



United States Department
of Agriculture

Lower Dolores Watershed



Hydrologic Unit Code 14030004

Natural Resources
Conservation Service

Lakewood, Colorado

Rapid Assessment

RWA 14030004

April 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.

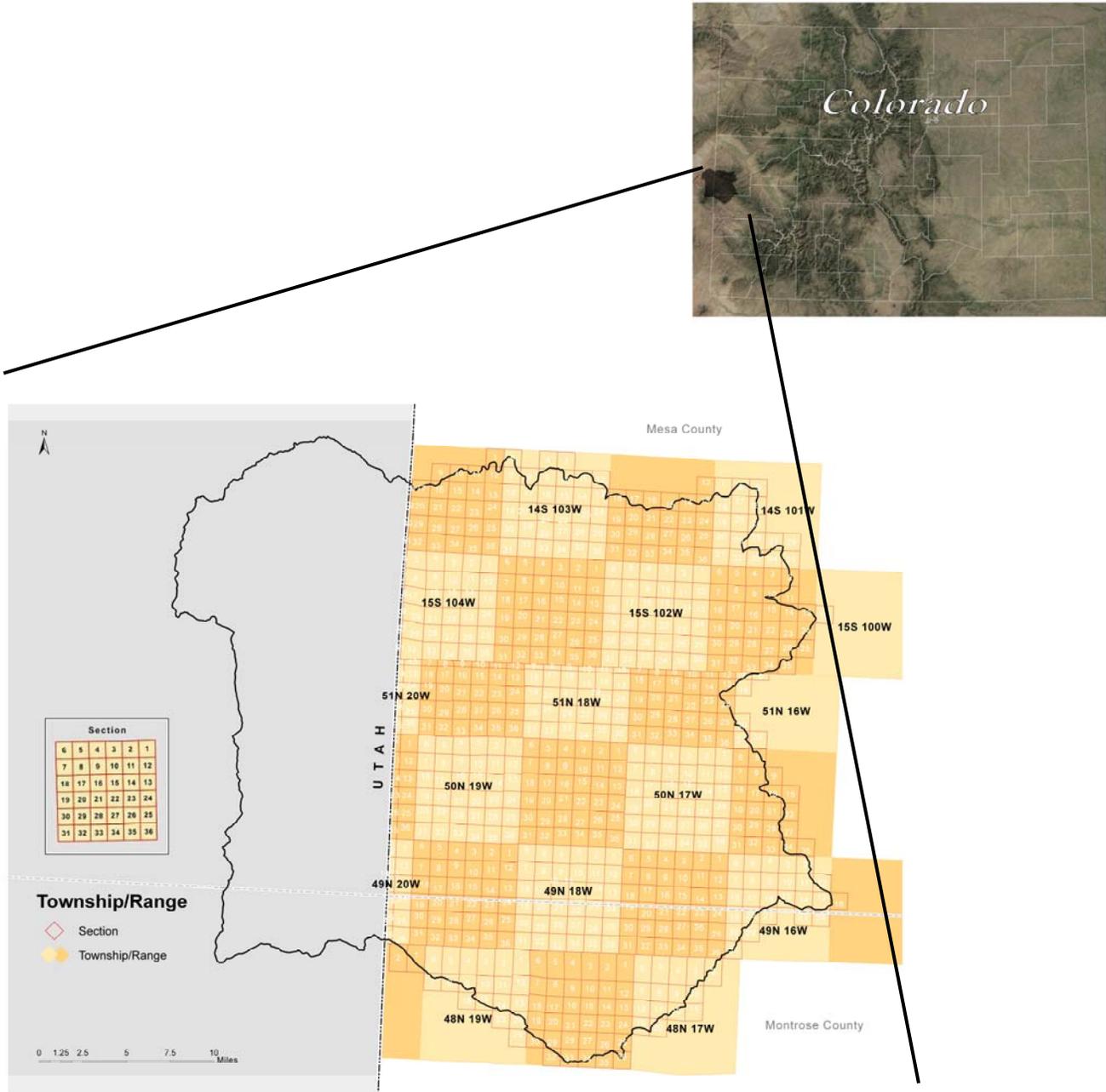
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best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

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



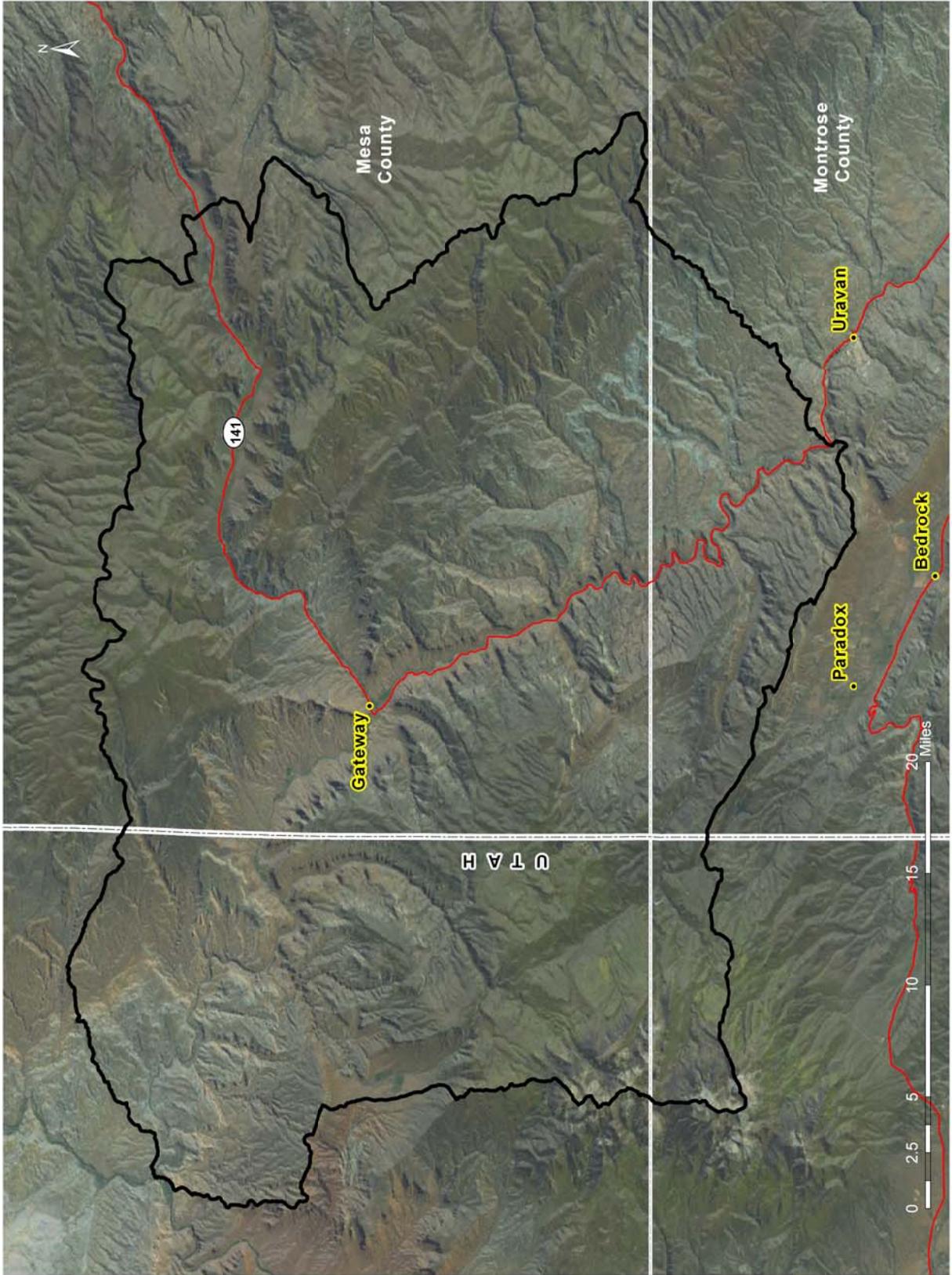
COLORADO County	County Acres	County Acres in LOWER DOLORES Watershed	% of County in the Watershed	% of Watershed in the County
Mesa	2,140,821	331,804	15.5%	56.0%
Montrose	1,437,265	77,781	5.4%	13.1%

