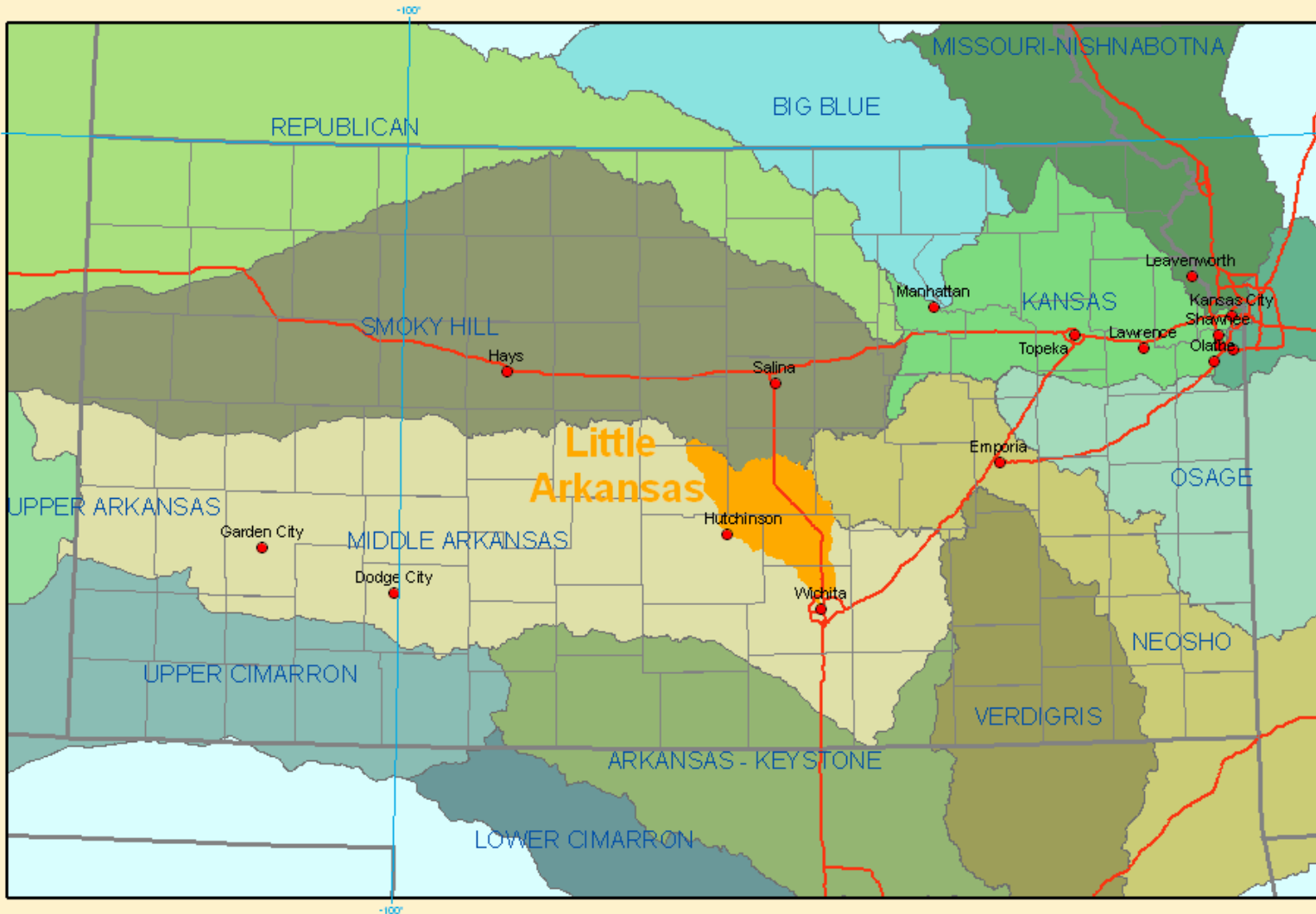


Targeting Atrazine BMP's in the Little Arkansas River Watershed

Ron Graber, Dan Devlin, Phil Barnes, Tim Keane,
Dale Ladd, Rick Schlender

Heartland Region Water Quality Workshop
June 7, 2007

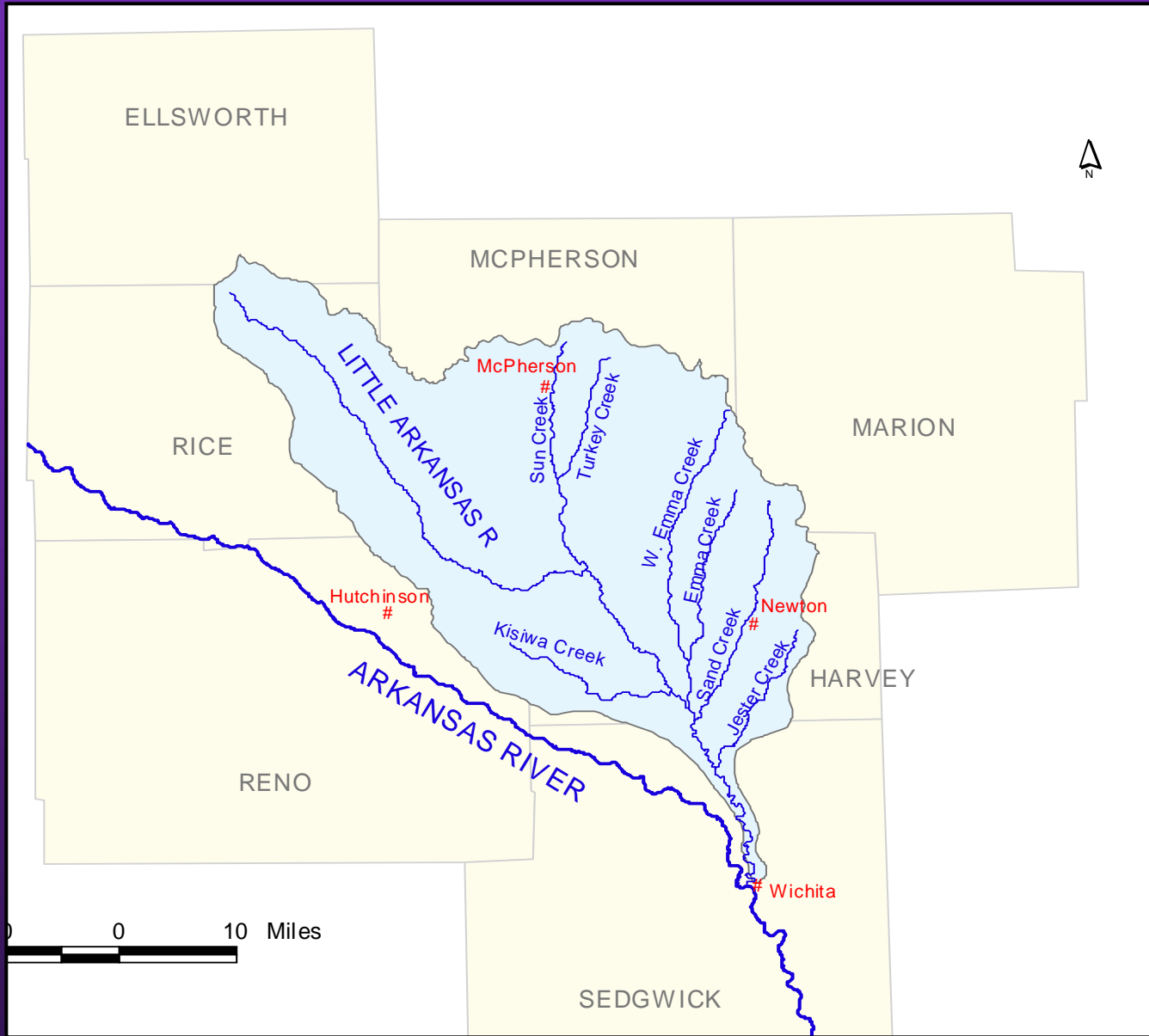


Little Arkansas River Watershed

Watershed Specialist Ron G. Guber
 Map by Kansas State University

Sources: ESRI, U.S. EPA and KDHE





Little Arkansas River Watershed

- Agricultural watershed
 - 78% cropland
 - 19% grazingland
 - 237 registered CAFO's
- 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
 - 205 public water supplies
 - 7400 groundwater wells
- Source for aquifer recharge

Watershed Restoration & Protection Strategy (WRAPS)

- KDHE began WRAPS projects in 2003
- Governors Sub-cabinet on Environment endorses concept.
- 2005 Legislature appropriated \$800,000 – State Water Plan funds for WRAPS.
- KDHE adds \$1.2 mill. In EPA 319 Clean Water Act funding, brings total to \$2 mill.

