

Development and Implementation of an Environmental Training Program for Manure and Compost Haulers/Applicators in the Texas High Plains

Texas Cattle Feeders Association

Texas A&M AgriLife Extension Service

Texas A&M AgriLife Research

West Texas A&M University

FY09 CWA Section 319(h)

Quarterly Report Number 15 (cumulative)

Covering accomplishments July-September, 2013

October 11, 2013

TASK 1: Project Administration

Subtask 1.1 TCFA/ AgriLife Extension 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 15th of January, April, July and October. QPRs shall be distributed to all project partners. (Start Date: Month 1; Completion Date: Month 48)

Procedures have been implemented to collect project information and work accomplished for each task and subtask.

1st quarterly report – submitted to TSSWCB on April 13, 2010

2nd quarterly report – submitted to TSSWCB on July 15, 2010

3rd quarterly report – submitted to TSSWCB on October 13, 2010

4th quarterly report – submitted to TSSWCB on January 14, 2011

5th quarterly report – submitted to TSSWCB on April 11, 2011

6th quarterly report – submitted to TSSWCB on July 15, 2011

7th quarterly report – submitted to TSSWCB on October 15, 2011

8th quarterly report – submitted to TSSWCB on January 15, 2012

9th quarterly report – submitted to TSSWCB on April 11, 2012

10th quarterly report – submitted to TSSWCB on July 13, 2012

A no cost 1 year extension was signed and approved on Sept 26, 2012.

11th quarterly report – submitted to TSSWCB on October 12, 2012

12th quarterly report – submitted to TSSWCB on January 15, 2013

13th quarterly report – submitted to TSSWCB on April 12, 2013

14th quarterly report – submitted to TSSWCB on July 15, 2013

15th quarterly report – submitted to TSSWCB on October 11, 2013

94% Complete – On-going

Subtask 1.2 TCFA 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)

Contract in place between TSSWCB and TCFA.

Subcontract in place between TCFA and Texas A&M AgriLife Extension Service/Texas A&M AgriLife Research.

Subcontract in place between TCFA and West Texas A&M University.

TCFA controller has been briefed on the project and will be the lead person for tracking, billing and fiscal reporting.

TCFA controller has been working with TSSWCB staff and TCFA's auditor to help ensure correct tracking and submission of project-related expenses.

The first invoice for project activities was submitted to TSSWCB by TCFA in August 2010.

MBE/WBE forms were submitted to TSSWCB by TCFA in Oct. 2010.

Invoices from Texas A&M AgriLife Research have been received, processed, and included in TCFA invoices submitted to the TSSWCB.

TCFA submitted MBE/WBE forms Oct. 12, 2011. Quarterly invoices to TSSWCB are current through Sept 30, 2011.

Invoices for the 4th quarter of 2011 and 1st quarter of 2012 are being processed at TCFA for submission to TSSWCB in the 2nd quarter of 2012.

TCFA has submitted invoices to the TSSWCB covering project expenses through September 30, 2012.

TCFA has submitted invoices to the TSSWCB covering project expenses through December 30, 2012.

TCFA submitted MBE/WBE forms Oct. 4, 2012, which are current until Sept. 30, 2013.

TCFA has submitted invoices to the TSSWCB covering project expenses through March 31, 2013.

TCFA has submitted invoices to the TSSWCB covering project expenses through June 30, 2013.

94% Complete – On-going

Subtask 1.3 TCFA/ AgriLife Extension will attend and participate in public meetings, such as watershed stakeholder meetings, Clean Rivers Program meetings, and Soil and Water Conservation District (SWCD) meetings, in order to communicate project goals, activities and accomplishments to affected parties. (Start Date: Month 1; Completion Date: Month 48)

The first Project Advisory Group meeting and project kick-off was held June 16, 2010 at the Texas A&M Research and Extension Center in Amarillo. Slide sets presented at the meeting are attached hereto and will be provided to our project webmaster, Jaclyn Tech, for subsequent publication. A list of attendees (n=26) is attached hereto (4th quarterly report—Jan. 14, 2011).

Project description and goals presented at the annual Texas Cattle Feeders Association convention held in Oklahoma City, Oklahoma on October 24-26, 2010. Attendees (~300)

Poster exhibit and a short 2 page project description were presented at the Texas Soil and Water Conservation District directors meeting in Lubbock, Texas on October 25-26, 2010.

The second Project Advisory Group meeting was held January 5, 2010 at the Texas A&M Research and Extension Center in Amarillo. Slide sets presented at the meeting are attached hereto and will be provided to our project webmaster, Jaclyn Tech, for subsequent publication. A list of attendees (n=29) is attached hereto (4th quarterly report—Jan. 14, 2011).

Dr. Paul DeLaune presented information about the project to the Red and Canadian River Basin Advisory Committee, which met in Amarillo on March 22, 2011.

A field day and project advisory group meeting was held at the water quality demonstration site in Deaf Smith County on September 14, 2011. Participants included certified crop advisors, manure and compost applicators, beef industry personal, crop producers, and students from Clarendon College. Project team members presented results on manure spreading calibration trials and kits, water well sampling, soil sampling, feedyard manure management surveys, and water quality demonstration results to date. The field day event ended with a compost and manure application event to demonstrate the various techniques used to calibrate manure and compost spreading equipment.

Updated poster exhibit and a short 2 page project description were presented at the Texas Soil and Water Conservation District directors meeting in San Antonio, Texas on October 24-25, 2011.

Ben Weinheimer presented information about the project at the Texas section of the American Society of Agricultural and Biological Engineers (ASABE) meeting in Bryan, Texas on October 13, 2011. There were approximately 80 participants.

Ben Weinheimer presented information about the project to NRCS Nutrient Management Specialists at the annual training meeting in Plainview, Texas on November 16, 2011. There were approximately 60 participants including staff from the NRCS Zone 1 office in Lubbock, Texas.

Dr. Paul DeLaune presented information about the water quality demonstration in a seminar prepared for the Department of Soil and Crop Sciences at Texas A&M University on February 8, 2012.

TCFA hosted a meeting for environmental managers and Certified Crop Advisors at the TCFA office on Nov. 13, 2012. Dr. Brent Auvermann provided the group with a progress report on the 319 manure demonstration project. The feedyard companies in attendance at the meeting represented 1.5 million head of feeding capacity.

Material outlining calibration methods and overall project goals were presented (poster) at the LPELC national conference in Denver, Colorado (April 2-4 2013). The focus of the conference was to integrate research, education and extension efforts related to managing environmental impacts of livestock and poultry production. The conference included workshops, tours, posters, commercial exhibits, and oral presentations.

TCFA personnel attended a public meeting concerning water quality issues in Dixon Creek watershed. At this meeting, landowners and citizens had the opportunity to learn about a new project, Assessment of Water Quality and Watershed Planning for Five Creeks in the Canadian River and Red River Basins, which focuses on providing stakeholders with information to address bacteria impairments and dissolved oxygen concerns in the Dixon Creek watershed. The meeting was April 16, 2013 in Borger, Texas.

Texas A&M AgriLife Research & Extension, WTAMU, and TCFA personnel conducted seven environmental management seminars aimed at educating producers (farm, ranch, feedyards, and manure/compost contractors) about the manure/compost demonstration project, water quality demonstration plots, manure/compost spreader calibration, soil nutrient levels and water well results.

Texas A&M AgriLife Extension Service personnel traveled to Temple, TX, to provide a brief project update to USDA-NRCS state and zone engineers.

100% Complete

Subtask 1.4 The TCFA/ AgriLife Extension will host coordination meetings through video conferencing or other means with TSSWCB, project partners, and any subcontractors, as appropriate, at least quarterly in the first year to discuss project activities, project schedule, communication needs, deliverables and other requirements. Meetings will be held as needed in the second and third year of the project. (Start Date: Month 1; Completion Date: Month 48)

Project management team conference calls were held on April 26, 2010, and June 1, 2010, with representatives from TSSWCB.

A project management team (TSSWCB/TCFA/Texas A&M AgriLife Extension Service/Texas A&M AgriLife Research/West Texas A&M University) planning meeting was held following the Project Advisory Committee meeting on June 16, 2010.

