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of Agriculture



Natural Resources
Conservation Service

Lakewood, Colorado

RWA 11040002

August 2010

Upper Cimarron Watershed

Hydrologic Unit Code 11040002

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.

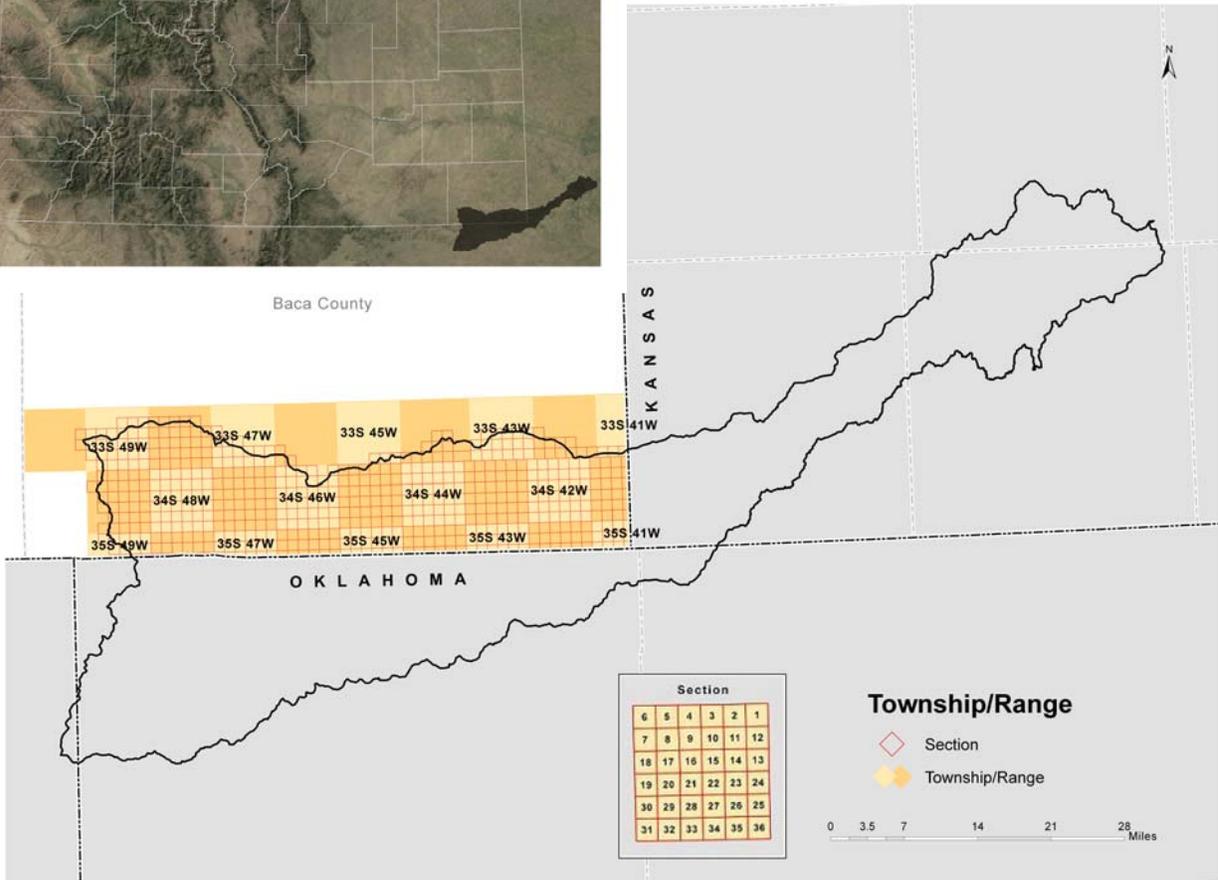
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best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

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



COLORADO County	County Acres	County Acres in UPPER CIMARRON Watershed	% of County in the Watershed	% of Watershed in the County
Baca	1,637,109	324,265	19.8%	30.7%

KANSAS

Grant	368,690	42,035	11.4%	4.0%
Morton	467,713	147,489	31.5%	14.0%
Stevens	466,583	118,154	25.3%	11.2%

