United States Department of Agriculture

Natural Resources Conservation Service

Lakewood, Colorado

RWA 14080203

March 2010

Montezuma Watershed

Hydrologic Unit Code 14080203

Rapid Assessment

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.

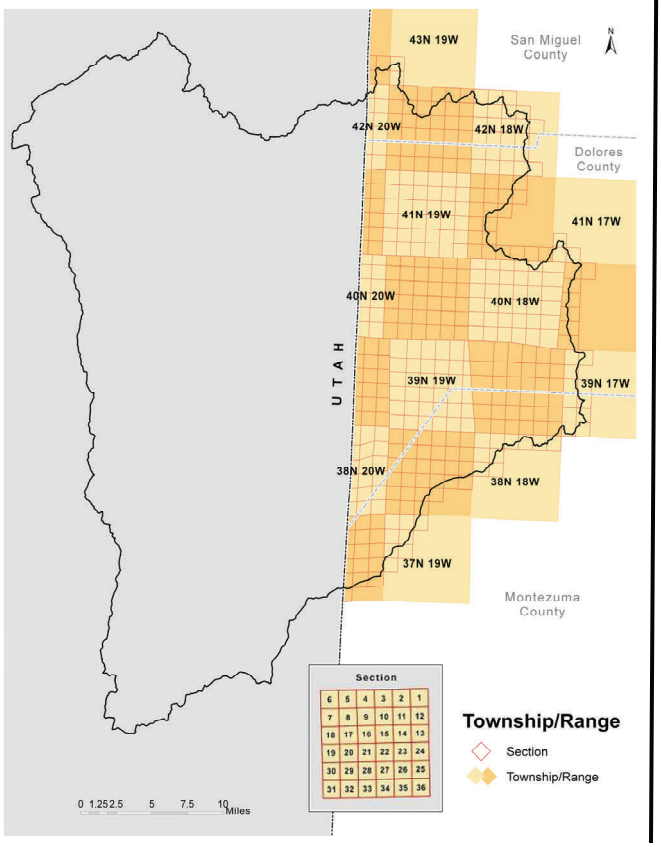
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best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

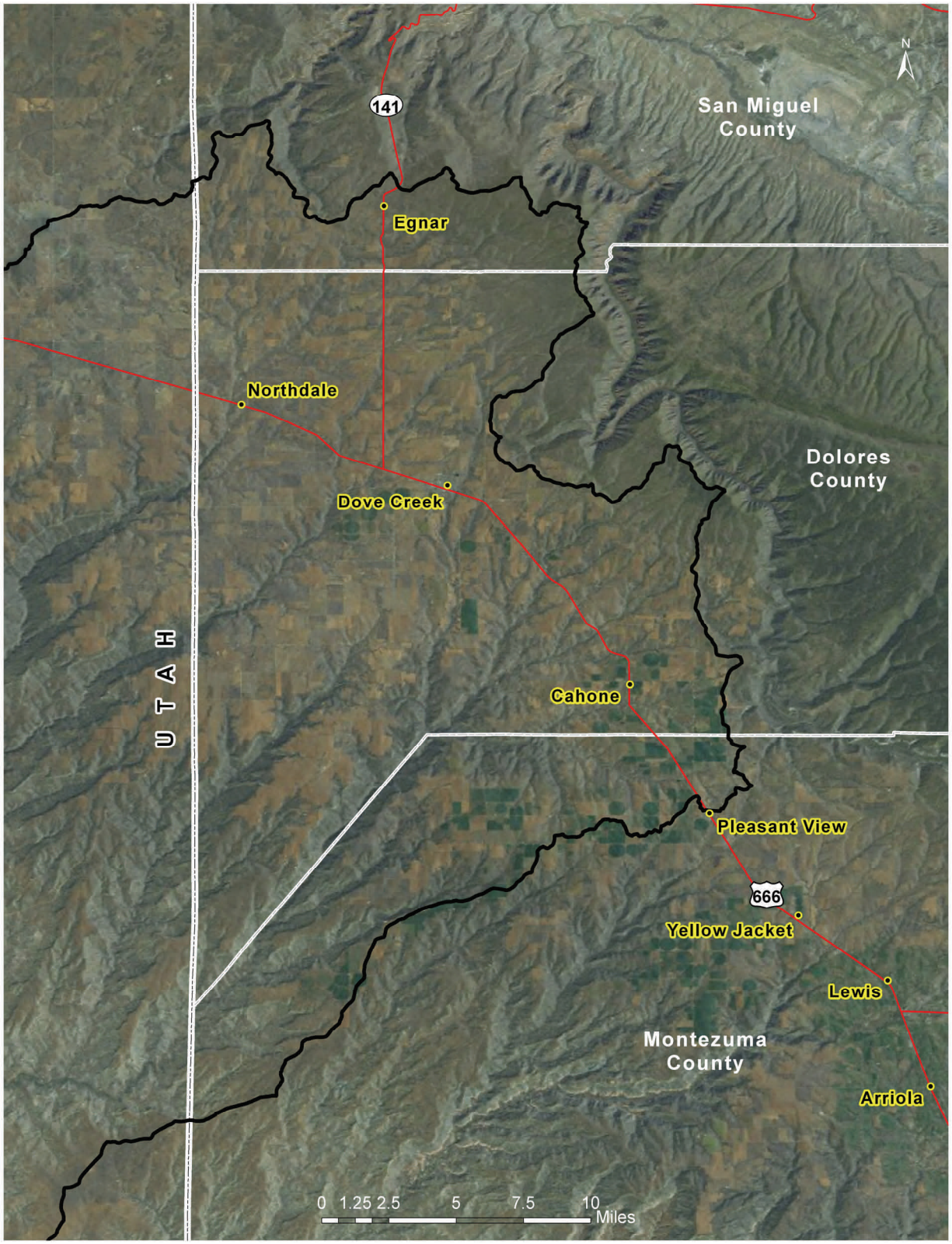
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis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