Project members met on July 7, 2010 at the Texas A&M AgriLife Extension Center in Amarillo to work on finalizing demonstration site selection and treatments to develop QAPP.

Project members from Texas A&M AgriLife Extension Service Amarillo, TCFA, and Texas A&M AgriLife Research Vernon had a meeting to discuss possible demonstration sites and the writing of the QAPP on July 27, 2010 at the AgriLife Research and Extension Center in Amarillo Tx.

Project management team conference call was held on August 9, 2010 with representatives from TSSWCB.

Project Manager Kevin Heflin met with PI's to discuss demonstration sites and QAPP progress on September 13, 2010.

Project members from Texas A&M AgriLife Extension Service Amarillo, and TCFA, had a meeting, on October 4, 2010, to discuss soil samples taken at one of the demonstration sites located in the Palo Duro Creek watershed.

Project members meet on October 14, 2010 to discuss the current draft of the QAPP.

Project members from Texas A&M AgriLife Extension Service meet on November 22, 2010 to discuss the current draft of the QAPP.

Project members from TCFA, WTAMU, and Texas A&M AgriLife Research and Extension Service assembled at the Texas A&M AgriLife Research facility, at Bushland Texas October 18-20, 2010, to determine the optimal method for calibrating a manure spreader.

Project management team conference call was held on December 1, 2010 with representatives from TSSWCB.

Project members met on January 3, 2011 to discuss the upcoming project advisory meeting on January 5, 2011.

The second Project Advisory Group meeting was held January 5, 2011 at the Texas A&M Research and Extension Center in Amarillo.

Project PI met with web page designer to discuss web page content and design on Feb. 16, 2011 in College Station, TX.

Project members met on March 1, 2011 to discuss the web site design produced by Jaclyn Tech.

Ben Weinheimer, Paul DeLaune and Kevin Heflin coordinated a site visit at the Deaf Smith County water quality demonstration site for Mitch Conine, TSSWCB, on March 22, 2011.

Project Team meeting held at TCFA headquarters on May 6th. TSSWCB represented by Mitch Conine via teleconference. Each task on the project task list was discussed and updated.

Project leader Ben Weinheimer meet with Corey Marsh to discuss details of the upcoming field day at the water quality site located on Marsh farm land.

Project Team meeting was held via teleconference on September 6, 2011 to discuss the September 16, 2011 field day.

TCEQ representative for CAFO permitting visited the water quality demonstration site with project leader Ben Weinheimer on July 7, 2011.

Posters detailing the project and preliminary results were presented at the Council of Resident Directors (CORD) meeting at the Amarillo AgriLife Research and Extension Center in Amarillo, Texas on September 13-14, 2011.

Project members from Texas A&M AgriLife Extension Service Amarillo, and TCFA, had a meeting, on January 11, 2012, to discuss the 8th quarterly report and upcoming project events.

AgriLife Amarillo project members had a meeting to discuss the 9th quarterly report and upcoming project events on April 6, 2012.

Project members from Texas A&M AgriLife Amarillo, Vernon, and TCFA, had a meeting, on June 18, 2012, to discuss the 10th quarterly report and upcoming project events.

Project members from Texas A&M AgriLife Amarillo, WTAMU, Vernon, and TCFA had a meeting, on January 2, 2013, to discuss the 12th quarterly report and upcoming project events.

Project members from Texas A&M AgriLife Amarillo, WTAMU, Vernon, and TCFA had a meeting, on April 8, 2013, to discuss the 13th quarterly report and upcoming project events.

Project members from Texas A&M AgriLife Amarillo, WTAMU, Vernon, and TCFA had a meeting, on June 17, 2013, to discuss the 14th quarterly report and upcoming project events.

TCFA personnel discussed demonstration sites with 2 cooperative landowners to obtain previous year crop yields, fertilizer history, manure and compost applications, and crop rotations for 2013.

Project members from Texas A&M AgriLife Amarillo, WTAMU, Vernon, and TCFA had a meeting, on September 30, 2013, to finalize contents of the 15th quarterly report and to plan upcoming project events.

96% Complete – On-going

Subtask 1.5 TCFA/AgriLife Extension will develop and disseminate project informational materials, including, but not limited to, flyers, brochures, letters, news releases, and other appropriate promotional publications. As appropriate, TCFA will include information about the

project in the TCFA e-Newsletter, in TCFA membership mailings, at the TCFA Annual Convention, and at the Annual Meeting of Texas SWCD Directors (TSSWCB must approve all announcements, letters and publications prior to distribution). (Start Date: Month 1; Completion Date: Month 48)

A news release coinciding with the Project Advisory Group/project kick-off meeting on for June 16, 2010, was published in the Amarillo Globe-News on June 23, 2010. The article is available on the web at HYPERLINK

"http://www.amarillo.com/stories/062310/new_news9.shtml"http://www.amarillo.com/stories/062310/new_news9.shtml . The release was also picked up by *Manure Manager* magazine for their on-line edition on June 22, 2010; the weekly TSSWCB e-update on June 23, 2010; and the TCFA newsletter on June 25, 2010.

A draft project overview handout was developed by TCFA and AgriLife for publication on the project website and to be used as a handout at the Soil and Water Conservation Districts Annual Meeting in Lubbock, Texas on Oct. 25-26 and at the Texas Cattle Feeders Association Annual Convention in Oklahoma City on Oct. 25-26, 2010.

The September 14, 2011 field day event had media coverage from the following online and print media outlets: Manure Manager magazine, Amarillo Globe News, Forage – Progressive Forage Grower, The Farmer Stockman - online, Sunbelt AGnet.com, Canyon News, The Winkler Post, Farm Progress Daily, Physorg.com, Eurekalert.org, AgriLife Today, North Texas e-News, Firstscience.com, Southwest Farm Press, High Plains Journal, and the TCFA Newsletter on August 5, 26, 2011 and September 9, 29, 2011. Newspapers in the following towns were targeted prior to the field day: Amarillo, Hereford, Friona, Dimmitt, Vega, and Dalhart.

Project rationale and water-quality goals were the subjects of a radio interview with James Hunt of KGNC-AM recorded on October 6, 2011, to be broadcast during the week of October 10-14th, 2011.

Texas A&M AgriLife Research & Extension, WTAMU, and TCFA personnel participated in seven environmental management seminars as mentioned in subtask 1.3. The agenda for the seminars were mailed to local SWCD personnel, the project advisor group, TCFA member feedyards, and manure/compost contractors. Educational materials in the form of printed slide sets were distributed at each of the meetings. Spreader truck calibration kits were also distributed to all manure/compost contractors that attended the seminars.

100% Complete

Subtask 1.6 AgriLife Extension will develop (months 1-3), host and maintain (months 4-36) an internet webpage for the dissemination of project information. (Start Date: Month 1; Completion Date: Month 48)

Ms. Jaclyn Tech (Texas Water Resources Institute), who assembled and managed the Buck Creek 319(h) web site, has agreed to serve as our project webmaster. A Texas A&M AgriLife internal contract has been submitted for final approval of the arrangement. A Linux-based, 100GB virtual machine/web server was to have been established for the project

by now, but internal delays with the Information Technologies group on the main Texas A&M campus have pushed this task back. In the meantime, materials are being collected for immediate publication.

Project members from TCFA and Texas A&M AgriLife Extension meet on December 14, 2010 to discuss website design and implementation.

Texas Water Resources Institute has agreed to temporarily host the project website until the Information Technologies group at Texas A&M University can allocate web server support. Brent Auvermann will be traveling to Texas A&M University on February 16, 2011 to further discuss the design of the website with Ms. Jaclyn Tech.

The project web site went “live” in April 2011 at <http://manurespreading.tamu.edu>.

The project team has outlined a proposed database structure by which we will make sampling and laboratory data, images, and other site-specific information available to the public via database queries. The proposed structure has been provided to Ms. Jaclyn Tech for programming and implementation.

We requested and received a quote from Appiction, Inc., for commercial development of a smartphone app to support in-field calibration of manure spreaders. The estimated cost, \$45,000, does not appear justified by the relatively limited market potential for such an app. The request for a quote is covered by a Non-Disclosure Agreement between Texas A&M AgriLife Extension Service and Appiction, Inc.

Power point presentations from the September 16, 2011 field day were added to the project website; along with a link to a news release and You Tube video showing the single pass manure truck calibration method.

