United States Department of Agriculture

Lower Gunnison Watershed

Hydrologic Unit Code 14020005

Natural Resources Conservation Service

Rapid Assessment

Lakewood, Colorado

RWA 14020005

December 2009

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.)

Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

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.

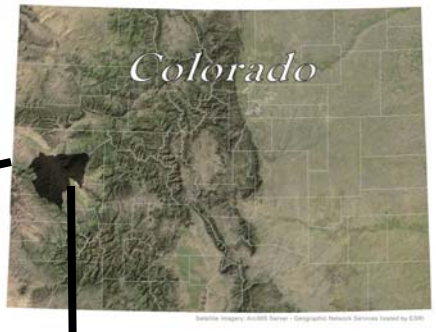
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best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

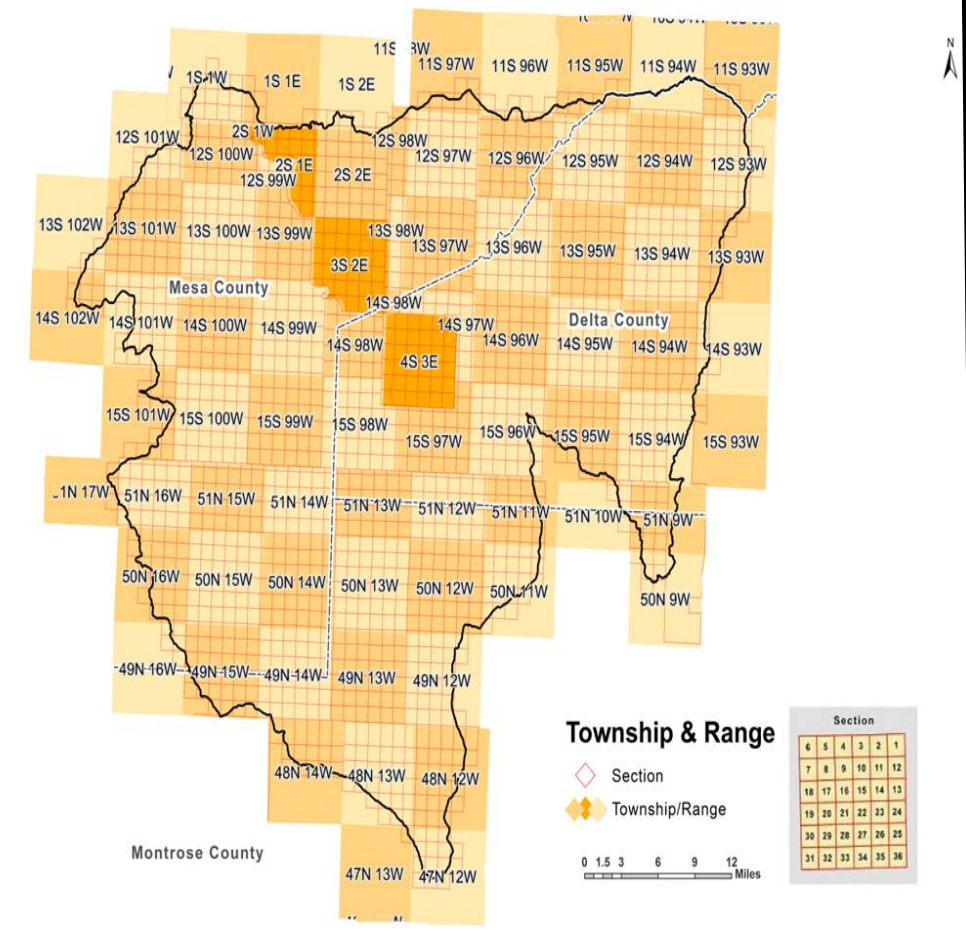
Benefits of these Activities

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:

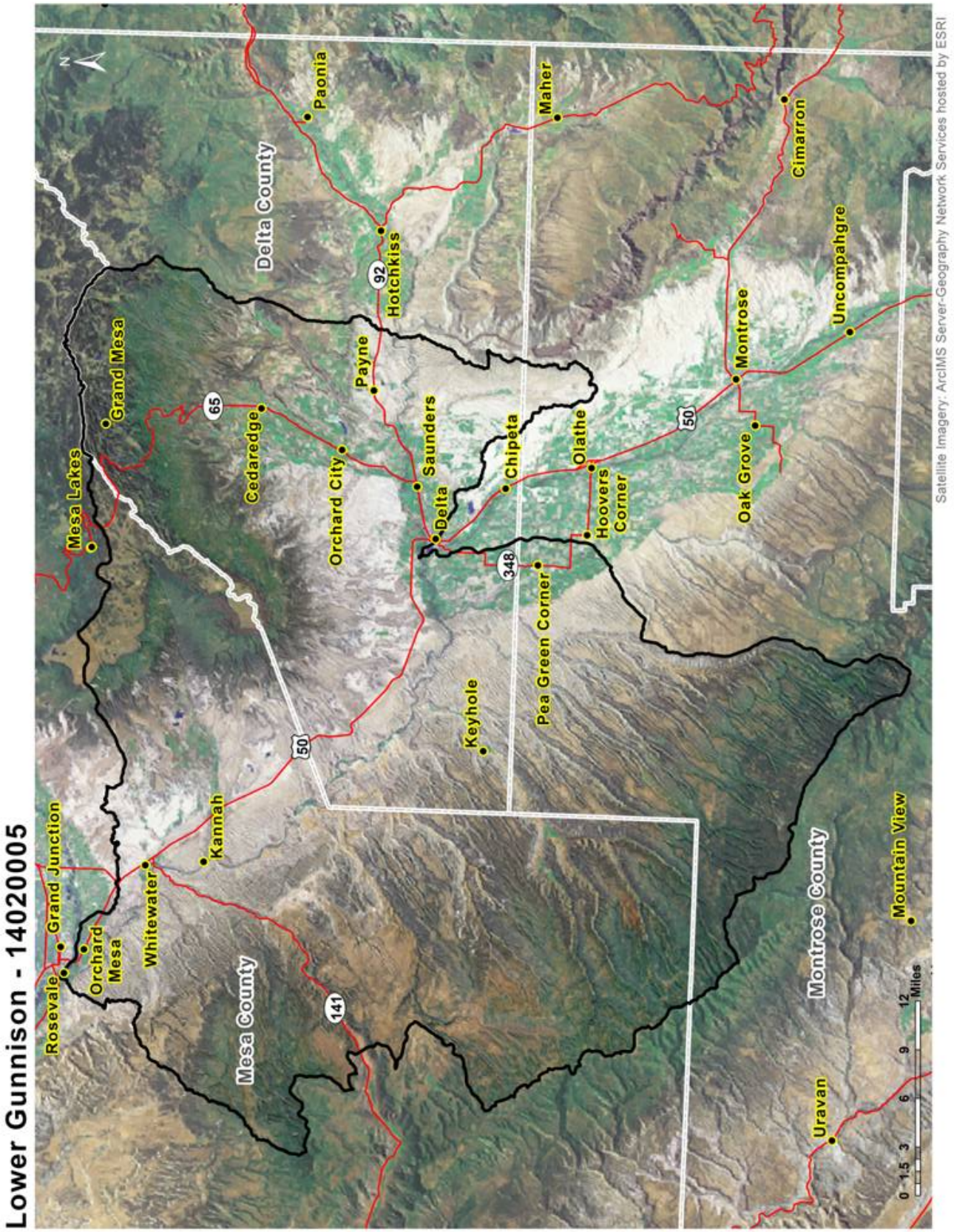
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis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

