for monthly grab samples collected from segment 1242 of the Brazos River and for runoff samples collected at the poultry litter application site to determine the presence of *E. coli* bacteria.
Costs: $49,258 (Federal), $29,772 (Non-federal Match), $79,030 (Total)

Subtask 4.1: Establish nine water sampling sites on segment 1242. The specific locations will be identified in the Quality Assurance Project Plan (QAPP).

Subtask 4.2: Collect monthly grab water samples from each of the sampling sites identified in the QAPP.

Subtask 4.3: Process and analyze all grab water samples for the presence of *E. coli* bacteria.

Subtask 4.4: Secure runoff water samples collected from the edge-of-field demonstration sites on the Riesel watershed.

Subtask 4.5: Process and analyze all runoff water samples for the presence of *E. coli* bacteria.

Deliverables:

- QAPP for bacterial sampling
- Water quality data reports for grab samples from segment 1242 of the Brazos River
- Water quality data reports for runoff samples from the poultry demonstration sites

Project Management:

Participating organizations and agencies along with roles in this project include:

- Texas Cooperative Extension (Monty Dozier) - Co-Project leader, river segment sampling program director, project coordination, technology transfer coordinator
- USDA-Agricultural Research Service (Daren Harmel) - Co-project leader and Poultry application demonstration project manager, runoff sampling program director
- Texas Agricultural Experiment Station (Scott Senseman) – Bacterial analysis program director; (Wyatte Harman) - On-farm budget project manager
- Texas State Soil and Water Conservation Board (Laurie Fleet) - Project management
- Midwestern State University (Bob Harmel and Mike Patterson) – adaptation of a decision support tool for use in on-farm decision making and will illustrate its use for a farm in central Texas.
- Environmental Protection Agency – Region VI – Project coordination and funding

Cooperating entities include, but not limited to the following:
Texas State Soil and Water Conservation Board, Soil and Water Conservation Districts, USDA-NRCS, USDA-ARS, Texas Cooperative Extension, Texas Agricultural Experiment Station, and the Environmental Protection Agency, Region VI.

Project Coordination:
Public participation will be an important component that will be stressed in this project. All of the Tasks focus on public participation through demonstration and technology transfer. Traditionally well-attended producer field days in the area including Falls, McLennan, and Williamson Counties as well as other counties in or near the study area **(Task 2)**, some of which will be conducted on the project site **(Task 1)**, will be used to provide an outlet for the information. The local county extension agents will also play a large role in conducting the educational activities. The local SWCD's in State Districts 3 and 5 will also assist in the public participation component. The educational material from results of the project **(Tasks 1 and 4)**

will be distributed in an extension publication **(Task 2)** that will include the economics and water quality information desired by producers and the public **(Task 3 and 4)**.

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Project Budget

05-06 "Plan for Tomorrow: Poultry Litter Application on New Sites" Budget Revision 7/17/2009			
Federal 319(h)	$210,002	% of total project	60%
Non-Federal Match	$140,126	% of total project (at least 40%)	40%
Total $ Cost	$350,128	Total project %	100%

Category	Federal	Non-Federal Match	Total
Personnel	$54,750	$97,000	$151,750
Fringe Benefits	$10,546	$23,038	$33,584
Subtotal Personnel & Fringe	$65,296	$120,038	$185,334
Travel	$6,563	$0	$6,563
Equipment	$0	$0	$0
Supplies	$12,899	$0	$12,899
Contractual	$0	$0	$0
Construction	$0	$0	$0
Other	$97,853	$0	$97,853
Subtotal	$117,315	$0	$117,315
Total Direct Costs	$182,611	$120,038	$302,649
Indirect Costs (15%)	$27,391	$20,088	$47,479
Total Project Costs	$210,002	$140,126	$350,128

Itemized Budget Justification

Personnel –

- TCE extension assistant will assist with water sampling and sample processing, educational programs, data analysis and educational materials development.
- TAES research assistant will assist with modeling effort and data analysis.
- Student worker will assist with bacterial sampling, sample analysis, and lab maintenance.

Supplies –

- Include office supplies such as paper, pens, computer disks, etc to support project
- *E. coli* sampling and analysis materials and supplies
- Materials to conduct meetings for farmers and general public at field days and other educational events

Travel –

- Six per year trips to demonstration site in Riesel from College Station and to educational programs or field days (an average of 200 miles x $0.35 per mile) - $420 per year
- One night's lodging ($80 per night) for four trips per year to educational programs or field days; $320 per year
- One day's meals ($30 per day) for four days per year to educational programs or field days; $120 per year
- 12 trips per year to collect grab water samples from sites on segment 1242 at 300 miles per trip at $0.35 per mile; $1,260.
- Out of state travel of $1,000 to offset a portion of meals and lodging to workshops to allow project professionals to remain up-to-date on information related to water quality protection.

Miscellaneous –

- Cost to publish and print an Extension Publication - $5,000
- Cost for preparation and publishing of one journal article - $1,200
- Cost associated with conducting field days and educational events to transfer technology - $2,000 per year
- Land Management of demonstration site - $31,000 per year

In-direct cost – Calculated at 15%

Matching funds source –

- State salary and fringe benefits for Monty Dozier, Scott Senseman, Wyatte Harman, Bob Harmel, Mike Patterson, and a TAES farm worker.
- Unrecorved IDC of 11% (difference between project-allowed in-direct costs (15%) and the typical TCE in-direct cost of 26%)