



Texas Alliance for Water Conservation

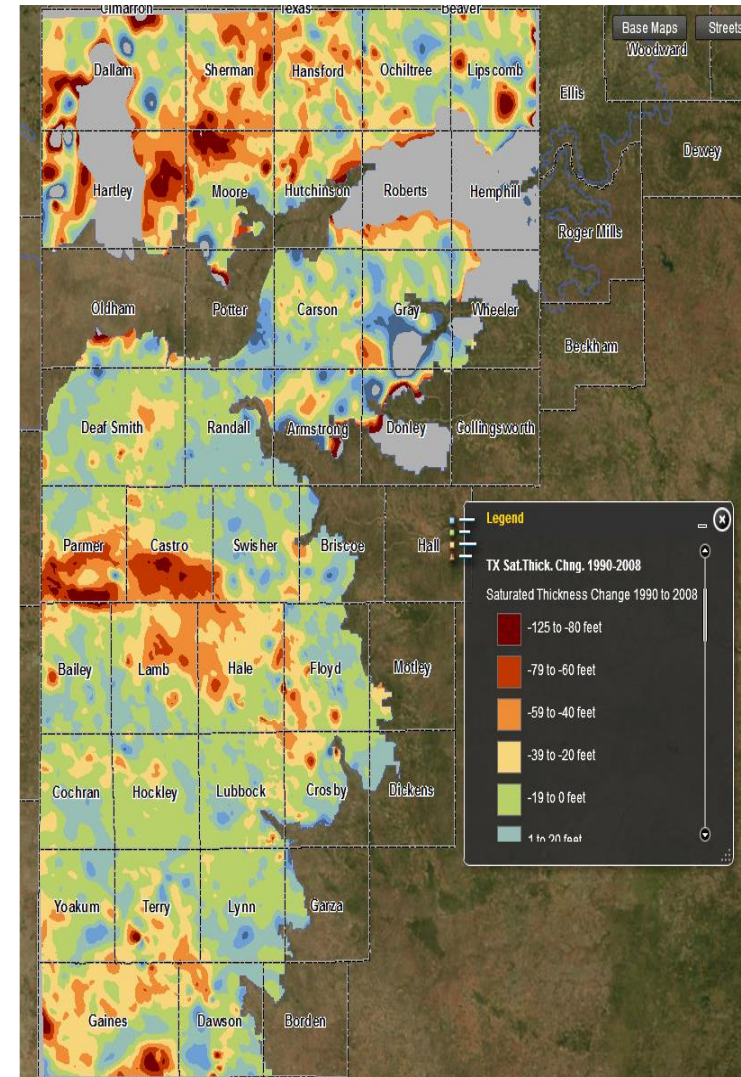
Rick Kellison, Project Director



TEXAS TECH UNIVERSITY

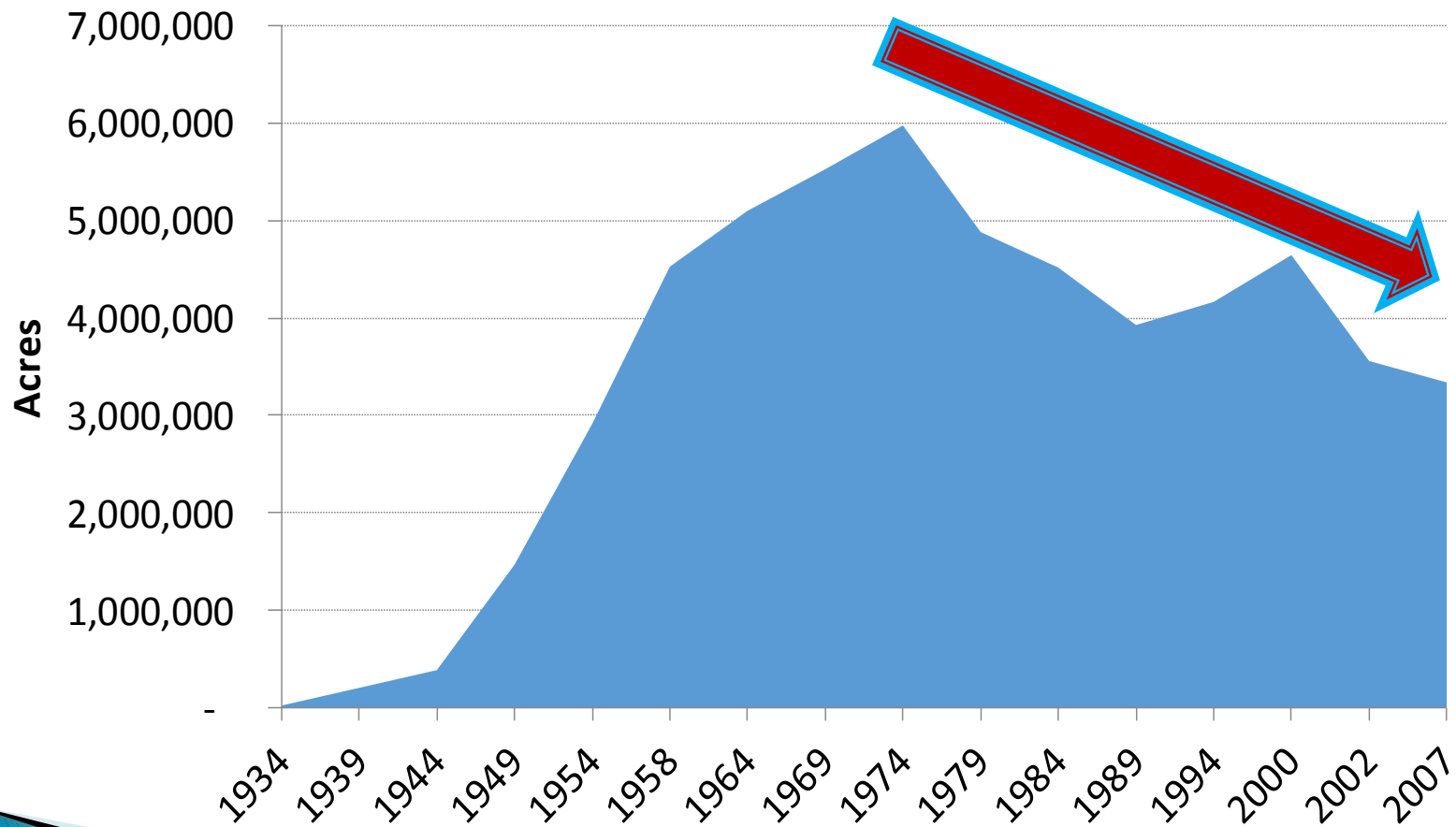
College of Agricultural Sciences
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Declining Water Resources



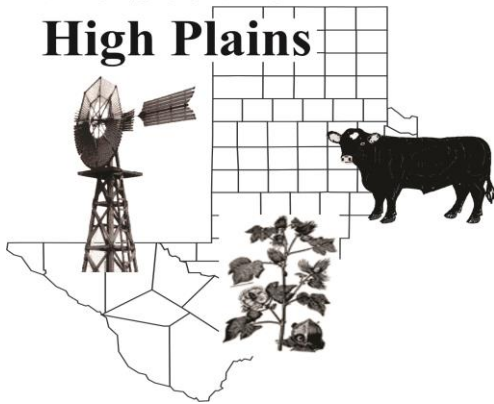
Texas High Plains Irrigation

(Ag Census) – all crops



A Cooperative Venture with the Texas Water Development Board

**Producers Across
the Southern
High Plains**



TEXAS TECH UNIVERSITY
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High Plains
Underground Water
Conservation District



