



United States Department  
of Agriculture

# San Miguel Watershed



Hydrologic Unit Code 14030003

Natural Resources  
Conservation Service

Lakewood, Colorado

## Rapid Assessment

RWA 14030003

March 2010





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## Introduction

### Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

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

### Benefits of these Activities

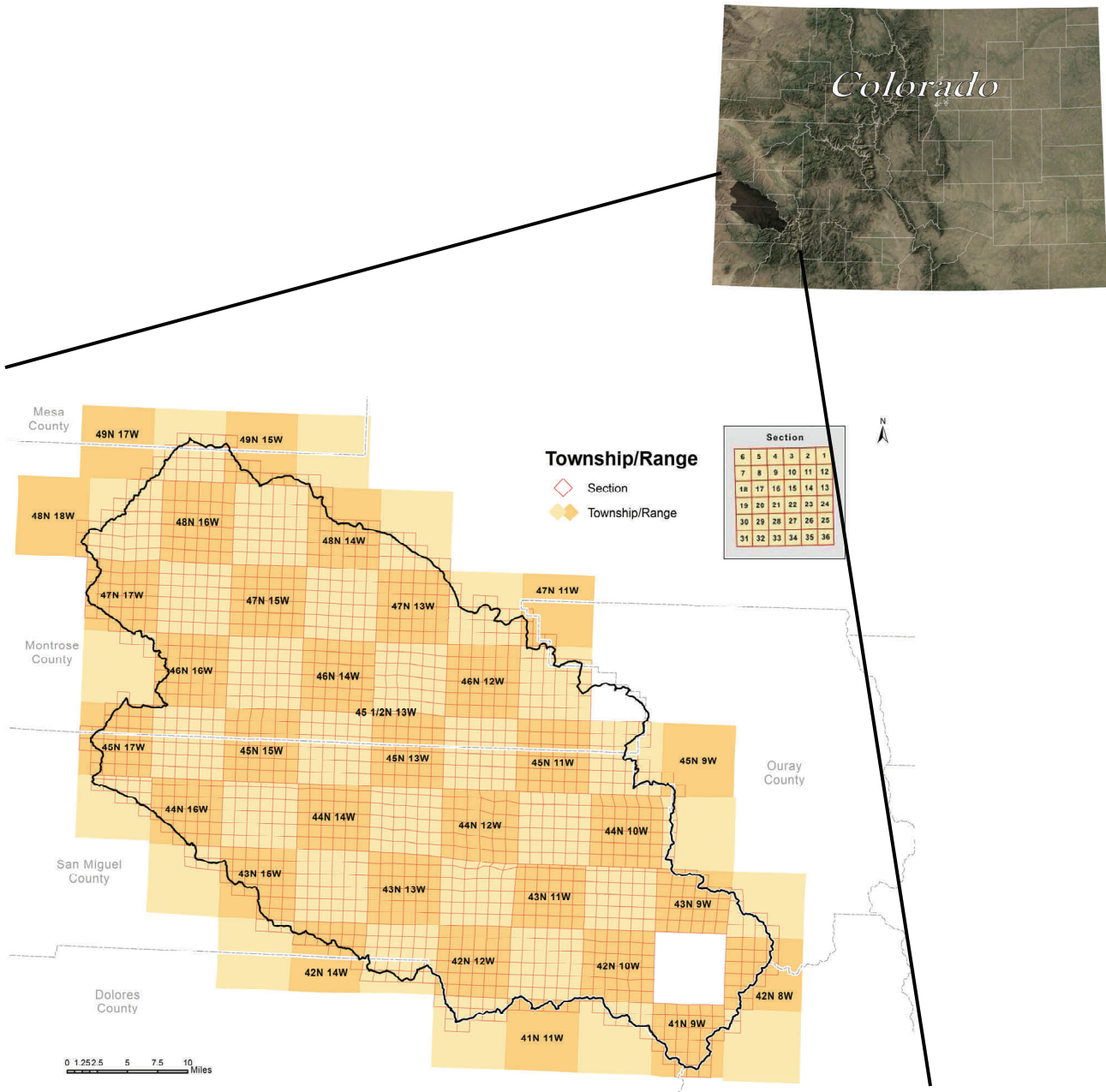
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

- 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.**

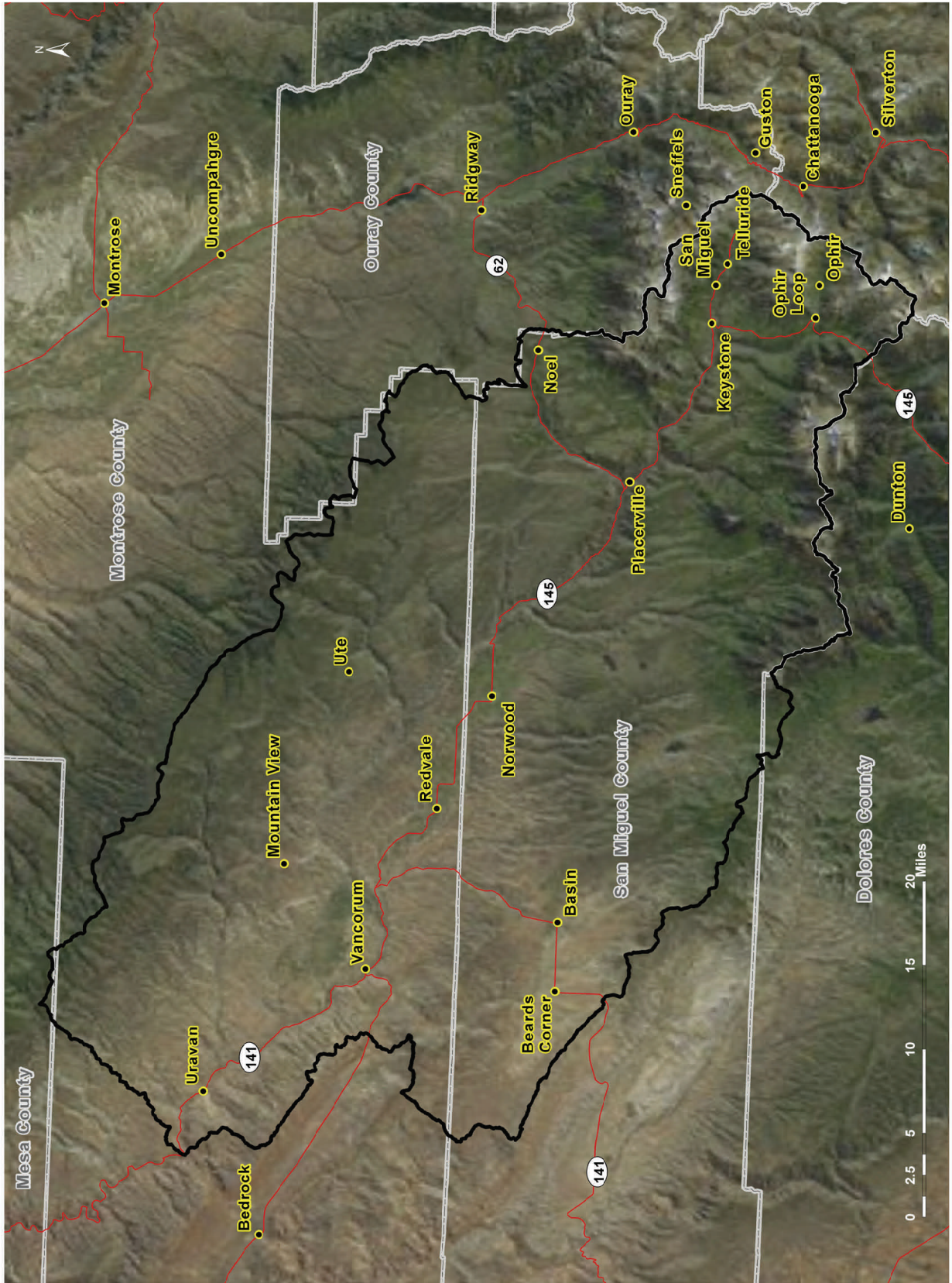
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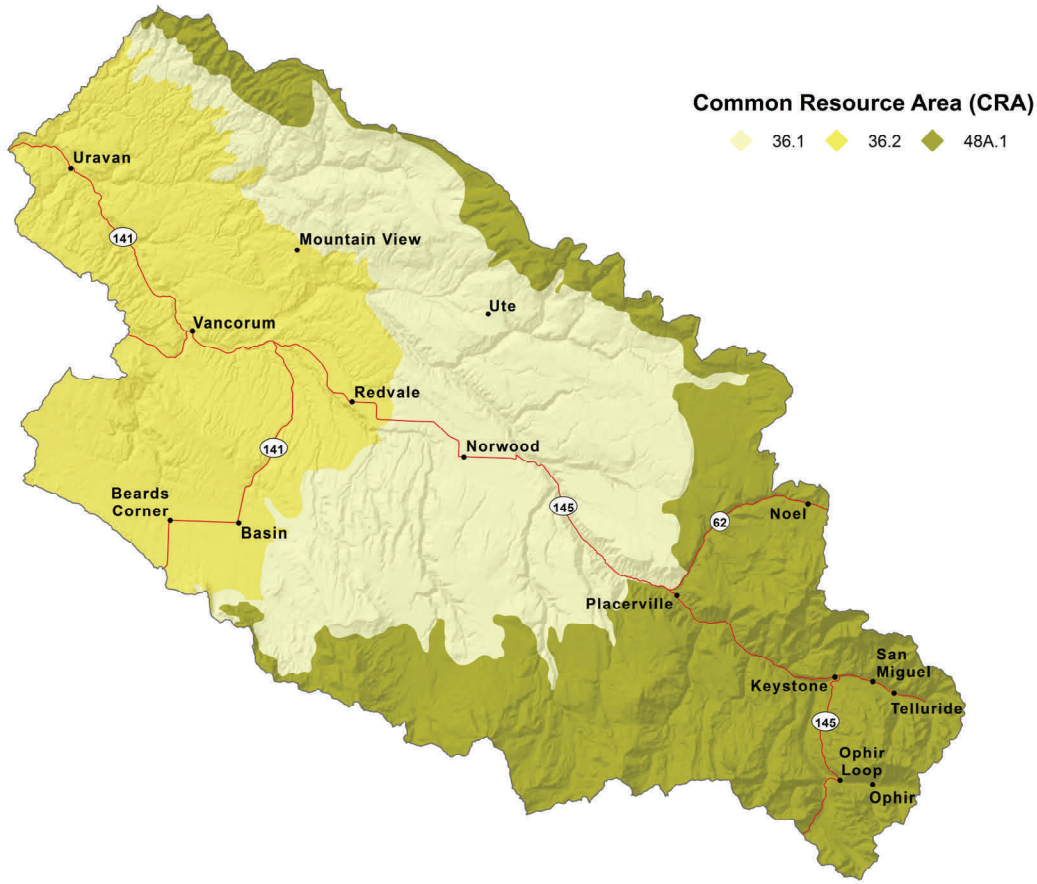


