



United States Department  
of Agriculture

# Beaver Watershed



Hydrologic Unit Code 10190013

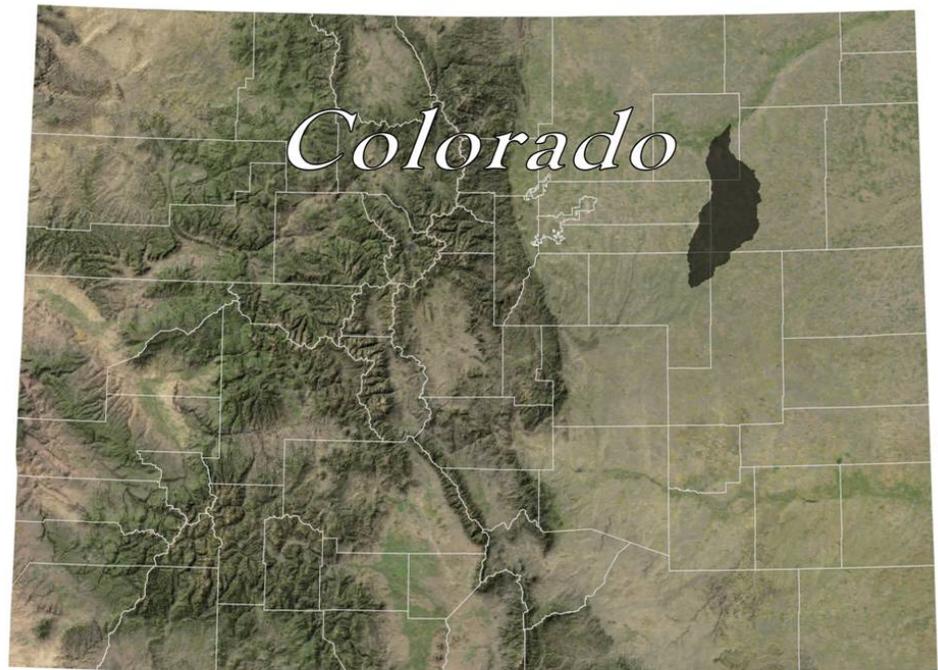
Natural Resources  
Conservation Service

## Rapid Assessment

Lakewood, Colorado

RWA 10190013

September 2009



Satellite Imagery: ArcIMS Server - Geographic Network Services hosted by ESRI



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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

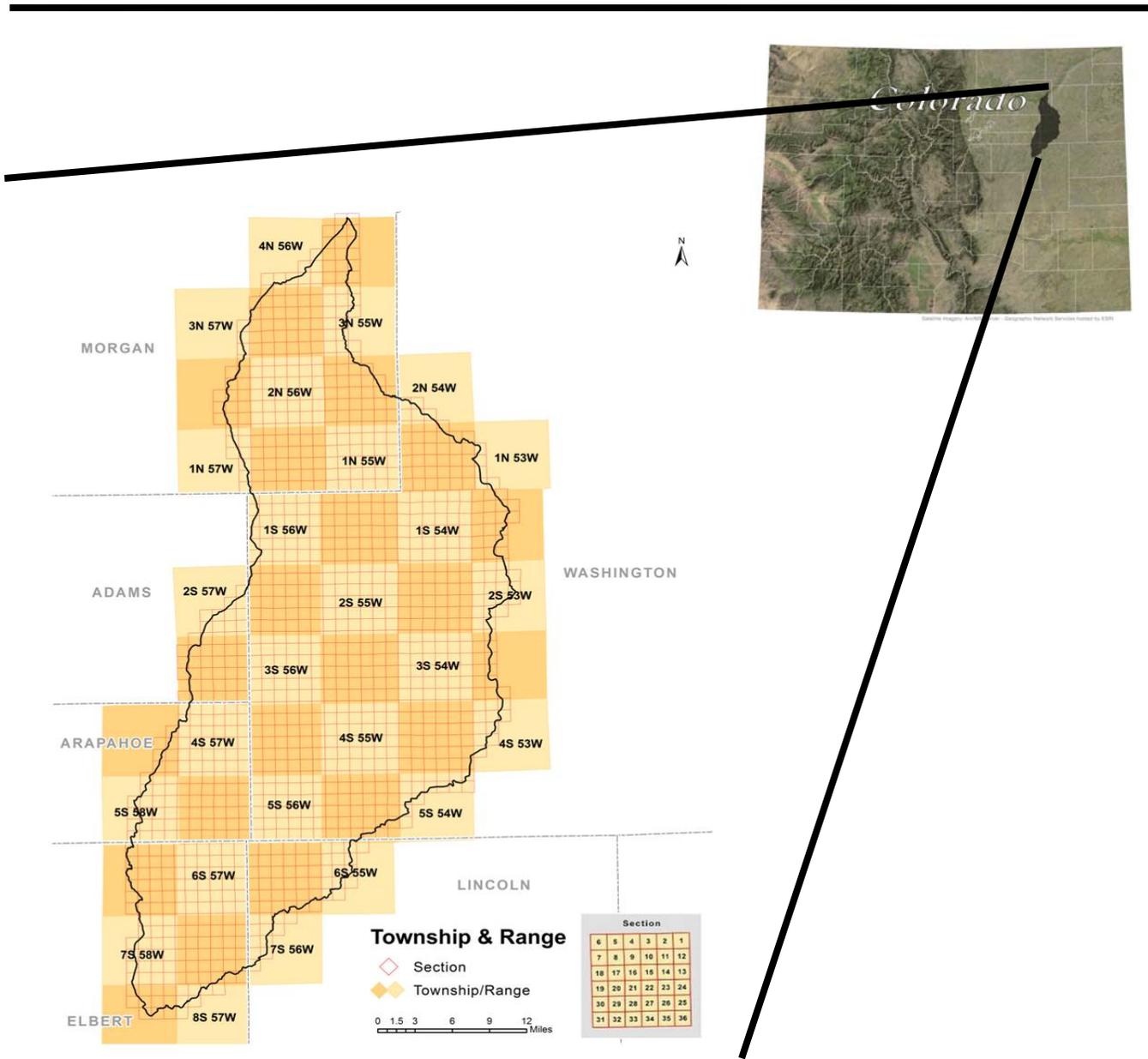
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

