Edge-of-Field Montoring for Arkansas Discovery Farms

Mike Daniels and Andrew Sharpley

ARKANSAS Discovery Farms

U of A DIVISION OF AGRICULTURE RESEARCH & EXTENSION University of Arkansas System

Thank You to the ones that do the Work

Program Associates: Cory Hallmark, Larry Barry, Lee Riley and Brittany Singleton, and Amanda Free

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Some of our sponsors

Arkansas Association of Conservation Districts

What is a Discovery Farm?

- *Real Working Farms that have volunteered to help us document the effect of agriculture and conservation on water quality and quantity*

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Why we need the program

- Address Water Quality Concerns
- Quantify Nutrient and Sediment Loss so that we can:
  - Measure Progress
  - Develop Solutions

- **Involve Agricultural Producers in the Solution Process**

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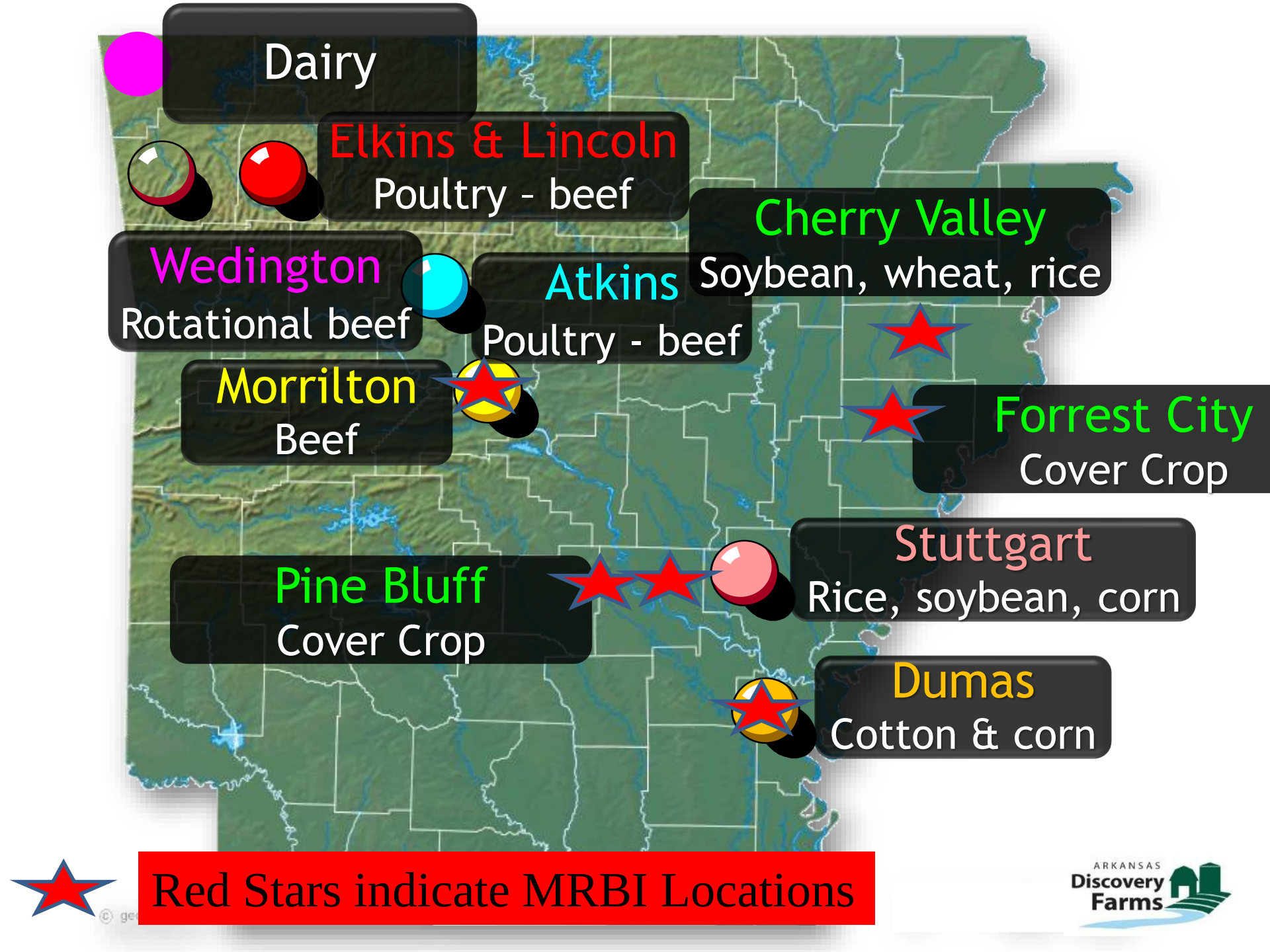