County	County Acres	County Acres in SAN MIGUEL Watershed	% of County in the Watershed	% of Watershed in the County
Dolores	684,641	3,744	0.5%	0.4%
Mesa	2,141,387	1,002	0.0%	0.1%
Montrose	1,437,265	436,893	30.4%	43.9%
Ouray	347,297	1,467	0.4%	0.1%
San Miguel	826,078	552,381	66.9%	55.5%

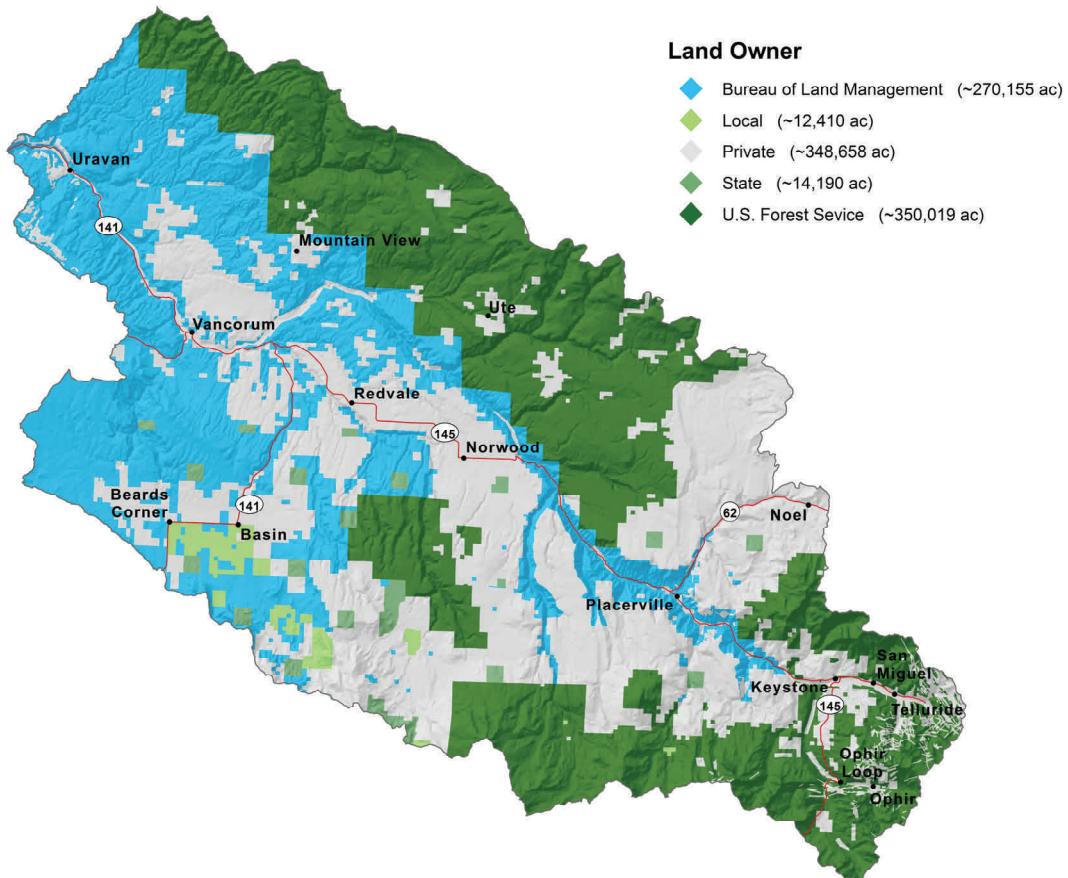
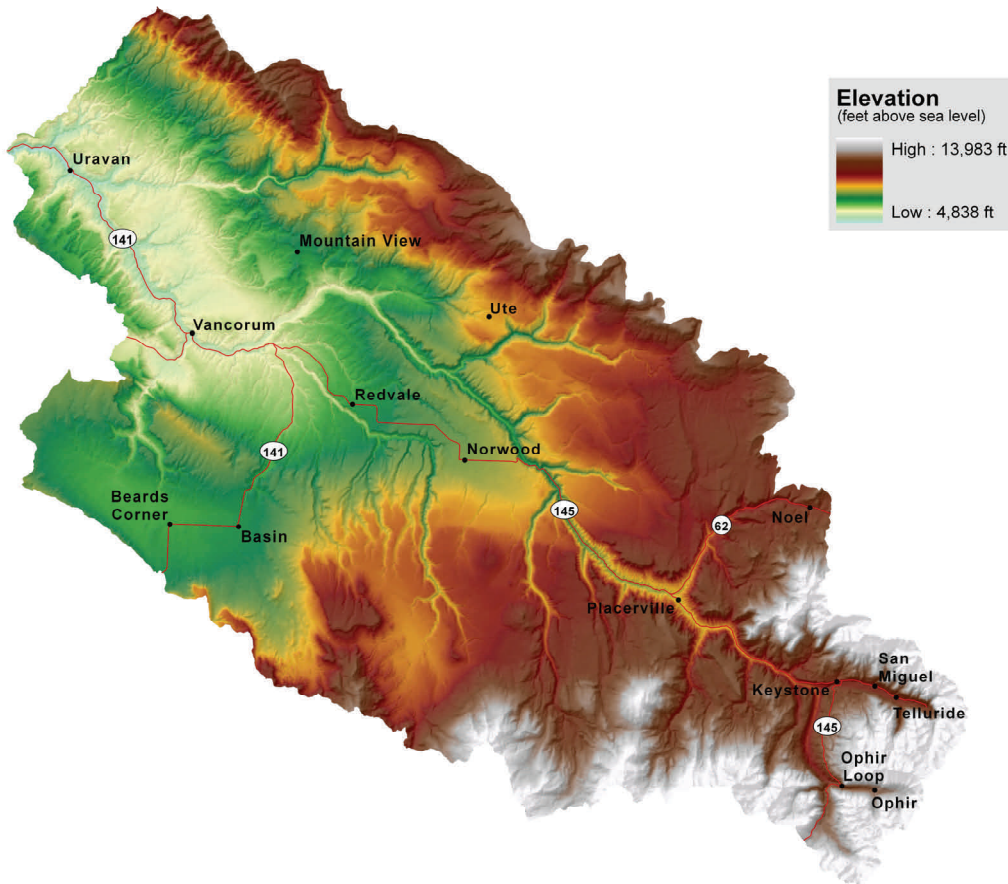
995,487

