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

Principal Investigators
Ben Weinheimer, Texas Cattle Feeders Association
Brent Auvermann, Texas AgriLife Extension Service-Amarillo

Project Advisory Meeting
16 Jun 2010

https://www.tsswcb.state.tx.us/en/managementprogram/TCFAEDU

Welcome, Introductions, and Opening Comments

Dr. John Sweeten, Resident Director, Texas AgriLife Research
Ben Weinheimer, Vice President, TCFA
Brent Auvermann, Professor, Texas AgriLife Extension Service

Overview of Clean Water Act §319(h) Nonpoint Source Grant Program

Mitch Conine
Texas State Soil and Water Conservation Board

Project Goals and Tasks

Brent Auvermann, Professor
Texas AgriLife Extension Service-Amarillo

Project Personnel

- Ben Weinheimer, TCFA, Principal Investigator
- Brent Auvermann, Texas AgriLife Extension Service-Amarillo, co-PI
- Paul DeLaune, Texas AgriLife Research-Vernon, soil and crop scientist
- Brent Bean, Texas AgriLife Extension Service-Amarillo, agronomist
- Marty Rhoades, West Texas A&M University, environmental science
- Kevin Heflin, Project Manager

Project Overview

- Context: land application of feedyard manure and wastewater
- Purpose: improve understanding of how to protect water quality
- Audience: contractors, equipment operators, CCAs, crop producers
- Methods:
  - Knowledge assessments
  - Curriculum development
  - Field demonstrations and BMP effectiveness monitoring
  - Delivery of educational materials

Project Focus: 303(d)-Listed Watersheds (2008)

- Sweetwater Creek
  - Gray and Wheeler Counties
  - Elevated bacteria counts, unknown source(s)
  - Segment 0299A (classified 5c)
- Buck Creek
  - Collingsworth, Childress, and Donley Counties
  - Elevated bacteria counts, unknown source(s)
  - Segment 0207A (classified 5c)
  - Watershed Protection Plan development in progress

Project Focus: Other Priority Areas

- SW Panhandle
  - Deaf Smith, Parmer, and Castro Counties
  - Greatest concentration of feedyard capacity
  - Tierra Blanca Creek and Frio Draw
- NW Panhandle
  - Dallam and Hartley Counties
  - Large feedyards

Project Advisory Group

- Broad membership
- Review objectives and project activities
- Assist with prioritization of criteria for demonstration sites
- Assist with selection of potential demo sites
- Advise project leaders on curriculum content and delivery

Environmental Knowledge Assessment

- Pre-survey: status of current knowledge and training efforts among contractors (haulers, applicators)
- Compile and summarize
- Design of training materials around gaps in knowledge and behavior
- Post-survey: changes in knowledge status, training intensity, and BMP implementation

Curriculum Development

- Fact sheets, video modules, forms/worksheets
- Prepared and narrated in English and Spanish
- Deploy materials nationally via Livestock and Poultry Environmental Learning Center

  http://www.extension.org/animal+manure+management
- Compile feedback from haulers in RE: calibration methods
- Assess implementation

Manure Spreader Calibration Kits

- Whole-truck vs. single-pass methods
- Composted vs. stockpiled vs. freshly scraped?
- Side-by-side evaluation at Bushland USDA-ARS/Texas AgriLife Research experimental feedyard
  - Electronic cattle scales (whole-truck method)
  - # of 4’8”x4’8” tarps (replications) needed for 1-pass accuracy?
  - Tentatively scheduled for fall 2010
- WTAMU recent-model manure spreader
- Kits provided to land-application contractors

Demonstration Sites

- 3-4 demonstration sites
  - BMPs: setbacks, spreader calibration, soil and manure sampling
  - 1+ in Sweetwater Creek watershed
  - 1+ in Buck Creek watershed
  - Other site(s) in SW Panhandle (e. g., Tierra Blanca Creek, Palo Duro Creek, or Tule Creek watersheds) and/or NW Panhandle (e. g., Rita Blanca H_2O-shed)
- Edge-of-field or edge-of-plot runoff sampling
- Field days (yrs 2 and 3) and workshops (yr 3)

BMP Effectiveness Monitoring

- Single-year vs. multi-year application rates
- Annual soil sampling 0-6” and 6-24”
- Runoff analysis for nutrients and bacteria
- Well water, downgradient soils
- Manure and compost analyses, archived samples made available to Bacterial Source Tracking (BST) library (cf. Buck Creek 319)
- Quality Assurance Project Plan (QAPP)

