



United States Department
of Agriculture

Tomichi Watershed



Hydrologic Unit Code 14020003

Natural Resources
Conservation Service

Rapid Assessment

Lakewood, Colorado

RWA 14020003

November 2009



Satellite Imagery: ArcIMS Server - Geographic Network Services hosted by ESRI

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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.

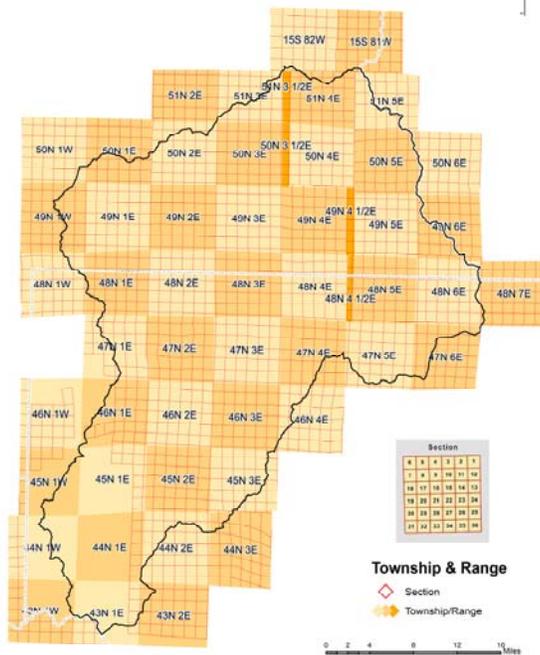
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best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

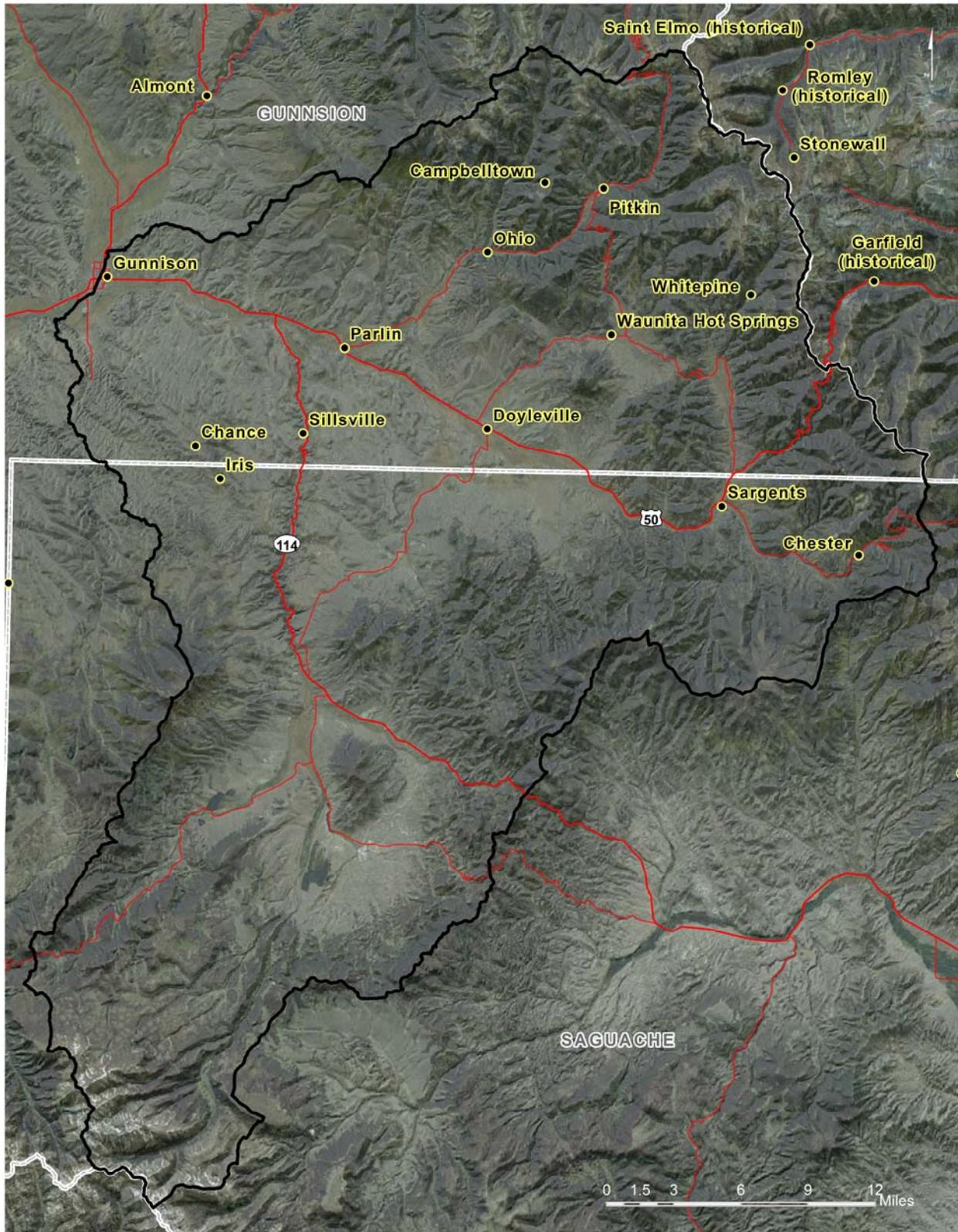
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis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

