United States Department
of Agriculture

Bear Watershed

Hydrologic Unit Code 11040005

Natural Resources
Conservation Service

Lakewood, Colorado

Rapid Assessment

RWA 11040005

August 2010

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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.

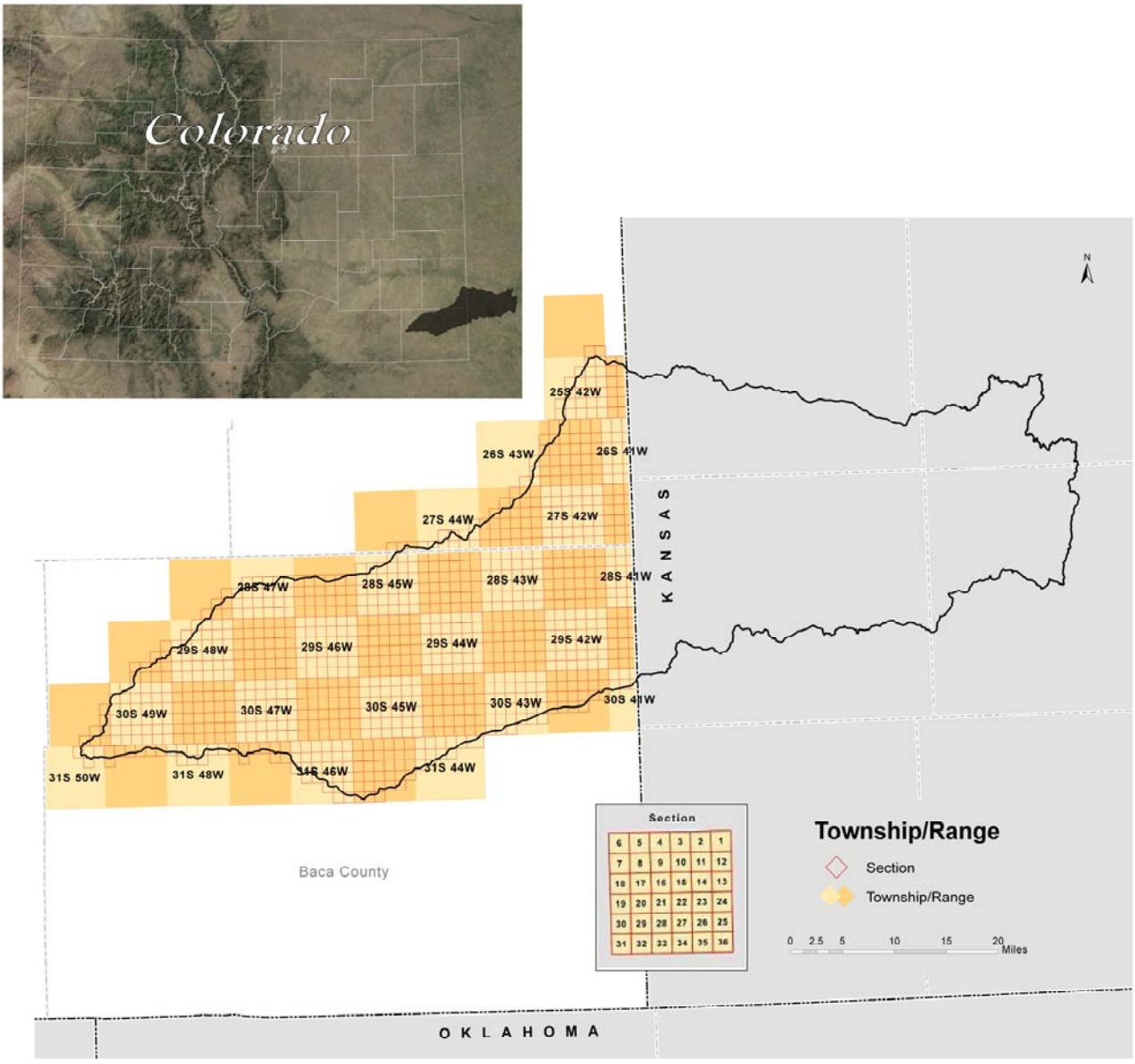
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best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

