



United States Department  
of Agriculture

# Roaring Fork Watershed



Hydrologic Unit Code 14010004

Natural Resources  
Conservation Service

## Rapid Assessment

Lakewood, Colorado

RWA 14010004

May 2008



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

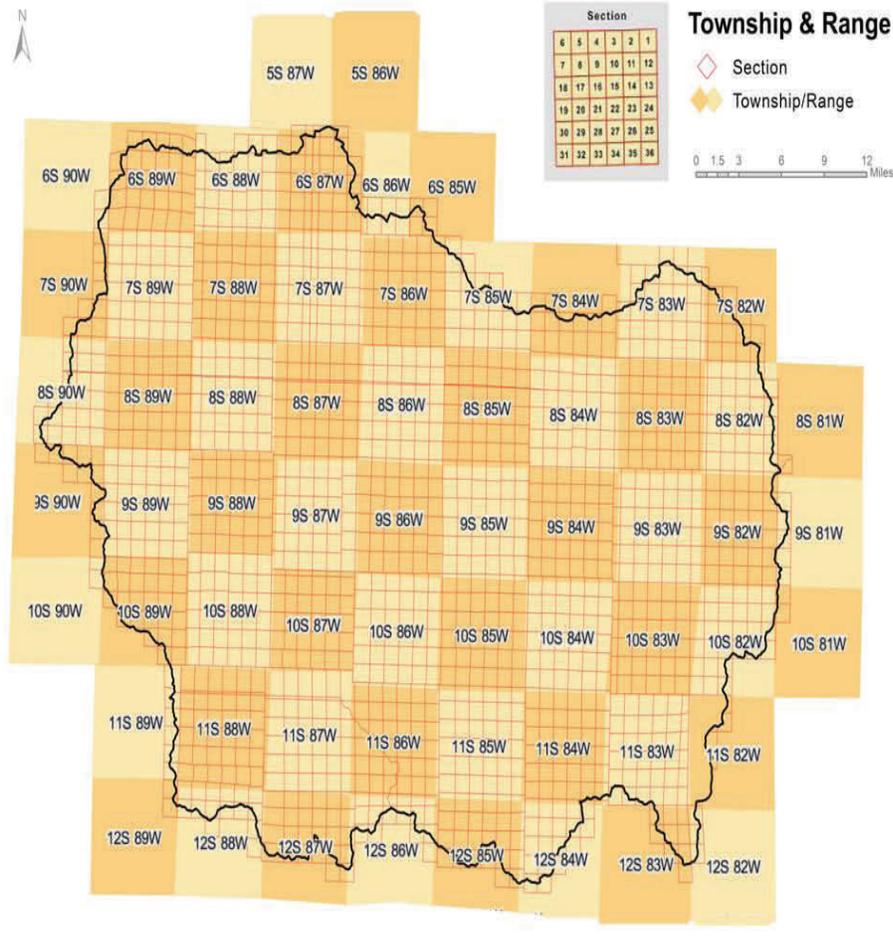
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

- 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.**

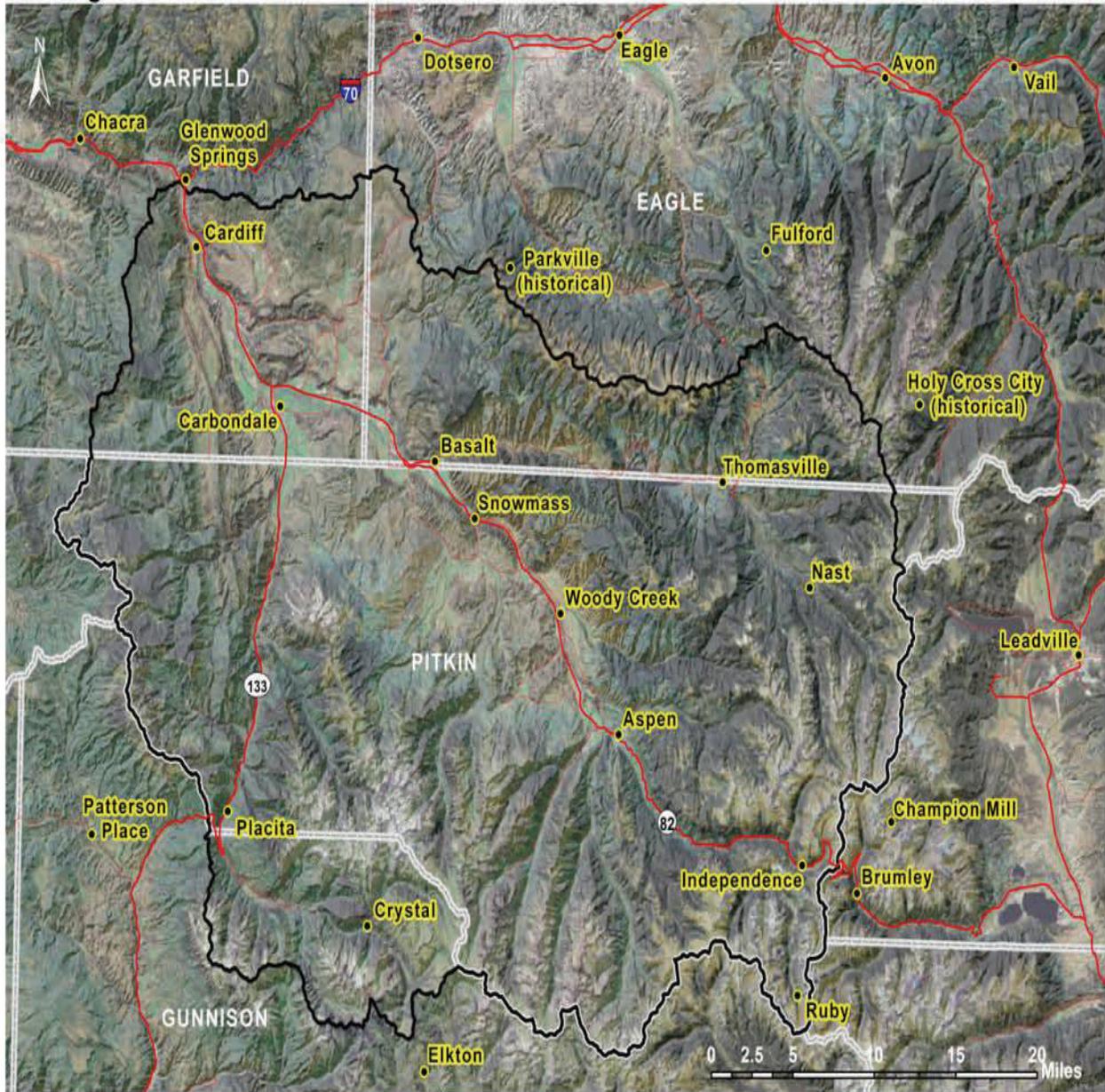
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County	County Acres	County Acres in Roaring Fork Watershed	% of County in the Watershed	% of Watershed in the County
Eagle	1,084,004	133,382	12.3%	14.3%
Garfield	1,893,489	116,267	6.1%	12.5%
Gunnison	2,085,945	67,984	3.3%	7.3%
Pitkin	621,363	613,117	98.7%	65.9%

