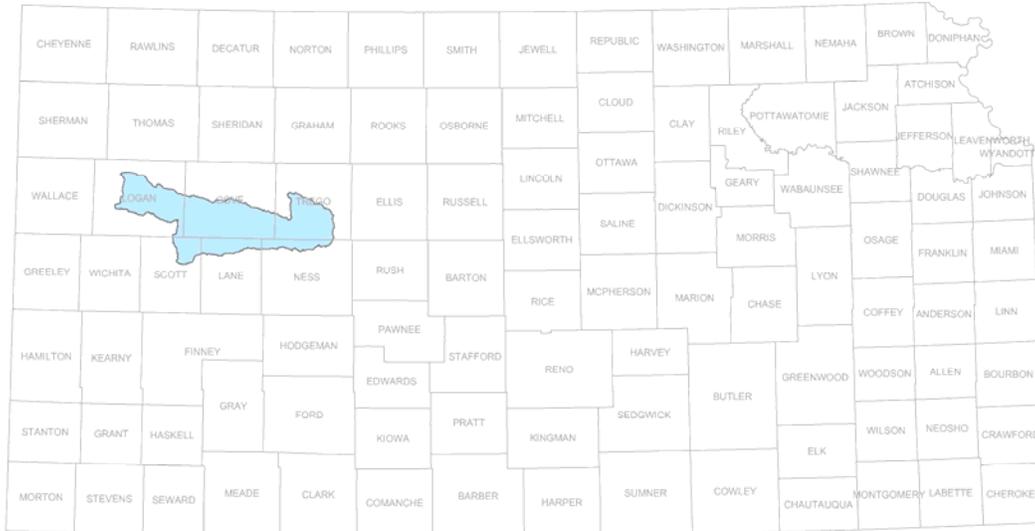


KANSAS

Rapid Watershed Assessment

Upper Smoky Hill Watershed Hydrologic Unit Code – 10260003



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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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 Hydric Soils
 - 3.6.1 Hydric Soils Summary Table
- 3.7 Farmland Classification
 - 3.7.1 Farmland Classification Summary Table

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
- 4.4 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

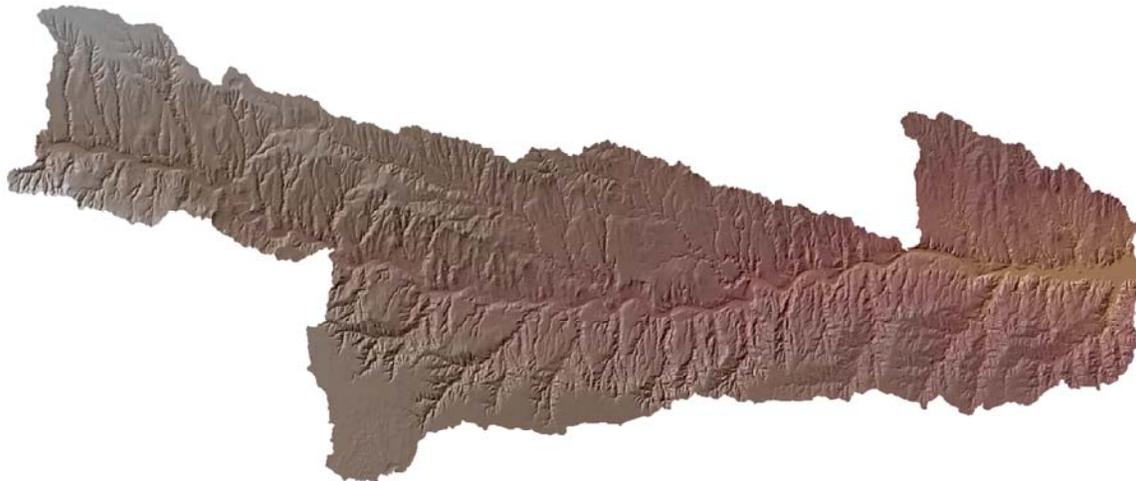
1.0 Purpose

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 Upper Smoky Hill sub-basin's natural resources, resource concerns, conservation needs, and ability to resolve natural resource issues and concerns.

2.0 Introduction

The Upper Smoky Hill 8-Digit Hydrologic Unit Code (HUC) sub-basin is comprised of approximately 945,700 acres in west central Kansas including Gove, Lane, Logan, Ness, Scott, and Trego counties. According to the National Land Cover Data (NLCD), approximately 28 percent of the sub-basin is in grain and row crop; 68 percent is in grassland, pasture, and hay; and the rest is in other various land uses. This sub-basin drains into the Kansas River as it flows from west to east through western Kansas.

Relief Map



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

It is estimated that there are 387 farms with an average size of 1,447 acres in the Upper Smoky Hill sub-basin.

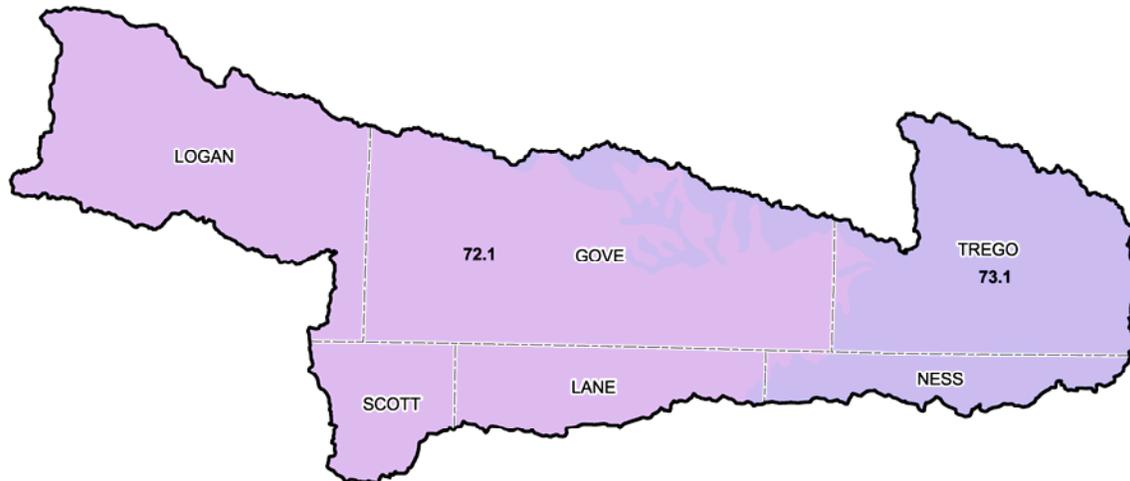
Six Natural Resources Conservation Service (NRCS) field offices, 6 county conservation districts, and 3 Resource Conservation and Development (RC&D) areas (Santa Fe Trail, Western Prairie, and Smoky Hills [pending]) provide conservation assistance in the sub-basin.