NEW MEXICO

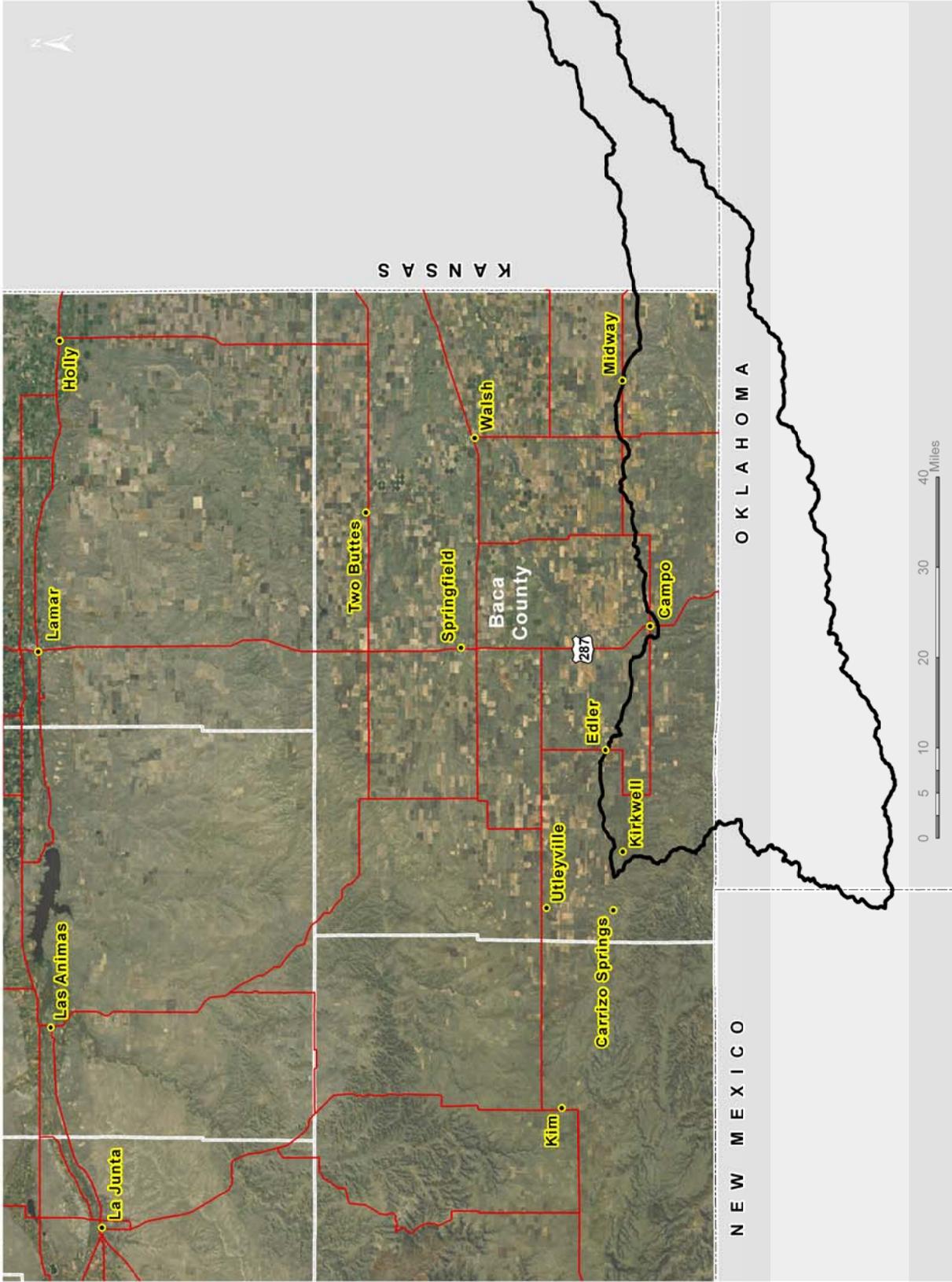
Union	2,450,868	3,866	0.2%	0.4%
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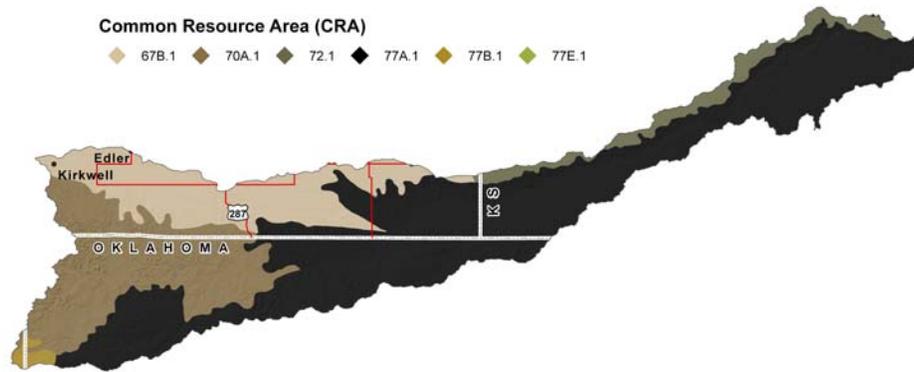
OKLAHOMA