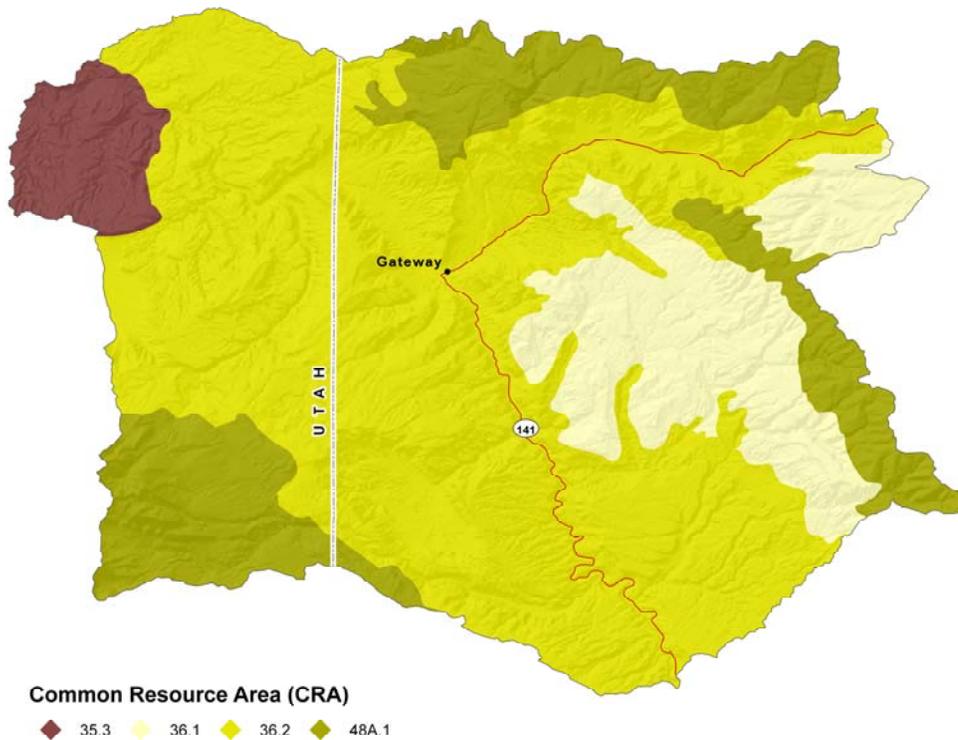
UTAH County

Grand	2,362,856	162,872	6.9%	27.5%
San Juan	5,074,979	19,541	0.4%	3.3%

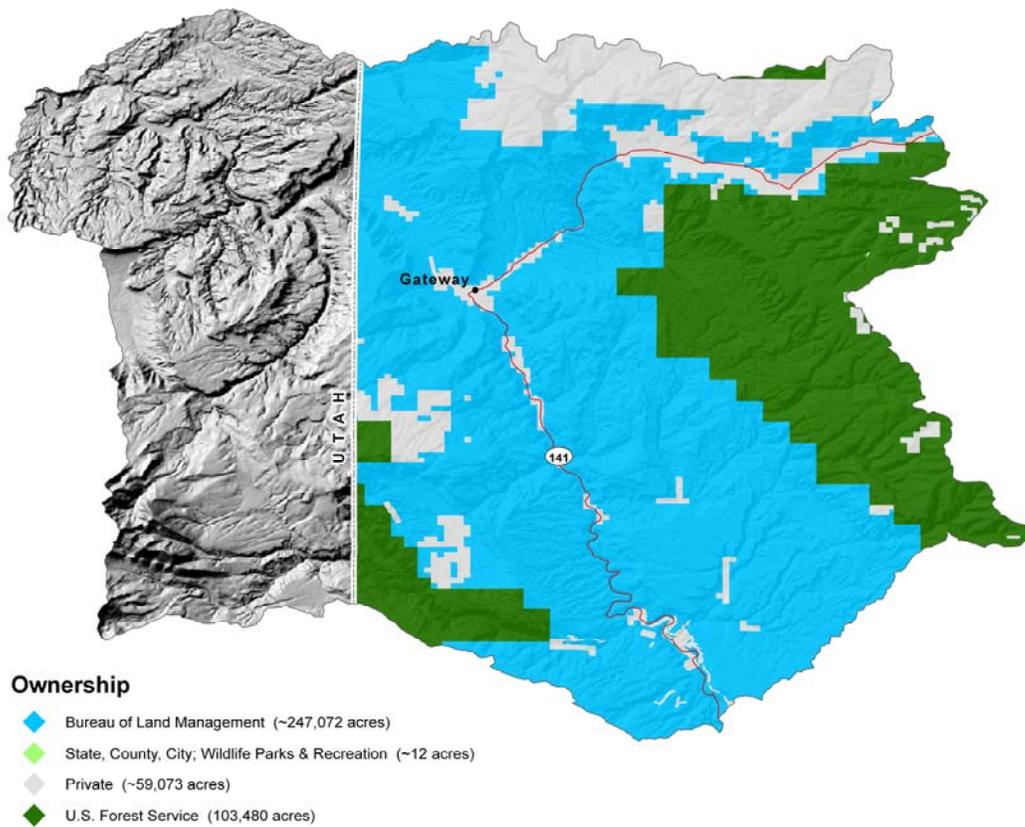
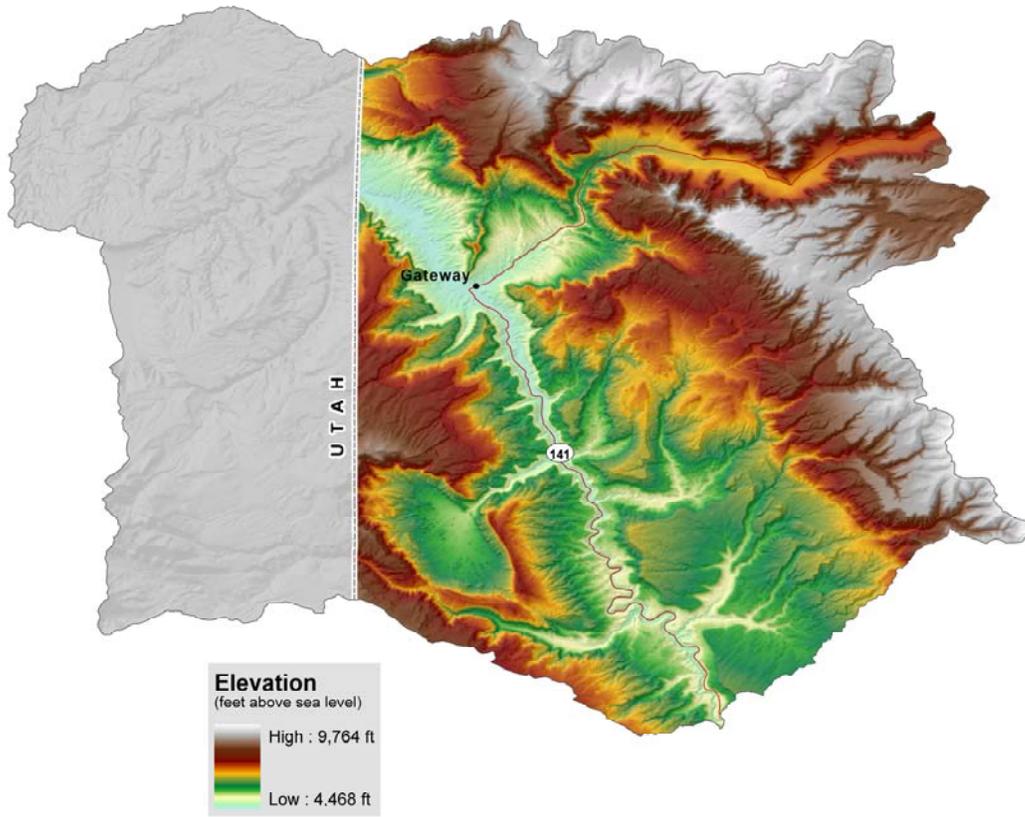
591,998

Lower Dolores Watershed - 14030004





MLRA	CRA	CRA NAME	CRA DESCRIPTION
35	35.3	Colorado Plateau Sagebrush – Grasslands	This unit occurs within the Colorado Plateau Physiographic Province and is characterized by gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Volcanic fields occur in places. Elevations range from 4500 to 6000 feet. Precipitation averages 10 to 14 inches per year. The soil temperature