**San Miguel Watershed - 14030003**

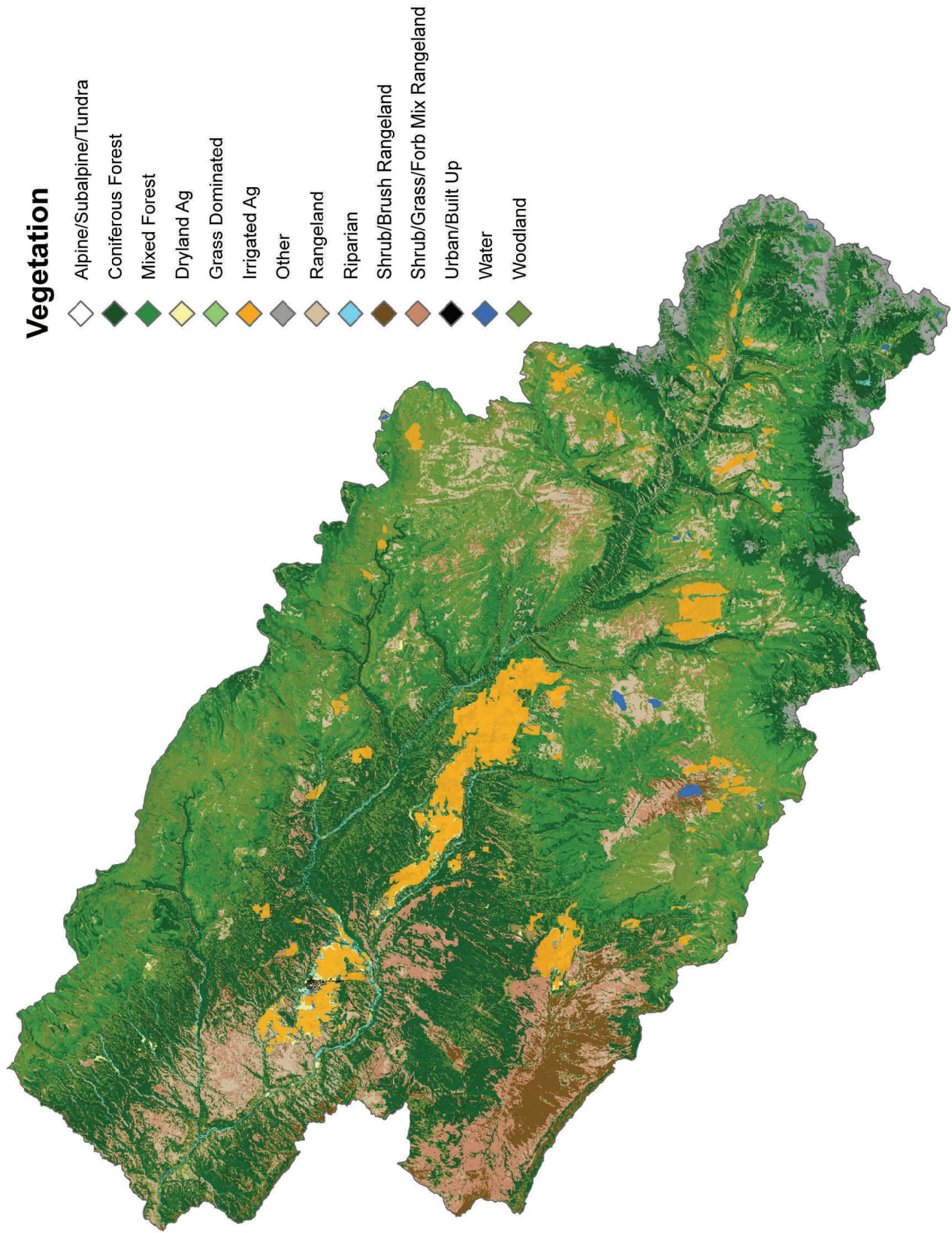




MLRA	CRA	CRA NAME	CRA DESCRIPTION
36	36.1	Southwestern Plateaus, Mesas, and Foothills - Cool Subhumid Mesas and Foothills	This area encompasses the higher elevation mesas and foothills that represent a transition to the Southern Rocky Mountains. The temperature regime is frigid, and the moisture regime 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.



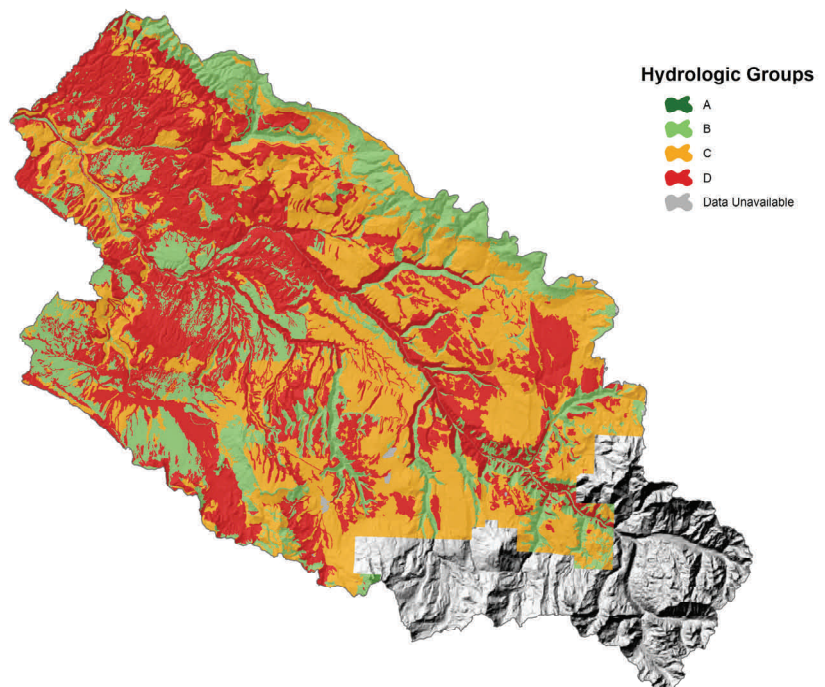
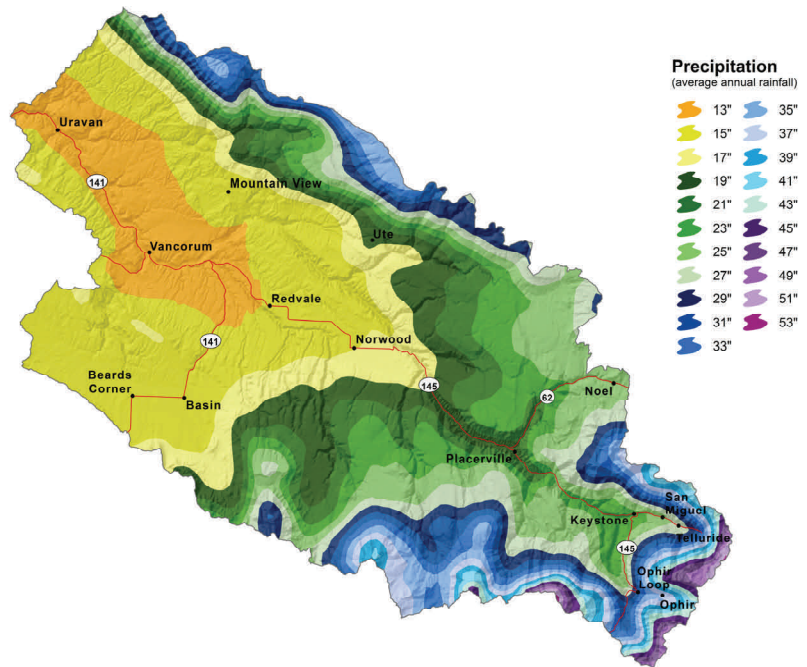


