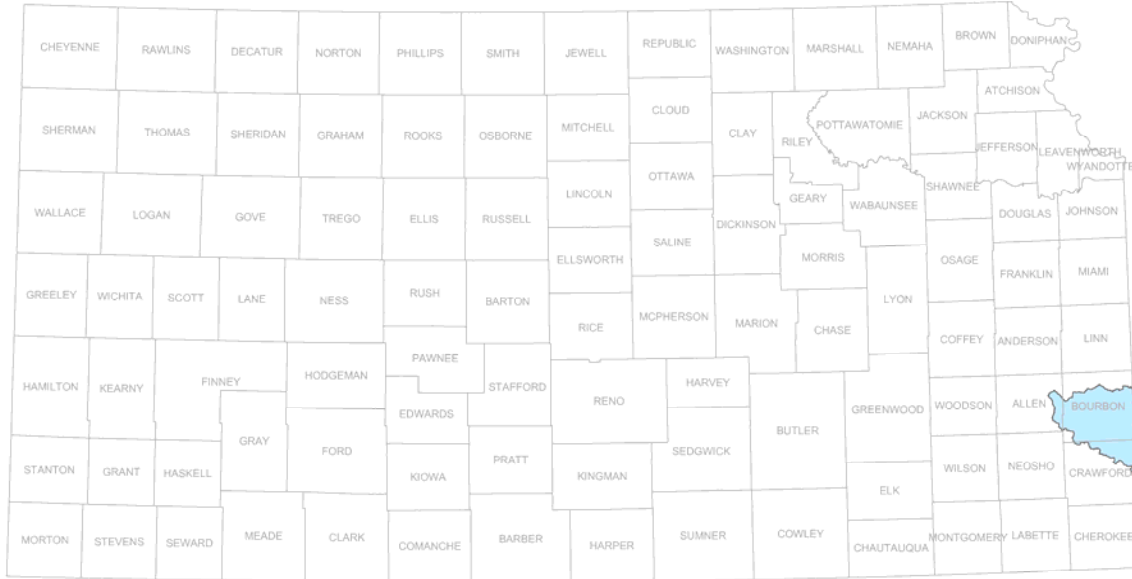


# KANSAS

## Rapid Watershed Assessment

### Marmaton Watershed

#### Hydrologic Unit Code – 10290104



**December 2007**

**Produced by:**

**U.S. Department of Agriculture  
Natural Resources Conservation Service  
760 South Broadway  
Salina, Kansas 67401**

**Kansas Department of Health and Environment  
Bureau of Water  
Watershed Management Section  
1000 S.W. Jackson  
Topeka, Kansas 66612**



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DECEMBER 2007

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## Resource Profile Contents

- 1.0 Purpose
- 2.0 Introduction
- 3.0 Physical Description
  - 3.1 Common Resource Area Map
  - 3.2 Precipitation Map
  - 3.3 Land Use and Land Cover Distribution Map
    - 3.3.1 Land Use and Land Cover Summary Table
  - 3.4 Stream Flow Data
  - 3.5 Other Physical Descriptions
  - 3.6 Farmland Classification
    - 3.6.1 Farmland Classification Summary
  - 3.7 Hydric Soils
    - 3.7.1 Hydric Soils Summary
- 4.0 Resource Concerns
  - 4.1 Summary of Resource Concerns
  - 4.2 Potential Soil Loss
  - 4.3 Water Quality Conditions
    - 4.3.1 Confined Animal Feeding Operations
    - 4.3.2 Public Water Supply Systems
    - 4.3.3 Designated Uses
    - 4.3.4 Total Maximum Daily Loads
    - 4.3.5 Modeled Pollutant Loads
  - 4.4 Threatened and Endangered Species Status
- 5.0 Census and Social Data
  - 5.1 Estimated Level of Willingness and Ability to Participate in Conservation
  - 5.2 Evaluation of Social Capital
  - 5.3 Population Distribution Map
- 6.0 Conservation Progress
  - 6.1 Reported Conservation Progress
  - 6.2 Cumulative Conservation Status
  - 6.3 Other Watershed Projects
  - 6.4 Lands Removed from Production through Farm Bill Programs
- 7.0 Footnotes/Bibliography
- 8.0 Additional On-line Resources

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DECEMBER 2007

## Resource Profile

### 1.0 Purpose

This rapid watershed assessment (RWA) organizes resource information into one document that local conservationists, units of government, and others can use to identify existing resource conditions and conservation opportunities. This will enable the user to direct technical and financial resources to the local needs in the watershed. This RWA provides a brief description of the Marmaton sub-basin's natural resources, resource concerns, conservation needs, and ability to resolve natural resource issues and concerns.

### 2.0 Introduction

The Marmaton 8-Digit Hydrologic Unit Code (HUC) sub-basin is comprised of approximately 388,400 acres in southeast Kansas including Allen, Bourbon, and Crawford counties. According to the National Land Cover Data (NLCD), approximately 30 percent of the sub-basin is in grain and row crop; 50 percent is in grassland, pasture, and hay; and the rest is in other various land uses. This sub-basin is located in the Marias de Cygne Basin and drains into the Little Osage River as it flows from west to east through eastern Kansas. Although the Marmaton extends into Missouri, this assessment does not contain information relating to Missouri.

#### Relief Map



Resource concerns are numerous in the sub-basin. They include, but are not limited to, soil erosion, soil condition, deteriorated surface water quality, deteriorating plant conditions, inadequate fish and wildlife life requirements, and water for livestock. Economic issues such as the high capital costs of crop production/farm operation and unreliable profits may delay the acceptance and implementation of conservation on agricultural lands in the sub-basin.

It is estimated that there are 660 farms with an average size of 410 acres in the Marmaton sub-basin.

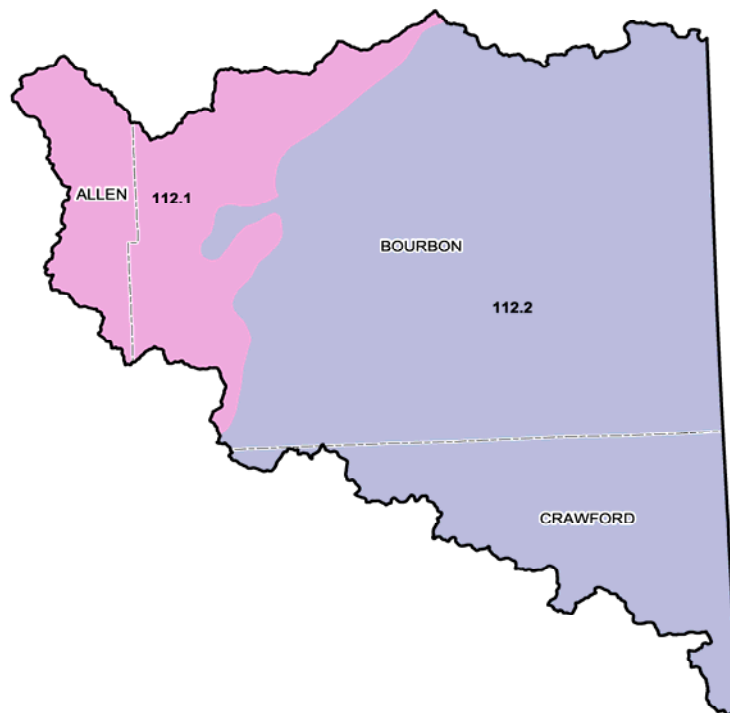
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Three Natural Resources Conservation Service (NRCS) field offices, 3 county conservation districts, and 2 Resource and Conservation and Development (RC&D) areas (See-Kan and Lake Region) provide conservation assistance in the sub-basin.

### 3.0 Physical Description

The physical description of the Marmaton sub-basin provides detailed information so that the user can better understand the natural resources associated with this geographical land unit.

