United States Department
of Agriculture

Bijou Watershed

Hydrologic Unit Code 10190011

Natural Resources
Conservation Service

Rapid Assessment

Lakewood, Colorado

RWA 10190011

October 2009

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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.

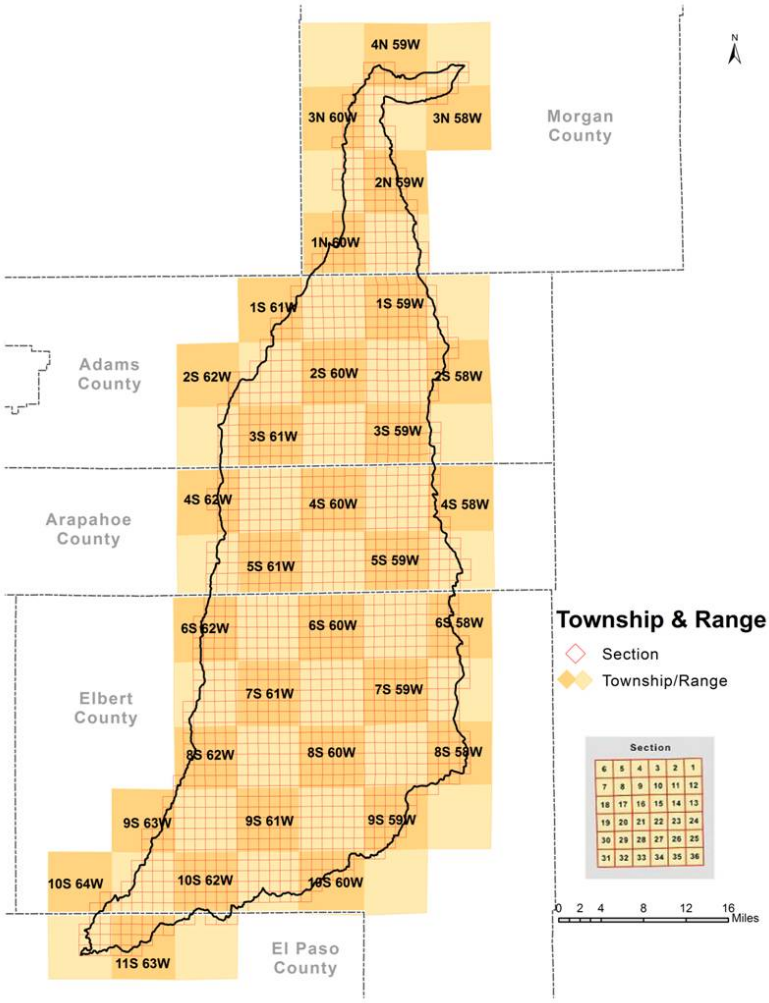
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best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

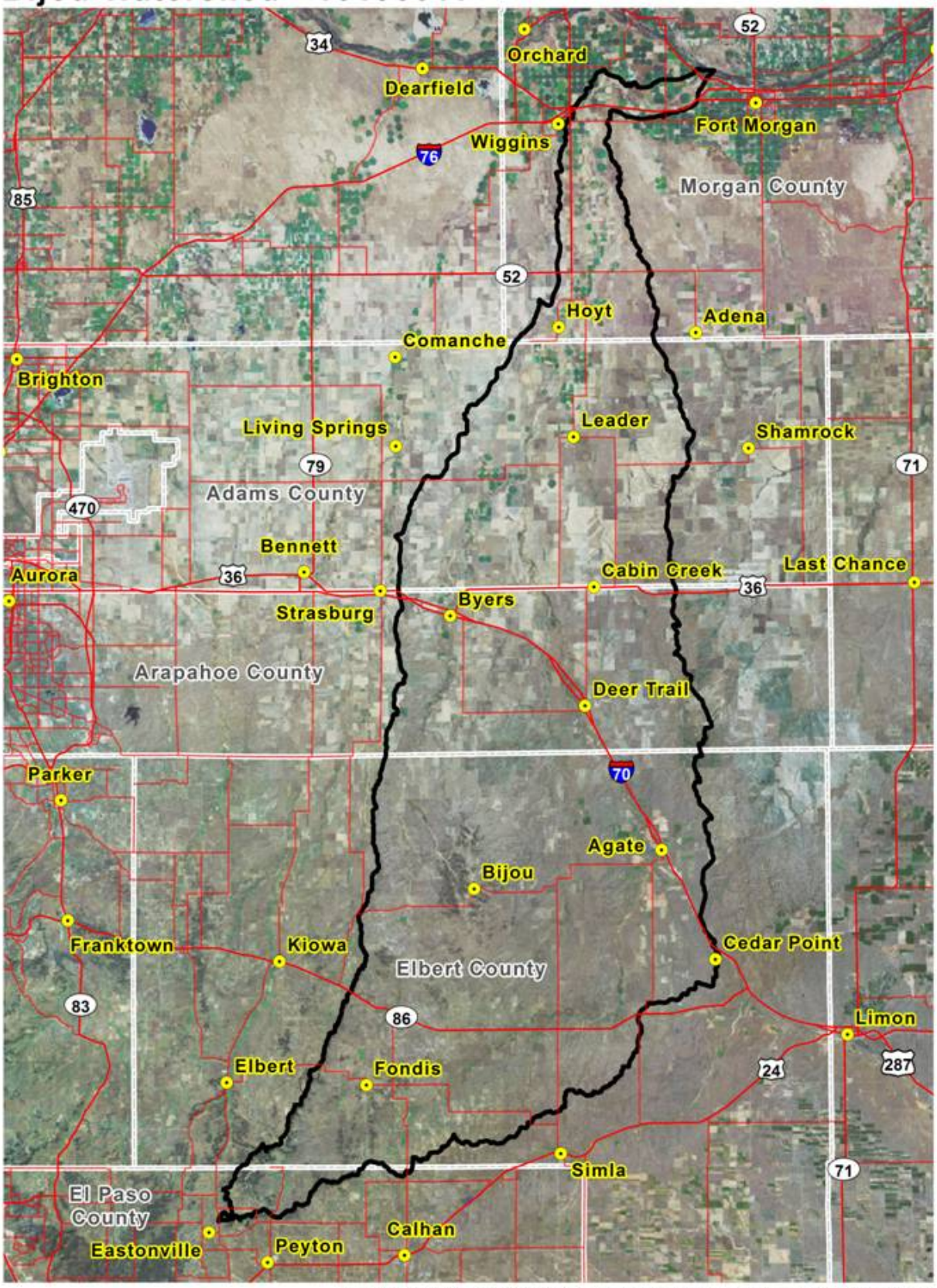
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis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

