

# North Bosque Manure Composting Initiative *What have we learned?*



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# Erath County

## *Headwaters of Upper North Bosque and Leon River Watersheds*



- ◆ Erath County (2005)
  - ◆ Human population = 34,000
  - ◆ Dairy cattle population = 98,000
  - ◆ 80% of income is livestock
  - ◆ **\$223 million** in milk sales annually
- ◆ Bosque River Watershed
  - ◆ Over 70 dairies
  - ◆ 37,000 cows
- ◆ Leon River Watershed
  - ◆ Over 78 dairies
  - ◆ 61,000 cows





**350,000 TONS  
IN MANURE  
ANNUALLY**

**COUNTRY  
Crafters**



# Bosque River Watershed

Excess Manure



Runoff

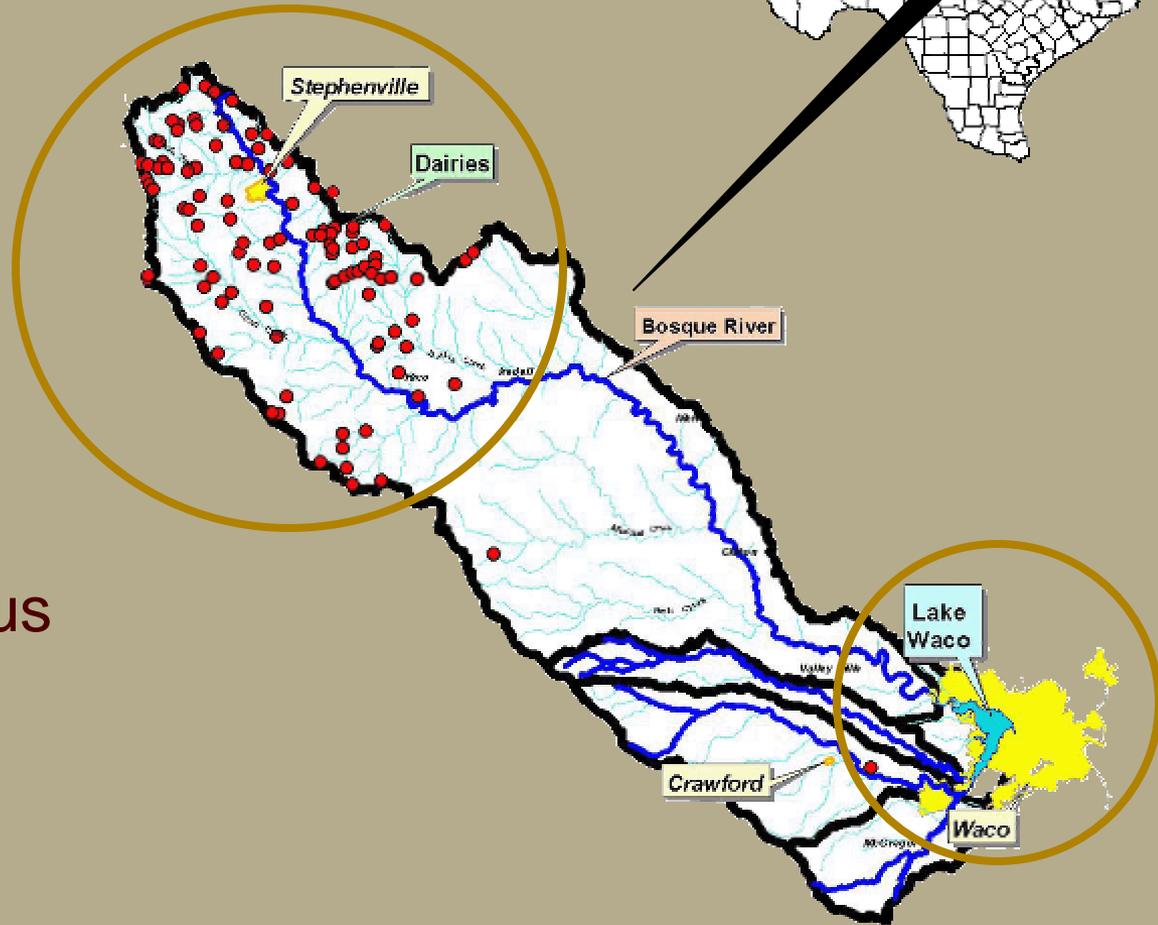


Increased phosphorus

Increased bacteria

Increased algae

AND...