#### 3.1 Common Resource Area (CRA) Map<sup>1</sup>

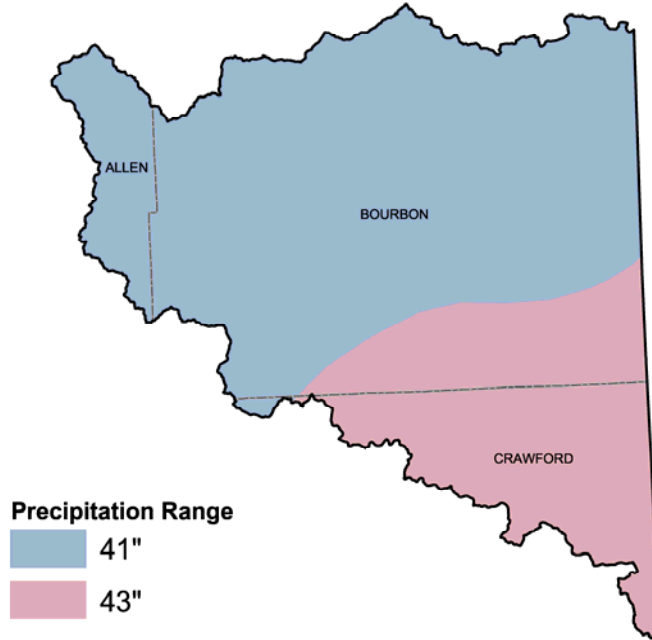


**112.1– Scarped Osage Plains:** The Scarped Osage Plains CRA is a smooth plain interrupted by low, ragged escarpments trending southwest-northeast in which limestone bedrock is regularly exposed. Local relief reaches 150 feet in the escarpment zones but elsewhere averages less than 100 feet. Valley bottoms are exceptionally broad for the size of the streams. Geologic parent materials are mainly thin-bedded Pennsylvanian limestones and shales. Pre-settlement vegetation was mostly prairie, with belts of scattered timber along limestone scarps and valleys. Most of the land is in farms, both pasture and cropland. The Kansas City metropolitan area exerts urbanization pressure on land use in the northwest.

**112.2 – Cherokee Plains:** The Cherokee Plains CRA is one continuous plain of very low relief (usually less than 80 feet) mostly on Pennsylvanian sandstones and shales, but with associated thin-bedded limestones and coal. Streams have hardly dissected the surface, and valleys are topographically subdued. Wetlands are abundant throughout the wide, flat alluvial plains. Claypan soils add further distinction to the CRA. Pre-settlement vegetation was both upland and wet prairie, with timber confined to narrow strips along the stream courses. Most of the land is in farms, both pasture and cropland, with local areas of extensive strip-mines. Substantial prairie remnants occur, many in conservation ownership.

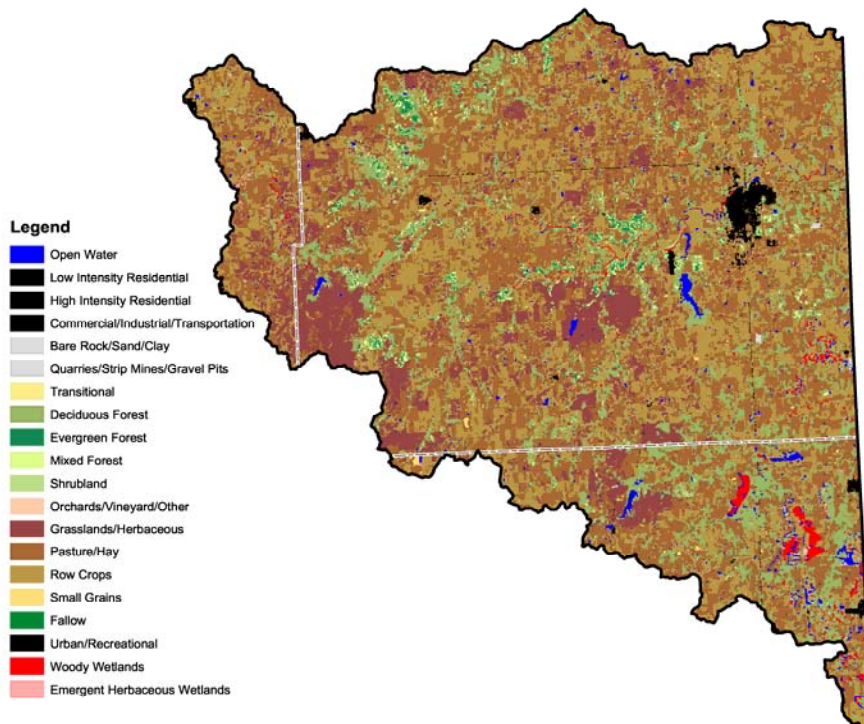
### 3.2 Precipitation Map<sup>2</sup>

The map below depicts the average precipitation occurring within the sub-basin.



### 3.3 Land Use and Land Cover Distribution Map<sup>3</sup>

The map below represents the distribution of land cover and land use as defined by the NLCD.



DECEMBER 2007

### 3.3.1 Land Use and Land Cover Summary Table<sup>3</sup>

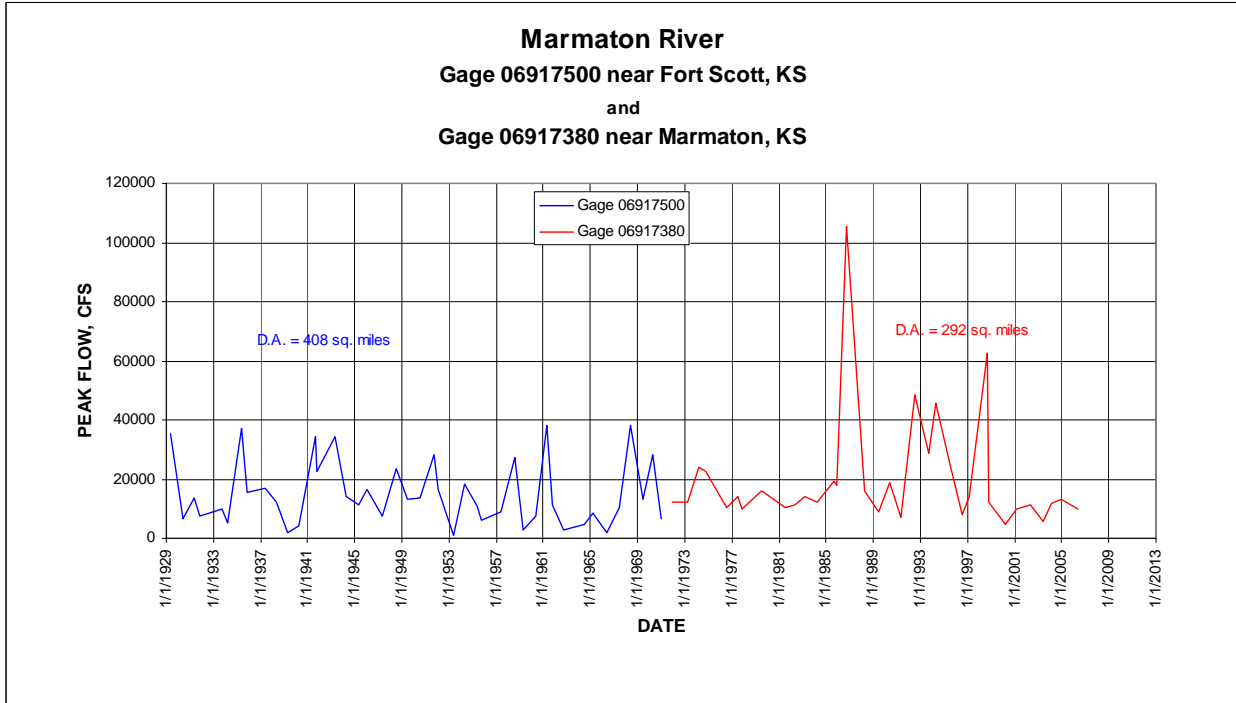
Land Cover/Land Use	Ownership					
	Public		Private		Totals	%
	Acres	%	Acres	%		
Open Water	103	*	4,241	1	4,344	1
Low Intensity Residential			1,426	*	1,426	*
High Intensity Residential			1,387	*	1,387	*
Commercial/Industrial/Transportation			1,174	*	1,174	*
Bare Rock/Sand/Clay			9	*	9	*
Quarries/Strip Mines/Gravel Pits			408	*	408	*
Transitional			6	*	6	*
Deciduous Forest			55,802	14	55,802	14
Evergreen Forest			2,610	1	2,610	1
Mixed Forest			4,228	1	4,228	1
Shrubland			957	*	957	*
Grasslands/Herbaceous	2,523	*	44,704	12	47,227	12
Pasture/Hay			147,191	38	147,191	38
Row Crops	180	*	114,751	30	114,931	30
Small Grains			430	*	430	*
Urban/Recreational			465	*	465	*
Woody Wetlands			4,378	1	4,378	1
Emergent Herbaceous Wetlands			1,453	*	1,453	*
<b>HUC Totals<sup>a</sup></b>	<b>2,806</b>	<b>*</b>	<b>385,622</b>	<b>99</b>	<b>388,428</b>	<b>100</b>
*Less than 1 percent of total acres						
<sup>a</sup> Totals are approximate due to rounding and small unknown acreages						
<b>Special Considerations for This 8-Digit HUC:</b>						
<ul style="list-style-type: none"> <li>▪ Small grains and row crops are the predominant commodities grown in rotation on 30 percent of the watershed (approximately 115,400 acres)</li> <li>▪ Grasslands/Herbaceous and Pasture/Hay make up 50 percent of the watershed (approximately 194,000 acres)</li> <li>▪ Forest makes up less than 17 percent of the watershed (approximately 63,600 acres)</li> <li>▪ Urban land comprises 1 percent of the watershed (approximately 4,000 acres)</li> </ul>						
<b>Irrigated Lands<sup>4</sup></b>	<b>Percent of Cropland</b>			<b>Percent of HUC</b>		
Pressure	1			<1		
Gravity	0			0		