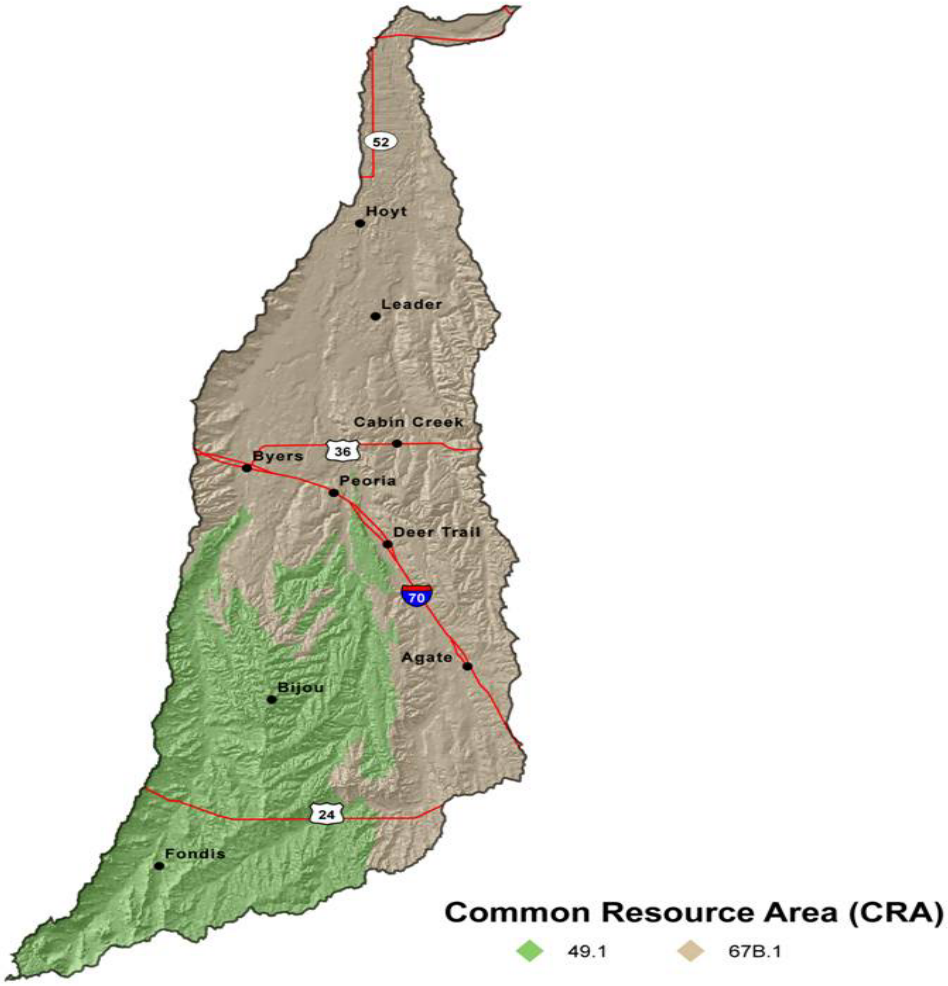


County	County Acres	County Acres in BIJOU Watershed	% of County in the Watershed	% of Watershed in the County
Adams	756,499	193,884	25.6%	22.0%
Arapahoe	515,064	163,946	31.8%	18.6%
Elbert	1,183,750	435,458	36.8%	49.4%
El Paso	1,362,117	14,956	1.1%	1.7%
Morgan	827,434	73,565	8.9%	8.3%
		881,809		