Quality Assurance Project Plan (QAPP)

- Sampling, sample preservation, laboratory analysis, chain-of-custody, and other quality-assurance measures
- Water, wastewater, manure, compost, soil
- Comparability of data to data from other projects with similar aims
- Subject to approval by TSSWCB and EPA-R6
- *Status: currently in development*

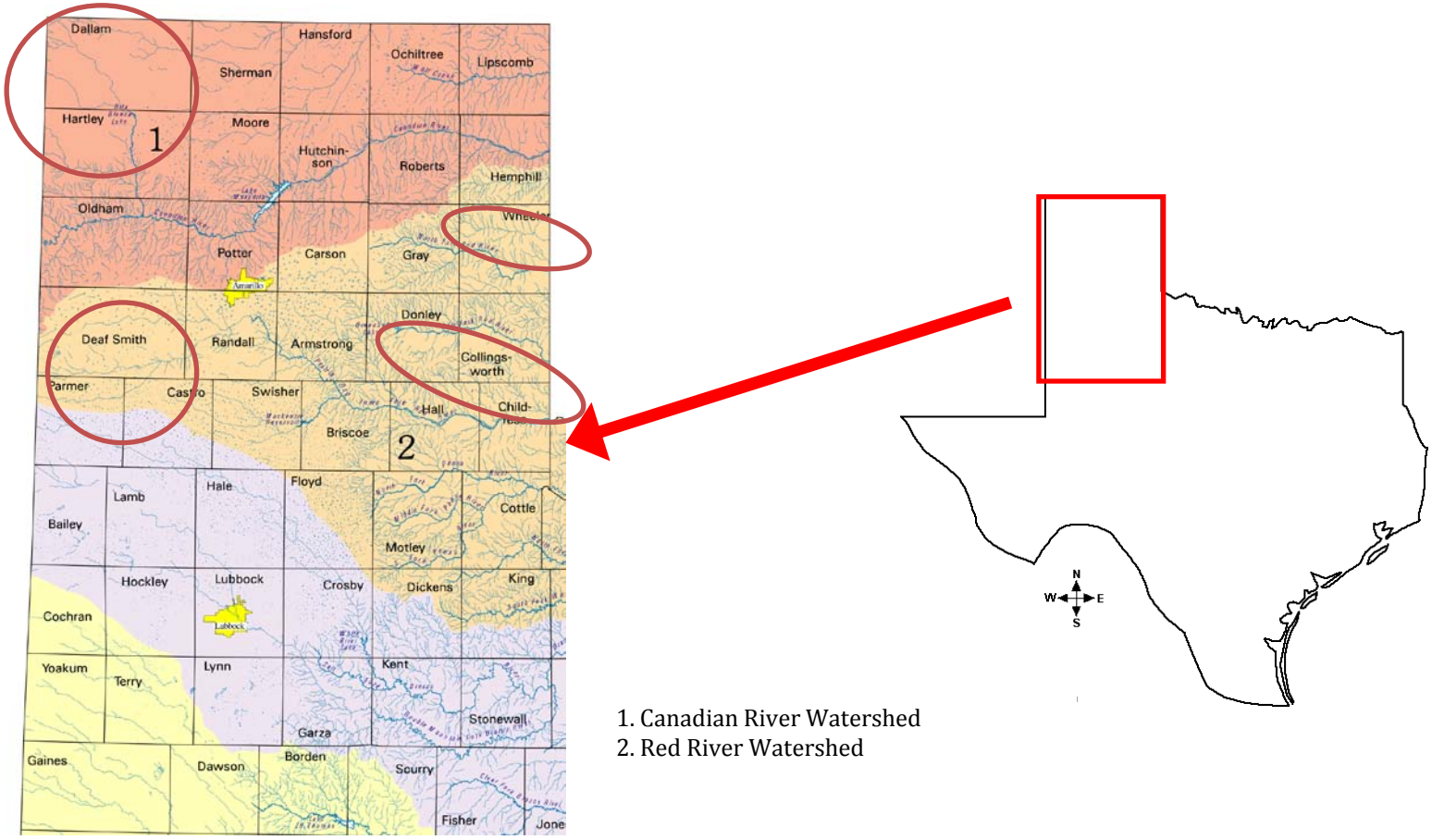
Technical Assistance

- In-field contractor training by Extension staff as requested
- Encourage adoption of certified Water Quality Management Plans (WQMP) by landowners
- Link manure-application BMPs to approved practices in NRCS Field Office Technical Guide
- Promote use of cost-share programs, as appropriate, to achieve WQMP goals
- Explore options for certification program for manure and compost haulers

