



United States Department  
of Agriculture



Natural Resources  
Conservation Service

Lakewood, Colorado

RWA 11030001

August 2010

# Middle Arkansas-Lake McKinney Watershed

Hydrologic Unit Code 11030001

Rapid Assessment





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## Introduction

### Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals.

### Benefits of these Activities

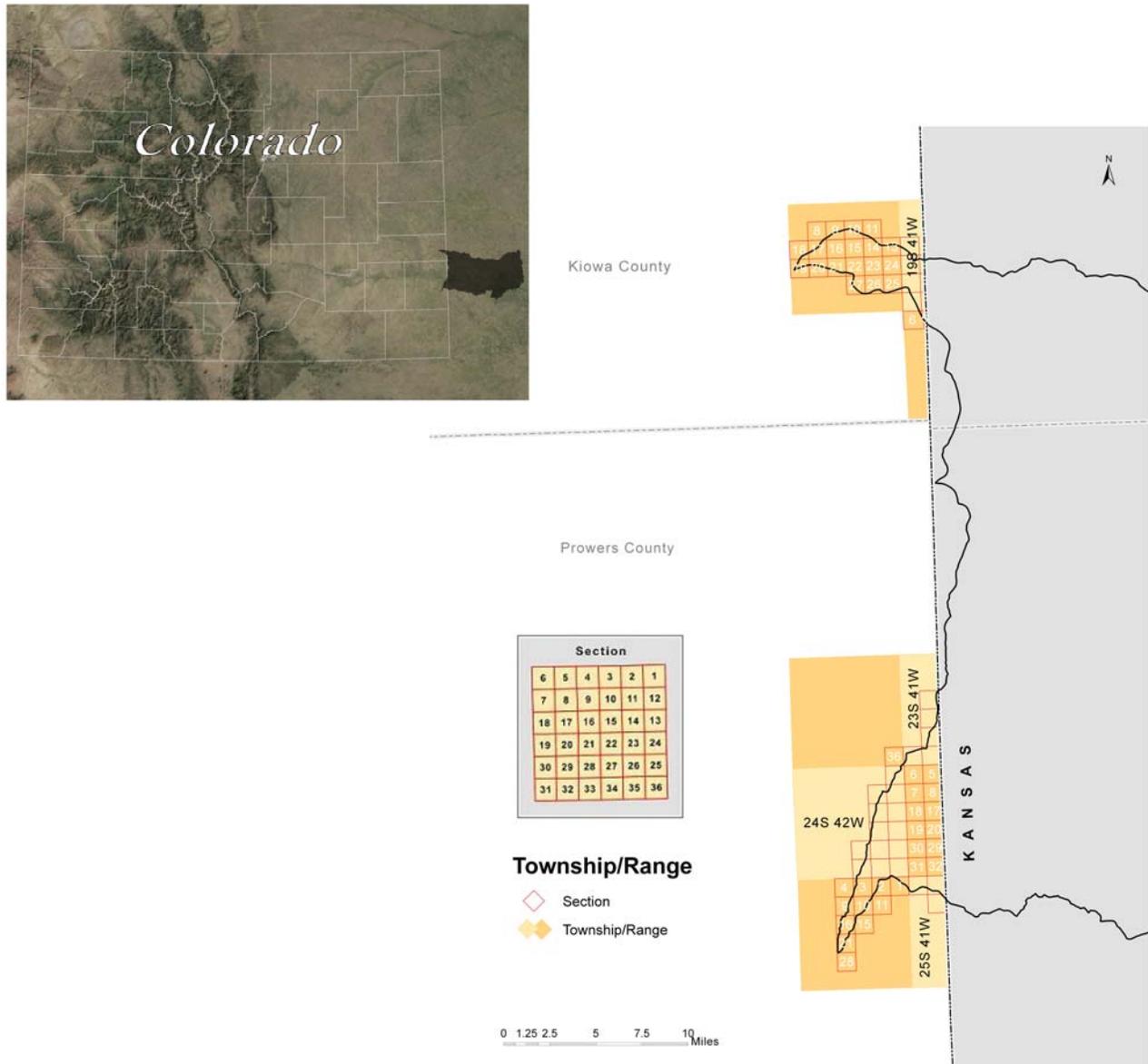
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis but these activities are part of standard requirements for use of best management practices (BMPs) and conservation systems
- Identifying where further detailed analyses or watershed studies are needed
- Plans address multiple objectives and concerns of landowners and communities
- Plans are based on established partnerships at the local and state levels
- Plans enable landowners and communities to decide on the best mix of NRCS programs that will meet their goals
- Plans include the full array of conservation program tools (i.e. cost-share practices, easements, technical assistance)

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Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.