Posters used in the CORD meeting and other agricultural outreach programs have been uploaded to the web site.

Metadata forms detailing demonstration site visits are added as events occur at each site. Events include soil, manure, and water sampling, site cleanup, and manure truck calibration events.

The internet web page has been transferred to a Texas A&M University server in College Station during the 10th quarter of the project. TWRI is no longer hosting the web page or the day to day additions. All content will now be managed by Texas A&M AgriLife personnel. Tom Lyster (IT Coordinator, Extension Information Technology TAMU) is the point of contact for technical issues concerning the internet web page.

Slide sets presented at the environmental management seminars will be uploaded to the website in the 15th quarter. Survey results obtained during the seminars will also be added to the website.

Slide sets pertaining to the land application of manure presented at the May/June seminars have been posted to the project website.

Due to excessive workloads within the AgriLife IT department in College Station during recent enterprise-system transitions, web site management has been adopted by Dr.

Auvermann. During September, he underwent intensive training in the AgriLife web content management system (CMS) and has begun active site management.

95% Complete – On-going

Subtask 1.7 AgriLife Extension will hire a Project Manager to coordinate and manage the work of project partners and subcontractors, to facilitate the project advisory group, to assist with the environmental knowledge assessment, to lead the development of the environmental training curriculum, to lead program delivery, and to assist with BMP effectiveness monitoring. (Start Date: Month 1; Completion Date: Month 4)

Mr. Kevin Heflin, Extension Associate, has been hired internally as the Project Manager of record, and he has been involved with all site tours and project activities. Additional support will be provided by Gary Marek and Jack Bush (Research Associates) and Brad Wilhite (Technician II) as needed.

100% Complete

Subtask 1.8 TCFA, in collaboration with project partners, will develop and submit a Final Report at the culmination of the project. This final report will document project performance related to each project goal and measure of success. A draft of this final report will be submitted to TSSWCB for review prior to completing the document. (Start Date: Month 46; Completion Date: Month 48)

Project review and final reporting was discussed by project partners at the September 30, 2013 project meeting held at the TCFA headquarters. Final reporting and project goals were also discussed with TSSWCB via a phone call to the project manager on September 26, 2013.

94% Complete – On-going

TASK 2: Quality Assurance

Subtask 2.1 AgriLife Extension / AgriLife Research will develop a QAPP for activities in Task 9 consistent with EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Environmental Data Quality Management Plan.

All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415) and Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416). (Start Date: Month 1; Completion Date: Month 6)

A project QAPP is under development. The QAPP will include provisions consistent with other recently developed QAPPs for monitoring, sample collection and laboratory analysis.

The QAPP cannot be finalized and submitted until all field sites have been selected and all sampling/analysis activities decided. As detailed below, project leadership has conducted three separate site-reconnaissance tours with County Extension Agents (CEAs) in Deaf Smith, Wheeler, and Collingsworth Counties; and project leadership met in Amarillo on July 7, 2010, to prioritize sites desired and activities planned for each site. CEAs will be engaged following the July 7 meeting to contact landowners and request access to desired sites.

CEAs actively engaged in selecting and arranging our demonstration sites are Rick Auckerman (Deaf Smith), Dale Dunlap (Collingsworth), Kenny Brdecko (Wheeler), and Leonard Haynes (Donley).

Demonstration sites have been selected in Donley, Deaf Smith, and Wheeler counties.

The first draft (dated 9/22/2010) of the QAPP has been circulated for review and editing among the project management team.

QAPP was submitted for review and comments to the TSSWCB on November 12.

QAPP was returned to project members with comments on January 4, 2011 and is currently being reviewed and will be resubmitted with corrections to TSSWCB.

QAPP has been submitted to the EPA by TSSWCB for review and approval (March 2011).

EPA comments on the QAPP were received and addressed by the project team on June 6, 2011. The QAPP was resubmitted to the TSSWCB and approval from the EPA is pending.

EPA comments on the QAPP were received, and the project group met on June 7, 2011 to address the comments and make corrections. Corrections to the QAPP were completed and resubmitted to TSSWCB on June 10, 2011.

Final revisions to the QAPP were discussed via teleconference call with TSSWCB on June 23, 2011. EPA approval of the QAPP pending.

Additional EPA comments on the QAPP were addressed by Mitch Conine (TSSWCB) and submitted to the EPA for approval on July 21, 2011.

QAPP was revised (this is the 7th revision of the QAPP by project members) by Texas A&M AgriLife/TCFA personnel after TSSWCB and EPA comments were received on September 9, 2011. The QAPP was resubmitted to TSSWCB on September 20, 2011 and approval from the EPA is pending.

Mitch Conine confirmed via a phone call to Ben Weinheimer on December 21, 2011 that the EPA is allowing TSSWCB to use “additional or excess” funds to purchase new refrigerated samplers for this project that are designed to keep runoff samples cool for 48 hours, thus preserving them in accordance to EPA guidelines. Once the samplers are installed the QAPP can be finalized (8th revision) and resubmitted for EPA approval.

The 8th revision of the QAPP is still pending in the 9th quarter of the project. The QAPP should be finalized once the refrigerated ISCO® samplers are installed at the water quality demonstration at DSC6. The samplers have been ordered, but not received. Language has

been added to the QAPP to reflect the changes in automated water samplers that meet EPA's criteria for holding times on samples used for bacterial analysis.

Revisions to the QAPP were made on April 30, 2012, May 3, 2012, and May 25, 2012. The 11th revision of the QAPP by Texas A&M AgriLife and TSSWCB was submitted to EPA for approval on June 1, 2012.

QAPP submitted and accepted by EPA on July 27, 2012.

100% Complete

Subtask 2.2 AgriLife Extension / AgriLife Research will submit revisions and necessary amendments to the QAPP as needed. (Start Date: Month 7; Completion Date: Month 48)

Revisions to the QAPP were made and submitted to TSSWCB on June 12, 2013. Revisions included an updated project plan task list that reflects the approved 1 year project extension.

100% Complete

TASK 3: Environmental Knowledge Assessment

Subtask 3.1 AgriLife Extension will prepare a survey instrument, as appropriate, to assess the current level of environmental understanding and employee training offered by manure/compost haulers. (Start Date: Month 1; Completion Date: Month 5)

We have decided to prepare two survey instruments. The first will be an in-person interview of manure haulers to describe current practices and assess spreader-calibration activities. The second will be directed to farmers and will assess basic knowledge of soil and manure testing as it relates to water quality.

A set of survey questions has been adapted from an existing, working document on manure quality developed by Sharon Sakirkin. Further development is planned for the third quarter.

Based on input received at the Jan. 5, 2011 Project Advisory Group meeting, three surveys will be finalized in the 1st quarter of 2011 (feedyards, manure/compost contractors, and farmers).

An on-line survey instrument for manure haulers and spreading contractors has been deployed by Texas A&M AgriLife Extension Service at <https://www.surveymonkey.com/s/Jan2011PAG>.

Texas Cattle Feeders Association personnel are collecting survey data from TCFA-member feedyards during regular site visits. Results will be summarized and available for review at the next meeting/field day of the Project Advisory Group in Deaf Smith County on September 14, 2011.

TCFA personnel have collected 18 feedyard manure surveys to date October 15, 2011.

TCFA personnel have collected 20 feedyard manure surveys to date January 15, 2012.

TCFA personnel have collected 36 feedyard manure surveys to date July 15, 2012.

Texas A&M AgriLife Research & Extension, WTAMU, and TCFA personnel participated in seven environmental management seminars as mentioned in subtask 1.3. Survey questions were asked to assess the environmental knowledge of the seminar participants. Survey questions were asked pre and post seminar. The anonymous responses were tabulated via Turning Point® interactive software.

Tabulated responses from the survey questions will be summarized in the final project report.

95% Complete – On-going

Subtask 3.2 AgriLife Extension will update existing lists of manure/compost haulers in the Texas High Plains and conduct a pre-survey by mail, phone or in person (if needed) with haulers. (Start Date: Month 4; Completion Date: Month 9)

An existing list of custom manure/compost haulers/applicators developed by TCFA and Texas A&M AgriLife Extension Service as part of past projects is being reviewed and updated.