Dairy
Elkins & Lincoln
Poultry - beef
Wedington
Rotational beef
Atkins
Poultry - beef
Cherry Valley
Soybean, wheat, rice
Morrilton
Beef
Forrest City
Cover Crop
Stuttgart
Rice, soybean, corn
Pine Bluff
Cover Crop
Dumas
Cotton & corn
Red Stars indicate MRBI Locations
ARKANSAS
Discovery
Farms

Things We Monitor

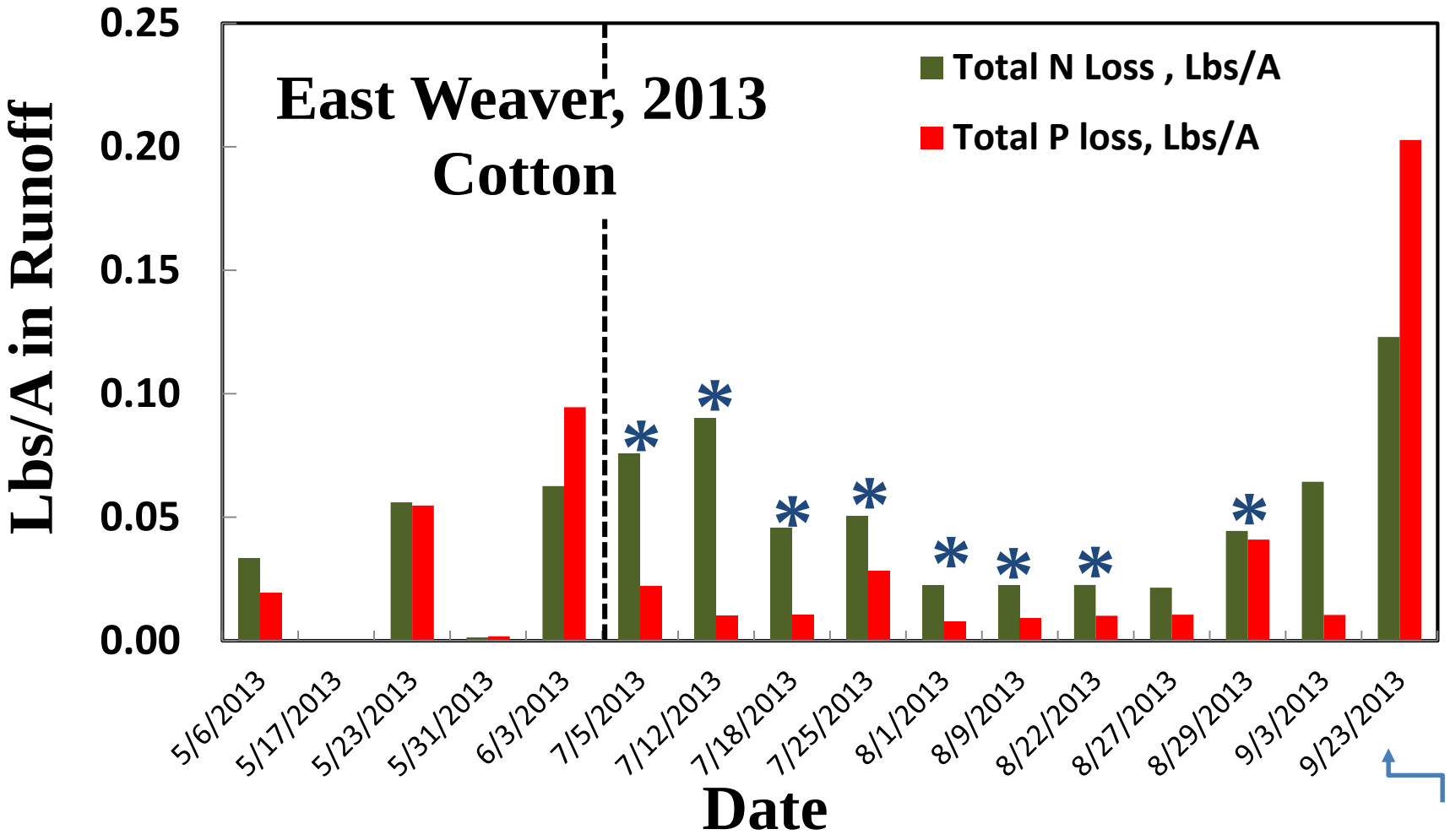
- Hydrologic Inputs – Irrigation and Precipitation
- Runoff Volume
- N, P and Suspended Solids in Runoff