Bijou Watershed - 10190011

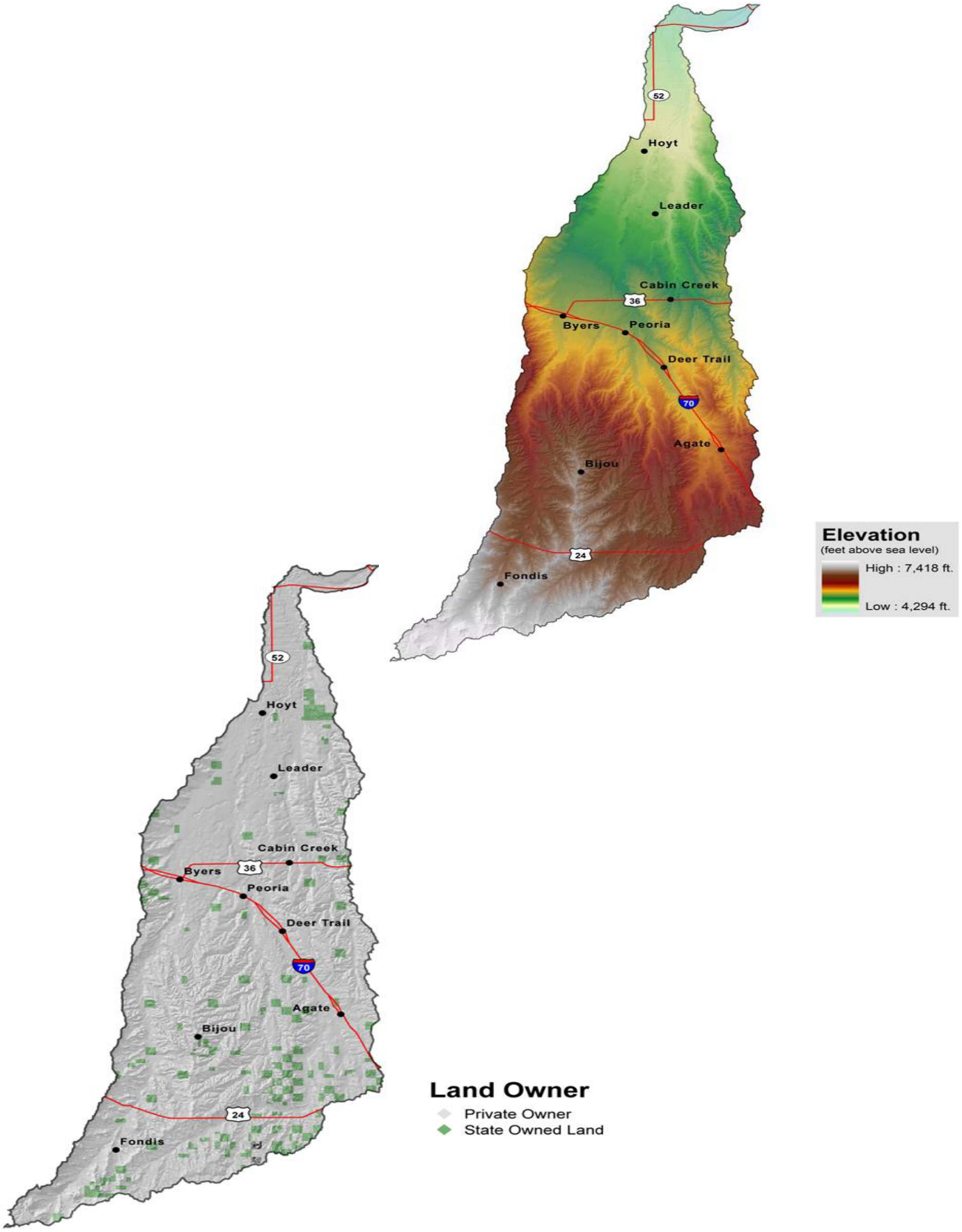


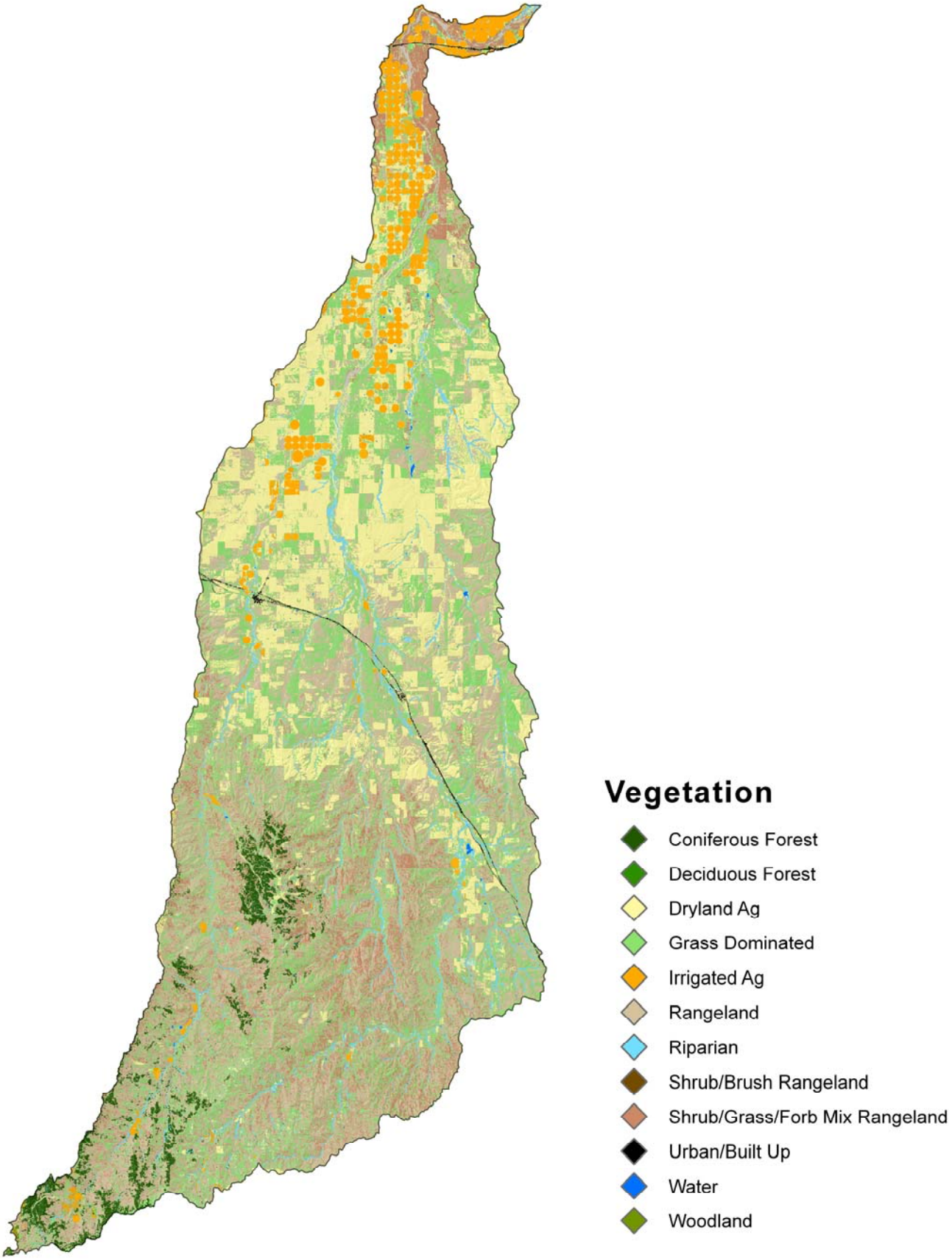
Satallite Imagery: Arc IMS Server - Geography Network Services hosted by ESRI



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
49	**49.1**	Southern Rocky Mountain Foothills	This area is generally a transition between the Great Plains and the Southern Rocky Mountains. The temperature regime is mesic or frigid, and moisture regime is ustic. Characteristic native vegetation ranges from grasslands and shrubs to ponderosa pine and Rocky Mountain Douglas fir forest.
67B	**67B.1**	Central Great Plains, Southern Part	The Central High Plains, Southern Part CRA is broad, undulating to rolling plains dissected by streams and rivers. Local relief is measured in tens of feet on the plains. Soils are deep and formed in aeolian and alluvial materials. Pre-settlement vegetation was short grass prairies. Nearly all of this area in fallow cropland rotations or rangeland. Some cropland areas are irrigated.


52
Hoyt
Leader
Cabin Creek
36
Byers
Peoria
Deer Trail
70
Agate
Bijou
24
Fondis
Elevation
(feet above sea level)
High : 7,418 ft.
Low : 4,294 ft.
Land Owner
Private Owner
State Owned Land