TEXAS A&M
AGRI LIFE
EXTENSION

TEXAS A&M
AGRI LIFE
RESEARCH

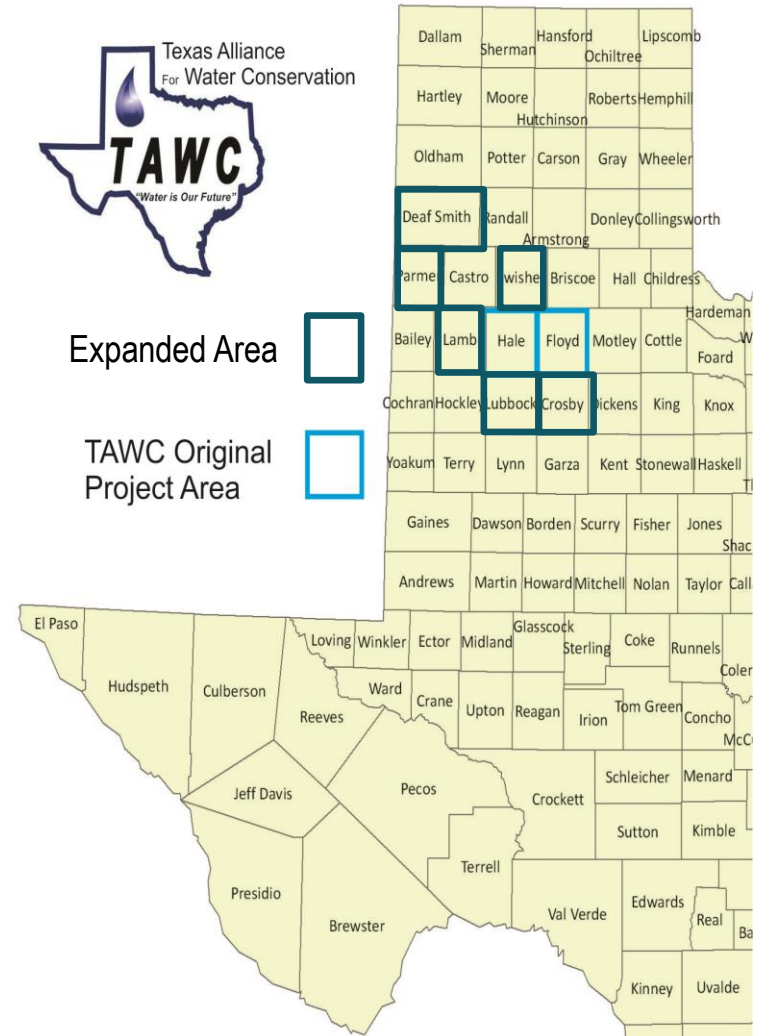
Texas Alliance for Water Conservation



Expanded Area



TAWC Original
Project Area



Primary Objectives of Project



- Demonstrate how to reduce total water use
- Demonstrate how to enhance profitability
- Identify effective crop and irrigation systems
- Impact producer decision-making



Crops / Livestock (~Total 5,000 acres)



Cotton
Monocultures



Corn
Cotton



Grain Sorghum
Cotton



Cotton-Cattle



Grass-cattle



Specialty Crops

Irrigation Methods



Sprinkler



Furrow



Sub-surface drip



Dryland

Site Monitoring



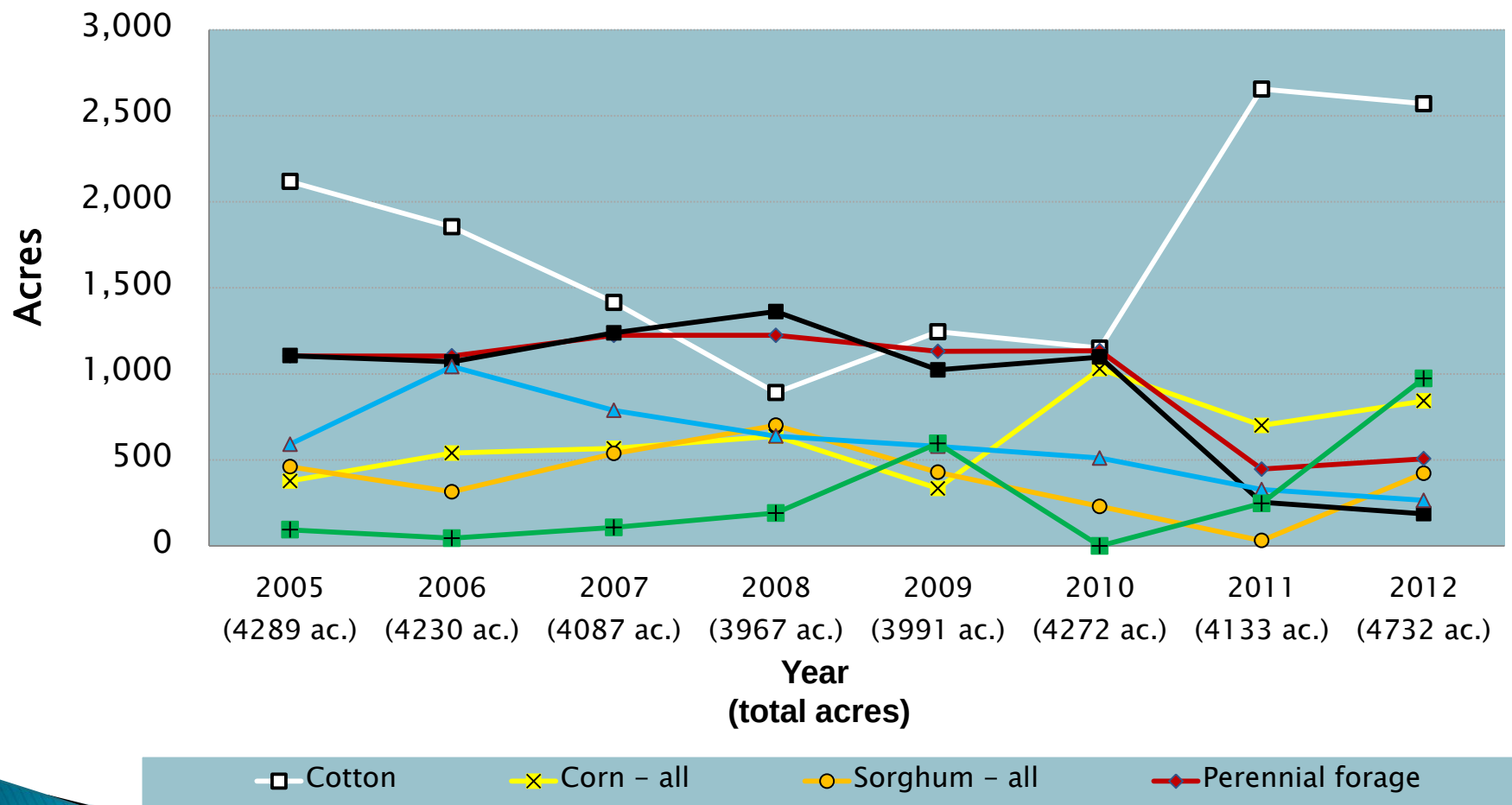
- Rainfall
- Temperature
- Water applied
 - Netirrigate*
 - PivoTrac*
- Soil moisture
 - AquaSpy*
 - Crop Sense*
 - Aqua Check*
- Production inputs
- Plant & animal yields
- Economic analysis