regime is mesic. The soil moisture regime is ustic aridic. Vegetation includes Wyoming big sagebrush, Utah juniper, cliffrose, Indian ricegrass, needle and thread, and blue grama.
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 Semi-arid 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.





Vegetation

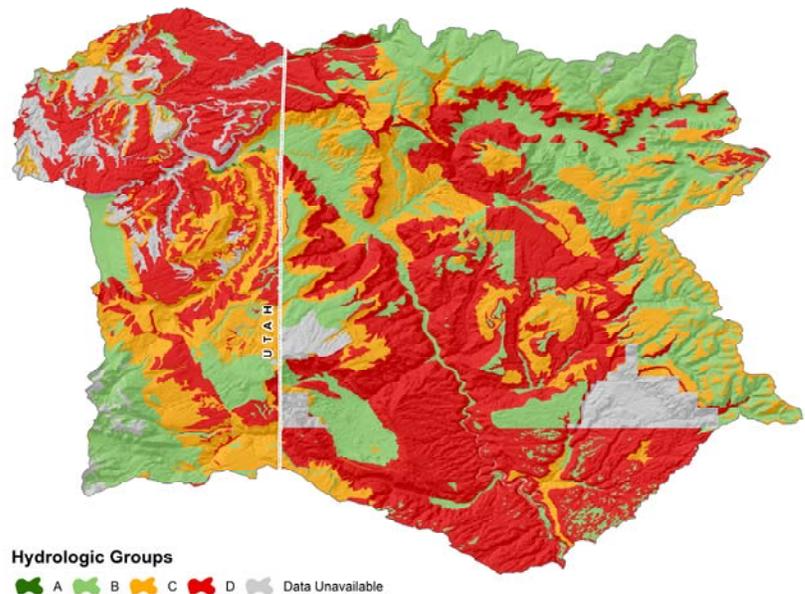
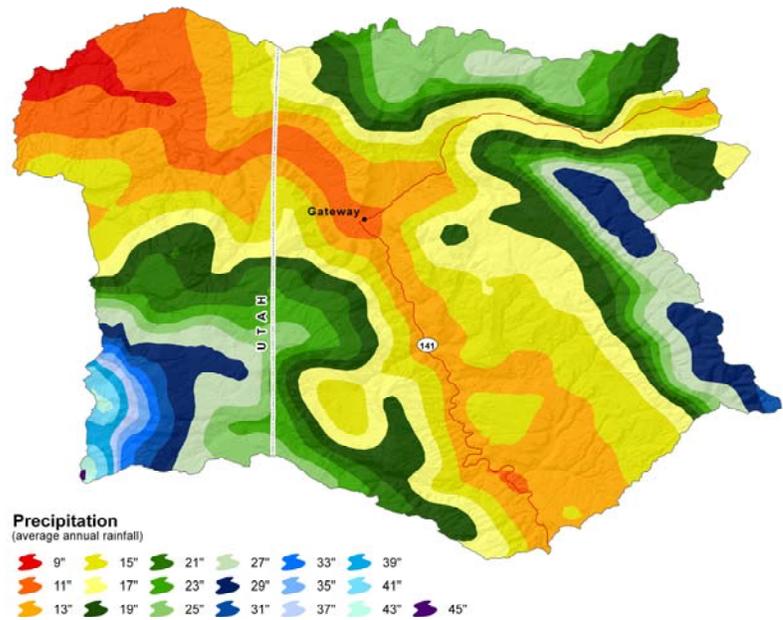
- ◇ Alpine/Subalpine/Tundra
- ◆ Coniferous Forest
- ◆ Mixed Forest
- ◆ Dryland Ag
- ◆ Irrigated Ag
- ◆ Other
- ◆ Rangeland
- ◆ Riparian
- ◆ Shrub/Brush Rangeland
- ◆ Shrub/Grass/Forb Mix Rangeland
- ◆ Water
- ◆ Woodland