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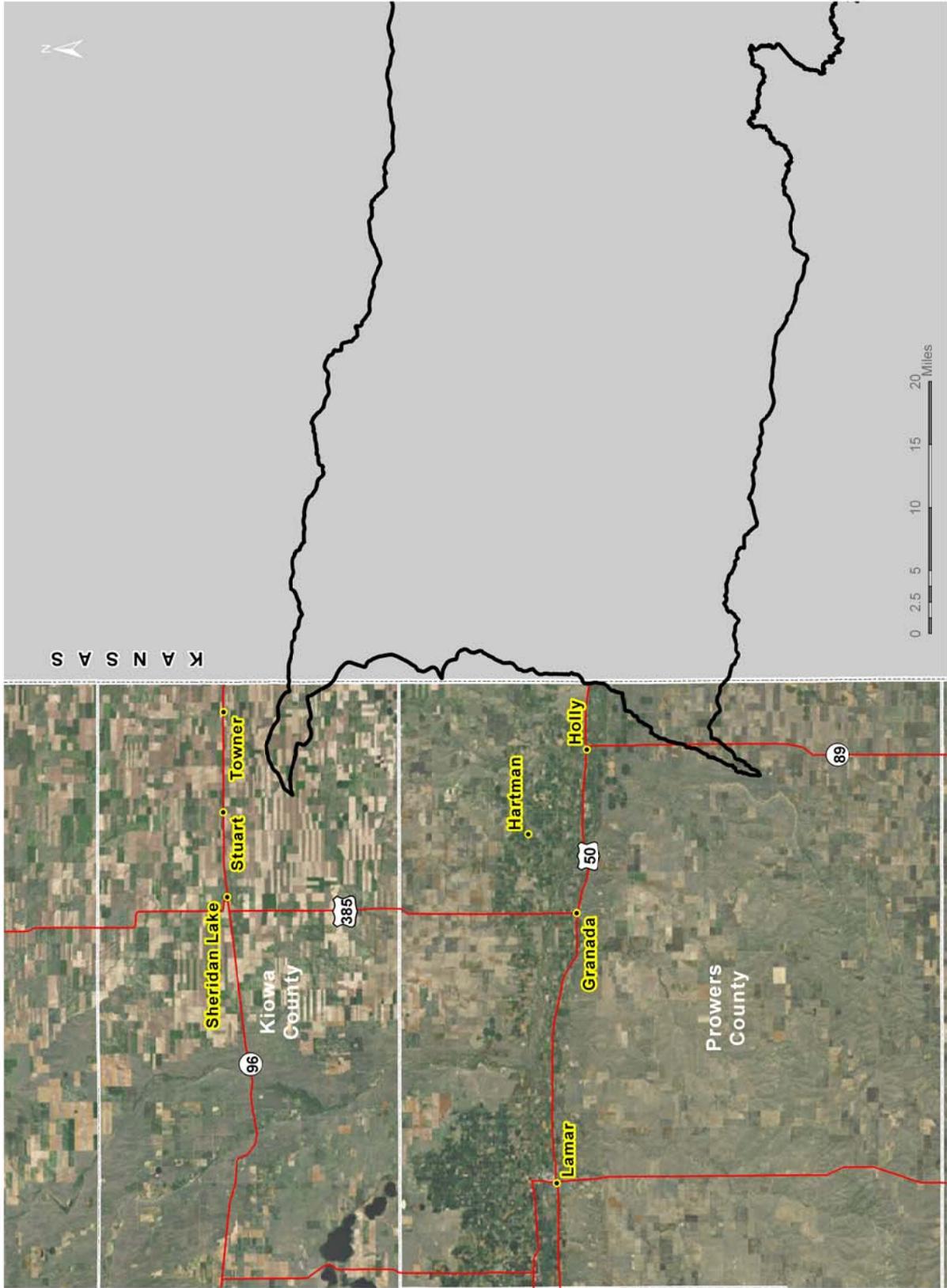
COLORADO County	County Acres	County Acres in MIDDLE ARKANSAS-LAKE McKINNEY Water-	% of County in the Watershed	% of Watershed in the County
Kiowa	1,143,074	9,537	0.8%	0.6%
Prowers	1,052,893	18,943	1.8%	1.3%