Benefits of these Activities

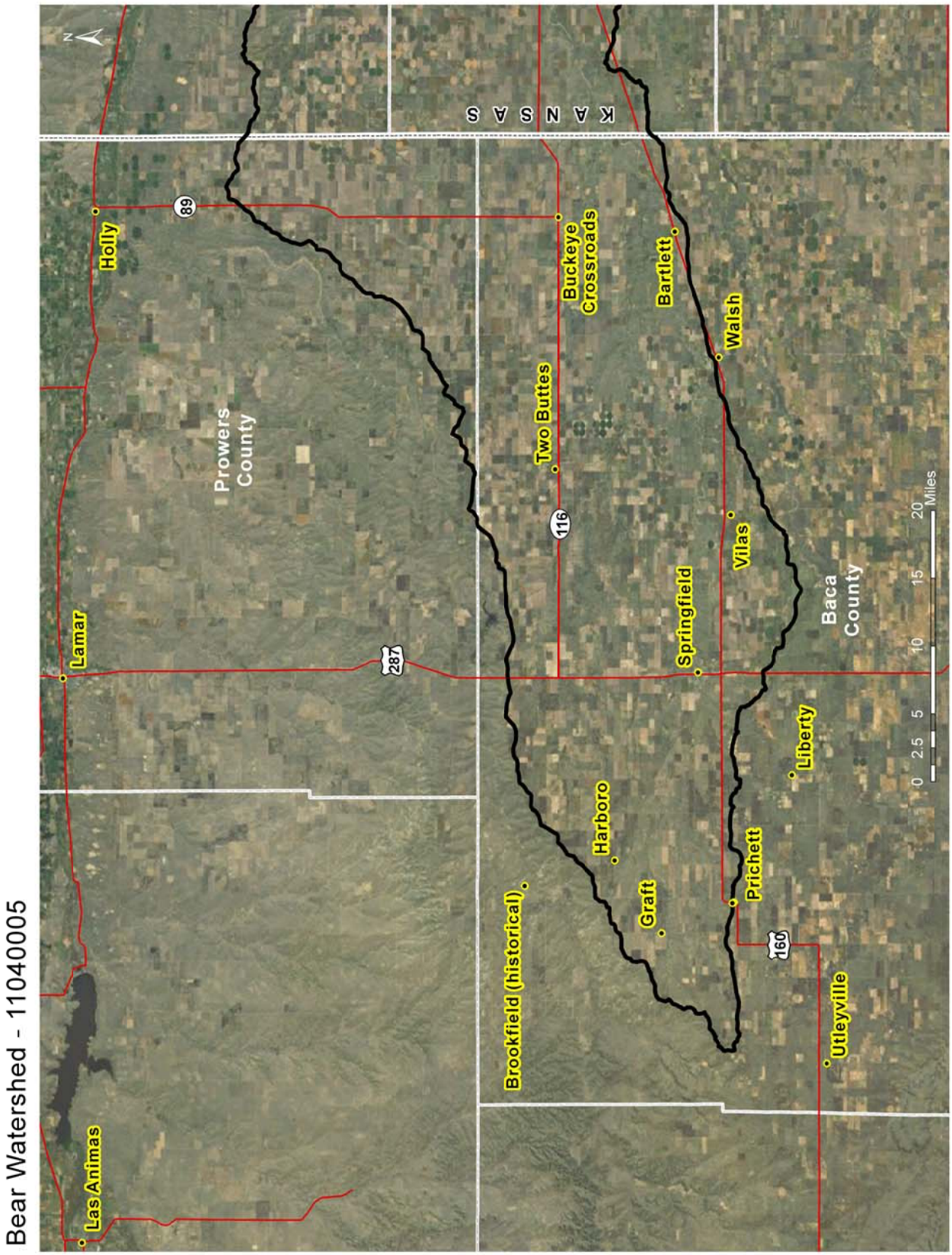
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

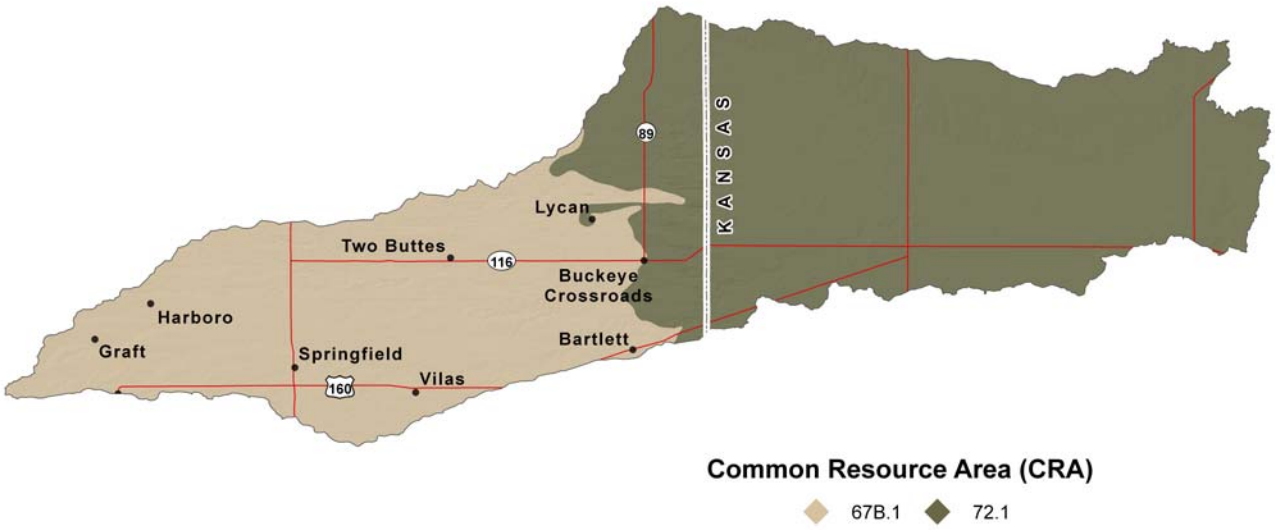
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis 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.