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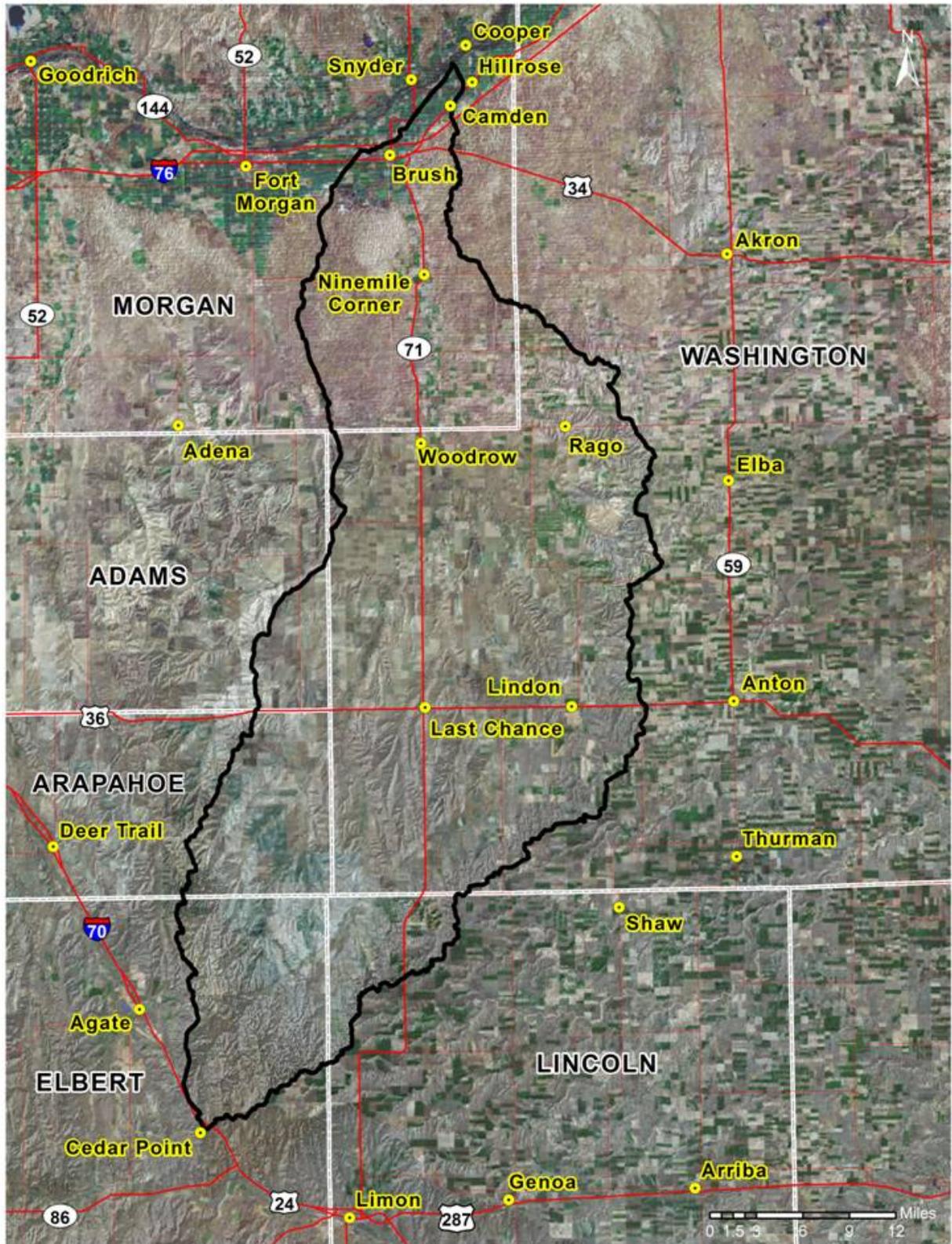
Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.