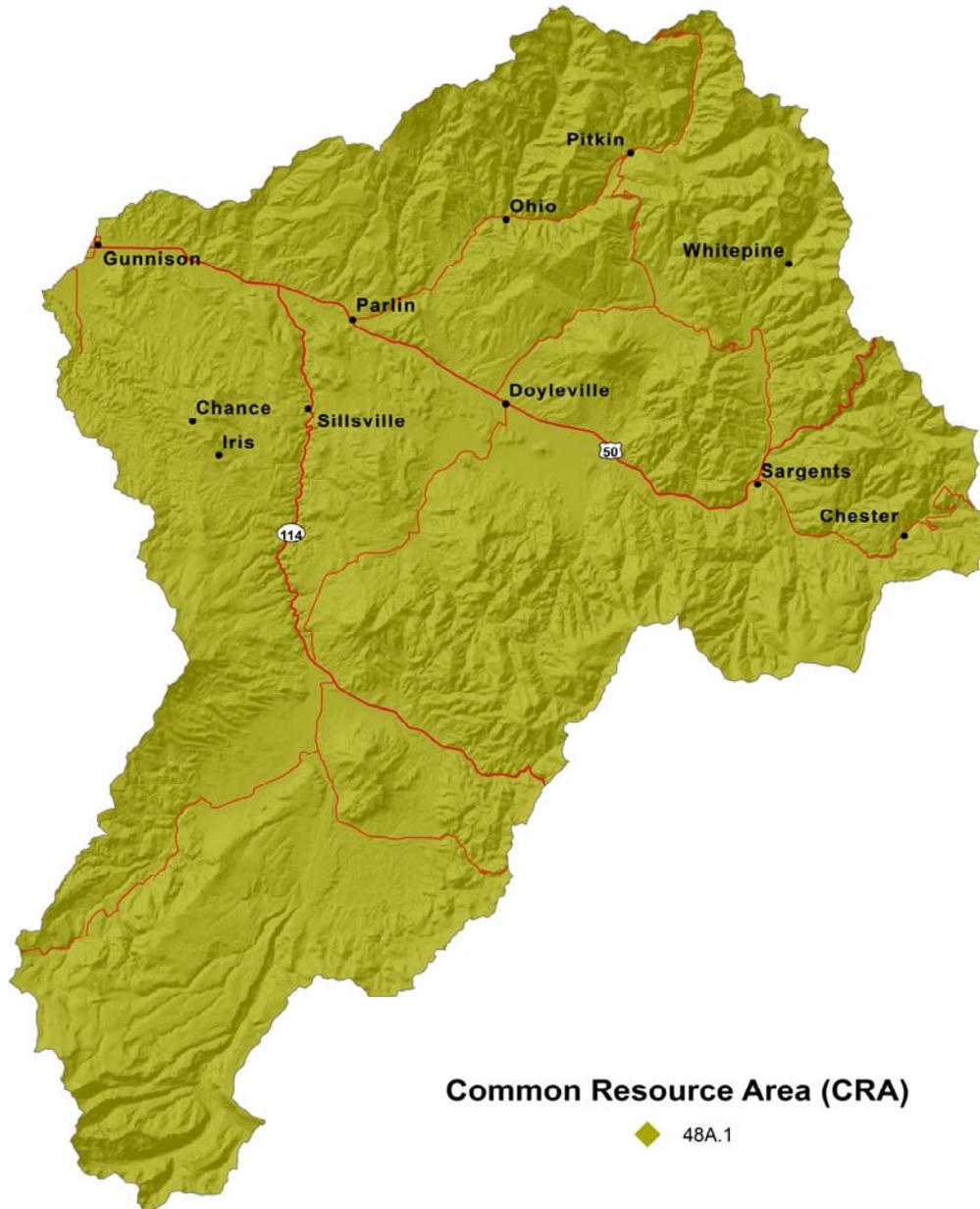
Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.



County	County Acres	County Acres in TOMICHI Watershed	% of County in the Watershed	% of Watershed in the County
Gunnison	2,085,945	308,841	14.8%	43.8%
Saguache	2,027,649	396,554	19.6%	56.2%
		705,487		