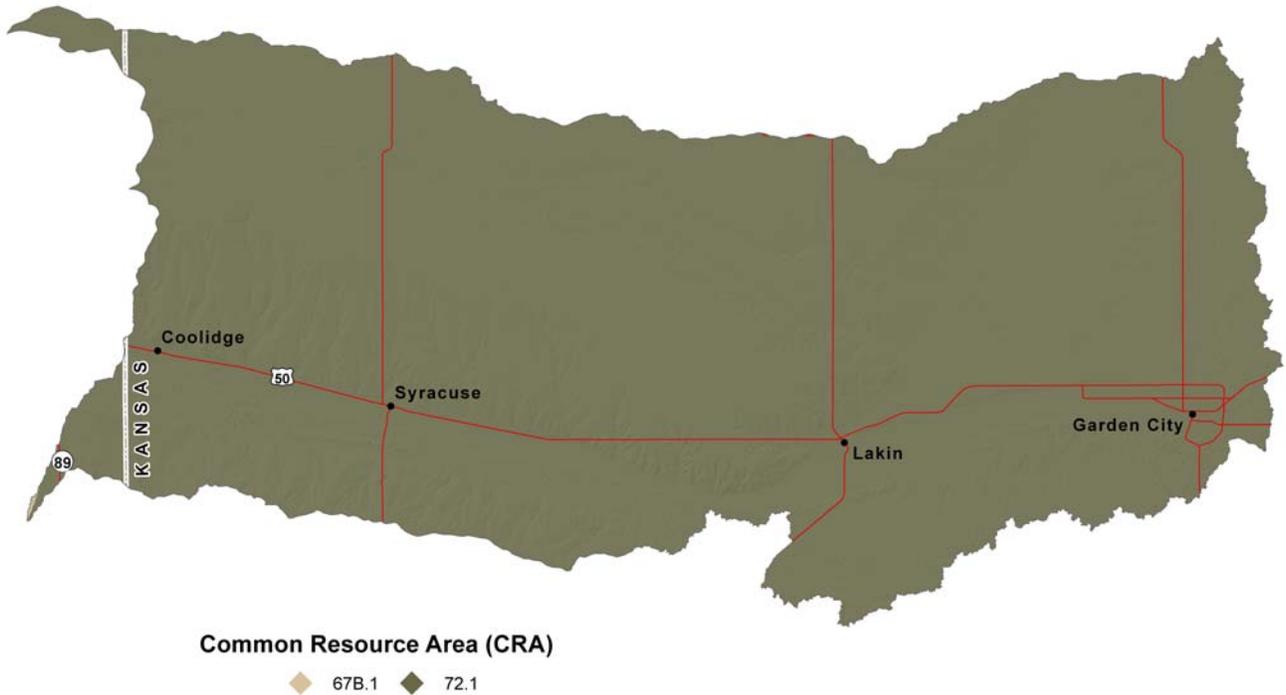
**KANSAS**

Finney	835,873	291,458	34.9%	19.8%
Greeley	498,469	107,842	21.6%	7.3%
Hamilton	639,207	486,697	76.1%	33.0%
Kearny	558,744	485,901	87.0%	32.9%
Scott	460,360	55,653	12.1%	3.8%
Wichita	460,642	19,193	4.2%	1.3%

1,475,224

Middle Arkansas-Lake McKinney Watershed - 11030001





MLRA	CRA	CRA NAME	CRA DESCRIPTION
67B	<b>67B.1</b>	Central Great Plains, Southern Part	The Central High Plains, Southern Part CRA is broad, undulating to rolling plains dissected by streams and rivers. Local relief is measured in tens of feet on the plains. Soils are deep and formed in aeolian and alluvial materials. Pre-settlement vegetation was short grass prairies. Nearly all of this area in fallow cropland rotations or rangeland. Some cropland areas are irrigated.
72	<b>72.1</b>	Central High Tableland	The Central High Tableland CRA is broad, level to gently rolling, loess mantled tableland. Local relief is measured in feet on the tableland tens of feet and major river valleys bordered by steep slopes. Soils are deep. Pre-settlement vegetation was short grass prairies. Nearly all of this area in cropland, both dry land small grain crops and irrigated corn and grain sorghum.

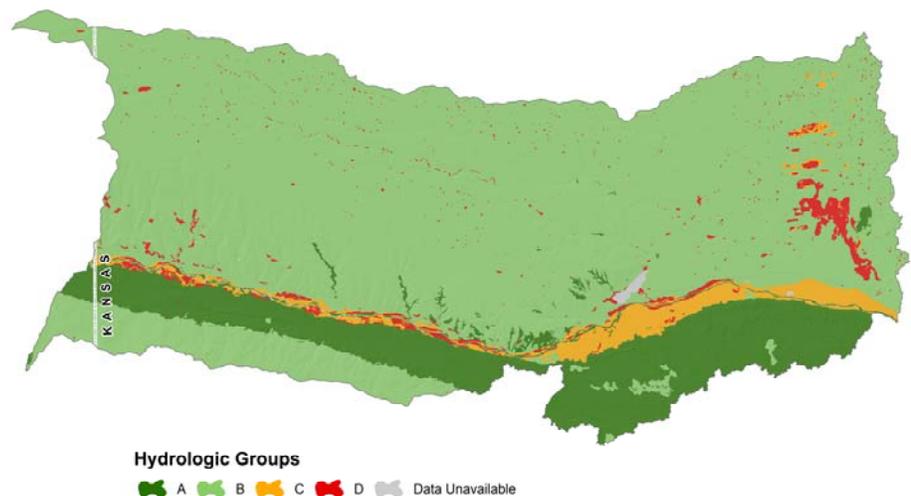
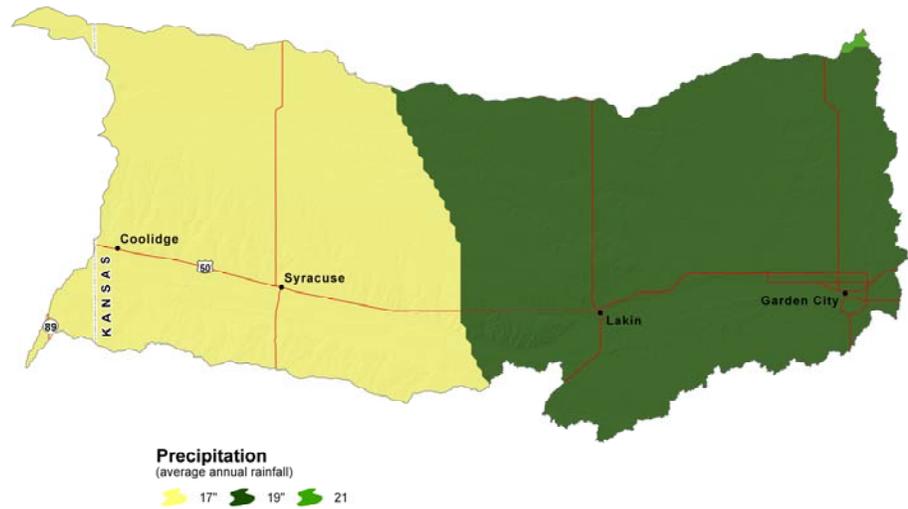


<u>MIDDLE ARKANSAS-LAKE McKINNEY WATERSHED Land Use</u>	Total Acreage	Vegetation	Acreage
Cropland	11,146	Dryland Ag	9,797.0
		Irrigated Ag	1,348.7
Rangeland/Grassland	16,871	Grass Dominated	3,529.9
		Grass/Forb Mix	7,274.5
		Mid-grass Prairie	17.8
		Sagebrush Community	2,898.9
		Sagebrush/Grass Mix	2,472.6
		Shrub/Grass/Forb Mix	358.0
		Sparse Grass (Blowouts)	319.7
Riparian	68	Forested Riparian	30.0
		Herbaceous Riparian	37.8
<b>~Total Watershed Acres</b>			<b>28,085</b>