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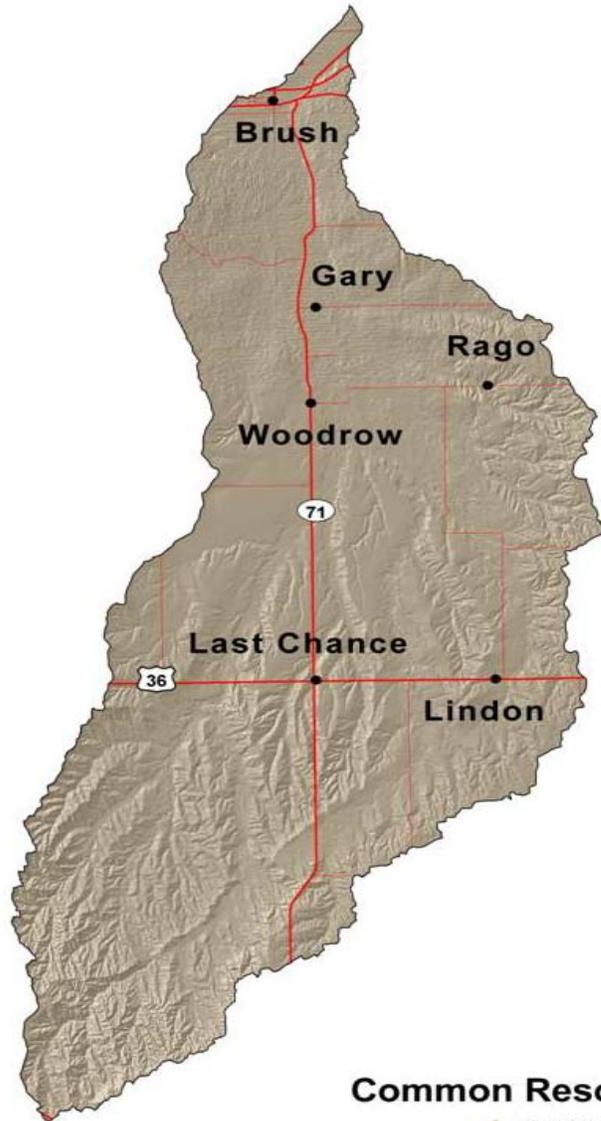


County	County Acres	County Acres in BEAVER Watershed	% of County in the Watershed	% of Watershed in the County
Adams	756498.867	22,817	3.0%	3.2%
Arapahoe	515064.276	58,204	11.3%	8.3%
Elbert	1183750.176	76,313	6.4%	10.9%
Lincoln	1654463.768	33,390	2.0%	4.8%
Morgan	827433.949	133,571	16.1%	19.0%
Washington	1615004.229	378,180	23.4%	53.9%
		702,060		

### Beaver Watershed - 10190013



Satellite Imagery: Arc IMS Server - Geography Network Services hosted by ESRI



**Common Resource Area (CRA)**  
 ◆ 67B.1

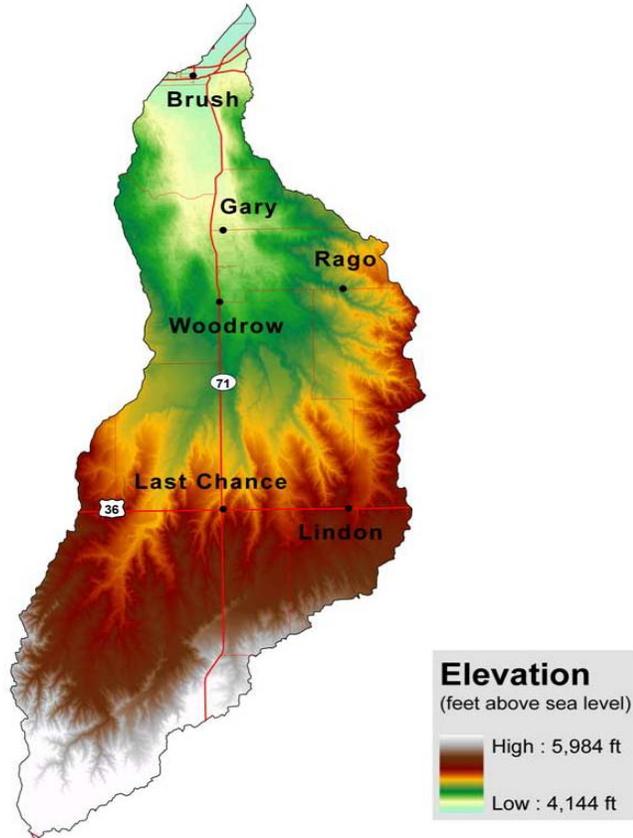
**Common Resource Areas (CRA):** Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

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.