**Reduced water quality!!!**

# TMDL Implementation Plan

*Available online at <http://www.tceq.state.tx.us/>*

- ◆ Reduce P loading by 50 percent
- ◆ Export 50% of collectible manure produced by dairies and other animal waste sources



# Project Partners

- ◆ US Environmental Protection Agency
- ◆ Texas Commission on Environmental Quality
- ◆ Texas State Soil and Water Conservation Board
- ◆ Upper Leon and Cross Timbers SWCD
- ◆ Texas Water Resources Institute
- ◆ Texas Cooperative Extension
- ◆ Texas Agricultural Experiment Station
- ◆ Texas Institute of Applied Environmental Research
- ◆ imanage, LLC



# North Bosque Manure Composting Initiative

- ◆ Funded through EPA CWA 319 funds in 2000
- ◆ Two prong approach:
  - ◆ Financial assistance to dairies for hauling of manure to compost facilities - DMES
  - ◆ Provide technical assistance to composters & financial incentives to public entities who purchase compost (markets) - CMIP



# Dairy Manure Export Support

- ◆ TSSWCB incentive program
- ◆ Supplement costs of exporting raw manure from dairy farms to approved compost facilities
- ◆ Program managed locally (office in Stephenville, TX) by imanage, LLC
- ◆ Dairy must have valid WQMP or NMP
- ◆ Hauler must complete training through TSSWCB
- ◆ Manure hauled to closest compost facility



# Dairy Manure Export Support

Incentive payments were reduced gradually to encourage financial responsibility from private industry

- *Nov 2000 - \$2.25/ton 1<sup>st</sup> mile + \$0.15 additional mile*
- *Feb 2002 - \$1.80/ton 1<sup>st</sup> mile + \$0.12 additional mile*
- *Oct 2002 - \$1.35/ton 1<sup>st</sup> mile + \$0.10 additional mile*
- *Oct 2005 - \$0.90/ton 1<sup>st</sup> mile + \$0.08 additional mile*
- *July 2006 - \$0.45/ton 1<sup>st</sup> mile + \$0.04 additional mile*



# Dairy Manure Export Support

## *Results*

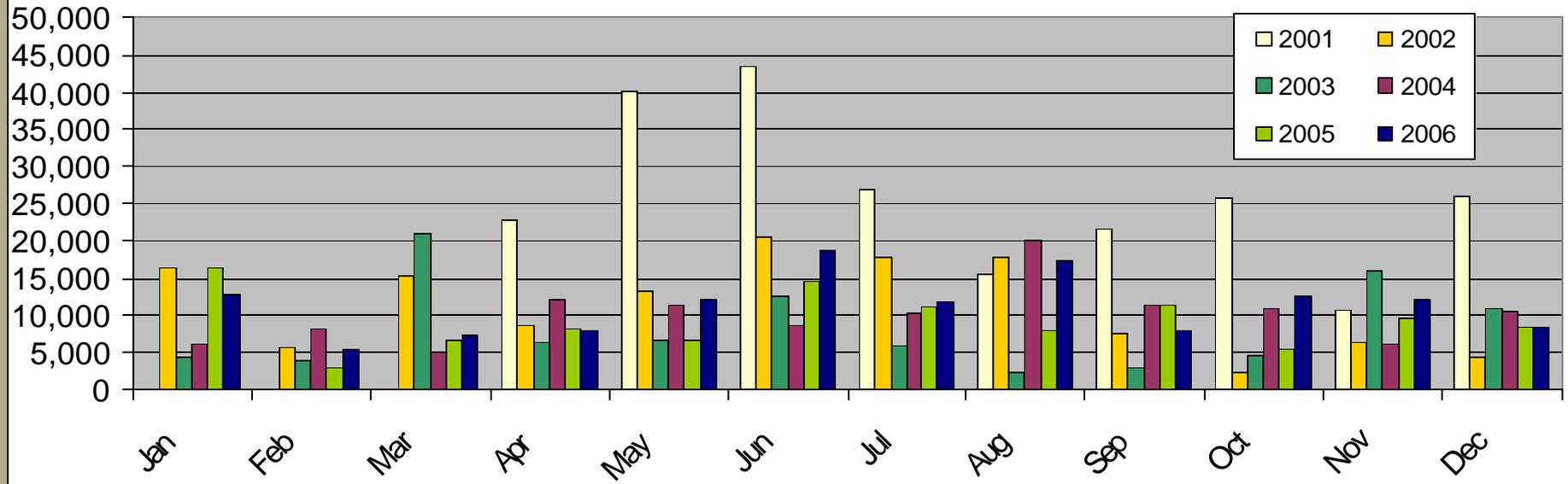
*Nov 2000 to Dec 2006*

- ◆ Over **1 million tons** of dairy manure have been hauled to compost sites by DMES
  - ◆ Over **390,000 tons** hauled from dairies in Leon River Watershed
  - ◆ Over **675,000 tons** hauled from dairies in N Bosque River Watershed
- ◆ Currently, **56 haulers** have participated in the DMES Program
- ◆ Over **\$3 million** paid to participating haulers