930,840

### Roaring Fork Watershed - 14010004



Satellite Imagery: ArcIMS Server - Geography Network hosted by ESRI

### Common Resource Areas (CRA's)



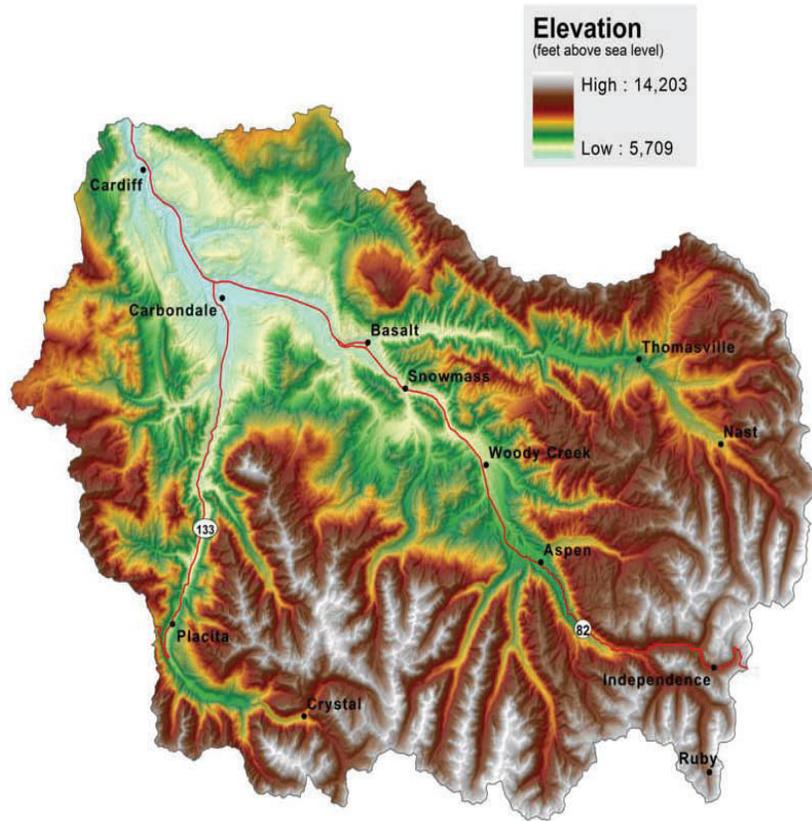
**Common Resource Areas (CRA):** Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

MLRA	CRA	CRA NAME	CRA DESCRIPTION
48A	48A.1	Southern Rocky Mountains - High Mountains and Valleys	This area is best characterized by steep, high mountain ranges and associated mountain valleys. The temperature regimes are mostly frigid and cryic; moisture regimes are mainly ustic and udic. Vegetation is sagebrush-grass at low elevations, and with increasing elevation ranges from coniferous forest to alpine tundra. Elevations range from 6,500 to 14,400 feet.