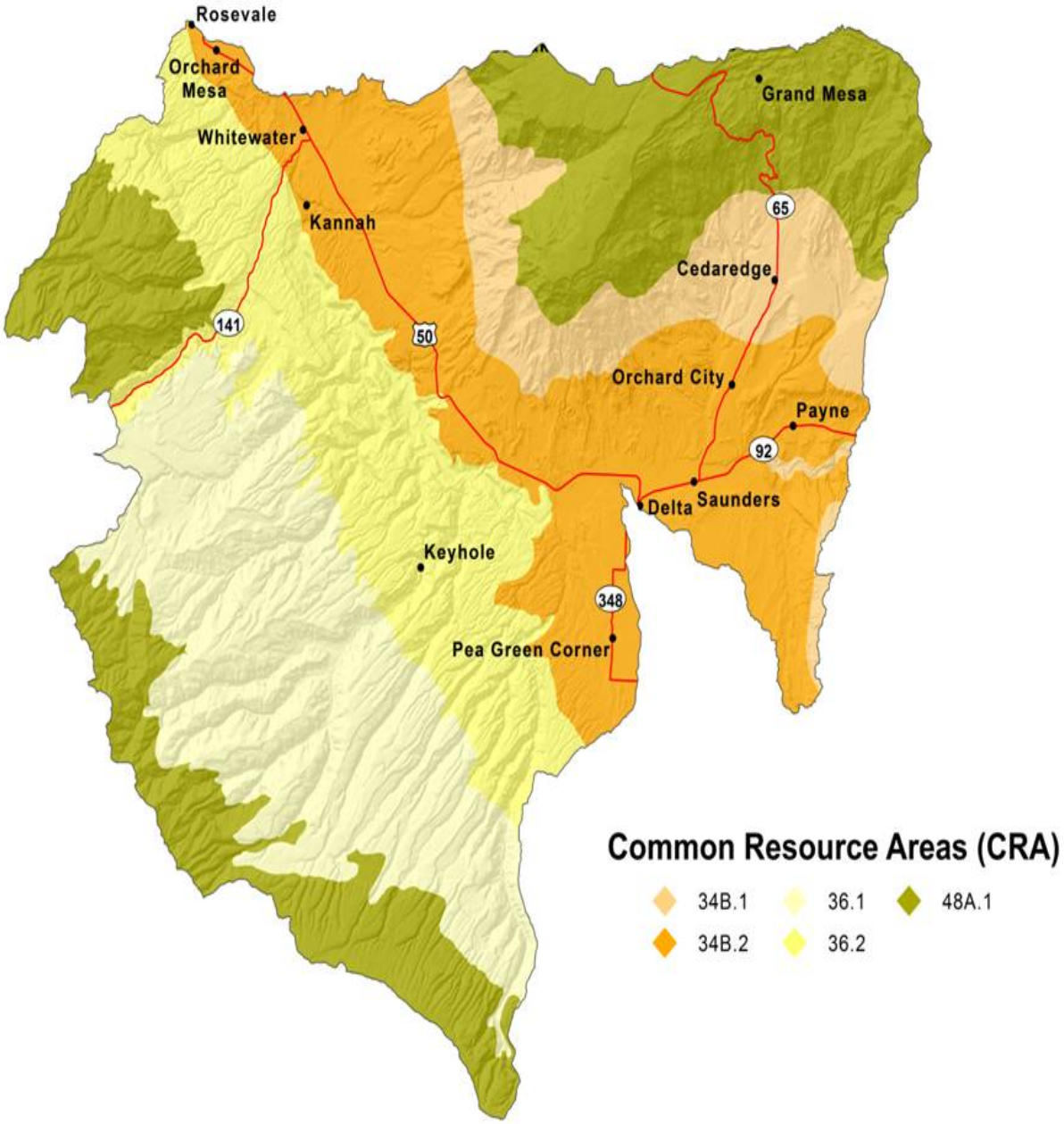
Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.





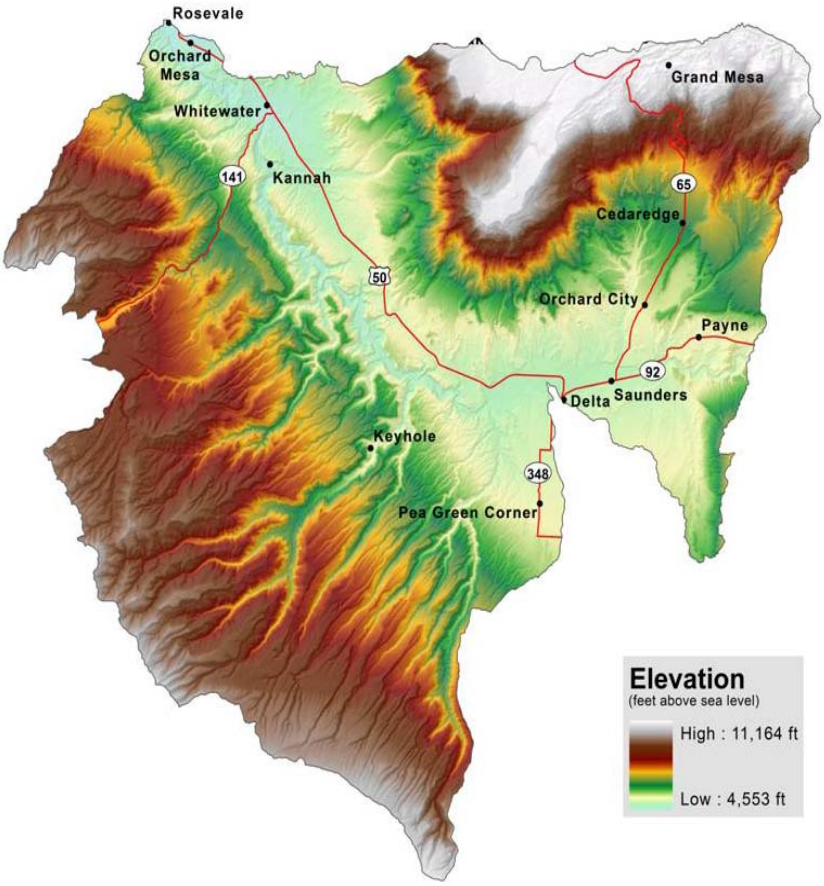
	County	County Acres	County Acres in LOWER GUNNISON Watershed	% of County in the Watershed	% of Watershed in the County
Delta		735,674	381,277	51.8%	35.8%
Mesa		2,140,130	487,700	22.8%	45.8%
Montrose		1,437,265	196,383	13.7%	18.4%
			1,065,360		

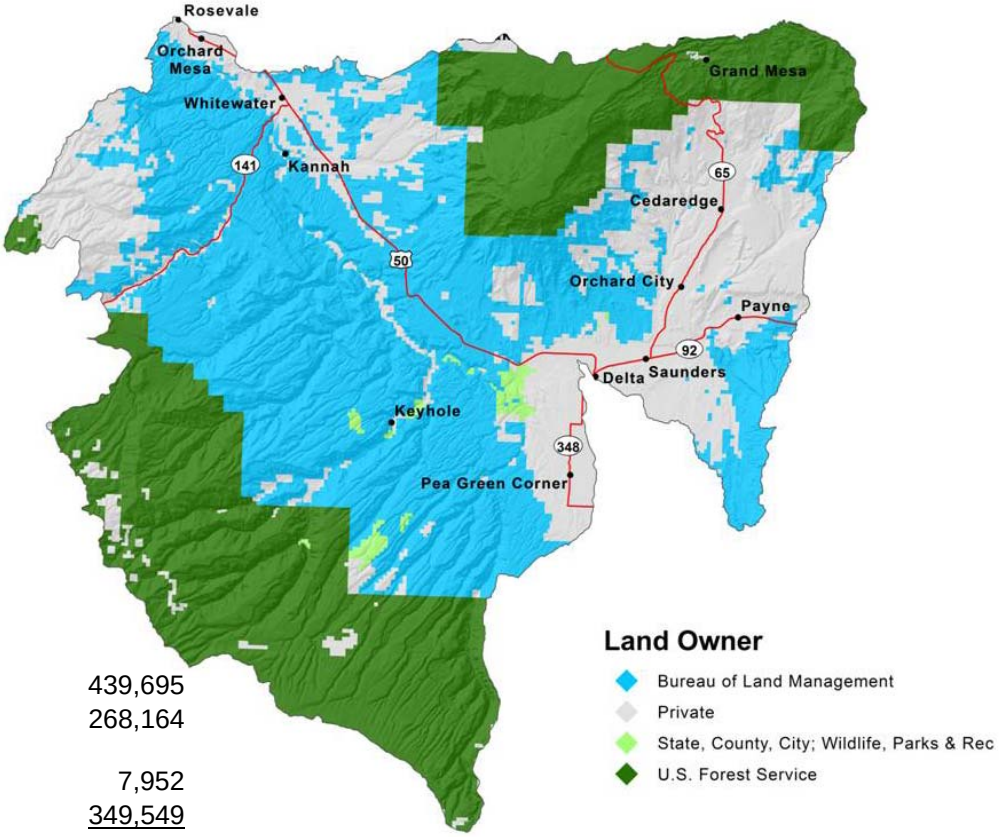

Lower Gunnison - 14020005
N
Paonia
Delta County
Maher
Cimarron
Hotchkiss
92
Payne
Grand Mesa
65
Cedaredge
Mesa Lakes
Orchard City
Saunders
Delta
Chipeta
Olathe
Hoovers Corner
Montrose
Uncompahgre
50
Oak Grove
348
Keyhole
Pea Green Corner
Kannah
Whitewater
Grand Junction
Orchard Mesa
Rosevale
Mesa County
141
Montrose County
Mountain View
Uravan
0 1.5 3 6 9 12
Miles
Satellite Imagery: ArcIMS Server-Geography Network Services hosted by ESRI


Rosevale
Orchard Mesa
Whitewater
Kannah
Grand Mesa
65
Cedaredge
141
50
Orchard City
Payne
92
Delta
Saunders
Keyhole
348
Pea Green Corner
Common Resource Areas (CRA)
34B.1
34B.2
36.1
36.2
48A.1

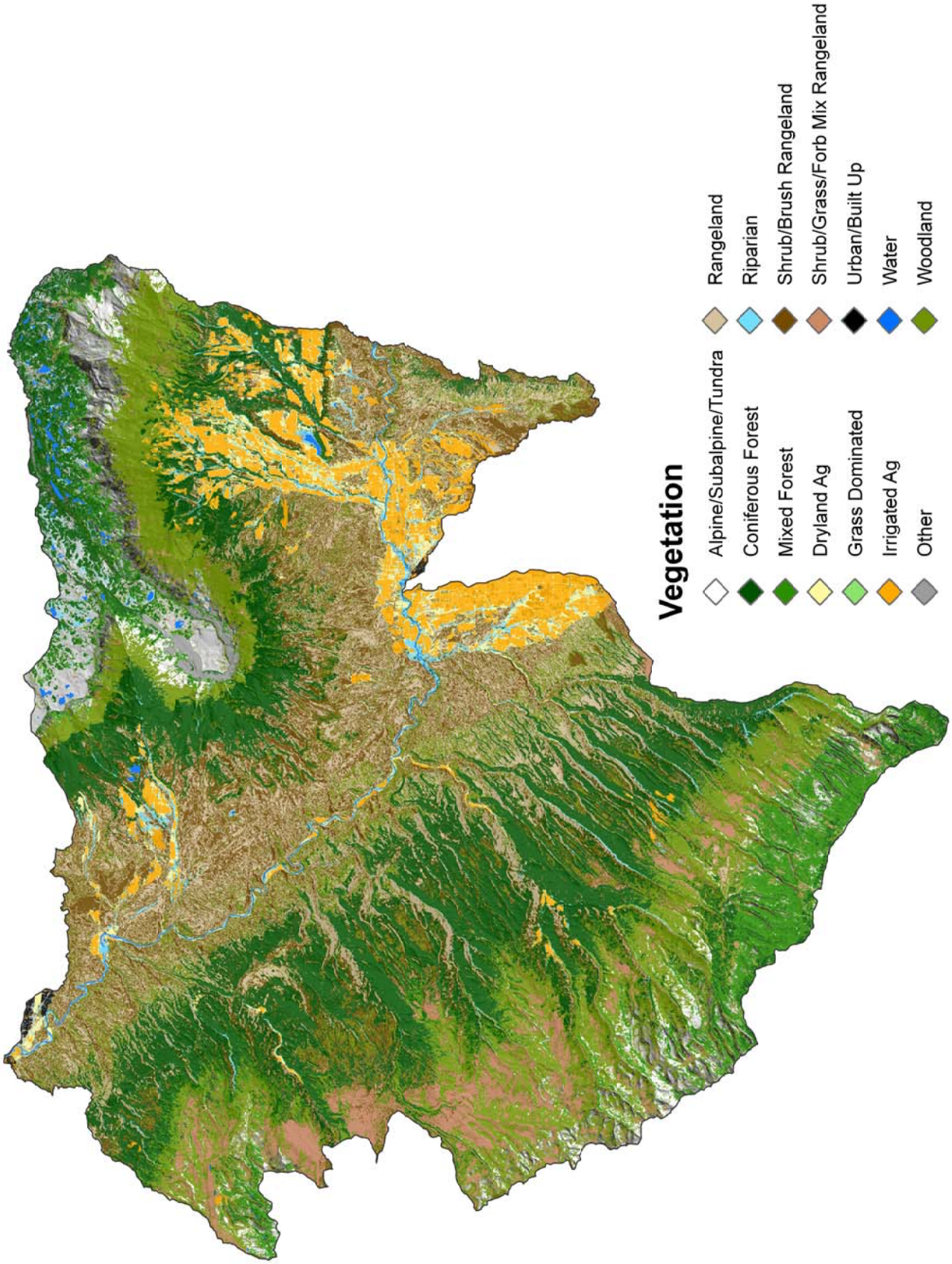
Common Resource Areas (CRA): Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

MLRA	CRA	CRA NAME	CRA DESCRIPTION
34B	**34B.1**	Warm Central Desertic Basins and Plateaus - Semiarid Plateaus and Low Mountains	This area is on broad plateaus and in narrow saline basins in Colorado and Utah. Soils have an aridic moisture regime and a mesic temperature regime. Natural vegetation is typically big sagebrush and bunchgrasses. Major use is range. Precipitation ranges from 5 to 16 inches. Elevations range from about 4,500 to 6,000 feet.
34B	**34B.2**	Warm Central Desertic Basins and Plateaus - Uncompahgre and Grand Valleys	This area is in the broad valleys of the Uncompahgre and Colorado Rivers. It includes a sizeable area of irrigated cropland, vineyards, and orchards. The temperature regime is mesic and the moisture regime is aridic (typic aridic subclass). Natural vegetation is typically shadscale, Gardner saltbush, and mat saltbush. Frost free periods are long, in some places more than 180 days.
36	**36.1**	Southwestern Plateaus, Mesas, and Foothills - Cool Subhumid Mesas and Foothills	This area encompasses the higher elevation mesas and foothills that represent a transition to the Southern Rocky Mountains. The temperature regime is frigid, and the moisture regime is ustic. The typical vegetation is big sagebrush, Gambel oak, and ponderosa pine. Land use is mainly forest and grazing land.
36	**36.2**	Southwestern Plateaus, Mesas, and Foothills - Warm Semiarid Mesas and Plateaus	This area encompasses the lower elevation mesas and plateaus. The temperature regime is mesic and the moisture regime is transitional from ustic to aridic. Vegetation is typically twoneedle pinyon, Utah juniper, and big sagebrush. Cropland is a significant land use in parts of this area, particularly on soils formed in thick deposits of eolian material. Precipitation ranges from 10 to about 16 inches. Elevations range from about 6,000 to 7.000 feet.
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.





Bureau of Land Management	439,695
Private	268,164
State, County, City; Wildlife,	7,952
U.S. Forest Service	349,549
	1,065,360

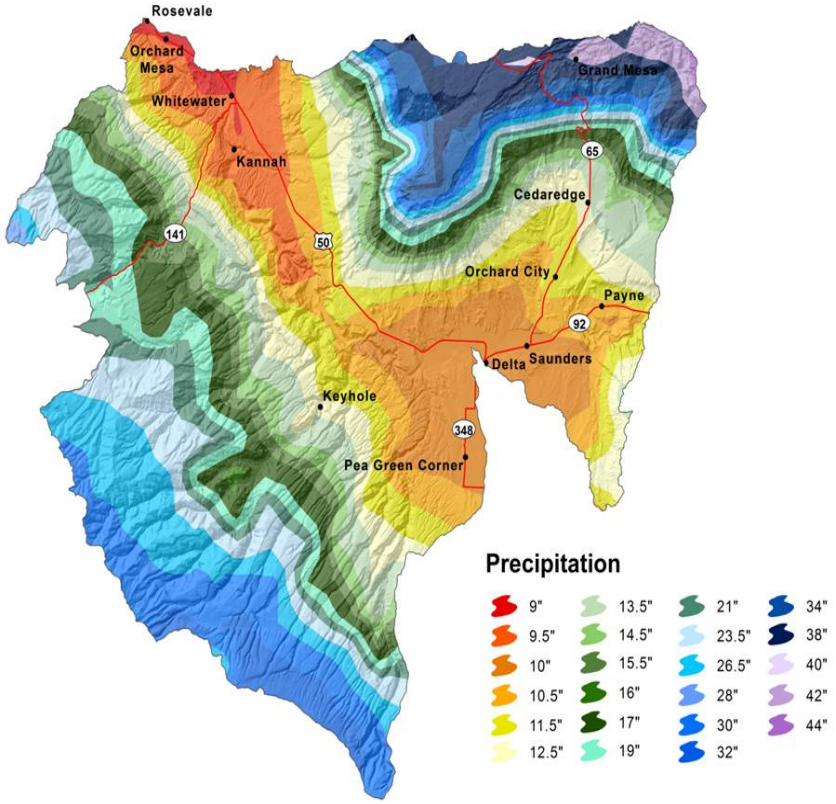

Vegetation
Alpine/Subalpine/Tundra
Coniferous Forest
Mixed Forest
Dryland Ag
Grass Dominated
Irrigated Ag
Other
Rangeland
Riparian
Shrub/Brush Rangeland
Shrub/Grass/Forb Mix Rangeland
Urban/Built Up
Water
Woodland

LOWER GUNNISON Land Use	Total Acreage	Vegetation	Acreage
Cropland	62,909.95	Dryland Ag	10,084.00
		Irrigated Ag*	52,815.00
		Orchard	10.95
Rangeland/Grassland	806,362	Alpine Meadow	15,899.46
		Barren Land	9,297.36
		Disturbed Rangeland	158.44
		Gambel Oak	102,093.03
		Grass Dominated	198.26
		Grass/Forb Mix	10.22
		Grass/Forb Rangeland	134,192.82
		Greasewood	16,172.05
		Juniper	51.40
		Juniper/Sagebrush Mix	26.48
		Mesic Mountain Shrub Mix	35,660.19
		P. Pine/Gambel Oak Mix	7,733.37
		PJ-Mtn Shrub Mix	513.68
		PJ-Sagebrush Mix	25,088.70
		Pinon-Juniper	227,069.09
		Rangeland	121.55
		Sagebrush Community	47,795.03
		Sagebrush/Gambel Oak Mix	591.21
		Sagebrush/Grass Mix	49,245.01
		Sagebrush/Greasewood	16.04
		Sagebrush/Mesic Mtn Shrub Mix	8,770.89
		Salt Desert Shrub Community	299.44
		Saltbush Community	72,763.94
		Shrub/Grass/Forb Mix	24.01
		Snakeweed	3,467.47
		Snowberry/Shrub Mix	63.69
		Soil	25.25
		Sparse Juniper/Shrub/Rock Mix	187.39
		Sparse PJ/Shrub/Rock Mix	43,712.92
		SubAlpine Shrub Community	1,619.34
		Subalpine Grass/Forb Mix	417.29
		Upland Willow/Shrub Mix	3,064.21
Forest	160,317	Aspen	54,098.83
		Douglas Fir	1,598.74
		Douglas Fir/Aspen Mix	609.29
		Englemann Spruce/Fir Mix	31,602.32
		Aspen/Mesic Mountain Shrub Mix	57.68
		P. Pine/Aspen/Gamble Oak Mix	0.77
		PJ-Oak Mix	16,922.89
		Ponderosa Pine	8,582.48
		Ponderosa Pine/Aspen Mix	70.07
		Spruce/Fir/Aspen Mix	46,774.17
Riparian	21,005		
Water	4,704	Water	4,704.16
~Total Watershed			**1,065,313**

*Colorado Decision Support Systems Data

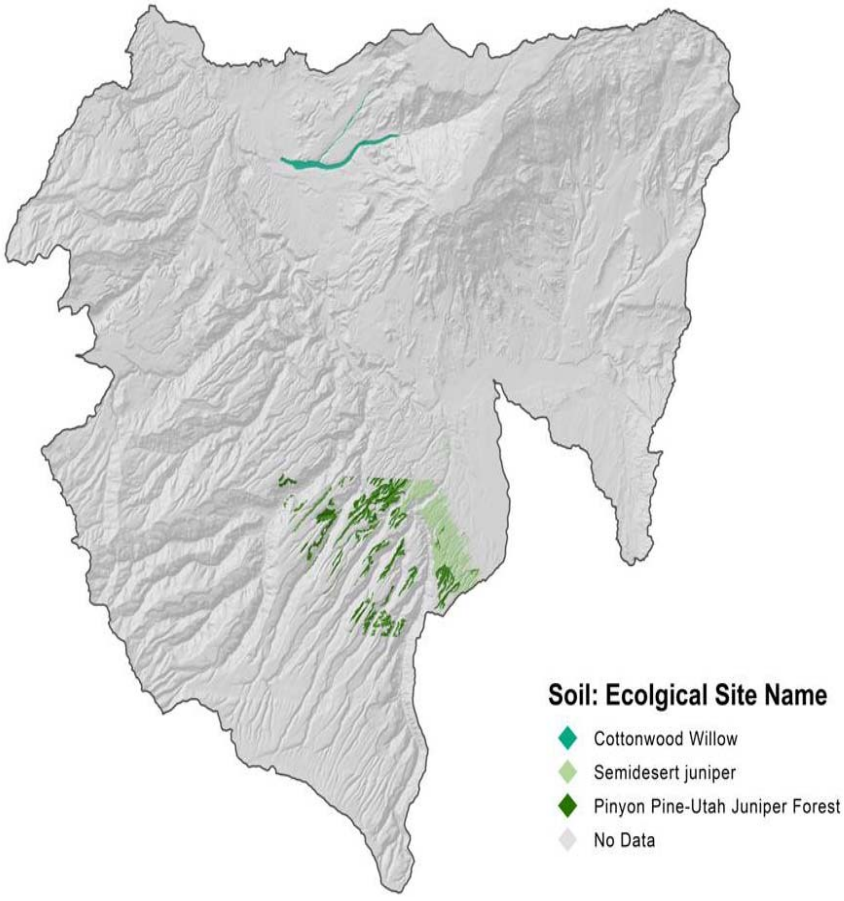
Precipitation

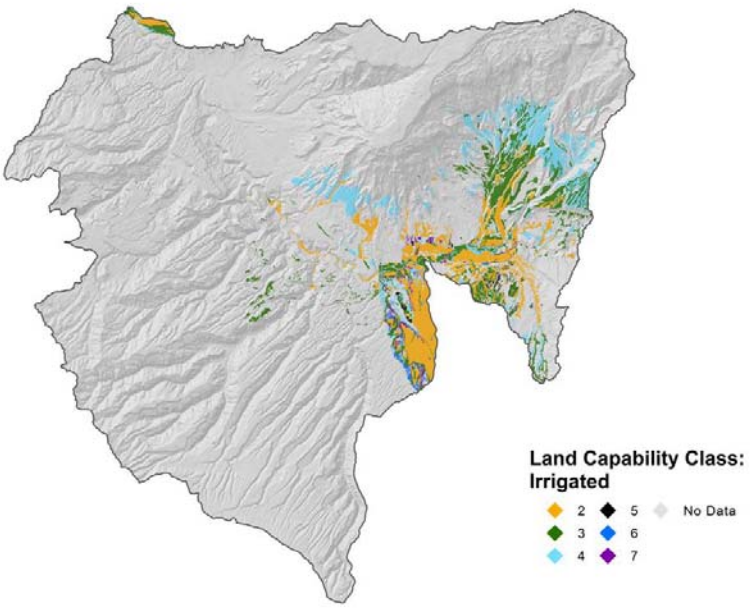
Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series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

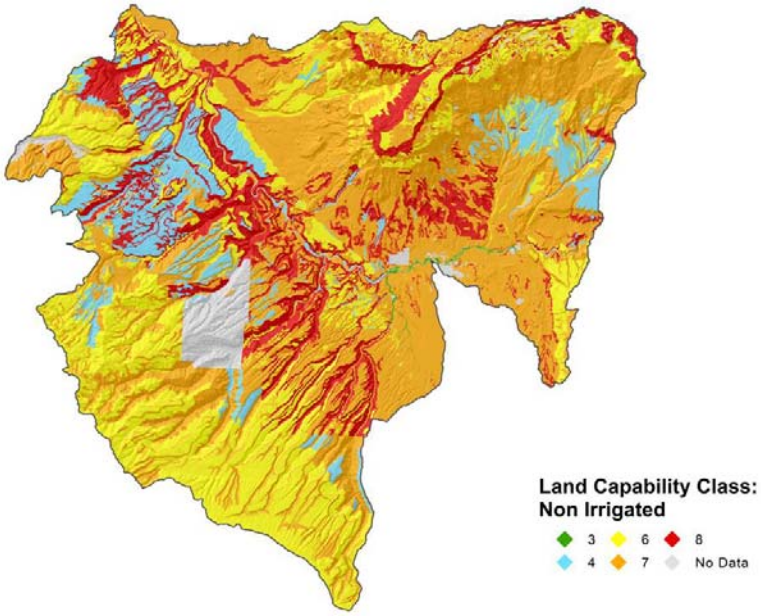


Ecological Sites

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/.







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.

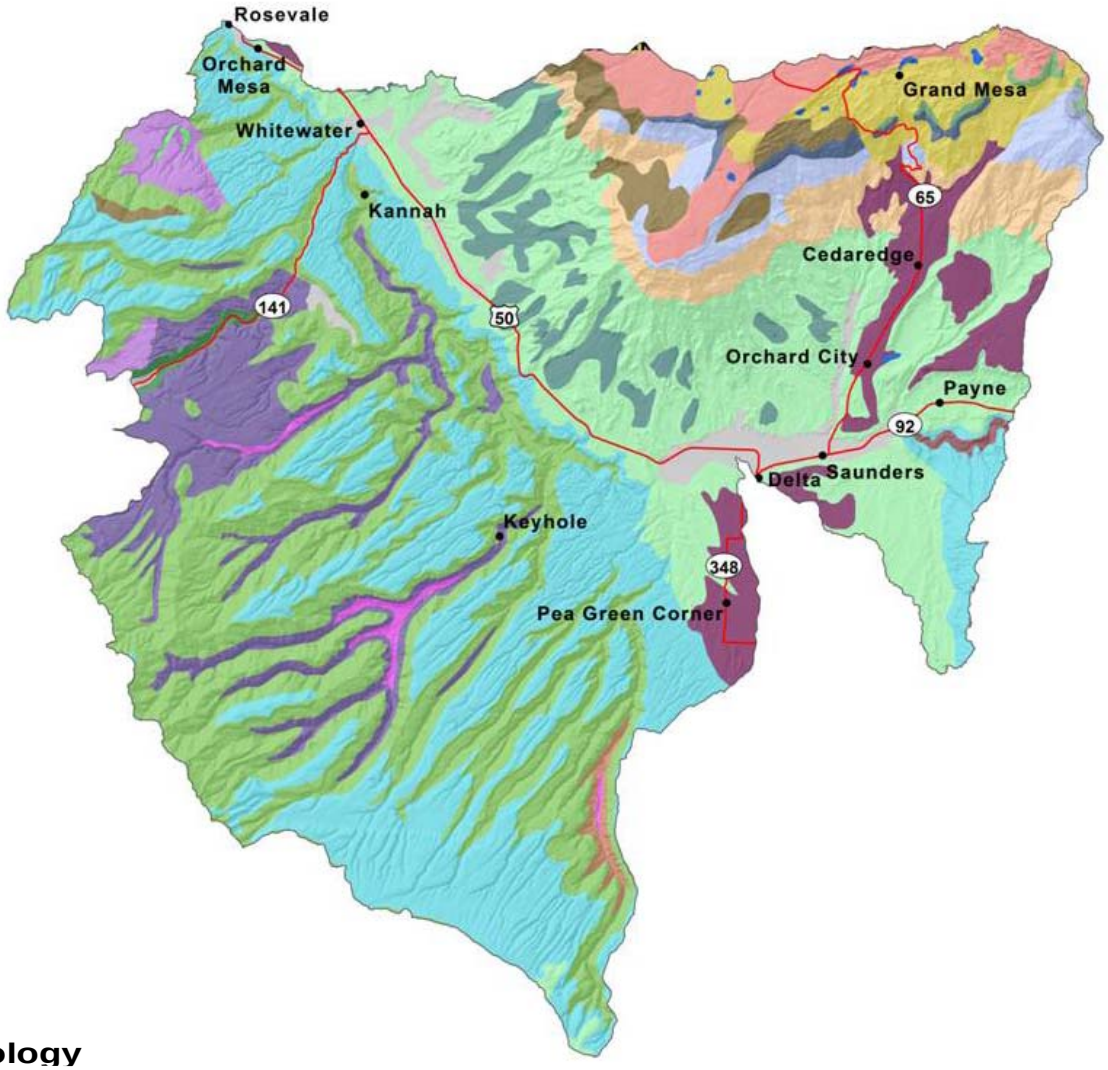
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

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 pur-



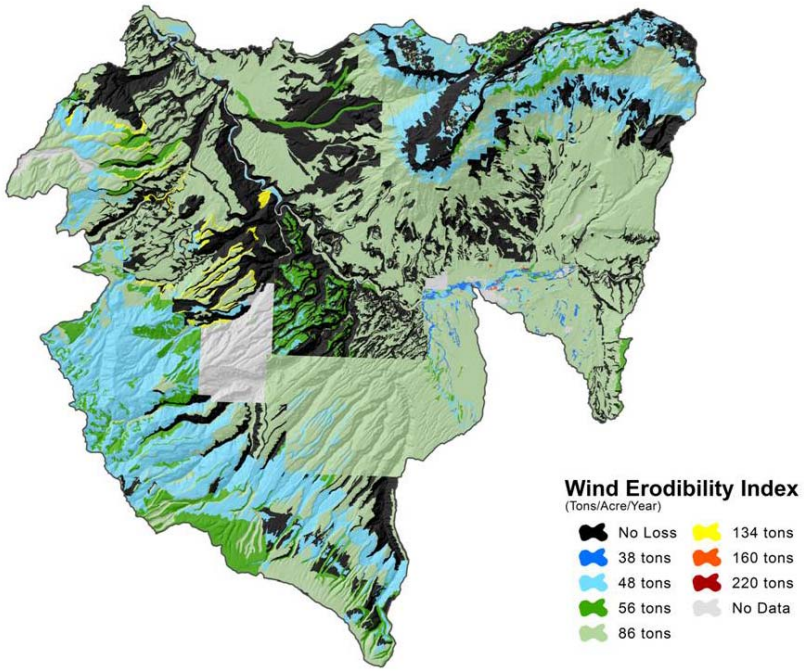
Geology

- BASALT FLOWS AND ASSOCIATED TUFF, BRECCIA, AND CONGLOMERATE OF LATE-VOLCANIC BIMODAL SUITE
- BIOTITIC GNEISS, SCHIST, AND MIGMATITE
- CHINLE FORMATION
- DAKOTA SANDSTONE AND BURRO CANYON FORMATION
- GLACIAL DRIFT OF PINEDALE AND BULL LAKE GLACIATIONS
- GRANITIC ROCKS OF 1,400- AND 1,700-M.Y. AGE GROUPS, UNDIVIDED
- GRANITIC ROCKS OF 1,400-M.Y. AGE GROUP (AGE 1,350-1,480 M.Y.)
- GRAVELS AND ALLUVIUMS (PINEDALE AND BULL LAKE AGE)
- GREEN RIVER FORMATION
- KAYENTA FORMATION, WINGATE SANDSTONE, AND CHINLE FORMATION
- LANDSLIDE DEPOSITS
- MANCOS SHALE
- MESAVERDE GROUP, UNDIVIDED
- MODERN ALLUVIUM
- MORRISON FORMATION, SUMMERVILLE FORMATION (SHALE AND SILTSTONE), AND ENTRADA SANDSTONE
- MORRISON, WANAKAH, AND ENTRADA FORMATIONS
- OLDER GRAVELS AND ALLUVIUMS (PRE-BULL LAKE AGE)
- PARACHUTE CREEK MEMBER
- UINTA FORMATION
- WASATCH FORMATION (INCLUDING FORT UNION EQUIVALENT AT BASE) AND OHIO CREEK FORMATION
- WATER
- WINGATE SANDSTONE AND CHINLE FORMATION

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.

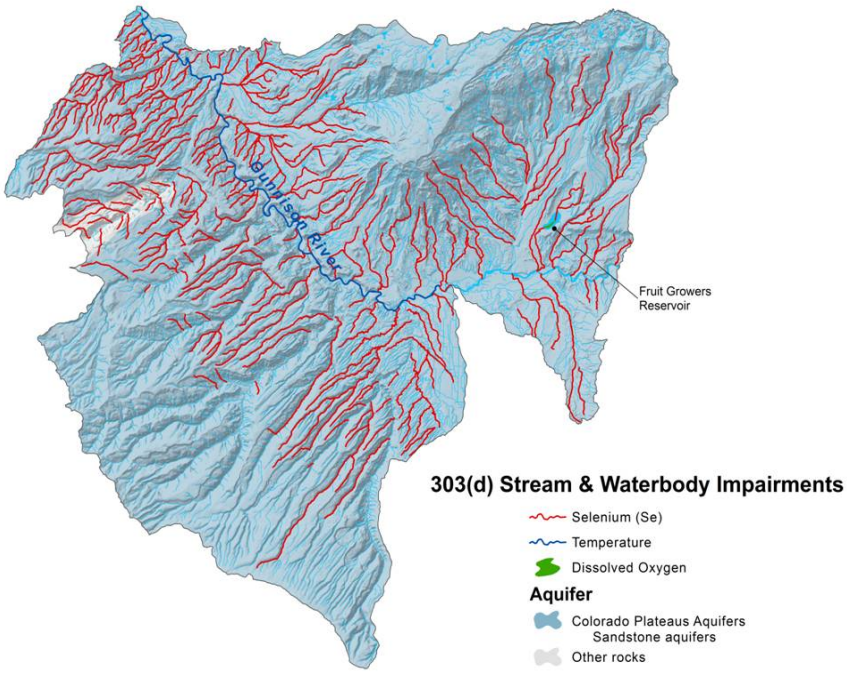
Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

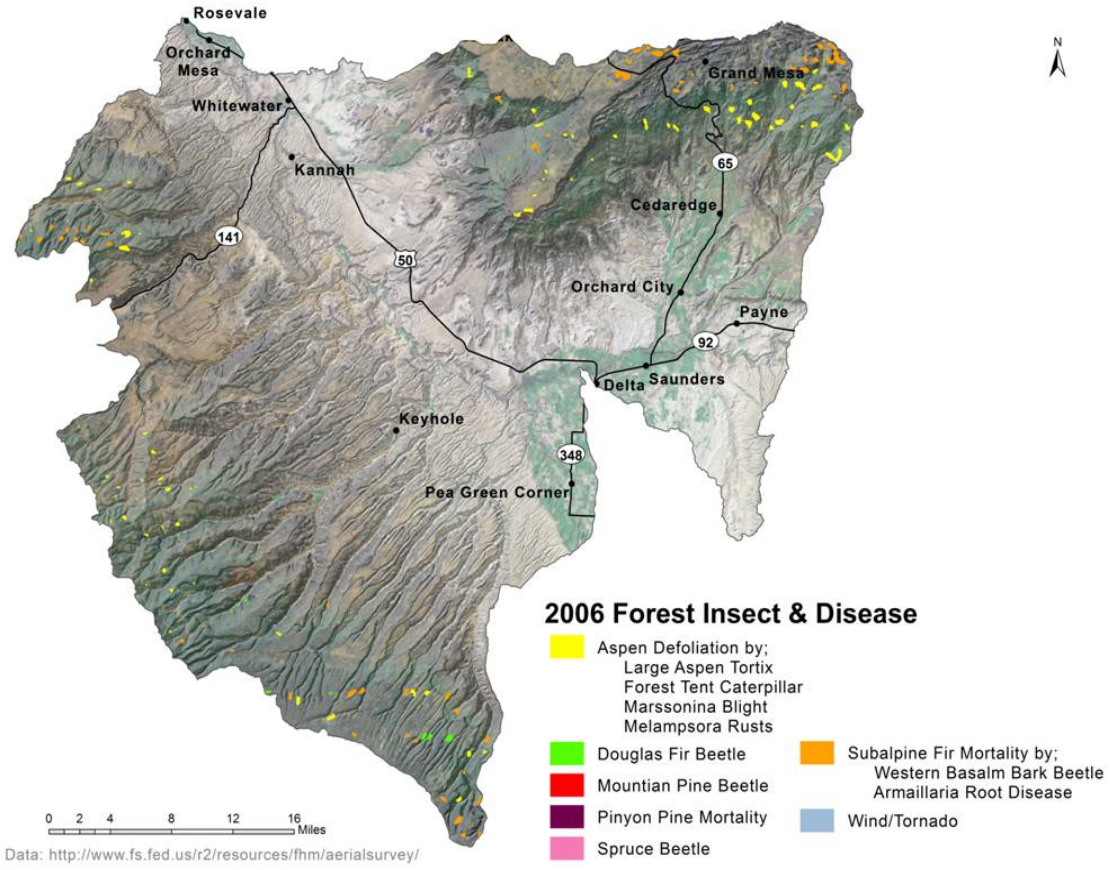
As shown on the Wind Erodibility Index map below, most cropland soils in the Lower Gunnison Watershed are considered highly erodible.



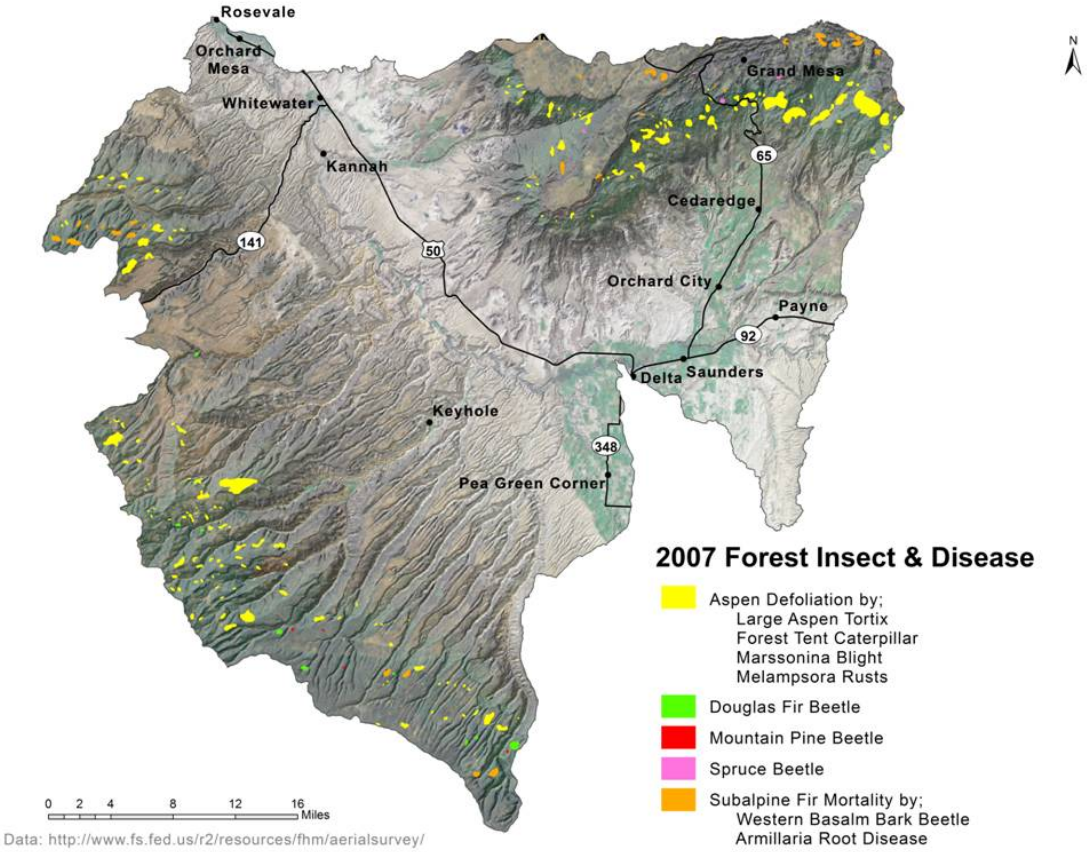
Stream Impairments

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.