Cimarron	1,178,825	407,410	34.6%	38.6%
Texas	1,313,361	13,364	1.0%	1.3%

1,056,583

Upper Cimarron Watershed - 11040002



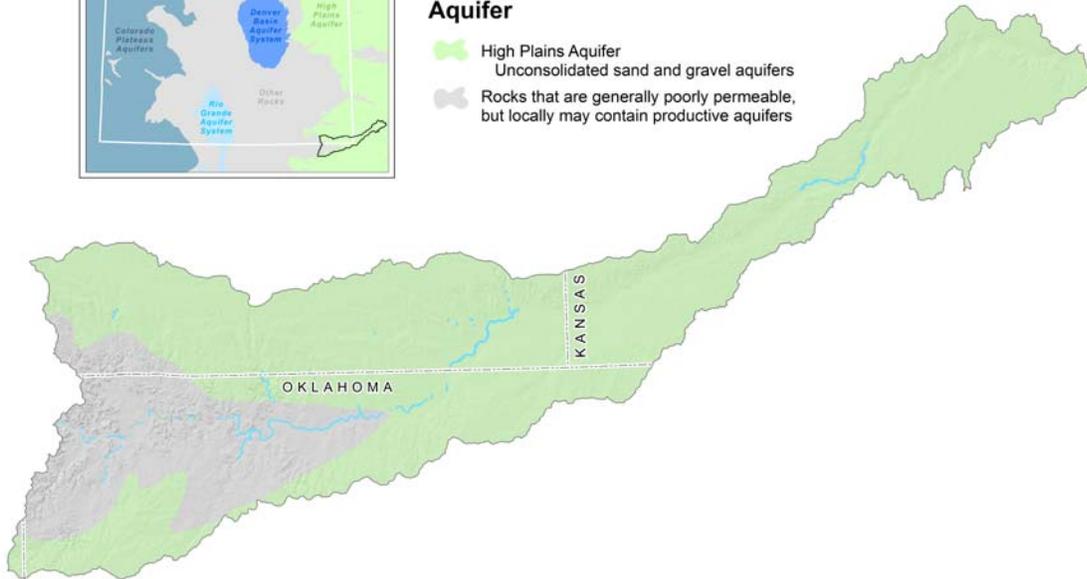


MLRA	CRA	CRA NAME	CRA DESCRIPTION
67B	67B.1	Central Great Plains, Southern Part	The Central High Plains, Southern Part CRA is broad, undulating to rolling plains dissected by streams and rivers. Local relief is measured in tens of feet on the plains. Soils are deep and formed in eolian and alluvial materials. Pre-settlement vegetation was short grass prairies. Nearly all of this area in fallow cropland rotations or rangeland. Some cropland areas are irrigated.
70A	70A.1	Northern New Mexico Highlands	This unit is characterized by broad, rolling plains broken by closed basins and drainage ways that have smooth-shaped valley floors. Rugged breaks are common in the northern part of the area. Native vegetation is mid- to short-grass prairie species in the lowlands, with pinyon and juniper in the higher elevations and on the breaks. The soils are formed in weathered sedimentary rocks of Cretaceous age and igneous rocks of Tertiary and Quaternary age.
72	72.1	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. Presettlement vegetation was short grass prairies. Nearly all of this area in cropland, both dryland small grain crops and irrigated corn and grain sorghum.
77A	77A.1	High Plains, Northern Part	This unit is characterized by nearly level plains with playa depressions and sloping breaks along rivers and creeks. Soils are generally deep, fine-textured, and occur in a mesic soil temperature regime. Native vegetation on the plains landscape is a short-grass community, while mid-grasses grow on more sloping areas. Current land use is evenly split between cropland (dryland and irrigated) and rangeland. The major crops are wheat and grain sorghum, with corn and soybeans grown under irrigation.
77B	77B.1	High Plains, Northwestern Part	This unit is characterized by nearly level to gently sloping plains with a minimal number of playa depressions and moderately sloping breaks along drainageways. Loamy and sandy soils are generally deep and occur in a mesic soil temperature regime and ustic soil moisture regime bordering on aridic. Current land use is dominantly rangeland with minor cropland. The plains support a short- and mid-grass community characterized by buffalograss, blue grama, sideoats grama, and western wheatgrass.