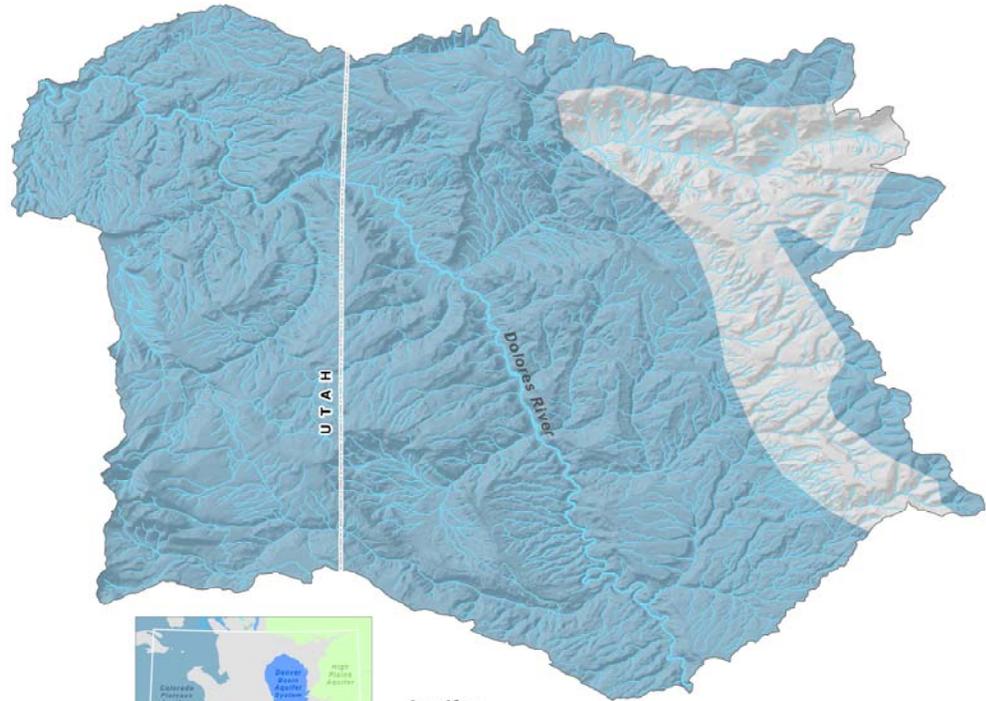
<u>LOWER DOLORES WATERSHED Land Use</u>	Total Acreage	Vegetation	Acreage
Cropland	2,789	Dryland Ag	529.4
		Irrigated Ag*	2,260.0
Rangeland/Grassland	361,486	Gambel Oak	55,905.6
		Grass/Forb Rangeland	12,384.2
		Mesic Mountain Shrub Mix	14,575.2
		PJ-Mtn Shrub Mix	17,143.2
		PJ-Oak Mix	32.4
		PJ-Sagebrush Mix	60,045.0
		Pinon-Juniper	84,712.8
		Rabbitbrush/Grass Mix	54.8
		Sagebrush Community	34,837.1
		Sagebrush/Gambel Oak Mix	13,916.2
		Sagebrush/Grass Mix	23,793.8
		Sagebrush/Mesic Mtn Shrub Mix	77.8
		Saltbush Community	7,883.7
		Snowberry/Shrub Mix	4,274.6
Sparse PJ/Shrub/Rock Mix	31,850.0		
Forest	38,300	Aspen	16,551.1
		Douglas Fir	23.0
		Douglas Fir/Aspen Mix	8,695.2
		Englemann Spruce/Fir Mix	30.6
		P. Pine/Aspen/Gamble Oak Mix	43.4
		P. Pine/Gambel Oak Mix	1,779.6
		Ponderosa Pine	10,417.0
		Spruce/Fir/Aspen Mix	760.5
Riparian	3,108	Riparian	3,100.1
		Upland Willow/Shrub Mix	8.3
Water	227	Water	227.3
Other	3,774	Alpine Meadow	1.1
		Barren Land	3,771.3
		Rock	1.5
~Total Watershed Acres			409,686