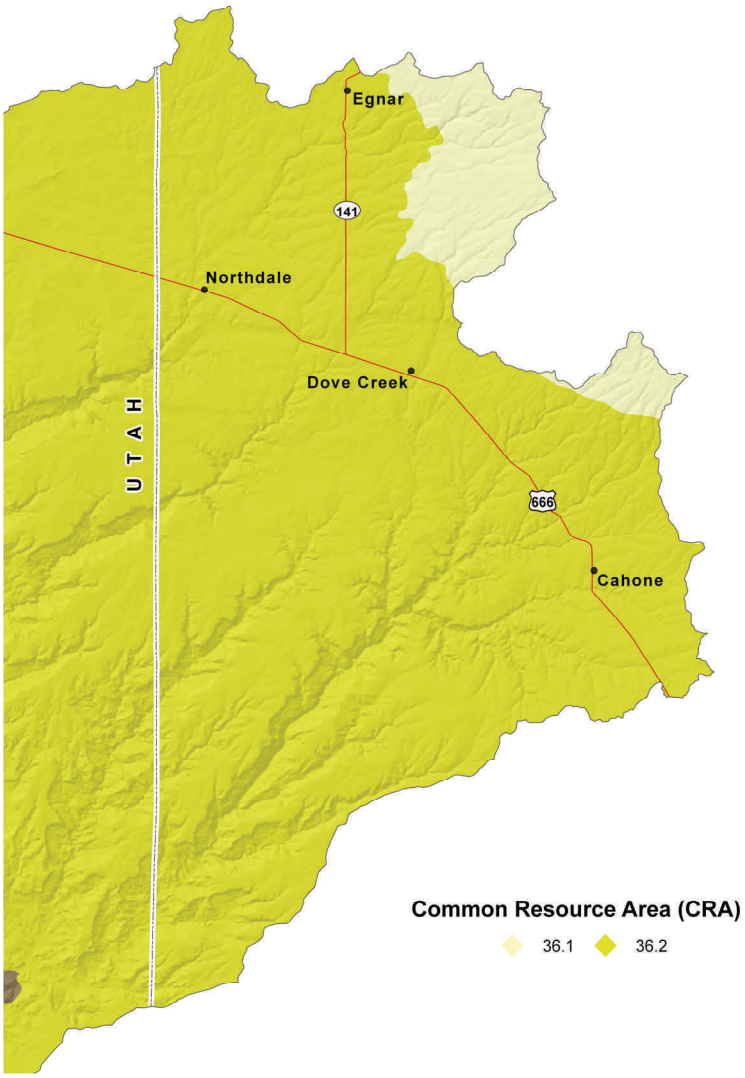
Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.



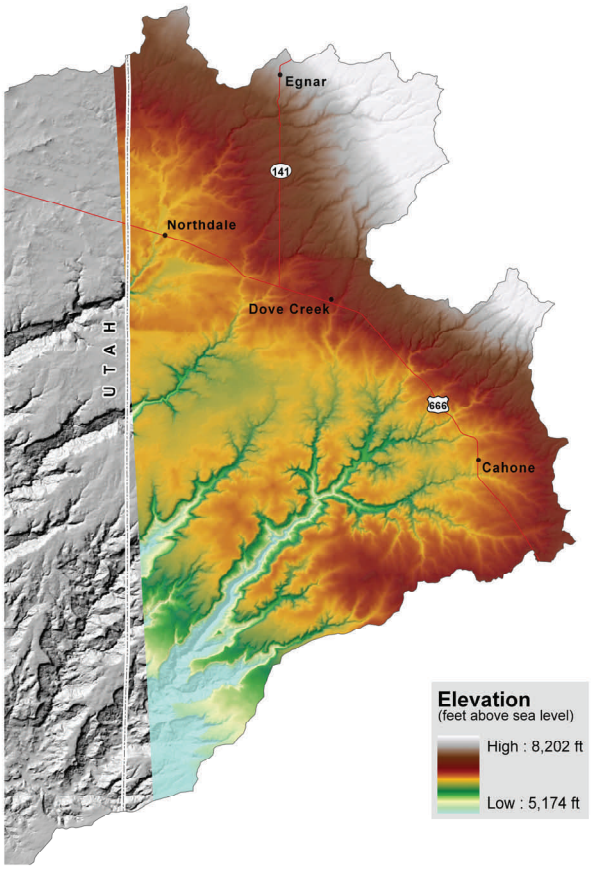
COLORADO County	County Acres	County Acres in MONTEZUMA Watershed	% of County in the Watershed	% of Watershed in the County
Dolores	684,931	165,020	24.1%	22.0%
Montezuma	1,306,961	51,179	3.9%	6.8%
San Miguel	826,078	23,734	2.9%	3.2%
UTAH **County**				
San Juan	5,074,979	510,067	10.1%	68.0%
		750,000		