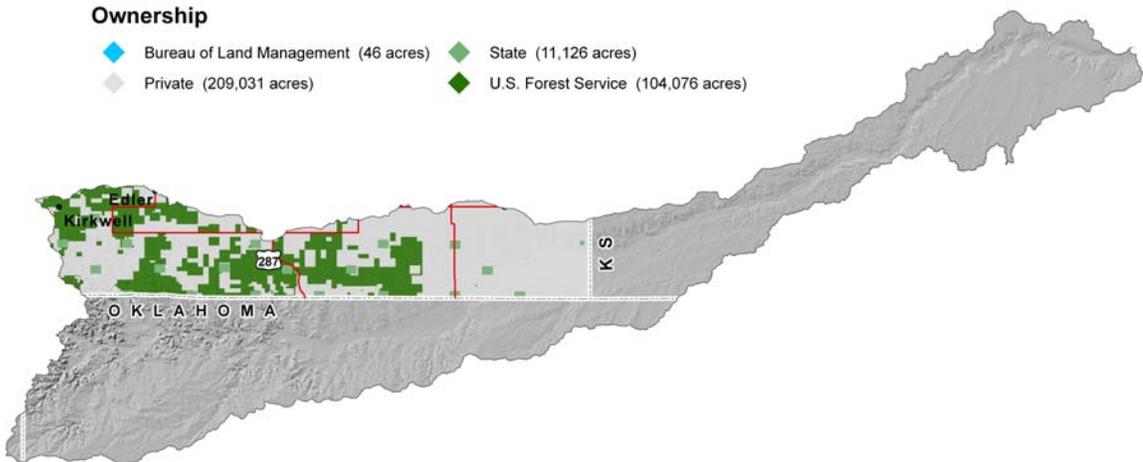
Aquifer

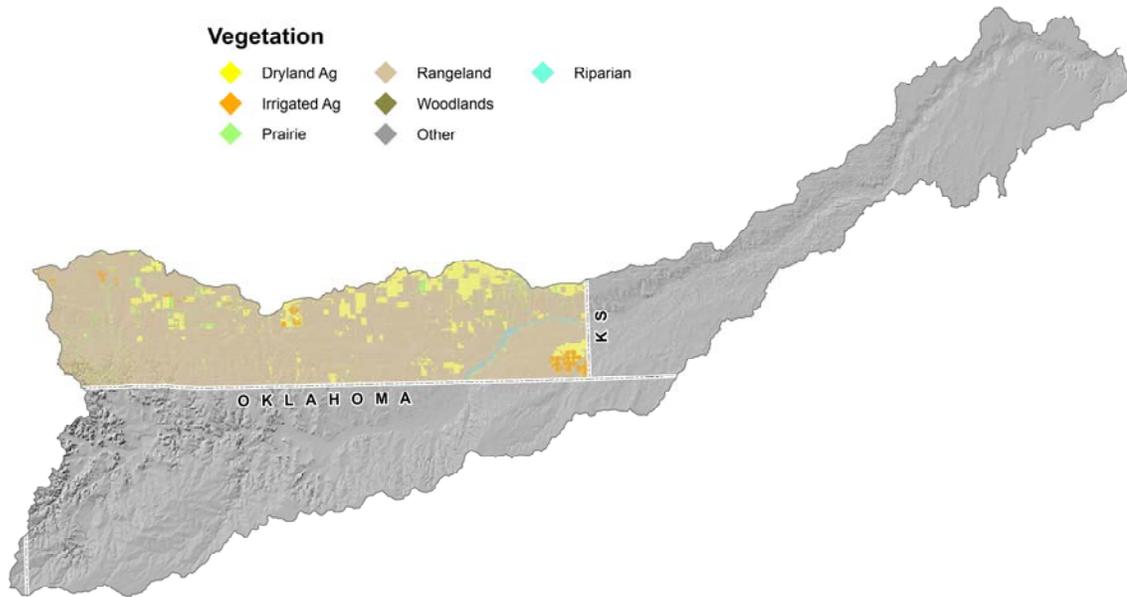
-  High Plains Aquifer
Unconsolidated sand and gravel aquifers
-  Rocks that are generally poorly permeable, but locally may contain productive aquifers



Ownership

-  Bureau of Land Management (46 acres)
-  State (11,126 acres)
-  Private (209,031 acres)
-  U.S. Forest Service (104,076 acres)

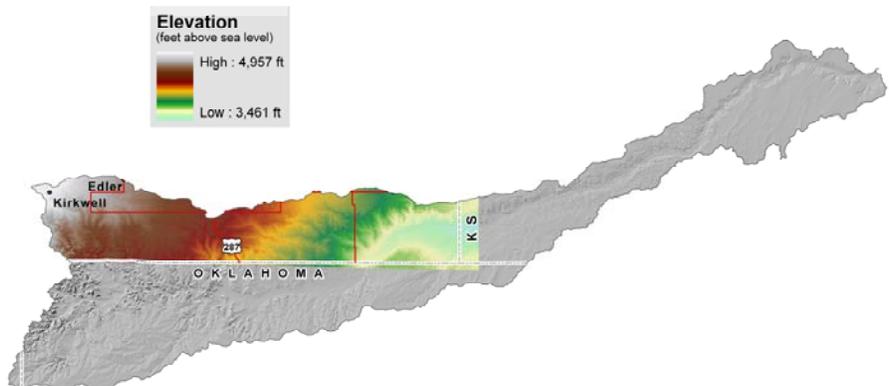
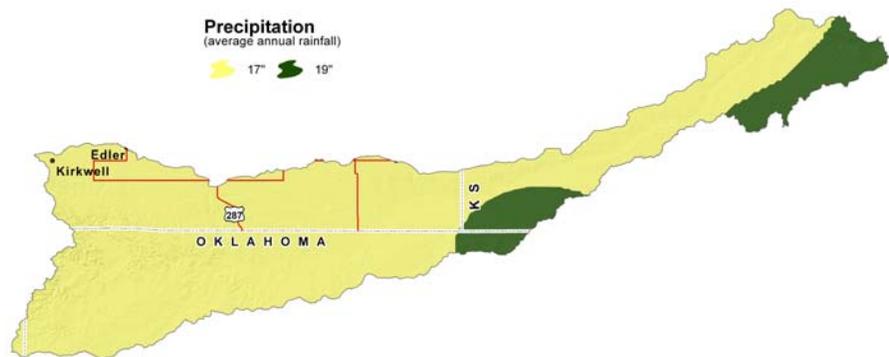




<u>UPPER CIMARRON WATERSHED</u> <u>Land Use</u>	Total Acreage	Vegetation	Acreage
Cropland	39,633	Dryland Ag	34,920.3
		Irrigated Ag	4,712.5
Rangeland/Grassland	283,389	Gambel Oak	0.6
		Grass Dominated	66,282.0
		Grass/Forb Mix	24,831.5
		Grass/Misc. Cactus Mix	116.0
		Juniper	301.5
		Mid-grass Prairie	7,760.0
		PJ-Mtn Shrub Mix	12.4
		PJ-Oak Mix	5.6
		Pinon-Juniper	67.3
		Sagebrush Community	68,795.2
		Sagebrush/Grass Mix	29,010.0
		Shrub/Grass/Forb Mix	84,517.9
		Short-grass Prairie	1,169.1
		Sparse Juniper/Shrub/Rock Mix	397.8
		Sparse PJ/Shrub/Rock Mix	121.5
Riparian	2,032	Exotic Riparian Shrubs	1,722.5
		Herbaceous Riparian	10.2
		Riparian	299.0
Other	9	Barren Land	4.2
		Rock	4.8
~Total Watershed Acres			325,062