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

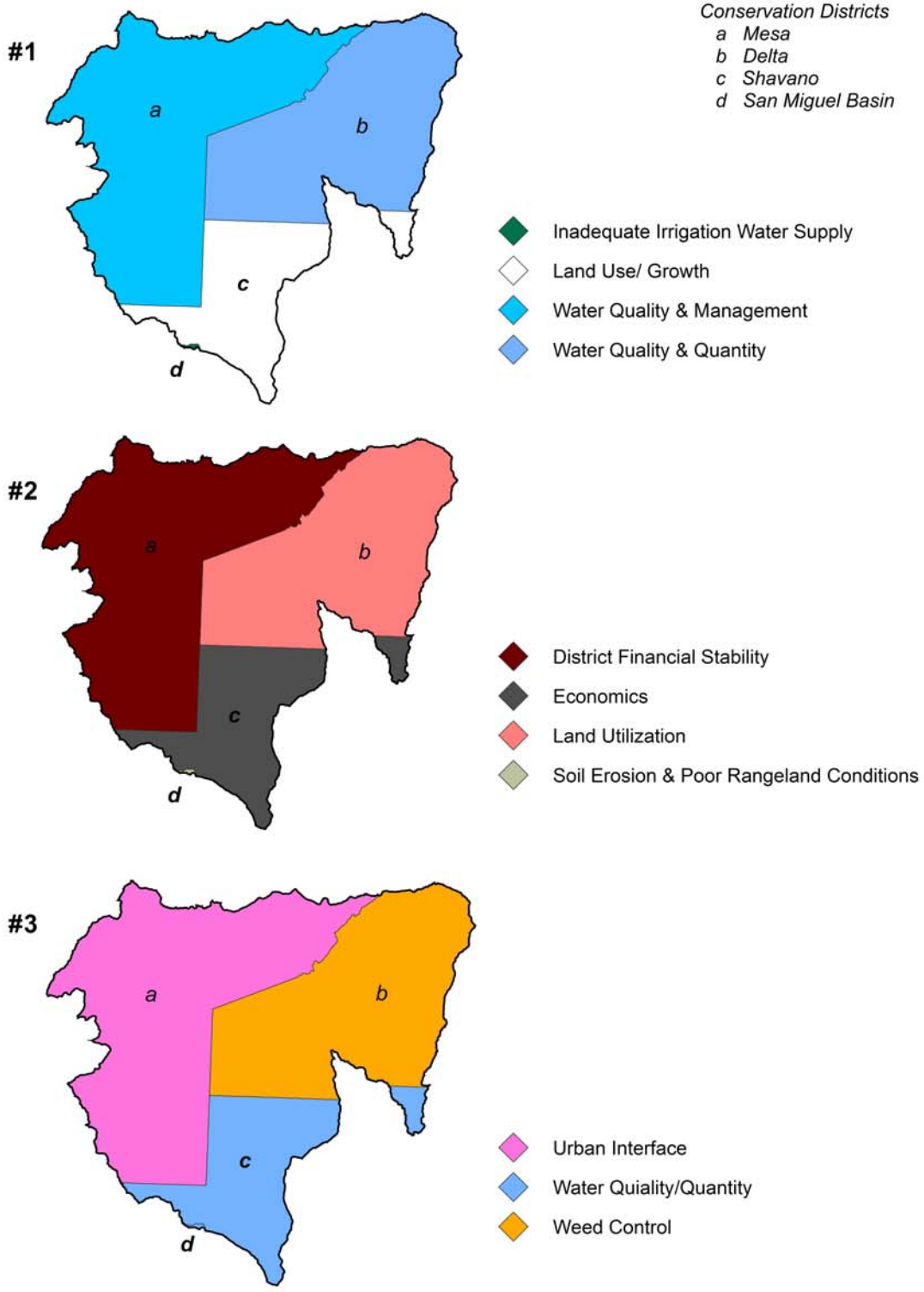


Data: http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/

Social Data	Delta	Mesa	Montrose
Demographics (US Census, American Factfinder)			
Total population	27,834	126,588	33,432
Male	13,972	61,566	16,458
Female	13,862	65,022	16,974
Median age (years)	42.3	36.9	38.8
White	25,688	114,662	30,074
Black or African American	146	670	102
American Indian and Alaska Native	211	734	340
Asian	89	955	140
Native Hawaiian and Other Pacific Islander	7	161	23
Some other race	1184	6852	1920
Hispanic or Latino (of any race)	3171	13718	4967
Economic Characteristics (US Census, American Factfinder)			
In labor force (population 16 years and over)	12,088	66,835	15,984
Median household income (dollars)	32,785	39,487	35,234
Median family income (dollars)	37,748	46,858	40,849
Per capita income (dollars)	17,152	21,318	17,158
Families below poverty level	679	x	824
Individuals below poverty level	3272	x	4160
X means that value is not applicale or not availiable			
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)			
Farms (number)	1063	1599	915
Land in farms/ranches (acres)	262,443	385,255	334,747
Average size farm/ranch (acres)	247	241	366
Median size farm (acres)	50	24	73
Average age of farmer or rancher	56.1	55.2	55.1
Net cash return from ag sales ($1,000)	3,191	4,746	15,237
Cattle and calves (number)	23,000	39,000	41,000

Identified Long Range Resource Concerns

Top Three Concerns within Conservation Districts



Selected Conservation Application Data	Lower Gunnison 14020005						
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	2,758	3,082	Not Avail.	4,072	2,283	2,150	14,345
Total Conservation Systems Applied (Acres)	3,436	1,572	Not Avail.	2,220	1,474	2,759	11,461
Practices							
Prescribed Grazing	330	195	0	0	7	0	532
Irrigation Water Management	1,804	2.630	1,138	318	228	561	6,679
Conservation Cropping System	0	0	69	138	248	170	625
Residue Management	143	143	69	63	248	170	836

Primary Resource Concern:	**Inefficient water use on forage**			
Conservation System Description:	Earthen ditch irrigation system converted to Sideroll Sprinkler System with Structure for Water Control, Underground Pipeline, IWM, and Forage Harvest Management			**Reference Conservation System Guide Code:** CO 34B.2-HY-Sideroll-R-1
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Irrigation Water Management	Ac	12,000	3,992	47,904,000
			Subtotal Costs Irrigated Crops	**$47,904,000**

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

Landuse	Resource Concern	Measurable Effects	Non-measurable Effects	Estimated Cost ($)
Irrigated Hay or other forage	Water	32 Ac-in/Ac/Yr	Water quality improvement	47,904,000
			Estimated Total Costs to Address Major Resource Concerns:	**$47,904,000**

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:

Grand Mesa-West Elk Area (CO660) Published 09/28/2007
Uncompahgre National Forest Area (CO676) Published 01/10/2007
Ridgway Area (CO677) Published 07/10/2006
Paonia Area (CO679) Published 01/10/2007
Mesa County Area (CO680) Published 01/06/2006
Douglas-Plateau Area (CO682) Published 12/05/2006

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.