OCTOBER 2007

3.0 Physical Description

The physical description of the Upper Smoky Hill 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) Map⁴¹



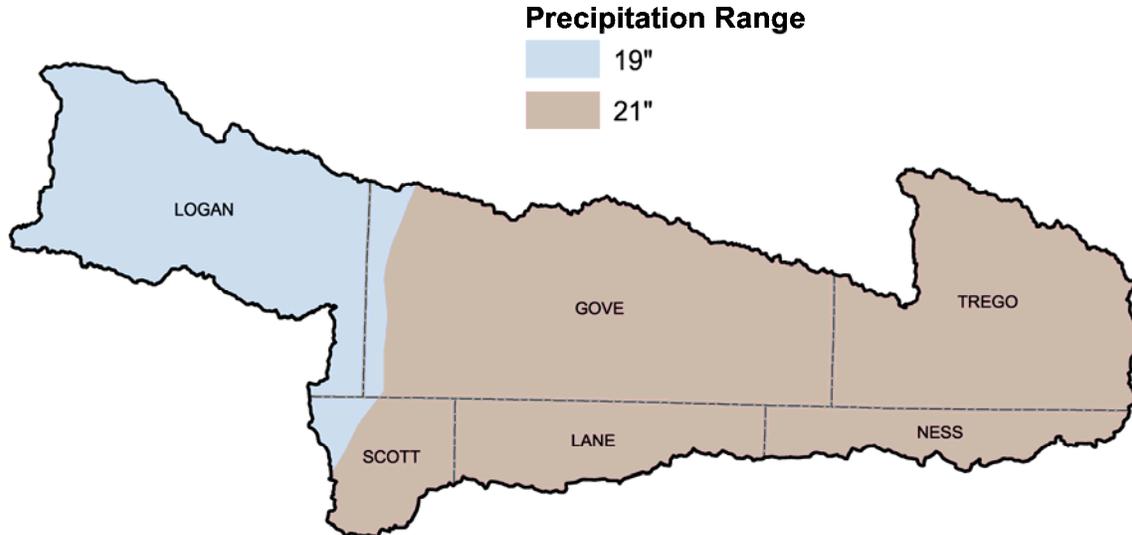
72.1 – Central High Tableland: The Central High Tableland CRA is broad, level to gently rolling, loess mantled tableland. Local relief is measured in tens of feet on the tableland and steep slopes border major river valleys. Soils are deep on the ridge-tops and moderately deep to shallow on the side-slopes. Presettlement vegetation was short grass prairies. Nearly all of this area is in cropland, both dryland small grain crops and irrigated corn and grain sorghum.

73.1 – Rolling Plains and Breaks: The Rolling Plains and Breaks CRA is dissected plains having broad undulating to rolling ridgetops, loess mantled, and hilly to steep sideslopes. Local relief reaches 300 feet and is dissected with narrow drainage ways and river valleys. Soils are deep on the ridgetops and moderately deep to shallow on the sideslopes. Presettlement vegetation was mid grass prairies. Most of this land is in farms, both small grain crops and native grasses.

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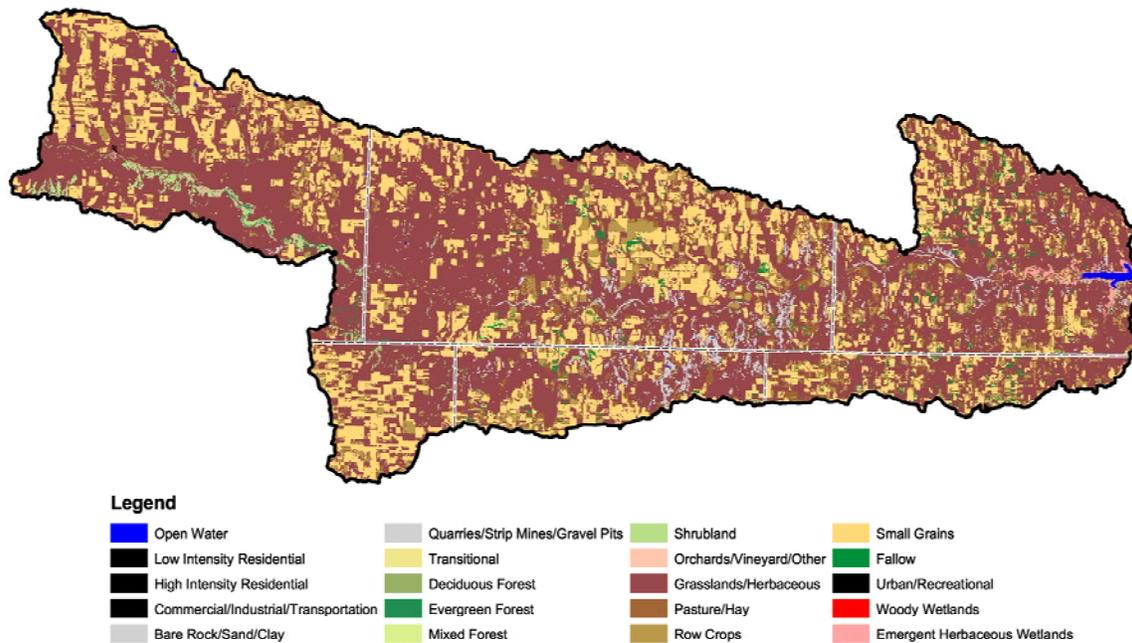
3.2 Precipitation Map²