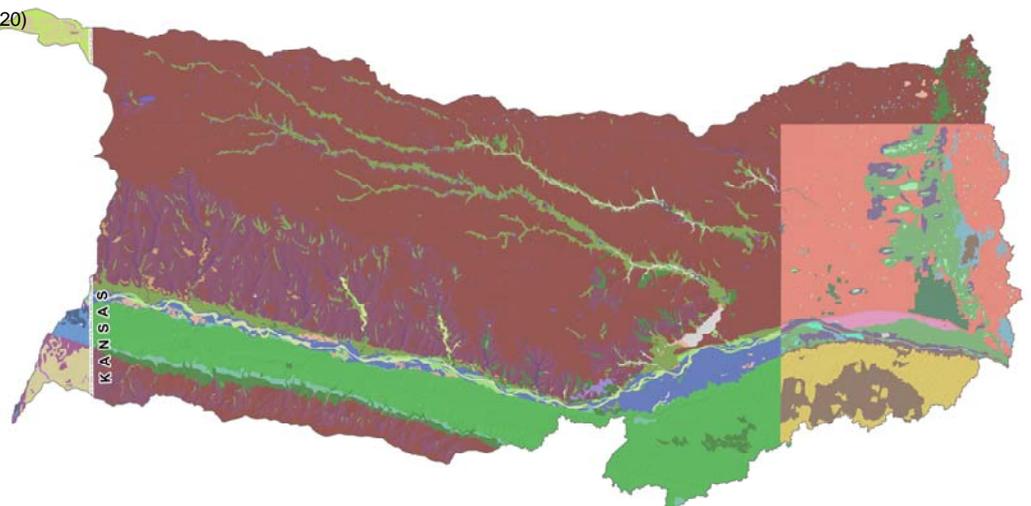
## Precipitation

Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide, in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series of hot, dry summers following a period of scant mountain snowpack created water shortages. The fourth drought hit parts of Colorado in the late 1970s. In this century, the most severe drought since 1723 hit the state in 2002. Prior to the 1700's, researchers looking at tree ring records have found evidence of even more severe droughts, some lasting many years.



**Soil: Ecological Site Name**

- ◆ Data Unavailable
- ◆ CHOPPY SANDS (PE16-20) (South) (Formerly Choppy Sands, KS & CO)
- ◆ CLAY UPLAND (South) (formerly Clay Upland, KS)
- ◆ CLOSED UPLAND DEPRESSION (South) (Formerly Lakebed in KS, Plains Swale in CO)
- ◆ Choppy Sands
- ◆ Choppy Sands (South) (PE16-20)
- ◆ Clay Upland (PE 20-26)
- ◆ Clay Upland (South) (PE16-20)
- ◆ Closed Upland Depression (South) (PE16-20)
- ◆ GRAVELLY HILLS (PE16-20)
- ◆ LAKEBED (PE17-20)
- ◆ LIMY UPLAND (PE20-26)
- ◆ LOAMY LOWLAND (PE16-20) (South) (Formerly Loamy Lowland, KS)
- ◆ LOAMY TERRACE (PE16-20) (South) (Formerly Loamy Terrace, KS - Part of Overflow, CO)
- ◆ LOAMY UPLAND (PE16-20) (South) (formerly Loamy Upland, KS - Loamy Plains, CO)
- ◆ Limestone Breaks
- ◆ Limy Upland (PE 20-26)
- ◆ Limy Upland (South) (formerly Limy Upland, KS - Loamy Slopes, CO)
- ◆ Loamy
- ◆ Loamy Plains
- ◆ Loamy Terrace (South) (PE 16-20)
- ◆ Loamy Upland (South) (PE 16-20)
- ◆ Overflow
- ◆ Plains Swale
- ◆ SALINE LOWLAND (PE16-20)(South) (Formerly Saline Lowland, KS & NE - Salt Flats, CO)
- ◆ SALINE SUBIRRIGATED (PE16-20)(South) (Formerly Saline Subirrigated, KS-Salt Meadow, CO)
- ◆ SALINE SUBIRRIGATED (PE20-26)
- ◆ SANDS (PE16-20) (South) (Formerly Sands, KS - Deep Sand, CO)
- ◆ SANDY (PE16-20) (South) (Formerly Sandy, KS - Sandy Plains, CO)
- ◆ SANDY LOWLAND (PE16-20) (South) (Formerly Sandy Lowland, KS - Sandy Bottomland, CO)
- ◆ SHALLOW LIMY (PE16-20) (South) (Formerly Shallow Limy, KS - Limestone Breaks, CO)
- ◆ SUBIRRIGATED (PE16-20)
- ◆ Saline Lowland (South) (PE 16-20)
- ◆ Saline Subirrigated (South) (PE 16-20)
- ◆ Salt Meadow
- ◆ Sands
- ◆ Sands (South) (PE 16-20)
- ◆ Sandy
- ◆ Sandy (South) (PE 16-20)
- ◆ Sandy Bottomland
- ◆ Sandy Lowland (South) (PE 16-20)