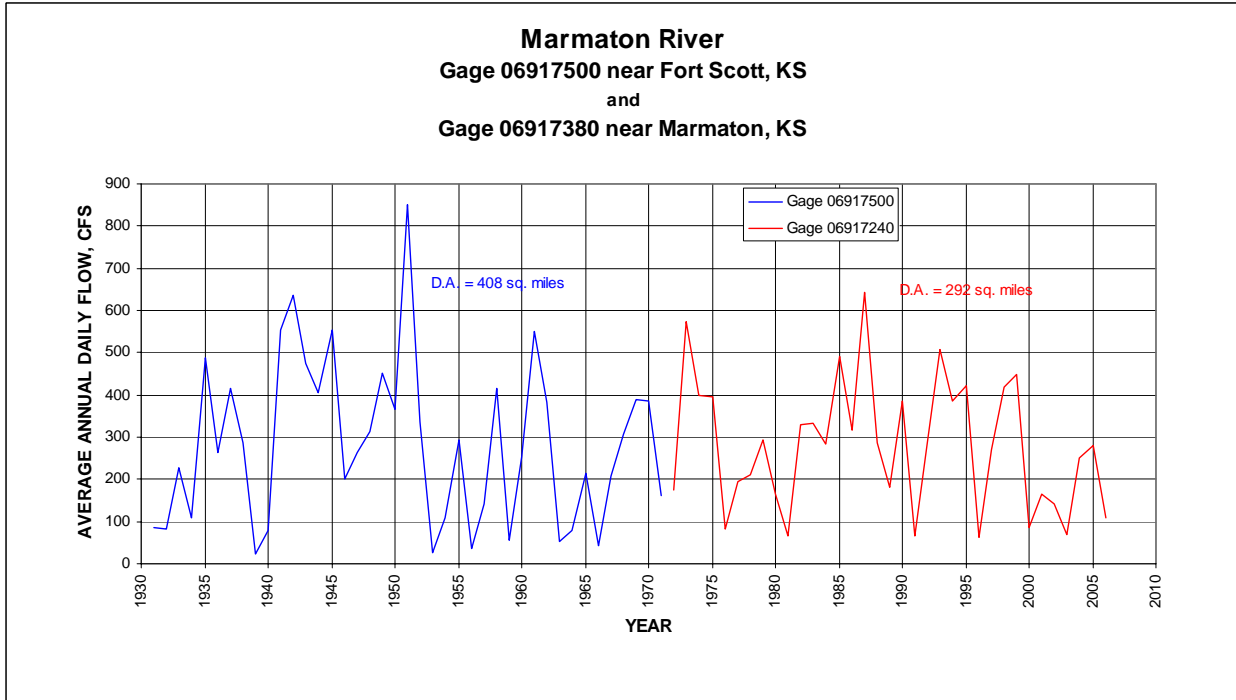
### 3.4 Stream Flow Data<sup>45</sup>

Stream flow data has been collected since the 1920s. For this assessment, data was collected from two stream gage stations on the Marmaton River near Marmaton and Fort Scott, Kansas.

#### Annual Peak Flow



#### Average Annual Discharge



### 3.5 Other Physical Descriptions

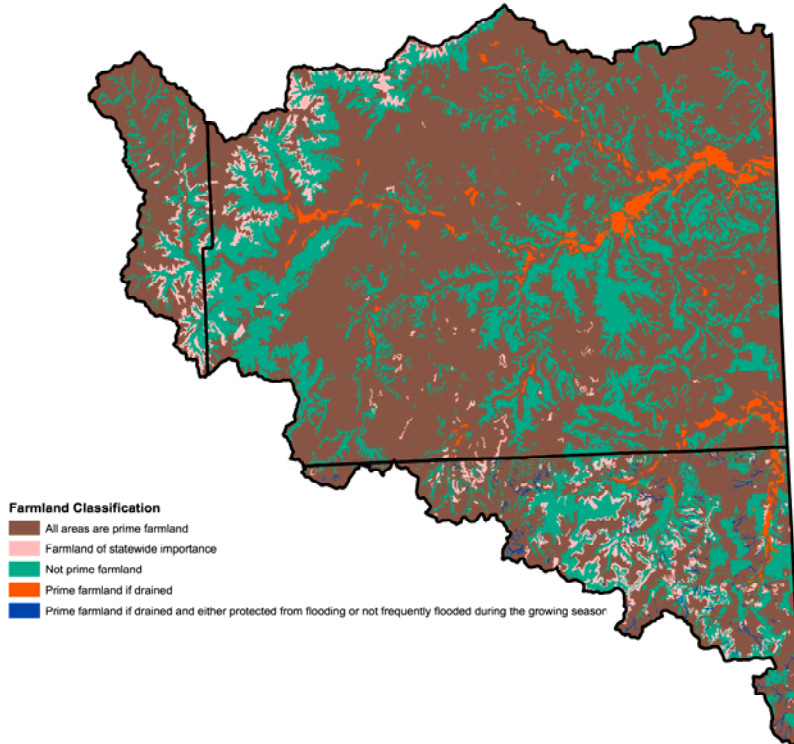
Stream Data <sup>46</sup>	Total Miles of Streams in HUC Major (24K Hydro Geographic Information System [GIS] Layer)	906 miles	
		ACRES	PERCENT
Land Cover/Use <sup>43</sup> Based on a 100-foot stretch on both sides of all streams in the 24K Hydro GIS Layer	Open Water	2,510	5
	Low Intensity Residential	81	0
	High Intensity Residential	30	0
	Commercial/Industrial/Transportation	87	0
	Bare Rock/Sand/Clay	0	0
	Quarries/Strip Mines/Gravel Pits	19	0
	Deciduous Forest	12,034	26
	Evergreen Forest	410	1
	Mixed Forest	868	2
	Shrubland	49	0
	Grasslands/Herbaceous	4,001	9
	Pasture/Hay	15,018	33
	Row Crops	9,521	21
	Small Grains	11	0
	Urban/Recreational	21	0
	Woody Wetlands	1,082	2
	Emergent Herbaceous Wetlands	305	1
<b>Total Acres of 100-foot Stream Buffers</b>	<b>46,047</b>	<b>100</b>	

### 3.6 Farmland Classification<sup>412</sup>

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management.

Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce economically sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.

Farmland of statewide importance, or of local importance, is land other than prime farmland or unique farmland but is also highly productive. Criteria for defining and delineating these lands are determined by the appropriate state or local agencies in cooperation with the USDA.