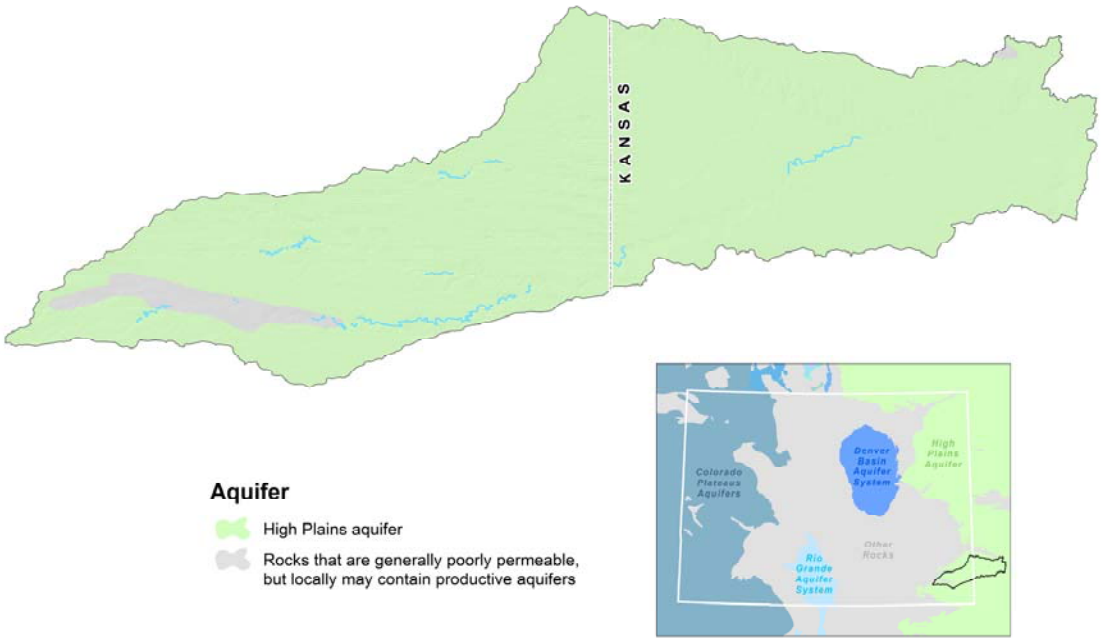


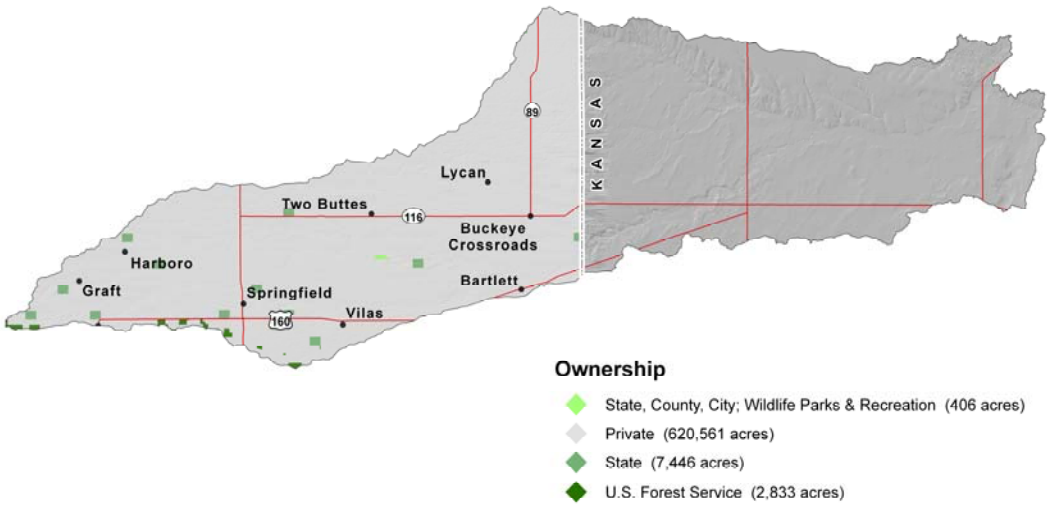
COLORADO County	County Acres	County Acres in BEAR Watershed	% of County in the Watershed	% of Watershed in the County
Baca	1,637,109	523,788	32.0%	42.9%
Prowers	1,052,893	107,498	10.2%	8.8%
KANSAS				
Grant	368,690	103,035	27.9%	8.4%
Hamilton	639207	143,583	22.5%	11.8%
Kearny	558,744	53,758	9.6%	4.4%
Stanton	435,748	288,228	66.1%	23.6%
		1,219,890		