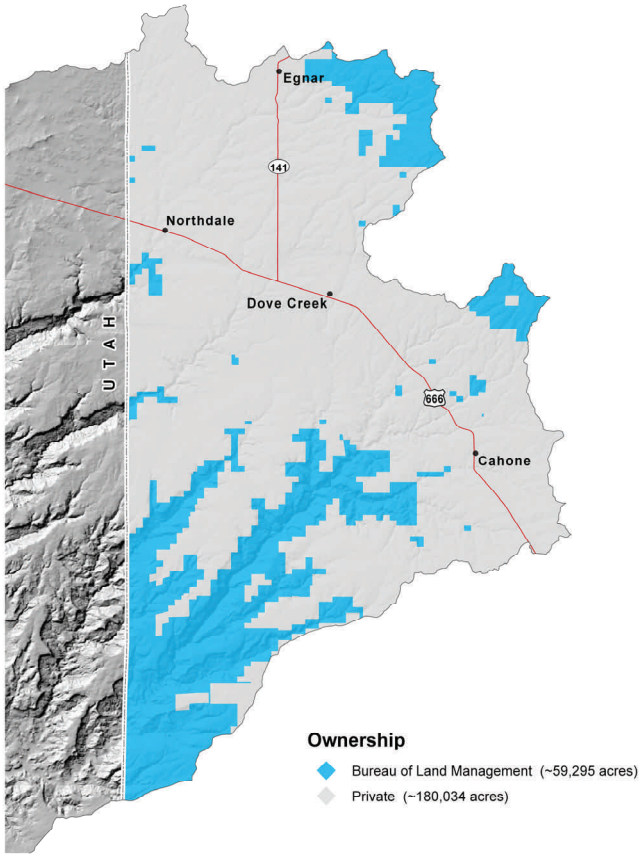
Montezuma Watershed - 14080203

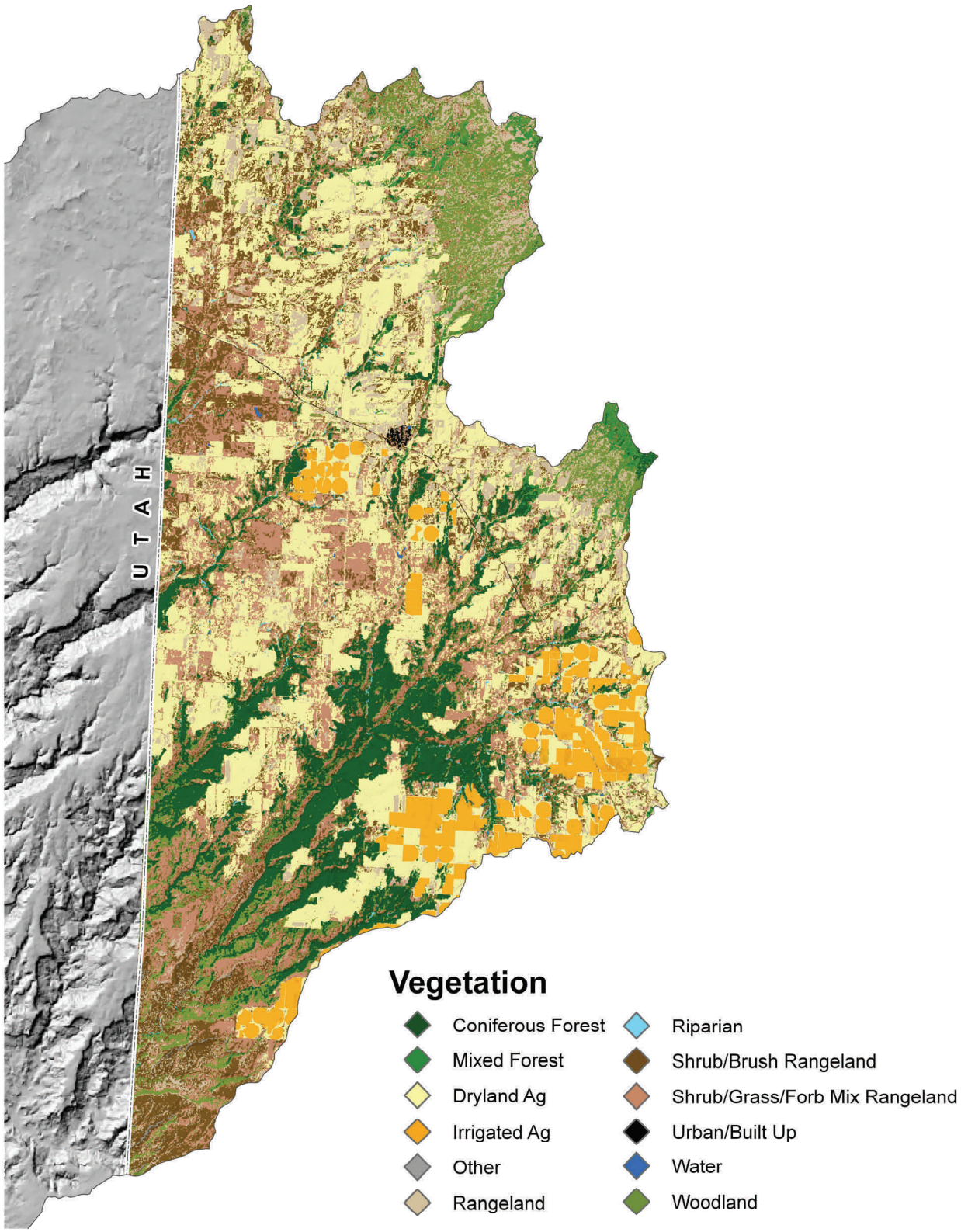




MLRA	CRA	CRA NAME	CRA DESCRIPTION
36	**36.1**	Southwestern Plateaus, Mesas, and Foothills - Cool Subhumid Mesas and Foothills	This area encompasses the higher elevation mesas and foothills that represent a transition to the Southern Rocky Mountains. The temperature regime is frigid, and the moisture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


Egnar
141
Northdale
Dove Creek
666
Cahone
U T A H
Elevation
(feet above sea level)
High : 8,202 ft
Low : 5,174 ft


Egnar
141
Northdale
Dove Creek
666
Cahone
U T A H
Ownership
Bureau of Land Management (~59,295 acres)
Private (~180,034 acres)