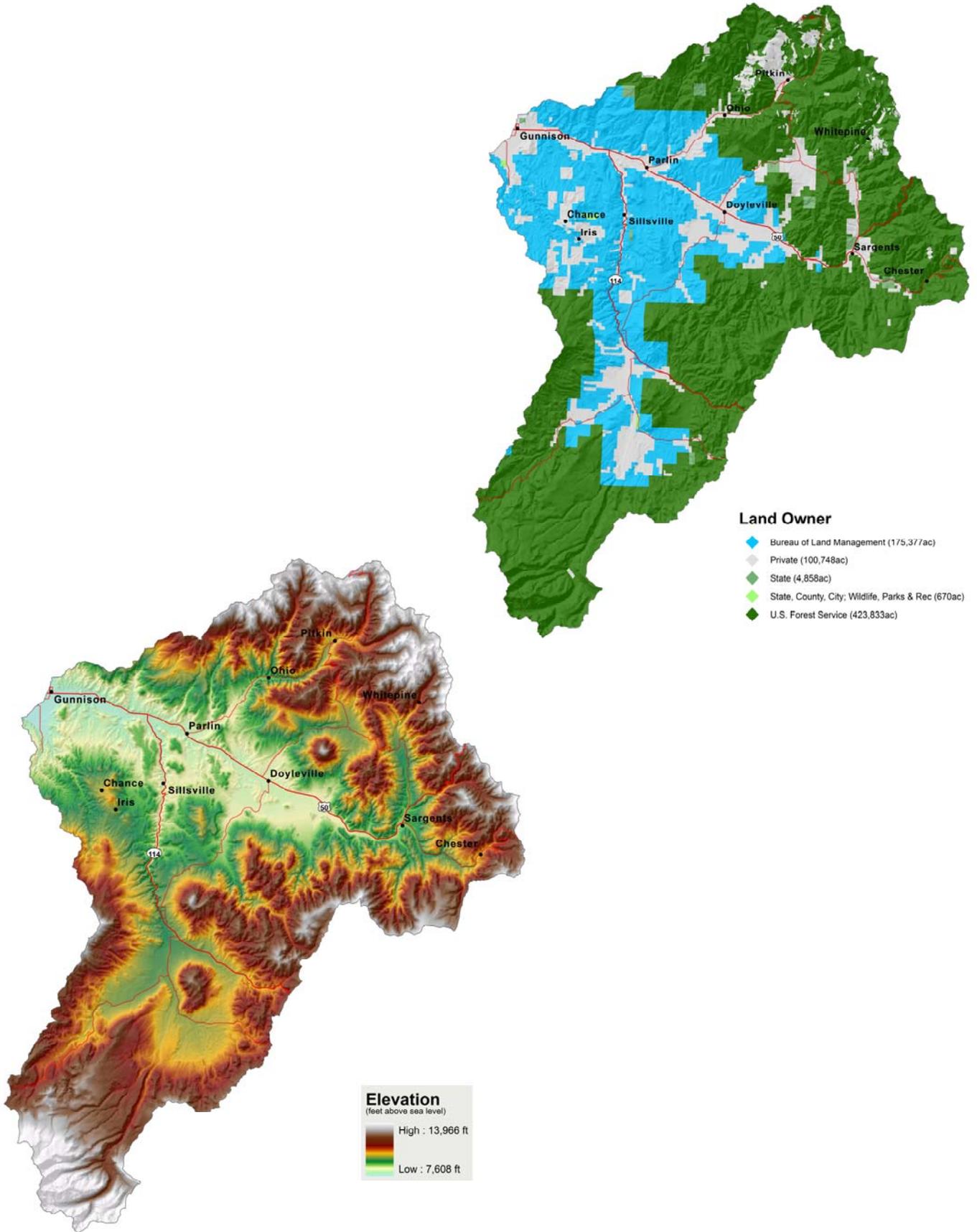
Tomichi Watershed - 14020003

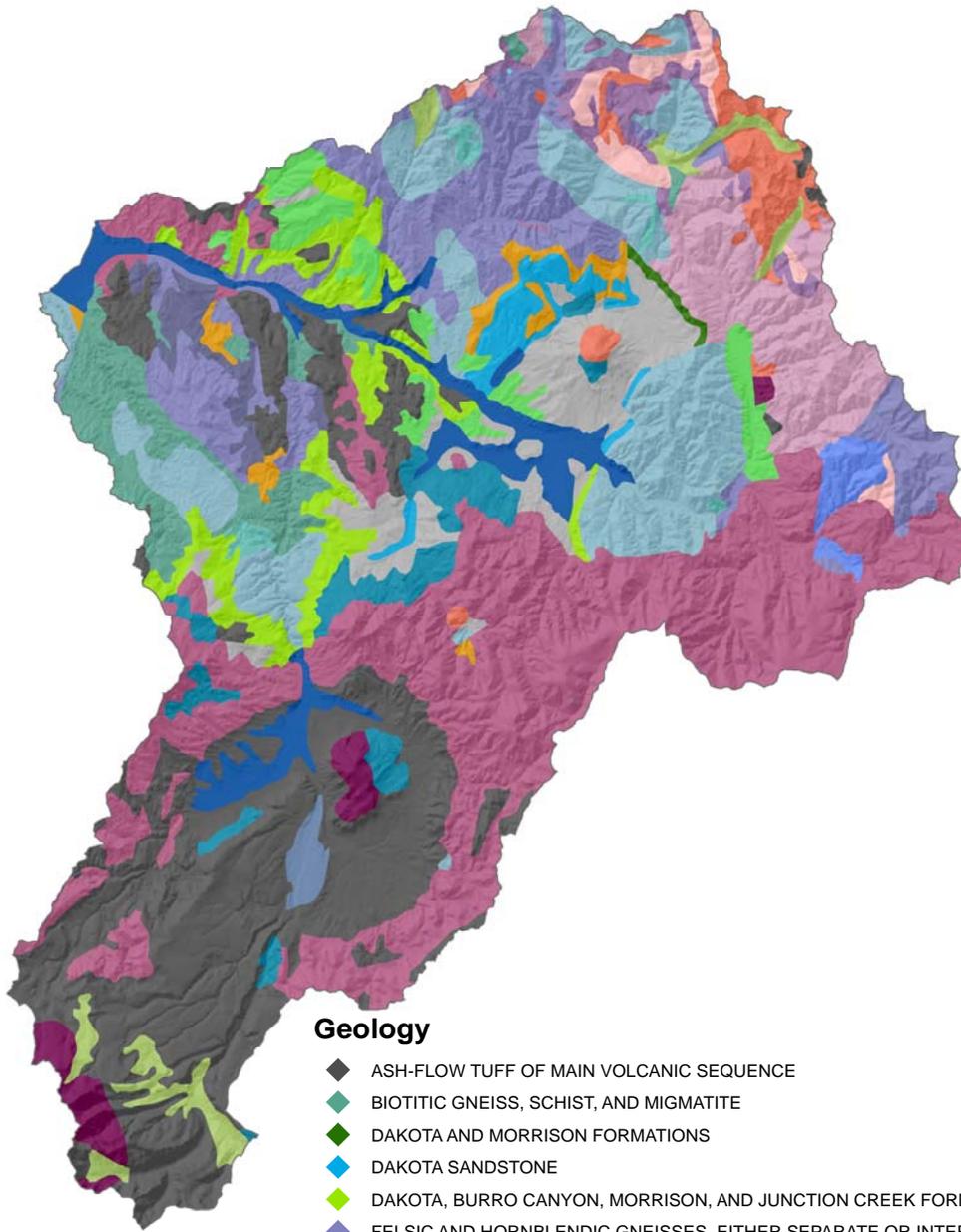




CRA: A geographical area where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

MLRA	CRA	CRA NAME	CRA DESCRIPTION
48A	48A.1	Southern Rocky Mountains - High Mountains and Valleys	This area is best characterized by steep, high mountain ranges and associated mountain valleys. The temperature regimes are mostly frigid and cryic; moisture regimes are mainly ustic and udic. Vegetation is sagebrush-grass at low elevations, and with increasing elevation ranges from coniferous forest to alpine tundra. Elevations range from 6,500 to 14,400 feet.