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



3.3 Land Use and Land Cover Distribution Map³

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



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3.3.1 Land Use and Land Cover Summary Table³

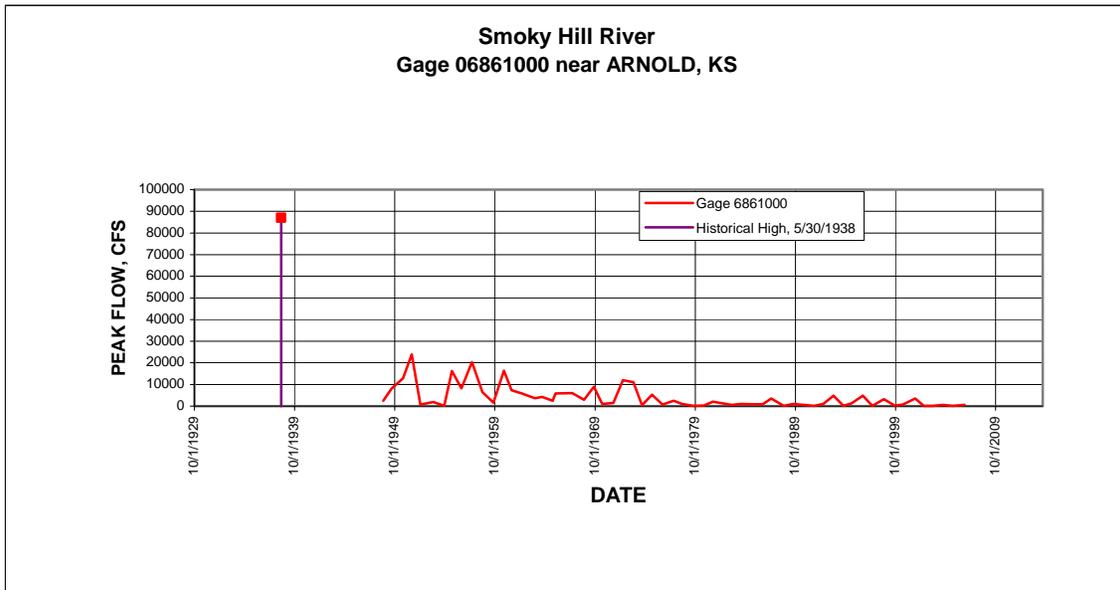
Land Cover/Land Use	Ownership						Totals	%
	Public		Private		Tribal			
	Acres	%	Acres	%	Acres	%		
Open Water	4,600	*	0				4,600	*
Low Intensity Residential			256	*			256	*
High Intensity Residential			10	*			10	*
Commercial/Industrial/ Transportation			201	*			201	*
Bare Rock/Sand/Clay	1,500	*	13,550	1			15,050	2
Quarries/Strip Mines/Gravel Pits			43	*			43	*
Transitional			54	*			54	*
Deciduous Forest			651	*			651	*
Evergreen Forest			897	*			897	*
Mixed Forest			2	*			2	*
Shrubland			10,322	1			10,322	1
Grasslands/Herbaceous	6,000	1	606,239	65			612,239	65
Pasture/Hay			25,838	3			25,838	3
Row Crops			47,431	5			47,431	5
Small Grains			219,395	23			219,395	23
Fallow			7,515	1			7,515	1
Urban/Recreational	850	*	0				850	*
Woody Wetlands			30	*			30	*
Emergent Herbaceous Wetlands	280	*	0				280	*
Unknown			36	*			36	*
HUC Totals^a	13,230	1	932,470	99	0	0	945,700	100
*Less than 1 percent of total acres								
^a Totals are approximate due to rounding an small, unknown acreages								
<u>Special Considerations for This 8-Digit HUC:</u>								
<ul style="list-style-type: none"> ▪ Small grains and row crops are the predominant commodities grown in rotation on 29 percent of the watershed (approx. 274,341 acres) ▪ Grasslands/Herbaceous and Pasture/Hay make up 68 percent of the watershed (approximately 638,077 acres) ▪ Forest makes up approximately 1 percent of the watershed (approximately 11,872 acres) ▪ Urban land comprises less than 1 percent of the watershed (approximately 467 acres) ▪ Cedar Bluff Reservoir and Wildlife Area information added to NLCD data. A discrepancy exists in the total land use and land cover estimates and needs to be evaluated further 								
Irrigated Lands⁴	Percent of Cropland				Percent of HUC			
Pressure	2				1			
Gravity	5				<3			