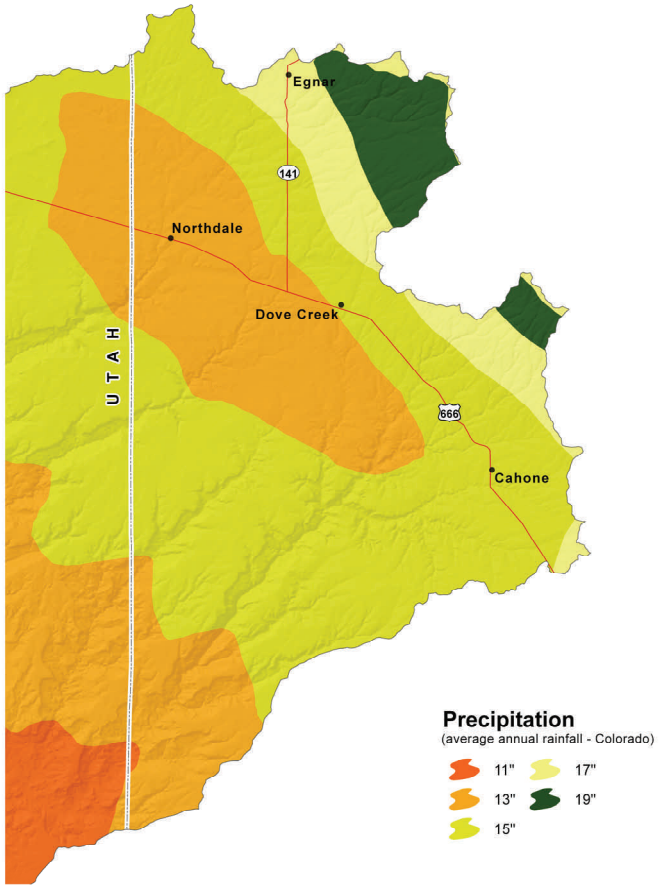

U T A H
Vegetation
Coniferous Forest
Mixed Forest
Dryland Ag
Irrigated Ag
Other
Rangeland
Riparian
Shrub/Brush Rangeland
Shrub/Grass/Forb Mix Rangeland
Urban/Built Up
Water
Woodland

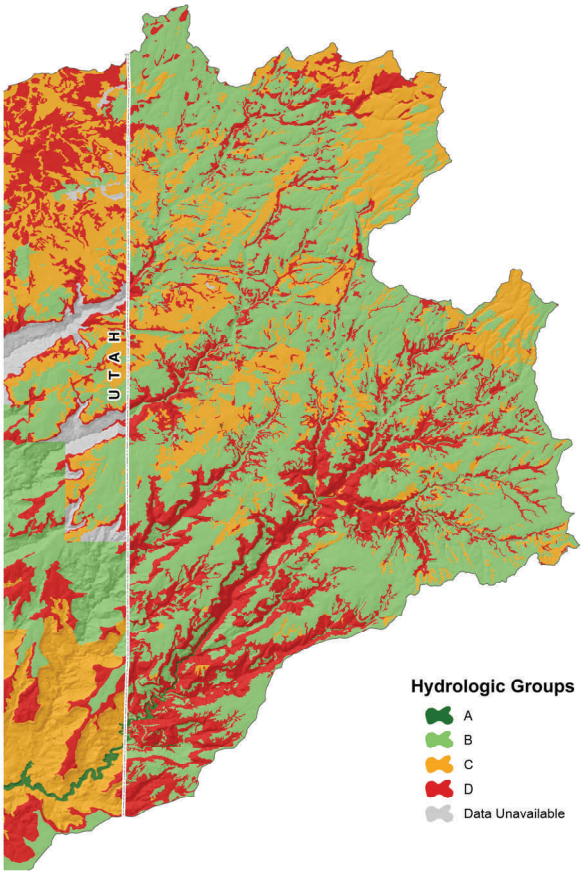
MONTEZUMA WATERSHED Land Use	Total Acreage	Vegetation	Acreage
Cropland	14,908	Irrigated Ag*	14,908.0
		Dryland Ag	71,502.6
Rangeland/Grassland	148,253	Gambel Oak	3,850.2
		Grass/Forb Rangeland	24,038.3
		Greasewood	386.6
		Mesic Mountain Shrub Mix	1,009.3
		PJ-Mtn Shrub Mix	5,009.1
		PJ-Sagebrush Mix	12,527.0
		Pinon-Juniper	26,911.3
		Rabbitbrush/Grass Mix	33,789.5
		Sagebrush Community	26,829.5
		Sagebrush/Grass Mix	7,557.6
		Saltbush Community	2,916.8
		Sparse PJ/Shrub/Rock Mix	3,427.5
Forest	3,710	Douglas Fir	0.3
		P. Pine/Aspen/Gamble Oak Mix	0.5
		P. Pine/Gambel Oak Mix	3,537.0
		Ponderosa Pine	172.5
Riparian	1,127	Riparian	1,126.6
		Upland Willow/Shrub Mix	0.5
Water	66	Water	65.9
Other	770	Barren Land	88.6
		Rock	391.5
		Urban/Built Up	289.9
Total Watershed Acres			**240,336.6**

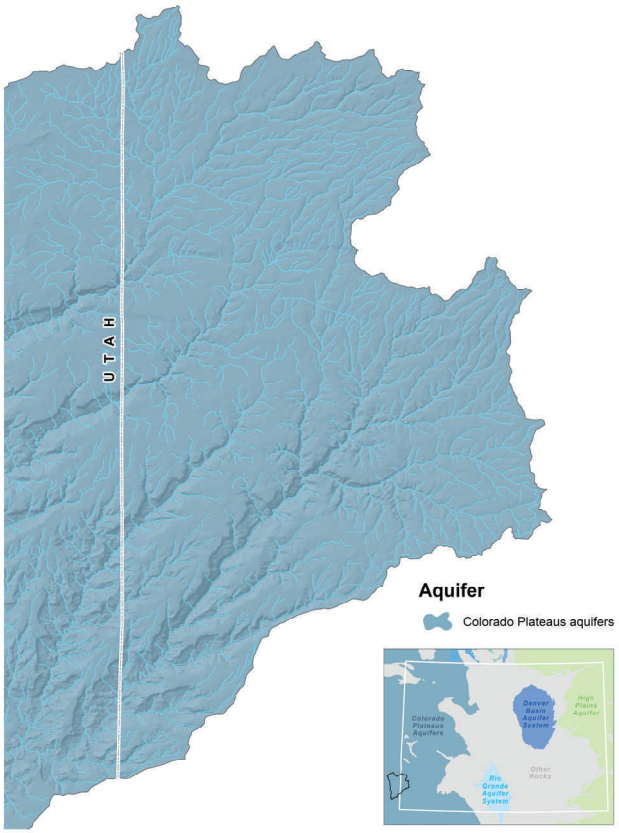
* Colorado Decision Support Systems Data