**Class 1** - soils have few limitations that restrict their use.

**Class 2** - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

**Class 3** - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

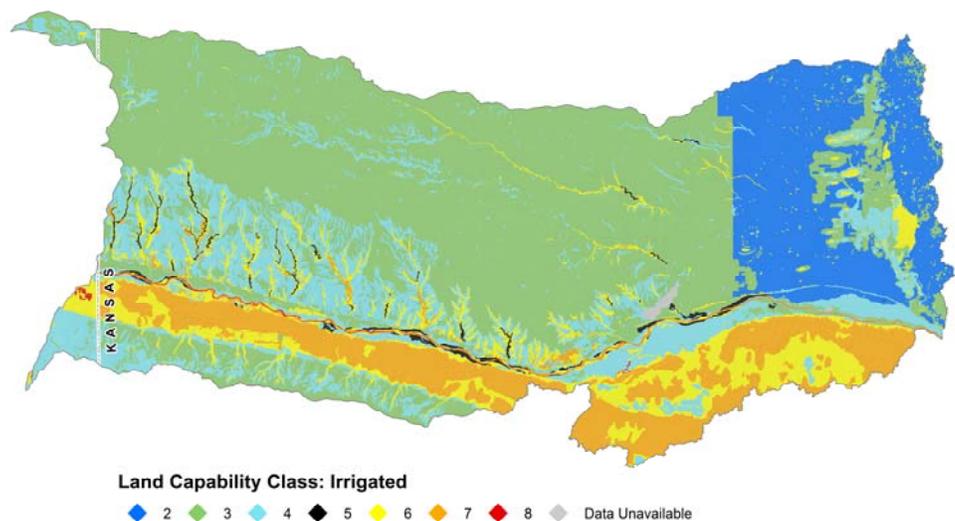
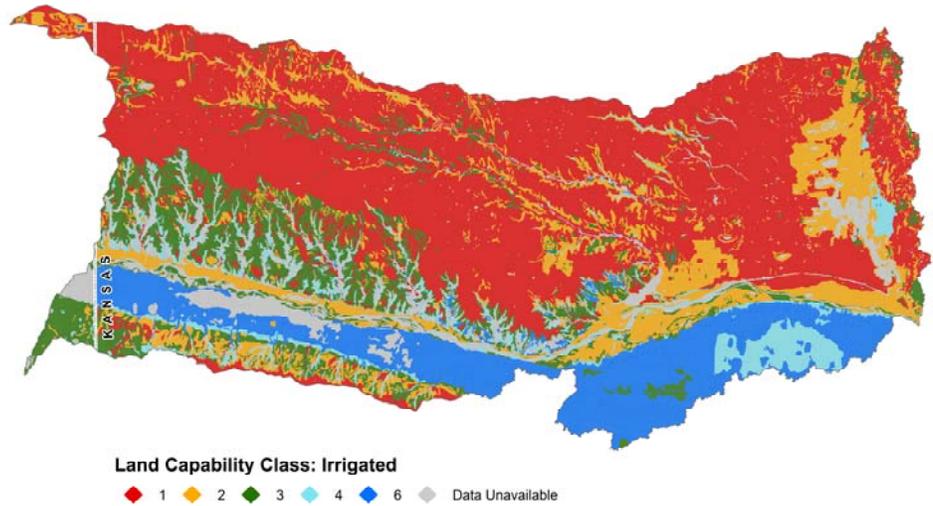
**Class 4** - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

**Class 5** - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

**Class 6** - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

**Class 7** - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

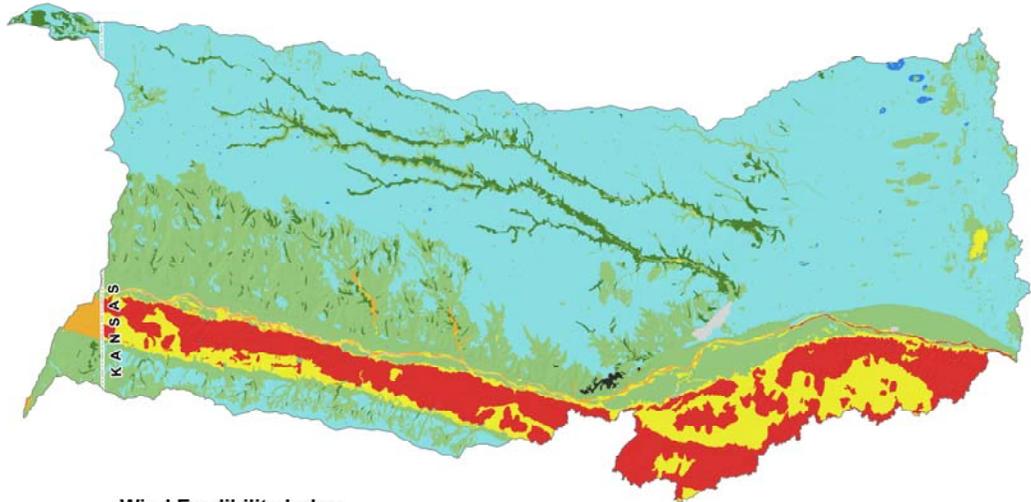
**Class 8** - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.