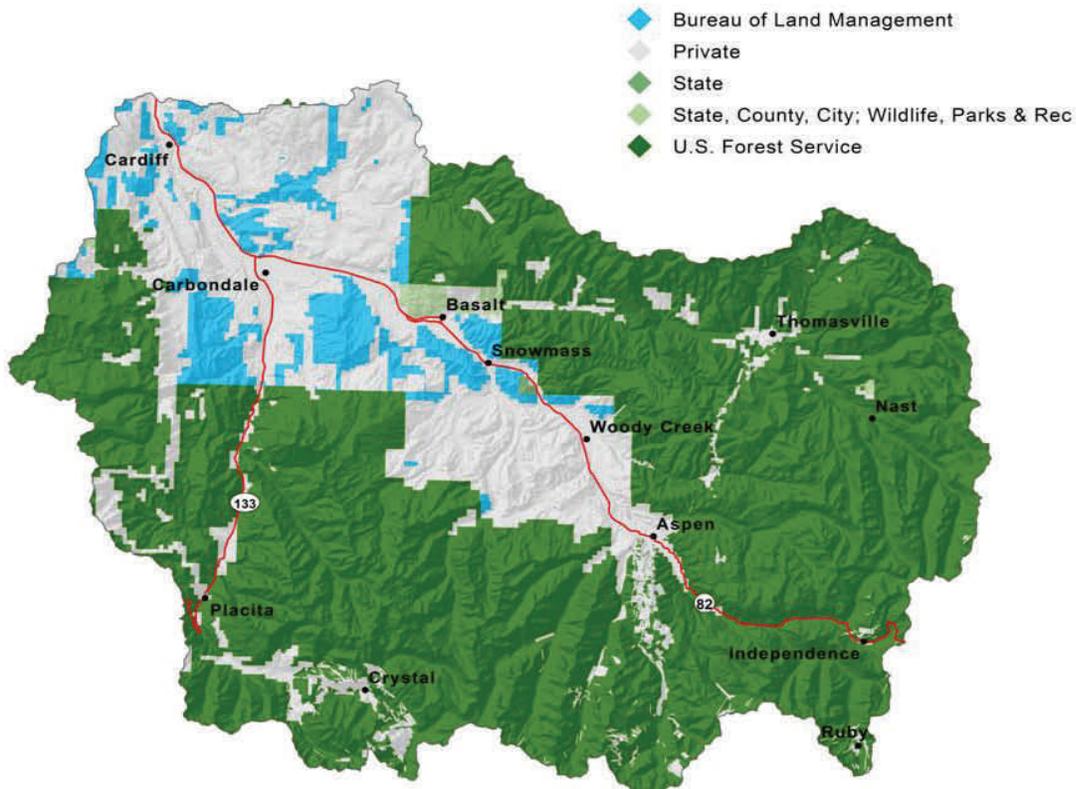
## Physical Description

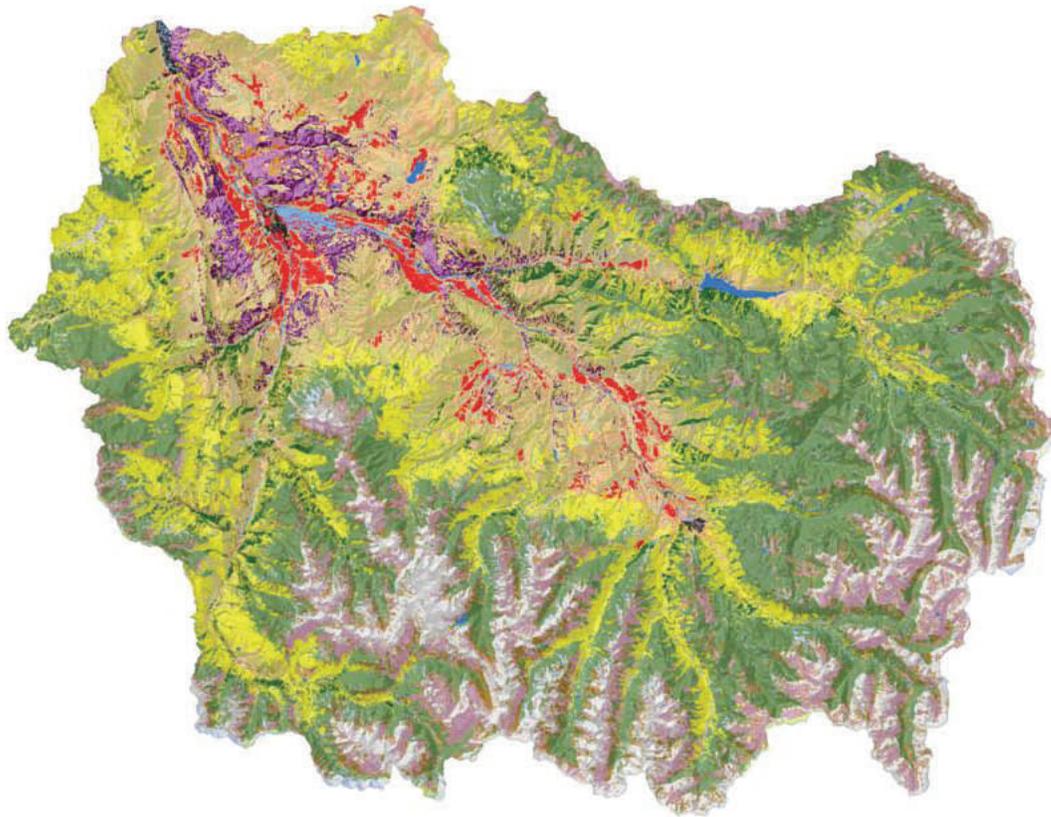
This area is characterized by broad, undulating to rolling plains dissected by streams and rivers. The highest elevations are on the northwestern side of the watershed and gently slopes down to the lowest elevation to the southeast.

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



## Land Owner





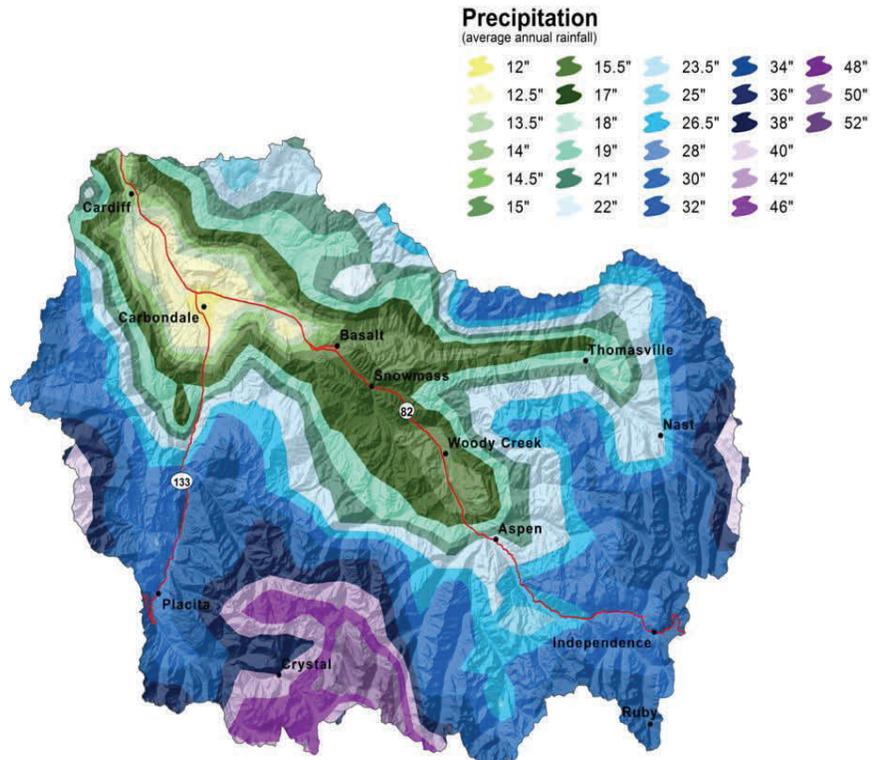
### Vegetation

- |                                    |                                  |
|------------------------------------|----------------------------------|
| ◇ No Data                          | ◆ P.J-Mtn Shrub Mix              |
| ◆ Agriculture Land                 | ◆ PJ-Sagebrush Mix               |
| ◆ Alpine Grass Dominated           | ◆ Pinon-Juniper                  |
| ◆ Alpine Grass/Forb Mix            | ◆ Residential                    |
| ◆ Alpine Meadow                    | ◆ Riparian                       |
| ◆ Aspen                            | ◆ Rock                           |
| ◆ Aspen/Mesic Mountain Shrub Mix   | ◆ Sagebrush Community            |
| ◆ Barren Land                      | ◆ Sagebrush/Grass Mix            |
| ◆ Conifer Riparian                 | ◆ Sagebrush/Greasewood           |
| ◆ Cottonwood                       | ◆ Sagebrush/Mesic Mtn Shrub Mix  |
| ◆ Douglas Fir                      | ◆ Shrub/Grass/Forb Mix           |
| ◆ Douglas Fir/Aspen Mix            | ◇ Snow                           |
| ◆ Douglas Fir/Englemann Spruce Mix | ◆ Snowberry                      |
| ◆ Dryland Ag                       | ◆ Snowberry/Shrub Mix            |
| ◆ Englemann Spruce/Fir Mix         | ◆ Sparse PJ/Shrub/Rock Mix       |
| ◆ Exotic Riparian Shrubs           | ◆ Spruce/Fir/Aspen Mix           |
| ◆ Fir/Lodgepole Pine Mix           | ◆ Spruce/Fir/Lodgepole/Aspen Mix |
| ◆ Gambel Oak                       | ◆ Spruce/Lodgepole Pine Mix      |
| ◆ Grass Dominated                  | ◆ SubAlpine Shrub Community      |
| ◆ Grass/Forb Mix                   | ◆ Subalpine Grass/Forb Mix       |
| ◆ Grass/Forb Rangeland             | ◆ Talus Slopes & Rock Outcrops   |
| ◆ Irrigated Ag                     | ◆ Upland Willow/Shrub Mix        |
| ◆ Lodgepole Pine                   | ◆ Urban/Built Up                 |
| ◆ Lodgepole Pine/Aspen Mix         | ◆ Water                          |
| ◆ Lodgepole/Spruce/Fir Mix         | ◆ Willow                         |
| ◆ Mesic Mountain Shrub Mix         |                                  |

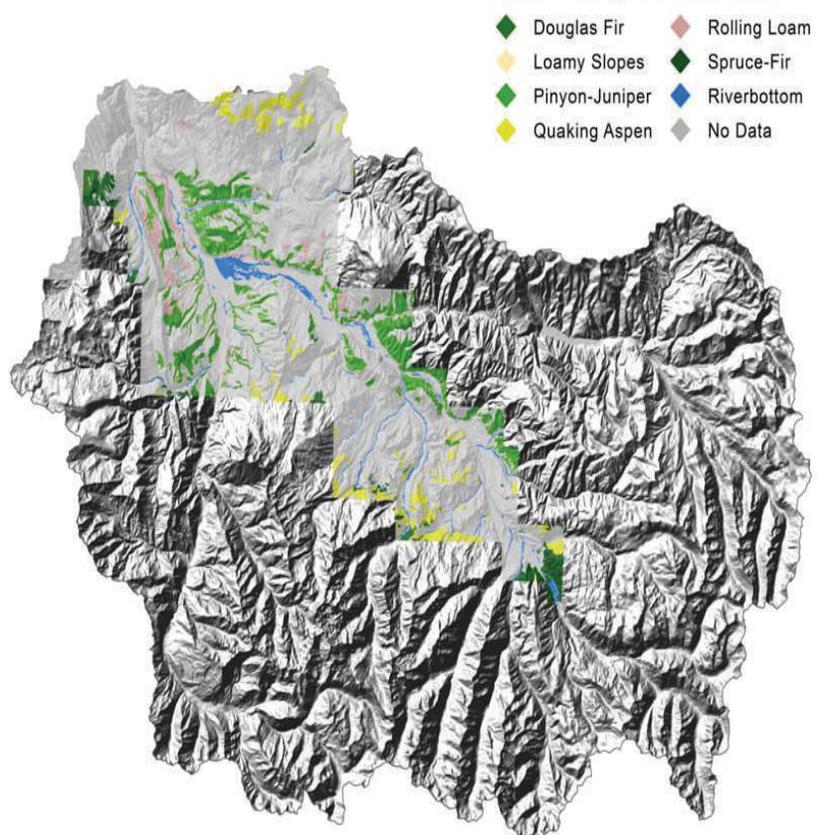
ROARING FORK	Land Use	Total Acreage	Vegetation	Acreage
Cropland		18,917.8	Agriculture Land	18,898.1
			Dryland Ag	0.2
			Irrigated Ag	19.5
Rangeland/Grassland		363,247.2	Alpine Grass Dominated	250.3
			Alpine Grass/Forb Mix	936.2
			Alpine Meadow	69,462.3
			Gambel Oak	73,936.9
			Grass Dominated	1.5
			Grass/Forb Mix	0.2
			Grass/Forb Rangeland	53,902.4
			Mesic Mountain Shrub Mix	29,569.1
			PJ-Mtn Shrub Mix	16,253.1
			PJ-Sagebrush Mix	7,297.5
			Pinon-Juniper	9,628.3
			Sagebrush Community	3,982.8
			Sagebrush/Grass Mix	51,467.6
			Sagebrush/Greasewood	0.3
			Sagebrush/Mesic Mtn Shrub Mix	187.5
			Shrub/Grass/Forb Mix	34.3
			Snowberry	5.7
			Snowberry/Shrub Mix	3.7
Sparse PJ/Shrub/Rock Mix	2.7			
SubAlpine Shrub Community	5.9			
Subalpine Grass/Forb Mix	258.6			
Upland Willow/Shrub Mix	46,060.4			
Forest		430,432.9	Aspen	119,383.5
			Aspen/Mesic Mountain Shrub Mix	28.9
			Douglas Fir	17,991.2
			Douglas Fir/Aspen Mix	27,102.9
			Douglas Fir/Englemann Spruce Mix	12.2
			Englemann Spruce/Fir Mix	211,573.7
			Fir/Lodgepole Pine Mix	25.0
			Lodgepole Pine	27,307.6
			Lodgepole Pine/Aspen Mix	2.7
			Lodgepole/Spruce/Fir Mix	2.0
			Spruce/Fir/Aspen Mix	26,997.9
			Spruce/Fir/Lodgepole/Aspen Mix	3.8
Spruce/Lodgepole Pine Mix	1.5			
Riparian		5,765.3	Conifer Riparian	0.1
			Cottonwood	0.5
			Exotic Riparian Shrubs	0.3
			Riparian	5,575.2
			Willow	189.2
Water		2,794.2	Water	2,794.2
Other		109,647.8	Barren Land	13,589.1
			Residential	4.6
			Rock	72,317.9
			Snow	3,186.2
			Talus Slopes & Rock Outcrops	18,989.3
			Urban/Built Up	1,557.4
			No Data	3.2
<b>Total Watershed Acres</b>		<b>930,805</b>		<b>930,805</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

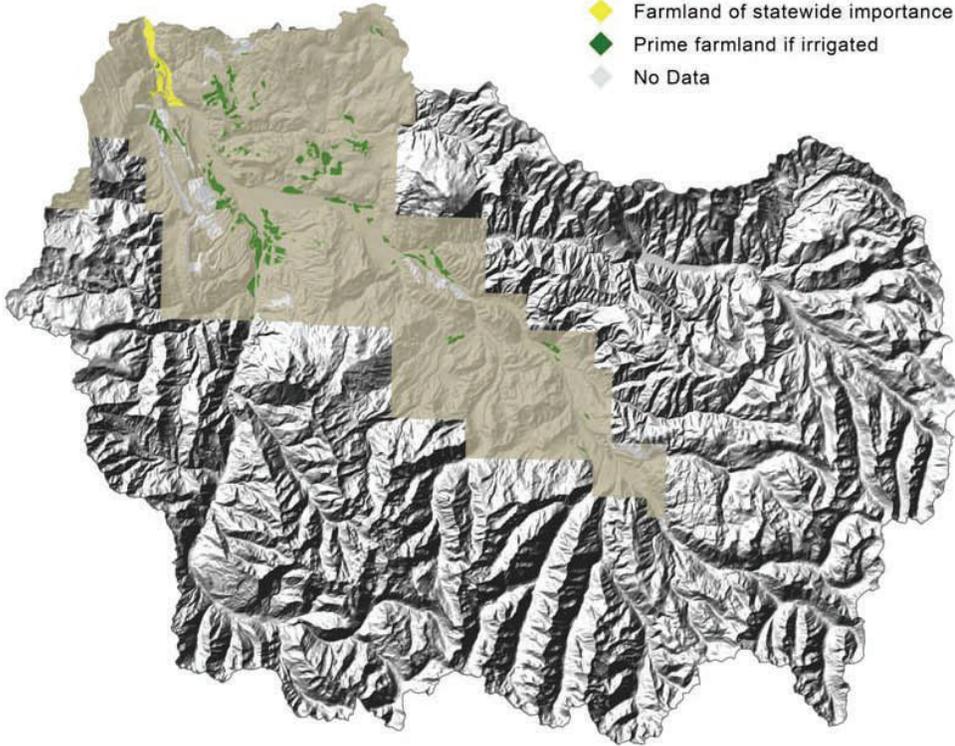


### Ecological Sites

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/>.

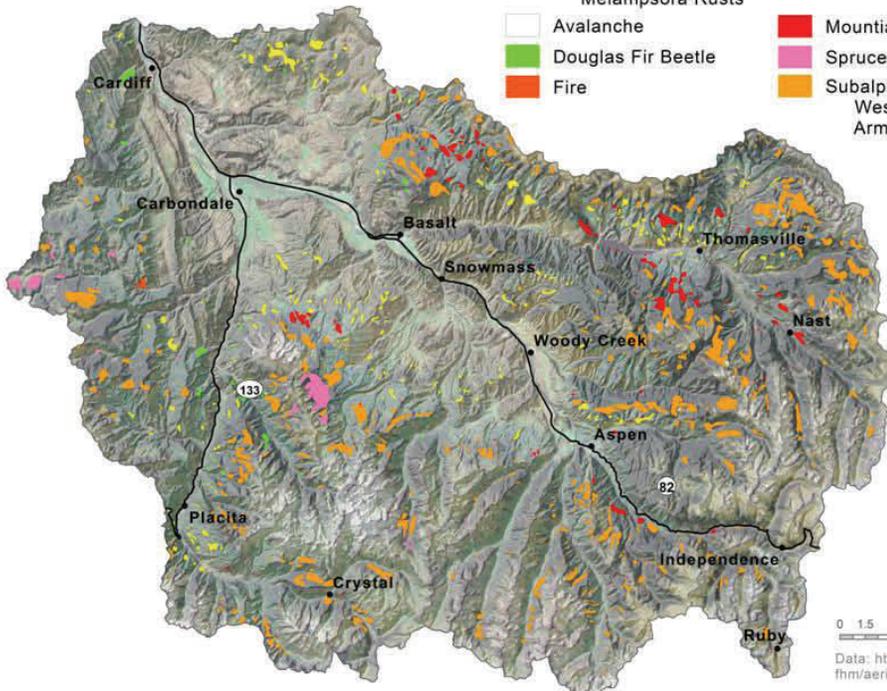
### Farmland Classification

- ◆ Not prime farmland
- ◆ Farmland of statewide importance
- ◆ Prime farmland if irrigated
- ◆ No Data



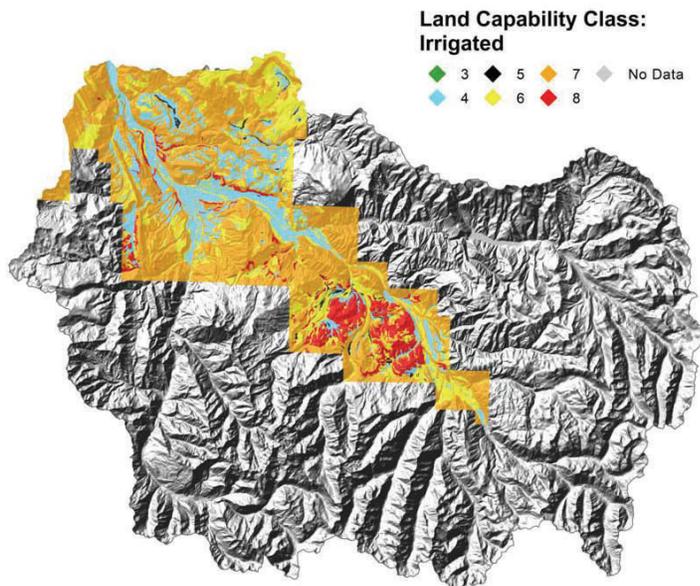
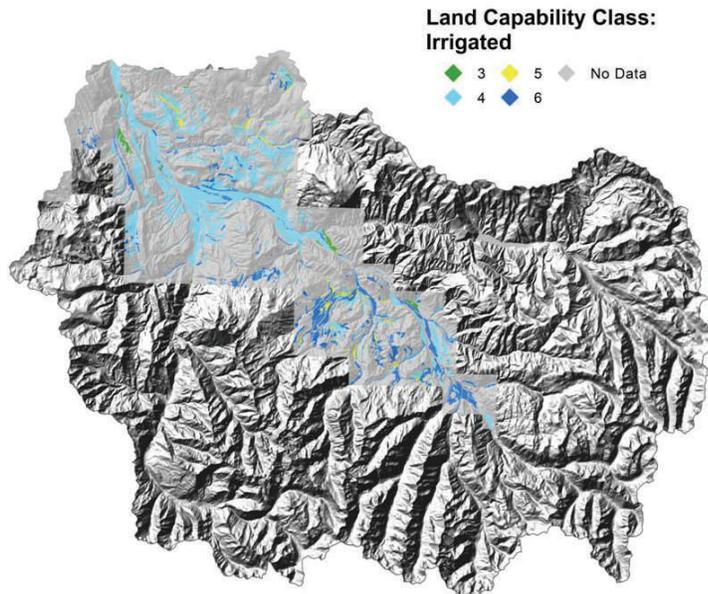
### 2006 Forest Insect & Disease

- Aspen Defoliation by:  
Large Aspen Tortix  
Forest Tent Caterpillar  
Marssonina Blight  
Melampsora Rusts
- Avalanche
- Douglas Fir Beetle
- Fire
- Mountain Pine Beetle
- Spruce Beetle
- Subalpine Fir Mortality by:  
Western Basalm Bark Beetle  
Armillaria Root Disease



0 1.5 3 6 9 12 Miles

Data: <http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/>



## 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.

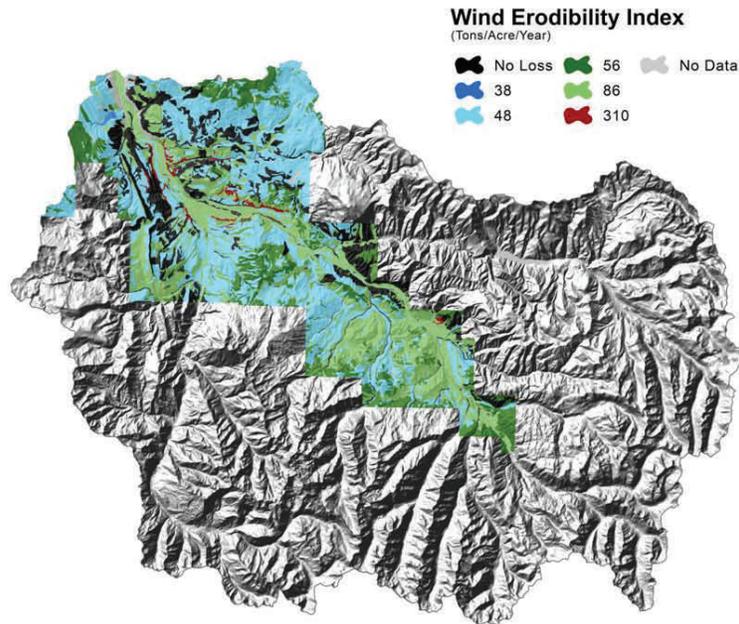
**Class 8** - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

**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.

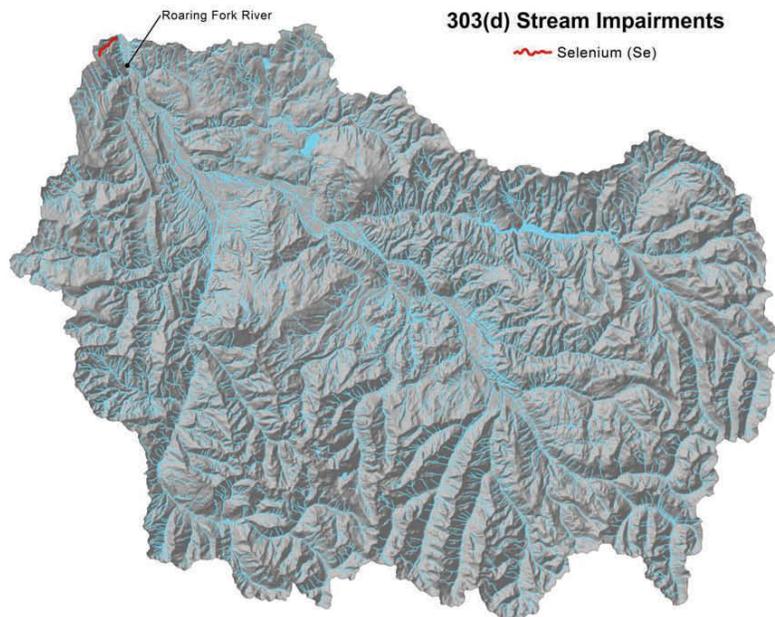
Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

As shown on the Wind Erodibility Index map below, most cropland soils in the Roaring Fork 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.



**Impairment Definition**

Selenium: A naturally occurring metal in marine shale that serves as a micronutrient. Excessive amounts impair aquatic life and bioaccumulation up the food chain occurs causing toxicity to birds, mammals, and humans.

## State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern in Roaring Fork Watershed

Common Name	Scientific Name	Class	Status		Comments
			State	Federal	
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Birds	Concern	None	Nests in the watershed
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Birds	Threatened	None	Winter range and nest and roost sites in the watershed
Boreal Toad	<i>Bufo boreas boreas</i>	Amphibians	Endangered	None	May occur in the watershed
Canada Lynx	<i>Lynx canadensis</i>	Mammals	Endangered	Threatened	Occurs in the watershed
Colorado River Cutthroat Trout	<i>Oncorhynchus clarki pleuriticus</i>	Fish	Concern	None	Occurs in the watershed
Colorado Roundtail Chub	<i>Gila robusta</i>	Fish	Concern	None	May occur in the watershed
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Birds	Threatened	Threatened	May occur in the watershed
Northern Leopard Frog	<i>Rana pipiens</i>	Amphibians	Concern	None	Occurs in the watershed
River Otter	<i>Lontra Canadensis</i>	Mammals	Threatened	None	Occurs in the watershed
Townsend's big-eared bat (pale ssp)	<i>Corynorhinus townsendii pallescens</i>	Mammals	Concern	None	Occurs in the watershed
Uncompahgre Fritillary Butterfly	<i>Boloria acrocneema</i>	Insects	None	Endangered	May occur in the watershed
Wolverine	<i>Gulo gulo</i>	Mammals	Endangered	None	May occur in the watershed
Western Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Birds	Concern	Candidate	May occur in the watershed

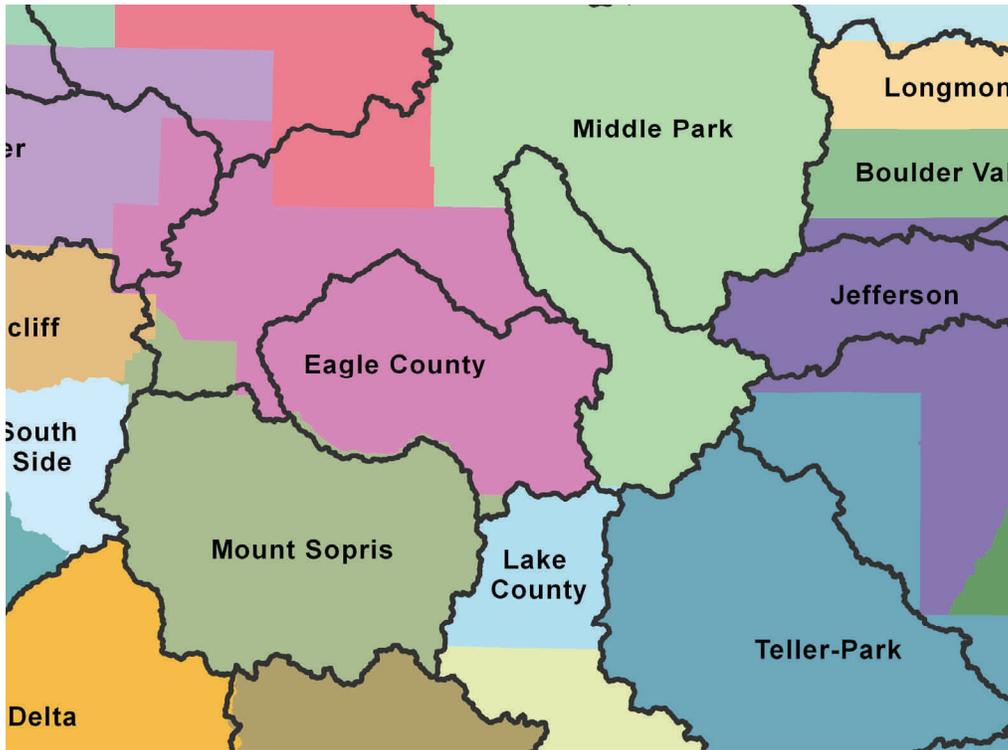
The terrestrial habitats in this watershed include irrigated hayland; big sagebrush, oak, and pinyon-juniper shrub habitats; coniferous and aspen forest habitats; subalpine meadows; and alpine tundra. Numerous riparian areas and wetlands provide aquatic habitats in the watershed.

Wildlife species found in this watershed are diverse. Representative species of the highest elevations include pika, marmot, bighorn sheep, mountain goats, and white-tailed ptarmigan.

Economically important species in the watershed include: black bear, elk, mule deer, mountain lion, and trout, throughout most of the watershed; wild turkey in the foothills and montane zones; and moose on the western edge of the watershed.

<b>Social Data</b>	<b>Eagle</b>	<b>Garfield</b>	<b>Gunnison</b>	<b>Pitkin</b>
<b>Demographics (US Census, American Factfinder)</b>				
Total population	41,659	43,791	13,956	14,872
Male	22,813	22,489	7,563	7,958
Female	18,846	21,302	6,393	6,914
Median age (years)	31.2	34.2	30.4	38.4
White	35,558	39,394	13,269	14,029
Black or African American	142	196	68	79
American Indian and Alaska Native	296	310	98	40
Asian	342	191	75	167
Native Hawaiian and Other Pacific Islander	30	35	5	6
Some other race	4498	2861	201	352
Hispanic or Latino (of any race)	9682	7300	700	973
<b>Economic Characteristics (US Census, American Factfinder)</b>				
In labor force (population 16 years and over)	26,598	23,562	8,635	10,154
Median household income (dollars)	62,682	47,016	36,916	59,375
Median family income (dollars)	68,226	53,840	51,950	75,048
Per capita income (dollars)	32,011	21,341	21,407	40,811
Families below poverty level	358	522	182	98
Individuals below poverty level	3221	3206	1949	917
<b>County Agricultural Characteristics (Colorado Agricultural Census, county data tables)</b>				
Farms (number)	114	499	186	84
Land in farms/ranches (acres)	115,998	404,335	165,488	23,872
Average size farm/ranch (acres)	1,018	810	890	284
Median size farm (acres)	181	110	320	75
Average age of farmer or rancher	53.9	54	53.1	56.1
Net cash return from ag sales (\$1,000)	1,239	-1,364	1,669	-2,277
Cattle and calves (number)	6,000	22,000	19,000	1,500

Natural Resource Concerns



Conservation District	Concern 1	Concern 2	Concern 3	Concern 4
EAGLE COUNTY	Noxious Weeds	Vegetation Management	Water	Land Use

Selected Conservation Application Data		Roaring Fork 14010004					
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	3,493	8,383	Not Avail.	4,689	18,524	5,514	40,603
Total Conservation Systems Applied (Acres)	4,716	7,550	Not Avail.	3,202	4,931	9,727	30,126
<b>Practices</b>							
Prescribed Grazing	0	4,968	1,100	323	3,258	6,205	15,854
Upland Wildlife Habitat Management	0	18,892	0	0	0	0	18,892

### 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 65,000 acres need to be treated on median sized ranches of 900 acres.			Based on Conservation System Guide Code: <a href="#">CO 48A.1-GR-01-R-Grazing</a>
Practices	Unit	Quantity	Cost/Unit (\$)	Estimated Cost per Median Sized Ranch (\$)
Prescribed Grazing				
Fence (382)	Ft.	3,100	1.6	4,960
Pest Management (595)	Ac.	300	4,500	4,500
Pipeline (516)	Ft.	2,000	3.40	6,800
Upland Wildlife Habitat Management (645)	Ac.	300	na	
Irrigation Water Management	Ac.	85	450.00	38,250
Watering Facility (614)	No.	2	610	1,220
Costs to apply prescribed grazing per median sized ranch of 900 acres	No.	72	55,730	4,012,560
<b>Subtotal Rangeland costs:</b>				<b>4,012,560</b>

## 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/100293wqlimitedsegtmls.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:

Aspen-Gypsum Area (CO655) Published 01/08/2007 Rifle Area (CO683) Published 01/10/2007

To download SSURGO data, visit <http://soildatamart.nrcs.usda.gov>. The surveys were then loaded into Soil Data Viewer <http://soildataviewer.nrcs.usda.gov> (a tool built as an extension to ArcMAP for quick geospatial analysis of soil data for use in resource assessment) and the subsequent data was exported to a GIS shapefile.

**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), **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>.

**Forest Insect & Disease** data obtained from the U.S. Forest Service annual aerial survey. For more information visit <http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/>