Photo by:
Neal Hinkle
Texas Tech University

Crops / Forages / Livestock Grown

TAWC Sites 2005–2012



Field Walks

2013



Field 1
82.8 Acres

Field 2
54.1 Acres

Field 3
92.3 Acres

35

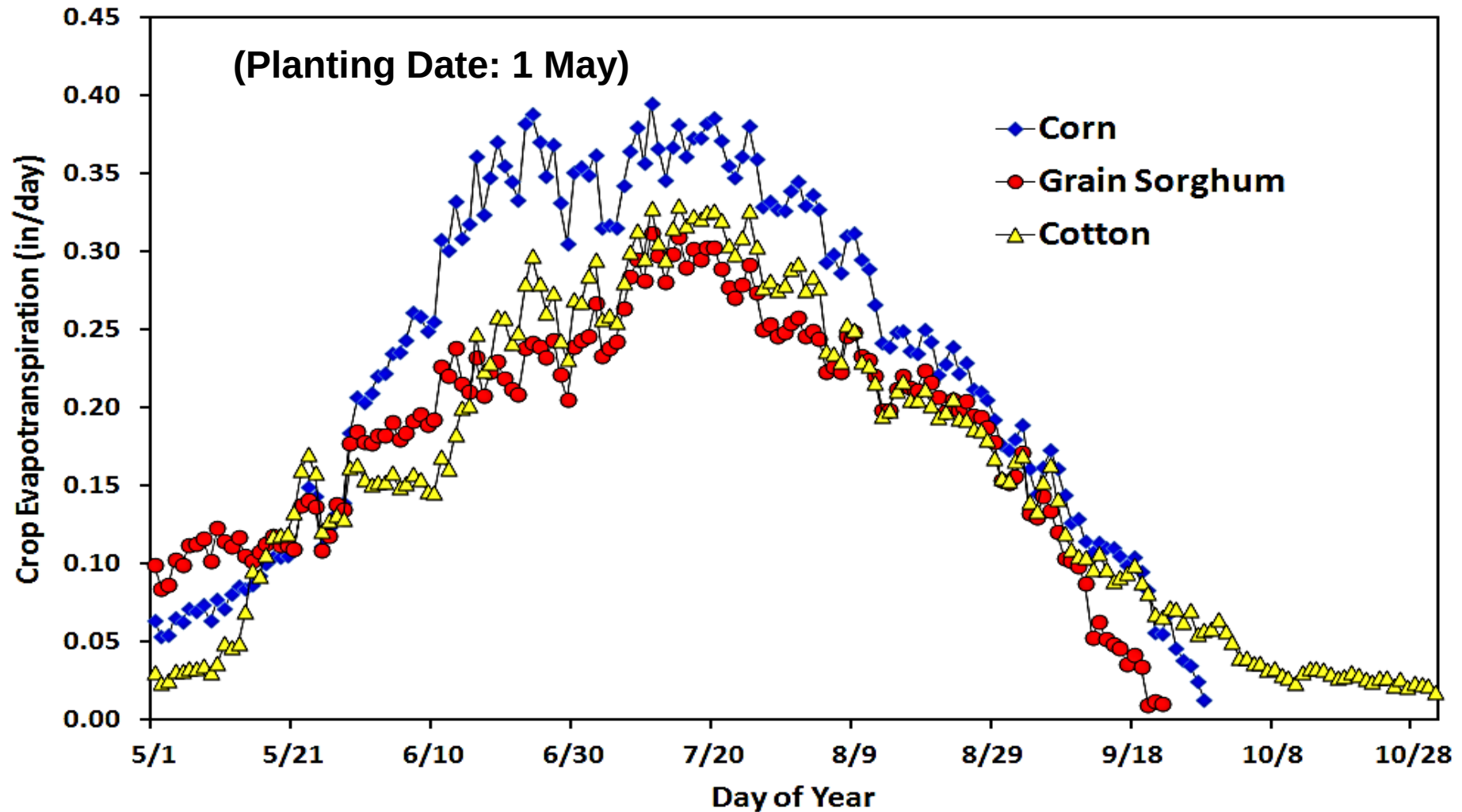
Grain Sorghum

Corn

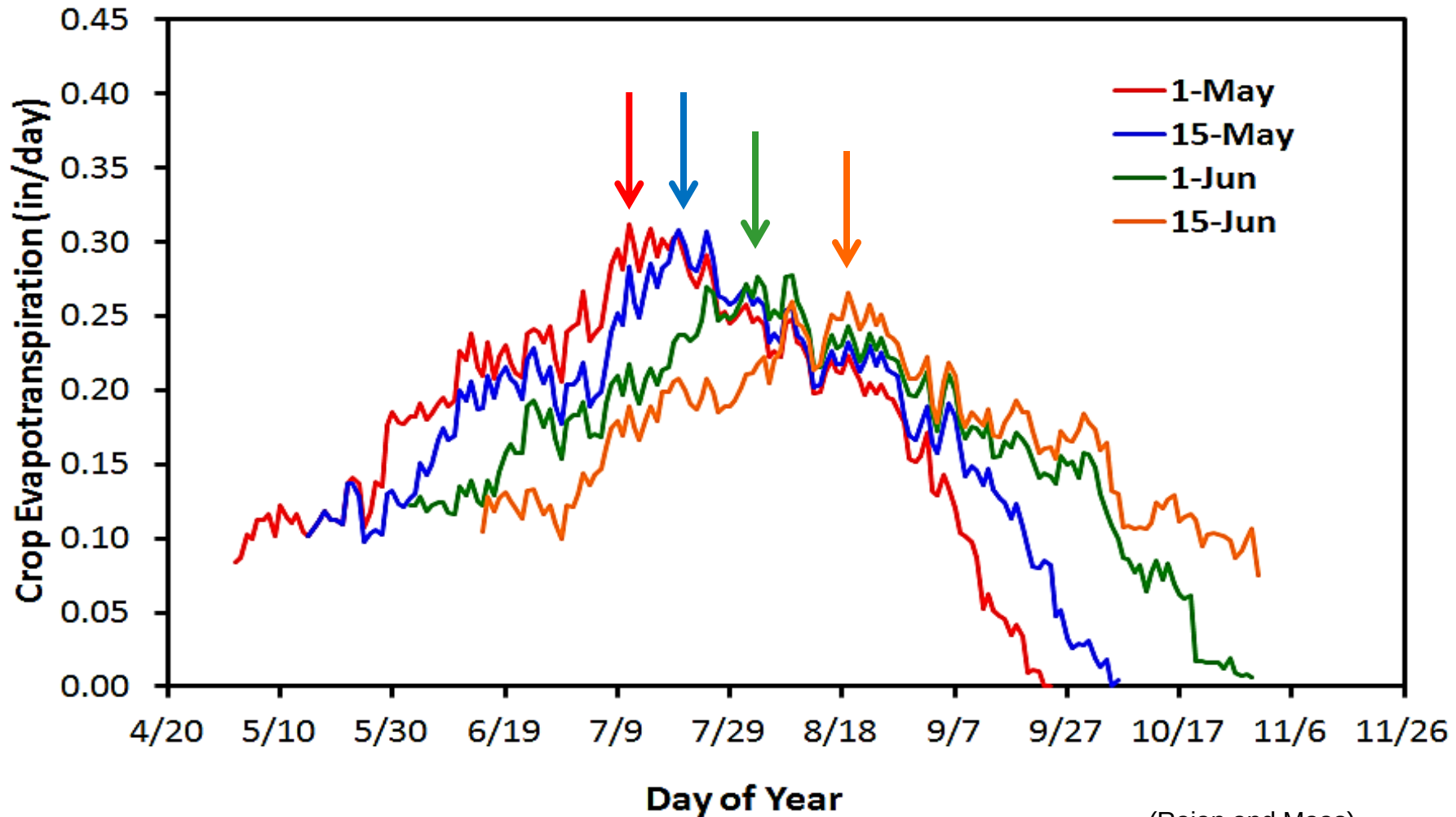
Cotton



Crop Evapotranspiration Long-term Average (1997–2011)