# DMES Results

Manure Hauled by Month (Tons)  
April 1, 2001 - December 31, 2006



# DMES

## Plan A vs Plan B

### ? Plan A

- ? No local oversight
- ? Measured/paid in cubic yards
- ? Limited project participation policies

### ? Plan B

- ? Administered locally by imanage, LLC
- ? Measured in tons (certified scale tickets required)
- ? Strict participation policies developed and written agreements established (legal counsel)



# Composted Manure Incentive Project

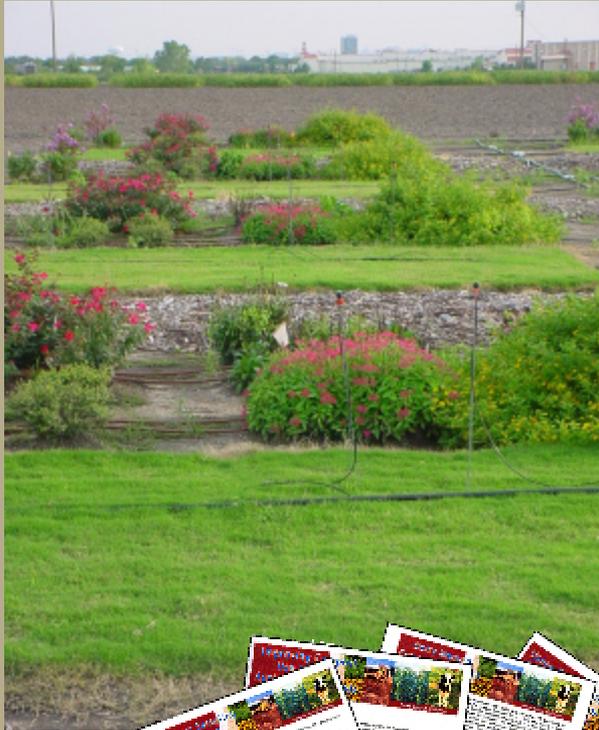


- ◆ TCEQ incentive program
- ◆ Reimburse compost costs for public entities (ie. Texas DOT) to *stimulate creation of a sustainable market for manure-derived compost*
- ◆ Goals of Project:
  - ◆ Provide quality assurance / technical assistance to composters
  - ◆ Provide education of compost use to public
  - ◆ Document / measure environmental outcomes in Watersheds
  - ◆ Remove 250,000 tons of manure from watersheds in form of compost



# CMIP

## Demonstration & Education



### ◆ Demonstrations

- 1) County Demos
- 2) Newly constructed landscapes
- 3) Turfgrass varieties
- 4) Forages and rowcrops
- 5) Roadside applications (TxDOT)

### ◆ Education and Outreach

- 1) Fact Sheets
- 2) Compost Production
- 3) Compost Quality Assessment



# Composted Manure Incentive Project

*N. Bosque Watershed Results  
Sept 2000 to Aug 2006*



- ◆ Over **368,000 CY** dairy manure compost have been sold from the Bosque Watershed
- ◆ Over **329,000 CY** have been exported out of the Bosque Watershed
- ◆ Removed over **1.4 million lbs of P** from the Bosque Watershed

*note: 1 ton dairy manure yields ~ 1 CY compost*



# Composted Manure Incentive Project

*Combined Watershed Results  
Sept 2000 to Aug 2006*



- ◆ Over **575,000 CY** dairy manure compost have been sold from both watersheds
- ◆ Over **468,000 CY** have been exported from both watersheds – *almost twice the project goal*
- ◆ Approximately **\$255,000** has been paid to compost purchasers (51,000 CY compost)



# DMES

## *Lessons Learned*



- ◆ Project coordination
- ◆ Political and legal problems
- ◆ Two pronged project missing a prong...  
markets, markets,  
markets