## Physical Description

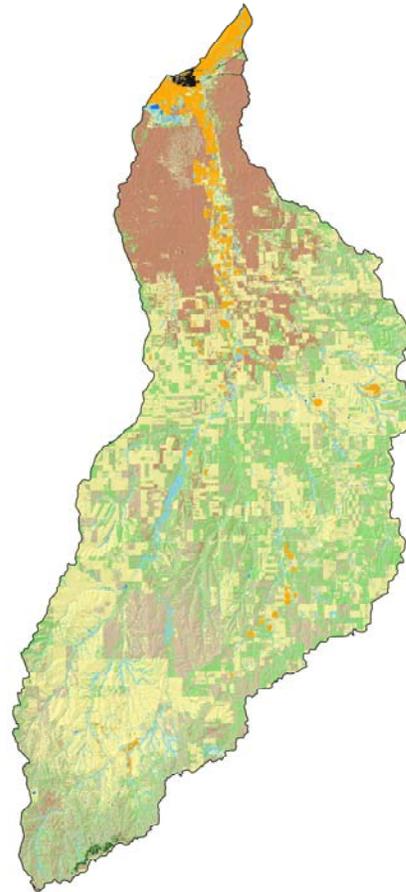
This area is characterized by broad, undulating to rolling plains dissected by streams and rivers. The highest elevations are on the northwestern side of the watershed and gently slopes down to the lowest elevation to the southeast.

The vast majority of the Beaver Watershed consists of rangeland. Cropland is dominated by dryland crops in the eastern portion of the watershed.



## Vegetation

- ◆ No Data
- ◆ Agriculture Land
- ◆ Commercial
- ◆ Cottonwood
- ◆ Dryland Ag
- ◆ Grass Dominated
- ◆ Grass/Forb Mix
- ◆ Grass/Yucca Mix
- ◆ Herbaceous Riparian
- ◆ Irrigated Ag
- ◆ Pinon-Juniper
- ◆ Ponderosa Pine
- ◆ Residential
- ◆ Riparian
- ◆ Sagebrush Community
- ◆ Sagebrush/Grass Mix
- ◆ Sand Dune Complex
- ◆ Shrub/Grass/Forb Mix
- ◆ Soil
- ◆ Water
- ◆ Willow



### Vegetation

- ◆ Coniferous Forest
- ◆ Dryland Ag
- ◆ Grass Dominated
- ◆ Irrigated Ag
- ◆ Other
- ◆ Rangeland
- ◆ Riparian
- ◆ Shrub/Brush Rangeland
- ◆ Shrub/Grass/Forb Mix Rangeland
- ◆ Urban/Built Up
- ◆ Water

BEAVER Land Use	Total Acreage	Vegetation	Acreage
Cropland	269,464.62	Dryland Ag Irrigated Ag*	253,586.62 15,878.00
Rangeland/Grassland	401,165	Grass Dominated Grass/Forb Mix Grass/Yucca Mix Pinon-Juniper Sagebrush Community Sagebrush/Grass Mix Shrub/Grass/Forb Mix	172,914.31 126,540.14 2,193.33 849.87 490.64 95,353.92 2,823.17
Forest	81	Ponderosa Pine	80.82
Riparian	26,592	Cottonwood Herbaceous Riparian Riparian Willow	3,868.14 6,257.40 13,910.10 2,556.03
Water	615	Water	615.31
Other	4,520	Commercial No Data Residential Sand Dune Complex Soil	350.79 2.77 765.40 3,353.34 47.39
<b>~Total Watershed Acres</b>			<b>702,437</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.

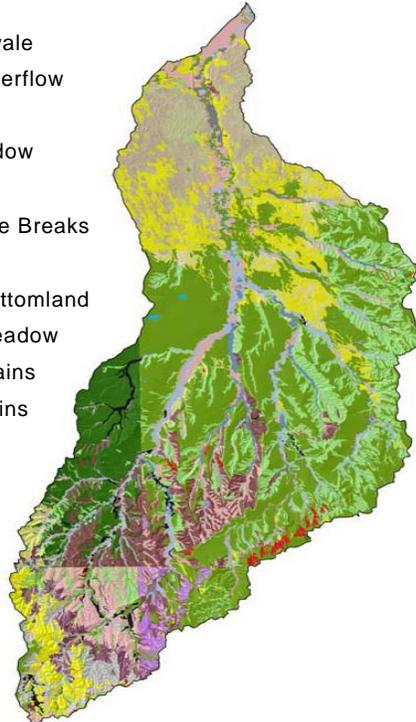
Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series of hot, dry summers following a period of scant mountain snowpack created water shortages. The fourth drought hit parts of Colorado in the late 1970s. In this century, 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. Rainfall occurs as frontal storms in the spring and early summer and high intensity, convective thunderstorms in late summer. Maximum precipitation is from mid spring through late autumn.

Precipitation in winter is snow. The average annual temperature is from 45 to 55 degrees F. The frost free period averages 162 days but ranges from 133 to 191 days.



