

Implementation of BMPs in the Little Arkansas River Watershed

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Little Arkansas River Watershed



Little Arkansas River Watershed

- Agricultural watershed
 - 78% cropland
 - 19% grazingland
- TMDLs set for the watershed
 - 52% of stream segments required TMDLs
- Water quality concerns include bacteria, nutrients, sediments, pesticides
- Drinking water source for city of Wichita and numerous smaller cities and towns
- Source for aquifer recharge

Watershed Restoration and Protection Strategy For The Little Arkansas River Watershed

October 2004

Stakeholders Committee

Joe Bergkamp
Frank Harper
Richard Larson
Dwight Lohrenz
Mike McGinn
Don Schroeder
Joe Swanson
Mark Toews
Jay Warner
Clyde Young

Agency Advisors

Ron Graber, Watershed Specialist, Kansas State Research and Extension
Baron Shively, McPherson County, Natural Resource Conservation Service
Kirk Miles, Harvey County, Natural Resource Conservation Service
Brenda Peters, McPherson County Conservation District
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Susan Brown, Kansas State Research and Extension

Little Arkansas Watershed WRAPS Implementation Goals

- Reduce atrazine herbicide in water to reach goal of 3 $\mu\text{g/L}$, with no seasonal spikes.
- Reduce fecal coliform bacteria in water to < 200 cfu/100 ml water for swimming and < 2,000 cfu/100 ml water for wading (boating and fishing).
- Reduce nutrients and sediments to achieve goal of DO > 5mg/L, BOD < 3.5 mg/L, TDS < 808 mg/L and TSS < 101 mg/L in lake waters.

KSU Asked to Develop a Research, Education, and Implementation Project

- Wanted to target.
- Wanted to document water quality success.

Project Funding

- USDA CSREES 406 Project, “Measuring success of a TMDL implementation plan: land, stream, and economic responses to targeted stakeholder actions”
- EPA 319 Project, “Little Arkansas River Watershed Restoration and Protection Strategies”
- City of Wichita
- Kansas State Conservation Commission

Project Overview

- Stream geomorphologic assessment on targeted streams to assess stream condition and sediment sources.
- Watershed modeling is being used to estimate the extent of target-BMP implementation to achieve measurable changes in water quality.
- Economic analysis is being conducted to determine the impact on net return per acre associated with potential improvements in water quality.