Bear Watershed - 11040005
N
KANSAS
Holly
89
Prowers County
Lamar
287
Las Animas
Buckeye Crossroads
Two Buttes
116
Bartlett
Walsh
Springfield
Vilas
Baca County
Liberty
Harboro
Graft
Brookfield (historical)
Prichett
160
Utleyville
0 2.5 5 10 15 20 Miles

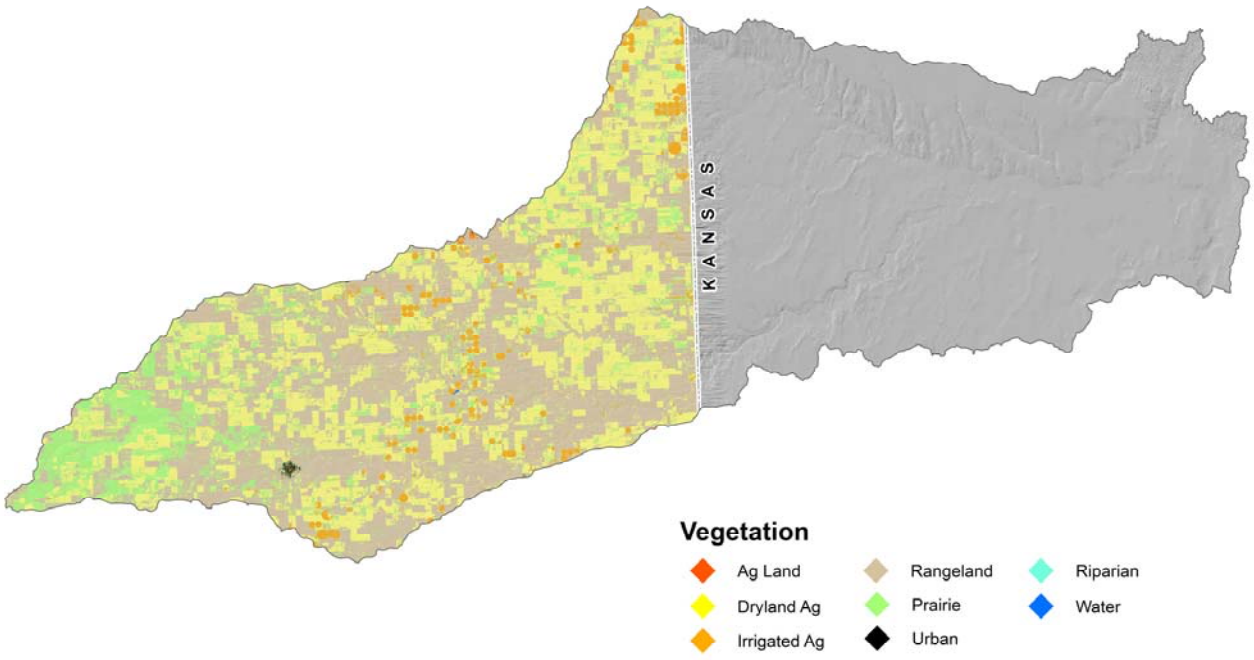


MLRA	CRA	CRA NAME	CRA DESCRIPTION
67B	**67B.1**	Central Great Plains, Southern Part	The Central High Plains, Southern Part CRA is broad, undulating to rolling plains dissected by streams and rivers. Local relief is measured in tens of feet on the plains. Soils are deep and formed in aeolian and alluvial 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	**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. 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.


KANSAS
Aquifer
High Plains aquifer
Rocks that are generally poorly permeable, but locally may contain productive aquifers
Colorado Plateaus Aquifers
Denver Basin Aquifer System
High Plains Aquifer
Rio Grande Aquifer System
Other Rocks

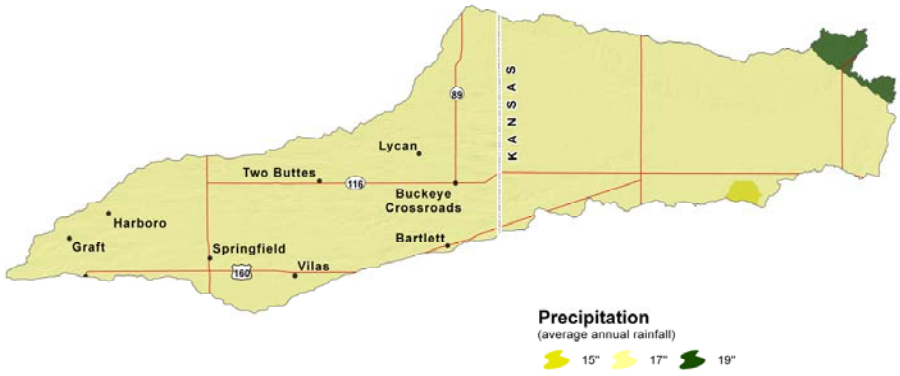

KANSAS
89
Lycan
Two Buttes
116
Buckeye Crossroads
Harboro
Graft
Springfield
Bartlett
Vilas
160
Ownership
State, County, City; Wildlife Parks & Recreation (406 acres)
Private (620,561 acres)
State (7,446 acres)
U.S. Forest Service (2,833 acres)