* Colorado Decision Support Systems Data

Precipitation

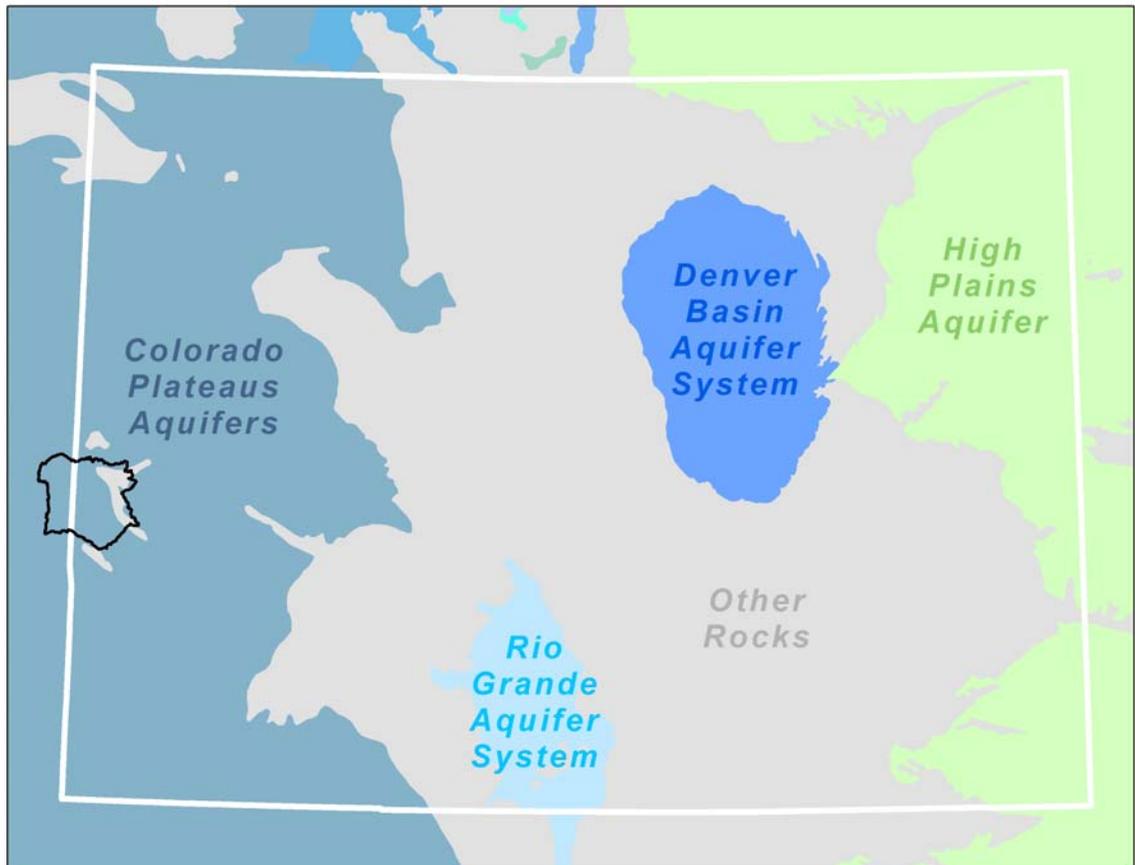
Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide, in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series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





Aquifer

-  Colorado Plateaus aquifers
-  Rocks that are generally poorly permeable, but locally may contain productive aquifers



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.

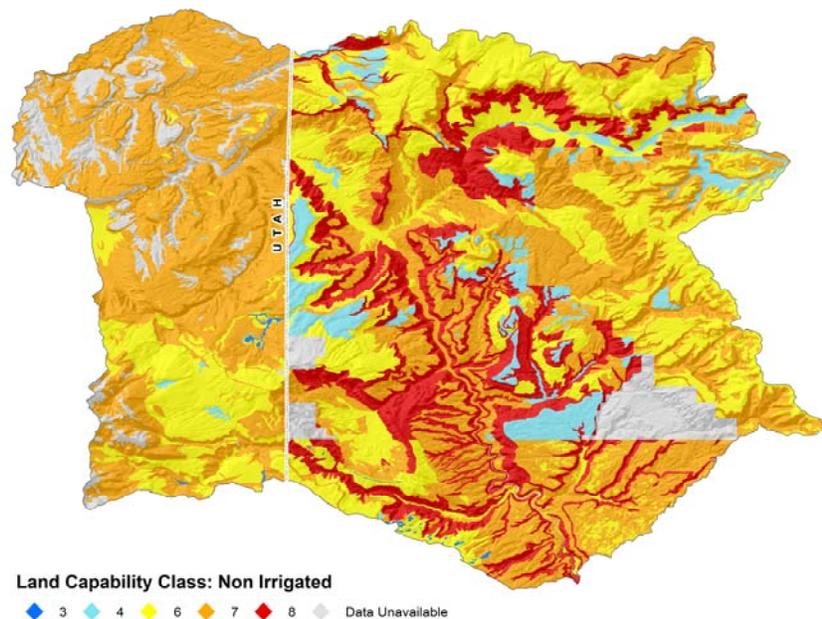
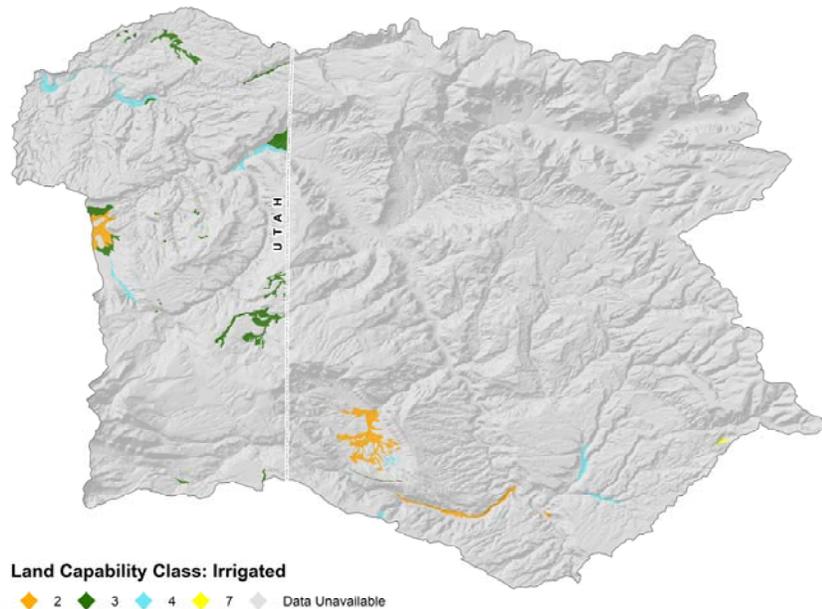
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