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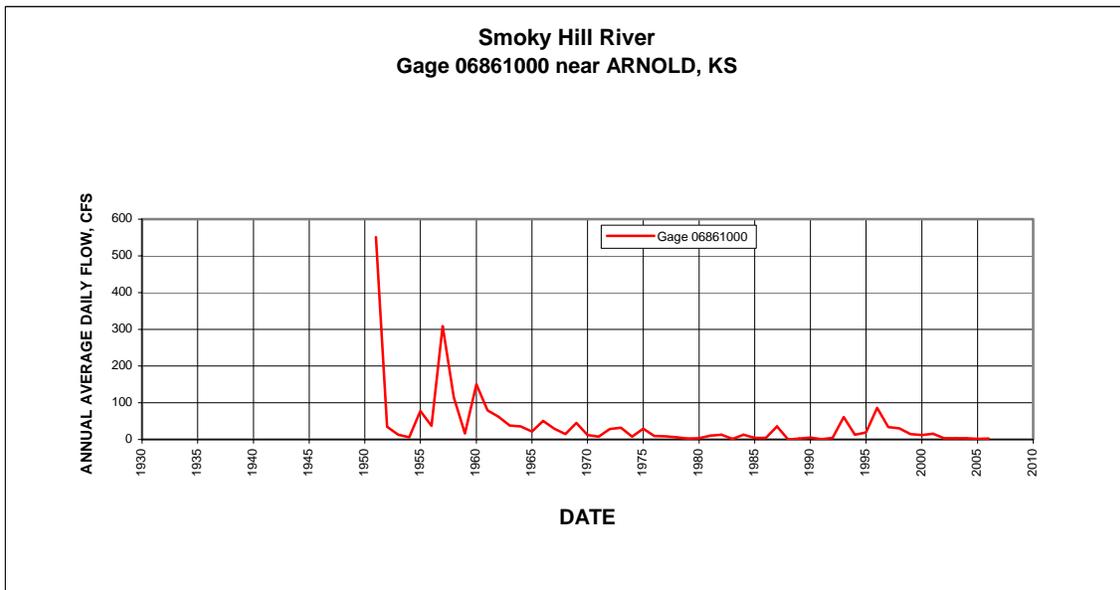
3.4 Stream Flow Data⁴⁵

Stream flow data has been collected since the mid 1940s. There are two known U.S. Geological Survey (USGS) stream gage stations located within the sub-basin. For this assessment, data was collected from one stream gage station on the Smoky Hill River near Arnold, Kansas.

Annual Peak Flow



Annual Average Discharge

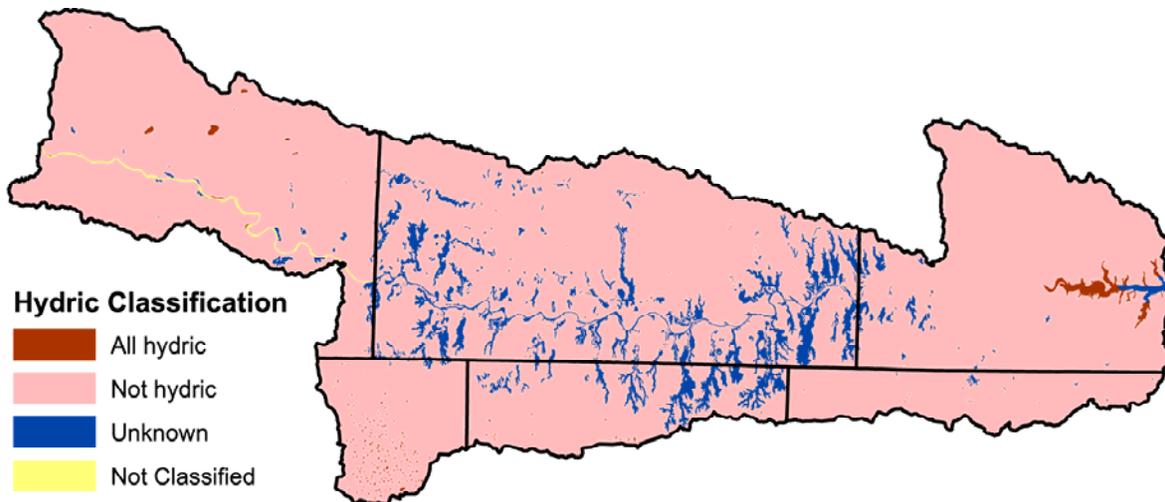


3.5 Other Physical Descriptions

Stream Data ^{/6}	Total Miles of Streams in HUC Major (24K Hydro Geographic Information System [GIS] Layer)	176 miles	
		ACRES	PERCENT
Land Cover/Use ^{/3} Based on a 100-foot stretch on both sides of all streams in the 24K Hydro GIS Layer	Open Water	1,548	2
	Low Intensity Residential	2	
	Commercial/Industrial/Transportation	2	
	Bare Rock/Sand/Clay	2,571	4
	Quarries/Strip Mines/Gravel Pits	3	
	Transitional	9	
	Deciduous Forest	270	
	Evergreen Forest	184	
	Mixed Forest	1	
	Shrubland	1,067	1
	Grasslands/Herbaceous	56,516	77
	Pasture/Hay	3,197	4
	Row Crops	2,627	4
	Small Grains	4,199	6
	Fallow	83	
	Woody Wetlands	12	
Emergent Herbaceous Wetlands	668	1	
	Total Acres of 100-foot Stream Buffers	72,957	100

3.6 Hydric Soils^{/12}

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, floodwater 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.



3.6.1 Hydric Soils Summary

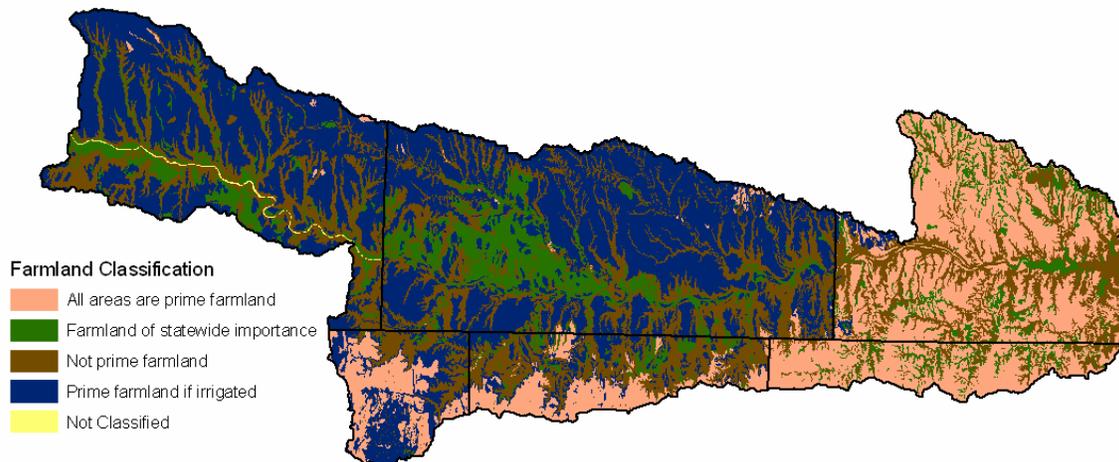
Hydric Classification	Acres	Percent
Not Classified	1,730	*
All Hydric	5,227	1
Not Hydric	887,005	94
Unknown	51,737	6
Total	945,700	100
<i>*Less than 1 percent of total acres</i>		

3.7 Farmland Classification⁴¹²

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 USDA.