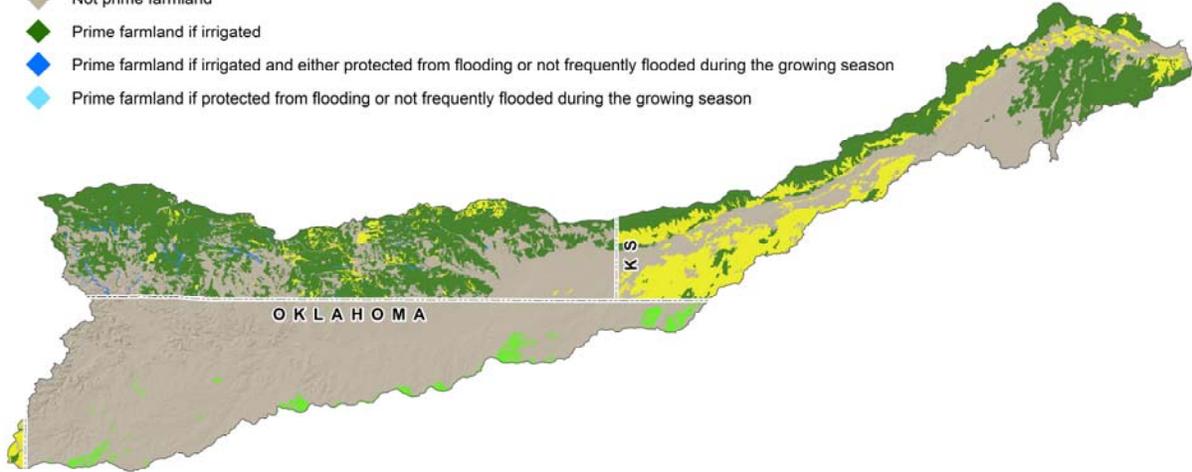
Precipitation

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.



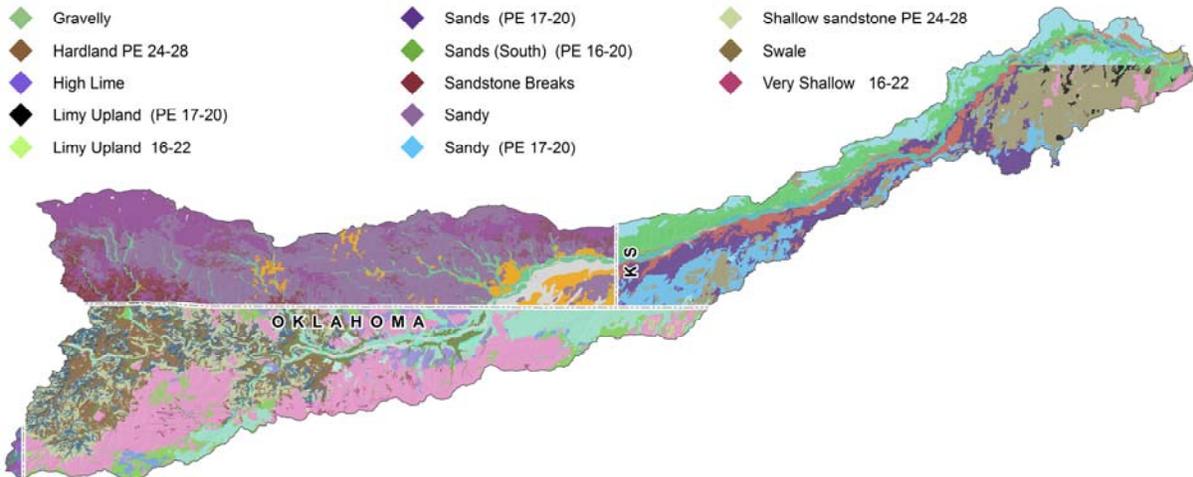
Farmland Classification

- ◆ All areas are prime farmland
- ◆ Farmland of statewide importance
- ◆ Not prime farmland
- ◆ Prime farmland if irrigated
- ◆ Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- ◆ Prime farmland if protected from flooding or not frequently flooded during the growing season