Sorghum Evapotranspiration Long-term Average (1997-2011)

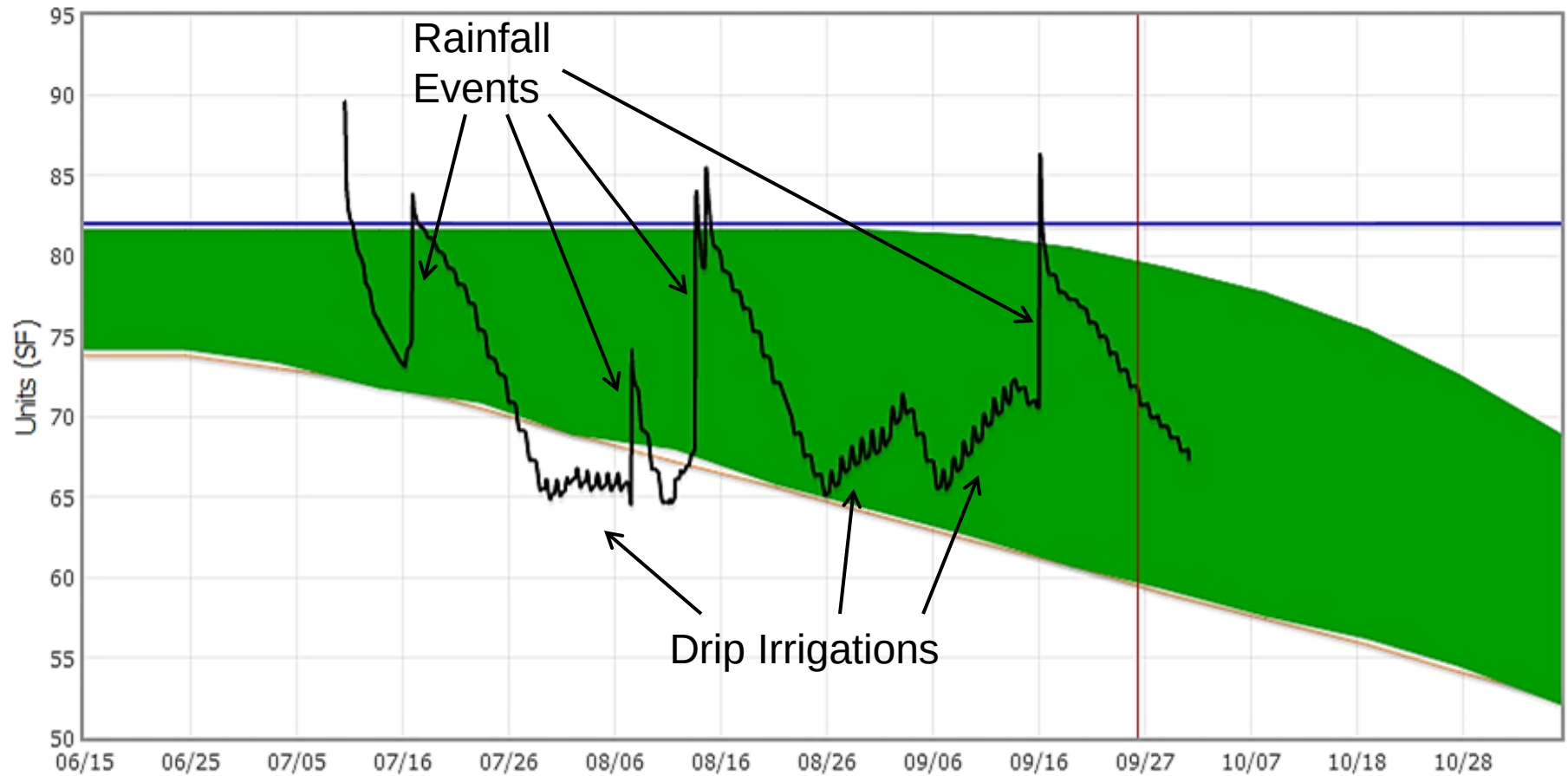


(Rajan and Maas)

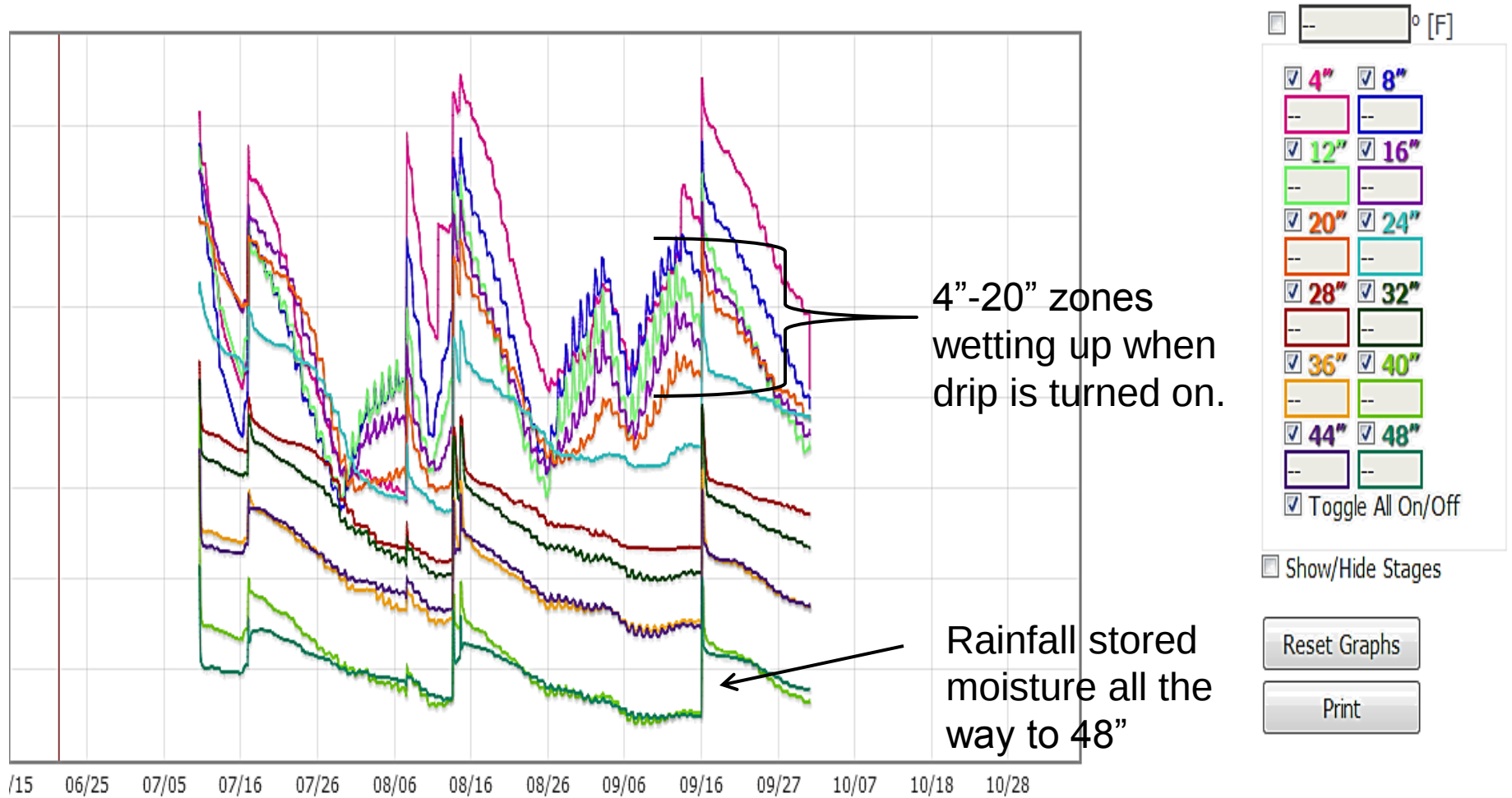
Summary Graph

Thu Sep 26 2013 07:45 AM (Central Standard Time)