3.7.1 Farmland Classification Summary

Farmland Classification	Acres	Percent
All areas are prime farmland	210,661	22
Farmland of statewide importance	111,162	12
Not prime farmland	270,371	29
Prime farmland if irrigated	351,774	37
Not classified	1,731	<1
Total	945,700	100

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 Upper Smoky Hill sub-basin.

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				
	Wind		X	X				
	Ephemeral Gully		X	X				
Soil Condition	Organic Matter Depletion		X	X				
	Rangeland Site Stability				X			
	Compaction		X	X				
	Contaminants: Commercial Fertilizer - N		X	X				
	Contaminants: Commercial Fertilizer - P		X	X				
Water Quantity	Inefficient Water Use on Irrigated Land		X	X				
	Aquifer Overdraft		X	X				
Water Quality, Groundwater	Excessive Nutrients and Organics		X	X				
Water Quality, Surface	Excessive Nutrients and Organics		X	X				
	Excessive Suspended Sediment and Turbidity		X	X				
Plant Condition	Productivity, Health and Vigor				X			
	Noxious and Invasive Plants		X	X	X			
	Forage Quality and Palatability				X			
Animal: Domestic	Inadequate Quantities and Quality of Feed and Forage				X			
	Inadequate Stock Water				X			
Human, Economics	Low or Unreliable Profitability				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.
- Sheet and rill, ephemeral gully, and wind erosion are concerns in part due to lack of residue and/or needed erosion control methods on cropland.

Grazed Range

- Rangeland is commonly over-utilized, affected by timing of grazing and invasive weeds, in turn affecting productivity, health, and vigor.
- Noxious weeds (e.g., musk thistle) are a concern.
- Over-utilization and lack of precipitation has created site stability, forage quality, and palatability concerns.
- Inadequate water supply for livestock affects grazing distribution and health and condition of the animal.

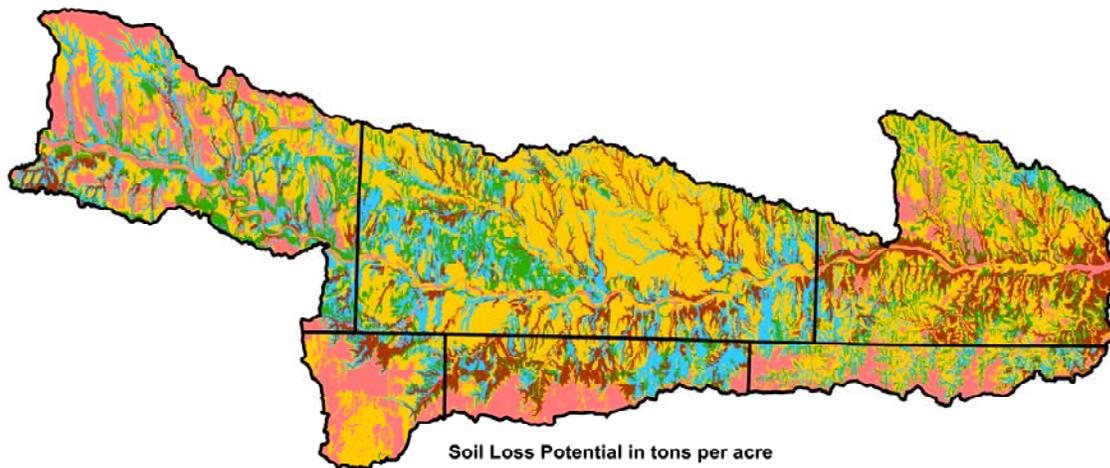
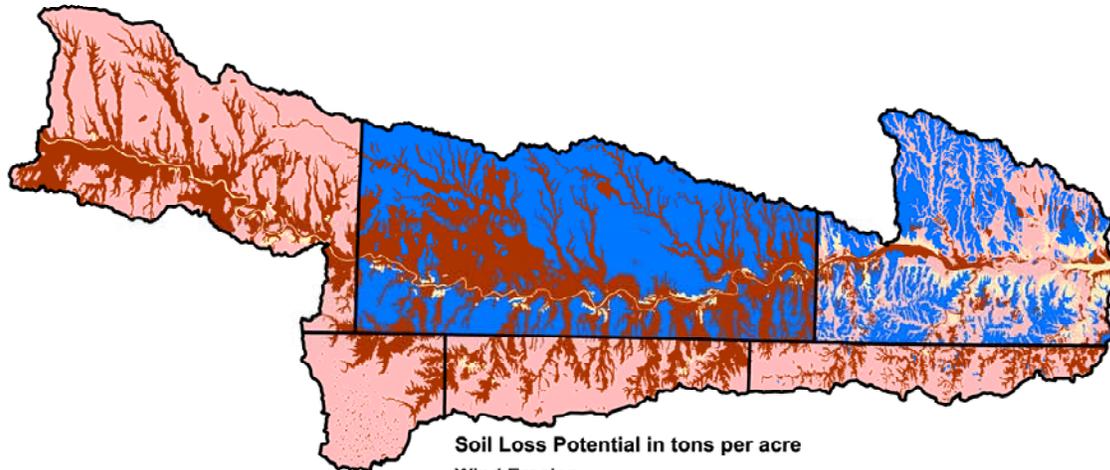
General

- Inputs needed to manage large agricultural operations, costs of production, and low commodity values require large capital outlay and place heavy financial burdens of landowners and producers.