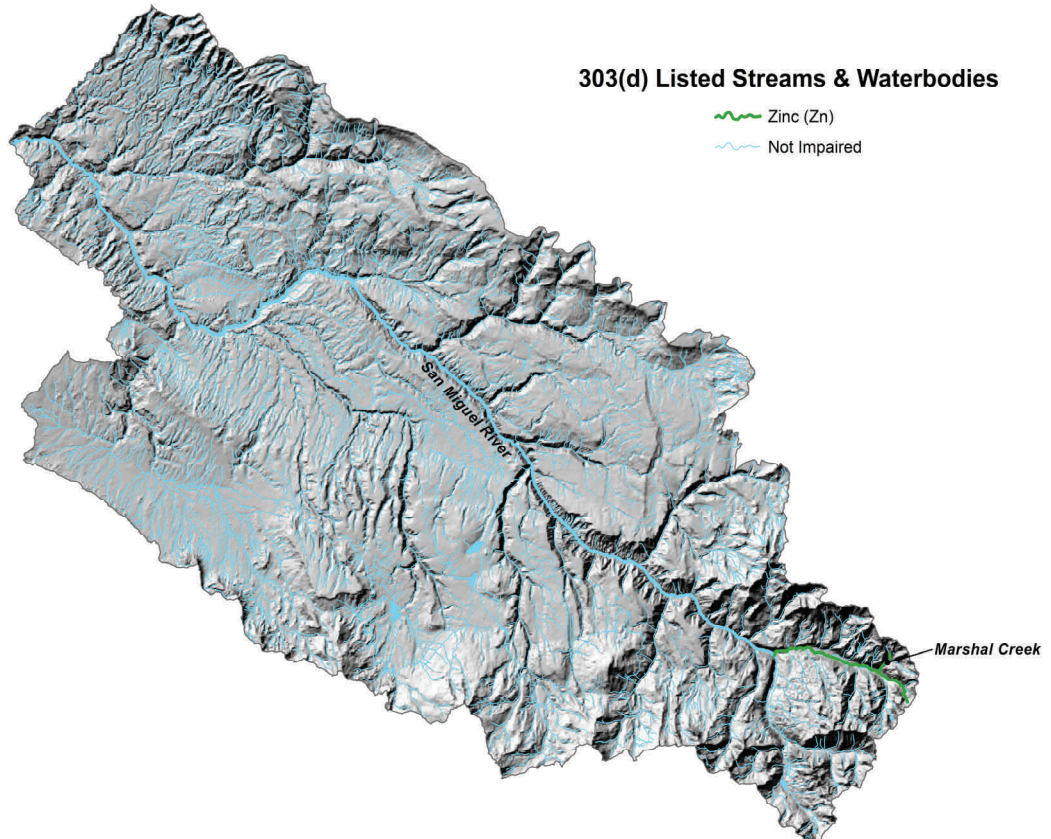
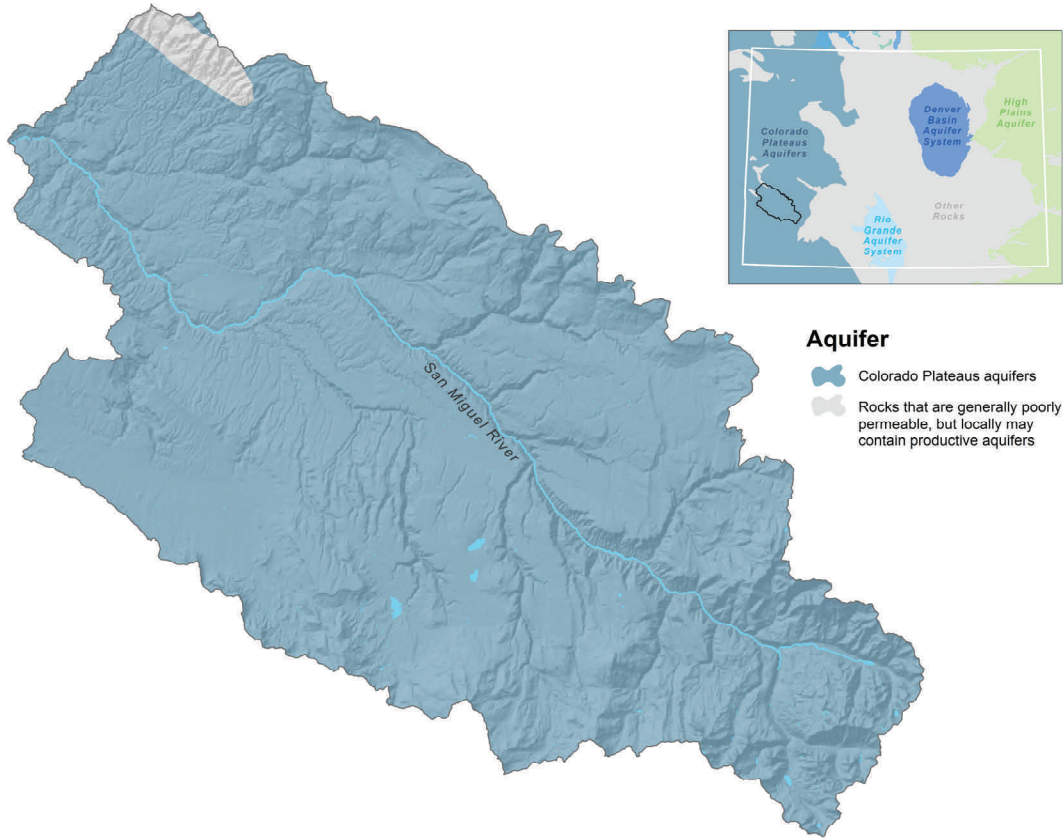


<u>SAN MIGUEL Land Use</u>	Total Acreage	Vegetation	Acreage
Cropland	41,433	Dryland Ag	840.0
		Irrigated Ag*	40,593.0
Rangeland/Grassland	619,358	Alpine Forb Dominated	4.6
		Alpine Grass Dominated	0.3
		Alpine Grass/Forb Mix	9.6
		Alpine Meadow	15,511.9
		Gambel Oak	36,806.1
		Grass Dominated	58.5
		Grass/Forb Mix	21.2
		Grass/Forb Rangeland	97,887.0
		Greasewood	1.1
		Mesic Mountain Shrub Mix	112,757.3
		PJ-Mtn Shrub Mix	57,864.4
		PJ-Sagebrush Mix	16,483.8
		Pinon-Juniper	181,095.5
		Sagebrush Community	17,395.6
		Sagebrush/Gambel Oak Mix	16.2
		Sagebrush/Grass Mix	62,029.7
		Sagebrush/Mesic Mtn Shrub Mix	1.7
		Salt Desert Shrub Community	0.3
		Saltbush Community	9,074.5
Serviceberry/Shrub Mix	4.0		
Sparse PJ/Shrub/Rock Mix	1,408.3		
SubAlpine Shrub Community	164.5		
Subalpine Grass/Forb Mix	953.8		
Upland Willow/Shrub Mix	9,807.8		
Forest	300,347	Aspen	68,962.8
		Aspen/Mesic Mountain Shrub Mix	60.1
		Douglas Fir/Aspen Mix	18.8
		Englemann Spruce/Fir Mix	62,587.2
		P. Pine/Aspen/Gamble Oak Mix	8,997.9
		P. Pine/Gambel Oak Mix	91,112.1
		Ponderosa Pine	10,952.3
		Ponderosa Pine/Aspen Mix	156.0
Spruce/Fir/Aspen Mix	57,499.9		
Riparian	5,140	Cottonwood	2.8
		Riparian	5,113.1
		Shrub Riparian	1.2
		Willow	22.5
Water	1,359	Water	1,359.2
Other	27,872	Barren Land	36.0
		Rock	26,766.8
		Talus Slopes & Rock Outcrops	777.1
		Urban/Built Up	292.2
<b>~Total Watershed Acres</b>			<b>995,509</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 usually snow.