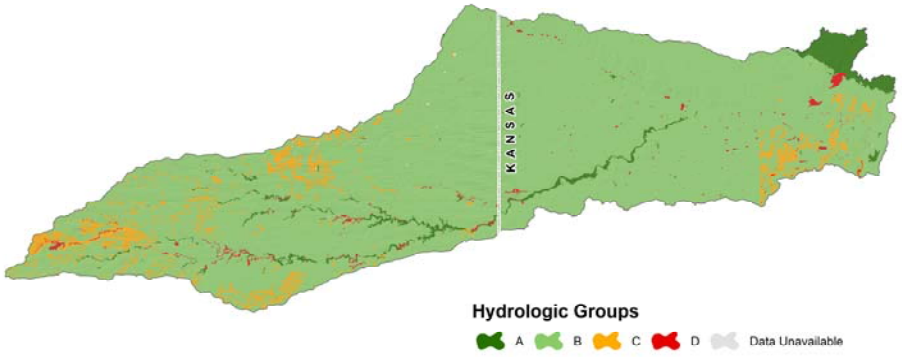
BEAR WATERSHED Land Use	Total Acreage	Vegetation	Acreage
Cropland	249,383	Agriculture Land	141.0
		Dryland Ag	227,832.1
		Irrigated Ag	21,410.0
Rangeland/Grassland	377,782	Grass Dominated	157,075.8
		Grass/Forb Mix	121,029.0
		Grass/Misc. Cactus Mix	148.0
		Mid-grass Prairie	55,539.6
		Sagebrush Community	1,791.5
		Sagebrush/Grass Mix	2,053.3
		Short-grass Prairie	30,762.6
		Shrub/Grass/Forb Mix	9,319.3
		Sparse Grass (Blowouts)	62.9
Riparian	1,286	Exotic Riparian Shrubs	397.8
		Herbaceous Riparian	133.3
		Riparian	755.4
Water	69	Water	69.5
Other	472	Residential	472.1
~Total Watershed Acres			**628,993**

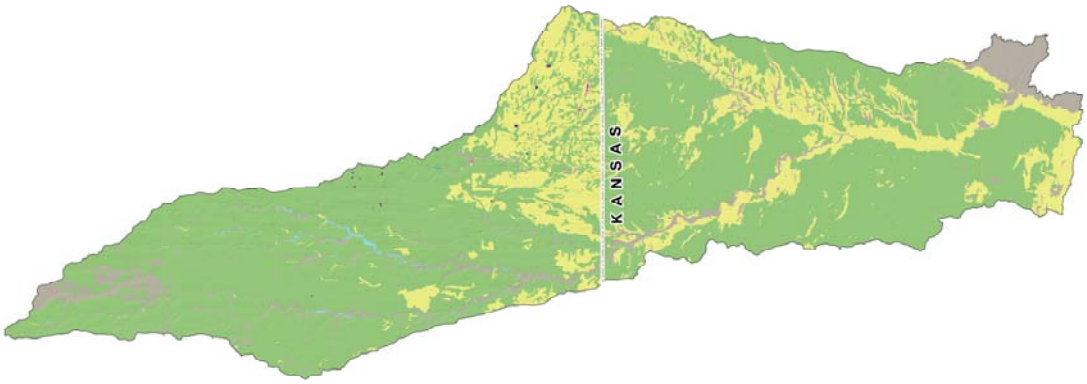


Precipitation

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

- Farmland of statewide importance
- Not prime farmland
- Prime farmland if irrigated
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if protected from flooding or not frequently flooded during the growing season

Geology

- CARLILE SHALE, GREENHORN LIMESTONE, AND GRANEROS SHALE
- DAKOTA SANDSTONE AND PURGATOIRE FORMATION
- EOLIAN DEPOSITS
- OGALLALA FORMATION
- WATER

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.