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4.2 Potential Soil Loss¹²

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 Upper Smoky Hill sub-basin.



4.3 Water Quality Conditions¹⁴

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/befs/download/KS2006_305b_Reoprts.pdf.

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	12	0	0	0	0
No. of Permitted Animal Units	101	61,579	0	0	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 12 active public water supply sites located within the HUC 8 10260003 watershed. Although there are alluvial aquifers of the Smoky Hill River and its tributaries present, they do not account for the source of any of the public water supply wells. The High Plains and Dakota Aquifers provide water for active wells within this watershed. The surface water quality is affected by medium priority issues concerning eutrophication and lack of dissolved oxygen as well as low priority issues with selenium and sulfates.

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 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>.

4.3.3 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.

LAKE NAME	AL	CR	DS	FP	GR	IW	IR	LW
Cedar Bluff Lake	E	A		X			X	
Logan Co. SFL	E	B	O	X		O	O	O

Stream Name	AL	CR	DS	FP	GR	IW	IR	LW
Big Windy Creek	E	b						
Cheyenne Creek	E	b						
Downer Creek	E	b						
Downer Creek, E Branch	E	b						
Gibson Creek	E	b						
Goat Canyon Creek	E	b						
Hell Creek	E	b						
Indian Creek	E	b						
Indian Creek	E	b						
Page Creek	E	b						
Plum Creek	E	b						
Salt Creek	E	b						
Salt Creek, East	E	b						
Sand Creek	E	b						
Sand Creek	E	b						
Sand Creek, E Branch	E	b						
Six Mile Creek	E	b						
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Smoky Hill River	E	b	X	X	X	X	X	X
Spring Creek, West	E	b						
Unnamed Stream	E	b						
Wild Horse Creek	E	b						

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

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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

The following table shows the percentage of stream miles within HUC 8 10260003 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.

Stream Data <i>*Percent of Total Miles of Streams in HUC</i>	303d/TMDL Listed Streams (DEQ)	326	78%
--	--------------------------------	-----	-----

2006 Impaired Waters with TMDLs			
Stream Segment	Stream/Watershed/Lake with TMDL	Priority for TMDL Implementation	Impairments
	Smoky Hill River Watershed including Big Windy Creek, Downer Creek, East Branch Downer Creek, Hell Creek, Indian Creek, Salt Creek, East Salt Creek, Sand Creek, East Branch Sand Creek, Six Mile Creek, Wild Horse Creek	Medium Low Low	Dissolved Oxygen Selenium Sulfate
	Cedar Bluff Lake	Medium Low	Eutrophication Sulfate

2006 Impaired Waters Needing TMDLs	
Impaired Stream/Lake	Impairment
Smoky Hill River near Gove	Dissolved Oxygen
Smoky Hill River above Cedar Bluff	Cadmium E Coli Bacteria

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.

Cadmium: A trace metal with acute toxicity and long-term detrimental impacts to aquatic biology in streams and lakes.

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E Coli Bacteria: Bacteria found in the digestive systems of warm-blooded animals. Coliform bacteria are an indicator of potential disease producing organisms. Potential sources of bacterial contamination in groundwater include livestock facilities, septic systems, pets, and wildlife. Many wells are impacted by bacteria due to improper construction, which allows water from the surface to funnel directly into the well.

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

Selenium: A naturally occurring inorganic material that may have toxic effects on humans at high concentrations.

Sulfate: A naturally occurring mineral that can cause taste and odor problems in drinking water. Sulfates are dissolved into groundwater as the water moves through various sulfur containing rock formations.

4.4 Threatened and Endangered Species Status¹⁷

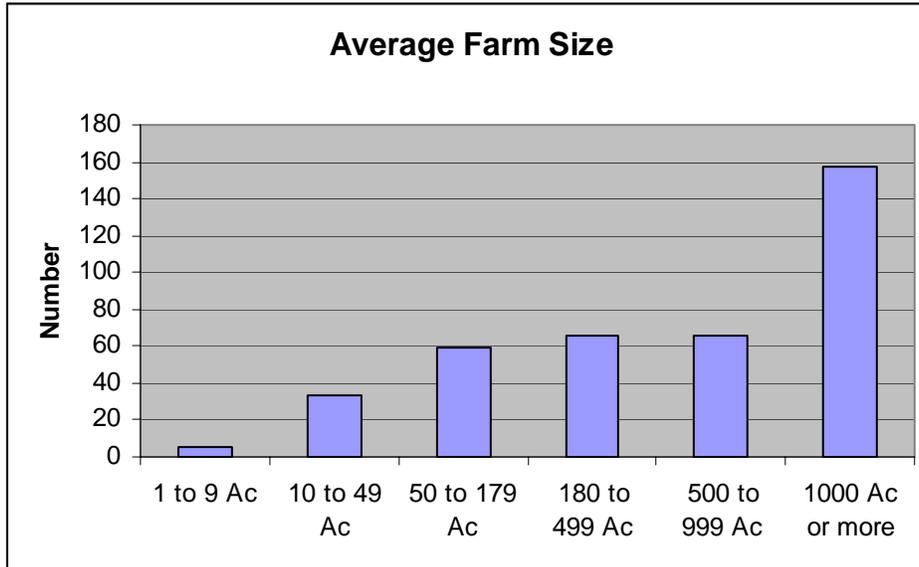
The Endangered Species Act (ESA) and Kansas Environmental Coordination Act provide protection to animals and their habitat that are experiencing a decline in population, or nearing extinction. The table below lists species of concern and their federal and state designation(s).