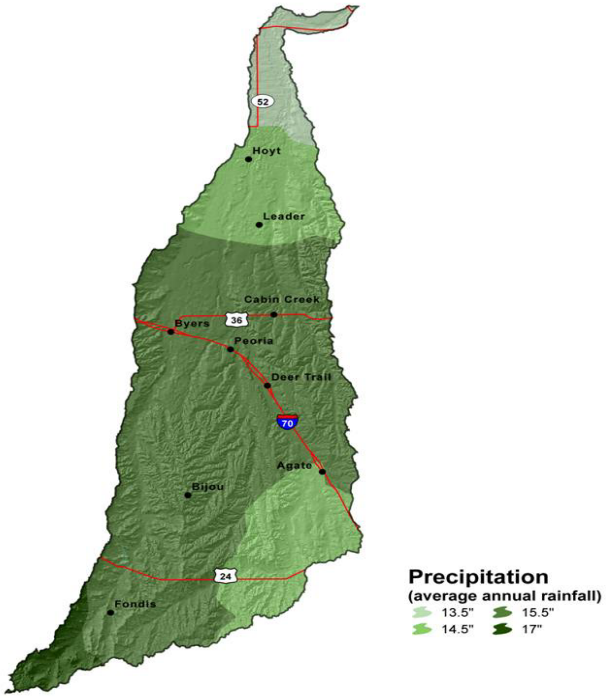

Vegetation
Coniferous Forest
Deciduous Forest
Dryland Ag
Grass Dominated
Irrigated Ag
Rangeland
Riparian
Shrub/Brush Rangeland
Shrub/Grass/Forb Mix Rangeland
Urban/Built Up
Water
Woodland

BIJOU Land Use	Total Acreage	Vegetation	Acreage
Cropland	213,659.00	Dryland Ag	181,577.00
		Irrigated Ag*	32,082.00
Rangeland/Grassland	607,706	Grass Dominated	222,943.09
		Grass/Forb Mix	307,286.97
		Grass/Yucca Mix	33,006.43
		Gambel Oak	194.32
		Mesic Mountain Shrub Mix	2.42
		Sagebrush Community	129.03
		Sagebrush/Grass Mix	16,646.54
		Shrub/Grass/Forb Mix	27,496.83
Forest	22,821	P. Pine/Gambel Oak Mix	159.68
		Ponderosa Pine	22,658.14
		Ponderosa Pine/Douglas Fir Mix	2.77
Riparian	28,358	Cottonwood	7,530.52
		Herbaceous Riparian	9,349.66
		Riparian	11,394.42
		Willow	82.91
Water	769	Water	768.62
Other	8,447	Commercial	1,877.51
		Residential	167.35
		Sand Dune Complex	1,459.14
		Soil	4,942.18
		No Data	0.62
~Total Watershed Acres			**881,758**

*Colorado Decision Support Systems Data

Precipitation

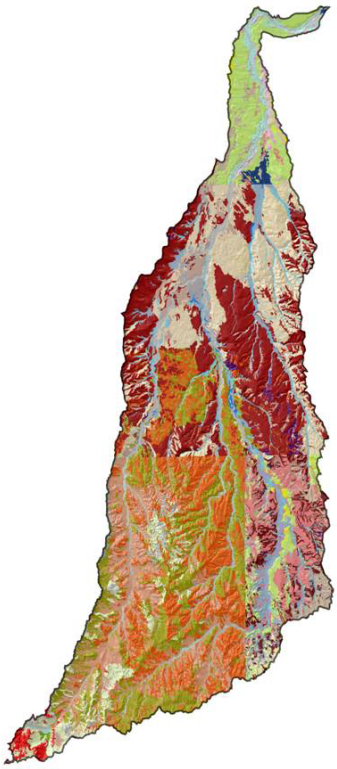
Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series 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 snow. The average annual temperature is from 45 to 55 degrees F. The frost free period averages 162 days but ranges from 133 to 191 days.



