



**Texas State Soil and Water Conservation Board
 Clean Water Act §319(h) Nonpoint Source Grant Program
 FY 2009 Project Workplan 09-05**

NONPOINT SOURCE SUMMARY PAGE for the CWA §319(h) Agricultural/Silvicultural Nonpoint Source Grant Program						
Title of Project:	Environmental Effects of In-House Windrow Composting of Poultry Litter					
Project Goals:	To reduce bacteria, nutrients, and other environmental impacts of poultry litter application through demonstration/evaluation of in-house windrow composting (IWC) of poultry litter and transferring the results to poultry producers throughout the state					
Project Tasks:	(1) Project Administration; (2) Quality Assurance; (3) Demonstration of IWC of Poultry Litter; (4) Analysis of Environmental Effects of IWC, and (5) Technology Transfer					
Measures of Success:	(1) Reduction in levels of bacteria, nutrients, and volatiles observed between IWC litter and raw litter (2) Reduction in bacteria, nutrients, and volatiles loading from sites where IWC litter is applied vs. where raw litter is applied (3) Number of educational programs conducted (4) Number of people attending educational programs					
Project Type:	Implementation (); Education (X); Planning (); Assessment (X); Groundwater ()					
Status of Water Body: 2008 Texas Water Quality Inventory and 303(d) List	<u>Segment ID:</u> 1209 Navasota River Below Lake Limestone <ul style="list-style-type: none"> • Steele Creek (1209K) 1210 Lake Mexia <ul style="list-style-type: none"> • Navasota River above Lake Mexia (1210A) 1242 Brazos River Above Navasota River <ul style="list-style-type: none"> • Deer Creek (1242J) • Big Creek (1242P) 1253 Navasota River Below Lake Mexia 1252 Lake Limestone	<u>Parameter:</u> Bacteria Bacteria N/A Bacteria N/A Bacteria Bacteria N/A N/A	<u>Category:</u> 5a 5c N/A 5c N/A 5c 5c N/A N/A			
Project Location (Statewide or Watershed and County)	USDA-ARS demonstration site – Brazos River Above Navasota River watershed in McLennan County Cooperator demonstration site – watershed TBD in either Falls or Limestone County Technology transfer – Statewide, primary poultry producing areas (see attached map)					
Key Project Activities:	Hire Staff (X); Surface Water Quality Monitoring (); Technical Assistance (); Education (X); Implementation (); BMP Effectiveness Monitoring (X); Demonstration (X); Planning (); Modeling (); Bacterial Source Tracking (X); Other ()					
Texas NPS Management Program Elements:	<ul style="list-style-type: none"> • Long-Term Goal Objective 2 • Short-Term Goal 3, Objectives A, B, D • Milestone F 					
Project Costs:	Federal:	\$268,236	Non-Federal:	\$178,844	Total:	\$447,080
Project Management:	<ul style="list-style-type: none"> • Texas Water Resources Institute • Texas AgriLife Extension Service • Texas AgriLife Research • USDA – Agricultural Research Service 					
Project Period:	November 2, 2009 – October 31, 2013					

Part I – Applicant Information

Applicant							
Project Lead		Dr. Kevin Wagner					
Title		Associate Director					
Organization		Texas Water Resources Institute					
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City	College Station	County	Brazos	State	TX	Zip Code	77843-2260
Telephone Number		979.845.2649		Fax Number		979.845.8554	

Project Co-Lead		Dr. Craig Coufal					
Title		Asst. Professor & Extension Specialist					
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City	College Station	County	Brazos	State	TX	Zip Code	77843-2472
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Project Co-Lead		Dr. Daren Harmel					
Title		Agricultural Engineer					
Organization		USDA – Agricultural Research Service					
E-mail Address		daren.harmel@ars.usda.gov					
Street Address		808 E Blackland Rd					
City	Temple	County	Bell	State	TX	Zip Code	76502
Telephone Number		254.770.6521		Fax Number		254.770.6561	

Project Co-Lead		Dr. Terry Gentry					
Title		Asst. Professor of Soil & Aquatic Microbiology					
Organization		Texas AgriLife Research – Department of Soil and Crop Sciences					
E-mail Address		tgentry@ag.tamu.edu					
Street Address		2474 TAMU					
City	College Station	County	Brazos	State	TX	Zip Code	77843-2474
Telephone Number		979.845.5323		Fax Number		979.845.0456	

Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects.
Texas Water Resources Institute (TWRI)	Project coordination and administration; QA/QC
Texas AgriLife Extension Service – Department of Poultry Science (POSC)	Demonstration of environmental effects of IWC and technology transfer
Texas AgriLife Extension Service – Soil, Water and Forage Testing Laboratory (SWFTL)	Lab analysis of nutrient levels in soil and litter samples
Texas AgriLife Research – Department of Soil and Crop Sciences – Soil & Aquatic Microbiology Lab (SAML)	Lab analysis of bacteria in IWC and raw litter, and runoff
West Texas A&M Univ. Olfactometry Laboratory (W-TAMU)	Analysis of volatiles
Sanderson Farms	Poultry Integrator will help secure cooperator demonstration site
Texas Poultry Federation	Project Partner will provide leadership and guidance for advisory committee and education activities
USDA – Natural Resources Conservation Service (USDA-NRCS)	Provide direction for modifying practice standards to include IWC
USDA – Agricultural Research Service (USDA-ARS)	Management of Riesel demonstration site and analysis of nutrient levels in runoff from Riesel
Limestone-Falls Soil and Water Conservation District (SWCD 501)	Project Partner will provide leadership and guidance for advisory committee and education activities
Private poultry grower	Cooperator site for IWC demonstration

Part II – Project Information

Project Type					
Surface Water	<input checked="" type="checkbox"/>	Groundwater	<input type="checkbox"/>		
Does the project implement recommendations made in a completed Watershed Protection Plan or an adopted TMDL or Implementation Plan?				Yes	No
If yes, identify the document.					X
If yes, identify the agency/group that developed and/or approved the document.				Year Developed	

Watershed Information				
Watershed Name(s)	HUC (8 Digit)	Segment ID	305(b) Cat.	Size (Acres)
Navasota River Below Lake Limestone	12070103	1209	5a	996,477
Steele Creek	12070103	1209K	5c	TBD
Lake Mexia	12070103	1210	N/A	125,440
Navasota River above Lake Mexia	12070103	1210A	5c	125,440
Brazos River Above Navasota River	12070101	1242	N/A	26,362,880
Deer Creek	12070101	1242J	5c	TBD
Big Creek	12070101	1242P	5c	TBD
Navasota River Below Lake Mexia	12070103	1253	N/A	306,560
Lake Limestone	12070103	1252	N/A	306,560

Water Quality Impairment

Describe all known causes (pollutants of concern) of water quality impairments from any of the following sources: 2008 Texas Water Quality Inventory and 303(d) List, Clean Rivers Program Basin Summary, Basin Highlights Reports or Other Documented Sources.

<u>Segment</u>	<u>Name</u>	<u>Parameter</u>	<u>Category</u>	<u>Year 1st Listed</u>
1209	Navasota River blw Lk Limestone	NO ₃ & PO ₄	CS	
1209K	Steele Creek	Bacteria	5c	2006
1210	Lake Mexia	TP, Chl-a, PO ₄	CS	
1210A	Navasota River abv Lake Mexia	Bacteria	5c	2002
1242	Brazos River abv Navasota River	Demineralization	CS	
1242J	Deer Creek	Bacteria	5c	2002
1242P	Big Creek	Bacteria	5c	2002
1253	Navasota River Below Lake Mexia	DO & Chl-a	CS	
1252	Lake Limestone	DO & Chl-a	CS	

Project Narrative

Problem/Need Statement

According to the *2008 Texas Water Quality Inventory and 303(d) List*, 295 waterbodies in Texas are impaired by bacteria. To address the bacteria impaired waterbodies, Texas is developing and implementing Total Maximum Daily Loads (TMDLs), TMDL Implementation Plans, and Watershed Protection Plans. Many of these waterbodies are located in the poultry producing regions of Texas (see map). Poultry production has expanded significantly in recent years in Falls, Limestone, and surrounding counties. An estimated 550 new poultry houses have been built in this area, producing approximately 60 million broilers annually. If improperly managed, litter (the combination of bedding material and manure) removed from the facilities and land applied represents a threat to water quality through bacterial and nutrient runoff from these fields. By proactively planning for and addressing environmental issues, the impacts from new and existing facilities can be minimized for the long term. To achieve this, additional cost-effective best management practices (BMPs) are needed to reduce the environmental impacts. Furthermore, such BMPs must be demonstrated to area producers in order to achieve their adoption.