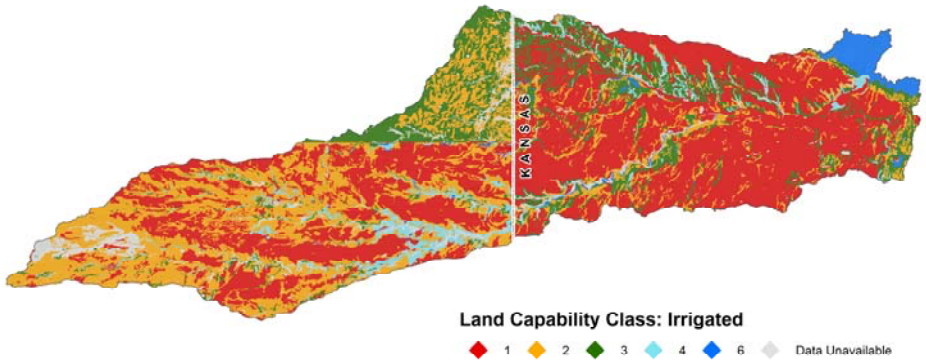
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

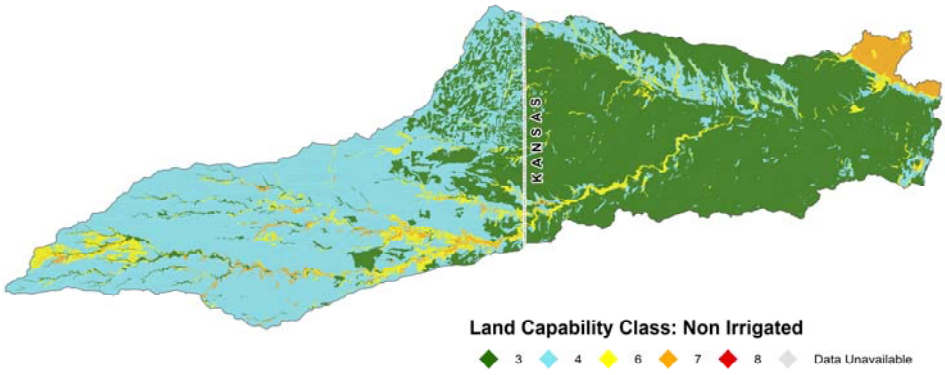
Class 5 - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

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.

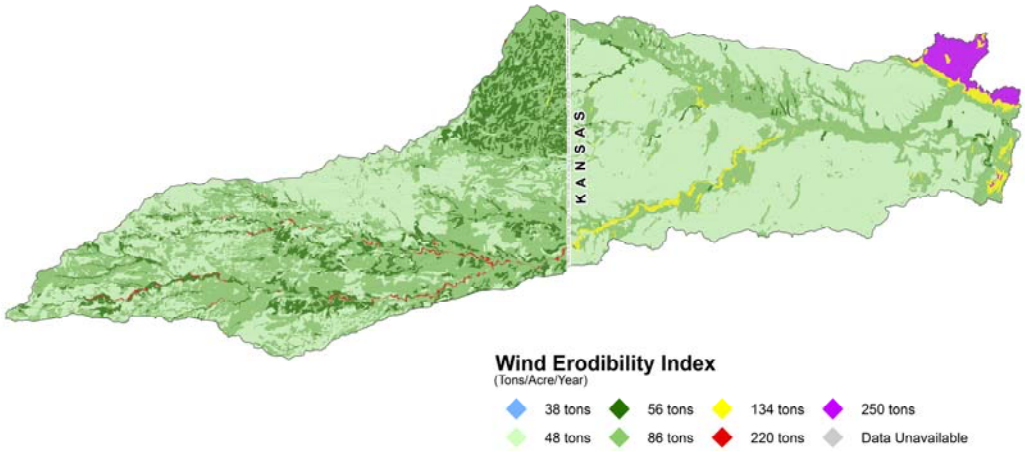
Class 8 - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