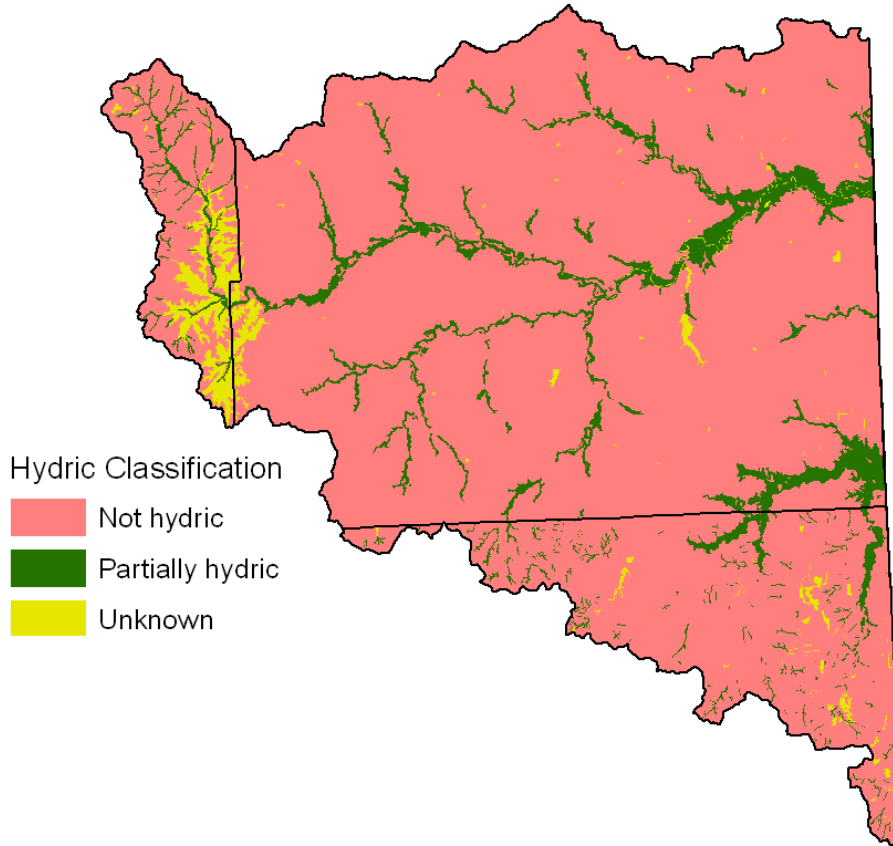


### 3.6.1 Farmland Classification Summary

Farmland Classification	Acres	Percent
All areas are prime farmland	263,996	68
Farmland of statewide importance	16,788	4
Not prime farmland	97,378	25
Prime farmland if drained	8,498	2
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	1,768	<1
<b>Total</b>	<b>388,428</b>	<b>100</b>

### 3.7 Hydric Soils<sup>12</sup>

Hydric soils are soils that are sufficiently wet in the upper part of the soil profile to develop anaerobic conditions during the growing season. These soils can include wetland areas which may provide benefits for aquifer recharge, flood water holding capacity, habitat for numerous species of terrestrial and aquatic organisms and a diversity of plants. These areas may be protected at the federal level.



### 3.7.1 Hydric Soils Summary

Hydric Classification	Acres	Percent
Not Hydric	350,719	90
Partially Hydric	27,893	7
Unknown	9,815	3
<b>Total</b>	<b>388,428</b>	<b>100</b>

## 4.0 Resource Concerns

Resource concerns are issues related to the natural environment. Natural resources include soil, water, air, plants, animals, and humans (SWAPA+H). Local conservationists identified major resource issues by land use that affect the Marmaton sub-basin.

DECEMBER 2007

## 4.1 Summary of Resource Concerns

Resource Concerns/Issues by Land Use								
SWAPA+H Concerns	Specific Resource Concern/Issue	Pasture/Hay	Grain Crops	Row Crops	Grazed Range	Forest	Wildlife	Urban
Soil Erosion	Sheet and Rill		X	X				
	Ephemeral Gully		X	X				
	Streambank	X				X		
Soil Condition	Organic Matter Depletion		X	X				
Water Quality, Surface	Excessive Nutrients and Organics	X	X	X				X
	Excessive Suspended Sediment and Turbidity		X	X				
Plant Condition	Productivity, Health and Vigor	X			X			
	Noxious and Invasive Plants	X			X	X	X	
Animal: Fish and Wildlife	Inadequate Water	X			X		X	
Animal: Domestic	Inadequate Stock Water	X			X			
Human, Economics	High Capital/Financial Costs	X	X	X	X	X	X	
	Low or Unreliable Profitability	X	X	X	X			

### Grain and Row Crops

- Residue, nutrient, and pest management; vegetative practices; and structural practices are necessary to control erosion, protect water quality, and improve soil conditions.
- Over application of nutrients and organics has created surface water quality concerns.
- Erosion concerns exist due to lack of residue and erosion control measures on cropland.

### Grazing Land

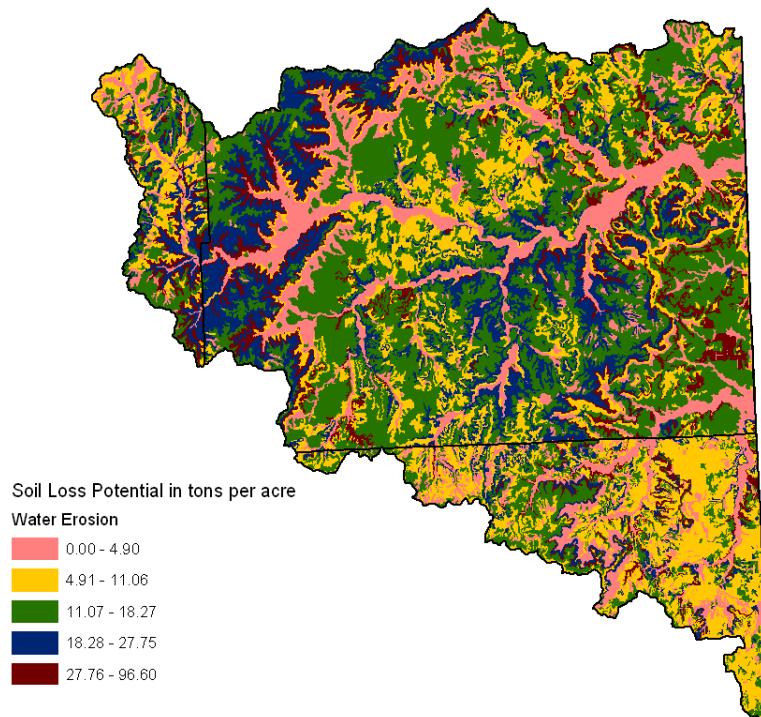
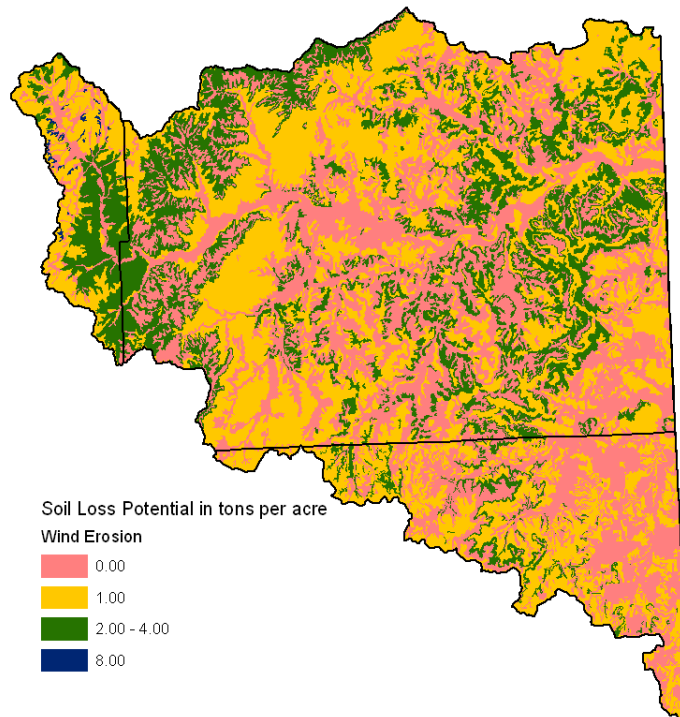
- Over-utilized grazing units are common; affected by timing of grazing and invasive weeds that affects productivity, health and vigor, and increases erosion.
- Over-utilization creates site stability, forage quality and palatability concerns.
- Inadequate livestock water supply affects grazing distribution and animal health and condition.

### General

- Inputs needed to manage large agricultural operations, costs of production, and fluctuating commodity values require large capital and financial burdens of operators.

## 4.2 Potential Soil Loss<sup>12</sup>

Soil loss through wind and water erosion is critical to consider for dealing with air and water quality issues. As airborne particulate, soil particles can be a major contributor to air quality concerns. Soil loss through water erosion causes water quality impairments as pollutants are attached to soil colloids and are transported into the stream systems. Wind and water erosion have been identified as concerns in the watershed. The following maps developed with the Soil Survey Geographic (SSURGO) Database display soil loss potential, within the Smoky Hill Headwaters sub-basin.



### 4.3 Water Quality Conditions

The Kansas Department of Health and Environment (KDHE) is responsible for monitoring water quality conditions in the state of Kansas. This section has been provided by KDHE. For up-to-date water quality condition information, visit the KDHE Web site at [http://www.kdheks.gov/nps/watershed\\_condition.htm](http://www.kdheks.gov/nps/watershed_condition.htm).