Progress to Date

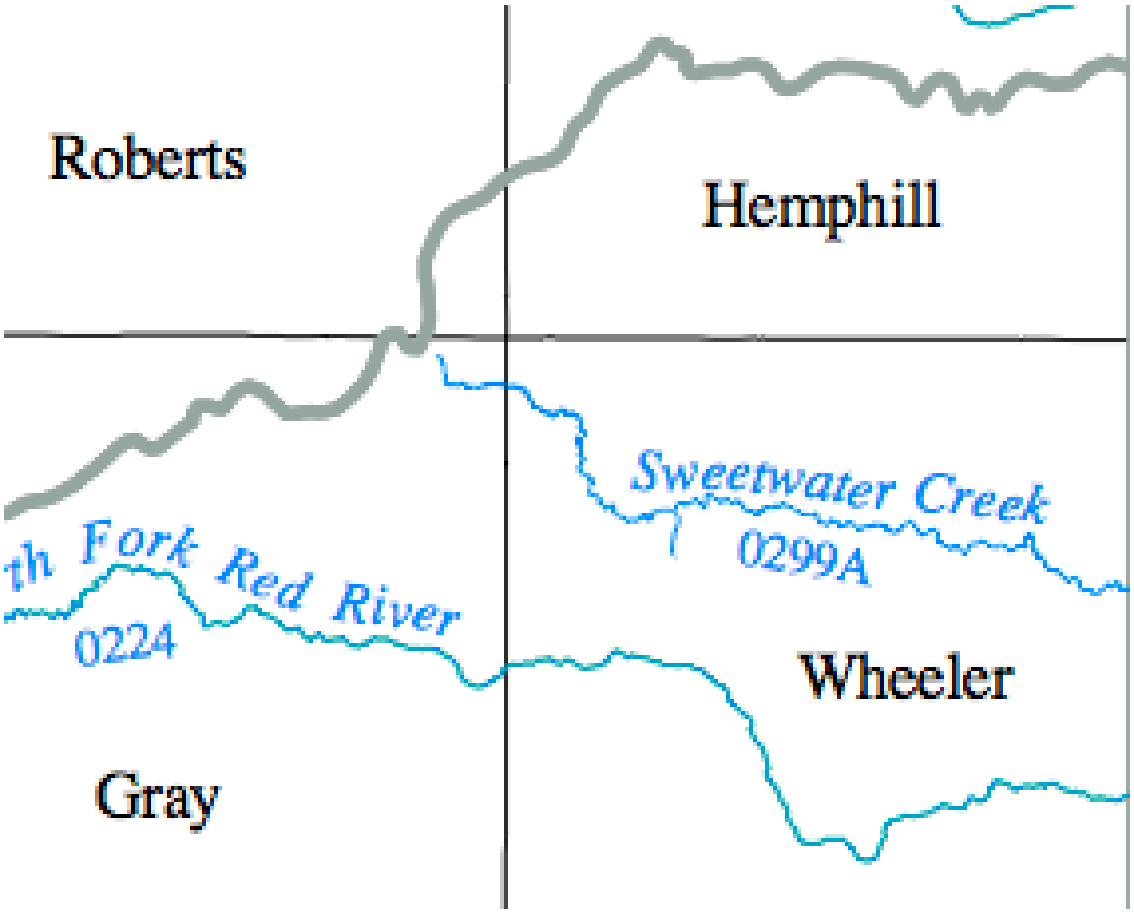
- QAPP in development, pending demonstration site selection and monitoring plans
- Toured Sweetwater Ck. watershed 14 Jun 2010
- Project web site
  - Contract with Jaclyn Tech, TWRI, awaiting approval
  - New Linux web server (100 GB) nearly ready for use
- Project kickoff meeting 16 Jun 2010
- Planning underway for fall 2010 spreader-calibration demo at Bushland, TX
- Existing educational materials and surveys have been collected
- Inaugural press release ready to go