**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.

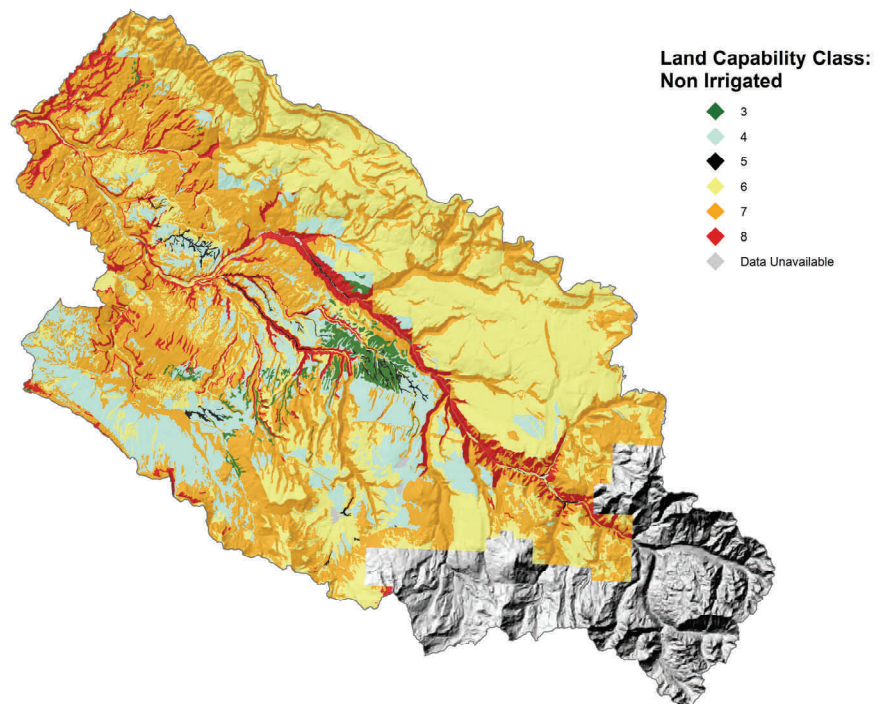
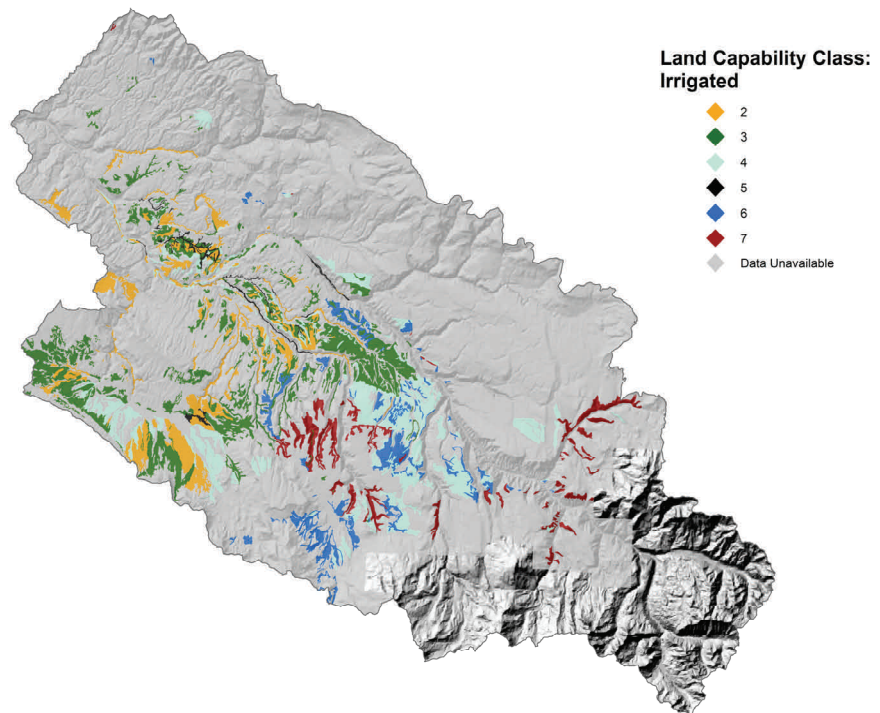
**Class 4** - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

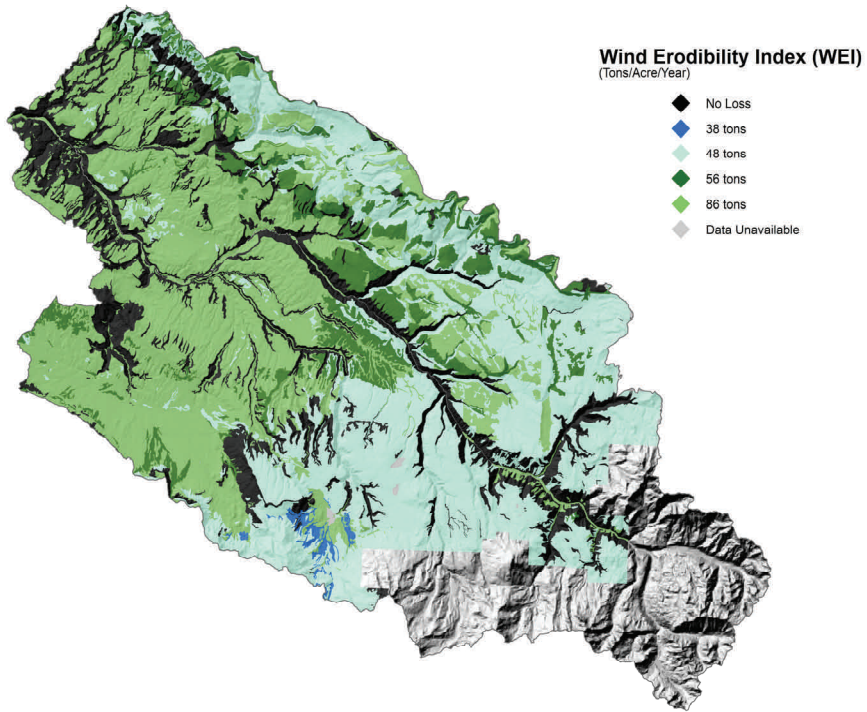
**Class 5** - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

**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.

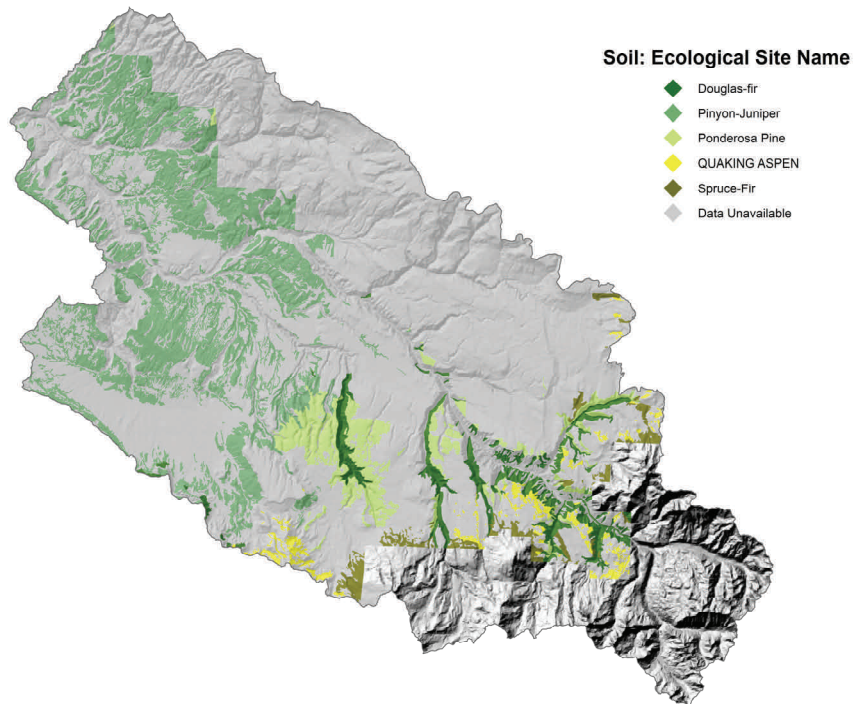
**Class 8** - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