#### 4.3.1 Confined Animal Feeding Operations (CAFO)

In Kansas, confined animal feeding operations (CAFOs) with an animal unit capacity of 300 or more must register with the KDHE. Waste disposal practices and the wastewater effluent quality of these registered CAFOs are closely monitored by the KDHE to determine the need for runoff control practices or structure in order to protect the waters of the state of Kansas. Because of this monitoring, registered CAFOs are not considered a significant threat to water resources within the watershed. A portion of the state's livestock population exists on small, unregistered farms. These small, unregistered livestock operations may contribute a significant source of fecal coliform bacteria and nutrients, depending on the presence and condition of waste management systems and proximity to water resources.

Animal Type	Dairy	Feedlot	Poultry	Swine	Truck-wash	Other
No. of Permitted Farms	1	0	0	2	0	1
No. of Permitted Animal Units	280	0	0	514	0	0

Note: All animal units based upon federal animal units as of 10/01/07.

#### 4.3.2 Public Water Supply Systems

In the state of Kansas, a public water supply system is defined by Kansas Statutes Annotated (K.S.A.) 65-162a and Kansas Administrative Regulations (K.A.R.) 28-15a-2 as a "system for delivery to the public of piped water for human consumption that has at least 10 service connections or regularly serves at least 25 individuals daily at least 60 days out of the year." These systems are regulated by the state to assure the citizenry safe and pathogen-free drinking water. The KDHE oversees more than 1,042 statewide public water supply systems including municipalities, rural water districts, and privately owned systems. These systems may serve a small community of several families to a city of more than 300,000 persons.

There are five active public water supply sites located within the HUC 8 10290104 watershed. Though water is drawn from surface water within the watershed, much of public water supply for the area is provided by the Ozark Aquifer. The alluvial aquifers of the Marmaton River and its tributaries exist throughout the watershed, and the river provides one active public water supply intake site. The Ozark Aquifer, which underlies the entire watershed, accounts for the remaining well sites. Aquifer water quality is generally good with naturally occurring minerals and nitrates as the primary pollutant concerns. Surface water quality in streams and rivers is generally fair to poor with the primary quality concern being a lack of dissolved oxygen.

Source Water Assessment: The 1996 amendments to the Safe Drinking Water Act required each state to develop a Source Water Assessment Program (SWAP). Additionally, each state was required to develop a Source Water Assessment (SWA) for each public water supply that treats and distributes raw source water. In Kansas, there are approximately 763 public water supplies that required SWAs. A SWA includes the following: delineation of the source water assessment area, inventory of potential contaminant sources, and susceptibility analysis. The SWA must also be made available to the public. KDHE's Watershed Management Section has implemented the Kansas SWAP plan, and all SWAs are completed.

The Safe Drinking Water Act did not require protection planning to be part of the SWAP process. On a voluntary basis, KDHE encourages public water supplies and their surrounding communities to use the SWAs as the foundation for future protection planning efforts. Source water protection information

**DECEMBER 2007**

will be posted on this site as it is compiled. To obtain a copy of SWAs in this watershed, please visit <http://www.kdheks.gov/nps/swap/SWreports.html>.

### 4.3.2 Designated Uses

According to the Kansas Surface Water Register, the most *common* designated uses for streams and rivers in this watershed include expected aquatic life use, primary and secondary contact recreation, domestic water supply, food procurement, industrial water supply, groundwater recharge, irrigation water supply, and livestock water supply.

Designated Uses - Lakes								
Lake Name	AL	CR	DS	FP	GR	IW	IR	LW
Bone Creek Lake	E	A	X	X		X		
Bourbon Co. SFL	E	B		X				
Bronson City Lake	E	B	X	X		X		
Elm Creek Lake	E	A		X				
Fort Scott City Lake	E	A	X	X		X		
Frisco Lake	E	B		X				
Gunn Park East Lake	E	B	O	X		O	O	O
Gunn Park West Lake	E	B	O	X		O	O	O
Lake Crawford State Park #2	E	A		X				
Rock Creek Lake	E	B		X				X

AL = Aquatic Life Support	FP = Food Procurement	IW = Industrial Water Supply
CR = Contact Recreation	GR = Groundwater Recharge	LW = Livestock Water Supply
DS = Domestic Water Supply	IR = Irrigation Water Supply	

E = Expected Aquatic Life Use Water  
 S = Special Aquatic Life Use Water  
 A = Primary contact recreation stream segment is a designated public swimming area  
 B = Primary contact recreation stream segment is by law or written permission of the landowner open to and accessible by the public  
 C = Primary contact recreation stream segment is not open to and accessible by the public under Kansas law  
 a = Secondary contact recreation stream segment is by law or written permission of the landowner open and accessible by the public  
 b = Secondary contact recreation stream segment is not open to and accessible by the public under Kansas law  
 X = Referenced stream segment is assigned the indicated designated use  
 O = Referenced stream segment does not support the indicated designated use

### 4.3.4 Total Maximum Daily Loads

Total Maximum Daily Loads (TMDLs) are limits on the amount of pollutant entering a stream or lake, while still attaining water quality standards. The water quality standards identify the designated uses of streams, lakes, and wetlands and the level of water quality necessary to fully support these uses. The process of developing TMDLs in Kansas determines:

1. The pollutants causing water quality impairments.
2. The magnitude of the impairment relative to applicable water quality standards.
3. The overall level of pollution reduction needed to attain achievement of water quality standards.
4. The allocation of pollutant loads to be distributed among point and non-point sources in the watershed affecting the water quality limited water body.
5. Suggested corrective actions and management practices to be implemented in order to achieve the load allocations, TMDLs, and water quality standards.
6. The monitoring and evaluation strategies needed to assess the impact of corrective actions in achieving TMDLs and water quality standards.
7. Provisions for future revision of TMDLs based on those evaluations.



**DECEMBER 2007**

The following table shows the percentage of stream miles within HUC 8 10260001 that are listed on the 303d list. Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met. Thereafter, TMDLs comprising quantitative objectives and strategies have been developed for these impaired waters within the watershed in order to achieve their water quality standards.

<b>Stream Data</b> <i>*Percent of Total Miles of Streams in HUC</i>	303d/TMDL Listed Streams (DEQ)	163 miles	60%
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2006 Impaired Waters with TMDLs			
Stream Segment	Stream/Watershed/Lake with TMDL	Priority for TMDL Implementation	Impairments
	Upper Marmaton River Watershed including Sweet Branch, Tennyson Creek, Wolfpen Creek, Turkey Creek, Paint Creek, Hinton Creek, Prong Creek, Owl Creek, Elm Creek, Pawnee Creek, Bunion Creek, Walnut Creek, Robinson Branch, and Cedar Creek	High	Dissolved Oxygen
	Bourbon County State Fishing Lake	Medium	Eutrophication, including Dissolved Oxygen and pH
	Bronson City Lake	Medium	Eutrophication
	Elm Creek Lake	Low	Eutrophication
	Lower Marmaton River Watershed including Mill Creek, Little Mill Creek, Wolverine Creek, and Lath Branch	High	Dissolved Oxygen, Impaired Biology
	Rock Creek Lake including Fort Scott City Lake	High	Eutrophication
	West Fork of Drywood Creek	Low	Dissolved Oxygen
	Lake Crawford State Park	Medium	Eutrophication

2006 Impaired Waters needing TMDLs	
Impaired Stream/Lake	Impairment
None	N/A

For additional TMDL information or to download the TMDL report, please visit <http://www.kdheks.gov/tmdl/index.htm>.