WRAPS Process

- **Development:** Local stakeholders organizing to address shared water quality concerns.
- **Assessment:** Watershed conditions, Land use, Water use, Specific needs or issues, etc.
- **Planning:** Strategy to address restoration and protection needs I.D.'d during assessment.
- **Implementation:** I & E, BMP's, Cost share Programs, Private & Public Collaboration, etc.

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
Mindy Vogt, Harvey County Conservation District
Dale Ladd, McPherson County, Kansas State Research and Extension
Jonie James, Harvey County, Kansas State Research and Extension
William Hargrove, Kansas State Research and Extension
Robert Wilson, Kansas State Research and Extension
Daniel Devlin, Kansas State Research and Extension
Don Sneathen, Kansas Department of Health and Environment
Susan Brown, Kansas State Research and Extension

Implementation Goals

- Goal 1 – Reduce atrazine in water to reach goal of 3 ug/L atrazine with no seasonal spikes
- Goal 2 – Reduce fecal coliform bacteria originating from cropland, grass, and septic systems
- Goal 3 – Reduce nutrients and sediment to achieve goal of $DO > 3.5$ mg/L, $TDS < 808$ mg/L, and $TSS < 101$ mg/L in lake waters



BMP Implementation

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



Project Funding

- USDA 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

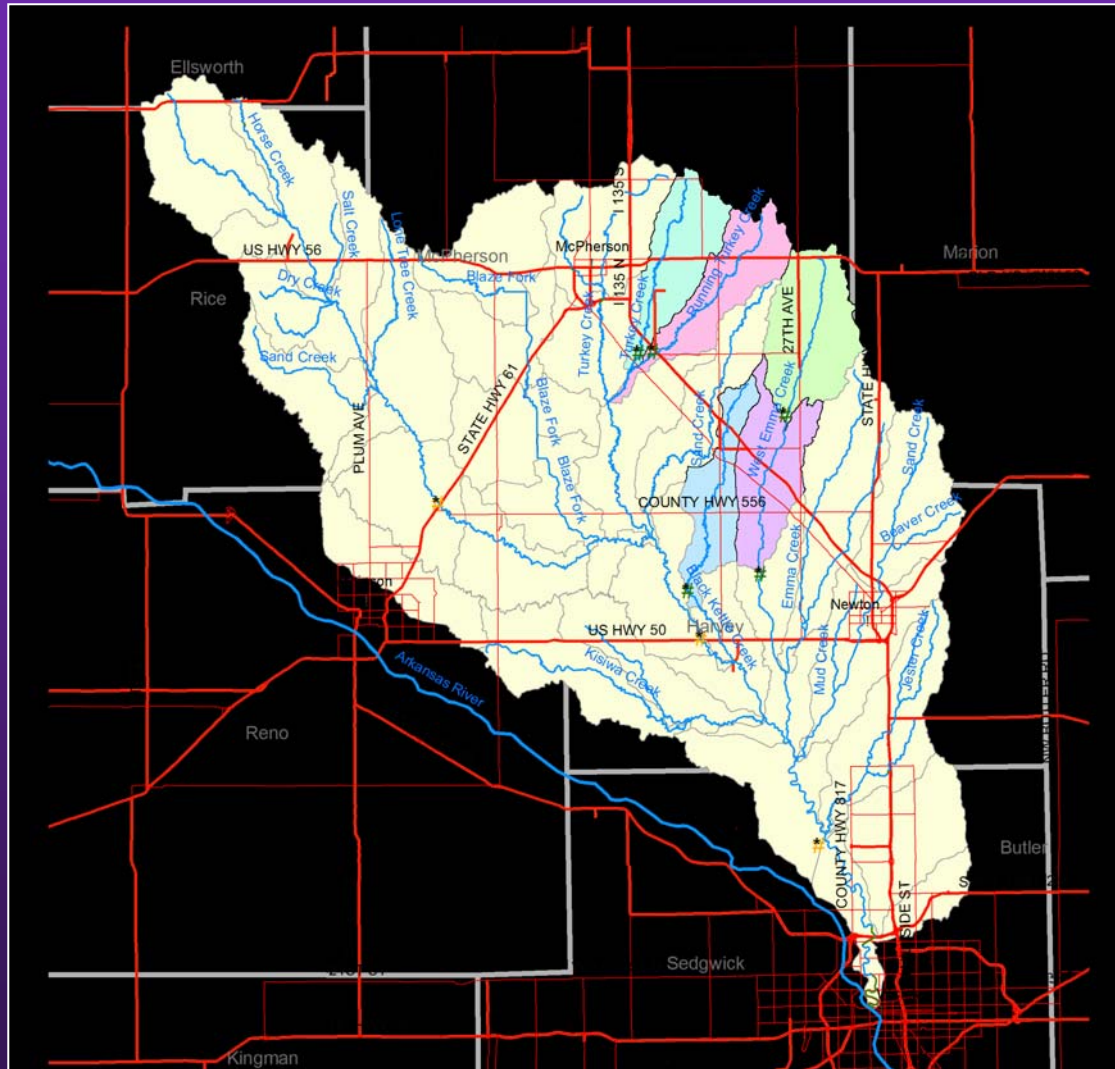
- Stream geomorphologic assessment on targeted streams to assess stream condition and sediment sources
- Watershed modeling is being used to estimate the extent of target-BMP implementation to achieve measurable changes in water quality
- Economic analysis is being conducted to determine the impact on 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**