Canadian and Red River Watersheds



1. Canadian River Watershed
2. Red River Watershed

Sweetwater Creek Watershed

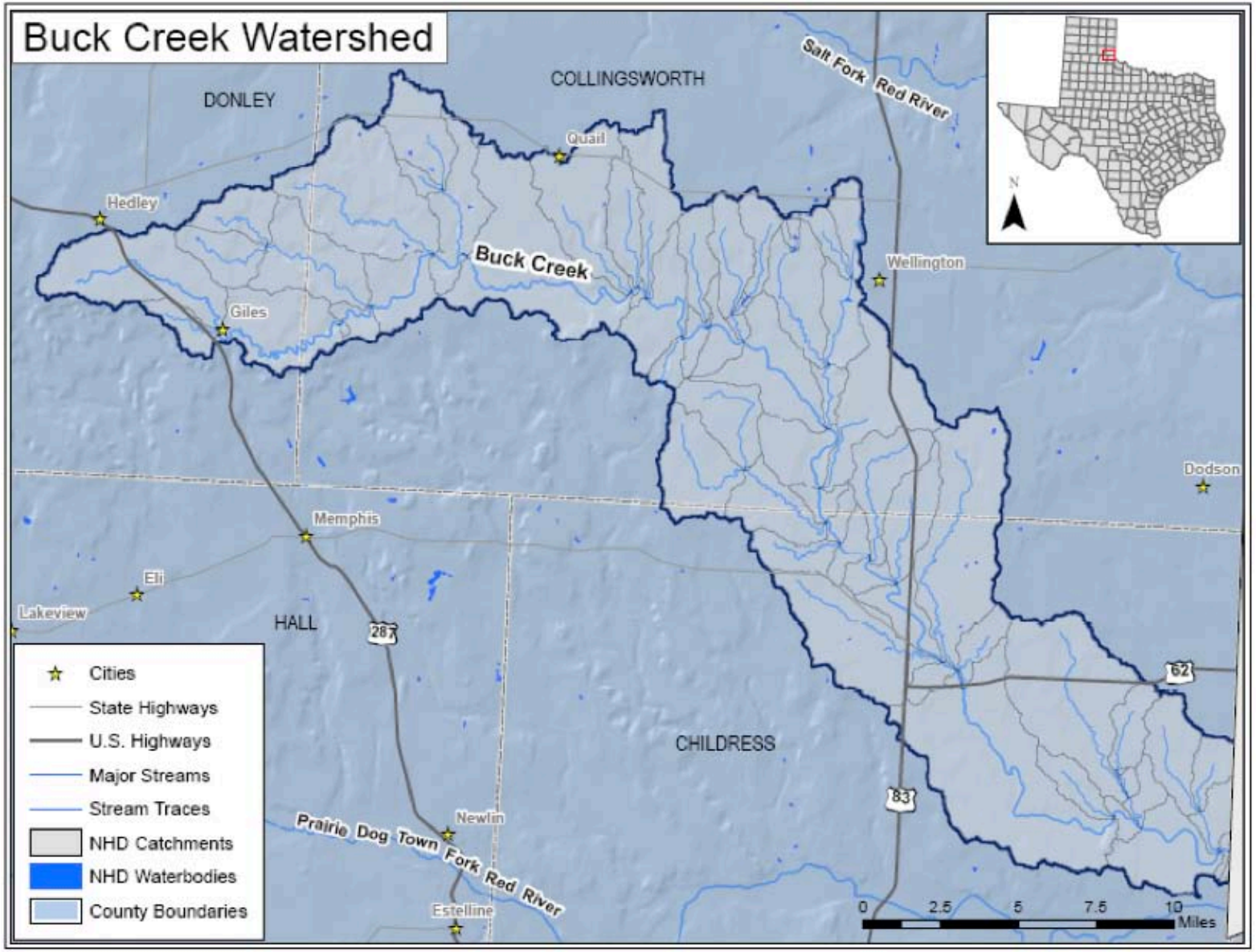


Sweetwater Creek Watershed

Looking upstream near headwaters