### The Wind Erodibility Index

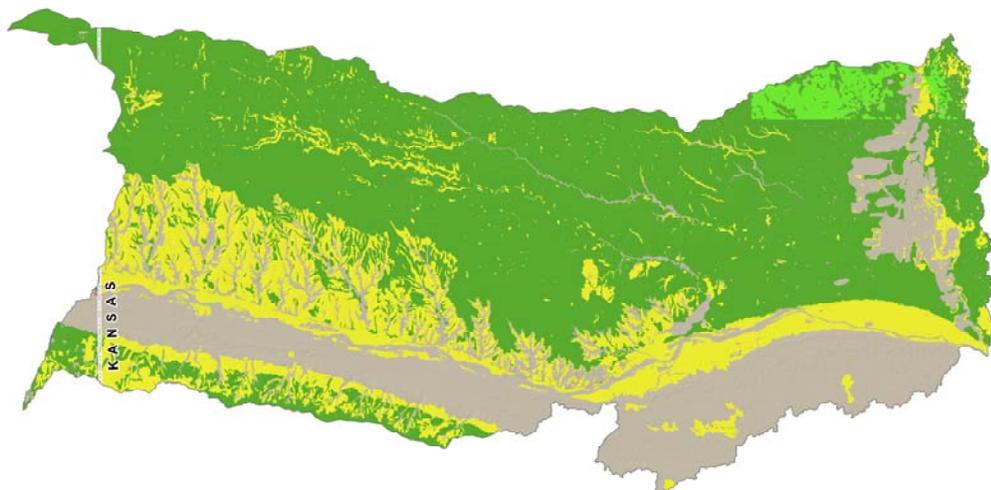
**(WEI):** numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

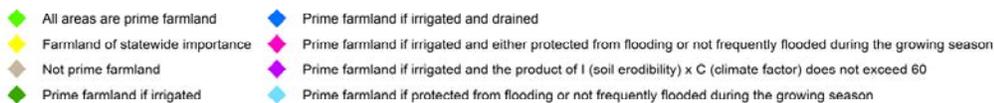


#### Wind Erodibility Index

(Tons/Acre/Year)



#### Farmland Classification



## State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern in Middle Arkansas-Lake McKinney Watershed

Common Name	Scientific Name	Class	State Status/Federal Status	Comments
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Birds	Threatened/None	May occur in the watershed
Black-tailed Prairie Dog	<i>Cynomys ludovicianus</i>	Mammals	Concern/None	Occurs in the watershed
Burrowing Owl	<i>Athene cunicularia</i>	Birds	Threatened/None	Occurs in the watershed
Common Kingsnake	<i>Lampropeltis getula</i>	Reptiles	Concern/None	May occur in the watershed
Ferruginous Hawk	<i>Buteo regalis</i>	Birds	Concern/None	May occur in the watershed
Flathead Chub	<i>Platygobio gracilus</i>	Fish	Concern/None	Occurs in the watershed
Lesser Prairie Chicken	<i>Tympanuchus pallidicinctus</i>	Birds	Threatened/Candidate	Occurs in the watershed
Long-Billed Curlew	<i>Numenius americanus</i>	Birds	Concern/None	May occur in the watershed
Massasauga	<i>Sistrurus catenatus</i>	Reptiles	Concern/None	Occurs in the watershed
Mountain Plover	<i>Charadrius montanus</i>	Birds	Concern/None	Occurs in the watershed
Plains Leopard Frog	<i>Rana blairi</i>	Amphibians	Concern/None	Occurs in the watershed
Suckermouth Minnow	<i>Phenacobius mirabilis</i>	Fish	Endangered/None	May occur in the watershed
Swift Fox	<i>Vulpes velox</i>	Mammals	Concern/None	Occurs in the watershed
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Reptiles	Concern/None	Occurs in the watershed
Townsend's big-eared bat (pale ssp)	<i>Corynorhinus townsendii pallescens</i>	Mammals	Concern/None	May occur in the watershed
Yellow Mud Turtle	<i>Kinosternon flavescens</i>	Reptiles	Concern/None	May occur in the watershed

The predominant terrestrial habitat types in this watershed are shortgrass prairie, sand dune/shrub complex, and dry cropland. Wildlife species found on the shortgrass prairie include mountain plover, black-tailed prairie dog, and swift fox. Seasonal streams with associated riparian areas and stock ponds provide limited aquatic habitats in the shortgrass. Economically important wildlife species that occur in the watershed include black bullhead, sunfish, pronghorn, mule and white-tailed deer, pheasant, mourning dove, wild turkey, bobwhite, and scaled quail.

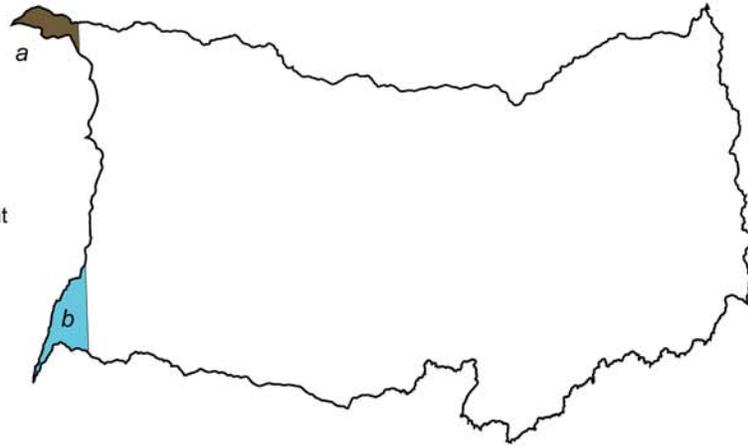
<b>Social Data</b>	<b>Kiowa</b>	<b>Prowers</b>
<b>Demographics (US Census, American Factfinder)</b>		
Total population	1,622	14,483
Male	811	7,278
Female	811	7,205
Median age (years)	39.7	32.4
White	1,559	11,379
Black or African American	8	43
American Indian and Alaska Native	18	177
Asian	0	54
Native Hawaiian and Other Pacific Islander	1	4
Some other race	23	2487
Hispanic or Latino (of any race)	51	4766
<b>Economic Characteristics</b>		
In labor force-population 16 years & over	776	6,976
Median household income (dollars)	30,494	29,935
Median family income (dollars)	35,536	34,202
Per capita income (dollars)	16,382	14,150
Families below poverty level	43	546
Individuals below poverty level	195	2755
<b>County Agricultural Characteristics</b>		
Farms (number)	357	531
Land in farms/ranches (acres)	896,772	861,778
Average size farm/ranch (acres)	2,512	1,623
Median size farm (acres)	1,280	640
Average age of farmer or rancher	55.2	53.3
Net cash return from ag sales (\$1,000)	944	8,467
Cattle and calves (number)	15,000	110,000