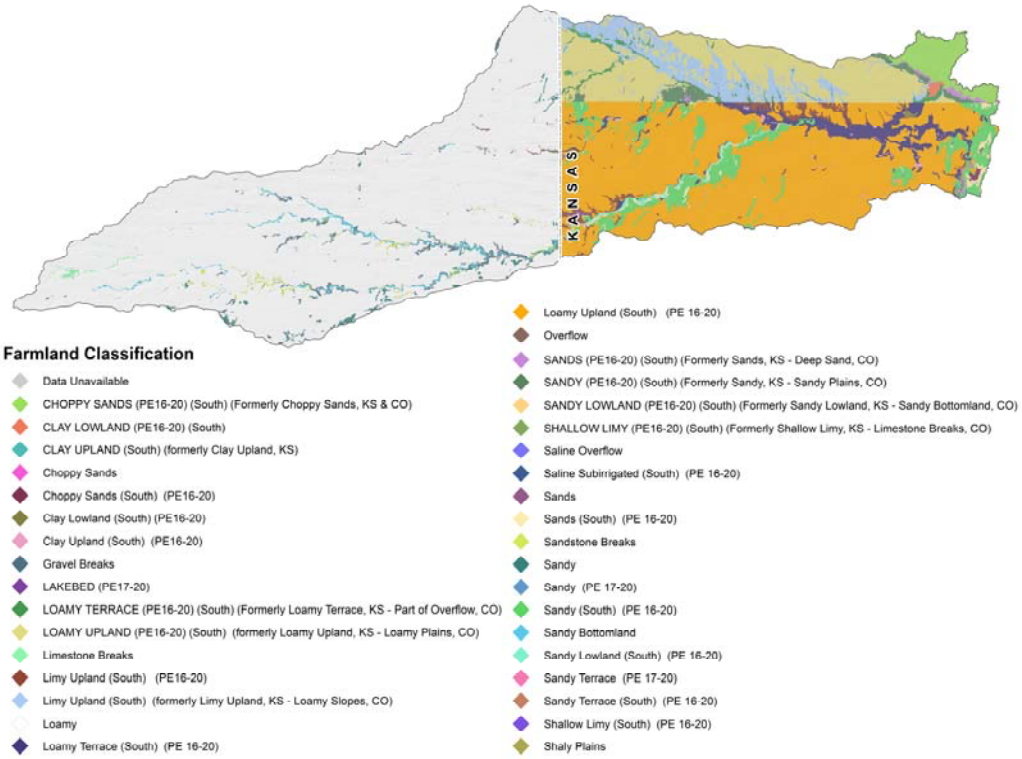




The Wind Erodibility Index (WEI): numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

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 Bear Watershed

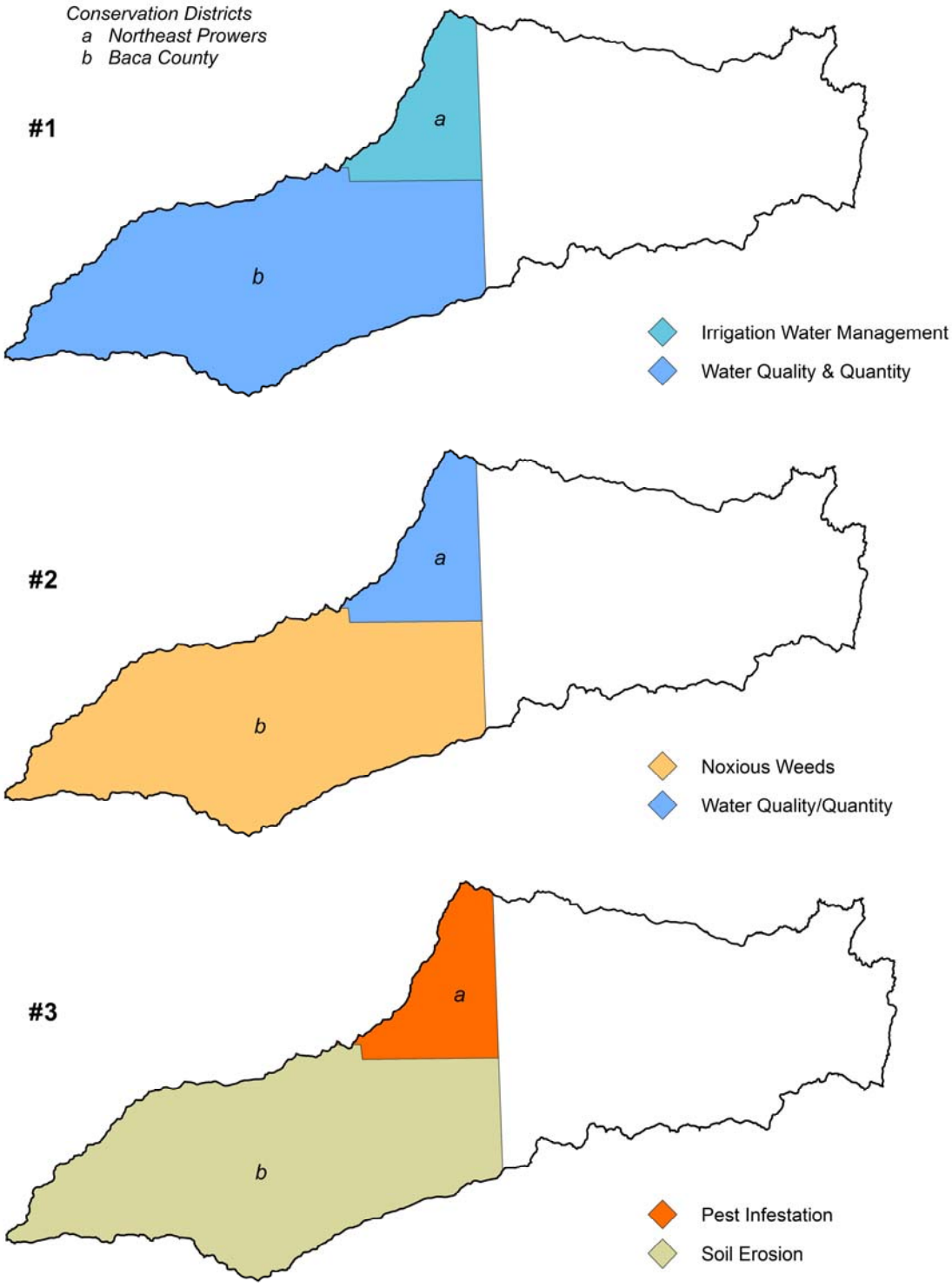
Common Name	Scientific Name	Class	State Status/Federal Status	Comments
Bald Eagle	*Haliaeetus leucocepha-lus*	Birds	Threatened/None	Occurs in the watershed
Black-footed Ferret	*Mustela nigripes*	Mammals	Endangered/Endangered	No current records of occurrence
Black-tailed Prairie Dog	*Cynomys ludovicianus*	Mammals	Concern/None	Occurs in the watershed
Burrowing Owl	*Athene cunicularia*	Birds	Threatened/None	Occurs in the watershed
Common Kingsnake	*Lampropeltis getula*	Reptiles	Concern/None	May occur in the watershed
Ferruginous Hawk	*Buteo regalis*	Birds	Concern/None	May occur in the watershed
Flathead Chub	*Platygobio gracilus*	Fish	Concern/None	May occur in the watershed
Lesser Prairie Chicken	*Tympanuchus pal-lidicinctus*	Birds	Threatened/Candidate	Occurs in the watershed
Long-Billed Curlew	*Numenius americanus*	Birds	Concern/None	May occur in the watershed
Massasauga	*Sistrurus catenatus*	Reptiles	Concern/None	Occurs in the watershed
Mountain Plover	*Charadrius montanus*	Birds	Concern/None	Occurs in the watershed
Plains Leopard Frog	*Rana blairi*	Amphibians	Concern/None	Occurs in the watershed
Suckermouth Minnow	*Phenacobius mirabilis*	Fish	Endangered/None	May occur in the watershed
Swift Fox	*Vulpes velox*	Mammals	Concern/None	Occurs in the watershed
Texas Horned Lizard	*Phrynosoma cornutum*	Reptiles	Concern/None	Occurs in the watershed
Townsend's big-eared bat (pale ssp)	*Corynorhinus town-sendii pallescens*	Mammals	Concern/None	May occur in the watershed
Yellow Mud Turtle	*Kinosternon flavescens*	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 sunfish, pronghorn, mule and white-tailed deer, pheasant, mourning dove, turkey, bobwhite, and scaled quail.