Results

- The effect of hydrology and crop production on nutrient losses during the year
- The Effect of Cover Crops on sediment loss
- The Effect of Irrigation Delivery on Runoff Volume and Water Quality
- Water Quality: Rainfall vs Irrigation

2013 Nutrients loss in Runoff (16 Events)

N – 20 lbs broadcast on June 13 + 89 lbs liquid knifed in on June 17
P – 27 lbs broadcast on June 13



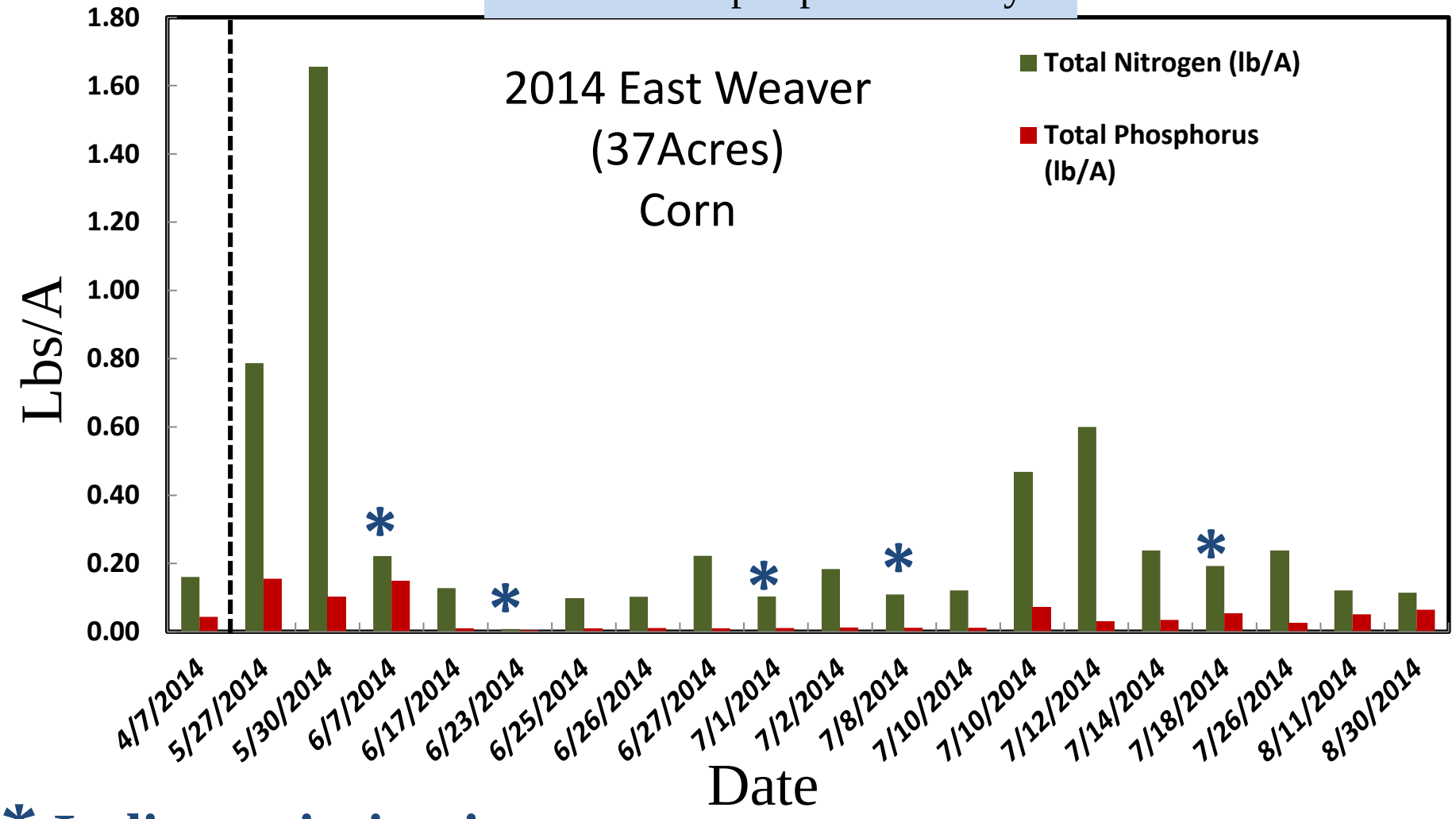
*** Indicates irrigation event**

4 inches of rain

2014 Nutrient Losses by Event (20)

N - 92 lbs as pre-plant on May 5 + 177 lbs. as liquid incorporated on May 22 on North half and 161 lbs broadcast on South Half