## Identified Long Range Resource Concerns Top Three Concerns within Conservation Districts

Conservation Districts  
a Kiowa County  
b Northeast Prowers

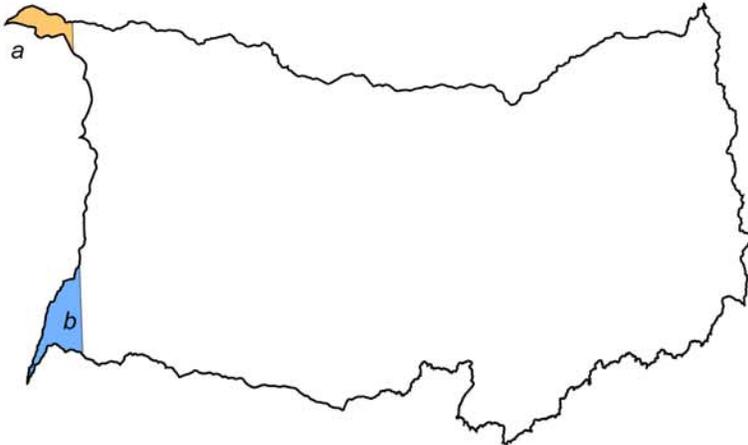
- Irrigation Water Management
- Soil Loss-Erosion Control

#1



- Noxious Weeds
- Water Quality/Quantity

#2



- Grasslands
- Pest Infestation

#3



Practice	Unit	Program	FY	Land Use	Applied	Count
Residue Management, Seasonal	ac	EQIP	2005	Crop	158.5	1
Conservation Crop Rotation	ac	CRP	2006	Crop	62.5	1
Conservation Crop Rotation	ac	CTA-GENRL	2006	Crop	1212.1	6
Residue Management, Seasonal	ac	CTA-GENRL	2006	Crop	1366.1	7
Forage Harvest Management	ac	CRP	2006	Crop	40	1
Prescribed Grazing	ac	CRP	2006	Crop	660.2	5
Conservation Crop Rotation	ac	CTA-GENRL	2007	Crop	150	4
Residue Management, Seasonal	ac	CTA-GENRL	2007	Crop	150	4
Irrigation Water Management	ac	CTA-GENRL	2007	Crop	140.7	2
Conservation Cover	ac	CRP	2008	Crop	975.3	7
Conservation Cover	ac	CTA-GENRL	2008	Crop	301.2	1
Residue Management, Seasonal	ac	CTA-GENRL	2008	Crop	70.7	1
Prescribed Grazing	ac	CTA-GENRL	2008	Crop	2122.6	11
Nutrient Management	ac	CTA-GENRL	2008	Crop	70.7	1
Integrated Pest Management	ac	CRP	2008	Crop	1276.5	8
Integrated Pest Management	ac	CTA-GENRL	2008	Crop	195.7	2
Conservation Cover	ac	CRP	2009	Crop	70.9	1
Conservation Cover	ac	CTA-GENRL	2009	Crop	788.5	7
Conservation Crop Rotation	ac	CTA-GENRL	2009	Crop	824.8	7
Residue Management, Seasonal	ac	CTA-GENRL	2009	Crop	824.8	7
Irrigation Water Management	ac	CTA-GENRL	2009	Crop	375	3
Prescribed Grazing	ac	CTA-GENRL	2009	Crop	809.7	7
Nutrient Management	ac	CTA-GENRL	2009	Crop	824.8	7
Integrated Pest Management	ac	CTA-GENRL	2009	Crop	1505.2	12
Prescribed Grazing	ac	CTA-GLC	2005	Grazed Range	783	1
Enhancement - Energy Management	ac	CSP	2005	Grazed Range	982.9	1
Enhancement - Grazing Management	ac	CSP	2005	Grazed Range	1223.1	1
Enhancement - Habitat Management	ac	CSP	2005	Grazed Range	327.6	1
Enhancement - Nutrient Management	ac	CSP	2005	Grazed Range	982.9	1
Enhancement - Pest Management	ac	CSP	2005	Grazed Range	982.9	1
Residue Management, Seasonal	ac	CTA-GLC	2007	Grazed Range	24.8	1
Irrigation Water Management	ac	CTA-GLC	2007	Grazed Range	24.8	1
Prescribed Grazing	ac	CTA-GLC	2007	Grazed Range	866.7	4
Prescribed Grazing	ac	CTA-GENRL	2008	Grazed Range	2627.3	5
Integrated Pest Management	ac	CTA-GENRL	2008	Grazed Range	1112.3	1
Integrated Pest Management	ac	EQIP	2008	Grazed Range	100	1
Upland Wildlife Habitat Management	ac	CTA-GENRL	2008	Grazed Range	1358.3	3
Brush Management	ac	EQIP	2009	Grazed Range	285.7	6
Prescribed Grazing	ac	CTA-GENRL	2009	Grazed Range	3133	14
Integrated Pest Management	ac	CTA-GENRL	2009	Grazed Range	3358.7	16
Integrated Pest Management	ac	EQIP	2009	Grazed Range	100	1