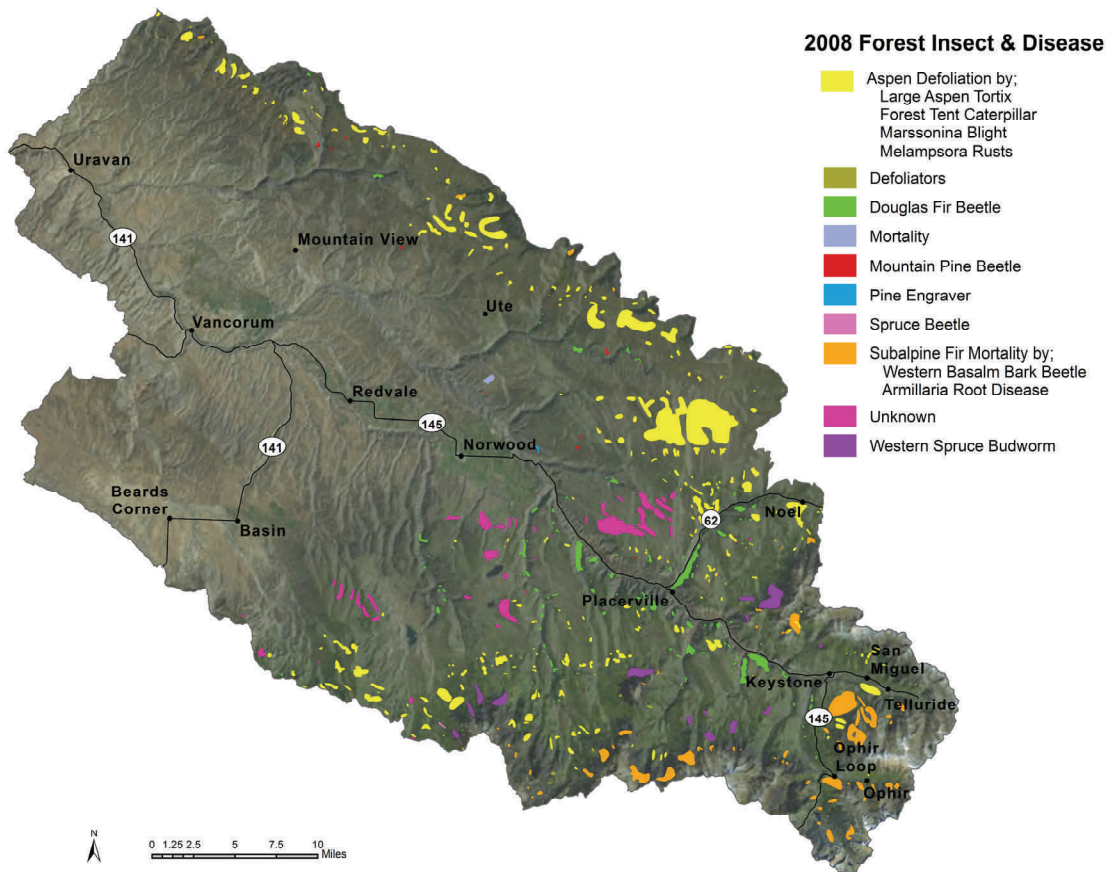
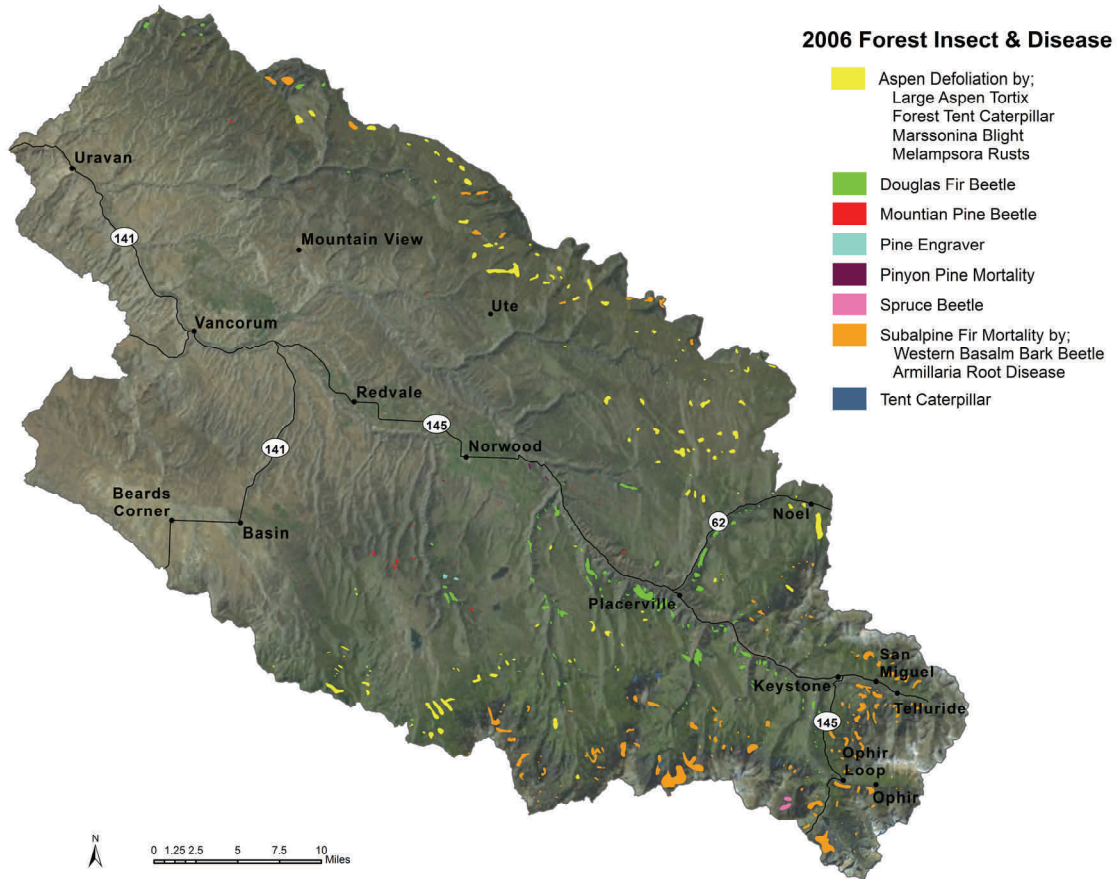