Paired Sub-watersheds



Educational Meetings

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



Research/Demonstration of BMPs on Farmer Fields

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



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 farmers adopt BMPs.
- Farmers signed up for program in the field. Payments based on level of protection.



Form Used To Calculate Incentive Payment

<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

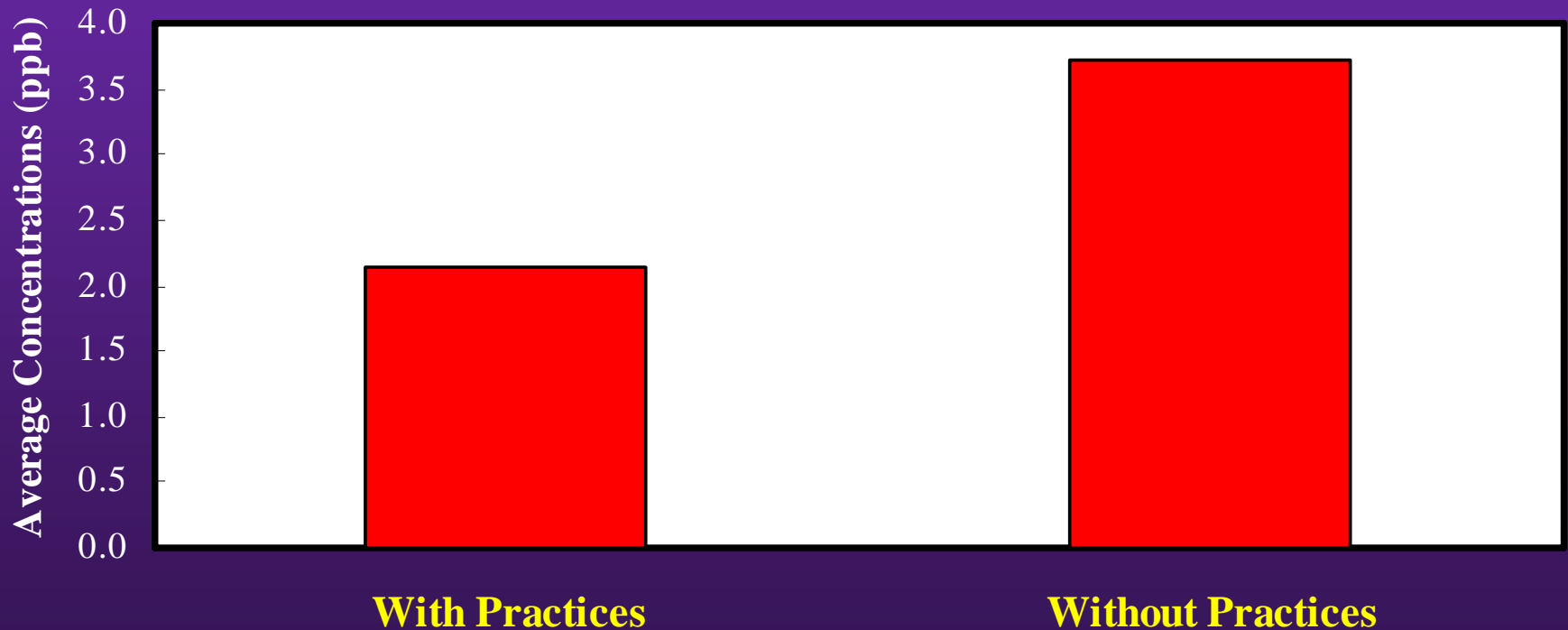
- 41 farmers committed to implementing atrazine BMPs.
- 4,792 acres of grain sorghum had BMPs implemented
 - Dry Turkey Creek 1,818 acres/44% of grain sorghum acres
 - West Upper Emma Creek 1,688 acres/33% of grain sorghum acres
 - Black Kettle Creek 1,286 acres/33% of grain sorghum acres