Data Last Received: Tue Oct 01 2013 10:54 AM (Central Standard Time)

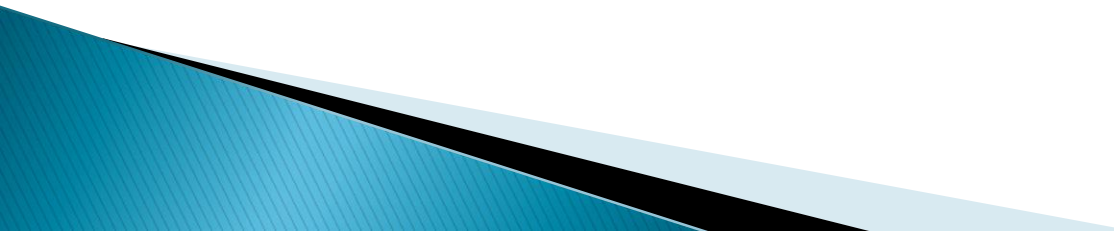


Sensor Graph



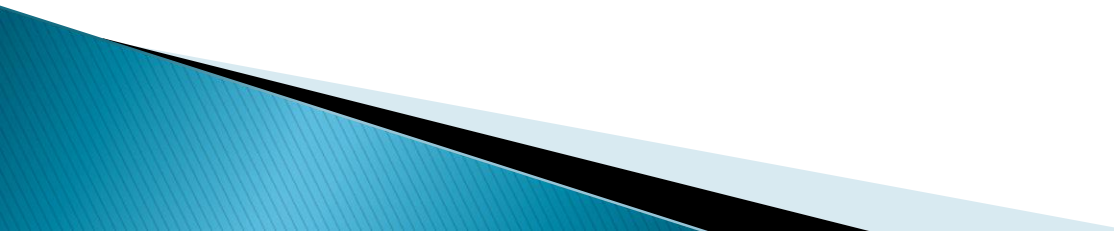
Eddie Teeter

Drip – Grain Grain Sorghum

- Pioneer 86G32
 - 82.8 acres produced 8816 pounds/acre
 - Total water supply = 9.3 inches irrigation and 13.4 inches rain = 22.7 inches
 - Water use efficiency = 411 lbs/acre-inch
- 

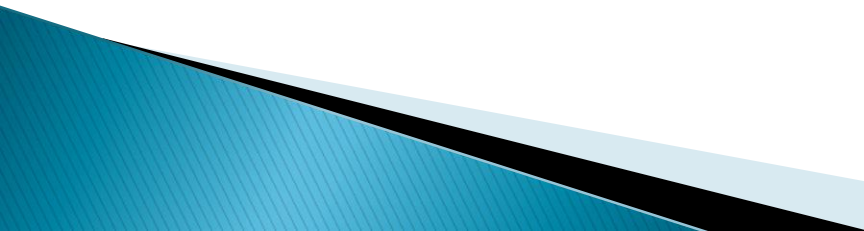
Eddie Teeter

Drip – Corn

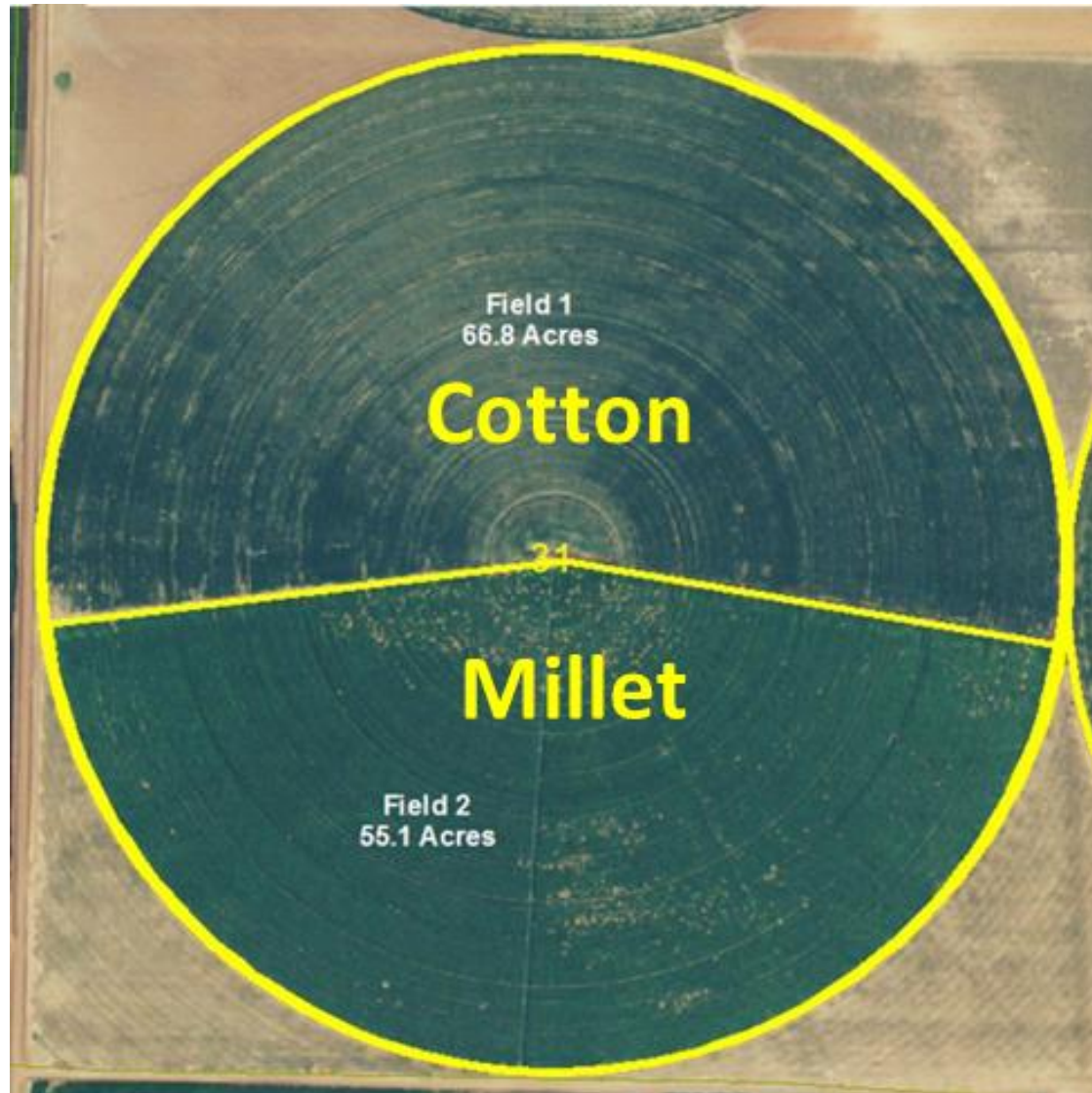
- Pioneer Aqua Max Yellow Hybrid
 - 54.1 acres produced 818,240 pounds
grain = 240.5 bushels/acre
 - Total water supply = 16.9 inches irrigation and
13.0 inches rain = 32.9 inches
 - Water use efficiency = 7.32 bushels/acre-inch
- 