Geology

- ◆ ASH-FLOW TUFF OF MAIN VOLCANIC SEQUENCE
- ◆ BIOTITIC GNEISS, SCHIST, AND MIGMATITE
- ◆ DAKOTA AND MORRISON FORMATIONS
- ◆ DAKOTA SANDSTONE
- ◆ DAKOTA, BURRO CANYON, MORRISON, AND JUNCTION CREEK FORMATIONS
- ◆ FELSIC AND HORNBLENDIC GNEISSES, EITHER SEPARATE OR INTERLAYERED
- ◆ GLACIAL DRIFT OF PINEDALE AND BULL LAKE GLACIATIONS
- ◆ GRANITIC ROCKS OF 1,400- AND 1,700-M.Y. AGE GROUPS, UNDIVIDED
- ◆ GRANITIC ROCKS OF 1,700-M.Y. AGE GROUP (AGE 1,650-1,730 M.Y.)
- ◆ GRAVELS AND ALLUVIUMS (PINEDALE AND BULL LAKE AGE)
- ◆ INTRA-ASH FLOW ANDESITIC LAVAS
- ◆ INTRA-ASH-FLOW QUARTZ LATITIC LAVAS
- ◆ LANDSLIDE DEPOSITS
- ◆ LEADVILLE LIMESTONE, WILLIAMS CANYON LIMESTONE AND FREMONT LIMESTONE, HARDING SANDSTONE
- ◆ LEADVILLE LIMESTONE, WILLIAMS CANYON LIMESTONE, MANITOU LIMESTONE, AND SAWATCH QUARTZITE
- ◆ MAFIC ROCKS OF 1,700-M.Y. AGE GROUP
- ◆ MANCOS SHALE
- ◆ MIDDLE TERTIARY INTRUSIVE ROCKS (AGE 20-40 M.Y.)
- ◆ MINTURN AND BELDEN FORMATIONS
- ◆ MODERN ALLUVIUM
- ◆ MORRISON FORMATION AND JUNCTION CREEK SANDSTONE
- ◆ OLIGOCENE SEDIMENTARY ROCKS
- ◆ PRE-ASH-FLOW ANDESITIC LAVAS, BRECCIAS, TUFFS, AND CONGLOMERATES (GENERAL AGE 30-35 M.Y.)
- ◆ WATER



Vegetation

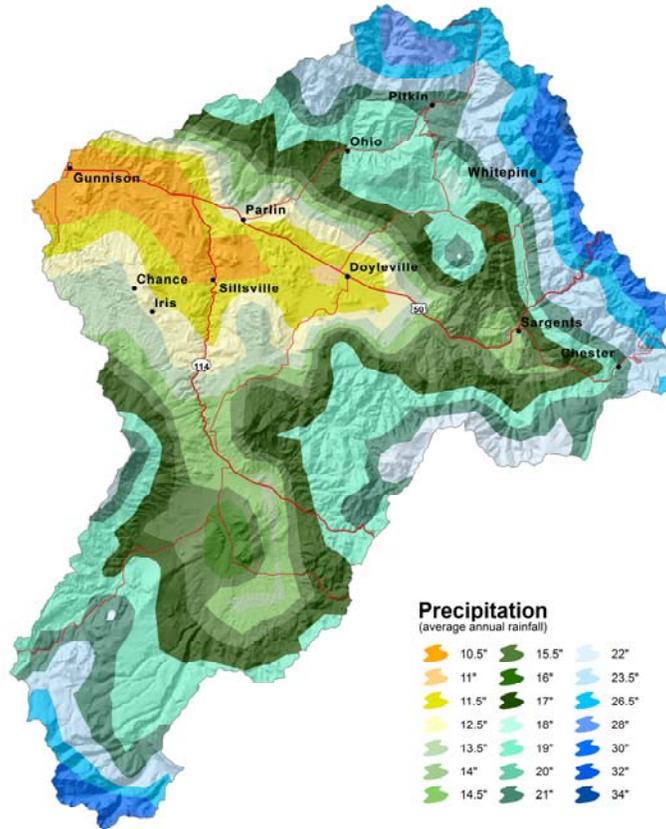
- ◇ Alpine/Subalpine/Tundra
- ◆ Coniferous Forest
- ◆ Mixed Forest
- ◇ Dryland Ag
- ◇ Grass Dominated
- ◆ Irrigated Ag
- ◇ Other
- ◇ Rangeland
- ◇ Riparian
- ◆ Shrub/Brush Rangeland
- ◇ Shrub/Grass/Forb Mix Rangeland
- ◆ Urban/Built Up
- ◆ Water
- ◆ Woodland

TOMICHI Land Use	Total Acreage	Vegetation	Acreage
Cropland	28,343	Agriculture Land Irrigated Ag*	16.0 28,327.0
Rangeland/Grassland	311,335	Alpine Meadow Alpine Grass Dominated Alpine Grass/Forb Mix Gambel Oak Grass Dominated Grass/Forb Mix Grass/Forb Rangeland Pinon-Juniper PJ-Sagebrush Mix PJ-Mtn Shrub Mix Sagebrush Community Sagebrush/Gambel Oak Mix Sagebrush/Grass Mix Sagebrush/Mesic Mtn Shrub Mix Saltbrush Community Sedge Sparse Grass (Blowouts) Sparse PJ/Shrub/Rock Mix Subalpine Shrub Community Subalpine Grass/Forb Mix Upland Willow/Shrub Mix	315.1 471.8 18,245.8 9.4 7.9 21,818.0 20.1 0.3 2.0 0.5 83,455.2 13.9 140,257.0 7,839.6 0.2 0.9 586.9 3.2 11,186.6 26,845.4 255.0
Forest	339,228	Aspen Bristlecone Pine Douglas Fir Douglas Fir/Aspen Mix Douglas Fir/Engelmann Spruce Mix Englemann Spruce/Fir Mix Fir/Lodgepole Pine Mix Limber Pine Lodgepole Pine Lodgepole Pine/Aspen Mix Lodgepole/Spruce/Fir Mix Ponderosa Pine Ponderosa Pine/Aspen Mix Ponderosa Pine/Douglas Fir Mix Spruce/Fir/Aspen Mix Spruce/Fir Regeneration Spruce/Fir/Lodgepole/Aspen Mix Spruce/Lodgepole Pine Mix	32,463.0 6,358.0 16,192.4 10,277.9 181.6 28,336.2 5,785.2 589.3 107,378.6 23,165.5 34,272.4 3,399.4 2,399.4 1,381.8 28,044.3 3,732.7 20,793.6 14,476.5
Riparian	10,982		
Water	430	Water	430.3
Other	15,140	Commercial Rock Soil Snow Talus Slopes & Rock Outcrops Urban/Built Up	169.6 1,115.1 480.6 0.6 13,031.7 341.9
~Total Watershed Acres			705,457