Soil: Ecological Site Name

- | | | |
|--|------------------------------------|------------------------------------|
| ◆ Data Unavailable | ◆ Limy Upland (South) (PE16-20) | ◆ Sandy 16-22 |
| ◆ Basalt Breaks | ◆ Loamy | ◆ Sandy (South) (PE 16-20) |
| ◆ Basalt Loam | ◆ Loamy Bottomland PE 25-36 | ◆ Sandy Bottomland |
| ◆ Choppy Sands (PE 17-20) | ◆ Loamy Lowland (South) (PE 16-20) | ◆ Sandy Loam |
| ◆ Choppy Sands (South) (PE16-20) | ◆ Loamy Terrace (South) (PE 16-20) | ◆ Sandy Loam 16-22 |
| ◆ Clay Upland (South) (PE16-20) | ◆ Loamy Upland | ◆ Sandy Lowland (PE 17-20) |
| ◆ Closed Upland Depression (South) (PE16-20) | ◆ Loamy Upland (PE 17-20) | ◆ Sandy Lowland (South) (PE 16-20) |
| ◆ Deep Hardland 16-22 | ◆ Loamy Upland (South) (PE 16-20) | ◆ Sandy Plains |
| ◆ Draw 16-22 | ◆ Malpais breaks PE 24-28 | ◆ Sandy Terrace (PE 17-20) |
| ◆ Eroded Deep Sand PE 28-32 | ◆ Mixedland Slopes 16-24 | ◆ Sandy Terrace (South) (PE 16-20) |
| ◆ Eroded Sandy Plains PE 28-32 | ◆ Playa 16-22 | ◆ Shallow PE 24-28 |
| ◆ Gravel Breaks | ◆ Sands | ◆ Shallow Sandstone |
| ◆ Gravelly | ◆ Sands (PE 17-20) | ◆ Shallow sandstone PE 24-28 |
| ◆ Hardland PE 24-28 | ◆ Sands (South) (PE 16-20) | ◆ Swale |
| ◆ High Lime | ◆ Sandstone Breaks | ◆ Very Shallow 16-22 |
| ◆ Limy Upland (PE 17-20) | ◆ Sandy | |
| ◆ Limy Upland 16-22 | ◆ Sandy (PE 17-20) | |



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.

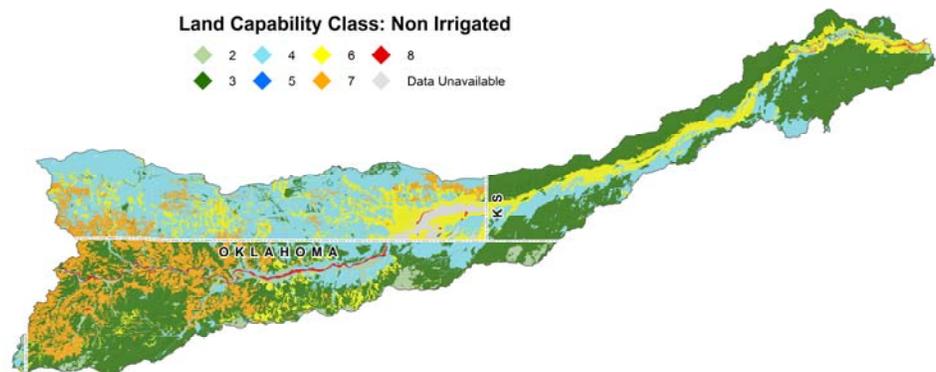
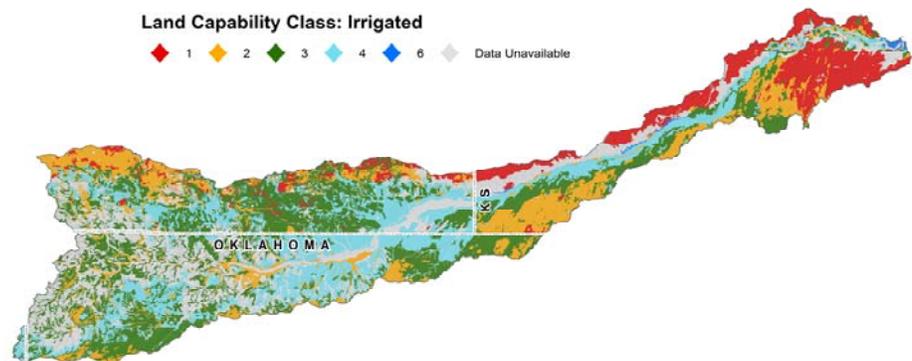
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

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.