## Soil: Ecological Site Name

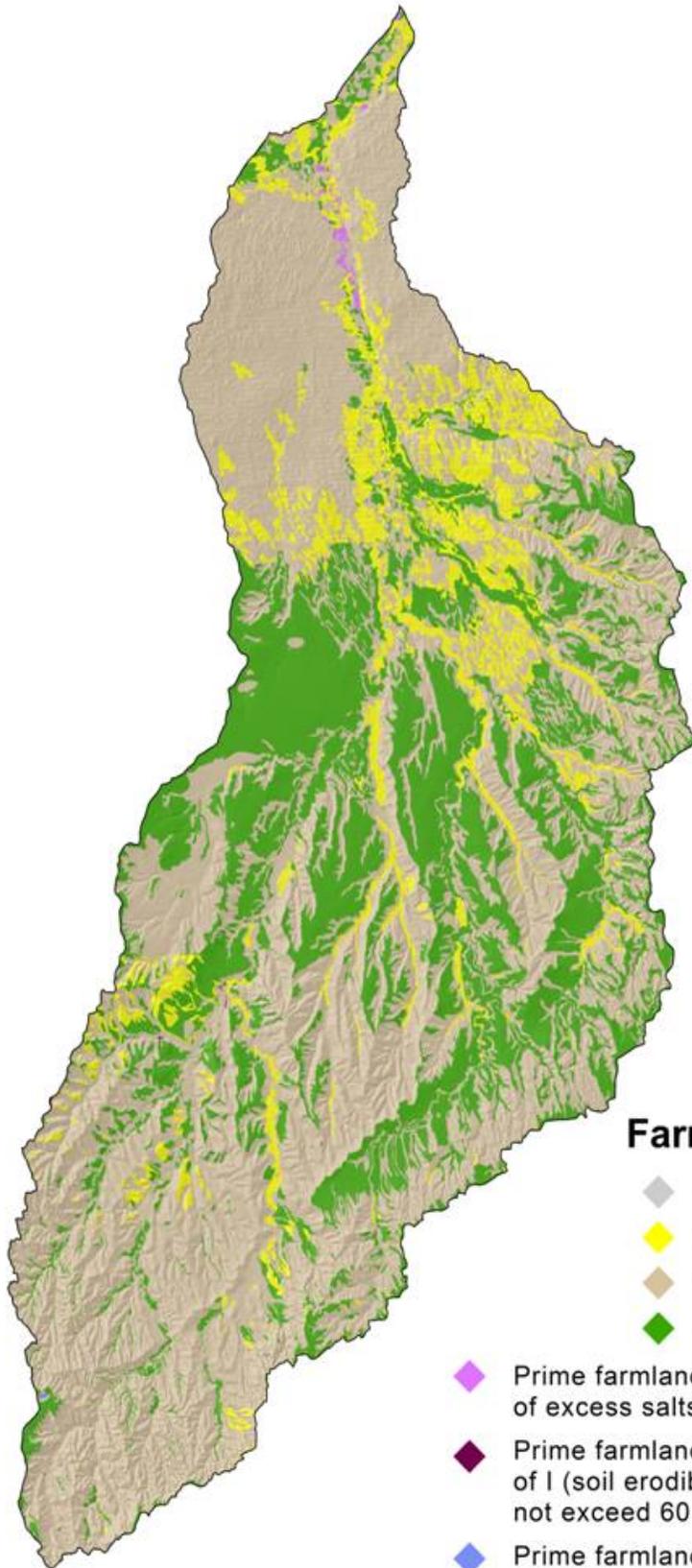
- |                    |                    |
|--------------------|--------------------|
| ◆ No Data          | ◆ Plains Swale     |
| ◆ Alkaline Plains  | ◆ Saline Overflow  |
| ◆ Choppy Sands     | ◆ Salt Flat        |
| ◆ Clayey           | ◆ Salt Meadow      |
| ◆ Clayey Plains    | ◆ Sands            |
| ◆ Deep Sands       | ◆ Sandstone Breaks |
| ◆ Gravel Breaks    | ◆ Sandy            |
| ◆ Limestone Breaks | ◆ Sandy Bottomland |
| ◆ Loamy            | ◆ Sandy Meadow     |
| ◆ Loamy Plains     | ◆ Sandy Plains     |
| ◆ Loamy Slopes     | ◆ Shaly Plains     |
| ◆ Overflow         |                    |



## Ecological Sites

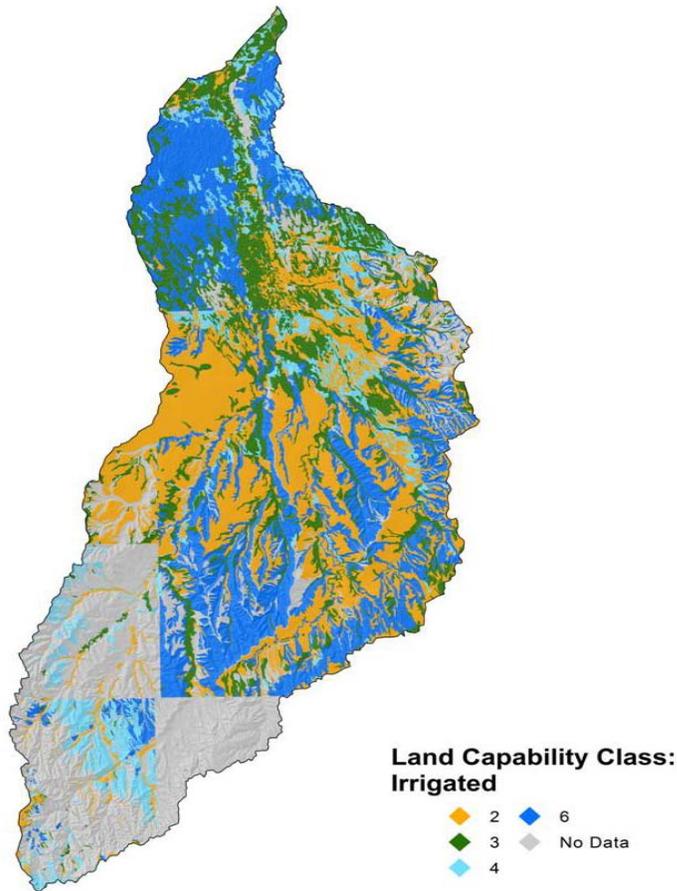
The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available in local offices of the Natural Resources Conservation Service (NRCS) and online at <http://www.nrcs.usda.gov/technical/efotg/>.