Ecological Sites

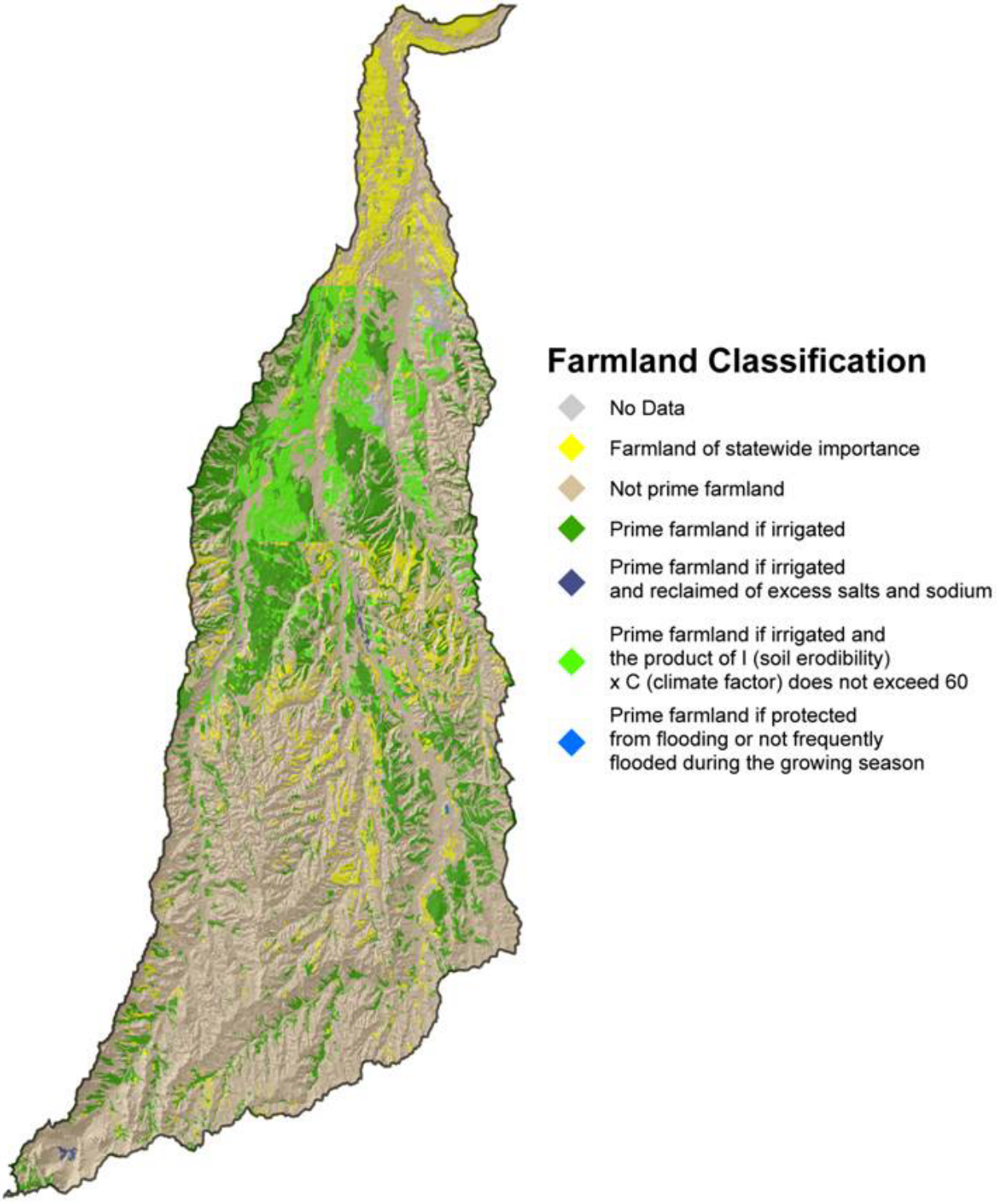
The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

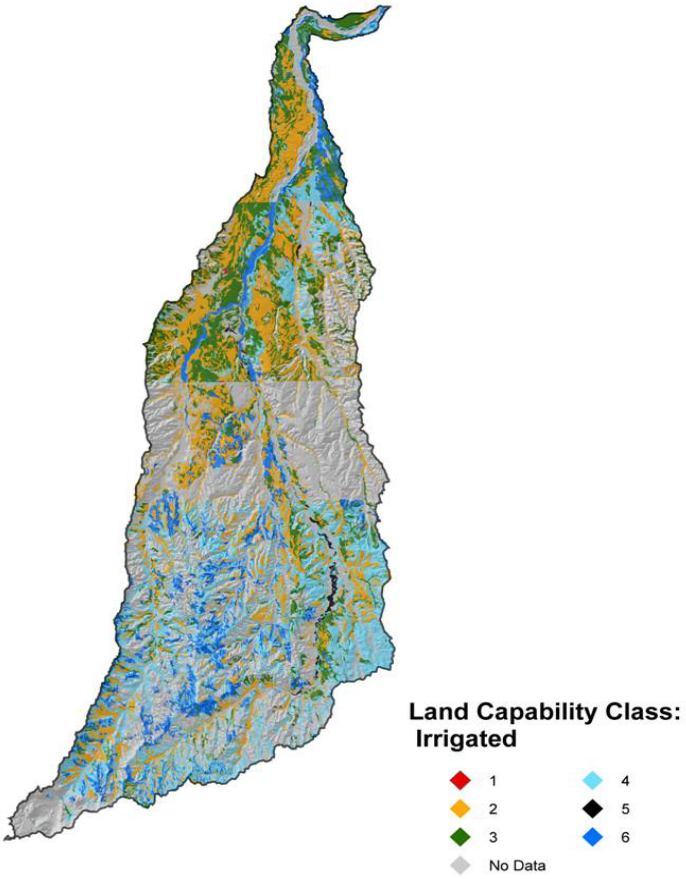
Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available in local offices of the Natural Resources Conservation Service (NRCS) and online at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