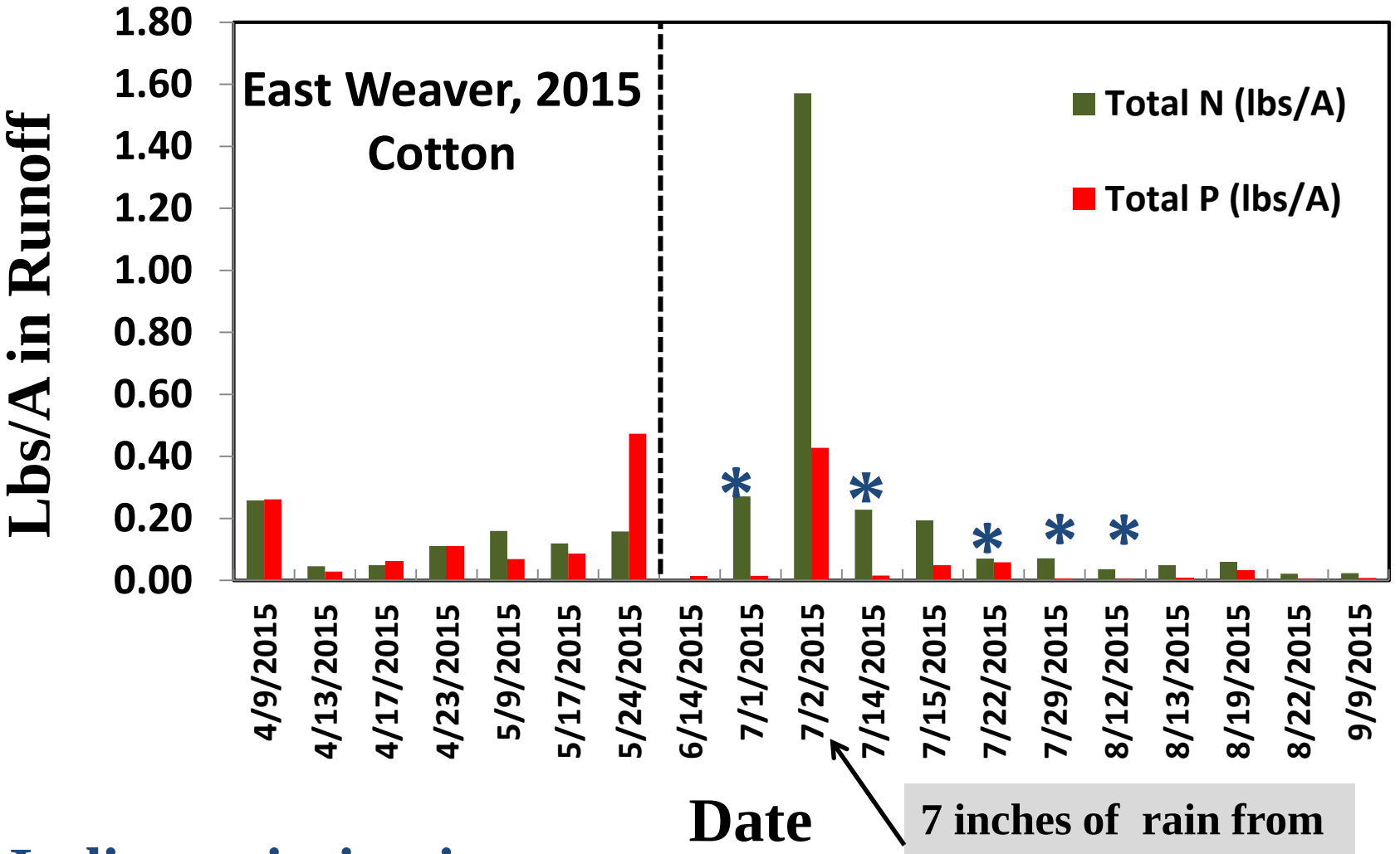
P- 48 Lbs. as pre-plant on May 5



*** Indicates irrigation event**

2015 Nutrients loss in Runoff (16 Events)

N - 22 lbs. Broadcast on June 4 + 96 lbs as liquid knifed in June 9
P – 30 Lbs. broadcast on June 4