One such BMP is in-house windrow composting (IWC) of poultry litter. IWC is a litter management strategy used by commercial poultry producers to reduce pathogenic microorganisms in litter and improve the overall quality of the litter between successive flocks reared on the same litter. While some research has been published about the methodology of performing IWC and the subsequent reductions in bacterial loads in litter, and many managers in the poultry industry currently utilize this technique, no data has been published regarding the effects of IWC on runoff water quality or other environmental impacts when litter that has been treated in this manner is land applied.

In-house windrow composting is a relatively simple technique to implement in a poultry house. After the birds are removed from the houses, the litter is piled into windrows down the length of the house. Natural bacterial metabolism generates heat within the piles. Within 48 hours, the internal temperature of the piles will surpass 131°F, a temperature sufficient to inactivate most pathogenic microorganisms found in litter such as *E. coli*, *Salmonella* and various viruses. Litter is typically left in piles for 5-9 days, and then spread out to be reused for the next flock of birds. Turning of the piles may also occur during this time to release moisture, increase aeration and assure that all parts of the litter pile are heated to inactivate pathogens. The IWC process has been referred to as a “pasteurization” procedure rather than composting, but the term “composting” is widely used in the literature and poultry industry.

If demonstration/evaluation of this practice shows it to be effective at reducing the loadings of nutrients, bacteria, and volatiles, this practice could then be added to the list of approved practices for Water Quality Management Plans for poultry operations. State law requires all poultry operations in Texas to operate in accordance with a TSSWCB certified WQMP. Additionally, if effective, the practice could be added by NRCS to the Field Office Technical Guide. This would not only benefit Texas, but poultry operations nationwide.

Project Narrative

General Project Description (Include Project Location Map)

This project will demonstrate the environmental effects of treating poultry litter using IWC. The effect of IWC-treated litter on runoff water quality when the litter is land applied will be assessed as well as other benefits of this practice. Data is needed to evaluate parameters such as nutrient load and solubility and *E. coli* content in runoff water from land upon which IWC-treated poultry litter has been applied. It is anticipated that the IWC procedure should eliminate most *E. coli* in the litter, thus reducing the potential for bacterial contamination of water resources. If successfully demonstrated, IWC could be used by poultry producers as a standard, cost-effective BMP to reduce the microbial load of poultry litter before it is removed from poultry houses during whole house cleanouts. In addition, implementation of IWC as a BMP between flocks could also eliminate the need for caked litter removal, handling and disposal; thus, reducing the frequency (and potentially the total amount) of litter removed from poultry houses and needing final disposition.

To evaluate the potential benefit to surface water runoff quality, IWC will be performed at a private poultry facility (cooperator site) in either Limestone or Falls County. Bacteria, nutrients, and volatiles in raw and IWC litter will be evaluated prior to land application at USDA-ARS sites in Riesel. A 3 ton/ac application rate will be utilized as recommended by Harmel et al. (2009). This rate is typical for pasture conditions in Central Texas. Additionally, through the use of laboratory and field evaluation of volatile concentrations from litter and from the application sites at Riesel by W-TAMU, the environmental impacts of using IWC poultry litter instead of raw litter will be demonstrated.

At the USDA-ARS watershed sites at Riesel, bacteria levels in runoff will be evaluated to determine the edge-of-field impacts of the BMP. Through a separate project, not funded by this or other CWA §319(h) funds, the water quality impacts of litter and commercial fertilizer application on nutrient runoff from the demonstration sites will be evaluated. Storm and baseflow water quality samples will be collected from USDA-ARS watersheds in Riesel and analyzed for NO₃-N, NH₄-N, and PO₄-P. Bacteria levels (*E. coli*) in the runoff from the Riesel watersheds will be analyzed by SAML.