Gray County, TX

Looking downstream at US83 bridge
Wheeler County, TX

Buck Creek Watershed



Proposed Demonstration Sites

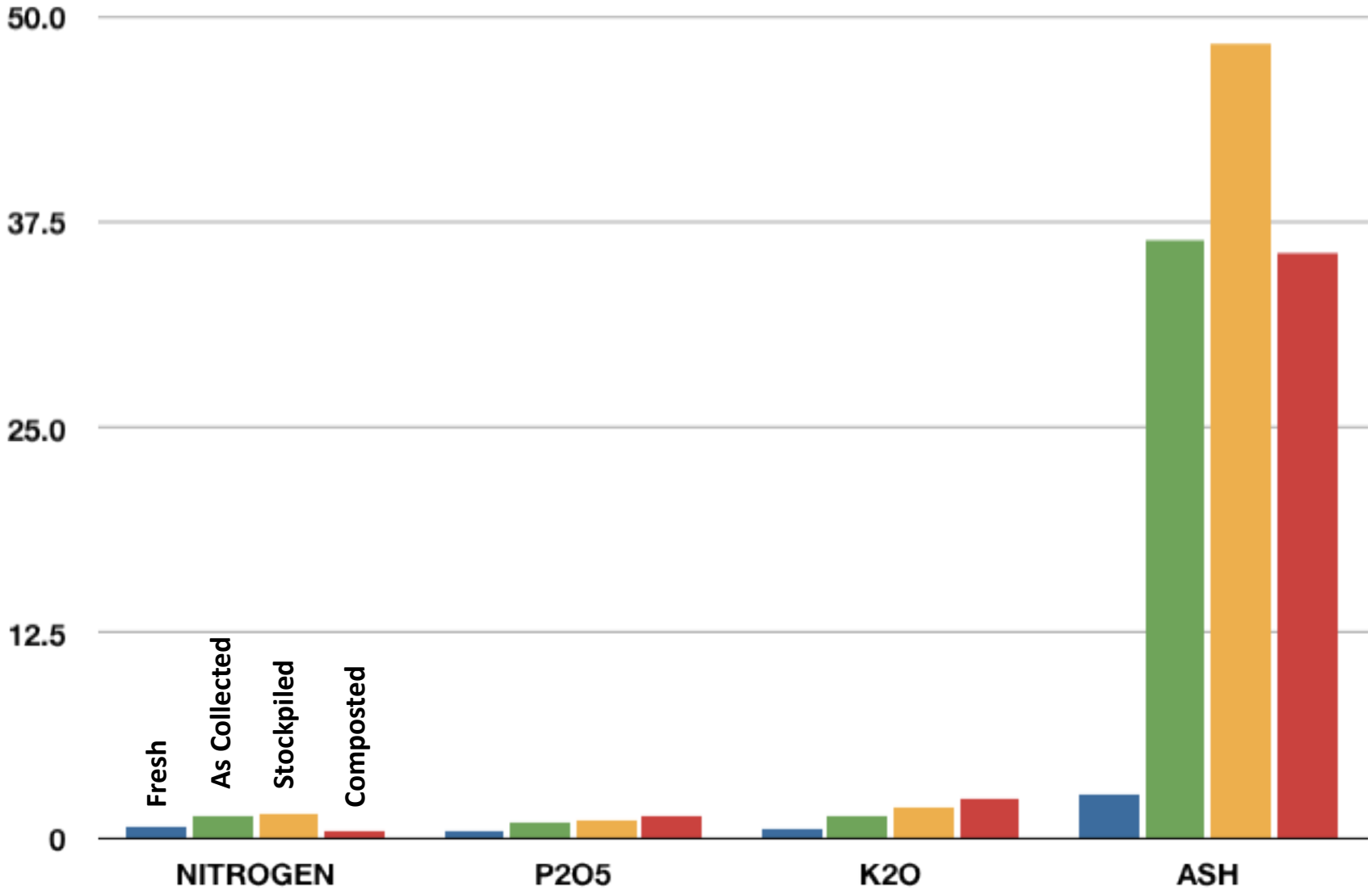
Paul DeLaune, Assistant Professor
Texas AgriLife Research-Vernon