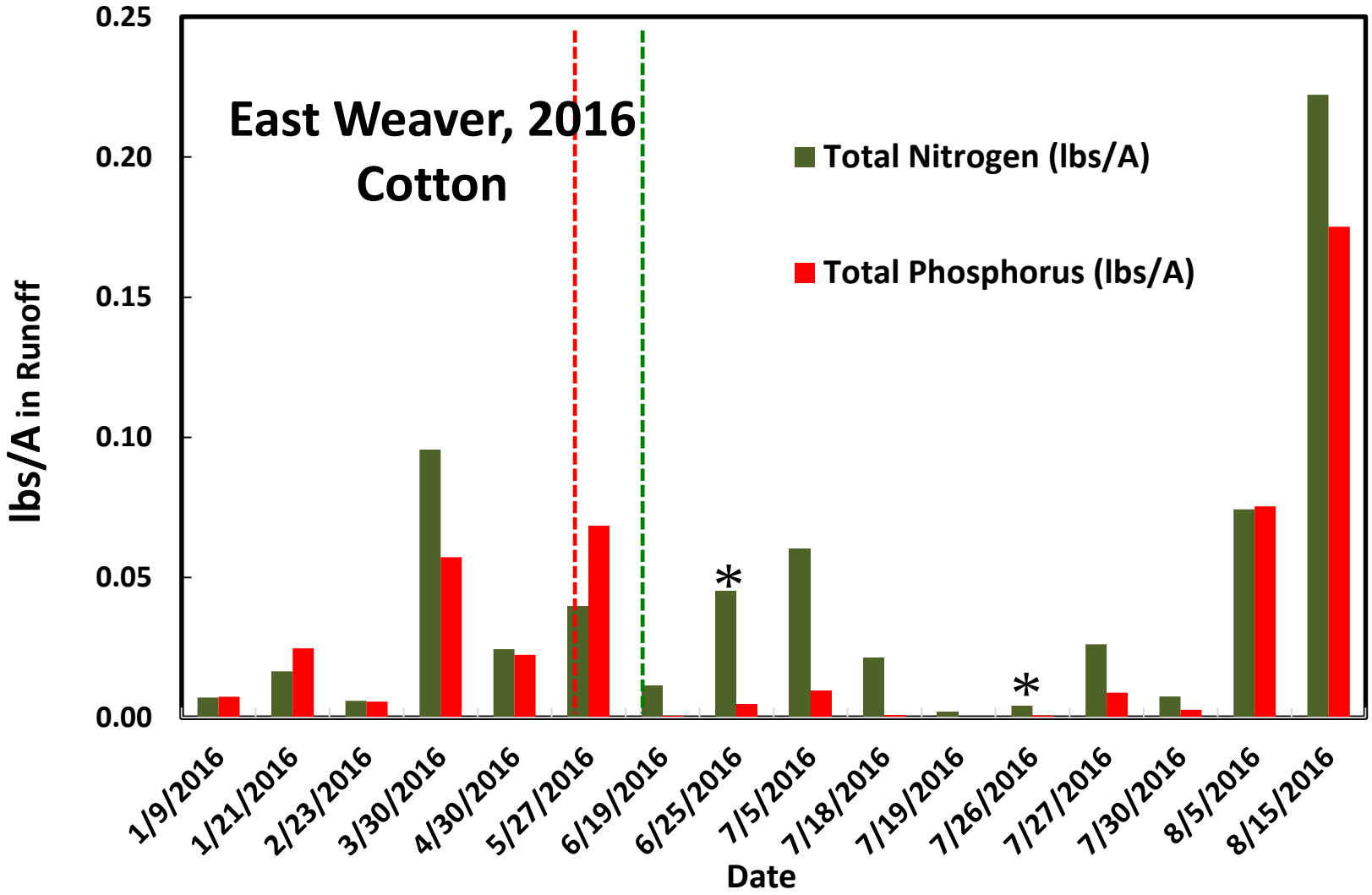


*** Indicates irrigation event**

2016 Nutrients in Runoff

N - 95 lbs liquid knifed in on June 17 ----------

P – 30 lbs broadcast on May 26 ----------



*** Indicates irrigation event**

No-Till

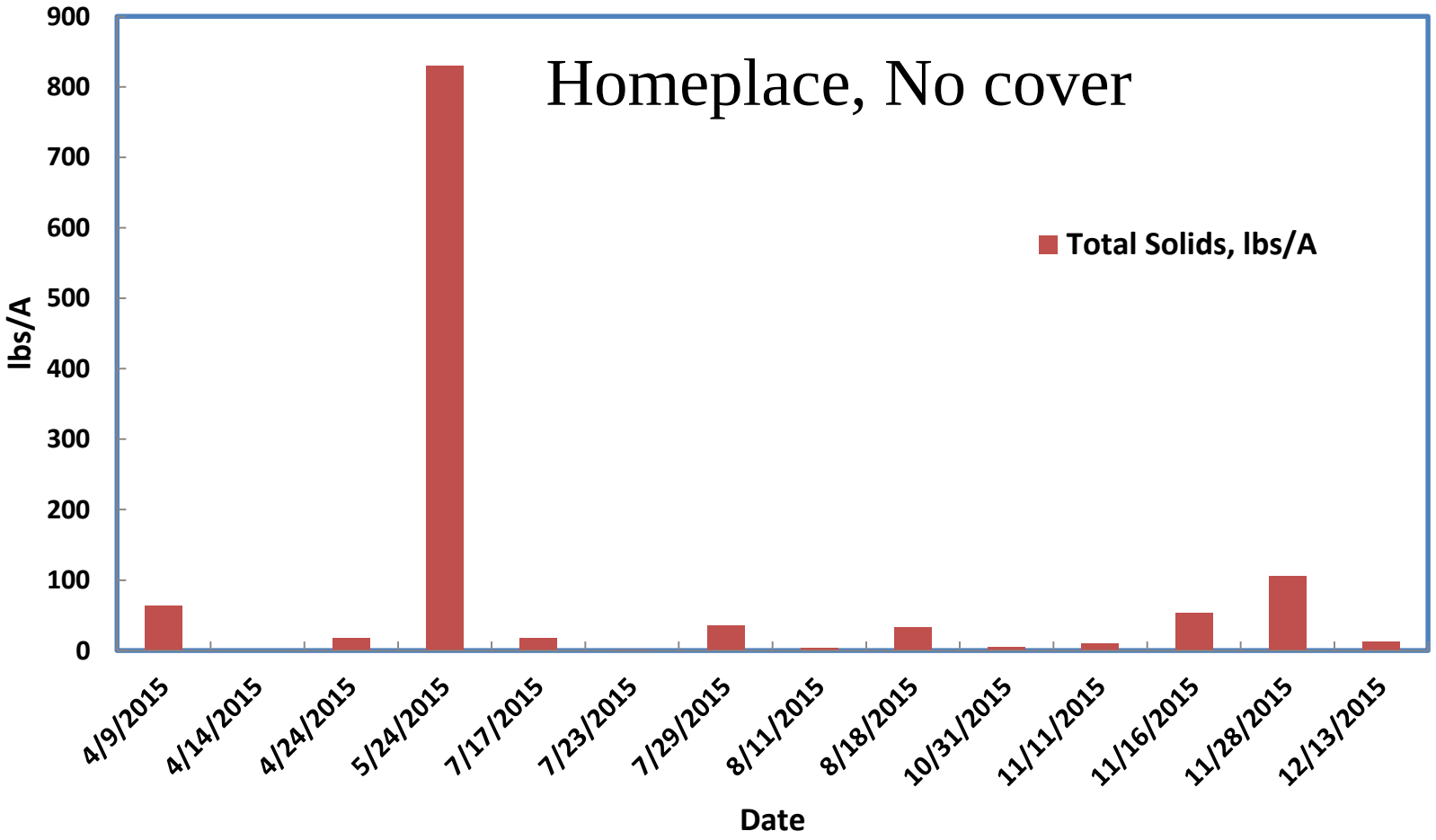