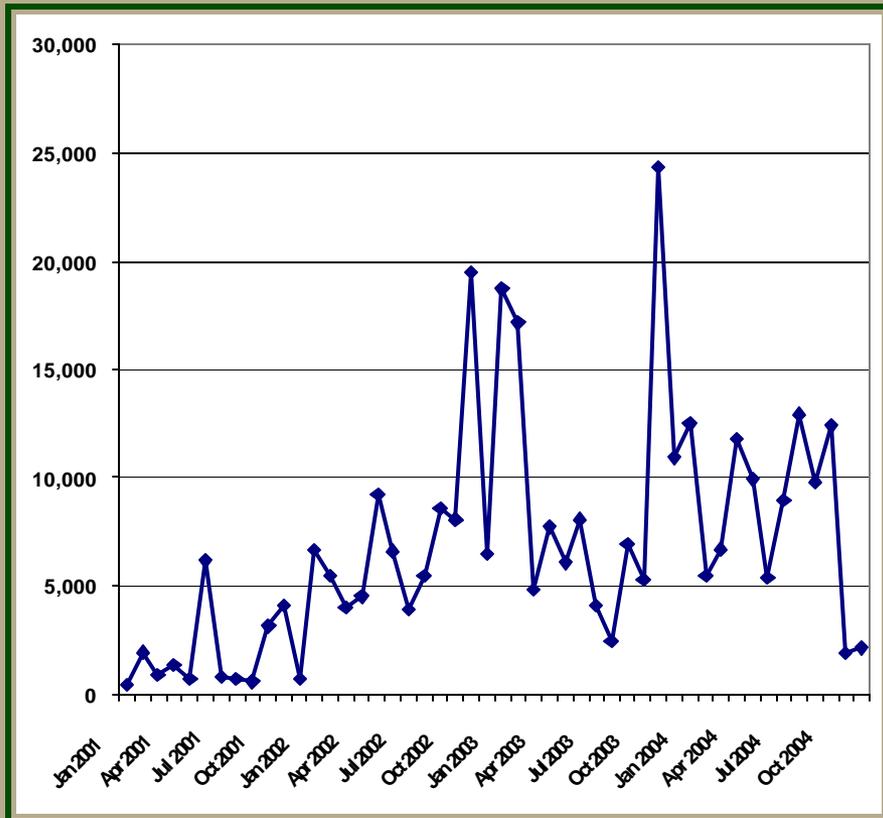


# CMIP *Lessons Learned*

- ◆ Long lead times on TxDOT compost purchases (> 1 yr on average)
- ◆ New, inexperienced compost producers
- ◆ Unrestricted hauling of manure led to compost site crowding, manure backlogs
- ◆ Public use of compost primarily involves landscape contracts rather than direct purchases



# Demonstration and Education *Lessons Learned*



- ◆ Low quality product
- ◆ Inconsistent product
- ◆ Inorganic contaminants
- ◆ Lacked sound quality data
- ◆ Transportation of product
- ◆ Competition with other organic markets
- ◆ Behavior change



# Project Benefits



- ◆ Inter-agency & inter-industry relationships
- ◆ Reduced litigation
- ◆ Warm fuzzies for politicians
- ◆ Multiple pieces of the puzzle
- ◆ Environmental & water quality protection (reduction in potential P loading)



# Other TMDL Activities

- ◆ TSSWCB completed guidance for dairies to complete a CNMP - **26 CNMPs certified of the 86 CNMPS submitted** (Dec 2006)
- ◆ TCEQ and BRA constructed an anaerobic digester on a dairy to generate electricity
- ◆ TSSWCB and TWRI evaluating new technologies to reduce P from dairy waste – **4 technologies evaluated**
- ◆ A statewide BST program on Lake Waco (EPA, BRA, City of Waco, Farm Bureau, Parsons, TSSWCB)
- ◆ Continuous water quality monitoring since June 2001



# Water Quality Improvements

- ◆ Positive correlation between water quality and participation in the composting program
  - ◆ TIAER microwatershed monitoring
  - ◆ 3 sites
  - ◆ 16-25% decrease in SRP (through Dec 2005)
  - ◆ Dairies in the 3 microwatersheds had relatively high levels of manure removal per cow and per unit of land area

Report: *Assessment of Preexisting and Post-Implementation Effects for the North Bosque River Watershed*



# In Summary

- ◆ Market development = Time
- ◆ Success = Sustainability
- ◆ Change is SCARY
- ◆ Litigation is SCARIER
- ◆ Political considerations