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)
Animals, Vertebrates – Fishes			
River Shiner (<i>Notropis blennioides</i>)	SINC	N	S
Plains Minnow (<i>Hybognathus placitus</i>)	SINC	N	S
Topeka Shiner (<i>Notropis topeka</i>)	E/T	N	F/S
Animals, Vertebrate – Birds			
Bald Eagle (<i>Haliaeetus leucocephalus</i>)*	T	Y	S
Black Tern (<i>Chidonias niger</i>)	SINC	N	S
Curve-Billed Thrasher (<i>Toxostoma curvirostre</i>)	SINC	N	S
Chihuahuan Raven (<i>Corvus cryptoleucus</i>)	SINC	N	S
Ferruginous Hawk (<i>Buteo regalis</i>)	SINC	N	S
Golden Eagle (<i>Aquila chrysaetos</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
Mountain Plover (<i>Charadrius montanus</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
White-faced Ibis (<i>Plegadis chihi</i>)	T	N	S
Whooping Crane (<i>Grus Americana</i>)	E/E	N	F/S
Animals, Vertebrate – Amphibians/Reptiles			
Eastern Hognose Snake (<i>Heterodon platirhinos</i>)	SINC	N	S
Glossy Snake (<i>Arizona elegans</i>)	SINC	N	S
Western Hognose Snake (<i>Heterodon nasicus</i>)	SINC	N	S
Western Green Toad (<i>Bufo debilis insidiar</i>)	T	Y	S

DECEMBER 2007

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)
Animals, Vertebrate – Mammals			
Black-footed Ferret (<i>Mustela nigripes</i>)	E/E	N	F/S
Eastern Spotted Skunk (<i>Spilogale putorius interrupta</i>)	T	Y	S
Franklin's Ground Squirrel (<i>Spermophilus franklinii</i>)	SINC	N	S
Animals, Invertebrate - Insects			
Scott Riffle Beetle (<i>Optioservus phaeus</i>)	T	Y	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) ⁴⁸



Average Number of Farms: 387

- Average Farm Size: **1,447**

Principal Operator by Primary Occupation: 275

5.1 Estimated Level of Willingness and Ability to Participate in Conservation ⁴⁹

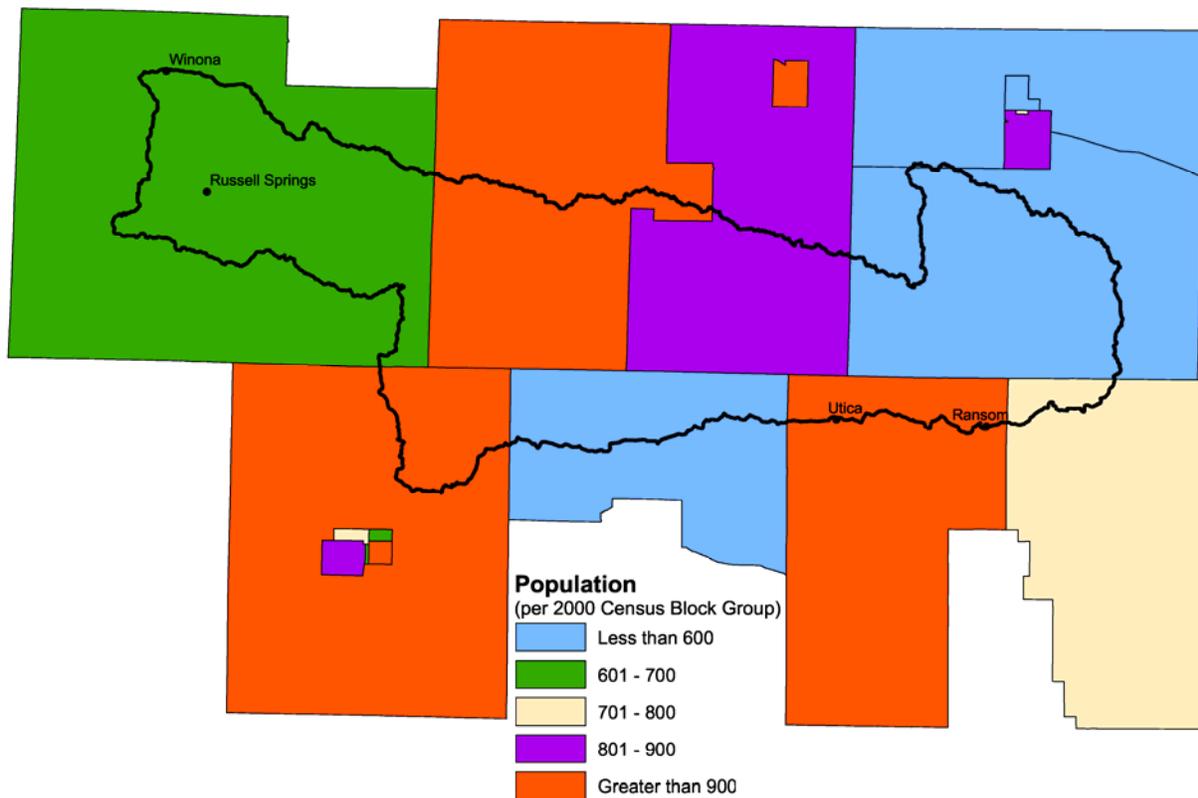
The Upper Smoky Hill sub-basin exhibits a good likelihood of full participation in the first 5 years of the project with moderate adjustments in technical and financial assistance, and conservation marketing. Management skills and a combination of educational assistance and technical assistance could be increased to improve the participation rate. On average, there are no concerns with the availability of technical assistance in the sub-basin. The existing information and education delivery system need 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 Capital¹⁰

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 Upper Smoky Hill sub-basin are reported to be somewhat effective at solving problems. Small communities are willing to assist their neighbors by pooling their resources to overcome adversity. Dry climatic conditions over the past decade have affected the community economic capital and led to a decreased state of social well-being, which decreases the community's ability to address local resource concerns.

5.3 Population Distribution Map (2000)



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/>.