In advance of the Jan. 5, 2011 Project Advisory Group Meeting, feedyard managers were asked to invite manure/compost contractors to the meeting. The list of contractors has been expanded and includes current contract information.

The “Feedyard Manure Management Survey” deployed by TCFA staff in July 2011 includes a question to capture the name, address and contact information for manure and compost contractors. The results of this question will be used to develop a new and updated list of contractors serving the industry.

TCFA staff have completed and compiled the information obtained from the “Feedyard Manure Management Survey”.

All surveys have been completed and the list of manure/compost haulers is up to date.

100% Complete

Subtask 3.3 AgriLife Extension will establish current state-of-knowledge by haulers for environmental management and training through compilation of pre-survey results and development of an interpretive summary. (Start Date: Month 9; Completion Date: Month 11)

An on-line survey has been deployed using the SurveyMonkey web site. Individual surveys are being conducted in person among TCFA member feedyards during routine visits by TCFA personnel to the feedyards.

A survey instrument will be deployed at the 7 workshops scheduled for April and May 2013. The survey will be conducted with Turning Point® interactive software. This technology creates an interactive presentation that can enhance the instruction, increase retention, engage participants, and immediately assess their current state-of-knowledge for environmental management.

A survey instrument was deployed at the 7 seminars/workshops scheduled in April and May 2013. The survey was conducted with Turning Point® interactive software and used to assess participants current state-of-knowledge for environmental management.

Tabulated responses from the survey questions will be summarized in the final project report.

95% Complete – On-going

Subtask 3.4 AgriLife Extension will conduct a post-survey of manure/compost haulers to assess adoption and implementation of BMPs and employee/equipment operator training programs. (Start Date: Month 32; Completion Date: Month 48)

A survey is being developed and will be added to the calibration kits for manure/compost haulers. The survey will consist of a series of questions that can be answered and then mailed back to Texas A&M AgriLife Extension Service Amarillo via a self-addressed stamped envelope.

Survey questions, at the April-May 2013 seminars, were used to assess the level of employee/equipment operator training and best management practices currently used by manure/compost contractors.

Feedback from the manure/compost haulers during the May/June seminars was used in lieu of conducting a post-survey to assess adoption and implementation of BMPs and employee training programs. Contact information for Texas Cattle Feeders Association and Texas AgriLife Extension Service was included on the last page of the spreader calibration kit instructions (in English and Spanish). The project website was also listed: <http://manurespreading.tamu.edu>.

100% Complete

TASK 4: Project Advisory Group

Subtask 4.1 TCFA will meet with AgriLife Extension specialists and Extension agents in Potter, Lubbock and Wilbarger counties and USDA-NRCS Zone 1 personnel to brief them on the objectives of the project, to solicit nominations for the advisory group and to identify potential demonstration sites and potential crop producer collaborators. (Start Date: Month 1; Completion Date: Month 3)

CEAs and NRCS Zone 1 personnel attended the June 16 project kickoff meeting in Amarillo and were briefed on the objectives of the project. Attendees provided guidance for preferred BMP emphasis. CEA-facilitated watershed tours were conducted in Deaf Smith (Tierra

Blanca and Palo Duro Creeks; June 22), Collingsworth (Buck Creek; July 1), and Wheeler (Sweetwater Creek; June 14) Counties.

The project overview handout will be disseminated at the SWCD Annual Meeting on Oct. 25-26 and copies of the project overview will be emailed to the USDA-NRCS Zone 1 personnel.

Representatives from the NRCS and SWCD offices in Amarillo participated in the Jan. 5, 2011 Project Advisory Group meeting.

A field day and project advisory group meeting was held at the water quality demonstration site in Deaf Smith County on September 14, 2011. Attendees included certified crop advisors, crop producers, personnel from USDA-NRCS, WTAMU, Clarendon College, Texas A&M AgriLife Research and Extension, agricultural environmental firms, manure/compost applicators, and the beef industry. Project team members presented results on manure spreading calibration trials and kits, water well sampling, soil sampling, feedyard manure management surveys, and water quality demonstration results to date. The field day event ended with a compost and manure application event to demonstrate the various techniques used to calibrate manure and compost spreading equipment. Certified crop advisors and pesticide applicators received CEUs for attending the field day.

Material presented at the September 14, 2011 field day is attached hereto (7th quarterly report—Oct. 15, 2011)

Ben Weinheimer presented information about the project to NRCS Nutrient Management Specialists at the annual training meeting in Plainview, Texas on November 16, 2011. There were approximately 60 participants including staff from the NRCS Zone 1 office in Lubbock, Texas.

Ben Weinheimer presented information about the project to NRCS Nutrient Management Specialists from Potter and Lubbock County.

County Extension Agents helped with the planning, organization, and execution of the May/June seminars hosted in their respective counties.

100% Complete

Subtask 4.2 TCFA will identify members for the project advisory group. The advisory group will, at a minimum, consist of CAFO operators, manure and compost haulers, livestock industry organizations (i.e., Texas Farm Bureau (TFB), Texas Association of Dairymen (TAD), Texas and Southwestern Cattle Raisers Association (TSCRA), commodity organizations (i.e., Corn Producers Association of Texas, Plains Cotton Growers, Texas Grain Sorghum Producers Board), AgriLife Extension, TSSWCB, SWCDs, Texas Department of Agriculture (TDA), U.S. Department of Agriculture- Natural Resources Conservation Service (USDA-NRCS), Certified Crop Advisors (CCAs) and crop producers, stakeholders of the pilot watersheds (Buck Creek and Sweetwater Creek) and demonstration site cooperators. (Start Date: Month 1; Completion Date: Month 6)

The Project Advisory Group met in Amarillo on June 16, 2010.

The Project Advisory Group met in Amarillo on January 5, 2011. A copy of the meeting notes taken at the meeting are attached hereto (4th quarterly report—Jan. 14, 2011).

100% Complete

Subtask 4.3 TCFA shall host meetings and/or conference calls of the project advisory group at least twice in the first year and annually thereafter. (Start Date: Month 6; Completion Date: Month 48)

The first Project Advisory Group meeting was June 16, 2010, in Amarillo.

The second meeting for the Project Advisory Group was held in Amarillo on January 5, 2011 at the Texas A&M AgriLife Research and Extension Center.

The third meeting for the PAG is tentatively scheduled for September 2011 and will include a site visit to the water quality demonstration in Deaf Smith County.

100% Complete

Subtask 4.4 The project advisory group will discuss and prioritize criteria for selection of demonstration sites and provide input on the evaluation of BMP effectiveness. BMPs for protection of wellheads and sensitive areas, type of manure/compost application equipment and measurements of compaction, nutrient stratification and nutrient availability in no-till vs. conventional tillage, nitrogen mineralization rates, and other demonstration concepts. (Start Date: Month 6; Completion Date: Month 12)

Discussions of this kind took place during the project kickoff meeting on June 16, 2010. Preferred emphases were tillage, manure and soil sampling, credit for residual soil nutrients, and nutrient mobilization/immobilization.

100% Complete

Subtask 4.5 The project advisory group shall review project objectives, provide input on project activities; provide input into development of an environmental training curriculum for manure/compost haulers, program delivery, and CEU processes. (Start Date: Month 11; Completion Date: Month 16)

At the 2nd meeting of the project advisory group (PAG), members suggested that the compost application rate be increased within the 1 acre plots that will be used in the water quality demonstration.

The PAG also suggested more soil samples within the demonstration plots used in the water quality demonstration. According to the PAG this could help explain the differences in soil phosphorus numbers between demonstration plots.

The PAG also suggested additional manure application calibration events to be scheduled with commercial applicators.

Two hours of CEU's were given to participants that attended the May 16, 2013 seminar held in Herford, Texas.

100% Complete

TASK 5: Manure Spreader Calibration Kits

Subtask 5.1 TCFA will identify options for field calibration of manure/compost spreader trucks. Options may include single-pass calibration using the calibration kits to be assembled in Subtask 5.2 and/or calibration using a whole-truck method (scale weights and area to which manure/compost has been applied). (Start Date: Month 4; Completion Date: Month 9)

TCFA staff has initiated a search of existing materials and methods to identify options and assemble prototype kits for field calibration.

Prototype kits for field calibration have been assembled and field tested.