**Impairment definitions:**

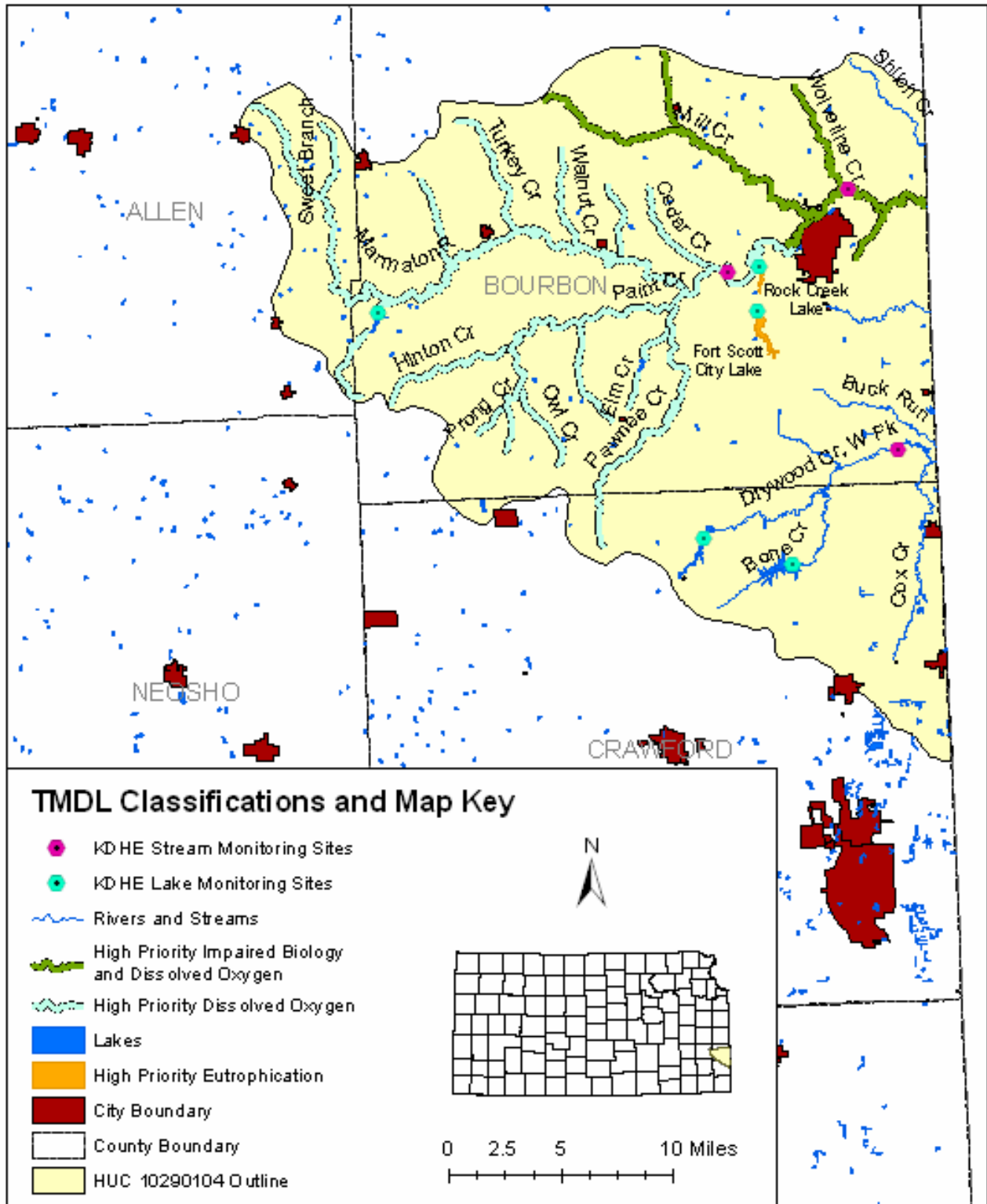
**Dissolved Oxygen:** Refers to the amount of oxygen available to aquatic life within the water column. State water quality standards require a stream or lake to have at least 5 mg/L of dissolved oxygen.

**Eutrophication:** Excessive nutrients entering lake causing an increase in algae to nuisance conditions, impairing aquatic life, recreation, and water supply uses.

**Impaired Biology:** Impairments caused by excessive nutrients/sediments, toxic ammonia or organic material present in the stream, decreasing the diversity of clean water biological organisms in the stream.

**pH:** Measure of the alkalinity of acidity of water. The scale ranges from 0 to 14 with 7.0 being neutral, 0 to 7 being acidic, and 7 to 14 being basic or alkaline.

## HUC 10290104 Watershed 2007 TMDLs



DECEMBER 2007

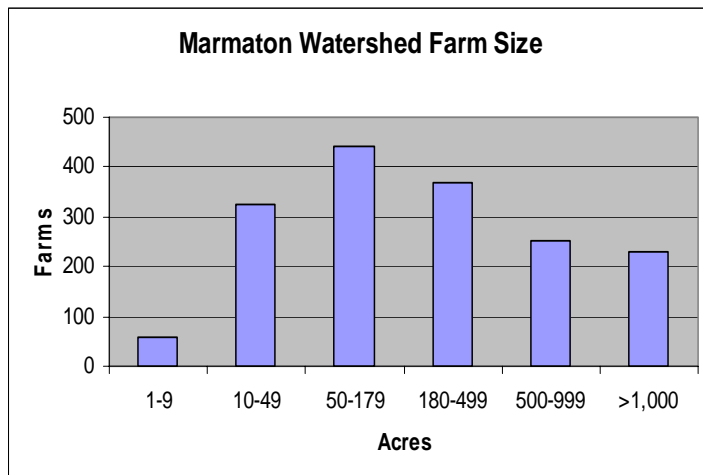
## 4.4 Threatened and Endangered Species Status<sup>17</sup>

The Endangered Species Act (ESA) and Kansas Environmental Coordination Act provide protection to animals and their habitat that are experiencing a decline in population, or nearing extinction. The table below lists species of concern and their federal and state designation(s).

LISTED THREATENED AND ENDANGERED SPECIES			
Species Common Name ( <i>Scientific name</i> )	Threatened (T), Endangered (E), Proposed (P), Candidate (C), Species in Need of Conservation (SINC)	Designated Critical Habitat (Y)es/(N)o	Listing: Federal (F), State (S)
<b>Animals, Vertebrates – Fishes</b>			
Neosho Madtom ( <i>Noturus placidus</i> )	T/T	Y	F/S
Redspot Chub ( <i>Nocomis asper</i> )	T	N	S
Banded Sculpin ( <i>Cottus carolinea</i> )	SINC	N	S
Banded Darter ( <i>Etheostoma zonale</i> )	SINC	N	S
Bluntnose Darter ( <i>Etheostoma niger</i> )	SINC	N	S
Brindled Madtom ( <i>Noturus miurus</i> )	SINC	N	S
Gravel Chub ( <i>Erimystax x-punctatus</i> )	SINC	N	S
Greenside Darter ( <i>Etheostoma blennioides</i> )	SINC	N	S
Hornyhead Chub ( <i>Nocomis biguttatus</i> )	T	N	S
Northern Hog Sucker ( <i>Hypentelium nigricans</i> )	SINC	N	S
Slough Darter ( <i>Etheostoma gracile</i> )	SINC	N	S
Speckled Darter ( <i>Etheostoma stigmaeum</i> )	SINC	N	S
Spotted Sucker ( <i>Minytrema melanops</i> )	SINC	N	S
Tadpole Madtom ( <i>Noturus gyrinus</i> )	SINC	N	S
<b>Animals, Vertebrate – Birds</b>			
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )*	T	Y	S
Black Tern ( <i>Chidonias niger</i> )	SINC	N	S
Bobolink ( <i>Dolichonyx oryzivorus</i> )	SINC	N	S
Cerulean Warbler ( <i>Dendroica cerulean</i> )	SINC	N	S
Golden Eagle ( <i>Aquila chrysaetos</i> )	SINC	N	S
Eskimo Curlew ( <i>Numensis borealis</i> )	E/E	N	F/S
Henslow's Sparrow ( <i>Ammodramus henslowii</i> )	SINC	N	S
Least Tern ( <i>Sterna antillarum</i> )	E/E	N	F/S
Long-billed Curlew ( <i>Numenius americanus</i> )	SINC	N	S
Peregrine Falcon ( <i>Falco peregrinus</i> )	E	N	S
Piping Plover ( <i>Charadrius melodus</i> )	T/T	N	F/S
Short-Eared Owl ( <i>Asio flammeus</i> )	SINC	N	S
Snowy Plover ( <i>Charadrius alexandrinus</i> )	T	N	S
Whip-poor-will ( <i>Camprimulgus vociferous</i> )	SINC	N	S
Yellow-throated Warbler ( <i>Dendroica dominica</i> )	SINC	N	S
<b>Animals, Vertebrate – Amphibians/Reptiles</b>			
Eastern Hognose Snake ( <i>Jeterodon platirhinus</i> )	SINC	N	S
Broadhead Skink ( <i>Eumeces laticeps</i> )	T	Y	S
Crawfish Frog ( <i>Rana areolata</i> )	SINC	N	S
Common Map Turtle ( <i>Graptemys gepgraphica</i> )	T	Y	S
Eastern Newt ( <i>Notophthalmus viridescens</i> )	T	N	S
Green Frog ( <i>Rana clamitans</i> )	T	N	S
Redbelly Snake ( <i>Storeria occipitomaculata</i> )	T	N	S
Smooth Earth Snake ( <i>Virginia valeria</i> )	T	N	S
Spring Peeper ( <i>Pseudocrus crucifer</i> )	T	Y	S