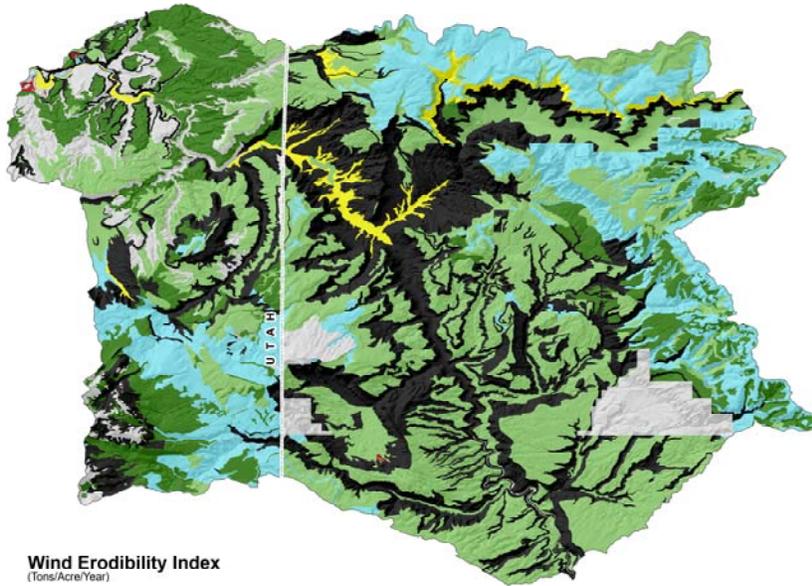
Class 5 - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

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.



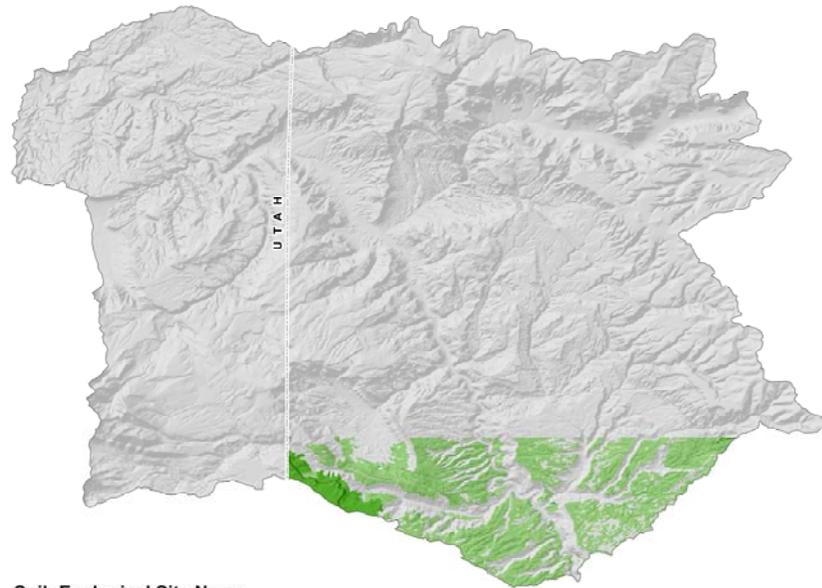


Wind Erodibility Index
(Tons/Acre/Year)

◆ No Loss	◆ 56 tons	◆ 134 tons	◆ Data Unavailable
◆ 48 tons	◆ 86 tons	◆ 310 tons	

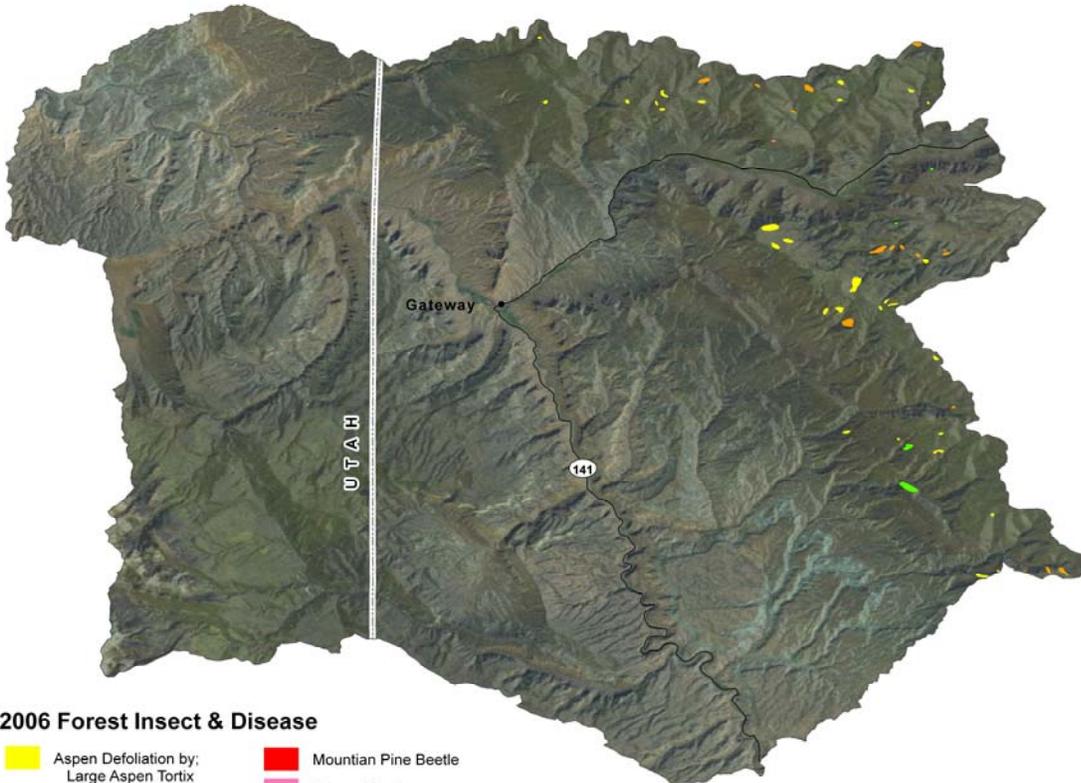
The Wind Erodibility Index (WEI): numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