Additional field testing of scales, tarps, tarp configuration, etc. is scheduled for Oct. 18-22, 2010 in Bushland, TX.

The single pass calibration method was tested in the field on October 18-20, 2010 at the Texas A&M AgriLife Research facility in Bushland Texas. Project personnel attempted to estimate the precision of the single pass calibration method by capturing the manure on tarps placed in the path of the manure truck during manure applications. The tarps varied in size, and were placed in different locations along the centerline path of the manure truck. The tarps ranged in size from 28"x28" (aspect ratio 1:1), 56"x56" (aspect ratio 1:1) and 28"x112" (aspect ratio 1:4). In the 11 calibration test runs conducted the aspect ratio of the tarps appeared to be the determining factor in the precision of the estimate. The preliminary results were presented at the second Project Advisory Group meeting held on January 5, 2010 at the Texas A&M Research and Extension Center in Amarillo. Slide sets presented at the meeting are attached hereto.

Single pass calibration method was field tested and methods were confirmed at the water quality monitoring site during manure and compost applications to treatment plots during the week of Feb. 21-24, 2011.

The single pass calibration method was field tested on August 29 and August 31, 2011 in Dallam County, Texas by TCFA/AgriLife personnel. Calibration kits consisted of 2^{1/2} pound weights, tarps with a 4 to 1 aspect ratio (28"x112"), and a digital handheld weigh scale. The calibrations were performed on equipment spreading raw manure and compost. The trucks spreading raw manure were calibrated in the field while the compost equipment was calibrated at the composting facility. Results from this calibration event were presented at the September 14, 2011 field day and are attached hereto.

A materials list for calibration kits has been refined after a manure and compost application field event (3-30-12) at the water quality demonstration site at DSC6.

A step by step field calibration guide for manure applicators was developed by Texas A&M AgriLife in the 10th quarter. This simple 2 page guide will be refined, translated to Spanish, and field tested to make sure the content is accurate and easy to follow.

100% Complete

Subtask 5.2 TCFA will assemble manure/compost spreader truck calibration kits. Thirty kits to be assembled initially. Distribute one calibration kit to each manure/compost hauling company in Texas High Plains at no charge at public project events. Additional kits will be provided at a nominal charge. (Start Date: Month 9; Completion Date: Month 16)

The main components of the calibration kits have been acquired and are being field tested. After field validation, material lists for the calibration kits will be finalized.

A prototype calibration kit with detailed instructions and pictures is being developed by TCFA and AgriLife staff and should be available for the next advisory group meeting/field day.

The calibration kit contents and calibration procedure has been discussed by project team members. Vendors are being sought to procure the necessary items for each calibration kit and will be assembled upon receipt.

Vendors for the calibration kit materials have been identified and some of the components purchased.

A materials list for calibration kits has been refined and components have been ordered, and are expected to arrive in the 10th quarter. Calibration kits will be assembled as components become available.

Materials for 30 calibration kits have been ordered in the 10th quarter and most have been received by TCFA personnel. Kits will be assembled in the 11th quarter.

August 2012 – TCFA staff completed assembly of manure calibration kits, which include two tarps for collecting and weighing manure/compost from spreader trucks in the field, a digital scale, tarp weights, and instructions for using the kits (in English and Spanish). Kits will be distributed to manure/compost haulers at a field day in the spring of 2013.

Twenty calibration kits were distributed in the 14th quarter.

Three calibration kits were distributed in the 15th quarter to an additional, Amarillo-area contractor heretofore unidentified within our roster of known contractors. The proper use of the calibration kits was also demonstrated in the field by Texas A&M AgriLife Extension Service. Four different trucks were calibrated and on site adjustments were made to achieve the requested land application rate. Contractor indicated an active interest in calibration techniques and requested multiple kits for his employees.

100% Complete

Subtask 5.3 AgriLife Extension will verify field-scale technique for whole-truck calibration. This method would serve as a complement to the single-pass calibration kits and would require gross wt., tare wt., effective spreader width and length of spreader travel. (Start Date: Month 5; Completion Date: Month 12)

Texas A&M AgriLife Extension has scheduled a field scale calibration event for September 2010. Calibration kits will be assembled and used to demonstrate calibration techniques with raw and composted cattle manure.

Field –scale whole truck calibration event has been moved to October 18-22, 2010.

Prototype calibration kits were field tested August 23, 2010, at the Texas A&M AgriLife Research station at Bushland Texas, to determine optimal methods for manure spreader calibration, and to assess the calibration kit materials. The spreader truck capacity, manure spreading width, travel speed, chain speed, and travel distance were also evaluated to determine optimal settings for the October calibration event. TCFA, Texas A&M AgriLife Extension Amarillo, and WTAMU participated in the event.

Single pass calibration method was field tested and methods were confirmed at the water quality monitoring site during manure and compost applications to treatment plots during the week of Feb. 21-24, 2011.

This method has been field verified to be not applicable to compost applicators due to the advanced material handling capabilities of compost spreaders.

Single pass calibration methods were field test at the water quality demonstration site located at DSC6. Manure was applied at a target rate of 10 tons/acre and compost was applied at a target rate of 5 tons/acre. Each of the plots receiving manure/compost on March 30, 2012 were calibrated (n=6/plot) using 2 calibration tarps with a 4:1 aspect ratio (28”x112”).

Single pass calibration methods were field tested at the water quality demonstration site located at DSC6. Two calibration tarps with a 4:1 aspect ratio (28”x112”) were used to verify the amounts of compost and raw manure applied to treatment plots. Manure was applied at a target rate of 10 tons/acre and compost was applied at a target rate of 5 tons/acre on February 8, 2013.

100% Complete

TASK 6: Curriculum Development

Subtask 6.1 TCFA/ AgriLife Extension will produce educational materials, pamphlets and video (if appropriate) to provide for concise and accurate descriptions of manure calibration equipment options. Types of materials will be determined by the project advisory group (TSSWCB must approve all educational materials prior to distribution). (Start Date: Month 13; Completion Date: Month 48)

High Definition video and pictures will be taken at the field scale calibration event as described in subtask 5.3. Video and pictures will be used to produce educational materials detailing appropriate manure spreader calibration techniques.

High Definition video and pictures were taken at the field calibration event on October 18-22, 2010. Some of the pictures have been used in the slide sets presented at the January PAG meeting and are attached hereto.

On March 16, 2011, Ben Weinheimer visited the soil sampling demonstration sites in Donley and Wheeler Counties. Digital pictures and video clips of all sites were collected.

Video taken at the field day event (September 14, 2011) of the spreader calibration methods, was uploaded to the website and will be available for future education materials. Video was taken by Kay Ledbetter, Texas A&M AgriLife Research and Extension Communications Specialist.

Data are being compiled to produce educational materials and will be refined in the 11th quarter.

Slide sets used at the educational seminars held in April and May 2013 are being converted for use in Texas A&M AgriLife Extension Service bulletins.

Slide sets pertaining to the land application of manure presented at the May/June seminars have been posted to the website.

85% Complete – On-going

Subtask 6.2 AgriLife Extension will deploy educational materials at a national scale through the Livestock and Poultry Environmental Learning Center and the Extension Community of Practice (www.extension.org). (Start Date: Month 32; Completion Date: Month 48)

Texas A&M AgriLife Extension Service has arranged with the Livestock and Poultry Environmental Learning Center to publish the project's educational deliverables to the World Wide Web through the LPELC Community of Practice (http://www.extension.org/animal_waste_management).

85% Complete – On-going

Subtask 6.3 AgriLife Extension will provide a template for field-level feedback from manure and compost haulers to verify implementation of single-pass and whole-truck methods. (Start Date: Month 32; Completion Date: Month 48)

A feedback template was added to each of the manure/compost truck calibration kits for the users to provide comments or feedback on the calibration kit design and implementation.

A smartphone app was also tested and verified for the whole-truck calibration method. This app was developed by the University of Nebraska and is available on iTunes and Android.