LISTED THREATENED AND ENDANGERED SPECIES			
Species Common Name ( <i>Scientific name</i> )	Threatened (T), Endangered (E), Proposed (P), Candidate (C), Species in Need of Conservation (SINC)	Designated Critical Habitat (Y)es/(N)o	Listing: Federal (F), State (S)
Timber Rattlesnake ( <i>Crotalus horridus</i> )	SINC	N	S
<b>Animals, Vertebrate – Mammals</b>			
Eastern Spotted Skunk ( <i>Spilogale putorius interrupta</i> )	T	Y	S
Franklin's Ground Squirrel ( <i>Spermophilus franklinii</i> )	SINC	N	S
Gray Myotis ( <i>Myotis grisescens</i> )	E/E	N	F/S
Southern Flying Squirrel ( <i>Glaucomys volans</i> )	SINC	N	S
<b>Animals, Invertebrate - Crustaceans</b>			
Flutedshell Mussel ( <i>Lasmigona costata</i> )	T	Y	S
Fawnsfoot Mussel ( <i>Truncilla donaciformis</i> )	SINC	N	S
Fat Mucket Mussel ( <i>Lampsilis radiata</i> )	SINC	N	S
Creeper Mussel ( <i>Strophitus undulates</i> )	SINC	N	S
Butterfly Mussel ( <i>Ellipsaria lineolata</i> )	T	Y	S
Flat Floater Mussel ( <i>Anadonta suborbiculata</i> )	E	Y	S
Noesho Mucket Mussel ( <i>Lampsilis rafinesqueana</i> )	E	Y	S
Quachita Kidneyshell Mussel ( <i>Ptychobranhus occidentalis</i> )	T	Y	S
Rabbitsfoot Mussel ( <i>Quadrula cylindrica</i> )	E	Y	S
Round Pigtoe Mussel ( <i>Pluerobema coccineum</i> )	SINC	N	S
Spike Mussel ( <i>Elliptio dilatata</i> )	SINC	N	S
Wabash Pigtoe Mussel ( <i>Fusconaia flava</i> )	SINC	N	S
Wartyback Mussel ( <i>Quadrula nodulata</i> )	SINC	N	S
Washboard Mussel ( <i>Megaloniaias nervosa</i> )	SINC	N	S
Western Fanshell Mussel ( <i>Cyprogenia aberti</i> )	E	N	S
<b>Animals, Invertebrate – Insects</b>			
American Burying Beetle ( <i>Nicrophorus americanus</i> )	E/E	N	F/S
Prairie Mole Cricket ( <i>Gryllotalpa major</i> )	SINC	N	S
*The Bald Eagle has been de-listed nationally (2007) but remains as a state listed species. The Bald Eagle remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.			

5.0 Census and Social Data (2000) <sup>4B</sup>



Estimated Number of Farms: 660  
Average Farm Size: 410

Estimated Number of Total Farm Operators: 660

Principal Operators – Full-Time: 380  
Principal Operators – Part-Time: 280

## 5.1 Estimated Level of Willingness and Ability to Participate in Conservation<sup>9</sup>

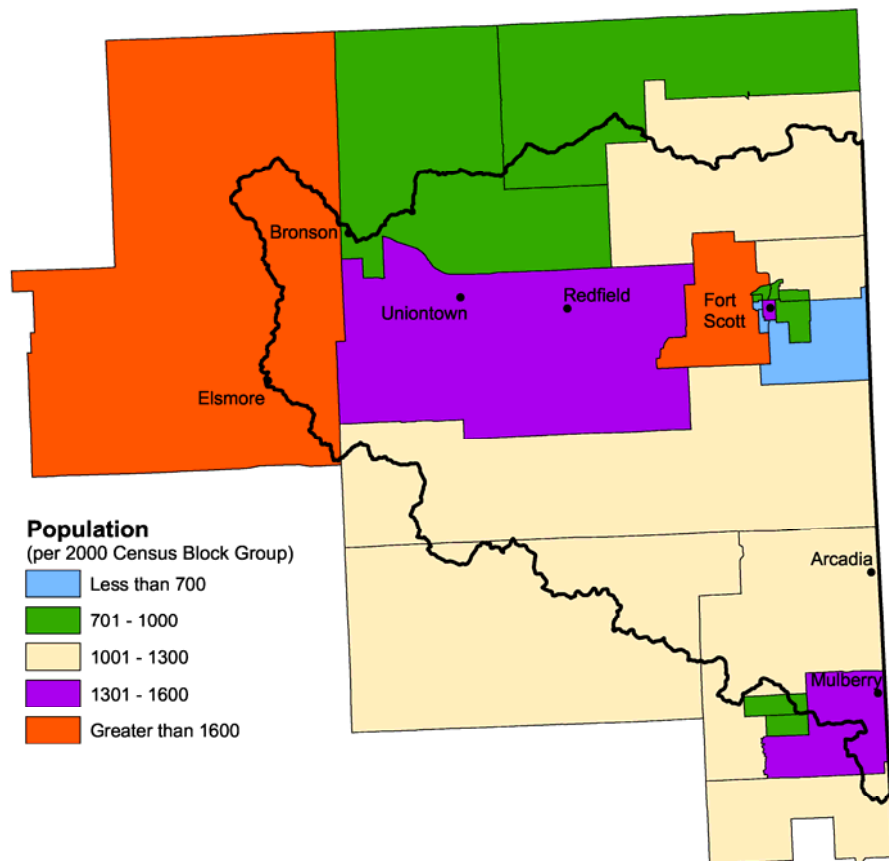
The Marmaton sub-basin exhibits a likelihood of full participation in the first 5 years of the project with only slight adjustments in technical and financial assistance and conservation marketing. Management skills, educational assistance, and technical assistance need moderate increases to improve the participation rate. On average, there are only a few concerns with the availability of technical assistance in the sub-basin. The existing information and education delivery system need minor modifications to improve effectiveness. Existing financial incentives need to be expanded or increased to achieve successful participation rates in a reasonable amount of time.

## 5.2 Evaluation of Social Capital<sup>10</sup>

Social capital is defined as bonds of trust that arise between people interacting in everyday life. Local conservationists developed a summary of social capital for this sub-basin and concluded the following.

Collectively, communities in the Marmaton sub-basin are reported to be somewhat effective at solving problems. Rural communities are willing to assist their neighbors by pooling their resources to overcome adversity.

## 5.3 Population Distribution Map (2000)



DECEMBER 2007

## 6.0 Conservation Progress

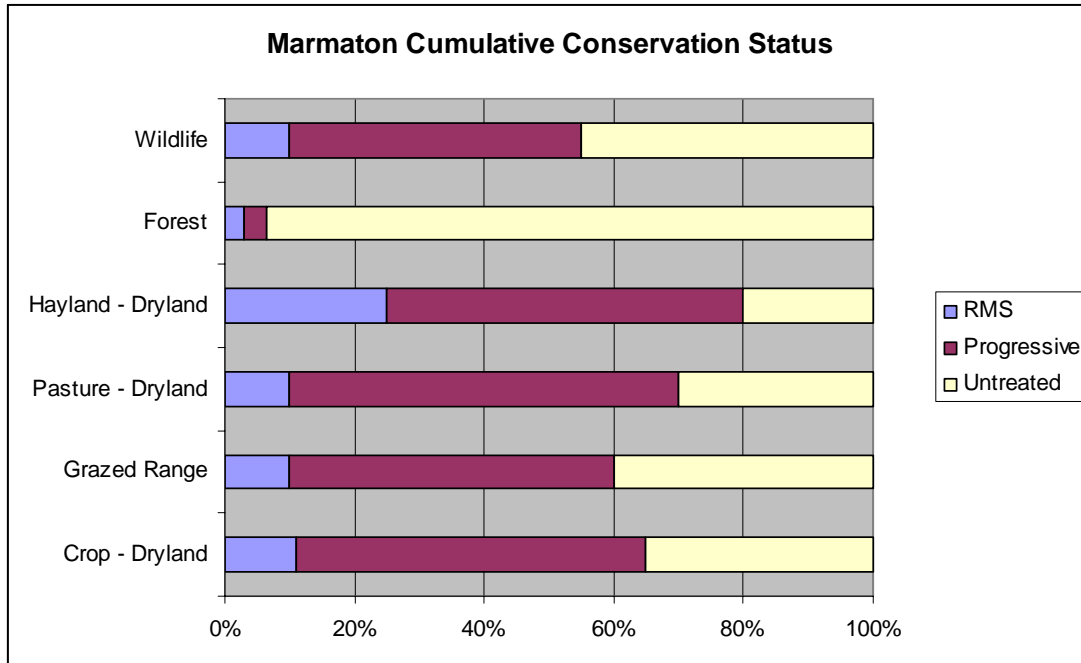
Conservation on the land is defined by the progress made by local landowners and operators addressing resource issues. Progress is typically accomplished through private, local, state, and federal funds. This data is current through the date the RWA was published. For up-to-date NRCS Performance Results System (PRS) information, visit <http://ias.sc.egov.usda.gov/PRSHOME/>.