*Colorado Decision Support Systems Data

Precipitation

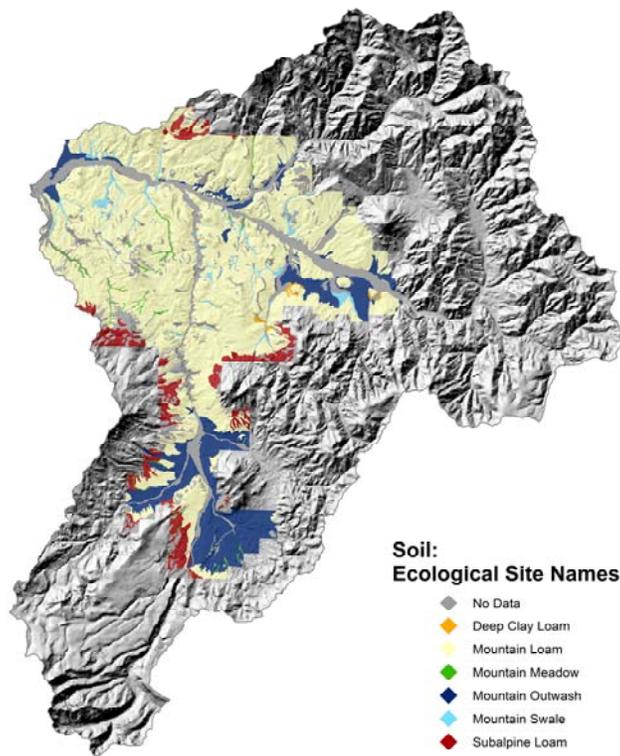
Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series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