Results of the demonstration and practice evaluation will be distributed through publications and grower meetings conducted in year 3 of the project in poultry producing regions of Texas (see map). POSC, SAML, and USDA-ARS, with assistance from TWRI, will develop outreach materials (e.g. refereed journal articles, Extension publications, and other materials as needed) summarizing the results of the demonstration and the analysis of the environmental impacts of IWC poultry litter. These will be submitted to the TSSWCB for review prior to publication. POSC will conduct 6-9 grower meetings throughout the poultry producing areas of the state to present results of the IWC demonstration/evaluation. POSC will work with poultry integrators to deliver 2-3 programs for growers for each integrator (Sanderson Farms, Tyson, Pilgrim's Pride). TWRI will assist POSC by developing press releases, meeting notification materials for distribution prior to the meetings, and post meeting summaries. TWRI, with assistance from POSC and SAML, will also develop, host, and maintain a project website for dissemination of project materials. POSC, with assistance from TSSWCB, TWRI and USDA-ARS, will work with USDA-NRCS to make necessary revisions to various practice standards (i.e., 629 Waste Treatment, 633 Waste Utilization, 317 Composting Facility) to include IWC so that it can be used in TSSWCB Water Quality Management Plans and NRCS conservation plans. Finally, POSC will work with SAML, USDA-ARS, and TWRI to develop a final report summarizing the results of the project. □

Tasks, Objectives and Schedules						
Task 1:	Project Administration					
Costs:	Federal:	\$19,800	Non-Federal:	\$12,832	Total:	\$32,632
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:	TWRI will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15 th of January, April, July and October. QPRs shall be distributed to all project partners.					
	Start Date:	Month 1		Completion Date:	Month 48	
Subtask 1.2:	TWRI will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.					
	Start Date:	Month 1		Completion Date:	Month 48	
Subtask 1.3:	TWRI will participate in meetings with TSSWCB and project partners as appropriate in order to efficiently and effectively achieve project goals, coordinate monitoring efforts and summarize activities and achievements made throughout the course of this project.					
	Start Date:	Month 1		Completion Date:	Month 48	
Subtask 1.4:	TWRI will work with the POSC, USDA-ARS, and SAML to ensure appropriate communication with the poultry industry.					
	Start Date:	Month 1		Completion Date:	Month 48	
Subtask 1.5:	TWRI will organize semi-annual TTVN meetings with project participants to discuss project activities, project schedule, lines of responsibility, communication needs, and other requirements.					
	Start Date:	Month 1		Completion Date:	Month 48	
Deliverables	<ul style="list-style-type: none"> Quarterly progress reports in electronic format Reimbursement Forms and necessary documentation in hard copy format 					

Tasks, Objectives and Schedules						
Task 2:	Quality Assurance					
Costs:	Federal:	\$5,000	Non-Federal:	\$3,300	Total:	\$8,300
Objective:	To develop data quality objectives (DQOs) and quality assurance/control (QA/QC) activities to ensure data of known and acceptable quality are generated through this project.					
Subtask 2.1:	TWRI will develop a QAPP for activities in Task 3 and 4 consistent with the most recent versions of <i>EPA Requirements for Quality Assurance Project Plans (QA/R-5)</i> and the <i>TSSWCB Environmental Data Quality Management Plan</i> .					
	All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the <i>TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)</i> and <i>Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416)</i> .					
Subtask 2.2:	TWRI will submit revisions and necessary amendments to the QAPP as needed.					
	Start Date:	Month 6		Completion Date:	Month 48	
Deliverables	<ul style="list-style-type: none"> QAPP approved by TSSWCB and EPA in both electronic and hard copy formats Approved revisions and amendments to QAPP, as needed Data of known and acceptable quality as reported through Task 3 and 4 					