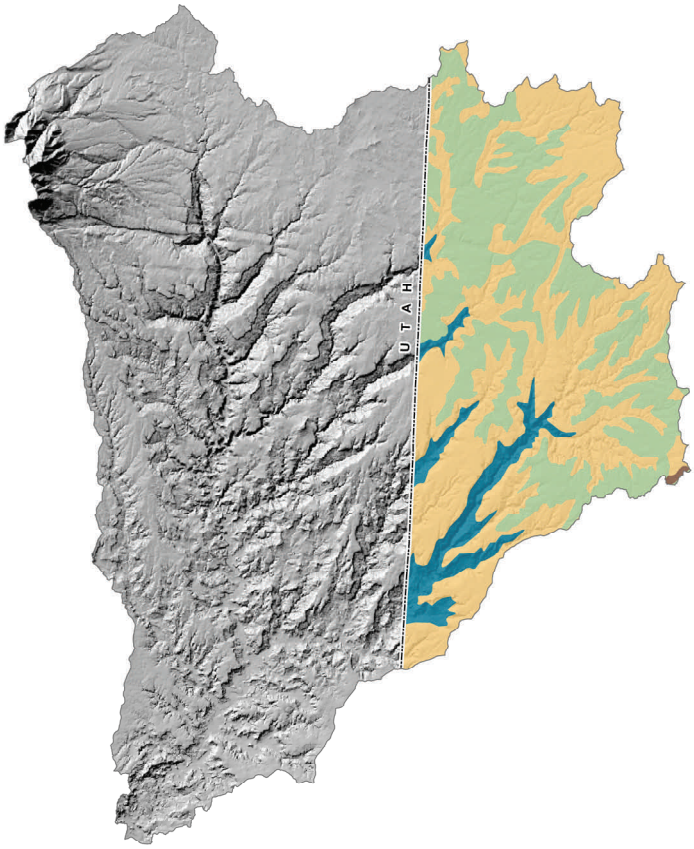
Precipitation

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 usually snow.









Geology

- DAKOTA SANDSTONE AND BURRO CANYON FORMATION
- EOLIAN DEPOSITS
- MANCOS SHALE
- MORRISON FORMATION, SUMMERVILLE FORMATION (SHALE AND SILTSTONE), AND ENTRADA SANDSTONE

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.

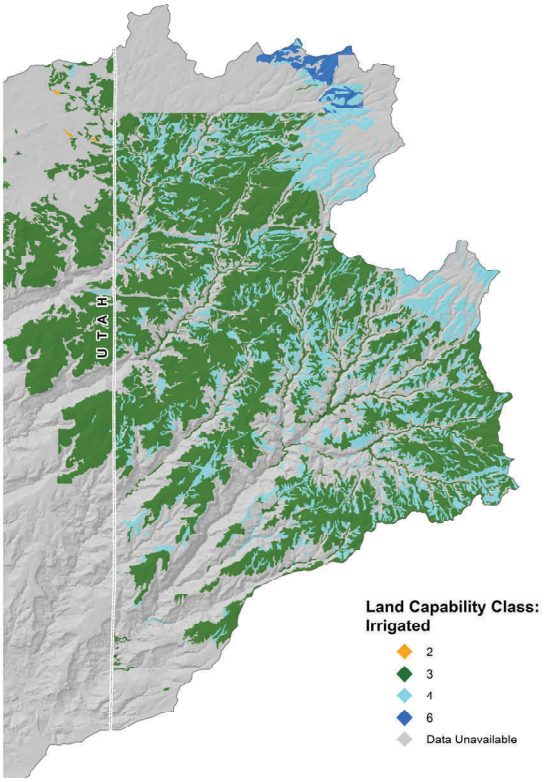
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

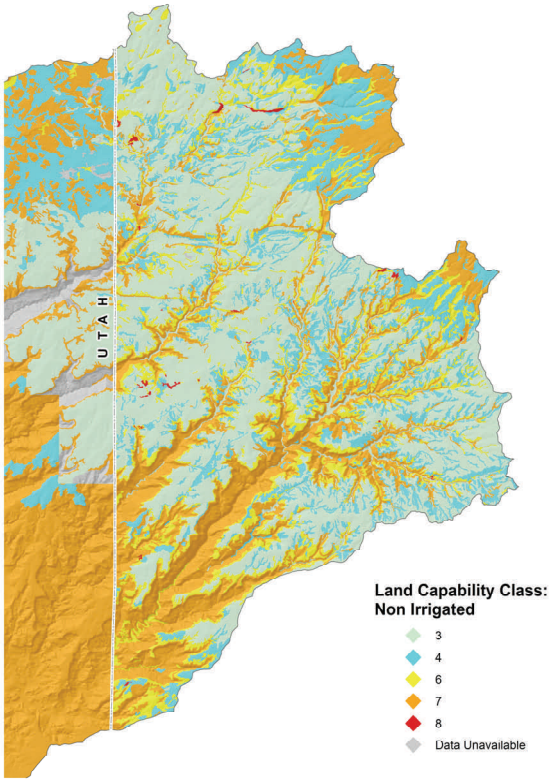
Class 5 - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