100% Complete

TASK 7: Demonstration and Program Delivery

Subtask 7.1 Select 3 to 4 demonstration sites based on the recommendations of the advisory group. Factors in selection of demonstration sites may include crop types, soil types, manure vs. compost, application rates, location of water wells, ability to sample down-gradient soils and date of previous manure/compost application, if any. At least 1 demonstration site will be selected within the Buck Creek Watershed and at least 1 demonstration site will be selected within the Sweetwater Creek Watershed. (Start Date: Month 1; Completion Date: Month 9)

Initial contact has been made with County Extension Agents in several locations throughout the Texas High Plains to encourage them to begin identifying potential landowners to serve as project collaborators/demonstration sites.

Potential demonstration sites have been identified in Donley, Wheeler, and Deaf Smith Counties following tours conducted by CEAs.

A plan of action for each potential demonstration site has been discussed by PIs and will be conveyed to the CEAs before they meet with the landowners.

County Extension Agents will be tasked with making first contact with landowners to determine willingness to cooperate.

Potential demonstration sites were visited in Wheeler County on July 23, 2010. CEA Kenny Brdeko identified possible demonstration locations and a cooperative land owner in Wheeler County with land located in the Sweetwater Creek watershed. Project team members met with additional landowners and identified potential demonstration sites. A series of good site locations were identified and landowner approval/cooperation was obtained.

Potential demonstration sites were visited in Donley County on August 3, 2010. CEA Leonard Haynes identified possible demonstration locations and a cooperative land owner in Donley County with land located in the Buck Creek watershed. Project team members met with a landowner, with intentions for this location to serve as the surface water quality evaluation. Two weeks later, the landowner declined to participate.

On August 27, 2010, Ben Weinheimer visited with additional landowners in Donley County and met with feedyard managers at two feedyards in that area.

Potential demonstration sites were visited in Deaf Smith County on September 9, 2010. PI's and project manager confirmed landowner participation in the project for both soil sampling and surface water quality evaluations. The help of Mr. Rick Auckerman, CEA-Deaf Smith County, was key to securing landowner cooperation.

All demonstration site locations in Deaf Smith, Donley and Wheeler Counties have been selected and landowner cooperation has been confirmed.

Project team members have maintained open lines of communication with landowners/project cooperators in each of the three counties. Copies of lab analyses for soil, manure and compost have been shared with the landowners.

On July 11, 2012, TCFA staff took photos of crops and demonstration sites in Wheeler County and discussed project status with landowner by phone.

On Aug. 3, 2012, TCFA staff took photos of crops and demonstration sites in Deaf Smith County.

On Aug. 8, 2012, TCFA staff took photos of crops and demonstration sites in Donley County and discussed project status with landowner by phone.

On Nov. 21, 2012, TCFA staff took photos of crops and demonstration sites in Wheeler County.

TCFA project team members discussed the current state of the project and results from recent soil sampling events with cooperating producer/land owner in Wheeler County on March 28, 2013.

The proper use of the spreader truck calibration kits was demonstrated in the field by Texas A&M AgriLife Extension Service during September 2013. Four trucks were calibrated and on site adjustments were made to achieve the targeted land application rate. Thirteen different measurements were taken, and results of these measurements were shared with the contractor.

100% Complete

Subtask 7.2 Train custom manure hauler owners, equipment operators, certified crop advisors and crop producers on the principles of environmental management for land application of manure. (Start Date: Month 14; Completion Date: Month 48)

Attendees at the September 14, 2011 field day represented 50% of the commercial composters that compost 70% of the cattle manure that is composted in the region. Raw manure applicators that apply 40% of all the manure generated in the region also attended the event. This combination of commercial composters and raw manure applicators are responsible for land applying manure generated by more than 2.5 million animals annually.

Feedyard environmental managers representing 40% of all fed beef (1 million + fed animals) annually in this region also attended the field day event.

The two largest environmental agricultural engineering consulting firms in the Texas High Plains region attended the field day event at the water quality demonstration site.

Other attendees to the field day event included: area producers, certified crop advisors, college students, and a representative from Congressman Mac Thornberry's office (13th Congressional District of Texas).

TCFA hosted a meeting for environmental managers and Certified Crop Advisors at the TCFA office on Nov. 13, 2012. Dr. Brent Auvermann provided the group with a progress report on the 319 manure demonstration project. The feedyard companies in attendance at the meeting represented 1.5 million head of feeding capacity.

Texas A&M AgriLife Research & Extension, WTAMU, and TCFA personnel participated in seven environmental management seminars as mentioned in subtask 1.3. Educational materials in the form of printed slide sets were distributed at each of the meetings. Spreader

truck calibration kits were also distributed to all manure/compost contractors that attended the seminars.

The proper use of the spreader truck calibration kits was demonstrated in the field by Texas A&M AgriLife Extension Service during September 2013. The manure/compost hauler contractor and 4 of his employees participated in the event. Two of the three calibration methods (single-pass and whole-field) promoted through this project were used constructively to refine and justify post-hoc billing arrangements.

100% Complete

Subtask 7.3 TCFA/ AgriLife Extension will host field days at each demonstration site at least once in Year 2 and once in Year 3. (Start Date: Month 13; Completion Date: Month 48)

Field day tentatively scheduled for September 14, 2011 in Deaf Smith County. Location and field day details to be determined by project group and County Extension Agent Rick Auckerman (pending).

A field day event was held at the water quality demonstration site (Field DSC 6) located in Deaf Smith County on September 14, 2011.

A field day for the month of February 2013 is tentatively scheduled at one of the demonstration sites in Wheeler County.

The field day that was planned for the month of February, 2013 has been tentatively rescheduled at one of the demonstration sites in Wheeler County due to the one-year project extension.

Texas A&M AgriLife Research & Extension, WTAMU, and TCFA personnel conducted 7 environmental management seminars to representatives of cattle-feeding and manure-contracting enterprises as mentioned in subtask 1.3. These 7 seminars were in all the regions where demonstration sites are located plus other intensive manure-producing areas, including Perryton, Wheeler, Dalhart, Jourdanton, Kingsville, Hereford, and Olton, TX.

100% Complete

Subtask 7.4 TCFA will organize, in conjunction with all project partners, six seminars/workshops across the Texas High Plains for program delivery in Year 3. (Start Date: Month 13; Completion Date: Month 48)

Six seminar/workshops are tentatively planned for May 2013. Each workshop will be held in a different location to maximize attendance.

Texas A&M AgriLife Research & Extension, WTAMU, and TCFA personnel participated in seven environmental management seminars aimed at educating producers (farm, ranch, feedyards, and manure/compost contractors) about the manure/compost demonstration project, water quality demonstration plots, manure/compost spreader calibration, soil nutrient levels and water well results.

Project goals and results were also presented at an annual event hosted by TCFA and WTAMU called Feedyard camp on June 24, 2013.

100% Complete

Subtask 7.5 TCFA will provide project results to state livestock organizations in Oklahoma, New Mexico, Kansas, Colorado and Nebraska. (Start Date: Month 32; Completion Date: Month 48)

Project results were presented to state livestock organizations at the National Cattlemen's Beef Association Annual Convention in Denver Colorado, August 2013.

100% Complete

Subtask 7.6 TCFA will present results of the project to the Property Rights and Environmental Management Committee at a National Cattlemen's Beef Association Annual Convention. (Start Date: Month 41; Completion Date: Month 42)

Project synopsis was presented to the Property Rights and Environmental Management Committee at a National Cattlemen's Beef Association Annual Convention in Denver Colorado, August 2013.

100% Complete

TASK 8: Technical Assistance

Subtask 8.1 Utilize group workshops, field days and hands-on demonstration of BMPs and ensure availability of education materials through websites. Notify custom manure haulers of the availability of on-site technical assistance and field training for owners and operators, and encourage implementation of USDA-NRCS conservation practices by landowners through the Environmental Quality Incentives Program (EQIP). (Start Date: Month 8; Completion Date: Month 12)

As of the Jan. 5, 2011 PAG meeting, the list of contractors has been expanded and includes current contract information. Additional work will be done the in 1st quarter of 2011 to finalize the contact list.

Twenty six manure and compost haulers have been identified and added to the contact list in the 14th quarter.

In the 15th quarter an additional manure/compost hauler was identified and added to the contact list bringing the total to 27.

100% Complete

Subtask 8.2 AgriLife Extension will establish a system of tracking and providing notifications on the availability of technical and financial assistance (i.e., mail, email, website subscription) to custom manure and compost haulers in the Texas High Plains region. (Start Date: Month 13; Completion Date: Month 48)

Subscriptions to the website for technical assistance and project updates are available as of February 2011.