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



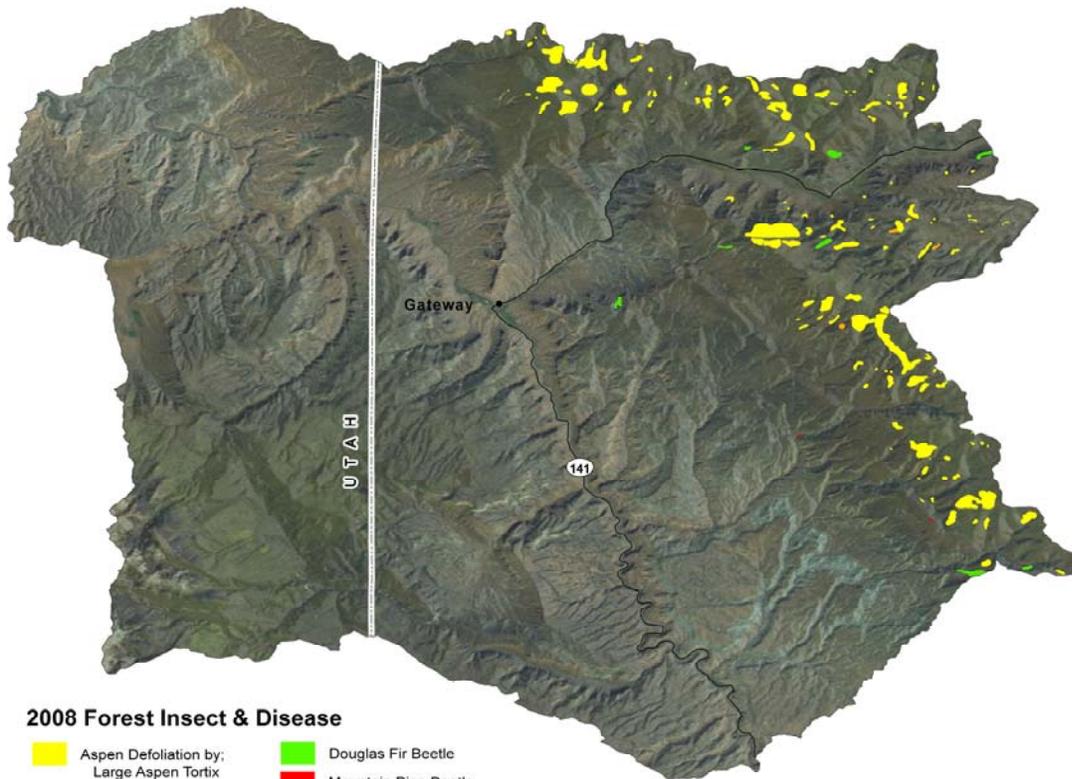
Soil: Ecological Site Name

◆ Douglas-fir	◆ Pinyon-Juniper	◆ Ponderosa Pine	◆ Data Unavailable
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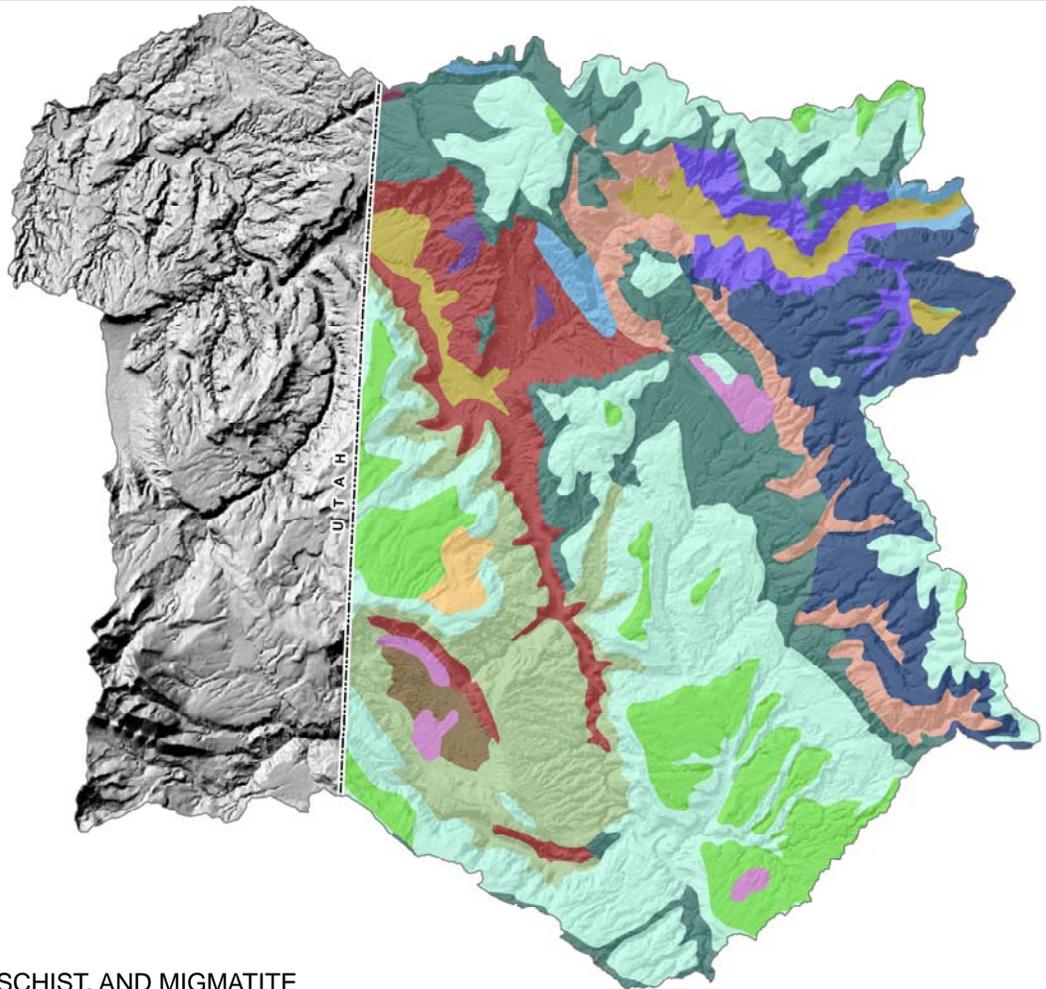
2006 Forest Insect & Disease

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



2008 Forest Insect & Disease

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



Geology

- ◆ BIOTITIC GNEISS, SCHIST, AND MIGMATITE
- ◆ CUTLER FORMATION
- ◆ DAKOTA SANDSTONE AND BURRO CANYON FORMATION
- ◆ EOLIAN DEPOSITS
- ◆ GLEN CANYON GROUP AND CHINLE FORMATION
- ◆ 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.)
- ◆ HERMOSA FORMATION
- ◆ KAYENTA FORMATION, WINGATE SANDSTONE, AND CHINLE FORMATION
- ◆ LANDSLIDE DEPOSITS
- ◆ MODERN ALLUVIUM
- ◆ MOENKOPI FORMATION (LOWER TRIASSIC) AND CUTLER FORMATION (LOWER PERMIAN)
- ◆ MORRISON FORMATION, SUMMERVILLE FORMATION (SHALE AND SILTSTONE), AND ENTRADA SANDSTONE
- ◆ OLDER GRAVELS AND ALLUVIUMS (PRE-BULL LAKE AGE)
- ◆ WATER
- ◆ WINGATE SANDSTONE AND CHINLE FORMATION