Tasks, Objectives and Schedules						
Task 3:	Demonstration of IWC of Poultry Litter					
Costs:	Federal:	\$60,859	Non-Federal:	\$40,678	Total:	\$101,537
Objective:	To demonstrate and evaluate the effectiveness of IWC of poultry litter in reducing bacteria, nutrient, and volatile levels.					
Subtask 3.1:	POSC will work with integrators (primarily Sanderson Farms) in Limestone and Falls Counties to identify a cooperator (poultry grower) for conducting the IWC demonstration. The cooperator demonstration site will provide the poultry house where IWC will be performed and the IWC and raw litter for land application.					
	Start Date:	Month 1		Completion Date:	Month 6	
Subtask 3.2:	IWC will be conducted by POSC at the cooperator site identified in Subtask 3.1 in years 1 and 2 to demonstrate and evaluate IWC utility prior to litter removal from poultry houses.					
	Start Date:	Month 6		Completion Date:	Month 24	
Subtask 3.3:	Raw and IWC poultry litter samples will be collected by POSC prior to land application to evaluate the effect of composting on levels of bacteria, nutrients, and volatiles in the litter. Bacteria levels (<i>E. coli</i>) in the litter will be analyzed by SAML. Nutrient levels (N-P-K) in the litter will be analyzed by SWFTL. Volatiles emitted from the litter prior to land application will be analyzed by W-TAMU.					
	Start Date:	Month 6		Completion Date:	Month 42	
Subtask 3.4:	Raw and IWC poultry litter will be applied by POSC at 3 tons/ac to the USDA-ARS Riesel site. Annual soil tests will be performed by SWFTL and by USDA-ARS.					
	Start Date:	Month 6		Completion Date:	Month 42	
Subtask 3.5:	POSC will assess the cost of implementing IWC on poultry operations for inclusion with educational materials as compared to conventional methods.					
	Start Date:	Month 6		Completion Date:	Month 42	
Deliverables	<ul style="list-style-type: none"> Assessment of IWC impact on bacteria, nutrient, and volatile levels in litter for final report Assessment of cost of using IWC versus conventional methods for final report 					

Tasks, Objectives and Schedules						
Task 4:	Analysis of Environmental Effects of IWC					
Costs:	Federal:	\$121,718	Non-Federal:	\$81,356	Total:	\$203,074
Objective:	To evaluate the environmental impacts of IWC of poultry litter.					
Subtask 4.1:	Runoff samples will be collected from two pastures at the USDA-ARS Riesel site for about one year prior to litter application and for about two years following litter application to evaluate the impacts of using IWC poultry litter versus raw poultry litter. Runoff samples will be collected from all other field- and watershed-scale sites at Riesel to quantify nutrient and bacteria from background sites and litter application sites. <i>E. coli</i> levels in water samples will be evaluated by SAML. Nutrient analysis (NO ₃ -N, NH ₄ -N, and PO ₄ -P) for water samples will be conducted by the USDA-ARS with funding from another project.					
	Start Date:	Month 6		Completion Date:	Month 42	
Subtask 4.2:	Runoff samples will also be collected from four 0.25 acre field sites at the USDA-ARS Riesel site for about 1 year prior to litter application and for about 2 years following litter application to compare the impacts of using IWC and raw poultry litter on bacteria and nutrient runoff. Two of the field sites will receive raw litter and two will receive IWC litter. Rainfall amounts, runoff, and quantities of <i>E. coli</i> and nutrients will be evaluated. <i>E. coli</i> levels in water samples will be evaluated by SAML. Nutrient analysis (NO ₃ -N, NH ₄ -N, and PO ₄ -P) for water samples will be conducted by the USDA-ARS with funding from another project.					
	Start Date:	Month 6		Completion Date:	Month 42	

Subtask 4.3:	POSC and W-TAMU will also evaluate other potential environmental benefits of using IWC poultry litter instead of raw litter. Through the use of field assessment of volatile levels at the litter application sites at Riesel by POSC and W-TAMU, the environmental impacts of using IWC poultry litter instead of raw litter will be demonstrated/evaluated.			
	Start Date:	Month 6	Completion Date:	Month 42
Deliverables	<ul style="list-style-type: none"> Assessment of impacts of IWC on plot, field, and watershed scale bacteria and nutrient loading for inclusion in final report Assessment of impacts of IWC on volatiles at land application sites for inclusion in final report 			