**Conservation Systems to Address Major Resource Concerns** *from the Field Office Technical Guide*

<b>Grazed Rangeland</b> —Grazing resources need improved plant condition (similarity index), productivity, health and vigor. Grazing animals have inadequate quantities and quality of feed, forage, and shelter. The animals are adapted to the climatic and ecological condition of the resources.	<b>CO 72.1-GR-01</b>
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<i>Practices</i>	<i>Description</i>	<i>Resource Concerns Addressed</i>
314 Brush Management 382 Fence 516 Pipeline 528 Prescribed Grazing 595 Pest Management 614 Watering Facility 642 Water Well 645 Upland Wildlife Habitat Management 666 Forest Stand Improvement	The Central High Tableland is broad, level to gently rolling, loess mantled tableland. Soils vary from shallow to deep. Vegetation varies from short grasses to tall grasses based on soils and past management. Majority of the precipitation occurs thru spring snows and also thru severe summer high intensity rains.	Domestic Animals - Inadequate Stock Water Fish and Wildlife - T&E Species: Declining Species, Species of Concern Plant Condition - Productivity, Health and Vigor Soil Erosion - Sheet and Rill Soil Erosion - Wind

<b>Dry Cropland Seasonal</b> —Seasonal residue management with Conservation crop rotation, Nutrient and Pest Mgt.	<b>CO 72.1-CR-Dryland</b>
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<i>Practices</i>	<i>Description</i>	<i>Resource Concerns Addressed</i>
328 Conservation Crop Rotation 344 Residue Management, Seasonal 590 Nutrient Management 595 Pest Management	Crops: wheat, corn, milo, millet, sunflower, forage sorghum. Fallow included in rotation. Soils: silt loams and loams. Annual precipitation ranges from 14 - 18". Moisture usually lacking in the summer during peak ET; rainfall often comes in short intense spring and early summer storms. Wildlife potential for use by pheasant, quail, deer, pronghorn and other wildlife. Long term agricultural production practices have resulted in water and wind erosion, soil compaction and decrease in organic matter.	Soil Erosion - Sheet and Rill Soil Erosion - Wind Water Quantity - Inefficient Water Use on Irrigated Land

**Estimated Costs of Application of Conservation Systems**

Landuse	Estimated Acres Need to be Treated	Estimated Average Cost per Acre (\$)	Costs (\$)
Range	10,000	30	300,000
Crop	3,000	45	135,000
			<b>Total Costs: \$435,000</b>

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## FOOTNOTES/ BIBLIOGRAPHY

**Threatened and Endangered Species** information was gathered using data from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS). NDIS GIS data may be downloaded at <http://ndis.nrel.colostate.edu>. For more information on Colorado's Endangered & Threatened Species, as well as Species of Concern, visit <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList/ListOfThreatenedAndEndangeredSpecies.htm> or <http://mountainprairie.fws.gov/endspp/CountyLists/COLORADO.htm>

**Resource Concerns** were identified using the Colorado Association of Conservation Districts' (CACD) long range (10 year) plans from the period of 1996-2000. Only the top three environmental resource concerns for each district were used. For more information on Colorado's Conservation Districts, visit <http://www.cacd.us>.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado & Border State surveys:

- Kiowa County (CO061) Published 3/3/2005
- Prowers County (CO099) Published 12/20/2005
- Finney County (KS055) Published 11/13/2008
- Greeley County (KS071) Published 2/8/2006
- Hamilton County (KS075) Published 2/8/2006
- Kearny County (KS093) Published 12/14/2006
- Scott County (KS171) Published 12/21/2006
- Wichita County (KS203) Published 12/23/2006

**Vegetation** data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. Completed in 2003, the CVCP is a landscape level vegetation dataset created using Landsat TM imagery and then formatted for GIS use. The species identified are an overview of the most common species associated in each cover type, in order of greatest occurrence. For more information on the Colorado Vegetation Classification Project, visit <http://ndis.nrel.colostate.edu/coveg>.

All border state (if applicable) vegetation data courtesy of the National Land Cover Dataset (NLCD). For more information visit [http://www.mrlc.gov/mrlc2k\\_nlcd.asp](http://www.mrlc.gov/mrlc2k_nlcd.asp)

**Common Resource Area (CRA)**, a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. Geographic boundaries of a CRA are determined by landscape conditions, soil, climate, human considerations and other natural resource information. For more information on Common Resource Areas visit <http://soils.usda.gov/survey/geography/cra.html>.

**Average Annual Precipitation** data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990. For more information on PRISM data visit <http://www.ncgc.nrcs.usda.gov/products/datasets/climate/docs/fact-sheet.html> or for more information about technical aspects of PRISM, visit the PRISM website at <http://www.ocs.orst.edu/prism>.

**Land Ownership** (status,07/22/2006 dataset) data was obtained from the Bureau of Land Management, Colorado State Office. For more information, visit [http://www.blm.gov/co/st/en/BLM\\_Programs/geographical\\_sciences/gis.html](http://www.blm.gov/co/st/en/BLM_Programs/geographical_sciences/gis.html)

**Relief & Elevation** maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS).