United States Department of Agriculture

Eagle Watershed

Hydrologic Unit Code 14010003

Natural Resources Conservation Service

Rapid Assessment

Lakewood, Colorado

RWA 14010003

December 2009

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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.

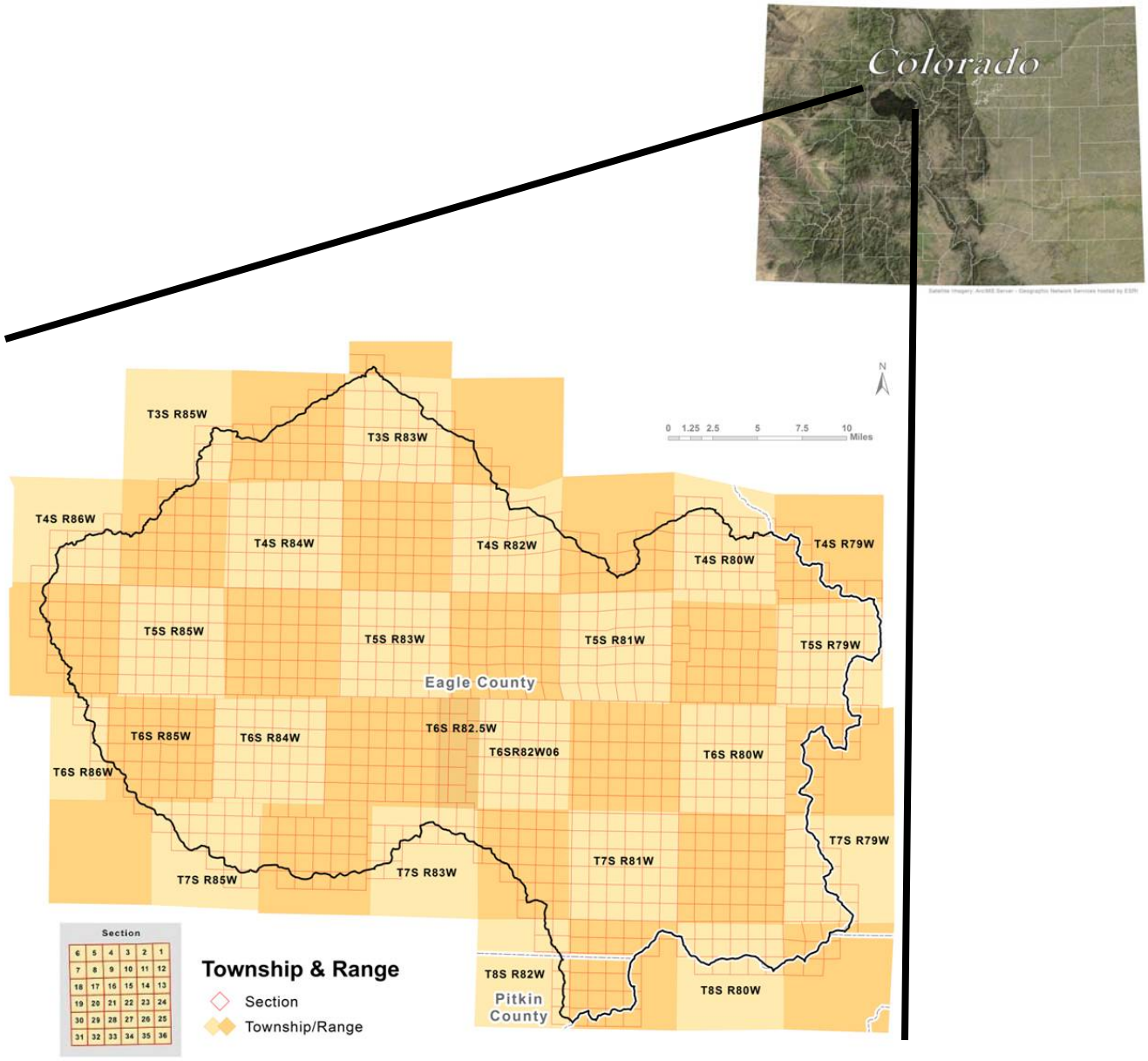
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best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

Benefits of these Activities

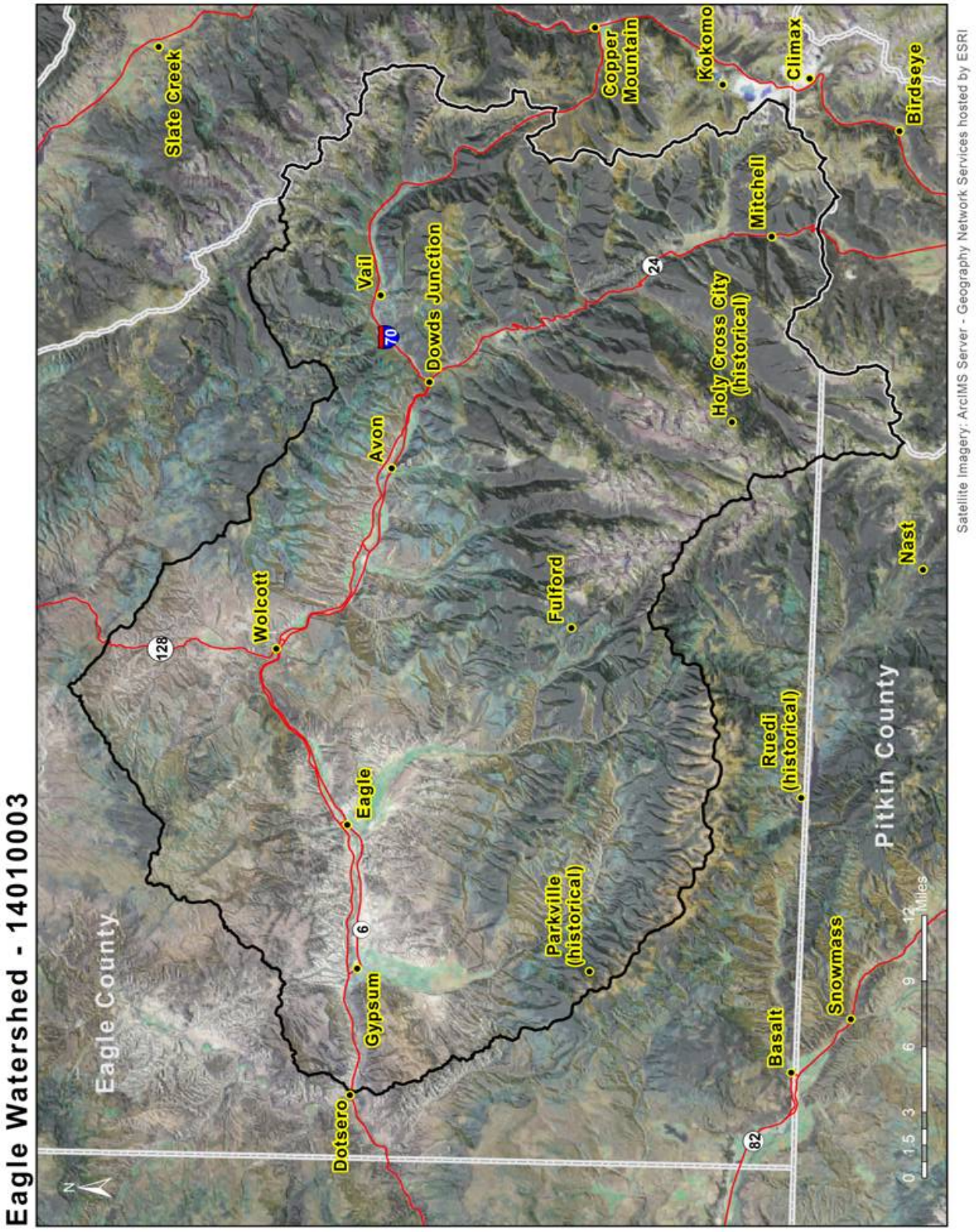
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

- 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.

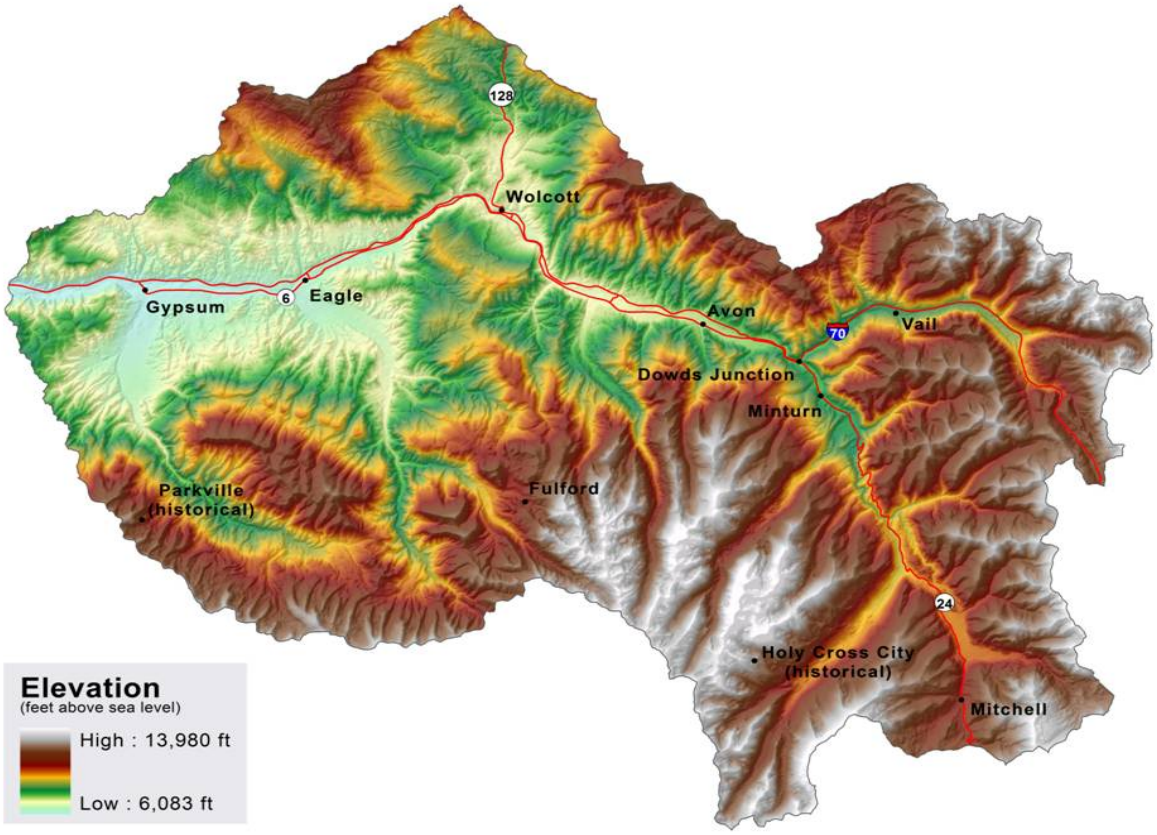


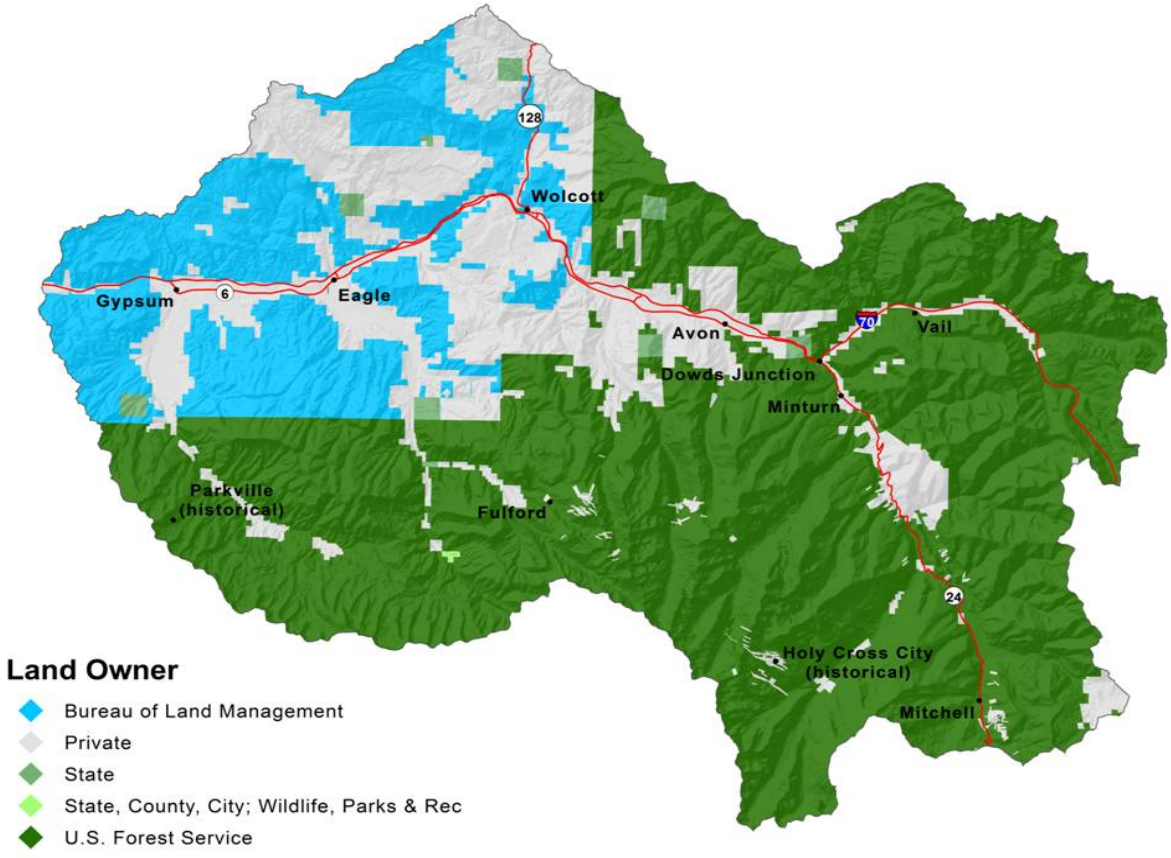
County	County Acres	County Acres in EAGLE Watershed	% of County in the Watershed	% of Watershed in the County
Eagle	1,084,004	614,038	56.6%	98.7%
Pitkin	621,363	7,949	1.3%	1.3%
		622,150		

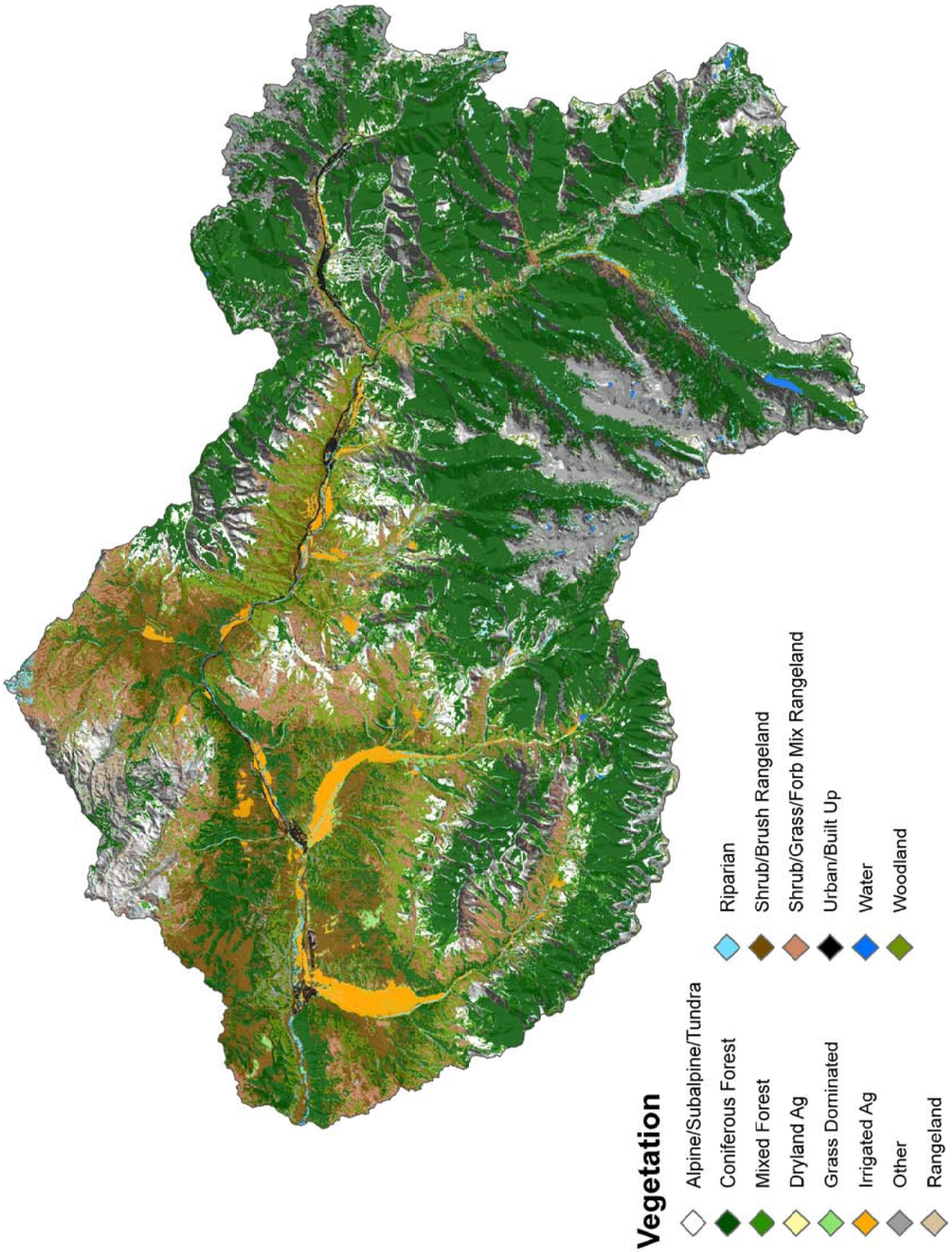

Eagle Watershed - 14010003
Eagle County
Pitkin County
Slate Creek
Copper Mountain
Kokomo
Climax
Birdseye
Vail
Dowds Junction
Mitchell
Holy Cross City (historical)
Avon
Wolcott
Fulford
Nast
Eagle
Gypsum
Parkville (historical)
Ruedi (historical)
Dotsero
Basalt
Snowmass
128
70
24
6
82
N
0 1.5 3 6 9 12 Miles
Satellite Imagery: ArcIMS Server - Geography Network Services hosted by ESRI

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.


128
Wolcott
Gypsum
6
Eagle
Avon
70
Vail
Dowds Junction
Minturn
Parkville
(historical)
Fulford
24
Holy Cross City
(historical)
Mitchell
Elevation
(feet above sea level)
High : 13,980 ft
Low : 6,083 ft


128
Wolcott
Gypsum
6
Eagle
Avon
70
Vail
Dowds Junction
Minturn
Parkville
(historical)
Fulford
24
Holy Cross City
(historical)
Mitchell
Land Owner
Bureau of Land Management
Private
State
State, County, City; Wildlife, Parks & Rec
U.S. Forest Service

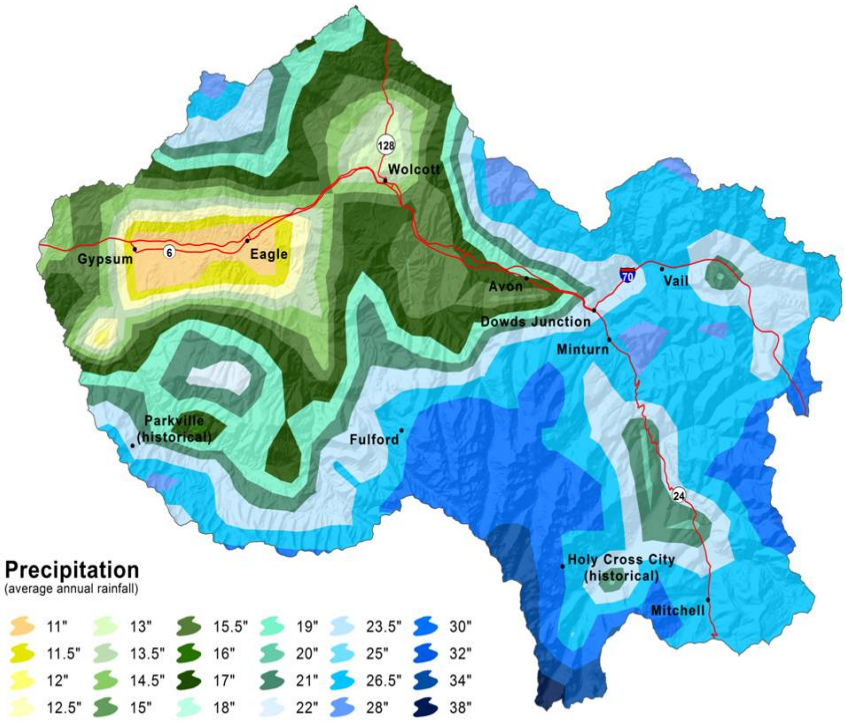

Vegetation
Alpine/Subalpine/Tundra
Coniferous Forest
Mixed Forest
Dryland Ag
Grass Dominated
Irrigated Ag
Other
Rangeland
Riparian
Shrub/Brush Rangeland
Shrub/Grass/Forb Mix Rangeland
Urban/Built Up
Water
Woodland

EAGLE Land Use	Total Acreage	Vegetation	Acreage
Cropland	7,336	Agriculture Land	0.8
		Irrigated Ag*	7,335.0
Grassland	20,748	Alpine Grass Dominated	608.3
		Alpine Grass/Forb Mix	19,444.8
		Alpine Meadow	695.0
Rangeland	245,940	Barren Land	51.2
		Forb Dominated	4,347.3
		Gambel Oak	7,580.5
		Grass Dominated	2,832.7
		Grass/Forb Mix	272.0
		Grass/Forb Rangeland	2.3
		Juniper/Mtn Shrub Mix	129.7
		Juniper/Sagebrush Mix	1,188.9
		Mesic Mountain Shrub Mix	29,650.0
		PJ-Mtn Shrub Mix	347.5
		PJ-Sagebrush Mix	1,396.9
		Pinon-Juniper	31,908.7
		Rabbitbrush/Grass Mix	153.3
		Sagebrush Community	47,025.4
		Sagebrush/Grass Mix	1,974.0
		Sagebrush/Greasewood	798.7
		Sagebrush/Mesic Mtn Shrub Mix	37,146.3
		Sagebrush/Rabbitbrush Mix	170.5
		Sedge	70.5
		Serviceberry/Shrub Mix	299.6
		Shrub/Grass/Forb Mix	659.8
		Soil	2,369.7
		Sparse Juniper/Shrub/Rock Mix	507.1
		Sparse PJ/Shrub/Rock Mix	9,005.1
		SubAlpine Shrub Community	285.5
		Subalpine Grass/Forb Mix	41,002.4
		Talus Slopes & Rock Outcrops	13,891.4
		Upland Willow/Shrub Mix	3,496.4
		Xeric Mountain Shrub Mix	7,376.5
Forest	312,457	Aspen	58,163.7
		Aspen/Mesic Mountain Shrub Mix	3,212.7
		Douglas Fir	4,768.6
		Douglas Fir/Aspen Mix	4,784.8
		Douglas Fir/Englemann Spruce Mix	3,650.1
		Englemann Spruce/Fir Mix	69,535.2
		Juniper	3,551.7
		Lodgepole Pine	32,589.5
		Lodgepole Pine/Aspen Mix	3,874.2
		Lodgepole/Spruce/Fir Mix	103,446.7
		Mixed Forest Land	5.1
		Spruce/Fir Regeneration	0.2
		Spruce/Fir/Aspen Mix	14.9
		Spruce/Fir/Lodgepole/Aspen Mix	17,066.7
		Spruce/Lodgepole Pine Mix	7,792.6
Riparian	8,912		
Water	1,389		1,388.7
Other	25,200		
~Total Watershed Acres			**621,981.3**

*Colorado Decision Support Systems Data

Precipitation

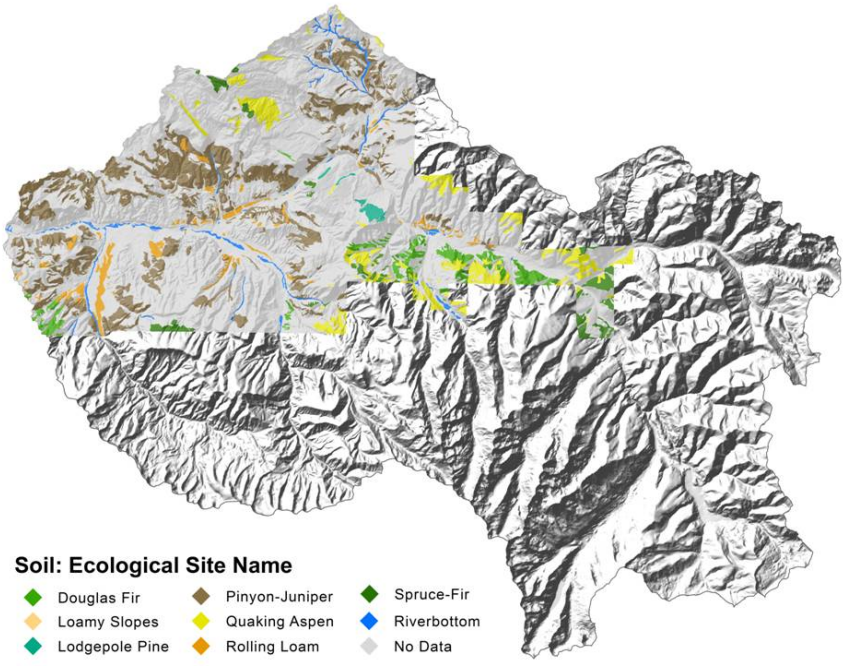
Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series 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.

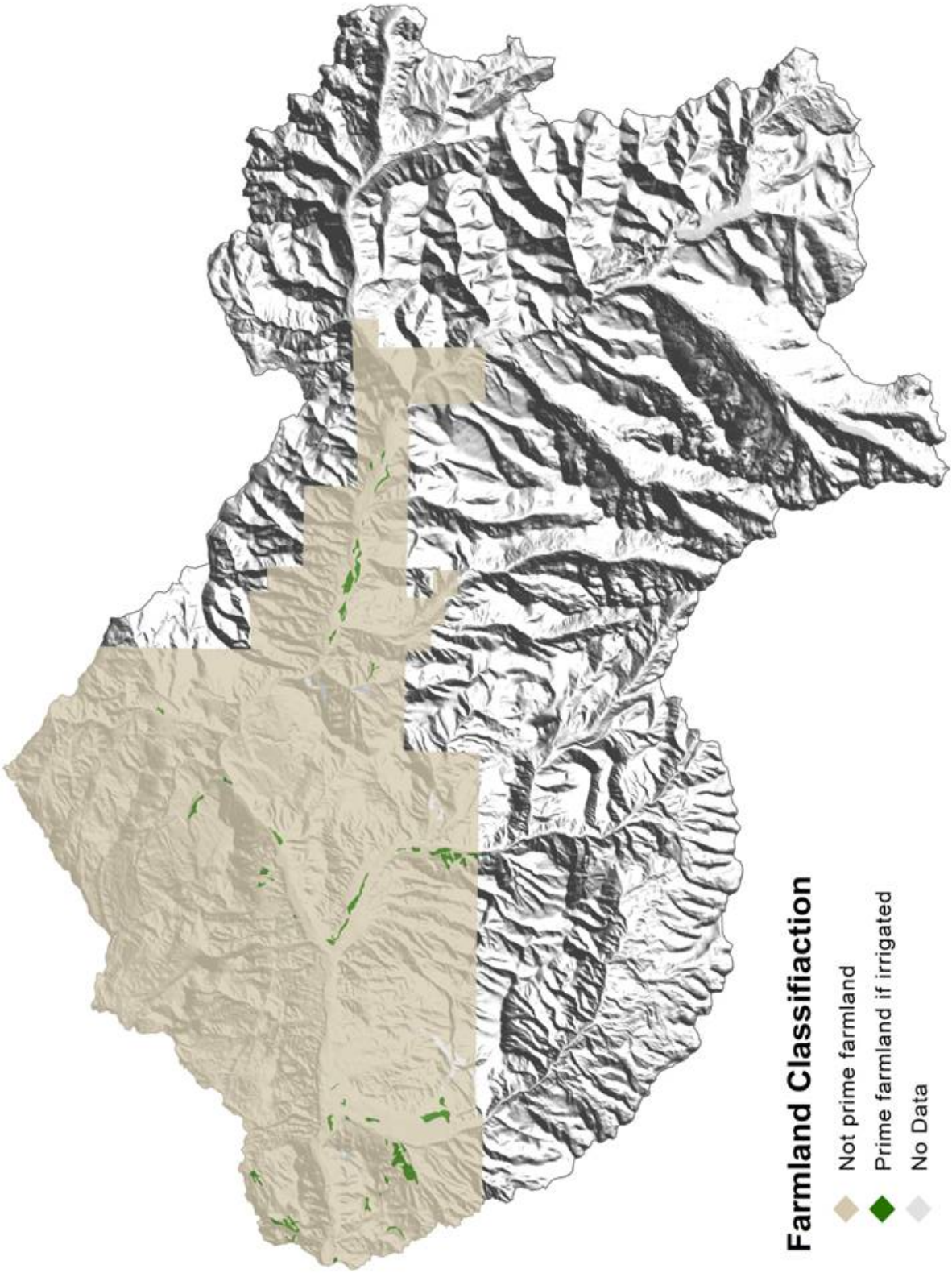


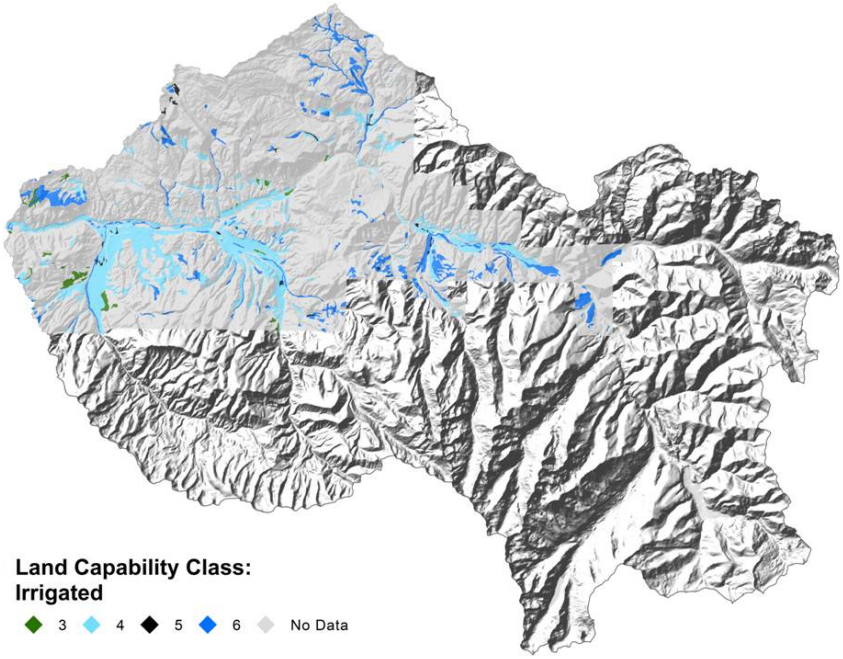
Ecological Sites

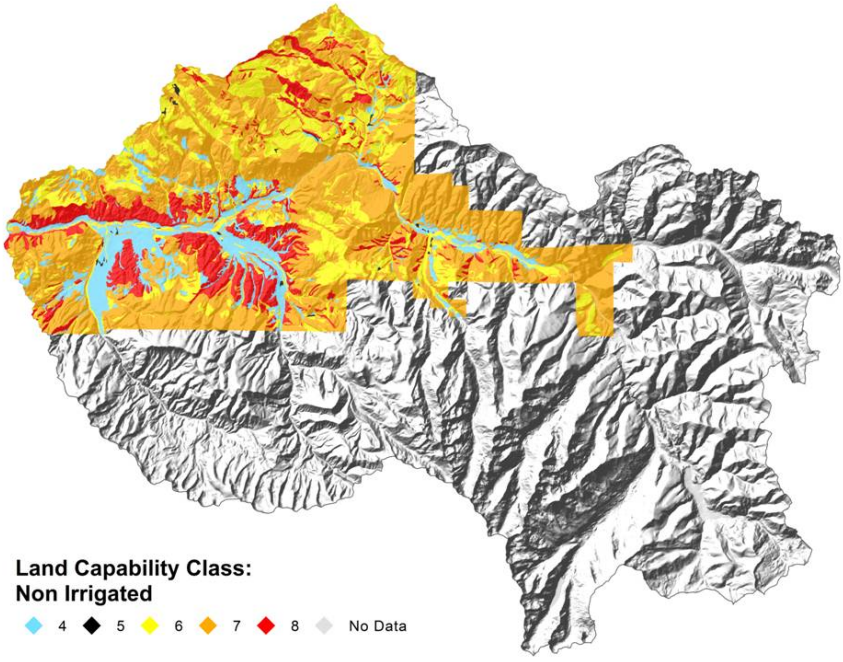
The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

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 Classifiaction
Not prime farmland
Prime farmland if irrigated
No Data





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.

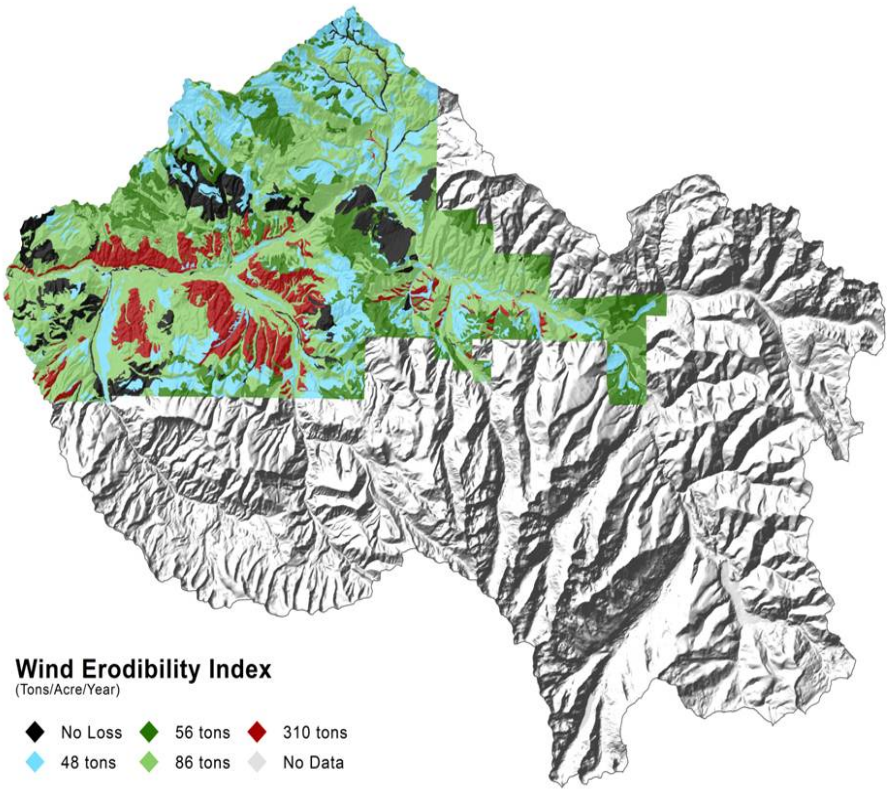
Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

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.

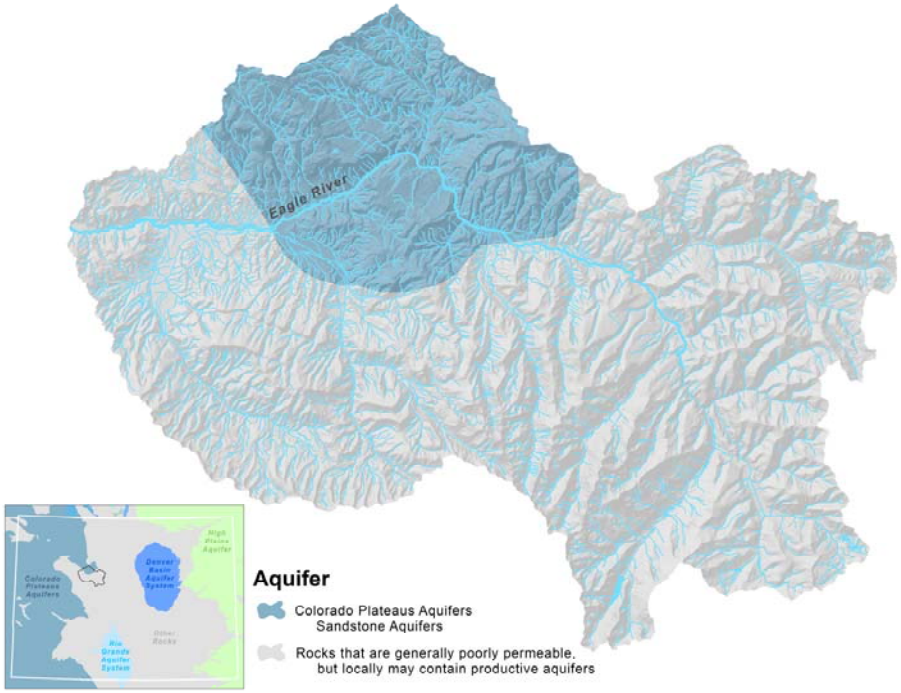
Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

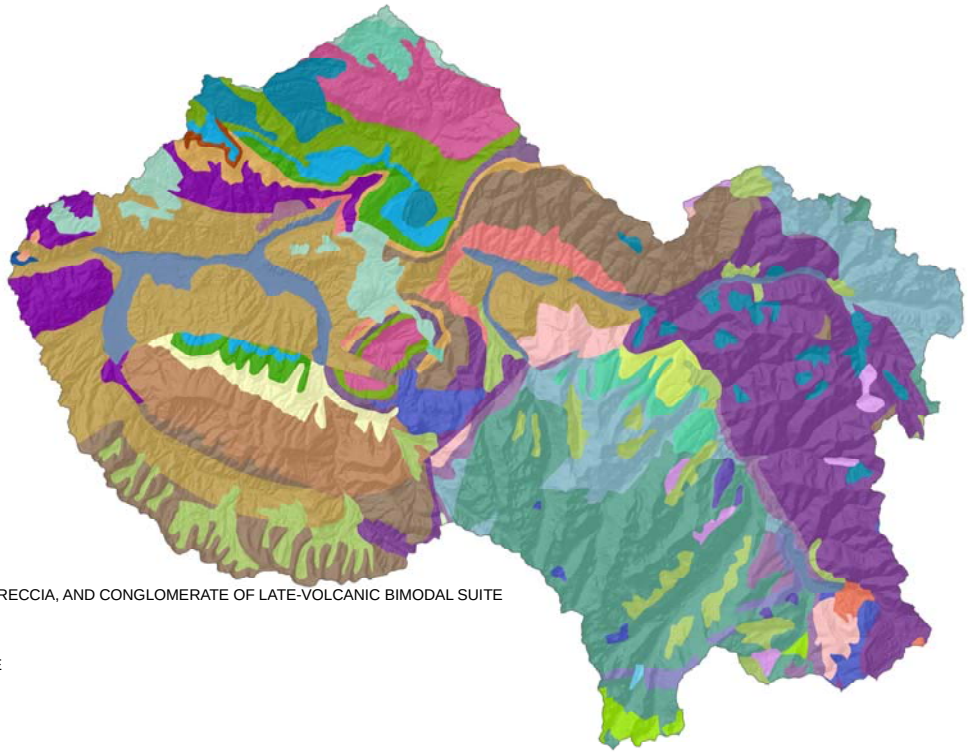
As shown on the Wind Erodibility Index map below, most cropland soils in the Beaver Watershed are considered highly erodible.



Stream Impairments

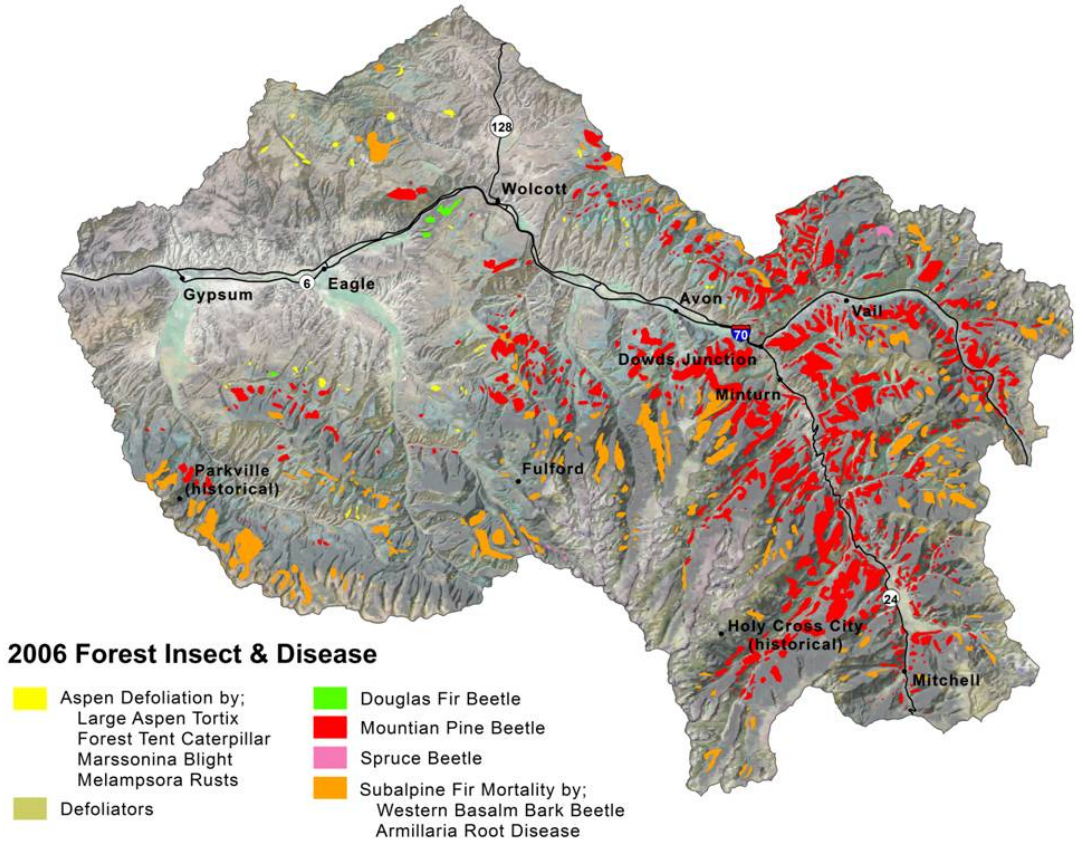
Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met. Thereafter, TMDLs compromising quantitative objectives and strategies have been or will be developed for these impaired waters within the watershed in order to achieve their water quality standards.





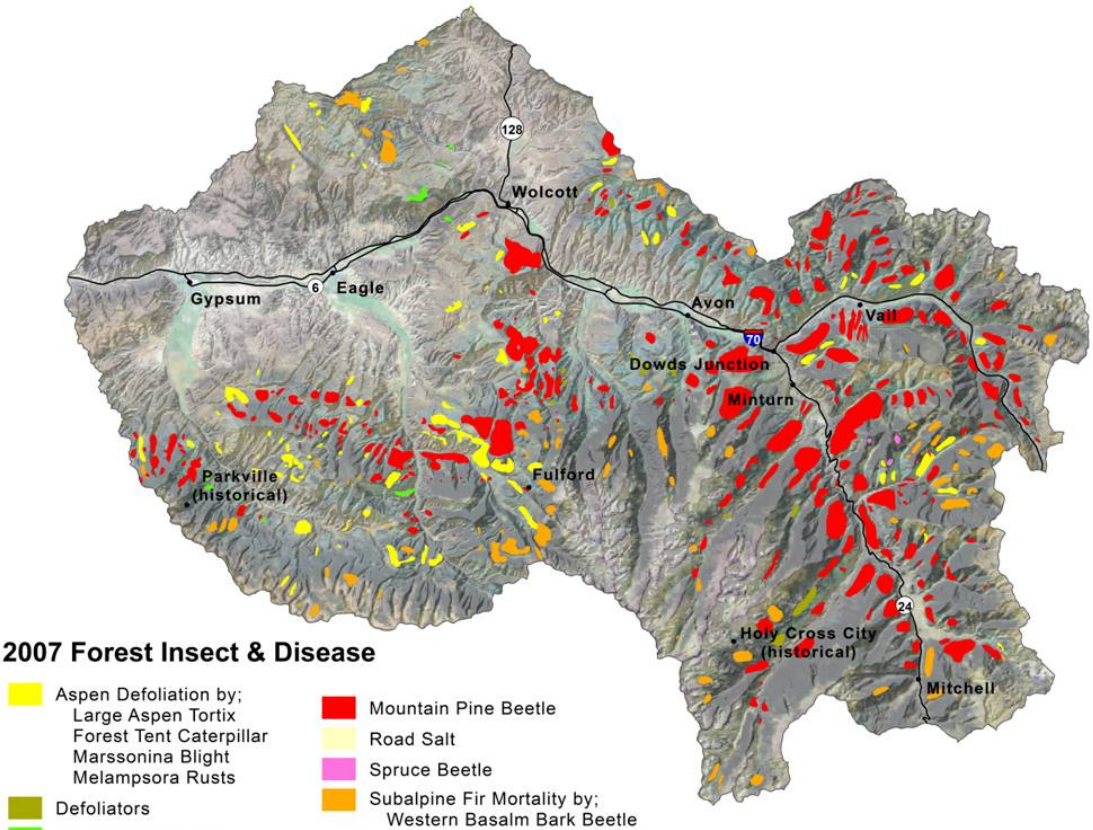
Geology

- ANCIENT ALLUVIUM
- BASALT FLOWS (AGE <1.8 M.Y. 1)
- BASALT FLOWS AND ASSOCIATED TUFF, BRECCIA, AND CONGLOMERATE OF LATE-VOLCANIC BIMODAL SUITE
- BELDEN FORMATION
- BIOTITIC GNEISS, SCHIST, AND MIGMATITE
- BROWNS PARK FORMATION
- CHINLE AND STATE BRIDGE FORMATIONS
- CHINLE FORMATION
- COLORADO GROUP
- DAKOTA SANDSTONE
- DAKOTA, PURGATOIRE, MORRISON, RALSTON CREEK, AND ENTRADA FORMATIONS
- EAGLE VALLEY FORMATION
- EVAPORITIC FACIES
- FELSIC AND HORNBLENDIC GNEISSES, EITHER SEPARATE OR INTERLAYERED
- GLACIAL DRIFT OF PINEDALE AND BULL LAKE GLACIATIONS
- GRANITIC ROCKS OF 1,400-M.Y. AGE GROUP (AGE 1,350-1,480 M.Y.)
- GRANITIC ROCKS OF 1,700-M.Y. AGE GROUP (AGE 1,650-1,730 M.Y.)
- GRAVELS AND ALLUVIUMS (PINEDALE AND BULL LAKE AGE)
- LANDSLIDE DEPOSITS
- LARAMIDE INTRUSIVE ROCKS (AGE 40-72? M.Y.)
- LEADVILLE LIMESTONE, GILMAN SANDSTONE, DYER DOLOMITE AND PARTING FORMATION
- LEADVILLE LIMESTONE, WILLIAMS CANYON LIMESTONE, MANITOU LIMESTONE, AND SAWATCH QUARTZITE
- MAROON FORMATION
- MIDDLE TERTIARY INTRUSIVE ROCKS (AGE 20-40 M.Y.)
- MINTURN AND BELDEN FORMATIONS
- MINTURN FORMATION IN WEST-CENTRAL AND SOUTH-CENTRAL AND OTHER UNITS OF MIDDLE PENNSYLVANIAN AGE
- MODERN ALLUVIUM
- MORRISON FORMATION AND ENTRADA SANDSTONE
- MORRISON, CURTIS, AND ENTRADA FORMATIONS
- OLDER GLACIAL DRIFT (PRE-BULL LAKE AGE)
- OLDER GRAVELS AND ALLUVIUMS (PRE-BULL LAKE AGE)
- ONE OR MORE ORDOVICIAN FORMATIONS (FREMONT LIMESTONE, HARDING SANDSTONE, AND MANITOU DOLOMITE)
- PIERRE SHALE, UNDIVIDED
- SAWATCH QUARTZITE
- STATE BRIDGE FORMATION
- WATER
- WEBER SANDSTONE AND MAROON FORMATION



2006 Forest Insect & Disease

- Aspen Defoliation by;
  - Large Aspen Tortix
  - Forest Tent Caterpillar
  - Marssonina Blight
  - Melampsora Rusts
- Defoliators
- Douglas Fir Beetle
- Mountian Pine Beetle
- Spruce Beetle
- Subalpine Fir Mortality by;
  - Western Basalm Bark Beetle
  - Armillaria Root Disease



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  - Marssonina Blight
  - Melampsora Rusts
- Defoliators
- Douglas Fir Beetle
- Mountain Pine Beetle
- Road Salt
- Spruce Beetle
- Subalpine Fir Mortality by;
  - Western Basalm Bark Beetle
  - Armillaria Root Disease

State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern in Eagle Watershed

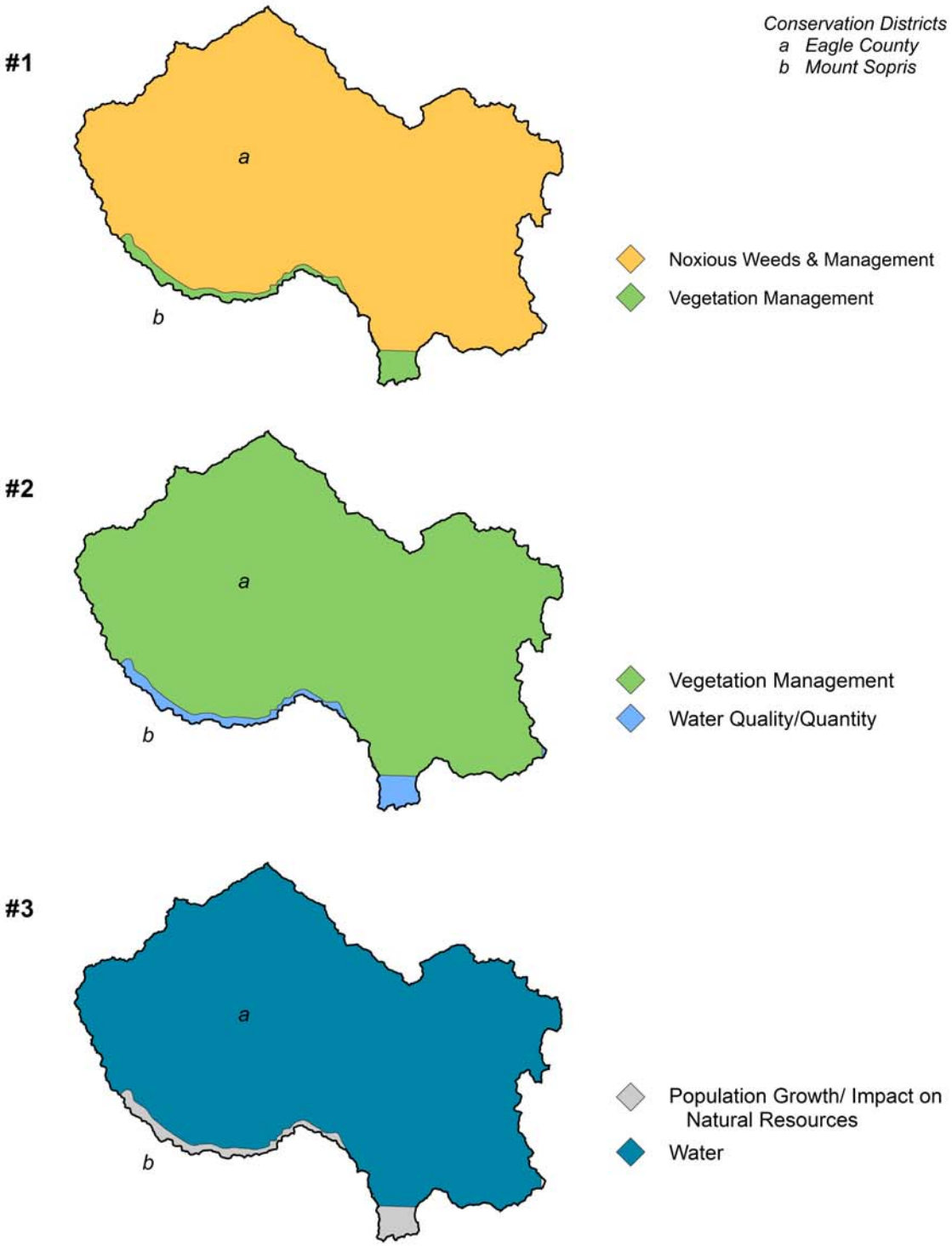
Common Name	Scientific Name	Class	State Status	Federal Status	Comments
American Peregrine Falcon	*Falco peregrinus anatum*	Bird	**Concern**	None	Nests in the watershed
Bald Eagle	*Haliaeetus leucocephalus*	Bird	**Threatened**	None	Winters in the watershed
Bonytail	*Gila elegans*	Fish	**Endangered**	**Endangered**	Water depletions in the watershed may affect downstream habitats/ fish
Boreal Toad	*Bufo boreas boreas*	Amphibian	**Endangered**	None	Occurs in the watershed
Canada Lynx	*Lynx canadensis*	Mammal	**Endangered**	**Threatened**	Occurs in the watershed
Colorado Pikeminnow	*Ptychocheilus lucius*	Fish	**Threatened**	**Endangered**	Water depletions in the watershed may affect downstream habitats/ fish
Colorado River Cutthroat Trout	*Oncorhynchus clarki pleuriticus*	Fish	**Concern**	None	Occurs in the watershed
Greater Sage Grouse	*Centrocercus urophasianus*	Bird	**Concern**	None	Occurs in the watershed
Humpback Chub	*Gila cypha*	Fish	**Threatened**	**Endangered**	Water depletions in the watershed may affect downstream habitats/ fish
Mexican Spotted Owl	*Strix occidentalis lucida*	Bird	**Threatened**	**Threatened**	May occur in the watershed
Northern leopard frog	*Rana pipiens*	Amphibian	**Concern**	None	Occurs in the watershed
Razorback Sucker	*Xyrauchen texanus*	Fish	**Endangered**	**Endangered**	May occur in the watershed
River Otter	*Lontra Canadensis*	Mammal	**Threatened**	None	May occur in the watershed
Townsend's Big-eared Bat	*Corynorhinus townsendii pallescens*	Mammal	**Concern**	None	May occur in the watershed
Uncompahgre Fritillary Butterfly	*Boloria acrocnema*	Insect	None	**Endangered**	May occur in the watershed
Ute ladies'-tresses Orchid	*Spiranthes diluvialis*	Plant	None	**Threatened**	May occur in the watershed
Wolverine	*Gulo gulo*	Mammal	**Endangered**	None	May occur in the watershed
Western Yellow-billed Cuckoo	*Coccyzus americanus*	Bird	**Concern**	**Candidate**	May occur in the watershed

Social Data

	Eagle	Pitkin
Demographics (US Census, American Factfinder)		
Total population	41,659	14,872
Male	22,813	7,958
Female	18,846	6,914
Median age (years)	31.2	38.4
White	35,558	14,029
Black or African American	142	79
American Indian and Alaska Native	296	40
Asian	342	167
Native Hawaiian and Other Pacific Islander	30	6
Some other race	4498	352
Hispanic or Latino (of any race)	9682	973
Economic Characteristics (US Census, American Factfinder)		
In labor force (population 16 years and over)	26,598	10,154
Median household income (dollars)	62,682	59,375
Median family income (dollars)	68,226	75,048
Per capita income (dollars)	32,011	40,811
Families below poverty level	358	98
Individuals below poverty level	3221	917
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)		
Farms (number)	114	84
Land in farms/ranches (acres)	115,998	23,872
Average size farm/ranch (acres)	1,018	284
Median size farm (acres)	181	75
Average age of farmer or rancher	53.9	56.1
Net cash return from ag sales ($1,000)	1,239	-2,277
Cattle and calves (number)	6,000	1,500

Identified Long Range Resource Concerns

Top Three Concerns within Conservation Districts



Selected Conservation Application Data Eagle 14010003

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	249	5,229	Not Avail.	2,159	365	603	8,605
Total Conservation Systems Applied (Acres)	2,959	1,416	Not Avail.	548	611	603	6,137
Practices							
Prescribed Grazing	1,833	824	5,285	374	331	0	8,647
Upland Wildlife Habitat Management	110	1,097	3,114	0	0	135	13,103

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 12,000 acres need to be treated on median sized ranches of 550 acres.			**Based on Conservation System Guide Code:** CO 48A-GR-01-R-Grazing
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost per Median Sized Ranch ($)**
Prescribed Grazing				
Fence (382)	Ft.	5,120	0.6	3,072
Pest Management (595)	Ac.	300	4,500	4,500
Pipeline (516)	Ft.	5,000	2.40	12,000
Upland Wildlife Habitat Management (645)	Ac.	300	na	0
Watering Facility (614)	No.	1	410	410
Irrigation Water Management (449)	Ac.	20	1,250	25,000
Costs to apply prescribed grazing per median sized ranch of 550 acres	*No.*	*22*	*19,982*	*464,604*
			Subtotal Rangeland costs:	**$464,604**

FOOTNOTES/ BIBLIOGRAPHY

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.

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.

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. This information was cross reference with Field Office data collected during a 2007 resource needs survey conducted by NRCS.

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

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.

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.

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.

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/