Atrazine BMPs Implemented

Atrazine BMP Implemented	No. of Acres BMP Implemented	Percent of Total Acres with BMPs
Preplant incorporation	705	15
Early application	817	17
Postemergence application	146	3
Reduce soil-applied rates	455	10
Alternative crop	1807	38
Combination of early application and reduced soil applied rate	852	18
No atrazine applied	6	.1

Atrazine Concentrations in Watersheds with and without BMP Implementation

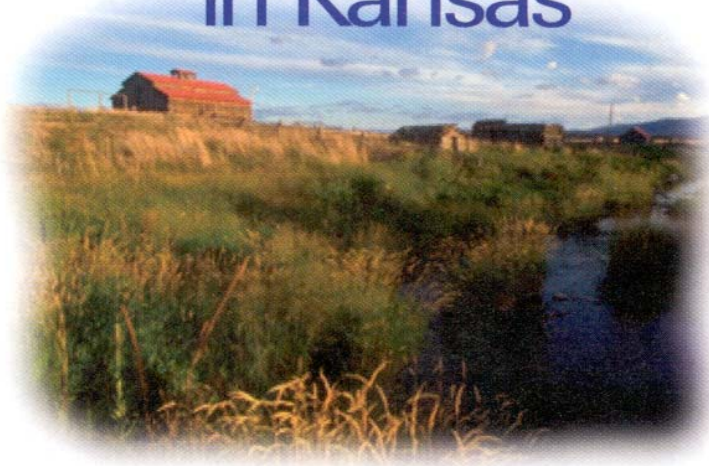
Predicted 27% less atrazine runoff in targeted watersheds. Actual 40% reduction.



2007 Implementation

- 150 farmers will be targeted.
- Will target two additional watersheds plus the three previous watersheds.
- Additional funding from city of Wichita and the Kansas State Conservation Commission.

Meeting Water Quality Challenges in Kansas



Taking Local Action

Questions

?