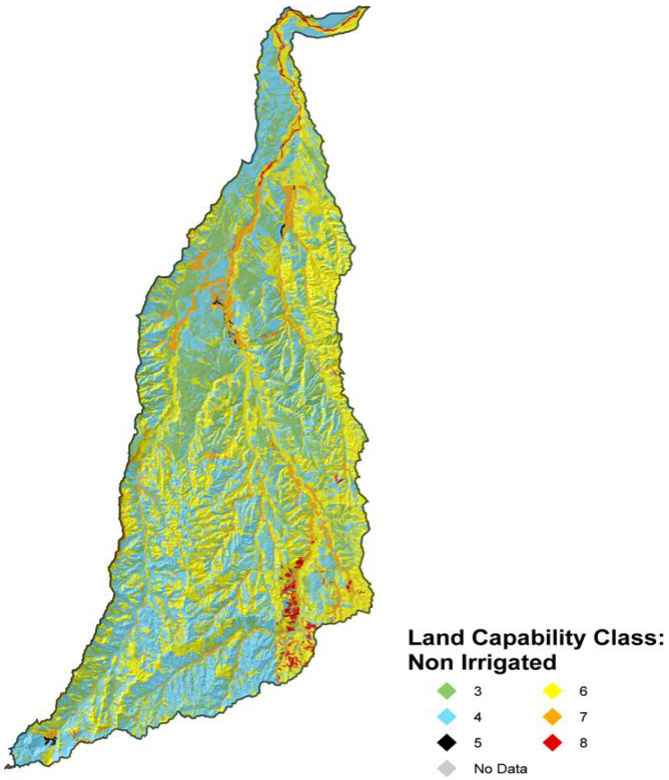


Soil: Ecological Site Name

- No Data
- Alkaline Plains
- Choppy Sands
- Clayey
- Clayey (formerly Clayey Plains)
- Clayey Foothill
- Clayey Foothills
- Clayey Plains
- Deep Sand
- Gravel Breaks
- Loamy
- Loamy (formerly Loamy Plains)
- Loamy Foothill
- Loamy Park
- Loamy Plains
- Loamy Slopes
- Mountain Meadow
- Overflow
- Salt Flat
- Salt Flats
- Salt Meadow
- Sands
- Sands (formerly Deep Sands)
- Sandstone Breaks
- Sandy
- Sandy (formerly Sandy Plains)
- Sandy Bottomland
- Sandy Divide
- Sandy Foothill
- Sandy Meadow
- Sandy Plains
- Shaly Plains
- Wet Meadow


Farmland Classification
No Data
Farmland of statewide importance
Not prime farmland
Prime farmland if irrigated
Prime farmland if irrigated and reclaimed of excess salts and sodium
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if protected from flooding or not frequently flooded during the growing season





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.

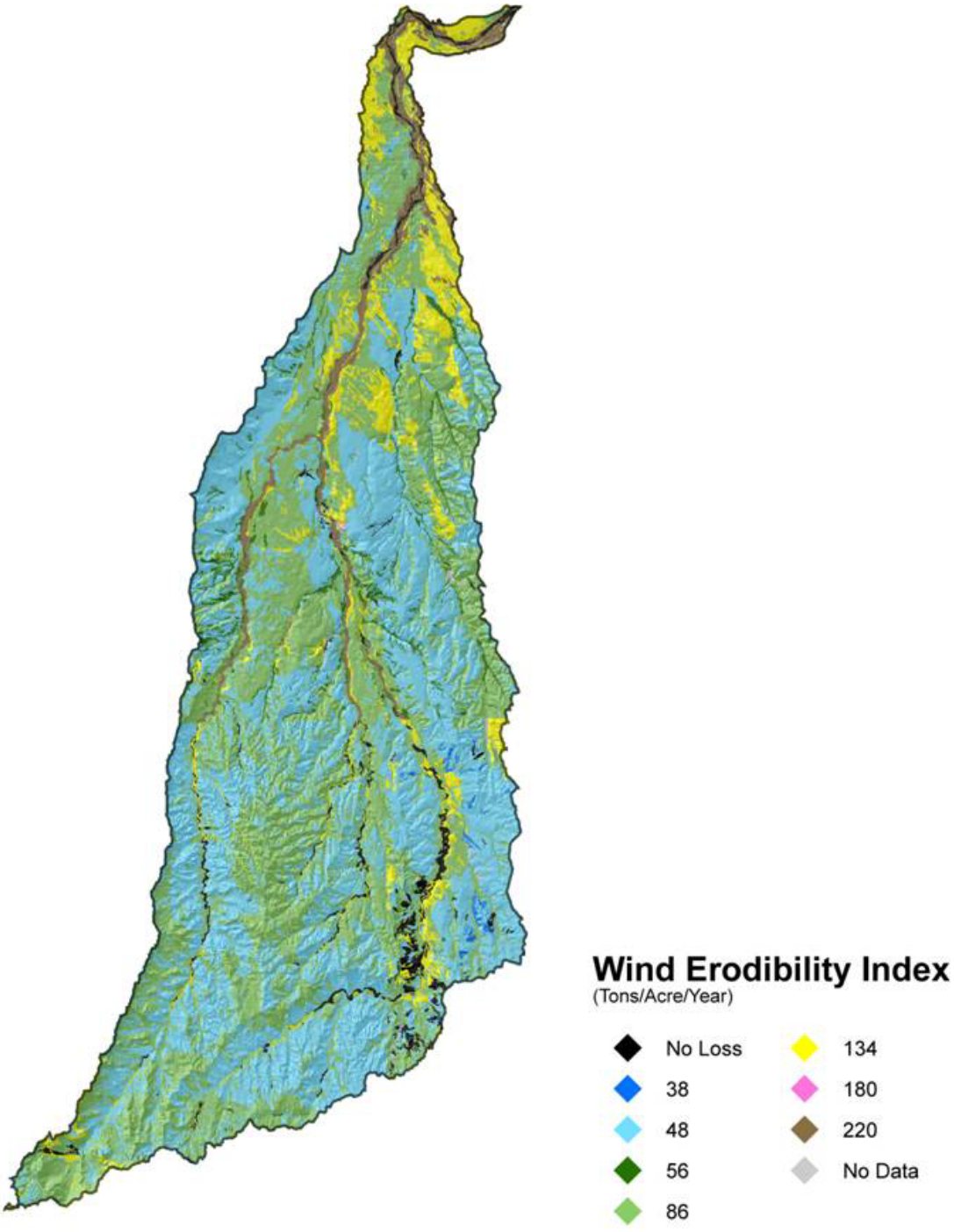
Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