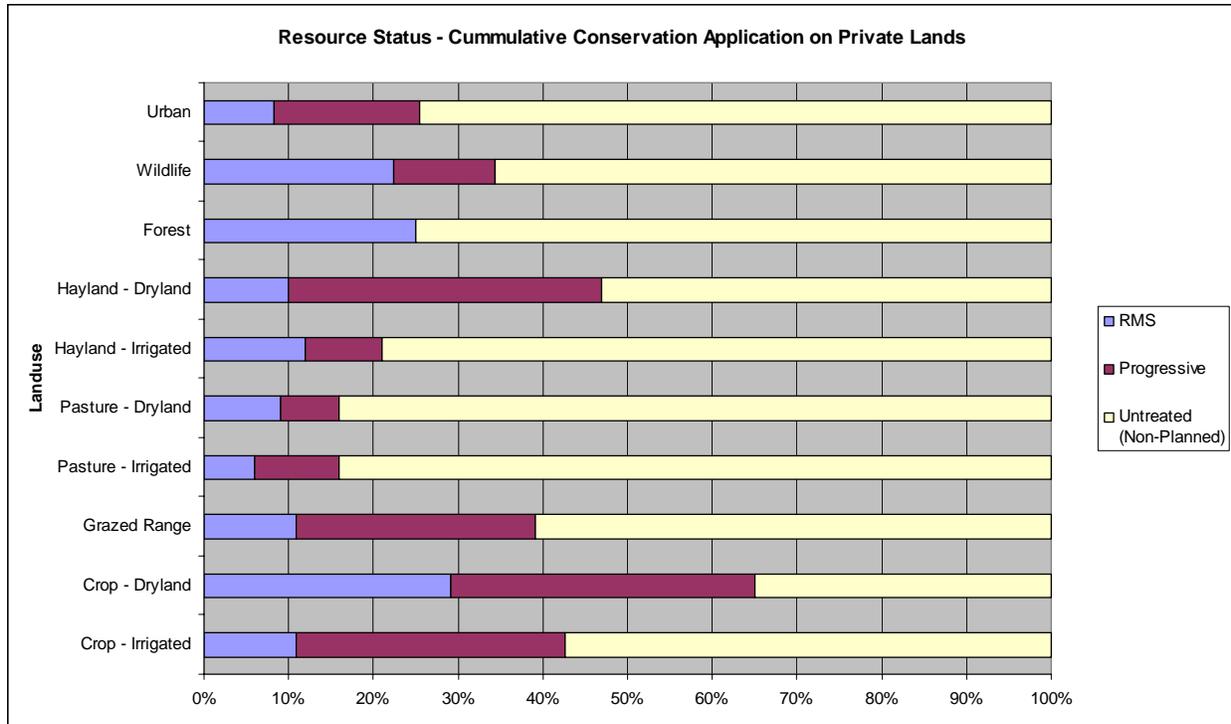
DECEMBER 2007

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)	70,064	36,427	N/A	45,820	29,395	23,108	40,963	204,814
Total Conservation Systems Applied (Ac)	35,913	28,520	N/A	11,984	34,713	18,386	25,903	129,516
Conservation Treatment (Units/Acres)								
Critical Area Planting (ac)			18	18	19	29	21	84
Cross Wind Trap Strips (ac)	6	12					9	18
Diversion (ft)						1,500	1,500	1,500
Fence (ft)					12,306		12,306	12,306
Filter Strip (ac)				9			9	9
Forage Harvest Management (ac)			891	544	596	313	586	2,344
Grassed Waterway (ac)	16	40	3	9	21	2	15	91
Irrigation Water Management (ac)	240						240	240
Nutrient Management (ac)					2,492	454	1,473	2,946
Pasture and Hay Planting (ac)				99	4		52	103
Pest Management (ac)	4,615	108	2,536	5,295	7,294	4,112	3,993	23,960
Pipeline (ft)			56,042	7,159	36,133		33,111	99,334
Prescribed Burning (ac)				79			79	79
Prescribed Grazing (ac)	35,354	23,165	2,783	3,013	12,254	4,550	13,520	81,119
Range Planting (ac)			827	1,513	3,608	1,022	1,743	6,970
Residue and Tillage Management, Mulch Till (ac)						26	26	26
Residue Management, Mulch Till (ac)	1,188	1,366		783	1,457	203	999	4,997
Residue Management, No-Till/Strip Till (ac)	250				6,812	5,178	4,080	12,240
Residue Management, Seasonal (ac)			1,645	1,031	1,923		1,533	4,599
Restoration and Management of Rare and Declining Habitats (ac)			1,655	3,247	5,179	2,800	3,220	12,881
Terrace (ft)			147,078	71,612	121,606	36,309	94,151	376,605
Underground Outlet (ft)						836	836	836
Upland Wildlife Habitat Management (ac)	34,506	388	2,348	2,699	6,873	5,052	8,644	51,866
Use Exclusion (ac)			2,003	19,993	7,192	5,309	8,624	34,497
Watering Facility (no)			27	3	15		15	45
Wildlife Watering Facility (no)			1	37	17	16	18	71
Windbreak/Shelterbelt Establishment (ft)	18,321	6,454	934	4,672	4,825		7,041	35,206

6.2 Cumulative Conservation Status

Conservation plans developed and applied from 1995 to 2005 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
- Range, pasture, and hay producers typically have not worked with NRCS, creating an opportunity for assistance.

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

6.3 Other Watershed Projects

Watershed Projects, Plans, Studies, and Assessments ¹³
319 Projects, KDHE TMDL Plans ¹⁶ , Watershed Restoration and Protection Strategy (WRAPS) Plans
Cedar Bluff Reservoir WRAPS Project

6.4 Lands Removed from Production through Farm Bill Programs¹⁴

Conservation Reserve Program (CRP)^a: **56,875 acres**

^aData from 2006 Farm Service Agency, CRP Information

DECEMBER 2007

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. The Kansas Department of Wildlife and Parks, 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/>.

DECEMBER 2007

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=10260003.
2. U.S. Environmental Protection Agency, Surf Your Watershed at: http://cfpub.epa.gov/surf/huc.cfm?huc_code=10260003.