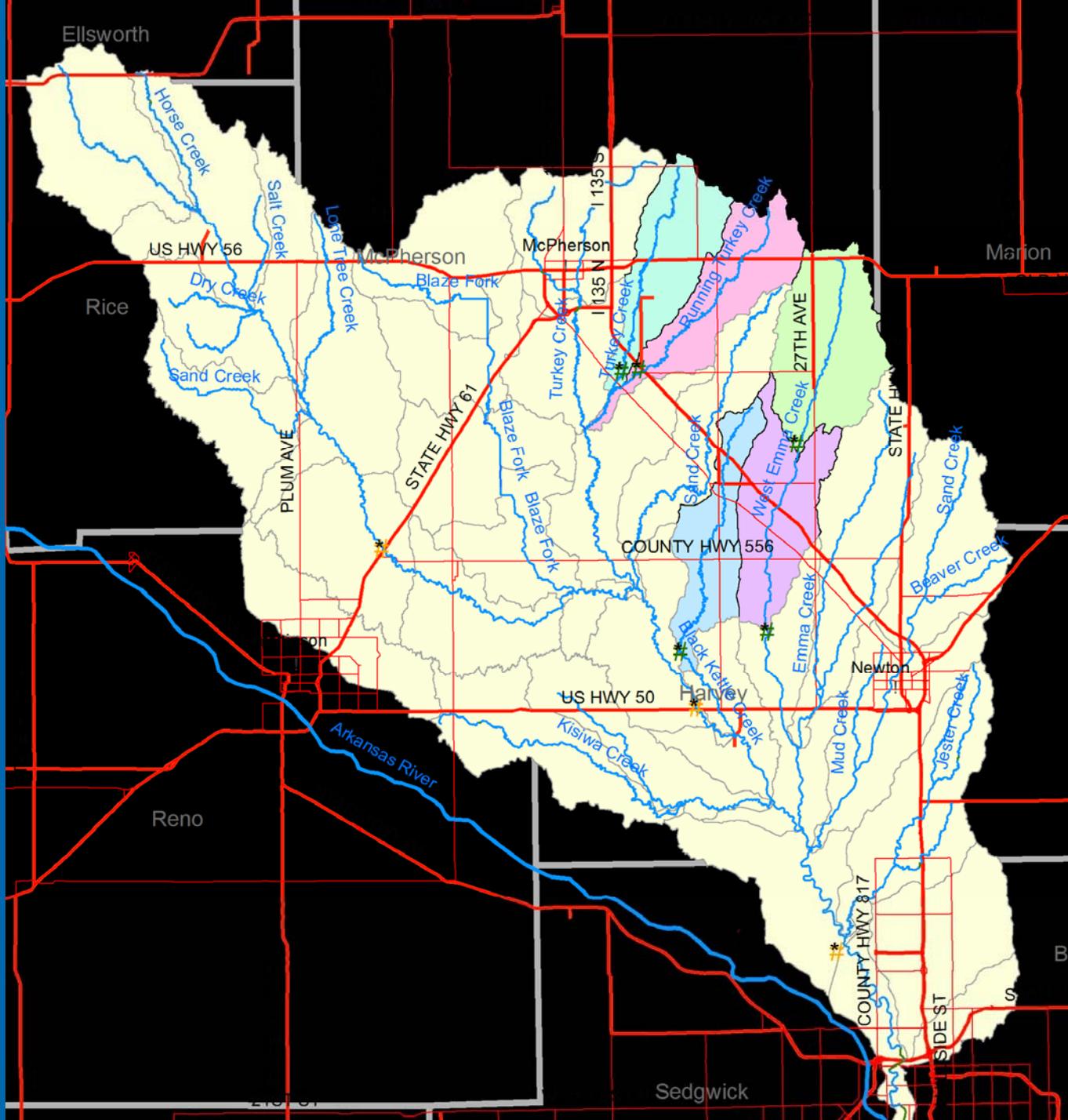
Project Overview

- Automated and grab sample water quality monitoring system established throughout watershed.
- Biomonitoring on targeted streams.
- Education and information.
- BMP implementation.



BMP Implementation

- Focused on reducing atrazine herbicide runoff from corn (2007) grain sorghum (2006, 2007) fields.
- Targeted three (2006) and five (2007) watersheds for rapid implementation of atrazine herbicide BMPs.
- Installed automated water quality monitoring stations at the base of the five targeted watersheds and two adjoining watersheds – “paired watersheds.”



Elements of BMP Implementation

- Developed and delivered educational meetings to farmers and pesticide dealers.
- Research/demonstrations of BMPs on farmer fields
- Incentive payments for atrazine BMP adoption.
- Met one-on-one with farmers in targeted watersheds.
- Evaluated progress.

Educational Meetings

- Trained crop consultants and pesticide dealers.
- Trained farmers.
- Atrazine BMPs publication.



Research/Demonstration of BMPs on Farmer Fields

- Three locations.
- Demonstrate BMPs for pesticides, sediments, and nutrients.
- Automated water quality monitoring equipment installed to evaluate effectiveness.
- Tours.



BMP Incentive Program

- Incentive \$ program developed for atrazine BMPs.
- Hired an Extension agronomist to meet one-on-one with farmers in the targeted watersheds. Our goal was to have 50 (2006) and 70 (2007) farmers adopt BMPs.
- Farmers signed up for program in the field. Payments based on level of protection.



Form Used Calculate Incentive Payment - 2006

<u>Atrazine BMPs Utilized</u> (Check all that apply)	<u>Reduction in Runoff Factor</u>
<input type="checkbox"/> Incorporate atrazine into the first 2 inches of soil prior to planting	.70
<input type="checkbox"/> Apply atrazine in the fall or prior to April 15	.50
<input type="checkbox"/> Apply atrazine as part of a postemergence premix	.60
<input type="checkbox"/> Reduce soil-applied atrazine rates to 1 lb ai/acre or less	.33
<input type="checkbox"/> Use split applications of atrazine, e.g. 2/3 prior to April 15 and 1/3 at planting	.25
<input type="checkbox"/> Band apply atrazine at planting	.50
<input type="checkbox"/> Use no atrazine	1.00

TOTAL ATRAZINE BMP RUNOFF EFFECTIVENESS (TABRE) _____
Add Reduction in Runoff Figure

Incentive Payment Per Acre \$6.00 X TABRE \$ _____
(Maximum payment per acre \$6.00)