Eddie Teeter

Drip – Cotton

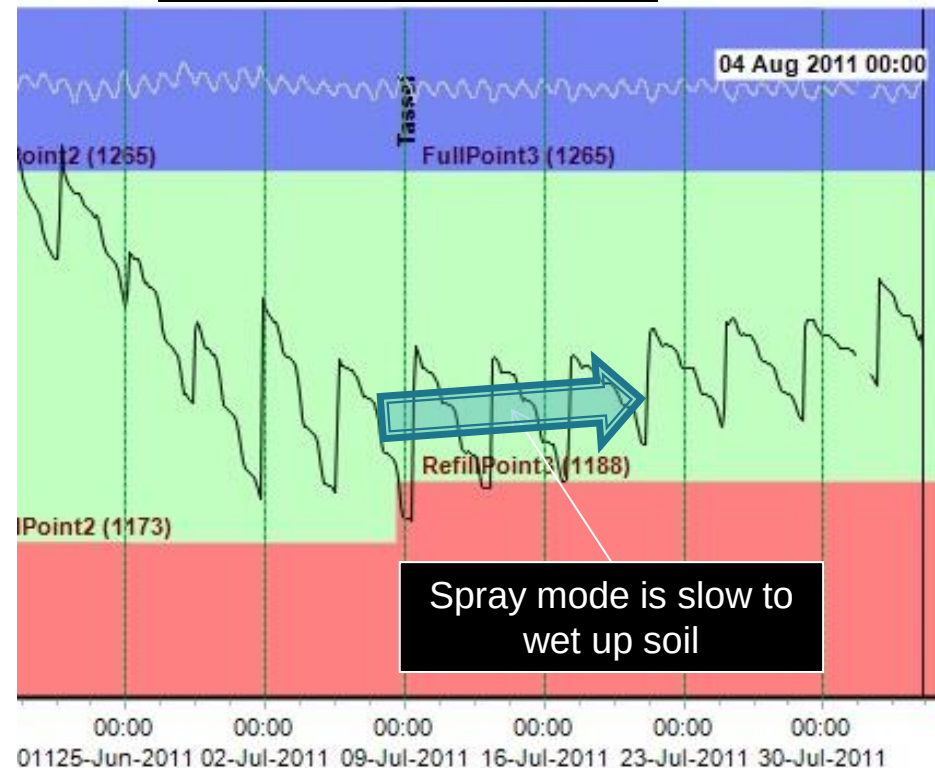
- FM 2484 B2F
 - 92.3 acres produced 1 891 pounds/acre
 - Total water supply = 11 inches irrigation and 13.9 inches rain = 24.9 inches
 - Water use efficiency = 75.9 lbs/acre-inch
- 

Water Management LEPA vs LESA

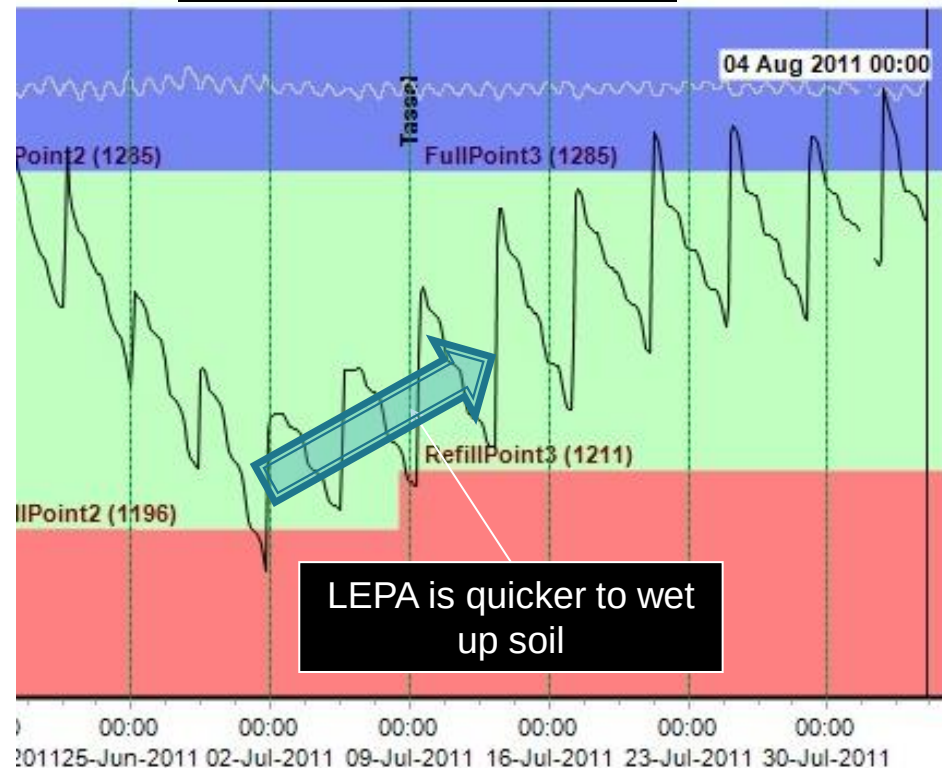


Comparison of Irrigation Method

Spray Mode



LEPA Mode



LEPA vs LESA



Spray



LEPA

LEPA vs LESA Budget Comparison

2011

	2011			
	LEPA		LESA	
PER ACRE GROSS INCOME	Quantity	Total	Quantity	Total
Cotton lint	1001	\$ 900.90	879	\$ 791.10
Cotton seed	0.72	\$ 245.39	0.63	\$ 215.48
PER ACRE TOTAL GROSS INCOME		\$ 1,146.29		\$ 1,006.58
PER ACRE TOTAL OF ALL COST		\$ 968.89		\$ 945.93
PER ACRE NET PROJECTED RETURNS		\$ 177.40		\$ 60.65
Percent Increase		193%		
WATER APPLIED - INCHES		26.1		
Lint lbs per acre-in of water applied		38.4		33.7
Percent Increase		13.9%		

LEPA vs LESA Budget Comparison

2012

	2012			
	LEPA		LESA	
PER ACRE GROSS INCOME	Quantity	Total	Quantity	Total
Cotton lint	1057	\$ 951.30	896	\$ 806.40
Cotton seed	0.76	\$ 213.39	0.65	\$ 180.88
PER ACRE TOTAL GROSS INCOME		\$ 1,164.69		\$ 987.28
PER ACRE TOTAL OF ALL COST		\$ 980.33		\$ 950.04
PER ACRE NET PROJECTED RETURNS		\$ 184.35		\$ 37.25
Percent Increase		395%		
WATER APPLIED - INCHES		19		
Lint lbs per acre-in of water applied		55.6		47.2
Percent Increase		18.0%		