### 6.1 Reported Conservation Progress (Fiscal Years [FY] 2002–2007)

PRS Data	FY02	FY03	FY04	FY05	FY06	FY07	Avg/ Year	Total
Total Conservation Systems Planned (ac)	4,198	3,655	N/A	7,898	9,990	3,422	5,833	29,163
Total Conservation Systems Applied (ac)	9,690	6,686	N/A	9,553	9,082	2,738	7,550	37,749
<b>Conservation Treatment (Units/Acres)</b>								
Brush Management (ac)				622	300	41	321	963
Conservation Crop Rotation (ac)			451	1,047	433	337	567	2,268
Contour Farming (ac)			118		197		158	315
Critical Area Planting (ac)			3	11	12	8	9	34
Dike (ft)						3,322	3,322	3,322
Diversion (ft)				450	547		499	997
Fence (ft)			1,413	21,811	24,735	8,682	14,160	56,641
Field Border (ft)				79,175	44,963		62,069	124,138
Filter Strip (ac)	32	191	108	71	18		84	420
Forage Harvest Management (ac)			350	429	244	75	275	1,098
Forest Stand Improvement (ac)						26	26	26
Grassed Waterway (ac)	9	20	2	9	17		11	57
Nutrient Management (ac)	701	1,127	629	239	1,294	202	699	4,192
Pasture and Hay Planting (ac)			192	151	139	19	125	501
Pest Management (ac)	1,263	1,378	1,583	2,409	2,285	187	1,518	9,105
Pipeline (ft)			700		3,748	1,375	1,941	5,823
Pond (no)			1	3	17	7	7	28
Prescribed Burning (ac)			7	1,503	917	574	750	3,001
Prescribed Grazing (ac)	1,997	1,700	1,558	3,239	4,157	360	2,169	13,011
Range Planting (ac)			232	130	86		149	448
Residue Management, Mulch Till (ac)			102	54	112	69	84	337
Residue Management, No-Till/Strip Till (ac)	336			173	112		207	621
Residue Management, Seasonal (ac)			517	780	502	73	468	1,872
Restoration and Management of Rare and Declining Habitats (ac)			1,986	958	813	32	947	3,789
Riparian Forest Buffer (ac)	22				37		30	59
Terrace (ft)			45,960	10,996	146,085		67,680	203,041
Tree/Shrub Establishment (ac)					25	5	15	30
Tree/Shrub Pruning (ac)						26	26	26
Tree/Shrub Site Preparation (ac)					21		21	21
Upland Wildlife Habitat Management (ac)	3,641	1,675	1,978	2,189	1,501	622	1,934	11,606
Use Exclusion (ac)			2,333	1,418	1,059	665	1,369	5,475
Watering Facility (no)				1	12	7	7	20
Wetland Restoration (ac)						73	73	73
Brush Management (ac)				622	300	41	321	963

## 6.2 Cumulative Conservation Status

Conservation plans developed and applied from 1995 to 2007 are projected in the following chart.



- Resource Management Systems (RMS) are conservation systems developed to address all identified resource concerns on a land unit or farm
- Progress over the last 10 years has been focused on:
  - Nutrient and pest management on cropland
  - Erosion control on cropland
  - Nutrient and Pest Management on grasslands

*Note: Estimates are based on information received from local conservationists in the watershed.*

## 6.3 Other Watershed Projects

<i>Watershed Projects, Plans, Studies, and Assessments</i> <sup>11,13</sup>
Marmaton River Watershed Restoration and Protection Strategy (WRAPS) Development Project
Marias de Cygne Basin WRAPS Implementation
Water Quality Protection Model Demonstration Project for Public Education Entities
Marmaton Watershed Joint District No. 102
Mill Creek Watershed Joint District No. 98

## 6.4 Lands Removed from Production through Farm Bill Programs<sup>14</sup>

Conservation Reserve Program (CRP)<sup>a</sup>: **13,552 acres**  
 Wetlands Reserve Program (WRP): **206 acres**

<sup>a</sup>Data from 2006 Farm Service Agency, CRP information

## 7.0 Footnotes/Bibliography

All data is provided "as is." There are no warranties, express or implied, including the warranty of fitness for a particular purpose, accompanying this document. Use for general planning purposes only.

1. Common Resource Area Map – Information available online at <http://efotg.nrcs.usda.gov/treemenuFS.aspx>; select Section I, E. Maps, 2. Common Resource Area Maps (CRA).
2. Precipitation Map – U.S. Department of Agriculture, National Weather and Climate Service. Online reference information available at <http://datagateway.nrcs.usda.gov/>.
3. National Land Cover Data (NLCD) - Originator: U.S. Geological Survey (USGS); Information available online at <http://landcover.usgs.gov/natl/landcover.php>.
4. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
5. Kansas stream flow data available from the U.S. Department of the Interior, U.S. Geological Survey online at: <http://waterdata.usgs.gov/ks/nwis/rt>.
6. Kansas Department of Health and Environment, Total Maximum Daily Loads (TMDL) Strategies, <http://www.kdheks.gov/tmdl/>.
7. U.S. Fish and Wildlife Service, Mountain-Prairie Endangered Species List, Kansas (January 2005) [http://ecos.fws.gov/tess\\_public/SpeciesReport.do?lead=6&listingType=L](http://ecos.fws.gov/tess_public/SpeciesReport.do?lead=6&listingType=L). The Kansas Department of Wildlife and Parks, Threatened and Endangered Species, [http://www.kdwp.state.ks.us/news/other\\_services/threatened\\_and\\_endangered\\_species](http://www.kdwp.state.ks.us/news/other_services/threatened_and_endangered_species).
8. Data were taken from the 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available.
9. Conservation participation was estimated using NRCS Social Sciences Technical Note 1801, [Guide for Estimating Participation in Conservation](#), 2004. Four categories of indicators were evaluated: Personal characteristics, farm structural characteristics, perceptions of conservation, and community context. Estimates are based on information received from local conservationists in the watershed.
10. Social capital is an indicator of the community's ability and willingness to work together to solve problems. A high amount of social capital helps a community to be physically healthy, socially progressive, and economically vigorous. A low amount of social capital typically results in community conflict, lack of trust and respect, and unsuccessful attempts to solve problems. The evaluation is based on NRCS Technical Report Release 4.1, March, 2002: [Adding up Social Capital: an Investment in Communities](#). Local conservationists provided information to measure social capital.
11. Natural Resources Conservation Service, Kansas online information at: <http://www.ks.nrcs.usda.gov/programs/pl566/>.



## Footnotes/Bibliography (continued)

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12. Natural Resources Conservation Service, Web Soil Survey can be located on-line at:  
<http://websoilsurvey.nrcs.usda.gov/app/>.
13. Kansas Department of Health and Environment, Bureau of Water, Watershed Management Section, <http://www.kdheks.gov/nps/wraps/index.htm>.
14. Natural Resources Conservation Service, Kansas, Program Information is located at:  
<http://www.ks.nrcs.usda.gov/programs/>.

### 8.0 Additional On-line Resources

1. U.S. Environmental Protection Agency, EnviroMapper for Water,  
[http://map8.epa.gov/scripts/esrimap.dll?name=NHDMapper&Cmd=ZoomInByCat&qc=3&th=6&lc=00010200000110\\_0000&fipsCode=10290104](http://map8.epa.gov/scripts/esrimap.dll?name=NHDMapper&Cmd=ZoomInByCat&qc=3&th=6&lc=00010200000110_0000&fipsCode=10290104).
2. U.S. Environmental Protection Agency, Surf Your Watershed at  
[http://cfpub.epa.gov/surf/huc.cfm?huc\\_code=10290104](http://cfpub.epa.gov/surf/huc.cfm?huc_code=10290104).