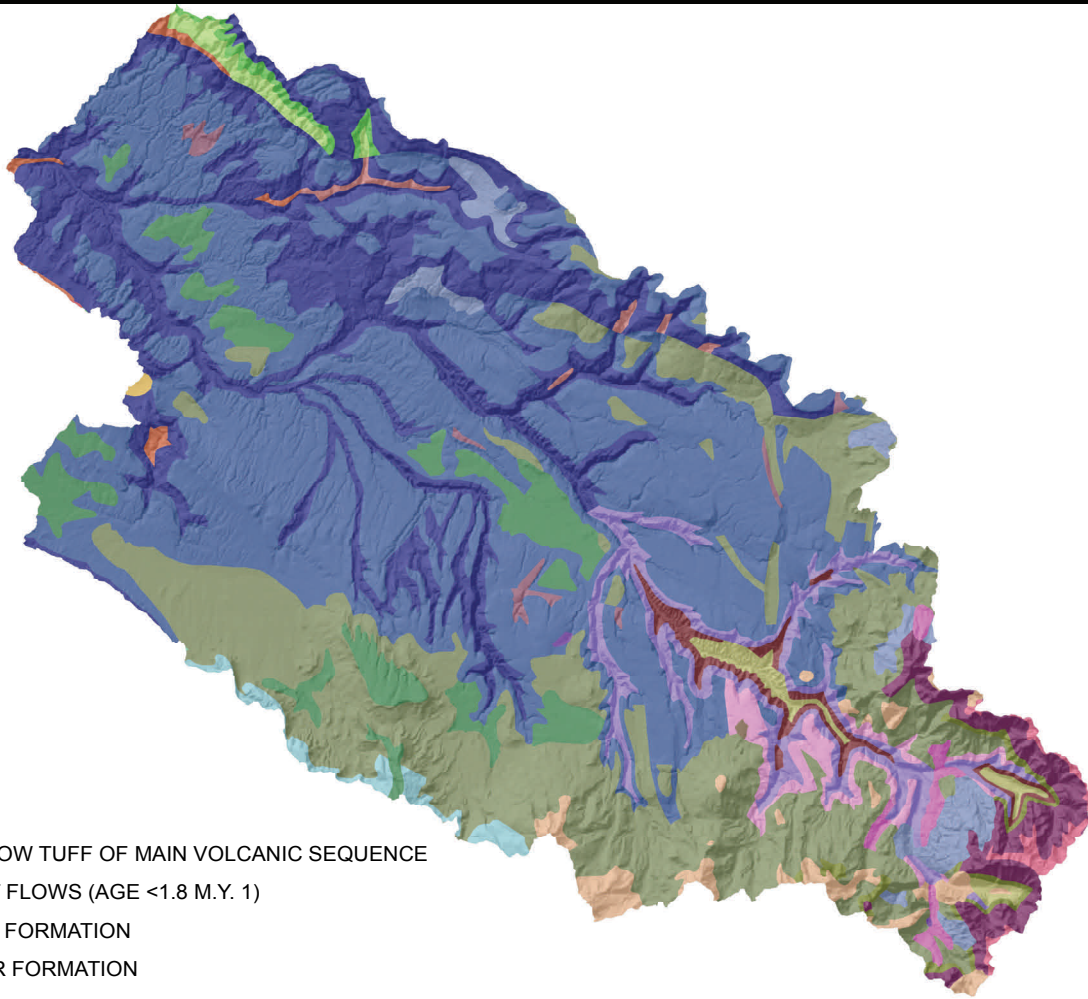


**The Wind Erodibility Index (WEI):** numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

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







## Geology

- ◆ ASH-FLOW TUFF OF MAIN VOLCANIC SEQUENCE
- ◆ BASALT FLOWS (AGE <1.8 M.Y. 1)
- ◆ CHINLE FORMATION
- ◆ CUTLER FORMATION
- ◆ DAKOTA SANDSTONE
- ◆ DAKOTA SANDSTONE AND BURRO CANYON FORMATION
- ◆ DOLORES FORMATION
- ◆ EOCENE PREVOLCANIC SEDIMENTARY ROCKS
- ◆ EOLIAN DEPOSITS
- ◆ GLACIAL DRIFT OF PINEDALE AND BULL LAKE GLACIATIONS
- ◆ GLEN CANYON GROUP AND CHINLE FORMATION
- ◆ GRANITIC ROCKS OF 1,400- AND 1,700-M.Y. AGE GROUPS, UNDIVIDED
- ◆ HERMOSA FORMATION
- ◆ KAYENTA FORMATION, WINGATE SANDSTONE, AND CHINLE FORMATION
- ◆ LANDSLIDE DEPOSITS
- ◆ MANCOS SHALE
- ◆ MESAVERDE GROUP, UNDIVIDED
- ◆ MIDDLE TERTIARY INTRUSIVE ROCKS (AGE 20-40 M.Y.)
- ◆ MODERN ALLUVIUM
- ◆ MOENKOPI FORMATION (LOWER TRIASSIC) AND CUTLER FORMATION (LOWER PERMIAN)
- ◆ MORRISON FORMATION
- ◆ MORRISON FORMATION, SUMMERVILLE FORMATION (SHALE AND SILTSTONE), AND ENTRADA SANDSTONE
- ◆ MORRISON, WANAKAH, AND ENTRADA FORMATIONS
- ◆ PRE-ASH-FLOW ANDESITIC LAVAS, BRECCIAS, TUFFS, AND CONGLOMERATES(GENERAL AGE 30-35 M.Y.)
- ◆ WATER
- ◆ WINGATE SANDSTONE AND CHINLE FORMATION



## State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern in the San Miguel Watershed

Common Name	Scientific Name	Class	State Status/Federal Status	Comments
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Birds	Concern/None	Occurs in the watershed
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Birds	Threatened/None	Occurs in the watershed
Black-footed Ferret	<i>Mustela nigripes</i>	Mammals	Endangered/Endangered	No current records of occurrence
Bonytail	<i>Gila elegans</i>	Fish	Endangered/Endangered	Water depletions in the watershed may affect downstream habitats/fish
Canada Lynx	<i>Lynx canadensis</i>	Mammals	Endangered/Threatened	May occur in the watershed
Colorado Pikeminnow	<i>Ptychocheilus lucius</i>	Fish	Threatened/Endangered	Water depletions in the watershed may affect downstream habitats/fis
<b>Burrowing Owl</b>	<i>Athene cunicularia</i>	Birds	<b>Threatened</b>	Occurs in the watershed
Greenback/Colorado River Cutthroat Trout	<i>Oncorhynchus clarki stomia/pleuriticus*</i>	Fish	Threatened/Threatened	Occurs in the watershed
Colorado Roundtail Chub	<i>Gila robusta</i>	Fish	Concern/None	Occurs in the watershed
Gunnison Sage Grouse	<i>Centrocercus minimus</i>	Birds	Concern/None	Occurs in limited areas of the watershed
Humpback Chub	<i>Gila cypha</i>	Fish	Threatened/Endangered	Water depletions in the watershed may affect downstream habitats/fish
Longnose Leopard Lizard	<i>Gambelia wislizenii</i>	Reptile	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
Razorback Sucker	<i>Xyrauchen texanus</i>	Fish	Endangered/Endangered	Water depletions in the watershed may affect downstream habitats/fis
River Otter	<i>Lontra Canadensis</i>	Mammals	Threatened/None	Occurs in the watershed
Southwestern Willow Flycatcher	<i>Empidonax traillii eximius</i>	Birds	Endangered/Endangered	May occur in southern part of watershed
Townsend's big-eared bat (pale ssp)	<i>Corynorhinus townsendii pallescens</i>	Mammals	Concern/None	May occur in the watershed
Uncompahgre Fritillary Butterfly	<i>Boloria acrocneuma</i>	Insects	None/Endangered	May occur at high elevations
Western Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Birds	Concern/Candidate	May occur in the watershed