State and Federal Threatened, Endangered, and Candidate Species and Species of Special Concern

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
Burrowing Owl	<i>Athene cunicularia</i>	Birds	Threatened	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 acrocnema</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

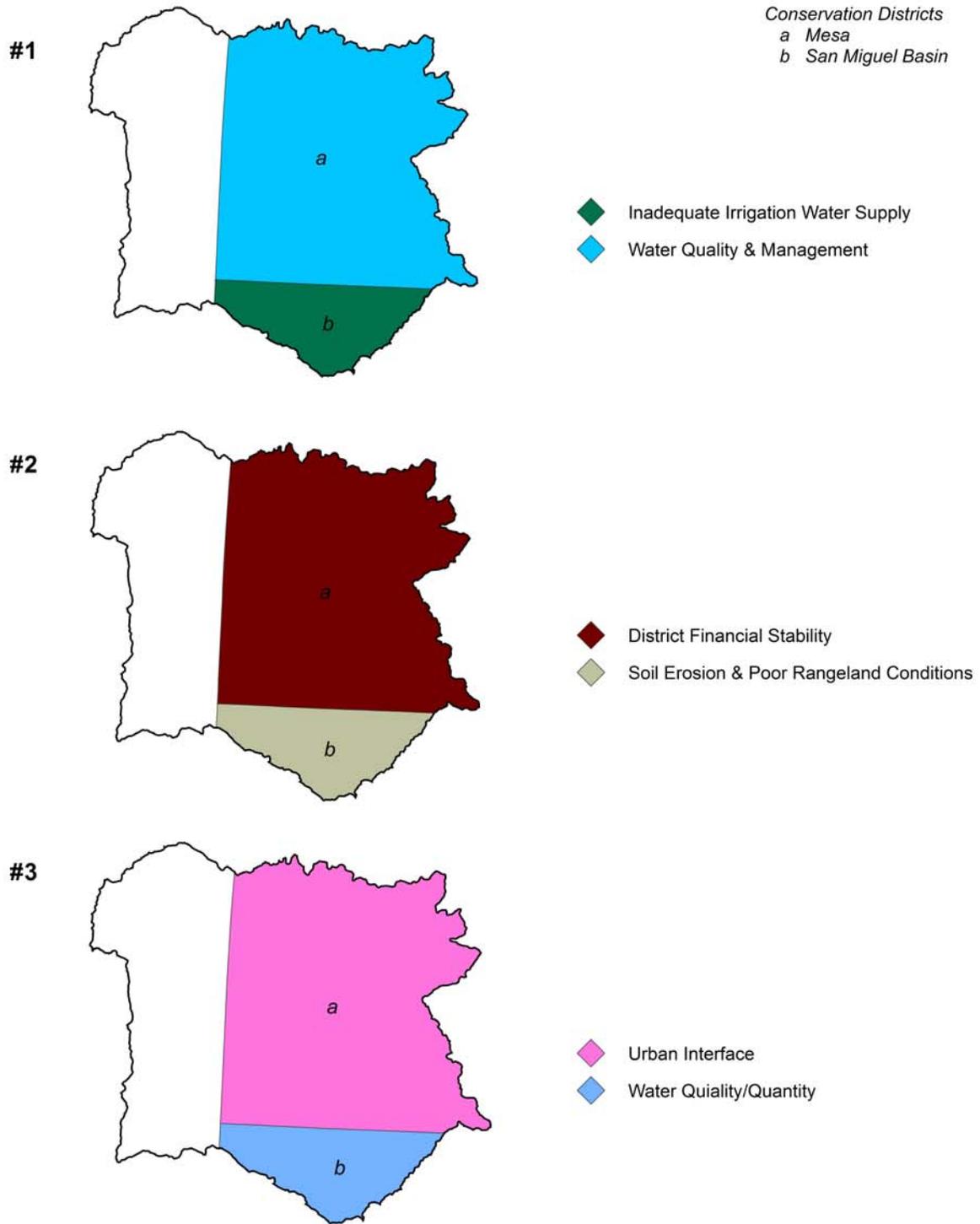
*Recent genetic tests identified cutthroat population as greenback lineage.

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	Montrose
Demographics (US Census, American Factfinder)		
Total population	126,588	33,432
Male	61,566	16,458
Female	65,022	16,974
Median age (years)	36.9	38.8
White	114,662	30,074
Black or African American	670	102
American Indian and Alaska Native	734	340
Asian	955	140
Native Hawaiian and Other Pacific Islander	161	23
Some other race	6852	1920
Hispanic or Latino (of any race)	13718	4967
Economic Characteristics (US Census, American Factfinder)		
In labor force (population 16 years and over)	66,835	15,984
Median household income (dollars)	39,487	35,234
Median family income (dollars)	46,858	40,849
Per capita income (dollars)	21,318	17,158
Families below poverty level	x	824
Individuals below poverty level	x	4160
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)		
Farms (number)	1599	915
Land in farms/ranches (acres)	385,255	334,747
Average size farm/ranch (acres)	241	366
Median size farm (acres)	24	73
Average age of farmer or rancher	55.2	55.1
Net cash return from ag sales (\$1,000)	4,746	15,237
Cattle and calves (number)	39,000	41,000

Identified Long Range Resource Concerns Top Three Concerns within Conservation Districts



Conservation Practices Applied, FY 2005 through FY 2009*

Practice Code	Practice Name	Practice Unit	Applied Amount	Applied Count
314	Brush Management	ac	12	7
* Practices applied in Colorado portion of the watershed				

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

Hayland—The Irrigation system is comprised of pipeline with side roll. The system efficiency is 65%.		CO 36.2-HY-Sideroll—R-1
<i>Practices</i>	<i>Description</i>	<i>Resource Concerns Addressed</i>
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 (\$)
Hayland	2,000	880	1,760,000
Total Estimated Costs:			\$1,760,000

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.cdphs.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:

Canyonlands Area (UT633) Published 1/1/2007
 Mesa County Area (CO680) Published 01/06/2006
 San Miguel Area (CO675) Published 1/8/2007
 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

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/>