An RSS feed will be added to the website in the 8th quarter to instantly update users to changes in the website.

A link to the smart phone app developed by the University of Nebraska to assist in spreader truck calibration will be added to the website to assist custom manure and compost haulers.

100% Complete

Subtask 8.3 TCFA, with assistance from local SWCDs, USDA-NRCS and the TSSWCB Hale Center Regional Office, will promote the availability of technical assistance and encourage adoption and implementation of USDA- NRCS conservation practices (or best management practices (BMPs)), described in the USDA-NRCS Field Office Technical Guide (FOTG) as effective at mitigating the environmental impact of manure/compost application.

TCFA, with assistance from local SWCDs and the TSSWCB Hale Center Regional Office, will promote the availability of technical assistance and encourage the development and implementation of TSSWCB-certified Water Quality Management Plans (WQMPs). A WQMP is a site-specific plan developed through and approved by SWCDs which includes appropriate land treatment practices, production practices, management measures, and technologies that prevent and abate agricultural and silvicultural nonpoint source pollution. The BMPs prescribed in a WQMP are defined in the NRCS FOTG. WQMPs afford agricultural producers an opportunity to comply with state water quality laws through traditional voluntary incentive-based programs.

TCFA, with assistance from local SWCDs and USDA-NRCS, will promote availability and utilization of cost-share funds through the EQIP State Resource Concern for AFO-CAFO Beef – Water Quality/Air Quality to aid in implementation of BMPs related to manure/compost application.

TCFA, with assistance from local SWCDs and the TSSWCB Hale Center Regional Office, will promote availability and utilization of cost-share funds through the WQMP Program (historically known as 503 cost-share) to aid in implementation of BMPs related to manure/compost application. (Start Date: Month 13; Completion Date: Month 48)

A project briefing/orientation conference call was conducted April 26, which included the field representatives for Soil and Water Conservation Districts and the USDA-Natural Resources Conservation Service – Zone 1 office (Lubbock/Amarillo region).

Texas A&M AgriLife Extension Service is assembling a table display for use at the SWCD Annual Meeting in Lubbock, Texas on Oct. 25-26, 2010.

Texas A&M AgriLife Extension Service presented a full-size, free-standing poster display and video loop of manure-spreader calibration at the SWCD Annual Directors' Meeting in Lubbock, TX, on Oct. 25-26, 2010.

The current state of the project along with results to date will be presented at the annual SWCD Directors meeting in San Antonio, Texas (October 24-26, 2011).

Ben Weinheimer presented information about the project to NRCS Nutrient Management Specialists at the annual training meeting in Plainview, Texas on November 16, 2011. There were approximately 60 participants including staff from the NRCS Zone 1 office in Lubbock, Texas.

NRCS personnel participated in the 7 environmental management seminars held in April and May 2013 as described in subtask 1.3

100% Complete

Subtask 8.4 TCFA/ AgriLife Extension will explore options for future development of a certification program for manure and compost haulers based on the outcomes of the training and demonstration efforts of this project. (Start Date: Month 44; Completion Date: Month 48)

Most custom haulers have grasped the concept of calibration and currently used the whole field method to calibrate their equipment. Based on the conversations with these haulers it has been determined that a certification process is not needed at this time.

100% Complete

TASK 9: BMP Effectiveness Monitoring

Subtask 9.1 TCFA/ AgriLife Extension and AgriLife Research, as appropriate, will establish control and treatment plots at one location in the Sweetwater Creek watershed, one location in the Buck Creek watershed and one location on the Caprock. Treatments may include application of manure and/or compost at single-year vs. multi-year agronomic rates. (Start Date: Month 6; Completion Date: Month 9)

Potential demonstration sites have been identified in each of the specified areas, as mentioned in subtask 7.1.

Demonstration sites (n=15) have been identified and landowners have agreed to cooperate with the project in Deaf Smith, Wheeler, and Donley counties. Demonstration sites are located in Buck Creek, Sweetwater Creek, Palo Duro Creek, and Silver Creek watersheds. The demonstration sites are situated on irrigated agricultural lands with varying slopes, soil

types, and cropping techniques. Details on each demonstration site location are included in the QAPP.

Demonstration sites for soil and water quality monitoring are in place. Initial “Year 1” soil samples were collected and analyzed using funds from other sources (prior to QAPP approval). The four water quality runoff plots in Deaf Smith County are complete; water samplers are in place and fully operational.

100% Complete

Subtask 9.2 At one demonstration location, AgriLife Research will install automatic water samplers to collect runoff from the control and treatment plots. Water samples will be analyzed for nutrients and bacteria by the Texas A&M AgriLife Research Laboratory at Vernon. (Start Date: Month 6; Completion Date: Month 9)

A potential demonstration site has been selected and a plan of action has been formalized for the CEA to present to the landowner.

A landowner has agreed to participate in the water quality study. The demonstration site is located in the Palo Duro Creek watershed in Deaf Smith County. Water sampling equipment will be installed after the current crop is harvested and the field has been prepared for the next crop rotation.

Project members started construction of the treatment plots for the water quality demonstration site located in Deaf Smith County on November 30 – December 2, 2010. Treatment plots were marked and GPS locations of the perimeters were collected. A tractor was used to make berms around each plot to prevent run on from the surrounding areas, and to channel the runoff from each plot to an automated water sampler. Water samplers will be installed in January on the concrete pads that were constructed at the runoff water discharge area of each plot. Black plastic was used to line the diversion berms at the downgradient side of each treatment plot to prevent erosion by the runoff water, and to help with long term berm stability in and around the water samplers.

Water samplers and H-flume supplies have been ordered and are expected to be installed in January 2011 by the project team.

Treatments for each of the plots were discussed by the PAG and their recommendations will be considered before treatments are applied. Proposed treatments for each plot are as follows: compost every year (2-5 tons/acre), manure every other year (10 tons/acre), commercial fertilizer (producer’s current practice), and a single high frequency manure application (30 tons/acre). The producer will incorporate the manure/compost with a disk plow after the demonstration plots receive the treatments.

Manure will be applied by the WTAMU manure truck, while compost will be applied by a small scale, tractor-pulled compost spreader. Each spreader will be calibrated before applications are made to each treatment plot. The commercial fertilizer application technique will be up to the discretion of the producer.

Flumes and samplers were installed January 14, 2011, and are now operational.

Manure and compost were applied to treatment plots at the water quality monitoring site during the week of Feb. 21-24, 2011. Manure was applied at a rate of 10 tons/acre to treatment plot #4, and 20 tons/acre to treatment plot #1. Compost was applied to treatment plot #2 at a rate of 5 tons/acre. Treatment plot #3 will have commercial fertilizer applied by the landowner.

Water drainage issues downgradient of sampler flumes addressed and corrected on March 4, 2011.

Water samples have been collected and analyzed from the periodic runoff events generated by the center pivot irrigation.

Water sampling flumes cleaned and diversion berms inspected on June 20, 2011.

Excess sediment removed from water sampling flumes and diversion berms were inspected/repared by TCFA and AgriLife staff on July 5-6, 2011. Weeds that were growing around the water samplers and directly upstream of the samplers were also removed.

AgriLife Vernon collected water samples from irrigation runoff on July 29, 2011.

AgriLife personnel removed weeds from plots and areas adjacent to the ISCO water samplers on July 28, 29 and August 1, 2011.

AgriLife personnel collected corn silage samples (16 total samples, n=4 per plot) from the 4 plots at the water quality demonstration site after each plot was harvested on August 29, 2011. The total weight of the silage harvested from each plot, along with the nutrient analysis of the silage was recorded, and presented at the September 14, 2011 field day.

AgriLife personnel inspected and repaired plot borders on September 2, 2011. Borders were repaired due to damage incurred during the harvesting process.

AgriLife personnel inspected (November 9, 2011) and repaired (November 30, 2011) plot borders.

New runoff water samplers are tentatively scheduled for installation during the month of February, 2012. These samplers are designed to keep runoff samples cool for 48 hours, thus preserving them in accordance to EPA guidelines.

AgriLife personnel inspected and repaired plot borders in February 2012.