Tasks, Objectives and Schedules						
Task 5:	Technology Transfer					
Costs:	Federal:	\$60,859	Non-Federal:	\$40,678	Total:	\$101,537
Objective:	To provide the results of the BMP demonstration and evaluation to poultry growers and integrators throughout the poultry producing areas of Texas.					
Subtask 5.1:	POSC, SAML, and USDA-ARS, with assistance from TWRI and project participants, will develop outreach materials (1 refereed journal article and 1 Extension fact sheet) summarizing the results of the demonstration and the analysis of the environmental impacts of IWC poultry litter. The Extension Fact Sheet will be submitted to the TSSWCB and poultry integrators for review prior to publication.					
	Start Date:	Month 24	Completion Date:	Month 48		
Subtask 5.2:	POSC will conduct 6-9 grower meetings throughout the poultry producing areas of the state to present results of the IWC demonstration/evaluation. POSC will work with poultry integrators to deliver 2-3 programs for growers for each integrator (Sanderson Farms, Tyson, Pilgrim's Pride). At least 1 field day will be held in conjunction with the grower meetings to view the IWC at Riesel field sites. TWRI will assist POSC by developing press releases, meeting notification materials for distribution prior to the meetings, and post meeting summaries.					
	Start Date:	Month 24	Completion Date:	Month 48		
Subtask 5.3:	TWRI, with assistance from POSC, USDA-ARS, and SAML, will develop (Month 1-6), host and maintain (Months 6-36) a project website for dissemination of project materials.					
	Start Date:	Month 1	Completion Date:	Month 48		
Subtask 5.4:	POSC, with assistance from TSSWCB, TWRI and USDA-ARS, will work with USDA-NRCS to make necessary revisions to various practice standards (i.e., 629 Waste Treatment, 633 Waste Utilization, 317 Composting Facility) to include IWC.					
	Start Date:	Month 30	Completion Date:	Month 48		
Subtask 5.5:	POSC will work with SAML, USDA-ARS, and TWRI to develop a final report summarizing the results of the project.					
	Start Date:	Month 30	Completion Date:	Month 48		
Deliverables	<ul style="list-style-type: none"> Outreach materials (1 Extension Fact Sheet and 1 refereed journal article) 6-9 Grower Meetings and related Materials Project Website Revised practice standards (as appropriate) Final Report summarizing the results of the project including the deliverables of Tasks 3 and 4 					

Project Goals (Expand from NPS Summary Page)

- To reduce the environmental impacts of land application of poultry litter by using IWC of poultry litter to reduce the levels of bacteria, nutrients and volatiles in litter and thus result in a reduction of the edge of field levels of these constituents.
- To demonstrate and evaluate the use of IWC of poultry litter to reduce bacteria and nutrient levels in surface water runoff, thereby providing an additional BMP for addressing bacteria and nutrient impairments in Texas.
- To transfer findings of this demonstration to poultry producers throughout the state by working with all major poultry integrators in Texas to distribute a series of outreach materials and host producer meetings, in order to increase the awareness of poultry producers and integrators of the environmental issues in the state and the ability of IWC to address those issues

Measures of Success (Expand from NPS Summary Page)

1. Success will be measured by the amount of reduction in levels of bacteria, nutrients, and volatiles observed between IWC litter and raw litter.
2. Success will be measured by the reduction in nutrients, and volatiles loading from sites where IWC litter is applied vs. where raw litter is applied.
3. Success will be measured by the number of educational programs conducted.
4. Success will be measured by the number of people attending educational programs.

2005 Texas Nonpoint Source Management Program Reference (Expand from NPS Summary Page)

Goals and/or Milestone(s)

Long-Term Goal, Objective 2 – Support the implementation of state, regional, and local programs to reduce NPS pollution through assessment, implementation, and education.

Short-Term Goal Three – Education, Objective A – Conduct education and technology transfer activities to help increase awareness of NPS pollution and prevent activities contributing to the degradation of water bodies, by NPS pollution.

Short-Term Goal Three – Education, Objective B – Reduce the amount of NPS pollution entering the water bodies of Texas through pollution prevention activities and education by: enhancing existing outreach programs at the state, regional, and local levels to maximize the effectiveness of NPS education; administering programs to educate citizens about water quality and their potential role in causing NPS pollution; and conducting outreach through Extension to facilitate broader participation and partnerships.

Short-Term Goal Three – Education, Objective D – Conduct outreach through Texas AgriLife Extension, Soil and Water Conservation Districts, and others to facilitate broader participation and partnerships. Enable stakeholders and the public to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen.

Milestone F – Implement voluntary actions in the watershed.