### Farmland Classification

- ◆ No Data
- ◆ Farmland of statewide importance
- ◆ Not prime farmland
- ◆ Prime farmland if irrigated
- ◆ Prime farmland if irrigated and reclaimed of excess salts and sodium
- ◆ 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



## Land Capability Classes

**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.

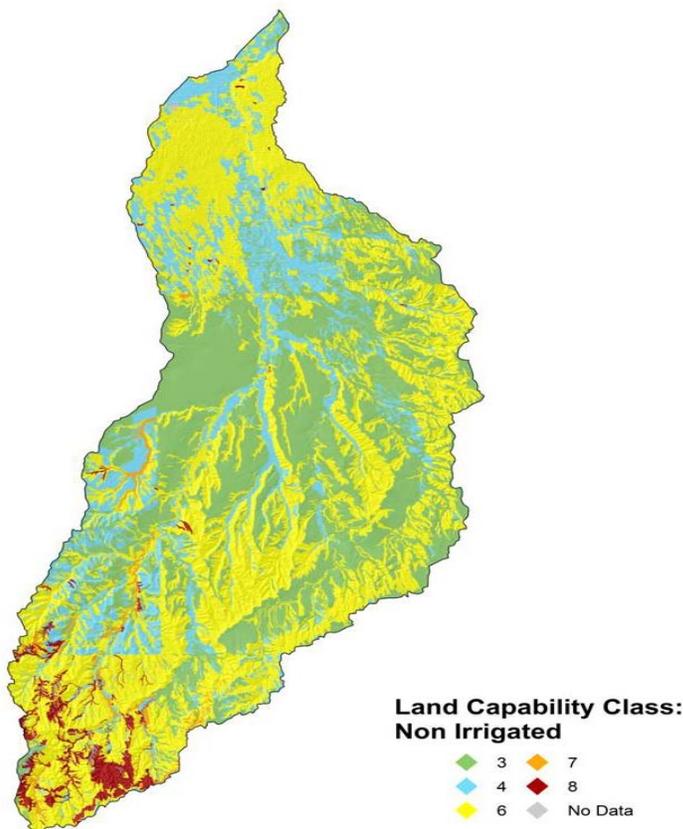
**Class 4** - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

**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.

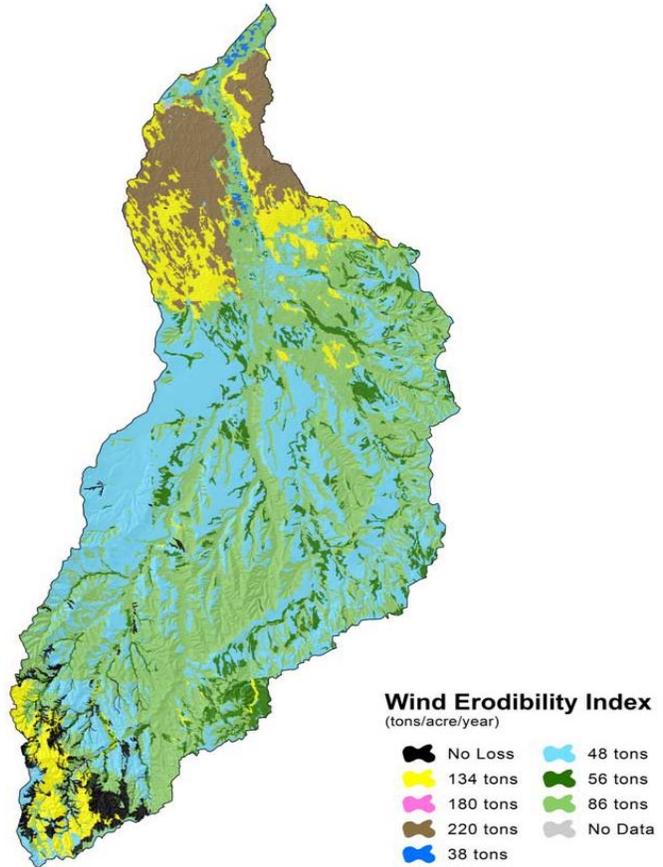


**The Wind Erodibility Index (WEI):**

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.