Till

Cover

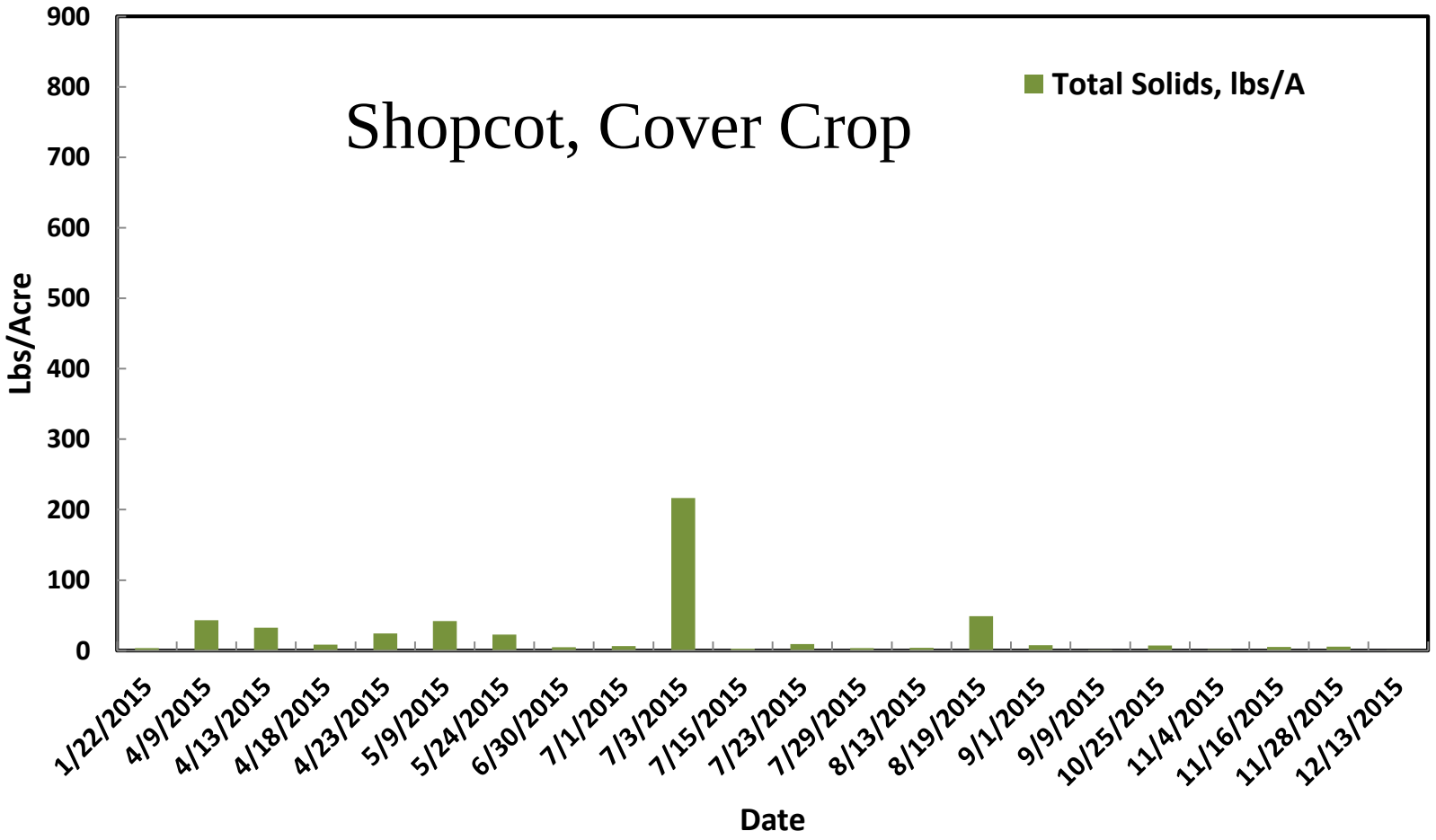
No Cover

Conservation Practice: Cover Crops

Total Suspended Solids, lbs./A



Total Suspended Solids, lbs./A



Documenting the Effects of Irrigation Water Management on water use in Cross County

- Paired Comparison for surge valve
- Field divided in half: Control and Treatment
- Irrigation flow was measured for both halves
- Runoff volume and quality for both halves


Rainfall runoff


Irrigation runoff

Comparison of Losses Between Rainfall and Irrigation in 2015 at Homeplace

Event	Runoff Volume	Total Nitrate+ Nitrite	Total Ortho Phosphate	Total N	Total P	Total Solids
	Gallons	----------Lbs./A----------				
Rainfall	150,552	2.07	0.387	3.64	1.10	350
Irrigation	19,986	0.03	0.002	0.16	0.02	19

Farmer Involvement

Meeting with the EPA Chief


Thank You