# In Summary

- ◆ Find your target
  - ◆ Those who stand to gain the most
- ◆ Be flexible
- ◆ Don't lose sight of goal
- ◆ Work on those relationships
  - ◆ Agencies
  - ◆ Stakeholders

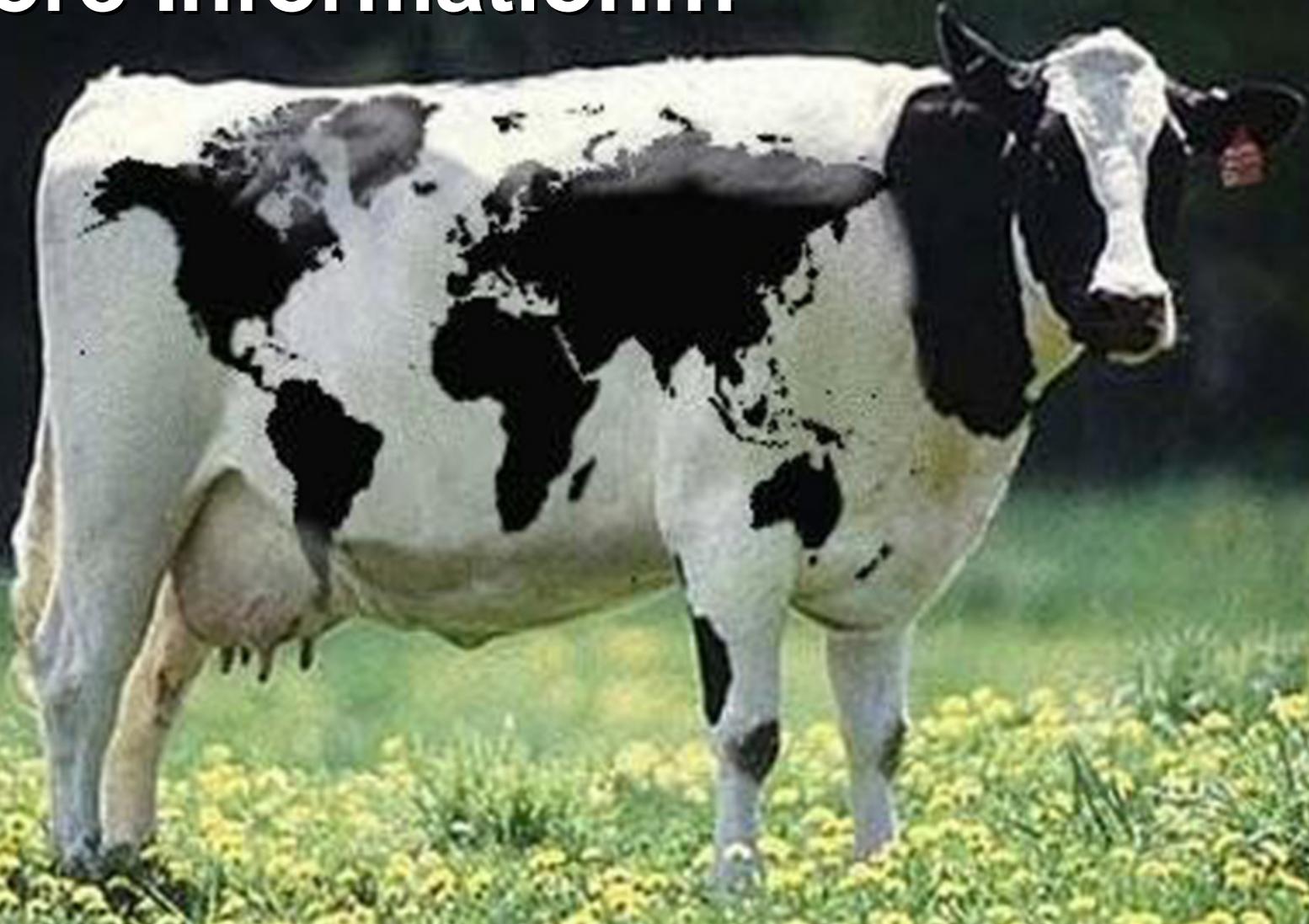


# Other Pearls of Wisdom

- ◆ When it involves poop or free money, the weirdos will come crawling out of the woodwork
- ◆ If there is a way to cheat, they will find it
- ◆ The good news is they're mostly not very smart



**More Information...**



**<http://compost.tamu.edu>**