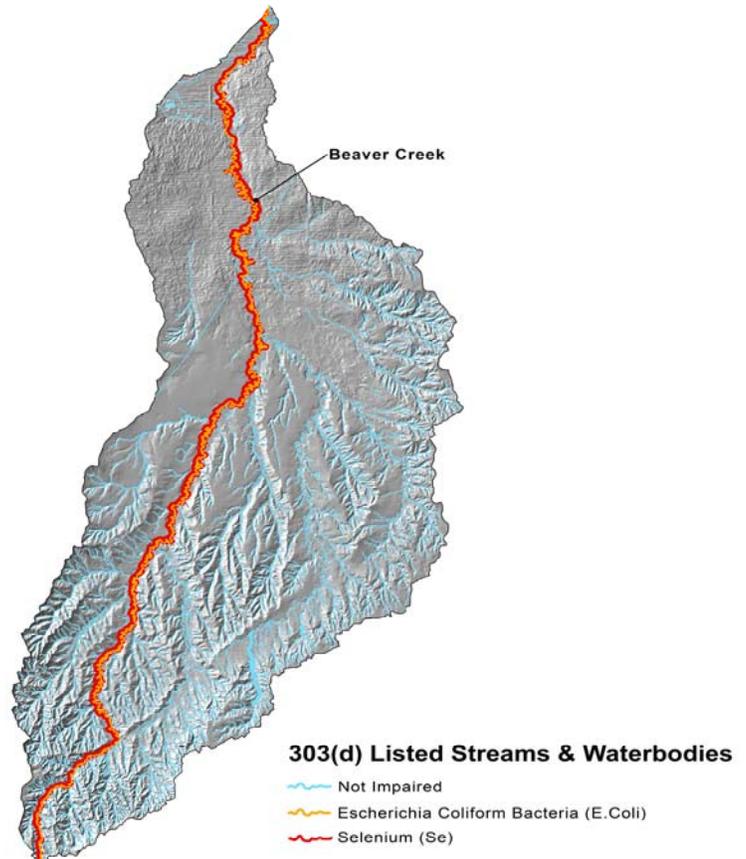
Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

As shown on the Wind Erodibility Index map below, most cropland soils in the Beaver Watershed are considered highly erodible.



**Stream Impairments**

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 compromising quantitative objectives and strategies have been or will be developed for these impaired waters within the watershed in order to achieve their water quality standards.



## State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern

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
Brassy Minnow	<i>Hybognathus hankinsoni</i>	Fish	Threatened/None	May occur in the watershed
Burrowing Owl	<i>Athene cunicularia</i>	Birds	Threatened/None	Occurs in the watershed
Common Garter Snake	<i>Thamnophis sirtalis</i>	Reptiles	Concern/None	May occur in the watershed
Cylindrical Papershell	<i>Anodontooides ferussacianus</i>	Gastropods	Concern/None	May occur in the watershed
Ferruginous Hawk	<i>Buteo regalis</i>	Birds	Concern/None	Occurs in the watershed
Iowa Darter	<i>Etheostoma exile</i>	Fish	Concern/None	Occurs in the watershed
Least Tern	<i>Sterna antillarum</i>	Birds	Endangered/Endangered	Water depletions in the watershed may affect downstream habitats
Long-Billed Curlew	<i>Numenius americanus</i>	Birds	Concern/None	Occurs in the watershed
Mountain Plover	<i>Charadrius montanus</i>	Birds	Concern/None	Occurs in the watershed
Northern Leopard Frog	<i>Rana pipiens</i>	Amphibians	Concern/None	Occurs in the watershed
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Fish	None/Endangered	Water depletions in the watershed may affect downstream habitats
Piping Plover	<i>Charadrius melodus</i>	Birds	Threatened/Threatened	Water depletions in the watershed may affect downstream habitats
Plains Minnow	<i>Hybognathus placitus</i>	Fish	Endangered/None	May occur 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
Whooping Crane	<i>Grus Americana</i>	Birds	Endangered/Endangered	Water depletions in the watershed may affect downstream habitats

Short and mid-grass prairie with a limited amount of shrub cover are the dominant, non-cropland, terrestrial habitat types in this watershed. Additional terrestrial habitats include limited irrigated cropland acres along the lower Beaver and significant acres of dryland crops scattered throughout the upper part of the watershed. Burrowing owl, mountain plover, black-tailed prairie dog, and swift fox are representative species for the prairie habitats. Greater prairie chicken may occur in the far northeastern part of the watershed. Water is scarce and the native species in this watershed are those that can survive without abundant water supplies. Riparian areas, playa lakes, and stock ponds provide seasonal to intermittent aquatic habitats. Economically important wildlife species that occur in much of the watershed include green sunfish, pronghorn, mule and/or white-tailed deer, and mourning dove. Pheasant, are common in the lower half of the watershed. Bobwhite quail and snow goose occur in or near the riparian areas along the confluence of Beaver and the South Platte River.

