



United States Department
of Agriculture



Natural Resources
Conservation Service

Lakewood, Colorado

RWA 13020101

April 2008

Upper Rio Grande Watershed

Hydrologic Unit Code 13020101

Rapid Assessment



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.

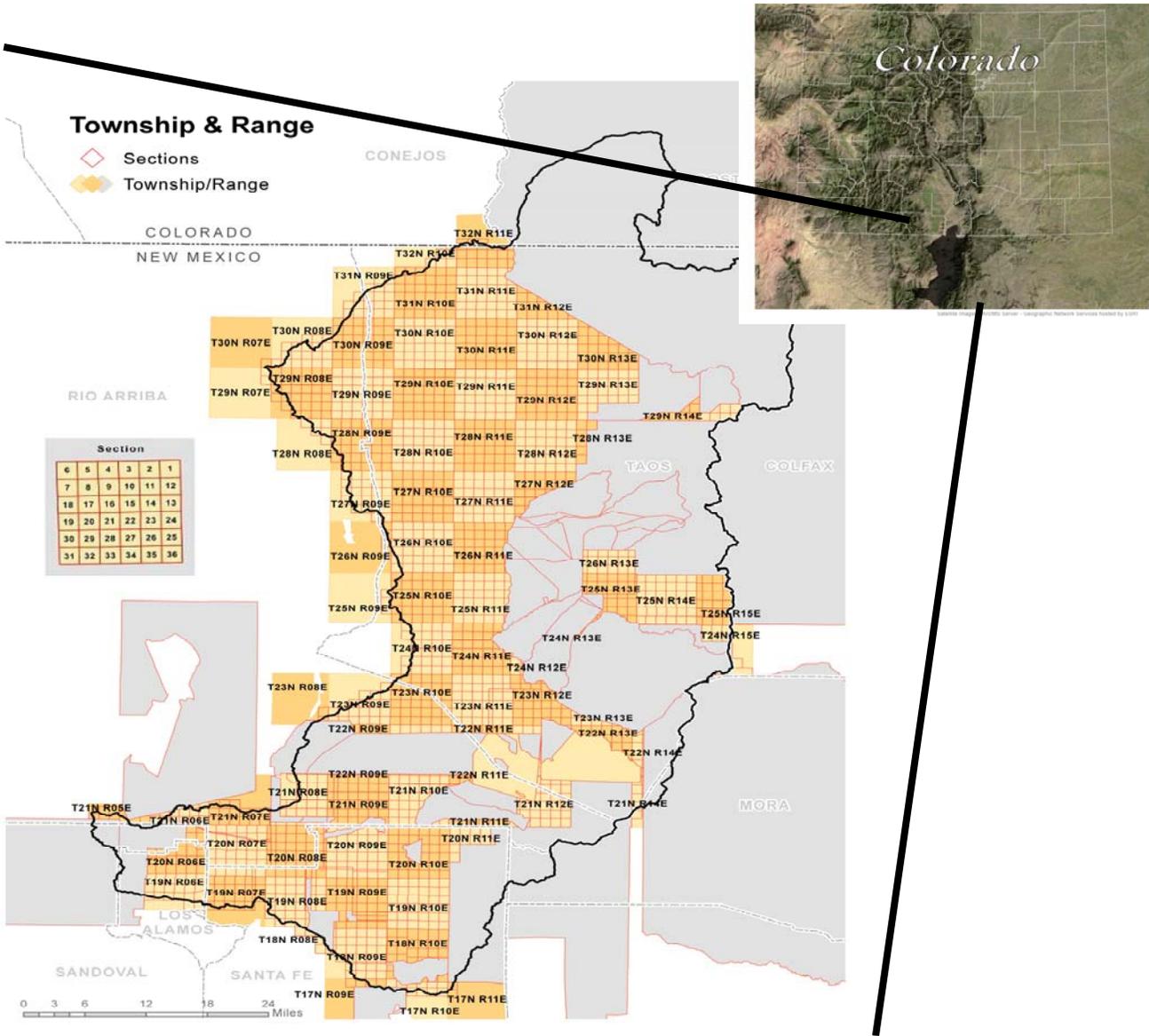
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best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

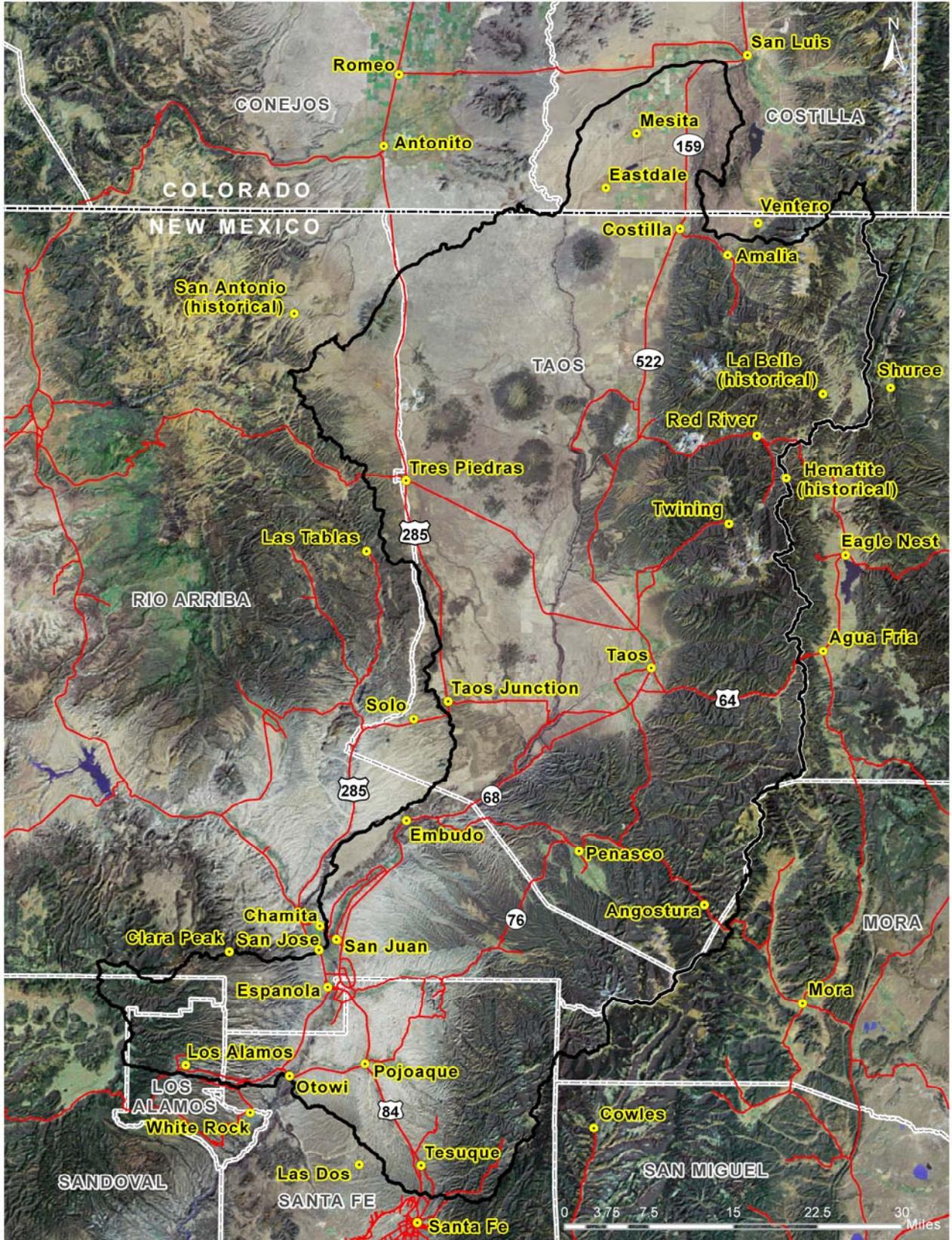
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis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

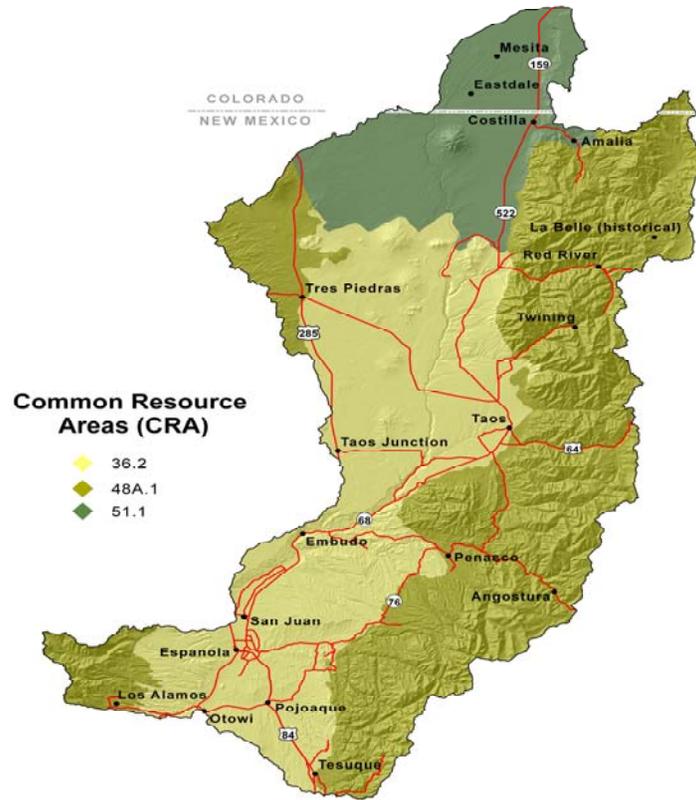


Colorado County	County Acres	County Acres in Upper Rio Grande Watershed	% of County in the Watershed	% of Watershed in the County
Costilla	786,788	102,878	13.08%	4.94%
Conejos	825,714	548	0.07%	0.03%
NEW MEXICO				
Colfax	2,409,715	190	0.01%	0.01%
Los Alamos	69,948	31,240	44.66%	1.50%
Mora	1,236,449	14,705	1.19%	0.71%
Rio Arriba	3,772,858	337,691	8.95%	16.23%
Sandoval	2,376,961	19,621	0.83%	0.94%
Santa Fe	1,222,153	237,971	19.47%	11.43%
Taos	1,409,910	1,336,405	94.79%	64.21%
		2,081,249		

Upper Rio Grande Watershed - 13020101

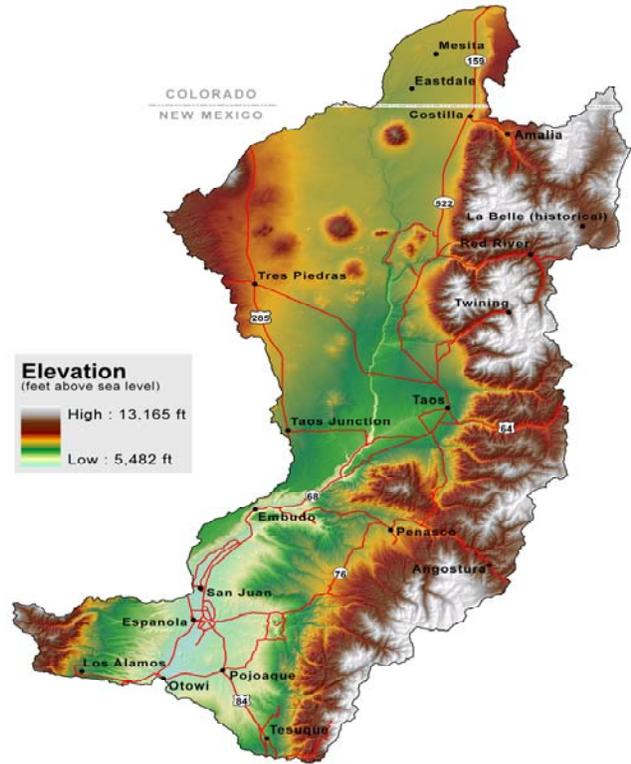


Satellite Imagery: ArcIMS Server - Geography Network Services hosted by ESRI

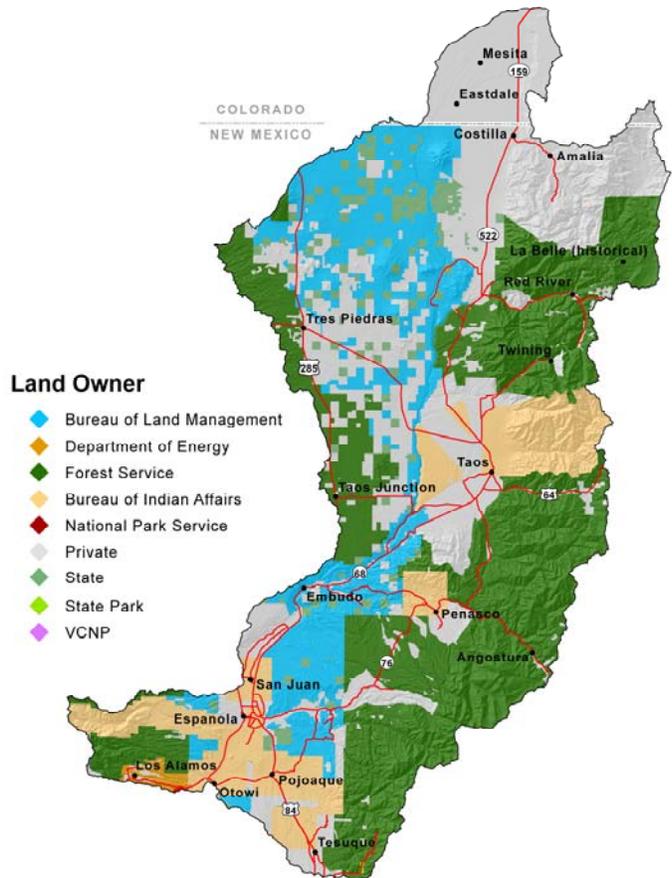


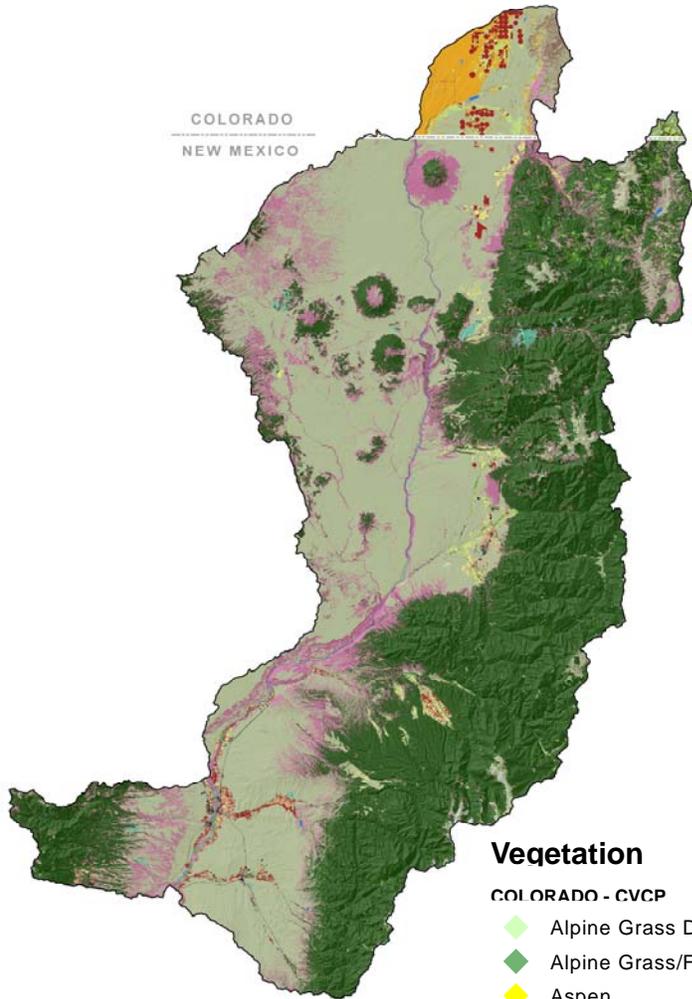
Common Resource Areas (CRA): Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

MLRA	CRA	CRA NAME	CRA DESCRIPTION
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.
51	51.1	High Intermountain Valleys	This is an area of low relief composed of valley fill sediments from the surrounding mountains. The temperature regime is mainly frigid but includes mesic in the southern part. The moisture regime is aridic. Characteristic native vegetation is greasewood, fourwing saltbush, and alkali sacaton.



Upper Rio Grande	
Bureau of Land Management	568
Private	102,405
Rio Chama	
Private	19,907
U.S. Forest Service	29,789





Vegetation

COLORADO - CVCP

- ◆ Alpine Grass Dominated
- ◆ Alpine Grass/Forb Mix
- ◆ Aspen
- ◆ Cottonwood
- ◆ Douglas Fir
- ◆ Douglas Fir/Aspen Mix
- ◆ Englemann Spruce/Fir Mix
- ◆ Grass Dominated
- ◆ Grass/Forb Mix
- ◆ Greasewood
- ◆ Herbaceous Riparian
- ◆ Irrigated Ag
- ◆ PJ-Sagebrush Mix
- ◆ Pinon-Juniper
- ◆ Ponderosa Pine/Douglas Fir Mix
- ◆ Rabbithrush/Grass Mix
- ◆ Rock
- ◆ Sagebrush Community
- ◆ Sagebrush/Grass Mix
- ◆ Shrub Riparian
- ◆ Shrub/Brush Rangeland
- ◆ Shrub/Grass/Forb Mix
- ◆ Soil
- ◆ Sparse Grass (Blowouts)
- ◆ Sparse PJ/Shrub/Rock Mix
- ◆ Spruce/Fir/Aspen Mix
- ◆ SubAlpine Shrub Community
- ◆ Subalpine Grass/Forb Mix
- ◆ Upland Willow/Shrub Mix
- ◆ Water
- ◆ Willow

NEW MEXICO - NLCD

- ◆ Open Water
- ◇ Perennial Ice/Snow
- ◆ Low Intensity Residential
- ◆ High Intensity Residential
- ◆ Commercial/Industrial/Residential
- ◆ Bare Rock/Sand/Clay
- ◆ Quarries/Strip Mines/Gravel Pits
- ◆ Deciduous Forest
- ◆ Evergreen Forest
- ◆ Mixed Forest
- ◆ Shrubland
- ◆ Grasslands/Herbaceous
- ◆ Pasture/Hay
- ◆ Row Crops
- ◆ Fallow
- ◆ Urban/Recreational Grasses
- ◆ Emergent Herbaceous Wetlands

UPPER RIO GRANDE Colorado Land Use	Total Acreage	Vegetation	Acreage
Cropland	9,194	Irrigated Ag	9,193.9
		Alpine Grass Dominated	453.6
		Alpine Grass/Forb Mix	470.1
		Grass Dominated	10,234.7
		Grass/Forb Mix	23.0
		Greasewood	58.4
		PJ-Sagebrush Mix	1,025.9
		Pinon-Juniper	1,763.3
		Rabbitbrush/Grass Mix	29,459.8
Rangeland/Grassland	89,150	Sagebrush Community	6,306.6
		Sagebrush/Grass Mix	37,161.0
		Shrub/Brush Rangeland	5.3
		Shrub/Grass/Forb Mix	524.4
		Sparse Grass (Blowouts)	110.4
		Sparse PJ/Shrub/Rock Mix	832.7
		SubAlpine Shrub Community	146.1
		Subalpine Grass/Forb Mix	131.9
		Upland Willow/Shrub Mix	442.5
		Aspen	278.8
		Cottonwood	19.2
		Douglas Fir	4.0
		Douglas Fir/Aspen Mix	0.4
Forest	2,417	Englemann Spruce/Fir Mix	1,188.2
		Ponderosa Pine/Douglas Fir Mix	238.0
		Spruce/Fir/Aspen Mix	665.5
		Willow	22.4
Riparian	353	Herbaceous Riparian	352.4
		Shrub Riparian	0.5
Water	286	Water	286.1
Other	859	Rock	153.8
		Soil	704.8
Total Colorado Watershed Acres			102,258
Total New Mexico Watershed Acres			1,979,985

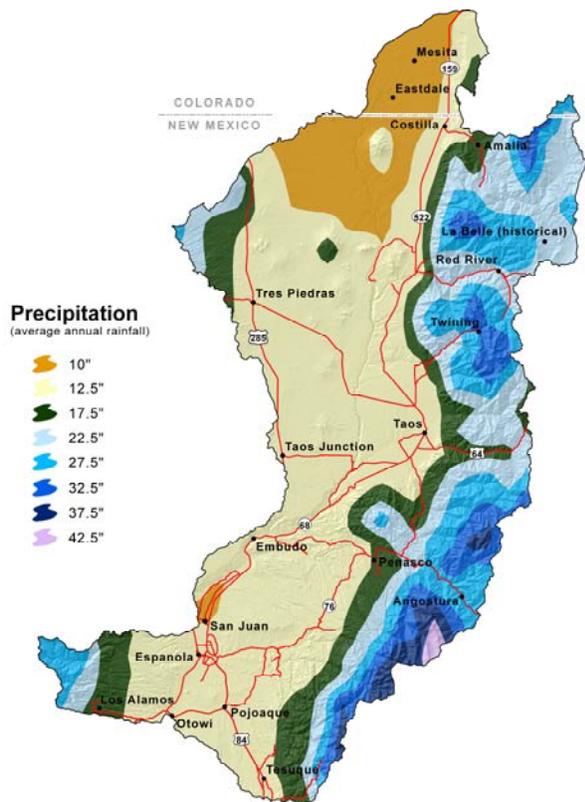
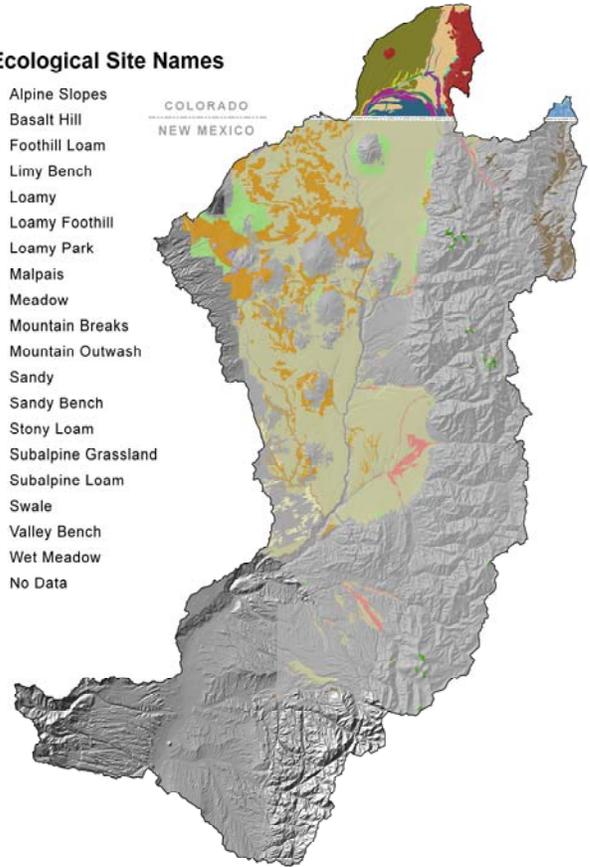
Ecological Sites

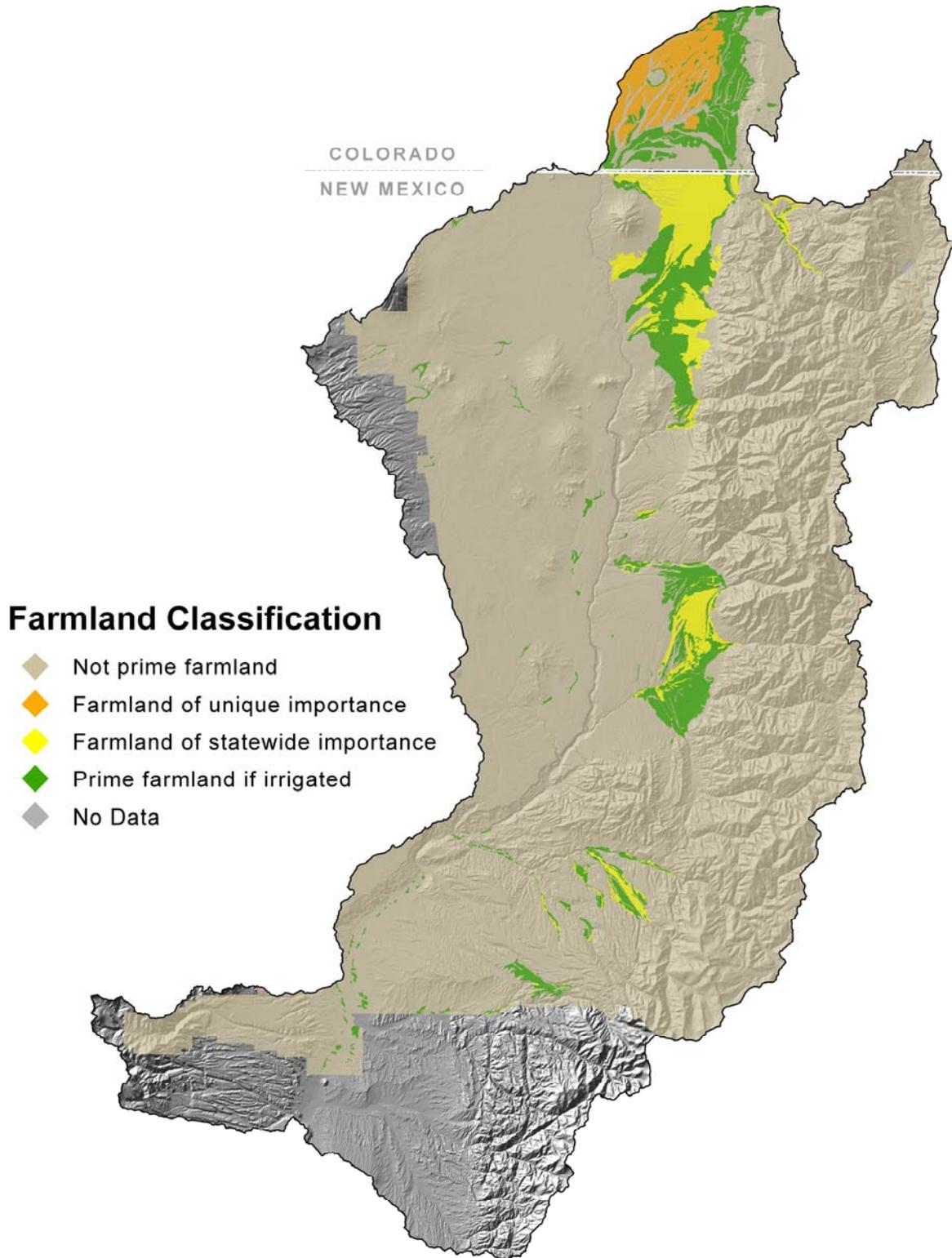
The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

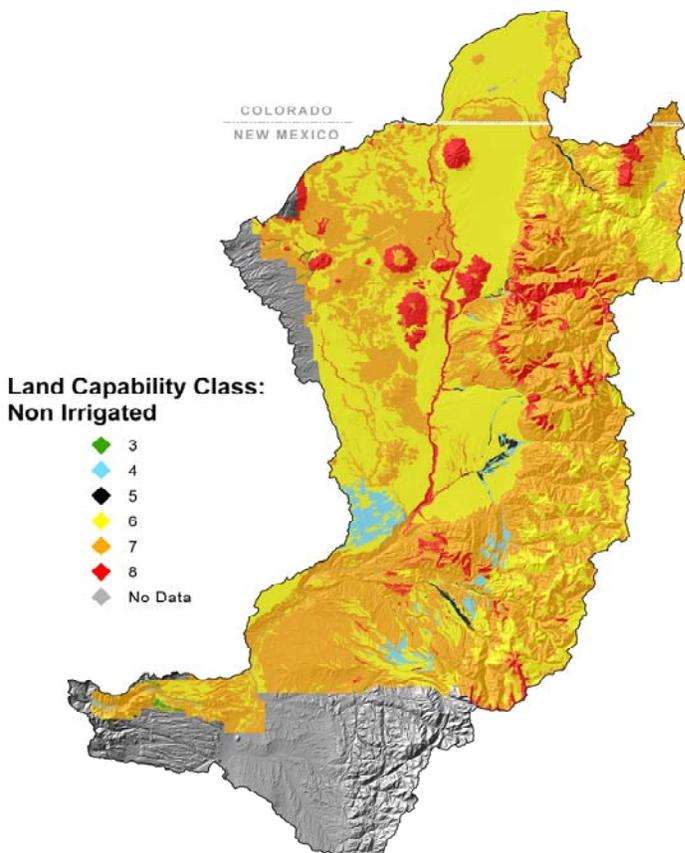
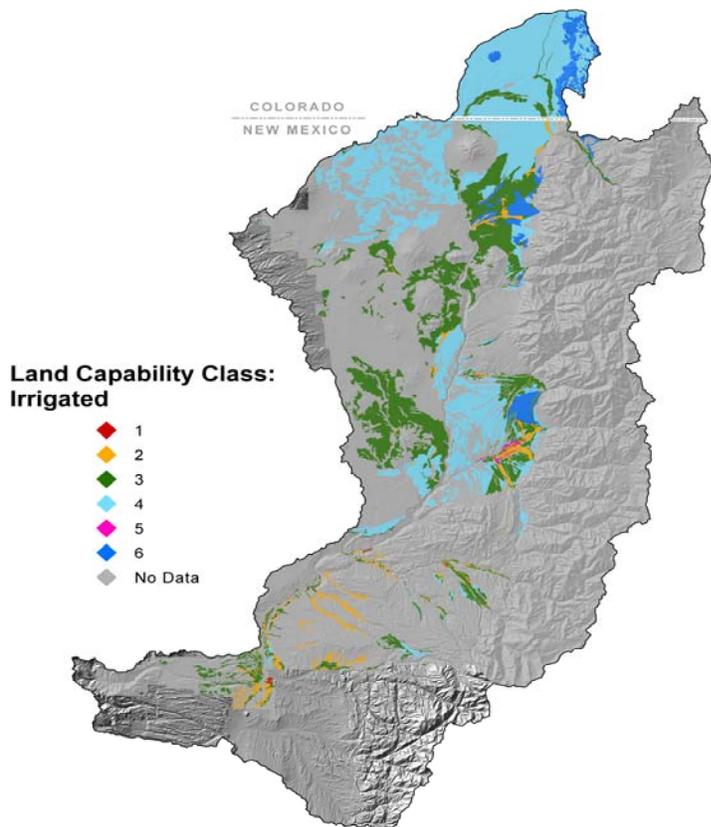
Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available in local offices of the Natural Resources Conservation Service (NRCS) and online at <http://www.nrcs.usda.gov/technical/efotg/>.

Soil: Ecological Site Names

- Alpine Slopes
- Basalt Hill
- Foothill Loam
- Limy Bench
- Loamy
- Loamy Foothill
- Loamy Park
- Malpais
- Meadow
- Mountain Breaks
- Mountain Outwash
- Sandy
- Sandy Bench
- Stony Loam
- Subalpine Grassland
- Subalpine Loam
- Swale
- Valley Bench
- Wet Meadow
- No Data







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.

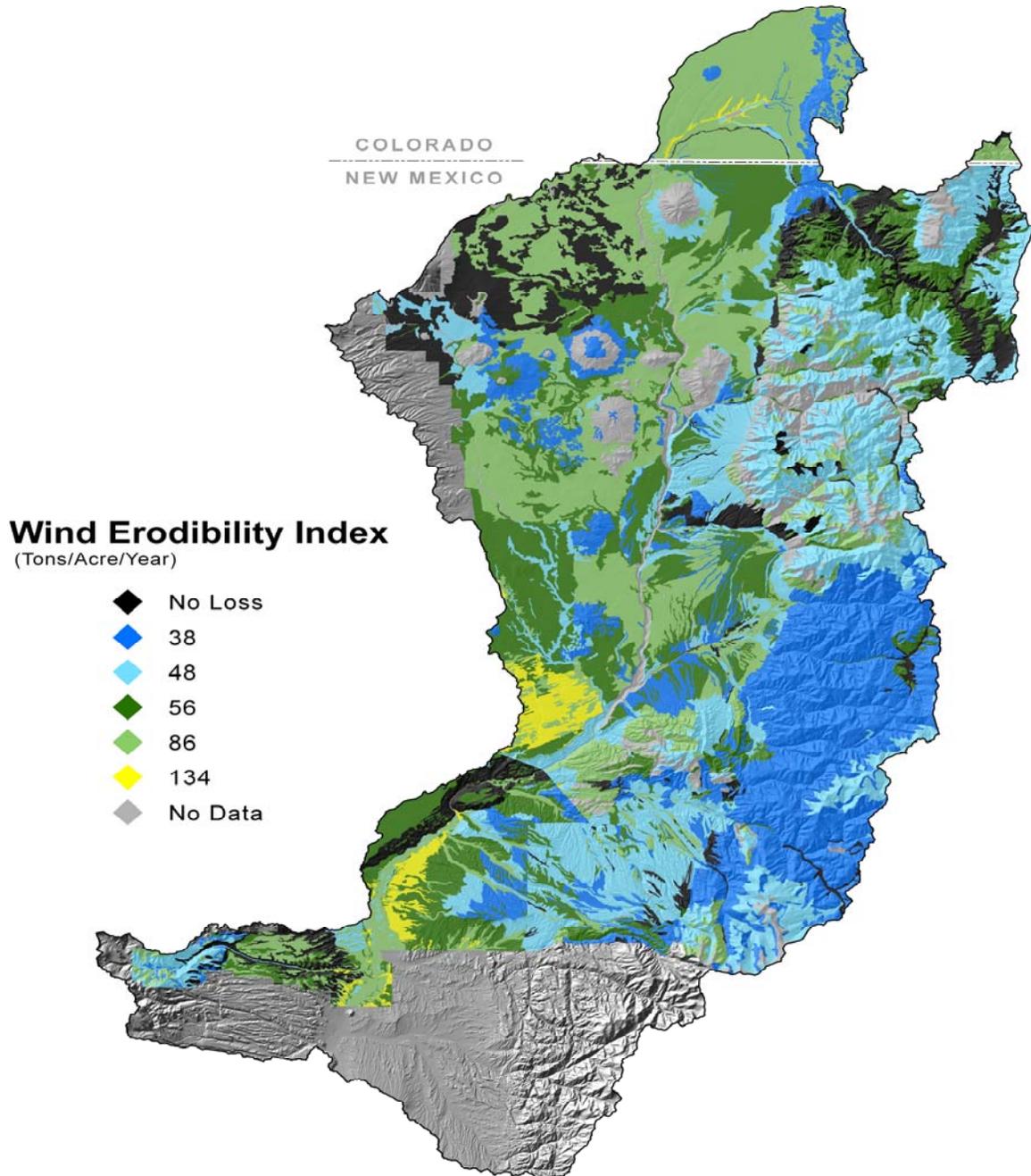
Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

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.

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



Threatened and Endangered Species in the Upper Rio Grande Watershed

	Common Name	Class	State Status	Federal Status	Comments
	Bald Eagle	Birds	Threatened	None	Winters in the Watershed
	Black-footed Ferret	Mammals	Endangered	Endangered	Suitable habitat in watershed; No current records of occurrence
	Greater Sandhill Crane	Birds	Concern	None	Occurs in the watershed
	Gunnison's Prairie Dog	Mammals	None	Candidate	Occurs in the watershed
	Northern leopard frog	Amphibians	Concern	None	Occurs in the watershed
	Rio Grande Cutthroat Trout	Fish	Concern	None	Occurs in the watershed
	Townsend's Big-eared Bat	Mammals	Concern	None	Occurs in the watershed
	Wolverine	Mammals	Endangered	None	Suitable habitat in watershed; No current records of occurrence

The terrestrial habitats on the west side of this watershed include desert shrub and sagebrush; irrigated cropland; pinon-juniper, and foothills/mountain grassland. On the east side, habitats are coniferous forest and alpine tundra. Riparian areas and wetlands provide important aquatic habitats for a number of species providing food, cover, or water at some life stage.

Wildlife found on the east side of the watershed at the highest elevations may include pika, marmot, lynx, bighorn sheep, and white-tailed ptarmigan.

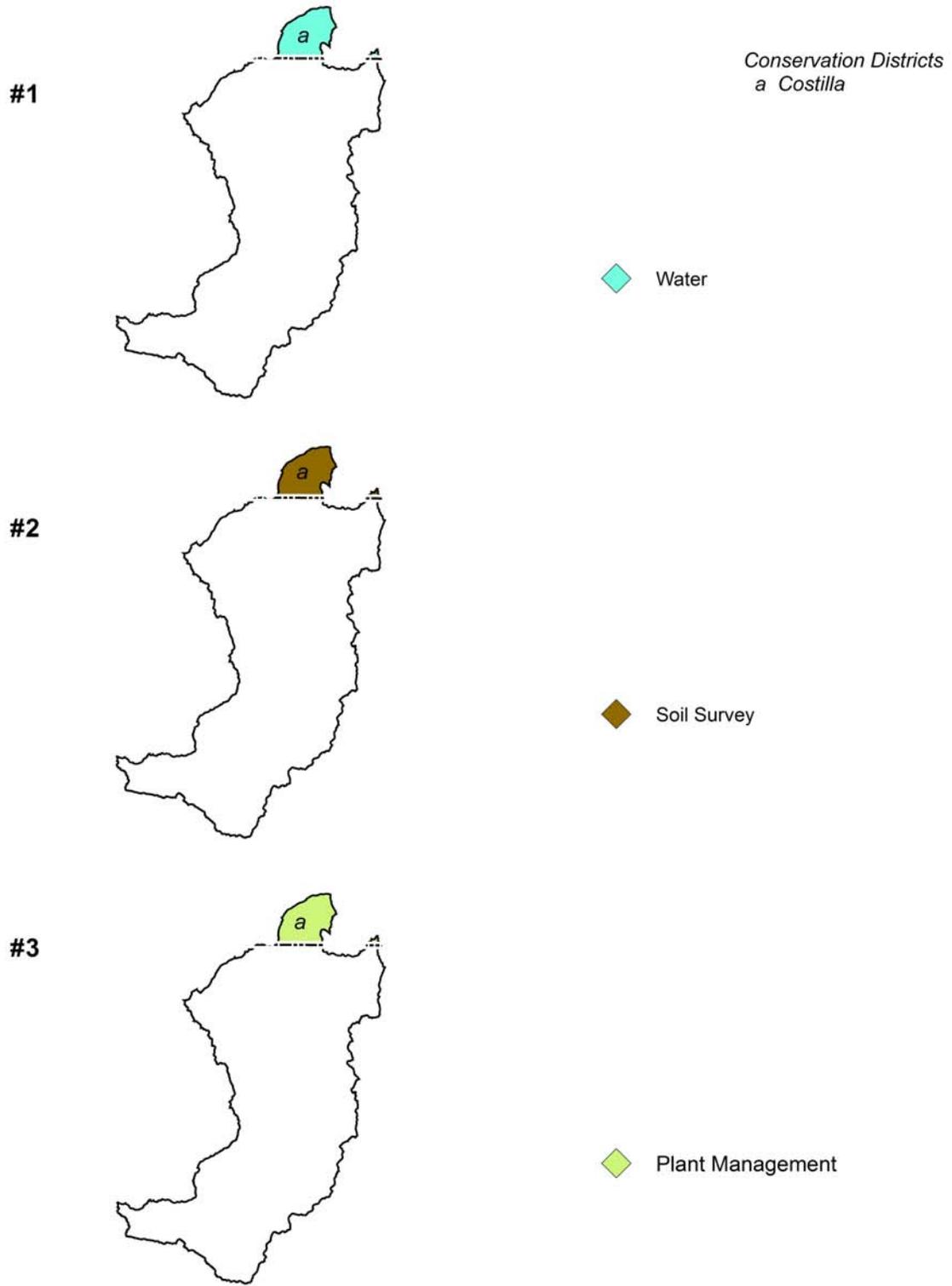
Economically important species in the watershed include: black bear, elk, mule deer, mountain lion, and trout, throughout most of the watershed and pronghorn (antelope) in lower elevation shrub and grasslands. Wild turkey are found in the east part of the watershed. Eastdale Reservoir and the surrounding irrigated cropland provide habitat for snow geese. Irrigated cropland areas in the west part of the watershed provide an important stop over areas for migrating sandhill cranes. Even though they are a non-game species, sandhill cranes are economically important because of the tourism dollars they attract to the San Luis Valley.

Social Data

	Costilla
Demographics (US Census, American Factfinder)	
Total population	3,663
Male	1,830
Female	1,833
Median age (years)	42.1
White	2,231
Black or African American	29
American Indian and Alaska Native	91
Asian	37
Native Hawaiian and Other Pacific Islander	5
Some other race	1079
Hispanic or Latino (of any race)	2476
Economic Characteristics (US Census, American Factfinder)	
In labor force (population 16 years and over)	1,312
Median household income (dollars)	19,531
Median family income (dollars)	25,509
Per capita income (dollars)	10,748
Families below poverty level	219
Individuals below poverty level	978
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)	
Farms (number)	205
Land in farms/ranches (acres)	354,067
Average size farm/ranch (acres)	1,727
Median size farm (acres)	170
Average age of farmer or rancher	53.7
Net cash return from ag sales (\$1,000)	10,117
Cattle and calves (number)	6,500

Identified Long Range Resource Concerns

Top Three Concerns within Conservation Districts



Selected Conservation Application Data Upper Rio Grande Watershed—13020101						
	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	Total
Total Conservation Systems Planned (Acres)	Not Avail.	584	1,736	2,750		6,453
Total Conservation Systems Applied (Acres)	Not Avail.	126	0	1,815		1,941
Practices						
Prescribed Grazing	0	0	0	519	0	519
Irrigation Water Management	0	124	0	1,087	892	2,103

Conservation Systems to Address Major Resource Concerns

Primary Resource Concern: Rangeland Health				
Conservation System Description:	Prescribed Grazing—planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals. Estimate 47,000 acres need to be treated on median sized ranches of 4,000 acres.			Based on Conservation System Guide Code: CO 51.1-GR-01-R-Grazing
Practices	Unit	Quantity	Cost/Unit (\$)	Estimated Cost per Median Sized Ranch (\$)
Prescribed Grazing				
Fence (382)	Ft.	21,120	0.6	12,672
Pest Management (595)	Ac.	300	4,500	4,500
Pipeline (516)	Ft.	15,000	2.40	36,000
Upland Wildlife Habitat Management (645)	Ac.	300	na	0
Watering Facility (614)	No.	2	410	820
Costs to apply prescribed grazing per median sized ranch of 5,000 acres	No.	12	53,992	647,904
Subtotal Rangeland costs:				\$647,904

Conservation Systems to Address Major Resource Concerns (cont'd)

Primary Resource Concern: Water Quality				
Conservation System Description:		Upgrading Sprinkler irrigation system with IWM, Crop rotation, Nutrient and Pest Mgt.		Reference Conservation System Guide Code: CO 51.1-CR-Sprinkler-R-2
Practices	Unit	Quantity	Cost/Unit (\$)	Estimated Cost (\$)
Irrigation Water Management (449)* * includes re-bowl, re-nozzle, and IWM	Ac	3,000	10.20	30,600
Nutrient Management (590)	Ac	4,000	5	20,000
Pest Management (595)	Ac	4,000	15	60,000
Conservation System Description:		Surface irrigation converted to sprinkler system. Sprinkler irrigation system with IWM, Crop rotation, Nutrient and Pest Mgt.		Reference Conservation System Guide Code: CO 51.1-CR-Gravity-R-2
Practices	Unit	Quantity	Cost/Unit (\$)	Estimated Cost (\$)
Irrigation System, Sprinkler (442)	Ac	1,000	600	600,000
Irrigation Water Management (449)	Ac	1,000	5	5,000
Nutrient Management (590)	Ac	1,000	5	5,000
Land Leveling (464)	Ac	150	300	45,000
Pest Management (595)	Ac	900	15	360,000
Subtotal Irrigated Crops: \$1,125,600				

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

Landuse	Resource Concern	Measurable Effects	Non-measurable Effects	Estimated Cost (\$)
Rangeland	Plants		Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter.	647,904
Irrigated Crop	Water		Nutrients and organics are stored, handled, disposed of, and managed so that surface water uses are not adversely	1,125,600
Estimated Total Costs to Address Major Resource Concerns:				\$1,773,504

References Not Cited in Document

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:

Costilla County Area (CO023) Published 01/20/2006

Parts of Rio Arriba & Sandoval Counties (NM650) Published 04/15/2007

Parts of Rio Arriba & Mora Counties (NM670) Published 04/15/2007

To download SSURGO data, visit <http://soildatamart.nrcs.usda.gov>. The surveys were then loaded into Soil Data Viewer <http://soildataviewer.nrcs.usda.gov> (a tool built as an extension to ArcMAP for quick geospatial analysis of soil data for use in resource assessment) and the subsequent data was exported to a GIS shapefile.

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>.