Part III – Financial Information

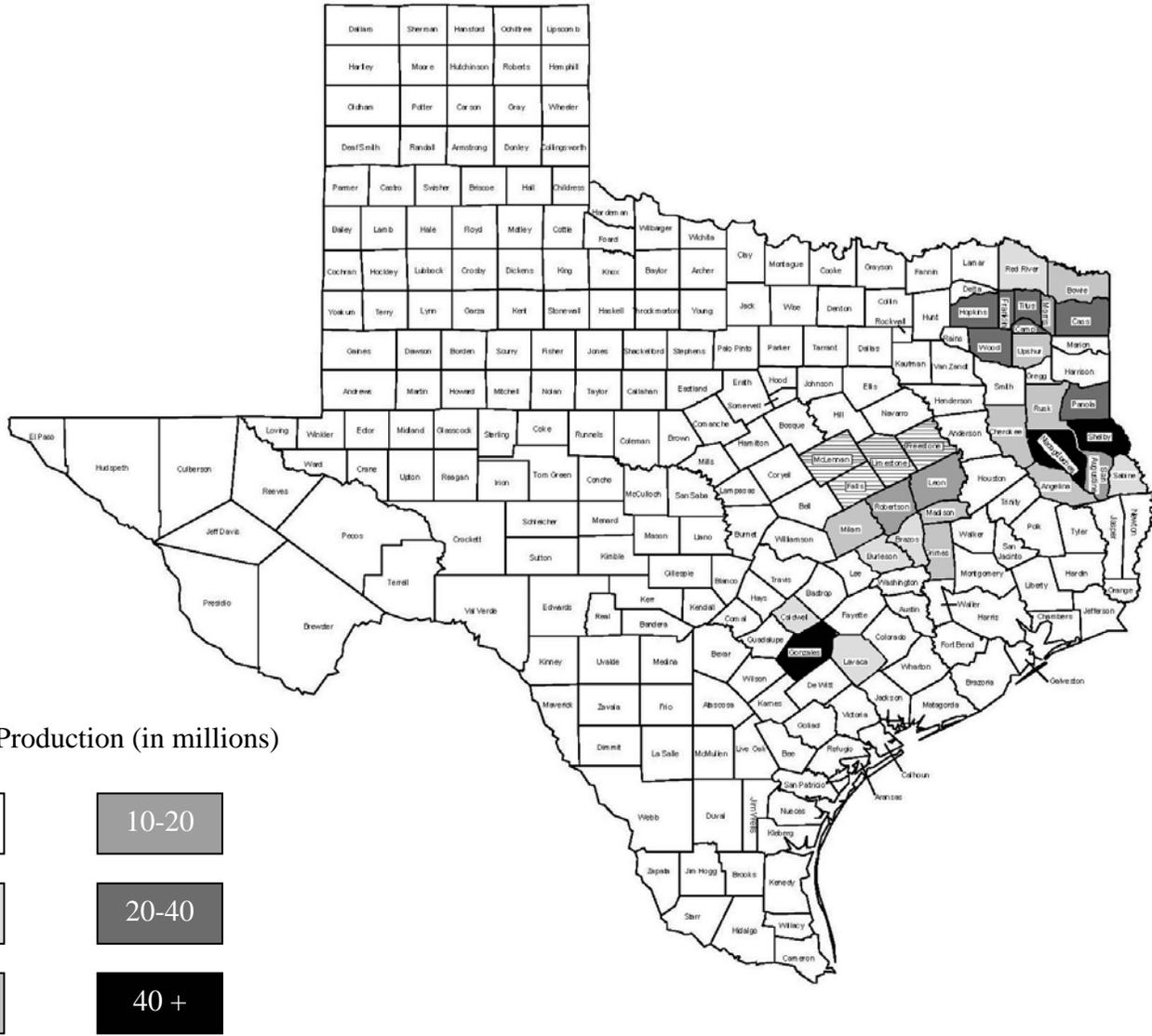
Budget Summary			
Federal	\$ 268,236	% of total project	60%
Non-Federal	\$ 178,844	% of total project	40%
Total	\$ 447,080	Total	100%
Category	Federal	Non-Federal	Total
Personnel	\$ 77,777	\$ 108,121	\$ 185,898
Fringe Benefits	\$ 13,860	\$ 27,760	\$ 41,620
Travel	\$ 15,000	\$ 0	\$ 15,000
Equipment	\$ 0	\$ 0	\$ 0
Supplies	\$ 27,500	\$ 0	\$ 27,500
Contractual	\$ 73,850	\$ 0	\$ 73,850
Construction	\$ 0	\$ 0	\$ 0
Other	\$ 25,262	\$ 0	\$ 25,262
Total Direct Costs	\$ 233,249	\$ 135,881	\$ 369,130
Indirect Costs (≤15%)	\$ 34,987	\$ 35,329	\$ 70,316
Unrecovered IDC		\$ 7,634	\$ 7,634
Total Project Costs	\$ 268,236	\$ 178,844	\$ 447,080

The TSSWCB CWA §319(h) NPS Grant Program has a 60/40% match requirement. The cooperating entity will be reimbursed 60% from federal funds and must contribute a minimum of 40% of the total costs to conduct the project. The 40% match must be from non-federal sources and should be described in the budget justification. Reimbursable indirect costs are limited to 15% of total federal direct costs. The project budget generally covers a three year period.