## Social Data

	Adams	Arapahoe	Elbert	Lincoln	Morgan	Washington
<b>Demographics (US Census, American Factfinder)</b>						
Total population	396,032	254,207	19,872	20,504	27,171	4,926
Male	200,836	258,572	9,966	10,834	13,613	2,504
Female	195,196	265,635	9,906	9,670	13,558	2,422
Median age (years)	31.2	34.8	37.2	36.5	33.5	40.2
White	297,986	410,747	18,923	18,792	21,642	4,748
Black or African American	12092	48,874	128	420	91	2
American Indian and Alaska Native	3945	4,180	125	131	221	28
Asian	14128	24,931	74	82	47	5
Native Hawaiian and Other Pacific Islander	66	719	18	14	46	1
Some other race	55810	21,919	255	772	4449	100
Hispanic or Latino (of any race)	138940	85,131	766	2439	8473	310
<b>Economic Characteristics (US Census, American Factfinder)</b>						
In labor force (population 16 years and over)	213,189	292,087	11,056	9,771	12,422	2,400
Median household income (dollars)	50,650	54,838	62,480	32,724	34,568	32,431
Median family income (dollars)	56,053	67,456	66,740	42,241	39,102	37,287
Per capita income (dollars)	22,228	30,170	24,960	16,721	15,492	17,788
Families below poverty level	x	x	145	454	592	121
Individuals below poverty level	x	x	791	2253	3281	555
X means that value is not applicable or not available						
<b>County Agricultural Characteristics (Colorado Agricultural Census, county data tables)</b>						
Farms (number)	728	448	1153	455	761	861
Land in farms/ranches (acres)	701,471	332,585	1,068,359	1,428,404	757,946	1,408,583
Average size farm/ranch (acres)	964	742	927	3,139	996	1,636
Median size farm (acres)	159	82	160	1,497	385	865
Average age of farmer or rancher	54.6	53.1	52.8	55.6	52.9	55.4
Net cash return from ag sales (\$1,000)	6,721	1,897	108	4,829	18,627	2,612
Cattle and calves (number)	10,000	6,000	36,000	40,000	242,000	60,000

Selected Conservation Application Data		Beaver 10190013					
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	77,117	72,056	Not Avail.	108,283	25,737	34,446	317,639
Total Conservation Systems Applied (Acres)	58,829	72,266	Not Avail.	46,577	27,249	45,118	244,039
<b>Practices</b>							
Prescribed Grazing	7,202	6,064	12,836	2,053	13,288	18,067	303,549
Upland Wildlife Habitat Management	8,019	9,799	5,300	11,853	3,227	8,970	47,168
Conservation Cropping System	0	0	2,218	19,941	978	1,070	24,207
Residue Management	4,449	2,693	3,975	20,667	2,424	118	34,326

### Conservation Systems to Address Major Resource Concerns

Primary Resource Concern: Rangeland Health				
Conservation System Description:	Prescribed Grazing—planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals. Estimate 870,000 acres need to be treated on median sized ranches of 5,000 acres.			Based on Conservation System Guide Code: <a href="#">CO 67B.1-GR-01-R-Grazing</a>
Practices	Unit	Quantity	Cost/Unit (\$)	Estimated Cost per Median Sized Ranch (\$)
Prescribed Grazing				
Fence (382)	Ft.	21,120	0.6	12,672
Pest Management (595)	Ac.	300	4,500	4,500
Pipeline (516)	Ft.	15,000	2.40	36,000
Upland Wildlife Habitat Management (645)	Ac.	300	na	0
Watering Facility (614)	No.	2	410	820
Windbreak/Shelterbelt Establishment (380)	Ft.	1,000	.85	850
Costs to apply prescribed grazing per median sized ranch of 5,000 acres	No.	174	54,842	9,542,508
<b>Subtotal Rangeland costs:</b>				<b>\$9,542,508</b>

### Conservation Systems to Address Major Resource Concerns (cont'd)

Primary Resource Concern: Soil Erosion By Wind on dryland crops				
Conservation System Description:		Seasonal residue management with Conservation crop rotation, Nutrient and Pest Mgt		Reference Conservation System Guide Code: <a href="#">CO 67B.1-CR-Dryland-R-2</a>
Practices	Unit	Quantity	Cost/Unit (\$)	Estimated Cost (\$)
Residue Mgmt, Seasonal (344)	Ac	81,800	5	27,770
Nutrient Management (590)	Ac	81,800	5	409,000
Pest Management (595)	Ac	81,800	15	1,227,000
Subtotal Costs Dryland Crops:				\$2,045,000

### General Effects, Impacts, and Estimated Costs of Application of Conservation Systems

Landuse	Resource Concern	Measurable Effects	Non-measurable Effects	Estimated Cost (\$)
Rangeland	Plants		Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter. Wildlife habitat is sustained or improved.	9,542,508
Dryland Crop	Soil	409,000 Total Tons/Year saved	Cropland sustainability	2,045,000
Estimated Total Costs to Address Major Resource Concerns:				\$11,587,508

## References Not Cited in Document

**303(d)** listed streams within the Watershed were created using data from Colorado Department of Public Health & Environments' Water Quality & Control Commission. Impaired streams are current as of April 30, 2006. For a list of all Colorado impaired streams, locations and priority ratings, visit <http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf>. Stream data from National Hydrologic Dataset <http://nhd.usgs.gov>

**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 surveys:

Adams County Area (CO001) Published 1/11/2008	Arapahoe County (CO005) Published 1/25/2000
Lincoln County (CO073) Published 12/19/2005	Morgan County (CO087) Published 11/28/2000
Washington County (CO121) Published 1/10/2007	Elbert County East (CO624) Published 12/16/2005

**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). 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>.