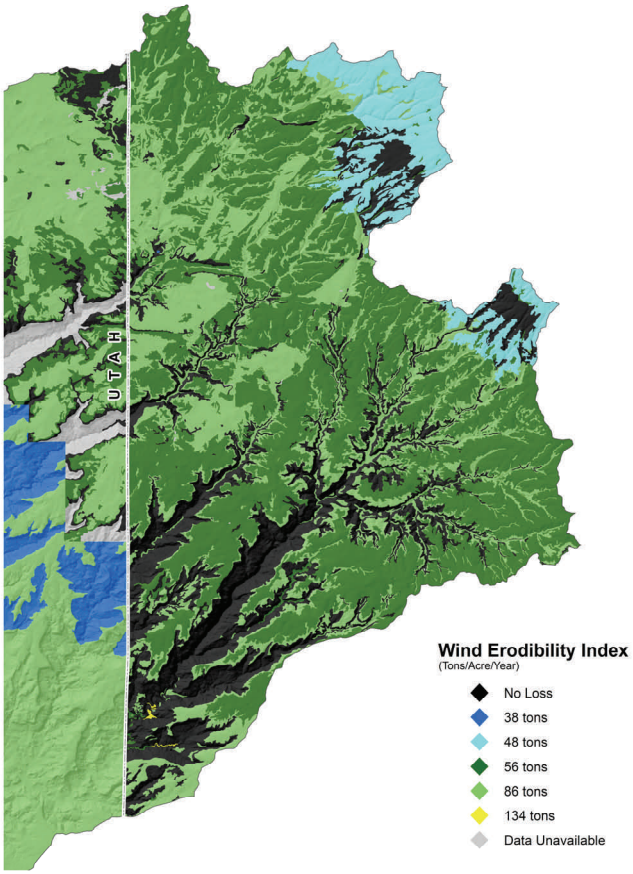
Class 6 - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

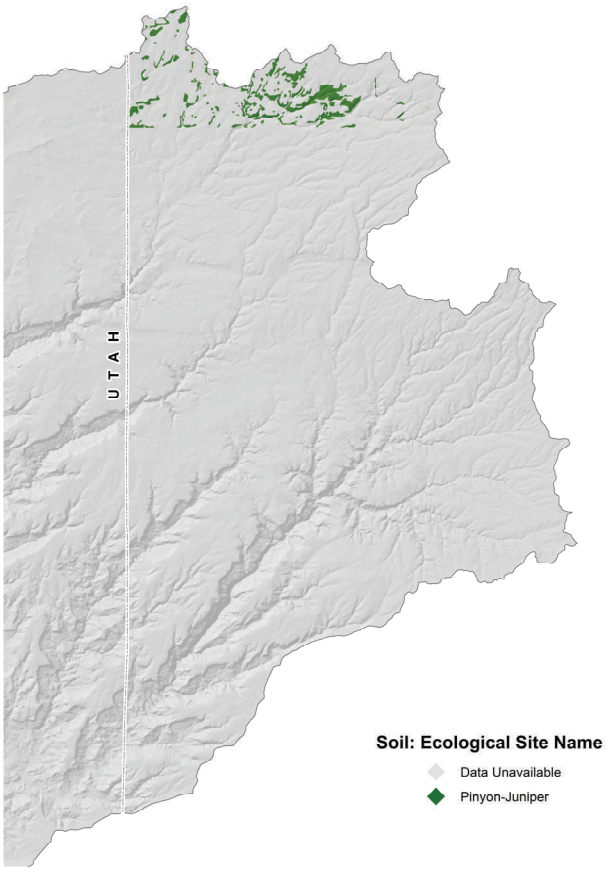
Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

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.