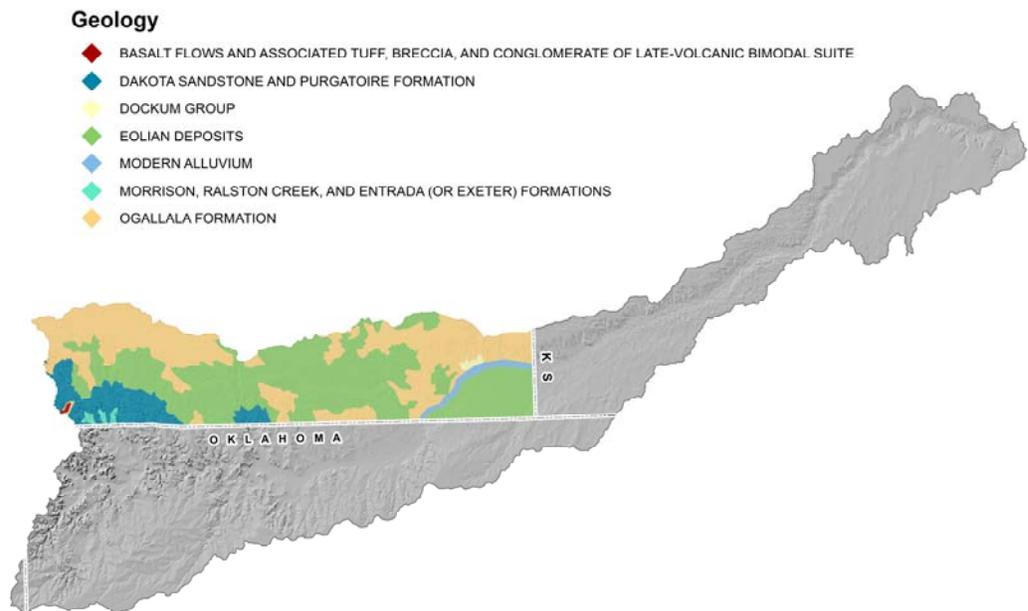
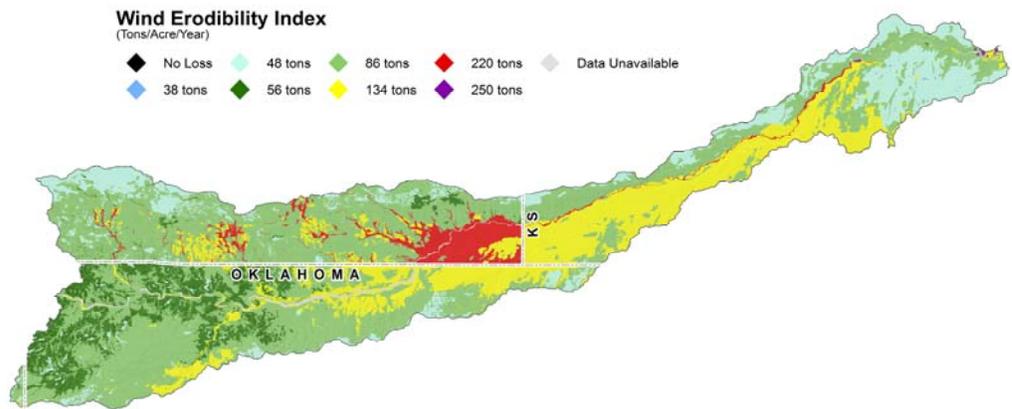
Class 8 - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.



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.



State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern in Upper Cimarron 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-footed Ferret	<i>Mustela nigripes</i>	Mammals	Endangered/Endangered	No current records of occurrence
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 gracilis</i>	Fish	Concern/None	May occur in the watershed
Great Plains narrow-mouth toad	<i>Gastrophryne olivacea</i>	Amphibians	Concern/None	May occur in the watershed
Lesser Prairie Chicken	<i>Tympanuchus pal-lidicinctus</i>	Birds	Threatened/Candidate	Occurs in the watershed
Long-Billed Curlew	<i>Numenius americanus</i>	Birds	Concern/None	May occur 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 blind snake	<i>Leptotyphlops dulcis</i>	Reptiles	Concern/None	May occur 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 town-sendii 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 pronghorn, mule and white-tailed deer, pheasant, mourning dove, bob-white, and scaled quail.

Social Data

Baca

Demographics (US Census, American Factfinder)

Total population	4517
Male	2247
Female	2270
Median age (years)	42.9
White	4,234
Black or African American	2
American Indian and Alaska Native	54
Asian	7
Native Hawaiian and Other Pacific Islander	4
Some other race	135
Hispanic or Latino (of any race)	317

Economic Characteristics

In labor force-population 16 years & over	2,072
Median household income (dollars)	28,099
Median family income (dollars)	34,018
Per capita income (dollars)	15,068
Families below poverty level	165
Individuals below poverty level	749

County Agricultural Characteristics

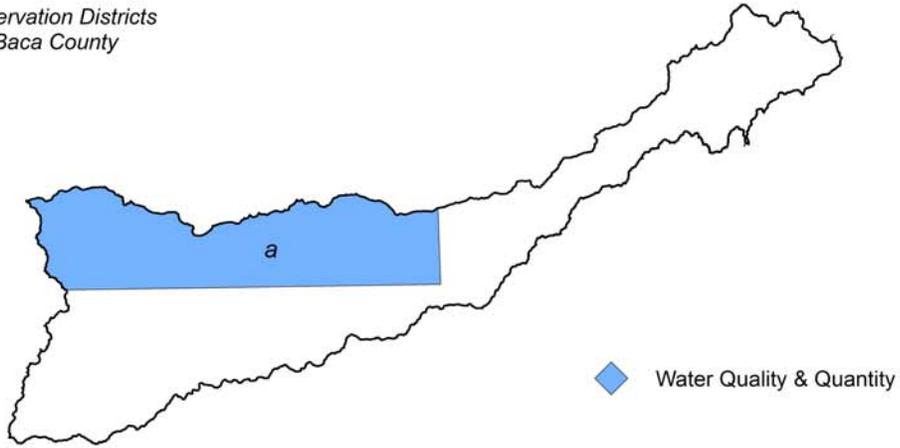
Farms (number)	608
Land in farms/ranches (acres)	1,080,386
Average size farm/ranch (acres)	1,777
Median size farm (acres)	1,120
Average age of farmer or rancher	57.2
Net cash return from ag sales (\$1,000)	5,944
Cattle and calves (number)	56,000