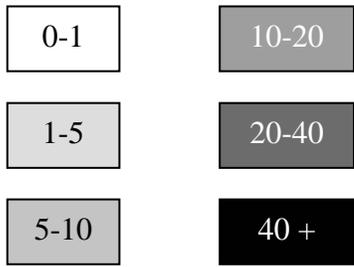
Budget Justification (Federal)		
Category	Total Amount	Justification
Personnel	\$ 77,777	<ul style="list-style-type: none"> • TWRI Project Manager at 8% effort for 3 yrs for project mgt and QA • 2 POSC Grad Students at 50% effort for 3 yrs each for IWC Demo • SAML Student Worker (15 hrs per wk at \$10/hr for 2 yrs) for bacteria analysis
Fringe Benefits	\$ 13,860	TWRI PM <ul style="list-style-type: none"> • 17.6% of Personnel plus percent effort times \$5,652 (insurance) POSC Grad Students <ul style="list-style-type: none"> • 10.1% of Personnel plus \$2,280 (insurance) SAML Student Worker <ul style="list-style-type: none"> • 10.1% of Personnel
Travel	\$ 15,000	<ul style="list-style-type: none"> • TWRI – \$500/yr for travel to and from project meetings • POSC – \$3,000/yr in yrs 1-2 and \$6,000 in yr 3 for travel to and from field sites in yrs 1-2; and grower meetings and travel to a national meeting in yr 3 • SAML – \$500/year for travel to and from field sites and project meetings
Equipment	\$ 0	N/A
Supplies	\$ 27,500	<ul style="list-style-type: none"> • POSC – \$4,500 in yr 1 and \$1,000/yr in yrs 2-3 • SAML – costs of media, reagents, and other consumables for enumeration of <i>E. coli</i> are estimated at \$35/sample for 580 water samples and 20 manure samples (\$21,000).
Contractual	\$ 73,850	<ul style="list-style-type: none"> • W-TAMU – \$4,800/yr in yrs 1-2 and \$1,000 in yr 3 to assess volatiles • USDA-ARS – \$28,750 in yr 1 for site prep, maintenance & sampling and \$17,250 in yrs 2-3 for site maintenance and sampling at Riesel
Construction	\$ 0	N/A
Other	\$ 25,262	POSC – litter application at Riesel (\$3,000/yr in yrs 1-2); windrower leasing for yrs 1-2 (\$1,000/yr); peer group survey at \$2,000/yr in yrs 1-2; publication expenses (\$3,730 in yr 3) and Tuition for 2 POSC Grad Students (\$4,766/year in years 1-2)
Indirect	\$ 34,987	15% of Total Direct Federal

Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel	\$ 108,121	<ul style="list-style-type: none"> • TWRI Project Manager at 4% effort for 3 yrs • 2 POSC Grad Students at 50% effort for 2 yrs each for IWC Demo • POSC Asst. Professor & Extension Poultry Specialist at 22.8% effort • SAML Asst. Prof of Soil and Aquatic Microbiology at 10% effort
Fringe Benefits	\$ 27,760	POSC Grad Students <ul style="list-style-type: none"> • 10.1% of Personnel plus \$2,280 (insurance) TWRI PM, POSC Asst. Prof, and SAML Asst. Prof. <ul style="list-style-type: none"> • 17.6% of Personnel plus percent effort times \$5,652
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 35,329	26% of Total Direct Non-Federal Match
Unrecovered IDC	\$ 7,634	11% of Total Direct Federal minus Tuition and Contractual >\$25,000

Meat Type Poultry Producing Counties in Texas



Poultry Production (in millions)



Source: USDA-NASS 2007 Census of Agriculture; Sanderson Farms, Inc.