LEPA vs LESA Budget Comparison

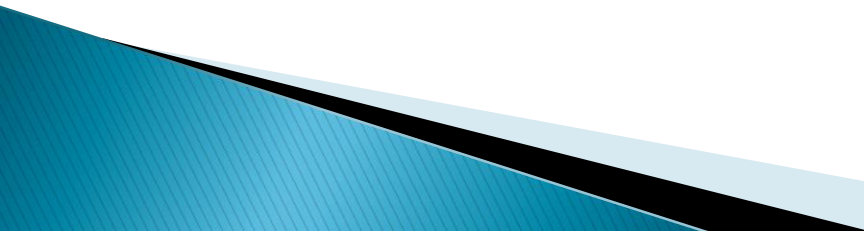
2013

	2013			
	LEPA		LESA	
PER ACRE GROSS INCOME	Quantity	Total	Quantity	Total
Cotton lint	1165	\$ 873.75	1028	\$ 771.00
Cotton seed	0.84	\$ 235.19	0.74	\$ 207.53
PER ACRE TOTAL GROSS INCOME		\$ 1,108.94		\$ 978.53
PER ACRE TOTAL OF ALL COST		\$ 924.94		\$ 906.33
PER ACRE NET PROJECTED RETURNS		\$ 184.00		\$ 72.20
Percent Increase		155%		
WATER APPLIED - INCHES		16.5		
Lint lbs per acre-in of water applied		70.6		62.3
Percent Increase		13.3%		

Solution Aids



“Water is Our Future”





TAWC-Solutions

Resource Allocation Analyzer



TAWC-Solutions

Resource Allocation Analyzer

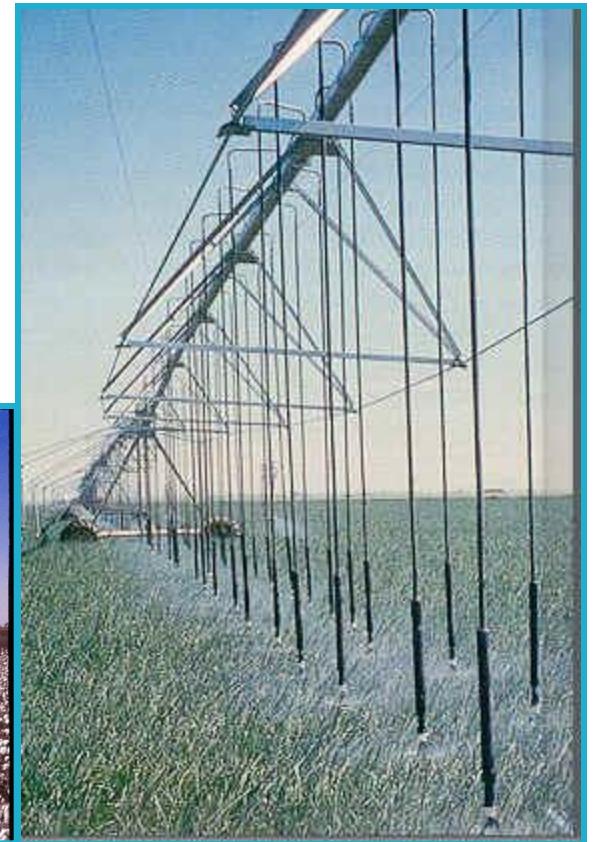
- To be used as a planning aid
- Captures changes in commodity price, water availability, and production costs
- Generates several options which maximize net returns/acre

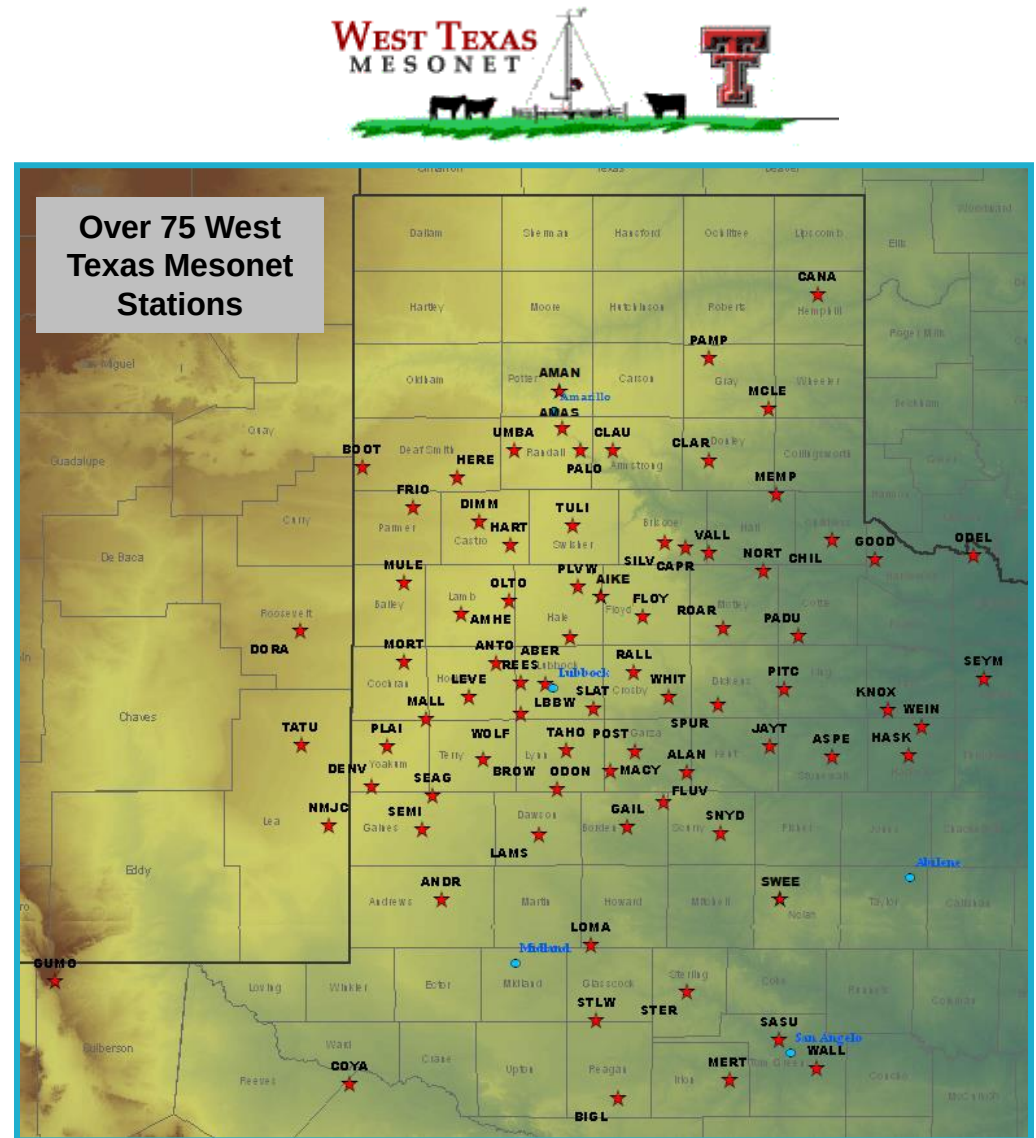


Irrigation Scheduler

The procedure used to determine:

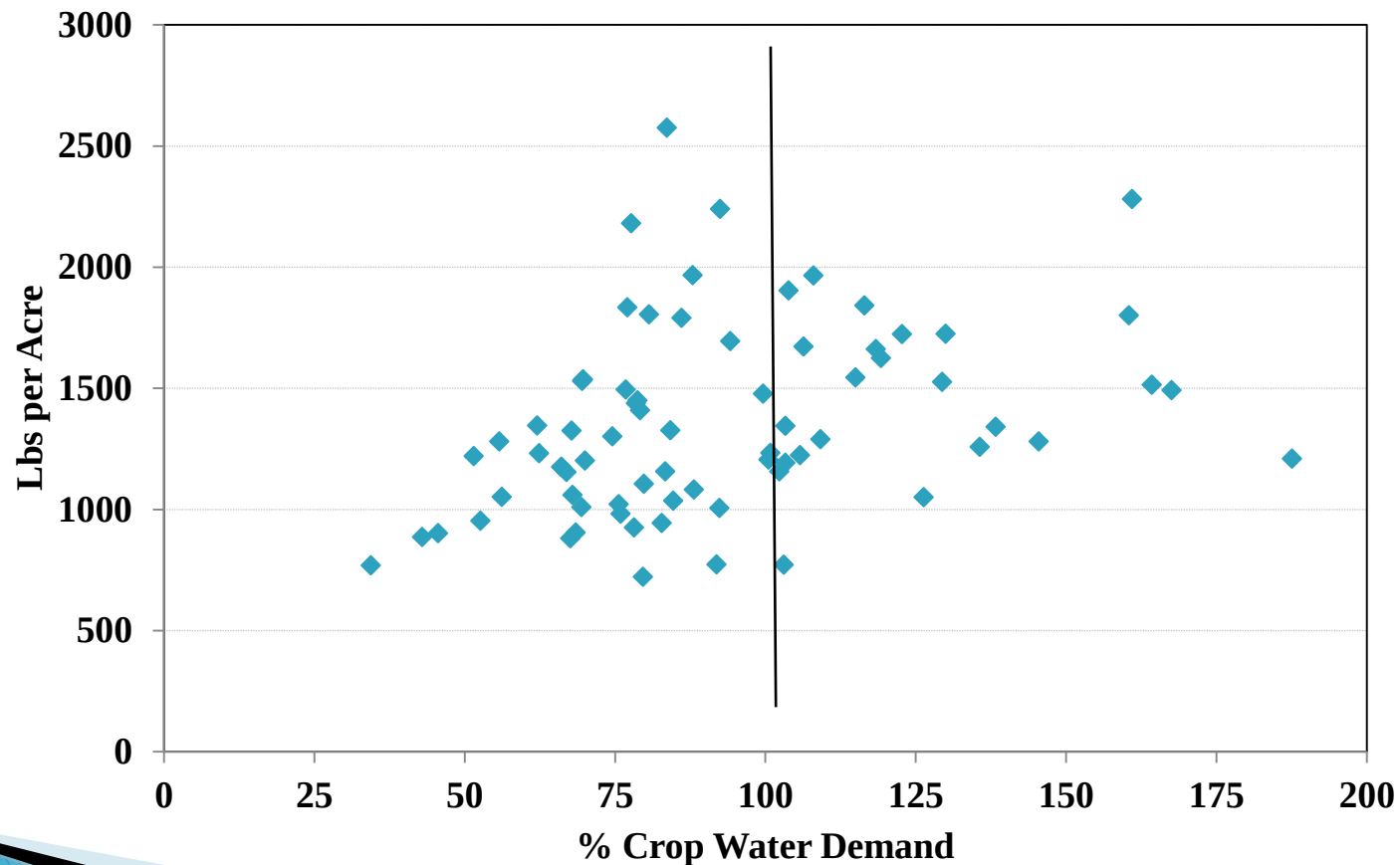
- When to apply
- How much water to apply
- Specific Management Goals





Relationship between Cotton Yield and Percent Water Demand

Project Sites 2006–2010



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New Crop Water Balance Track

Site:

Gomez-1 ▼

Select the site where this crop is located.

Crop Type:

NHP-Corn ▼

Select the type of crop and crop coefficients. Currently only Northern High Plains(NHP) coefficients are supported.

Select Planting Date:

Feb ▼ 21 ▼ 2011 ▼

Weather Station:

Abernathy ▼

Select the nearest or preferred weather station.

Crop Acreage: *

120

Total acreage for this crop, not necessarily the irrigated area.

Starting Moisture[in]: *

0

The initial estimate for moisture in the soil at planting time.

Initial Effective Rain[%]: *

100

This is the initial effective rain percentage, which can be adjusted at a later date if necessary.

Initial Effective Irrigation [%]: *

100

This is the initial effective irrigation value, which can be changed at a later date.

Initial Et[%]: *

100

This is the percentage of predicted evapotranspiration to use. This can be changed at a later date as well.

Create New Crop Water Balance Track

Cancel


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Crop Summary

Site	Weather Station	Acreage	Type	Last Et	Moisture Balance	Growth Stage	Total Irrigation	Total Rain
Old Mill-1	Abernathy	120	Cotton	0.01	0.69	Strip	0.00	12.21

Daily Measurements

Date	Effective Irrigation	Effective Rain	Percent Et	Irrigation	Rain	Daily Et	Moisture Balance	Growth Days	Growth Stage
0 2010-05-11	0.90	0.75	0.60	0.00	0.00	0	3	0	Planting Day
1 2010-05-12	0.90	0.75	0.60	0.00	0.00	0.01	2.99	1	-----
2 2010-05-13	0.90	0.75	0.60	0.00	0.00	0.01	2.98	2	-----
3 2010-05-14	0.90	0.75	0.60	0.00	1.03	0	3.75	3	-----
4 2010-05-15	0.90	0.75	0.60	0.00	0.01	0	3.76	4	-----
5 2010-05-16	0.90	0.75	0.60	0.00	0.00	0.01	3.75	5	-----
6 2010-05-17	0.90	0.75	0.60	0.00	0.54	0.01	4.15	6	-----
7 2010-05-18	0.90	0.75	0.60	0.00	0.00	0.01	4.14	7	-----
8 2010-05-19	0.90	0.75	0.60	0.00	0.00	0.01	4.13	8	-----
9 2010-05-20	0.90	0.75	0.60	0.00	0.00	0.01	4.12	9	-----
10 2010-05-21	0.90	0.75	0.60	0.00	0.00	0.01	4.11	10	Emerge
11 2010-05-22	0.90	0.75	0.60	0.00	0.00	0.02	4.09	11	-----
12 2010-05-23	0.90	0.75	0.60	0.00	0.00	0.01	4.08	12	-----
13 2010-05-24	0.90	0.75	0.60	0.00	0.03	0.02	4.08	13	-----
14 2010-05-25	0.90	0.75	0.60	0.00	0.00	0.01	4.07	14	-----
15 2010-05-26	0.90	0.75	0.60	0.00	0.08	0.02	4.11	15	-----
16 2010-05-27	0.90	0.75	0.60	0.00	0.00	0.01	4.1	16	-----
17 2010-05-28	0.90	0.75	0.60	0.00	0.00	0.02	4.08	17	-----
18 2010-05-29	0.90	0.75	0.60	0.00	0.00	0.02	4.06	18	-----
19 2010-05-30	0.90	0.75	0.60	0.00	0.00	0.02	4.04	19	-----

Water Balance Crops

[Gomez-1,Corn](#)
[Gomez-1,Cotton](#)
[Old Mill-2,Cotton](#)

Click on the above crops to view the summary and daily measurements for each.

Maximizing Water Use Efficiency

The Goal Of Production Agriculture



Thank You!



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