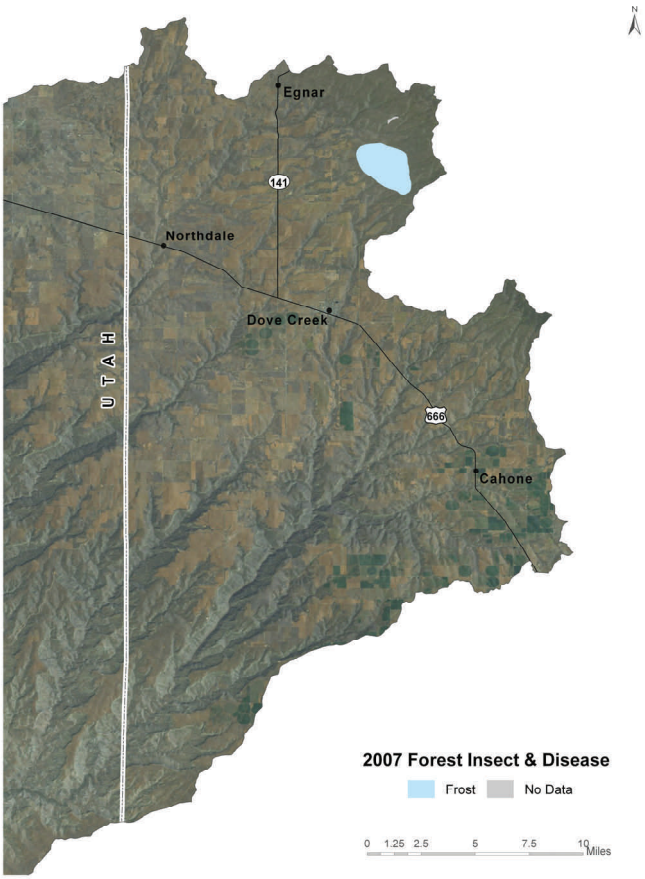


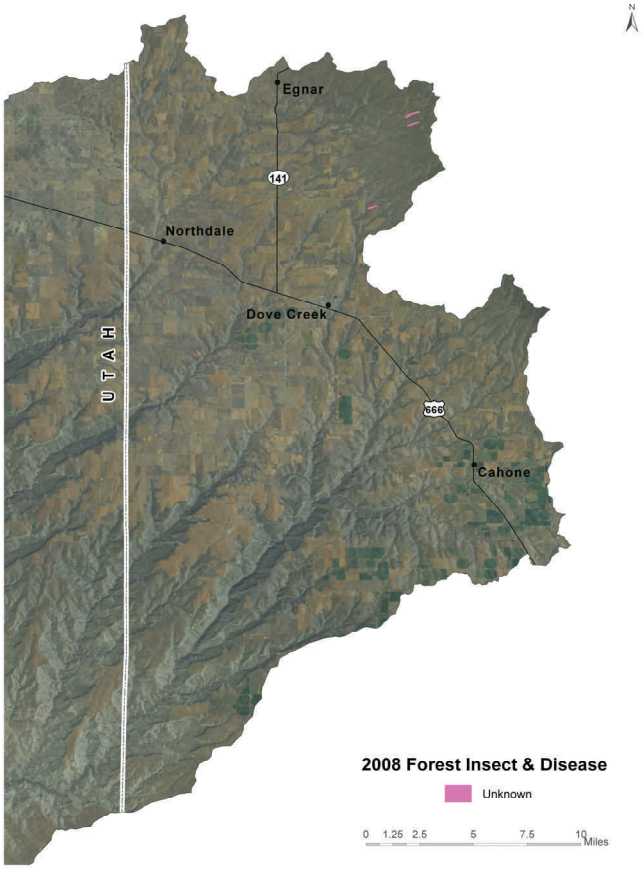


The Wind Erodibility Index (WEI): numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

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 Montezuma Watershed are considered highly erodible.


N
Egnar
141
Northdale
Dove Creek
U T A H
666
Cahone
2007 Forest Insect & Disease
Frost
No Data
0 1.25 2.5 5 7.5 10 Miles


N
Egnar
141
Northdale
Dove Creek
U T A H
666
Cahone
2008 Forest Insect & Disease
Unknown
0 1.25 2.5 5 7.5 10 Miles

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

Common Name	Scientific Name	Class	State Status/Federal Status	Comments
American Peregrine Falcon	*Falco peregrinus anatum*	Birds	Concern/None	May occur in the watershed
Bald Eagle	*Haliaeetus leucocepha-lus*	Birds	Threatened/None	Occurs in the watershed
Black-footed Ferret	*Mustela nigripes*	Mammals	Endangered/Endangered	No current records of occurrence
Bonytail	*Gila elegans*	Fish	Endangered/Endangered	Water depletions in the watershed may affect downstream habitats/ fish
Canada Lynx	*Lynx canadensis*	Mammals	Endangered/Threatened	May occur in the watershed
Colorado Pikeminnow	*Ptychocheilus lucius*	Fish	Threatened/Endangered	Water depletions in the watershed may affect downstream habitats/ fish
Colorado Roundtail Chub	*Gila robusta*	Fish	Concern/None	Occurs in the watershed
Greenback/Colorado River Cutthroat Trout	*Oncorhynchus clarki stomia/pleuriticus**	Fish	Threatened/Threatened	May occur in the watershed
Gunnison Sage Grouse	*Centrocercus minimus*	Birds	Concern/None	Occurs in the watershed
Humpback Chub	*Gila cypha*	Fish	Threatened/Endangered	Water depletions in the watershed may affect downstream habitats/ fish
Longnose Leopard Lizard	*Gambelia wislizenii*	Reptile	Concern/None	May occur in the watershed
Mexican Spotted Owl	*Strix occidentalis lucida*	Birds	Threatened/Threatened	May occur in the watershed
Northern leopard frog	*Rana pipiens*	Amphibians	Concern/None	Occurs in the watershed
Razorback Sucker	*Xyrauchen texanus*	Fish	Endangered/Endangered	Water depletions in the watershed may affect downstream habitats/ fish
River Otter	*Lontra Canadensis*	Mammals	Threatened/None	May occur in the watershed
Southwestern Willow Flycatcher	*Empidonax traillii ex-timus*	Birds	Endangered/Endangered	May occur in southern part of wa-tershed
Townsend's big-eared bat (pale ssp)	*Corynorhinus town-sendii pallescens*	Mammals	Concern/None	May occur in the watershed
Western Yellow-billed Cuckoo	*Coccyzus americanus*	Birds	Concern/Candidate	May occur in the watershed

*Recent genetic tests identified cutthroat population as greenback linage.

The terrestrial habitats in this watershed include large amounts of dry cropland and pinyon-juniper shrublands; smaller areas of irrigated cropland, big sagebrush, and ponderosa pine. Aquatic habitats are found in streams, ponds, wetlands, and associated riparian areas. These aquatic habitats provide food, cover, or water for many wildlife species at some life stage.

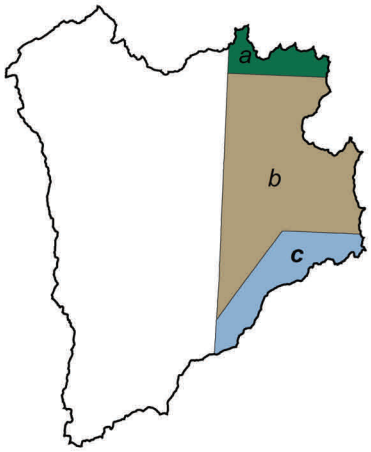
Economically important species in the watershed include: black bear, elk, mule deer, mountain lion, and sport fish throughout most of the watershed. Wild turkey are found on the eastern side of the watershed and pronghorn may be found in the central part of the watershed

Social Data	Montezuma	Dolores	San Miguel
Demographics (US Census, American Factfinder)			
Total population	23,830	1,844	6,594
Male	11,716	954	3,607
Female	12,114	890	2,987
Median age (years)	38	42.4	34.2
White	19,474	1,757	6,170
Black or African American	33	1	19
American Indian and Alaska Native	2676	36	56
Asian	48	7	49
Native Hawaiian and Other Pacific Islander	15	1	5
Some other race	1015	11	22
Hispanic or Latino (of any race)	2263	71	439
Economic Characteristics (US Census, American Factfinder)			
In labor force (population 16 years and over)	11,434	871	4,663
Median household income (dollars)	32,083	32,196	48,514
Median family income (dollars)	38,071	38,000	60,417
Per capita income (dollars)	17,003	17,106	35,329
Families below poverty level	859	55	95
Individuals below poverty level	3836	241	685
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)			
Farms (number)	829	216	112
Land in farms/ranches (acres)	818,677	158,518	151,093
Average size farm/ranch (acres)	988	734	1,349
Median size farm (acres)	105	340	234
Average age of farmer or rancher	56	55.4	57.1
Net cash return from ag sales ($1,000)	-2,661	-1,309	-443
Cattle and calves (number)	15,000	3,000	6,000