Identified Long Range Resource Concerns

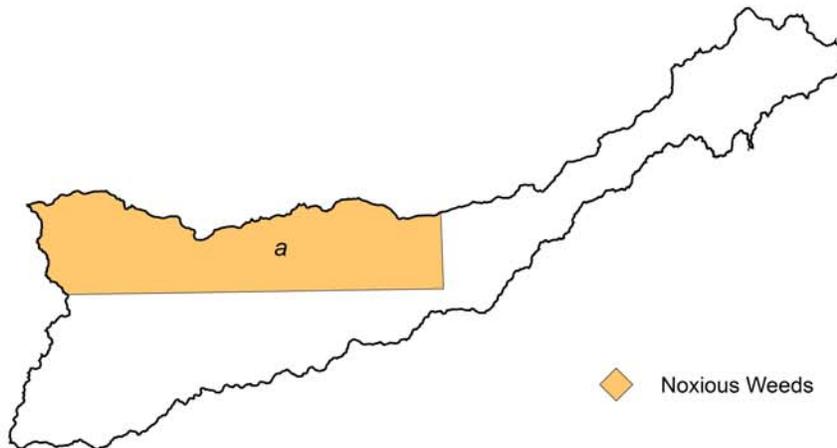
Top Three Concerns within Conservation Districts

Conservation Districts
a Baca County

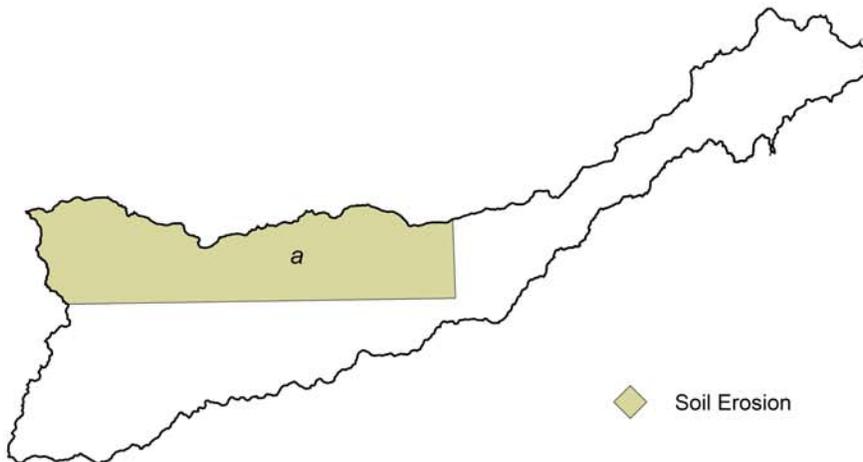
#1



#2



#3



Selected Conservation Practices Applied, FY 2005 through FY 2009

Practice Code	Practice Name	Practice Unit	Applied Amount	Applied Count
329	Residue Management	ac	1,581	7
449	Irrigation Water Management	ac	2,251	9
528	Prescribed Grazing	ac	50,642	211

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

<p>Grazed Rangeland—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.</p>		<p>CO 67B.1-GR-01-R-Grazing</p>
<p><i>Practices</i></p> <p>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</p>	<p><i>Description</i></p> <p>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.</p>	<p><i>Resource Concerns Addressed</i></p> <p>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</p>
<p>Dry Cropland Seasonal —Seasonal residue management with Conservation crop rotation, Nutrient and Pest Mgt.</p>		<p>CO 67B.1-CR-Dryland</p>
<p><i>Practices</i></p> <p>328 Conservation Crop Rotation 344 Residue Management, Seasonal 590 Nutrient Management 595 Pest Management</p>	<p><i>Description</i></p> <p>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.</p>	<p><i>Resource Concerns Addressed</i></p> <p>Soil Erosion - Sheet and Rill Soil Erosion - Wind Water Quantity - Inefficient Water Use on Irrigated Land</p>

Irrigation system converted to sprinkler –Sprinkler irrigation system with IWM, Crop rotation, Mulch-till, Nutrient and Pest Mgt.	CO 67B.1-CR-Pivot
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<i>Practices</i>	<i>Description</i>	<i>Resource Concerns Addressed</i>
328 Conservation Crop Rotation 345 Residue Mgmt, Mulch Till 442 Irrigation System, Sprinkler 449 Irrigation Water Management 590 Nutrient Management 595 Pest Management	Crops: corn (silage or grain), field beans, wheat, alfalfa, onions, melons, potatoes, vegetables and sugar beets. Soils: fine sandy loams, loams, silt and clay loams, sands and fine sands. Annual precipitation ranges from 12 - 16". Moisture usually lacking in the summer during peak ET and supplemented with gravity irrigation, the water source may be ground or surface water; 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 soil compaction.	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	50,000	10	500,000
Dryland Crop	3,000	30	90,000
Irrigated Crop	500	1,200	600,000
Total Costs:			\$1,190,000

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:

Baca County (CO009) Published 12/7/2005
 Grant County (KS067) Published 11/13/2008
 Morton County (KS129) Published 11/13/2008
 Stevens County (KS189) Published 11/13/2008
 Union County (NM059) Published 7/19/2006
 Cimarron County (OK025) Published 8/10/2005
 Texas County (OK139) Published 9/16/2008

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

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

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). A hillshade grid was created from the 30m DEM to create a 3D effect. For more information about the NED visit <http://ned.usgs.gov>. The data was downloaded from the NRCS Geospatial Data Gateway at <http://datagateway.nrcs.usda.gov>.