AgriLife Vernon personnel visited the site on March 30, 2012 to perform routine maintenance of the water samplers and clean soil and debris from the H-flumes.

ISCO® runoff samplers have been ordered, but have yet to be received. Installation is now tentatively scheduled for May 2012.

Manure and compost was land applied, on March 30, 2012, to the treatment plots at the water quality demonstration site. The berms surrounding the plots were repaired with a tractor using a border disk implement. Plot #4 received ≈10 tons of manure and Plot #2 received ≈5 tons of compost.

Texas A&M AgriLife Amarillo personnel visited the water quality demonstration site on May 17, 2012 to assess damage to diversion berms that occurred when the field was plowed for pre planting of cotton. Site was revisited on May 25, 2012 to repair the diversion berms and mow weeds in and around the samplers.

Texas A&M AgriLife Vernon installed new refrigerated ISCO water samplers (in the 10th quarter) at the Water Quality Demonstrations site to meet EPA's requirements for holding times on samples for bacteria analysis. Sampler hoses, strainers, catch basins and H-flumes were cleaned, or repaired.

Verizon cellular service was established and functional as of August 16, 2012 at the water quality demonstration site. This service allows the water samplers to notify AgriLife Vernon in the event of runoff/sampler activation.

Water samples were collected from two runoff events in the 11th quarter by AgriLife Vernon.

AgriLife Vernon coordinated with TCFA in the 11th Quarter in the collection of manure samples for bacterial source tracking purposes. AgriLife Vernon has obtained the isolates, and should be finishing that up soon, they thereafter will submit isolates for inclusion in BST state library.

On Aug. 17, 2012, TCFA and AgriLife staff held workday at Deaf Smith County water quality demonstration site. All vegetation was trimmed; berms were re-graded around all four plots; new plastic sheeting and sand bags were placed on down-gradient berms.

On October 4, 2012 TCFA staff trimmed vegetation in and around the water quality demonstration site.

A manure sample was collected at DSC2 on Oct. 24, 2012.

Maintenance of water samplers have been conducted monthly during the first quarter of 2013.

Texas A&M AgriLife Vernon personnel visited the water quality demonstration site for cleanup and maintenance on June 4, 2013.

Texas A&M AgriLife Vernon personnel visited the water quality demonstration site to retrieve runoff samples on June 12, 2013.

Texas A&M AgriLife Vernon personnel visited the water quality demonstration site to retrieve runoff samples on June 17, 2013.

Texas A&M AgriLife Vernon personnel visited the water quality demonstration site to retrieve runoff samples on June 18 and July 1. Each of these precipitation events were low flow.

Texas A&M AgriLife Vernon personnel collected runoff water samples on three dates during the quarter. Runoff was not produced or collected for each date, as each event was very low flow or no flow. Collection dates (plots collected from) were July 22 (plots 2, 3, & 4), August 13 (plots 1, 3, &4), and September 30, 2013 (plots 1 & 4).

On August 7, 18, and September 23, 2013 Texas A&M AgriLife Amarillo staff trimmed vegetation in and around the water quality demonstration site.

100% Complete

Subtask 9.3 At least annually, TCFA will collect soil samples from control and treatment plots using GPS grid soil sampling. Samples will be collected at the 0-6 inch depth and 6-24 inch depth across the grid. Composite samples will be submitted to a commercial soil testing laboratory for macronutrient, micronutrient, pH and organic matter. In a similar manner, soil samples will be collected at two distances down-gradient of the plots. Distances will be determined by site-specific topographic features of the site locations. (Start Date: Month 6; Completion Date: Month 48)

Soil sampling has been conducted by TCFA staff (September 22, 2010) at one of the demonstration sites before a previously scheduled manure application event occurred. The laboratory fees associated with the analytical results will be paid for by other funds not associated with this project. All results will be made available to this Sec 319 project.

All demonstration site locations have been digitized in GPS soil sampling software used by TCFA staff. Sample identification, labeling and chain of custody procedures have been implemented in accordance with the QAPP.

Initial “Year 1” soil sampling has been completed for all demonstration sites and reported on at the second PAG meeting (Jan. 5, 2011). Slide sets presented at the meeting are attached hereto (4th quarterly report—Jan. 14, 2011).

TCFA personnel have taken Year #2 soil samples from the water quality demonstration plots (DSC 6) in Deaf Smith County on September 9, 2011. These soil samples were taken after the corn silage crop was harvested on August 29, 2011.

TCFA personnel collected soil samples from all demonstration plots (December 11, 2011 – January 11, 2012).

100% Complete

Subtask 9.4 Water samples will be collected by TCFA from all water wells located within the boundaries of the control and treatment plots as well as any water wells (where access is granted) within 500 feet down-gradient of the plot locations. Water samples will be analyzed for bacteria and nutrients. (Start Date: Month 6; Completion Date: Month 48)

Water well samples were collected in Deaf Smith County on May 18, 2011. The samples were collected, preserved and analyzed in accordance with the procedures listed in the submitted (but not approved) QAPP. Water well sampling in Donley and Wheeler Counties was postponed, pending final and imminent approval of the QAPP by EPA.

TCFA personnel will resume collection of well water samples once the QAPP has been approved by the EPA. Sampling is tentatively scheduled for the 9th and 10th quarters.

TCFA staff collected water well samples from irrigation wells at demonstration sites in Deaf Smith (Aug. 3, 2012), Donley (Aug. 8, 2012) and Wheeler (Aug. 8, 2012) Counties. Lab analysis was completed by Texas A&M AgriLife Research Lab in Vernon, Texas.

TCFA staff collected water well samples from irrigation wells at demonstration sites in Deaf Smith (July 23, 2013), Donley (August 28, 2013) and Wheeler (July 22, 2013) Counties. Lab analysis was completed by Texas A&M AgriLife Research Lab in Vernon, Texas.

100% Complete

Subtask 9.5 TCFA will collect representative manure and/or compost samples prior to all planned land application events. Samples will be analyzed by a commercial testing laboratory for macronutrients, micro nutrients and moisture content. Split samples will also be provided to AgriLife Research for the BST library. (Start Date: Month 6; Completion Date: Month 48)

TCFA staff collected a sample of compost from a turn-row stockpile located adjacent to DC-2 in Donley County on Jan. 7, 2011. The sample was analyzed by Servi-Tech Laboratories in Amarillo, Texas. The compost was applied to the field the following week.

TCFA staff collected a sample of manure from a turn-row stockpile located adjacent to WC-3 in Wheeler County on March 16, 2011. The sample was analyzed by Servi-Tech Laboratories in Amarillo, Texas. The manure was applied to the field later that week.

TCFA staff collected a sample of manure (August 17, 2011) from a turn-row stockpile located DSC2 in Deaf Smith County. The sample will be analyzed by Servi-Tech Laboratories in Amarillo, Texas.

A compost sample was collected by TCFA personnel from material that was being applied to demonstration sites in the Sweetwater Creek watershed area in the 9th quarter.

TCFA staff collected samples of manure and compost (March 30, 2012) from the manure and compost application truck/spreader used at the water quality demonstration site located at DSC6. This manure and compost was applied to the treatment plots and nutrient analysis of the samples will be provided by Servi-Tech Laboratories in Amarillo, Texas.

A compost sample was collected by TCFA personnel from material that was being applied to demonstration sites in the Sweetwater Creek watershed area in the 9th quarter.

Soil samples were collected by TCFA staff from all sites (Oct-Dec 2012).

Compost and manure samples were collected Feb. 8, 2013 during the manure and compost applications at DSC6 water quality demonstration site.

Isolates from manure samples representing 29 feedyards in the Texas High Plains have been collected and submitted to the Soil and Aquatic Microbiology Laboratory in the Soil and Crop Sciences Department at Texas A&M University for addition to the bacterial source tracking (BST) state library.

100% Complete

Activities Planned for October 2013

Update project website with news and photos of demonstration sites.

Submit materials to TSSWCB for approval prior to dissemination to the public.

Analyze survey results and include the information in the final report.

Water quality monitoring demonstration site will be decommissioned and cleaned up to pre-demonstration condition.

Water well samples collected in the 15th quarter will be completed and reported in the final quarterly report.

Finalize project report for TSSWCB.