Identified Long Range Resource Concerns

Top Three Concerns within Conservation Districts

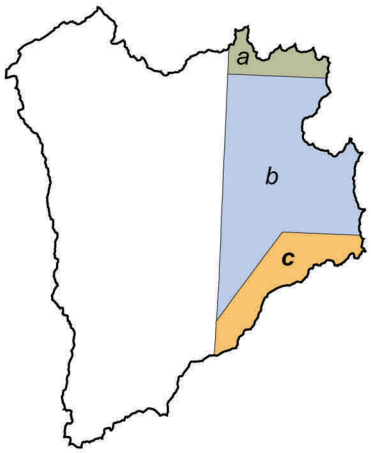
#1



Conservation Districts
- *a San Miguel Basin*
- *b Dove Creek*
- *c Dolores*

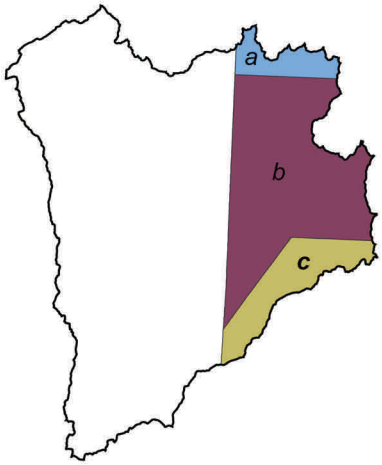
- Inadequate Irrigation Water Supply
- Mgmt of Water Resources
- Soil Mgmt.

#2



- Noxious Weeds
- Soil Erosion & Poor Rangeland Conditions
- Water Conservation

#3



- Rangeland Improvement/ Pest Control
- Resource Demonstration Events & Conservation
- Water Quiality/Quantity

Selected Conservation Practices Applied, FY 2005 through FY 2009*

Practice Code	Practice Name	Practice Unit	Applied Amount	Applied Count
328	Conservation Crop Rotation	ac	31966	190
449	Irrigation Water Management	ac	7175	24
528	Prescribed Grazing	ac	14467	165
600	Terrace	ft	63364	12

**Practices applied in Colorado portion of the watershed*

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

Irrigated Cropland—Pivot convert to subsurface drip - Subsurface drip irrigation with IWM, Mulch till, Crop rotation, Nutrient and Pest Mgt.		**CO 36.2-CR-Drip R-2**
Practices	***Description***	***Resource Concerns Addressed***
328 Conservation Crop Rotation 345 Residue Mgmt, Mulch Till 441 Irrigation System, Microirrigation 449 Irrigation Water Management 590 Nutrient Management 595 Pest Management	Crops: wheat, alfalfa, oats and dry beans. Soils: fine sandy loams, loams, silt and clay loams and fine sands. Annual precipitation ranges from 12 - 18". Moisture usually lacking in the summer during peak ET and supplemented with sprinkler irrigation, the water source may be ground or surface water; rainfall often comes in short intense spring and early summer storms. Wildlife potential for use by pheasant, quail, deer, pronghorn and other wildlife. Long term agricultural production practices have resulted in soil compaction.	Soil Erosion - Sheet and Rill Soil Erosion - Wind Water Quantity - Inefficient Water Use on Irrigated Land

Dryland Crops—Seasonal residue management system with Crop rotation, Nutrient and Pest Mgt.		**CO 36.2-CR-Dryland R-2**
Practices	***Description***	***Resource Concerns Addressed***
328 Conservation Crop Rotation 345 Residue Mgmt, Mulch Till 590 Nutrient Management 595 Pest Management	Crops: wheat, dry beans and alfalfa. Fallow usually included in rotation. Soils: heavy loams, silt loams, and loams. Annual precipitation ranges from 12 - 18". Moisture usually lacking in the summer during peak ET; rainfall often comes in short intense spring and early summer storms. Wildlife potential for use by pheasant, grouse, deer and other wildlife. Long term agricultural production practices have resulted in sheet and rill erosion, wind erosion, soil compaction and decrease in organic matter.	Soil Erosion - Sheet and Rill Soil Erosion - Wind Water Quantity - Inefficient Water Use on Irrigated Land

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 442 Irrigation System, Sprinkler 449 Irrigation Water Management 511 Forage Harvest Management 528 Prescribed Grazing 587 Structure for Water Control 614 Watering Facility	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 Soil Erosion - Wind Water Quantity - Inefficient Water Use on Irrigated Land

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 449 Irrigation Water Management 511 Forage Harvest Management 587 Structure for Water Control	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 Soil Erosion - Wind Water Quantity - Inefficient Water Use on Irrigated Land

Estimated Costs of Application of Conservation Systems

Landuse	Estimated Acres Need to be Treated	Estimated Average Cost per Acre ($)	Total Costs ($)
Irrigated Cropland	4,000	2,400	9,600,000
Dryland Crop	15,000	75	1,125,000
Irrigated Pasture	1,500	1,600	2,400,000
Hayland	1,000	880	880,000
			Total Costs: $14,005,000

FOOTNOTES/ BIBLIOGRAPHY

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 & Border State surveys:

Cortez Area (CO671) Published 1/10/2007

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

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

San Juan County (UT638) Published 12/7/2006

San Juan Area (UT639) Published 12/7/2006

Navajo Indian Reservation (UT643) Published 12/15/2006

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.

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/