TOTAL FIELD PAYMENT
_____ Acres X \$ _____ Incentive Payment Per Acre = \$ _____

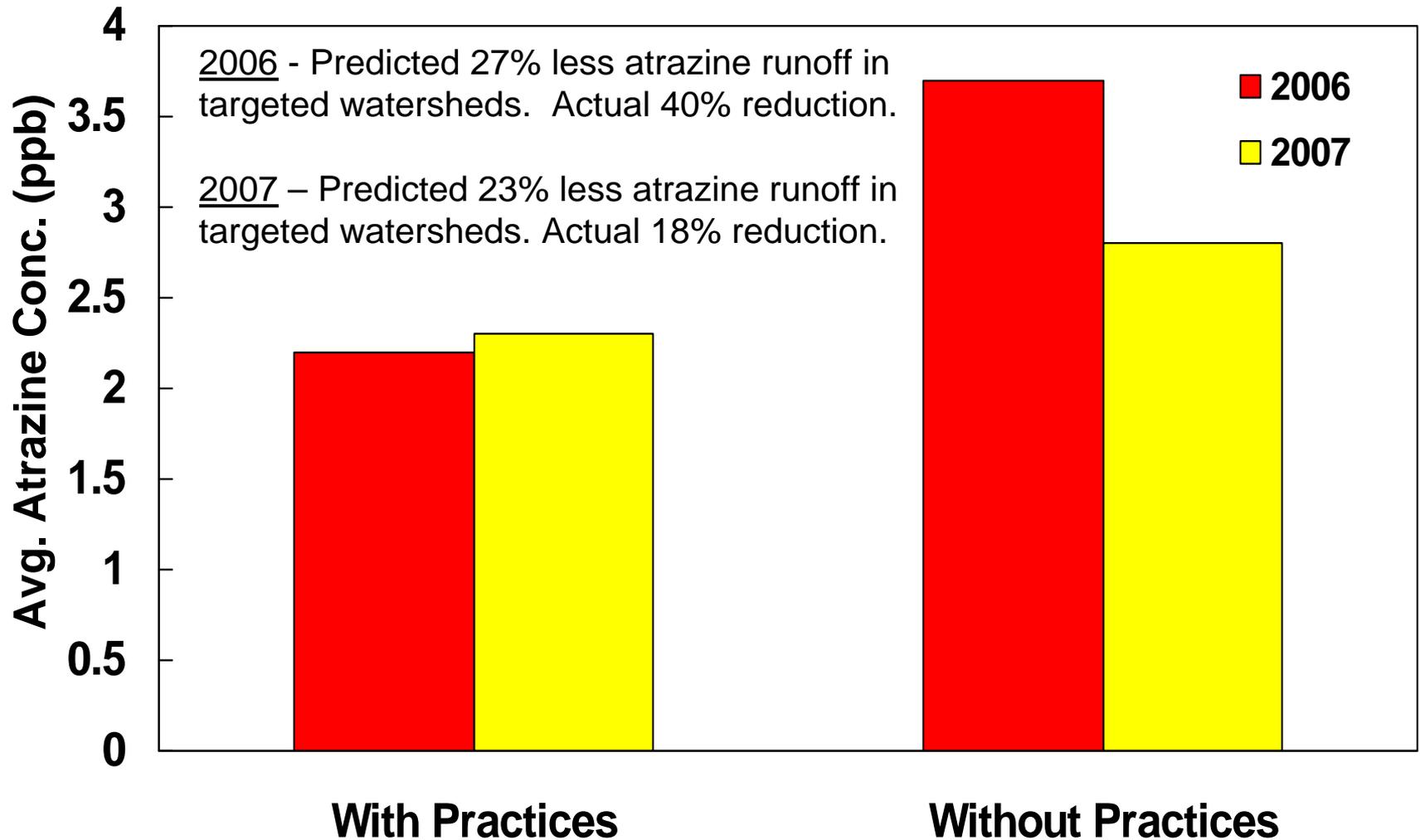
BMP Implementation Results

- Visited one-on-one with 50 (2006) and 77 (2007) farmers.
- 41 (2006) and 74 (2007) farmers committed to implementing atrazine BMPs.
- (2006) 4,792 acres of grain sorghum had BMPs implemented.
 - Dry Turkey Creek 44% of grain sorghum acres
 - West Upper Emma Creek 33% of grain sorghum acres
 - Black Kettle Creek 33% of grain sorghum acres
- (2007) 10,512 acres of corn and grain sorghum had BMPS implemented.
 - Dry Turkey Creek 34% of corn and grain sorghum acres
 - West Upper Emma Creek 61% of corn and grain sorghum acres
 - Black Kettle Creek 37% of corn and grain sorghum acres
 - Blaze Fork Creek 41% of corn and grain sorghum acres
 - Sand Creek 32% of corn and grain sorghum acres.

Atrazine BMPs Implemented

<i>Best Management Practice</i>	<i>Percent of Total Atrazine BMPs</i>	
	<i>(2006)</i>	<i>(2007)</i>
<i>Preplant incorporation</i>	15	18
<i>Early application</i>	17	15
<i>Postemergence application</i>	3	8
<i>Reduce soil-applied rates</i>	10	43
<i>Alternative crop</i>	38	---
<i>Combination of early application and reduced soil applied rate</i>	18	3
<i>No atrazine applied</i>	.1	12

Atrazine Concentrations in Watersheds with and without BMP Implementation



Summary

- A watershed plan was developed for the watershed.
- Three watersheds were targeted for rapid implementation of pesticide BMPs.
- Research/demonstration BMP sites were established on farmer fields.
- An education program taught BMPs to farmers and consultants.
- An incentive program was developed and funded.

Summary

- An extension agronomist met one-on-one with farmers.
- Farmers implemented BMPs on the targeted acres.
- Monitoring of paired watersheds found reductions in atrazine runoff.