Social Data	Baca	Prowers
Demographics (US Census, American Factfinder)		
Total population	4517	14,483
Male	2247	7,278
Female	2270	7,205
Median age (years)	42.9	32.4
White	4,234	11,379
Black or African American	2	43
American Indian and Alaska Native	54	177
Asian	7	54
Native Hawaiian and Other Pacific Islander	4	4
Some other race	135	2487
Hispanic or Latino (of any race)	317	4766
Economic Characteristics		
In labor force-population 16 years & over	2,072	6,976
Median household income (dollars)	28,099	29,935
Median family income (dollars)	34,018	34,202
Per capita income (dollars)	15,068	14,150
Families below poverty level	165	546
Individuals below poverty level	749	2755
County Agricultural Characteristics		
Farms (number)	608	531
Land in farms/ranches (acres)	1,080,386	861,778
Average size farm/ranch (acres)	1,777	1,623
Median size farm (acres)	1,120	640
Average age of farmer or rancher	57.2	53.3
Net cash return from ag sales ($1,000)	5,944	8,467
Cattle and calves (number)	56,000	110,000

Identified Long Range Resource Concerns

Top Three Concerns within Conservation Districts



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*

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.	CO 67B.1-GR-01-R-Grazing

Practices	*Description*	*Resource Concerns Addressed*
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

Dry Cropland Seasonal —Seasonal residue management with Conservation crop rotation, Nutrient and Pest Mgt.	**CO 67B.1-CR-Dryland**

Practices	*Description*	*Resource Concerns Addressed*
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

Irrigation system converted to sprinkler —Sprinkler irrigation system with IWM, Crop rotation, Mulch-till, Nutrient and Pest Mgt.	CO 67B.1-CR-Pivot

Practices	*Description*	*Resource Concerns Addressed*
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, prong-horn and other wildlife. Long term agri-cultural production practices have re-	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	158,000	10	1,580,000
Dryland Crop	23,000	30	690,000
Irrigated Crop	500	1,200	600,000
			Total Costs: $2,870,000

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 plans from the period of 1996-2010. 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 (CO099) Published 12/7/2005

Grant County (KS067) Published 11/13/2008

Hamilton County (KS075) Published 2/8/2006

Kearny County (KS093) Published 12/14/2006

Stanton County (KS187) Published 11/13/2008

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.