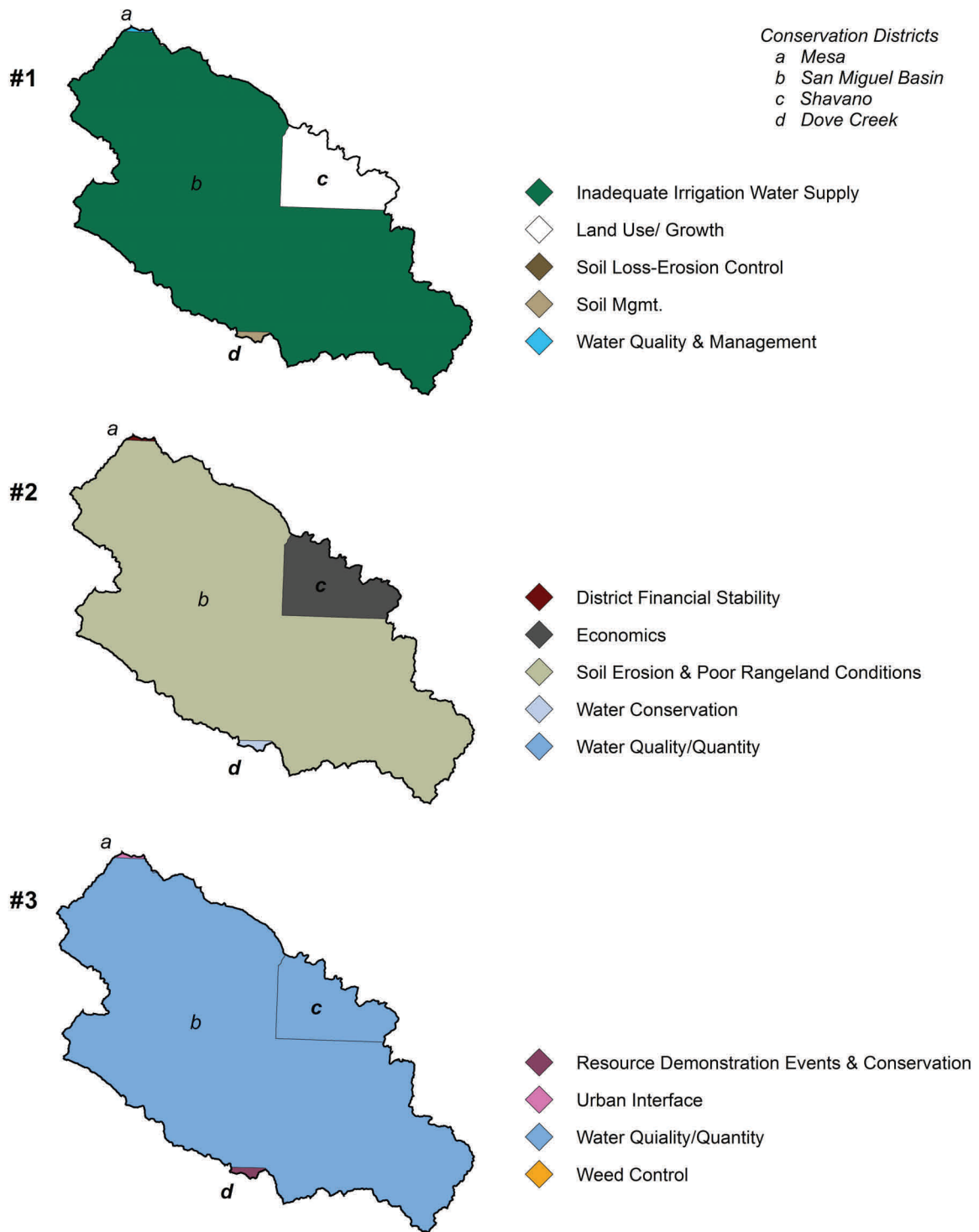
\*Recent genetic tests identified cutthroat population as greenback lineage.

The terrestrial habitats in this watershed include small amounts of dry cropland along the southwest side of the watershed; big sagebrush, oak, bitterbrush, and pinyon-juniper shrublands; aspen, ponderosa pine, and spruce-fir forest; sub-alpine meadows; and some tundra on the northeast boundary of the watershed. Significant aquatic habitats are found in the Dolores River, McPhee Reservoir, ponds, and other riparian and wetland areas in the watershed. These aquatic habitats provide food, cover, or water for many wildlife species at some life stage.

Economically important species in the watershed include: black bear, elk, mule deer, mountain lion, wild turkey and sport fish throughout most of the watershed. Trout occur at high elevations where water temperatures are cooler and warm-water fish at lower elevations. Ring-necked pheasant are found in the northern end of the watershed. Pronghorn may be found in the east-central part of the watershed. Snow geese make use of the Dolores River and associated riparian areas in the north part of the watershed. White-tailed ptarmigan occur in the southeastern part of the watershed at high elevations. The watershed also supports bighorn sheep in the northwest part and white-tailed ptarmigan on the eastern boundaries at high elevations.

Social Data	Mesa	Dolores	San Miguel	Montrose	Ouray
<b>Demographics (US Census, American Factfinder)</b>					
Total population	126,588	1,844	6,594	33,432	3,742
Male	61,566	954	3,607	16,458	1,890
Female	65,022	890	2,987	16,974	1,852
Median age (years)	36.9	42.4	34.2	38.8	43.4
White	114,662	1,757	6,170	30,074	3,605
Black or African American	670	1	19	102	3
American Indian and Alaska Native	734	36	56	340	35
Asian	955	7	49	140	13
Native Hawaiian and Other Pacific Islander	161	1	5	23	23
Some other race	6852	11	22	1920	20
Hispanic or Latino (of any race)	13718	71	439	4967	152
<b>Economic Characteristics (US Census, American Factfinder)</b>					
In labor force (population 16 years and	66,835	871	4,663	15,984	1,885
Median household income (dollars)	39,487	32,196	48,514	35,234	42,019
Median family income (dollars)	46,858	38,000	60,417	40,849	49,776
Per capita income (dollars)	21,318	17,106	35,329	17,158	24,335
Families below poverty level	x	55	95	824	68
Individuals below poverty level	x	241	685	4160	269
<b>County Agricultural Characteristics (Colorado Agricultural Census, county data tables)</b>					
Farms (number)	1599	216	112	915	96
Land in farms/ranches (acres)	385,255	158,518	151,093	334,747	108,088
Average size farm/ranch (acres)	241	734	1,349	366	1,126
Median size farm (acres)	24	340	234	73	200
Average age of farmer or rancher	55.2	55.4	57.1	55.1	60.2
Net cash return from ag sales (\$1,000)	4,746	-1,309	-443	15,237	-94
Cattle and calves (number)	39,000	3,000	6,000	41,000	6,000

## Identified Long Range Resource Concerns Top Three Concerns within Conservation Districts



### Selected Conservation Practices Applied, FY 2005 through FY 2009\*

Practice Code	Practice Name	Practice Unit	Applied Amount	Applied Count
449	Irrigation Water Management	ac	1080	23
528	Prescribed Grazing	ac	14,653	21
*Practices applied in Colorado portion of the watershed				

### Conservation Systems to Address Major Resource Concerns from the Field Office Technical Guide

**Irrigated Pasture**—The Irrigation system is comprised of pipeline with side roll. The system efficiency is 65%.

CO 36.2-PA-SideRoll—R-01

**Practices**

**Description**

**Resource Concerns Addressed**

382 Fence

This system is a side roll irrigation system. Prescribed Grazing and IWM are applied to improve plant health and production.

Soil Erosion - Sheet and Rill

442 Irrigation System, Sprinkler

Soil Erosion - Wind

449 Irrigation Water Management

Water Quantity - Inefficient Water Use on Irrigated Land

511 Forage Harvest Management

528 Prescribed Grazing

587 Structure for Water Control

614 Watering Facility

**Hayland**—The Irrigation system is comprised of pipeline with side roll. The system efficiency is 65%.

CO 36.2-HY-Sideroll—R-1

**Practices**

**Description**

**Resource Concerns Addressed**

442 Irrigation System, Sprinkler

Cool season grasses, alfalfa, or alfalfa/grass hay. Annual precipitation ranges from 8 - 20". Moisture usually lacking in the summer during peak ET and supplemented with gravity irrigation, the water source may be ground or surface water; rainfall often comes in short intense spring and early summer storms and as snowfall in the winter. Wildlife potential for use by elk, deer and other wildlife.

Soil Erosion - Sheet and Rill

449 Irrigation Water Management

Soil Erosion - Wind

511 Forage Harvest Management

Water Quantity - Inefficient Water Use on Irrigated Land

587 Structure for Water Control

### Estimated Costs of Application of Conservation Systems

Landuse	Estimated Acres Need to be Treated	Estimated Average Cost per Acre (\$)	Total Costs (\$)
Irrigated Pasture	5,000	1,500	7500000
Hayland	2,500	880	2200000

Total Estimated Costs: \$9,700,000

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## 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/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:

Animas-Dolores Area (CO672) Published 1/8/2007

San Miguel Area (CO675) Published 1/10/2007

MesaMontroseOuraySanMiguel (CO676) Published 1/10/2007

**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>.

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.

**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/>