Environmental Knowledge Assessment

Brent Auvermann, Professor
Texas AgriLife Extension Service

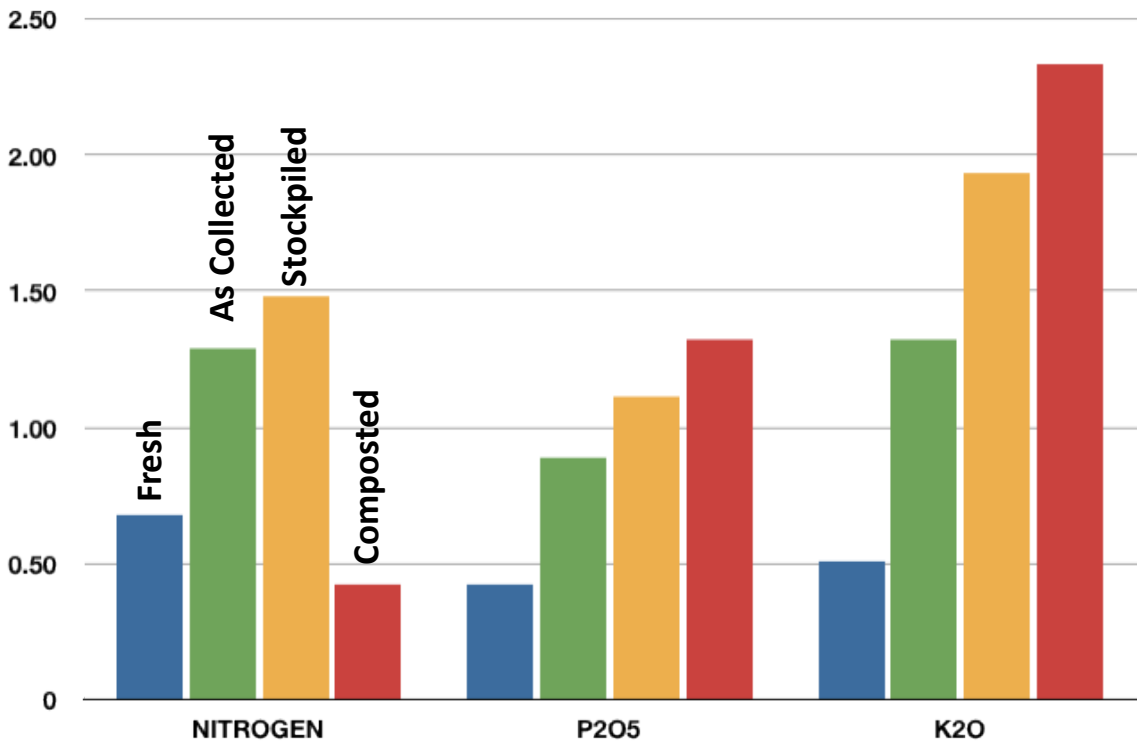
Possible Knowledge-Assessment Areas

- Manure composition, quality, and variability?
  - 2002 feedyard manure survey (Playa Basin 319)
  - Nutrient ratios: manure vs. soil-test crop req.
  - Limiting nutrient, dry vs. wet basis, unit conversions


50.0
37.5
25.0
12.5
0
Fresh
As Collected
Stockpiled
Composted
NITROGEN
P2O5
K2O
ASH

Possible Knowledge-Assessment Areas

- Basic soil chemistry of macronutrients?
  - Nutrient mobility as indicator of bacterial threat
  - Modes of N and P mobility (soluble vs. solid-phase)

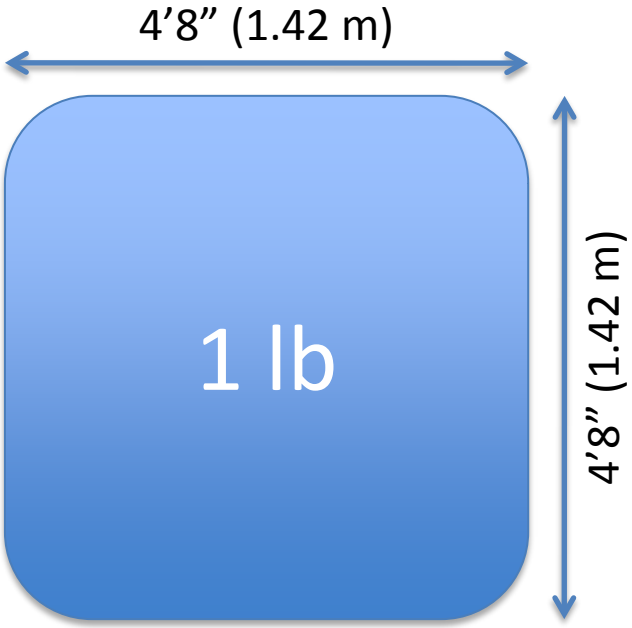


Possible Knowledge-Assessment Areas

- Manure quality vs. harvesting techniques?
  - Ash and moisture
  - Machinery selection and operation

Possible Knowledge-Assessment Areas

- Calibrating manure spreaders?
  - Single-pass method
  - Whole-truck method



= 1 ton/acre

Possible Knowledge-Assessment Areas

- Best Management Practices (BMPs) for NPS pollution prevention?
- Other assessment areas?
  - Idea #1
  - Idea #2
  - Idea #3
  - Idea #4
  - Idea #5