Ron Graber

Watershed Specialist

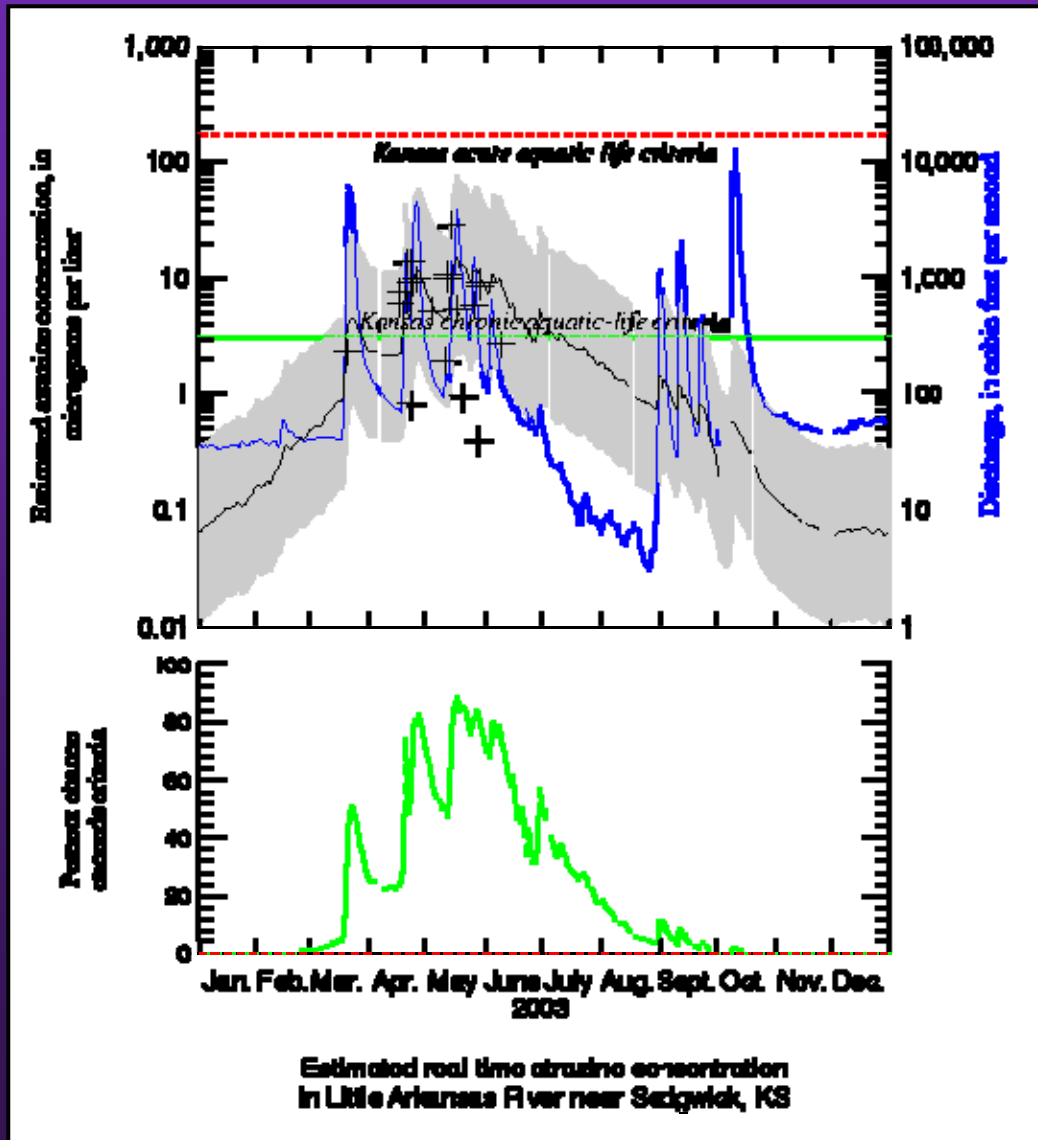
Atrazine Concentrations in Lower Arkansas, 1995-1997

	L. Ark. River at HW 50 near Halstead			L. Ark. River near Sedgwick		
	1995	1996	1997	1995	1996	1997
Average Atrazine Concentration (ppb)	0.9	1.6	--	1.4	2.2	2.6
Annual Atrazine Load (lbs/year)	2,100	1,500	--	4,100	2,200	3,200
Annual Atrazine Load (lbs/sq mile)	3.0	2.2	--	3.5	1.9	2.8
Average Atrazine Concentrations During 90% of Annual Load	5.2	13	--	3.7	14	11

Source: USGS

USGS Atrazine Data – 2003

(Sedgwick Site)



- Late April
– 13.3 ppm
- Mid May
– 28.0 ppm
- Late May
– 8.56 ppm

Proposed TMDLs for Atrazine

Location	# of Atrazine Detects/Sample Collected	Average Concentration/Detect (ppb)
Alta Mills	6/44	4.8
Valley Center	7/44	4.6
Halstead	37/68	10.0
Sedgwick	104/212	8.6

Source: KDHE, 2004

Potential Milo Acres In Watershed Studies

- 60,000 acres in 3 Watersheds
- Using McPherson County averages - 15% of all acres into milo production
- 9,000 acres to milo in these watersheds
- 80% participation would bring us to 7200 acres
- \$20,000 total funding from Wichita and State Conservation Commission
- Average of \$2.75/acre on these 7200 acres