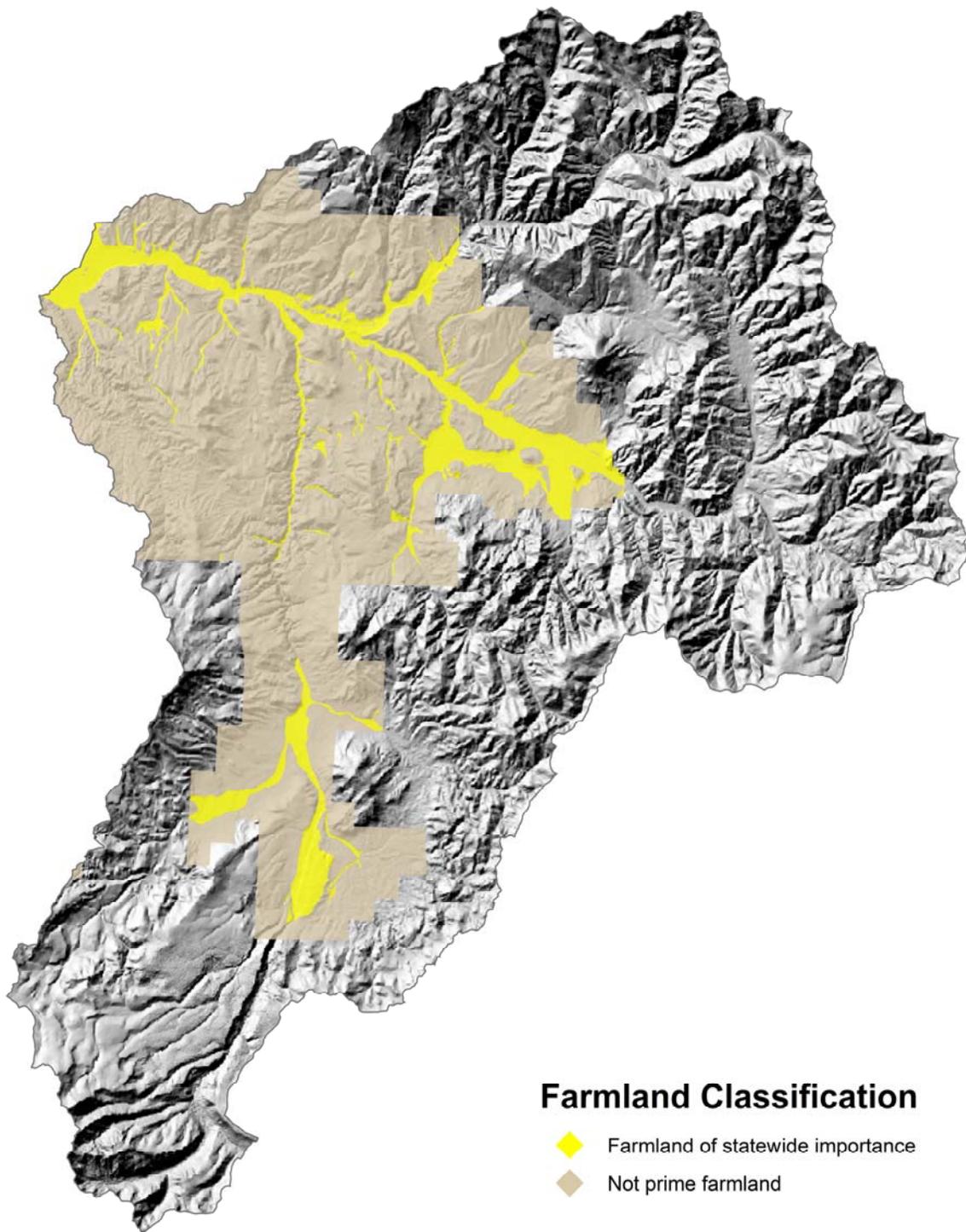


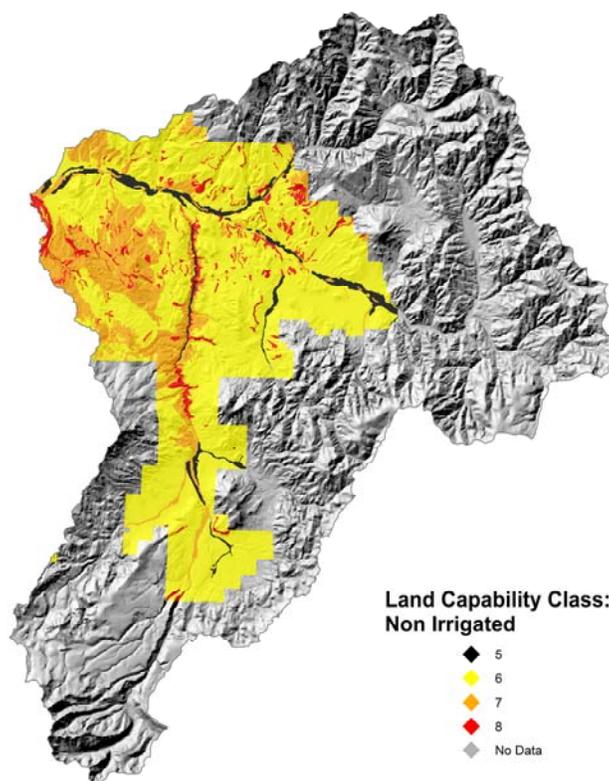
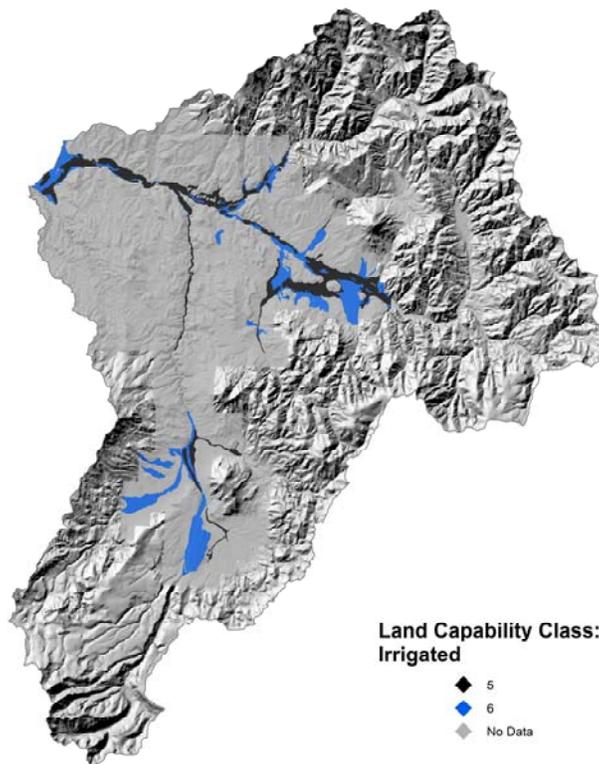
Ecological Sites

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.

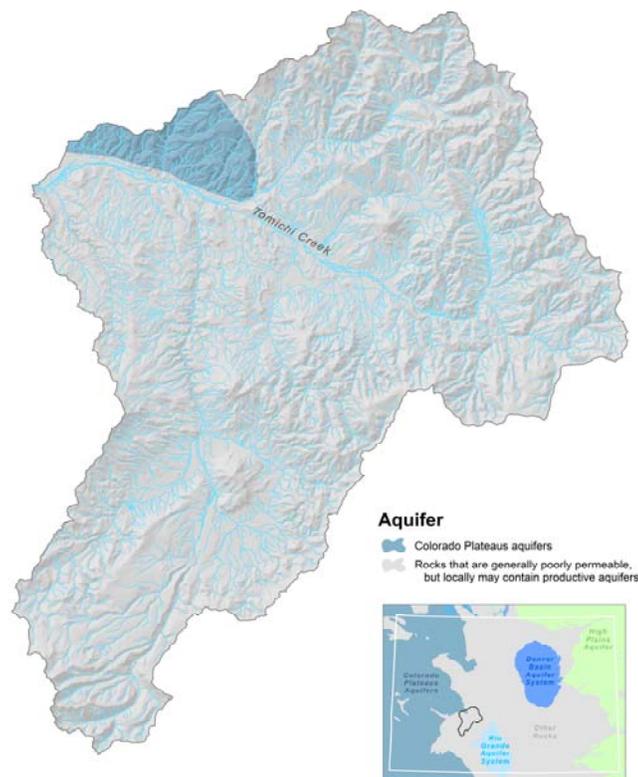
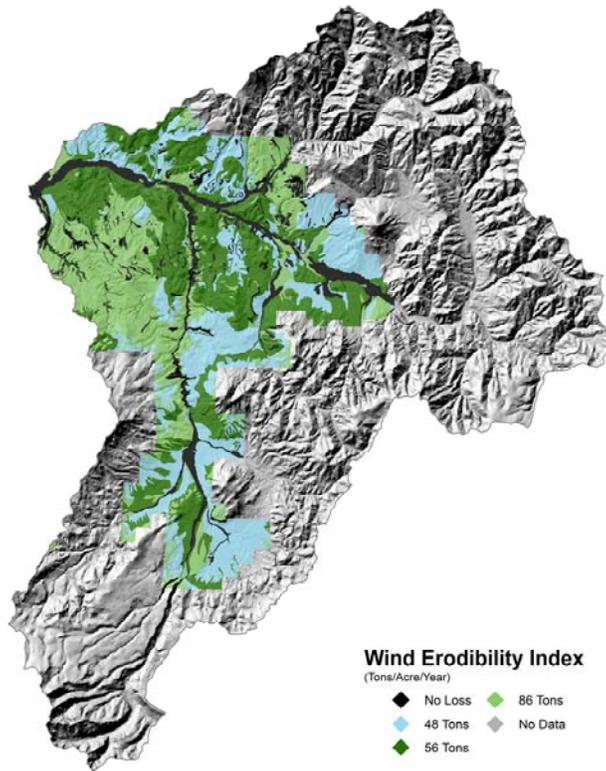
Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

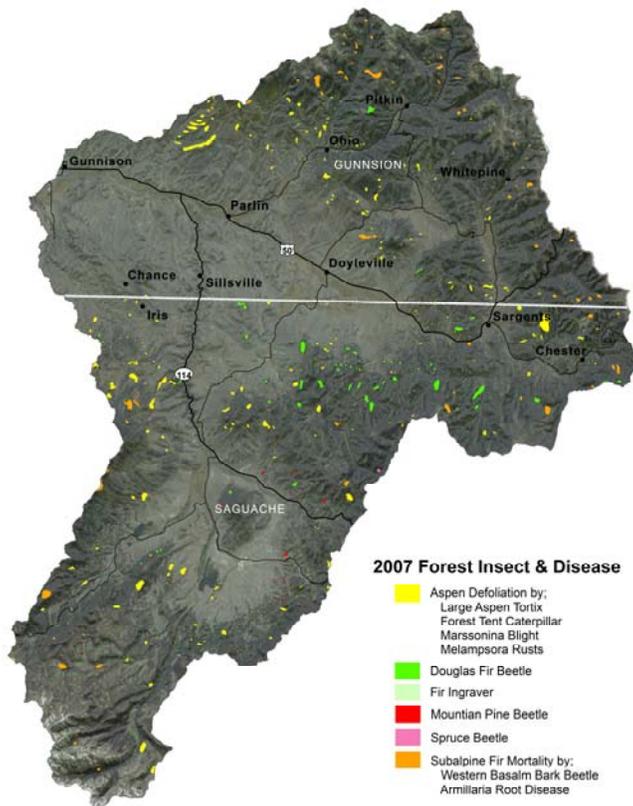
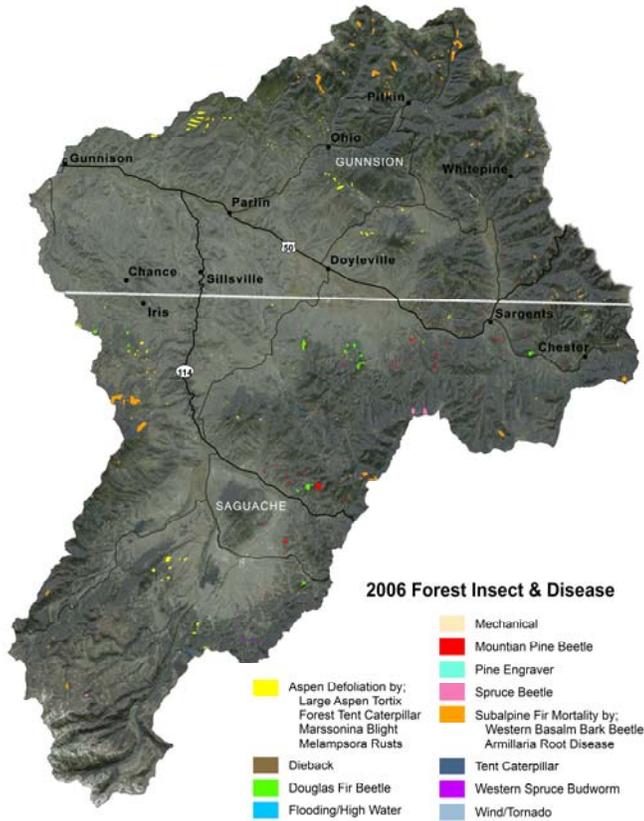
Class 8 - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.

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.

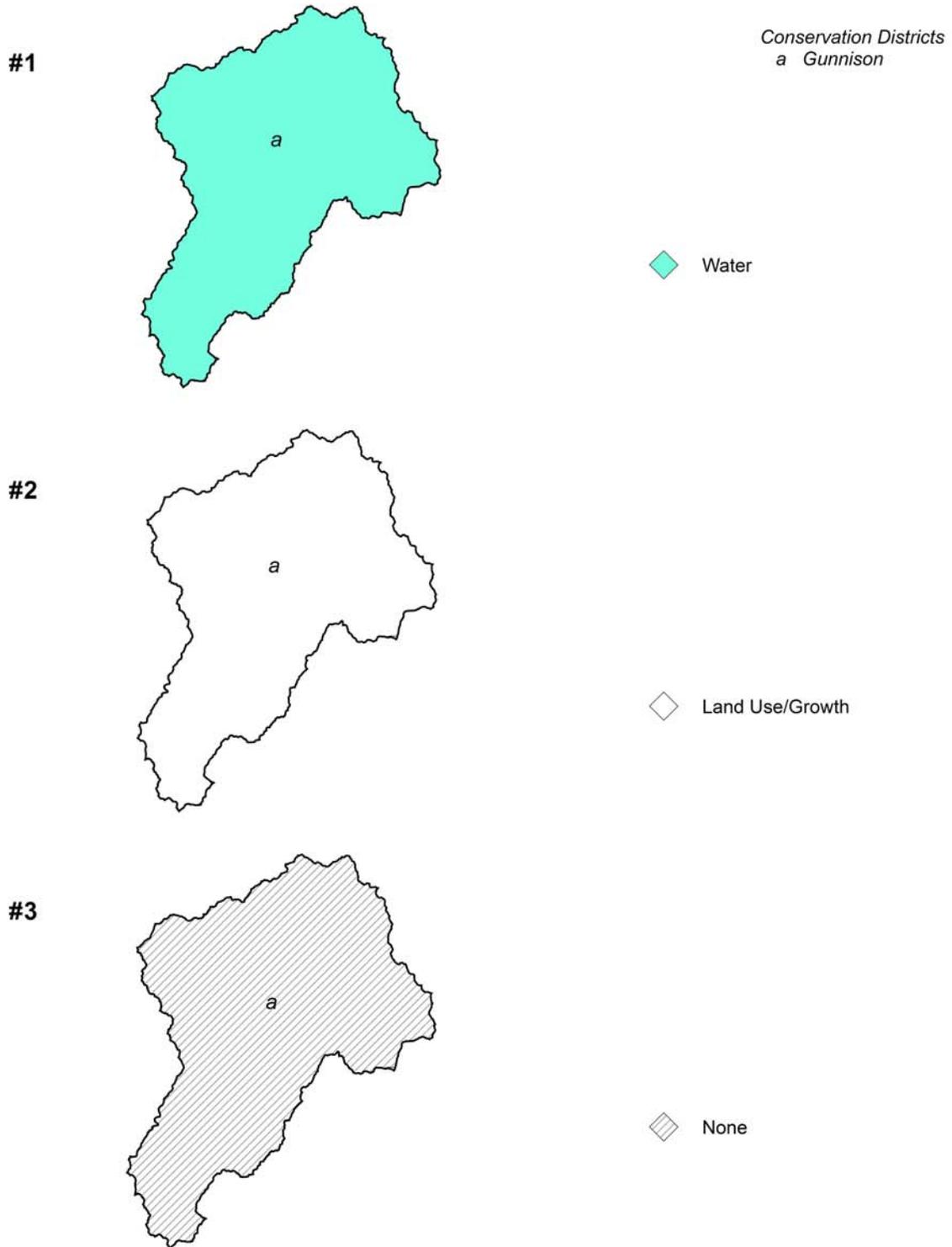




Social Data	Saguache	Gunnison
Demographics (US Census, American Factfinder)		
Total population	5,917	13,956
Male	2,984	7,563
Female	2,933	6,393
Median age (years)	36.9	30.4
White	4,218	13,269
Black or African American	7	68
American Indian and Alaska Native	122	98
Asian	27	75
Native Hawaiian and Other Pacific Islander	0	5
Some other race	1361	201
Hispanic or Latino (of any race)	2678	700
Economic Characteristics (US Census, American Factfinder)		
In labor force (population 16 years and over)	2,666	8,635
Median household income (dollars)	25,495	36,916
Median family income (dollars)	29,405	51,950
Per capita income (dollars)	13,121	21,407
Families below poverty level	291	182
Individuals below poverty level	1325	1949
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)		
Farms (number)	252	186
Land in farms/ranches (acres)	477,003	165,488
Average size farm/ranch (acres)	1,893	890
Median size farm (acres)	640	320
Average age of farmer or rancher	54.1	53.1
Net cash return from ag sales (\$1,000)	24,040	1,669
Cattle and calves (number)	20,000	19,000

Identified Long Range Resource Concerns

Top Three Concerns within Conservation Districts



Selected Conservation Application Data

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Total
Practices							
Forage Harvest Management	582	768	164	758	43	1,858	4,173
Irrigation Water Management	582	0	190	1,395	43	2,856	5,066
Prescribed Grazing	0	8,328	0	871	43	4,089	13,331

Conservation Systems to Address Major Resource Concerns

Primary Resource Concern: Inefficient water use on irrigated land				
Conservation System Description:		Earthen ditch irrigation system converted to Sideroll Sprinkler System with Structure for Water Control, Underground Pipeline, IWM		Reference Conservation System Guide Code: CO 48A.1-CR-Gravity-R-2
Practices	Unit	Quantity	Cost/Unit (\$)	Estimated Cost (\$)
Irrigation Water Management (449) may include:	Ac	8,000	1,100	8,800,000
Fence (382)	Ft			
Nutrient Management (590)	Ac			
Pest Management (595)	Ac			
Subtotal Costs Irrigated Crops \$8,800,000				

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 crops and forage	Water	32 Ac-in/Ac/Yr	Water quality improvement	8,800,000
Estimated Total Costs to Address Major Resource Concerns: \$8,800,000				

FOOTNOTES/ BIBLIOGRAPHY

303(d) listed streams within the Watershed were created using data from Colorado Department of Public Health & Environment's 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/100293wqlimitedsegmdls.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.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado surveys:

Gunnison Area (CO662) Published 01/04/2007

Vegetation data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. Completed in 2003, the CVCP is a landscape level vegetation dataset created using Landsat TM imagery and then formatted for GIS use. The species identified are an overview of the most common species associated in each cover type, in order of greatest occurrence. For more information on the Colorado Vegetation Classification Project, visit <http://ndis.nrel.colostate.edu/coveg>.

Common Resource Area (CRA), a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. Geographic boundaries of a CRA are determined by landscape conditions, soil, climate, human considerations and other natural resource information. For more information on Common Resource Areas visit <http://soils.usda.gov/survey/geography/cra.html>.

Average Annual Precipitation data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990.

Land Ownership (status,07/22/2006 dataset) data was obtained from the Bureau of Land Management, Colorado State Office. For more information, visit http://www.blm.gov/co/st/en/BLM_Programs/geographical_sciences/gis.html

Relief & Elevation maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS). A hillshade grid was created from the 30m DEM to create a 3D effect. 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/>

Disclaimer: Due to the nature of aerial surveys, the data on these maps will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented on this map because these agents are not detectable from aerial surveys. The data presented on this map should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Shaded areas show locations where tree mortality or defoliation were apparent from the air. Intensity of damage is variable and not all trees in shaded areas are dead or defoliated.

The insect and disease data represented on this map are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this map for purposes other than those for which it was intended may yield inaccurate or misleading results.