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 Big Sandy Watershed are considered highly erodible.



State & Federally Threatened, Endangered & Candidate Species and Species of Special Concern

Common Name	Scientific Name	Class	State Status	Federal Status	Comments
Bald Eagle	*Haliaeetus leucocephalus*	Birds	Threatened	None	May occur in the watershed
Black-footed Ferret	*Mustela nigripes*	Mammals	Endangered	Endangered	No current records of occurrence
Black-tailed Prairie Dog	*Cynomys ludovicianus*	Mammals	Concern	None	Occurs in the watershed
Brassy Minnow	*Hybognathus hankinsoni*	Fish	Threatened	None	May occur near watershed outlet
Burrowing Owl	*Athene cunicularia*	Birds	Threatened	None	Occurs in the watershed
Common Garter Snake	*Thamnophis sirtalis*	Reptiles	Concern	None	Occurs in the watershed
Cylindrical Papershell	*Anodontoides ferussacianus*	Gastropods	Concern	None	May occur in the watershed
Ferruginous Hawk	*Buteo regalis*	Birds	Concern	None	Occurs in the watershed
Iowa Darter	*Etheostama exile*	Fish	Concern	None	Occurs in the watershed
Least Tern	*Sterna antillarum*	Birds	Endangered	Endangered	Water depletions in the watershed may affect downstream habitats
Long-Billed Curlew	*Numenius americanus*	Birds	Concern	None	Occurs in the watershed
Mountain Plover	*Charadrius montanus*	Birds	Concern	None	Occurs in the watershed
Northern Cricket Frog	*Acris crepitans*	Amphibians	Concern	None	May occur in the watershed
Northern Leopard Frog	*Rana pipiens*	Amphibians	Concern	None	Occurs in the watershed
Pallid Sturgeon	*Scaphirhynchusalbus*	Fish	None	Endangered	Water depletions in the watershed may affect downstream habitats
Piping Plover	*Charadrius melodus*	Birds	Threatened	Threatened	Water depletions in the watershed may affect downstream habitats
Suckermouth Minnow	*Phenacobius mirabilis*	Fish	Endangered	None	May occur in the watershed
Swift fox	*Vulpes velox*	Mammals	Concern	None	Occurs in the watershed
Whooping Crane	*Birds*	Birds	Endangered	Endangered	Water depletions in the watershed may affect downstream habitats

Social Data

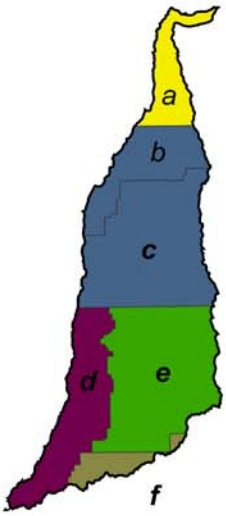
	Adams	Arapahoe	Elbert	ElPaso	Morgan
Demographics (US Census, American Factfinder)					
Total population	396,032	254,207	19,872	550,130	27,171
Male	200,836	258,572	9,966	272,922	13,613
Female	195,196	265,635	9,906	277,208	13,558
Median age (years)	31.2	34.8	37.2	33.5	33.5
White	297,986	410,747	18,923	444,799	21,642
Black or African American	12092	48,874	128	33484	91
American Indian and Alaska Native	3945	4,180	125	4855	221
Asian	14128	24,931	74	15516	47
Native Hawaiian and Other Pacific Islander	66	719	18	1241	46
Some other race	55810	21,919	255	29575	4449
Hispanic or Latino (of any race)	138940	85,131	766	70312	8473
Economic Characteristics (US Census, American Factfinder)					
In labor force (population 16 years and over)	213,189	292,087	11,056	288,867	12,422
Median household income (dollars)	50,650	54,838	62,480	50,714	34,568
Median family income (dollars)	56,053	67,456	66,740	61,719	39,102
Per capita income (dollars)	22,228	30,170	24,960	25,261	15,492
Families below poverty level	x	x	145	x	592
Individuals below poverty level	x	x	791	x	3281
	X means that value is not applicale or not availiable				
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)					
Farms (number)	728	448	1153	1175	761
Land in farms/ranches (acres)	701,471	332,585	1,068,359	811,931	757,946
Average size farm/ranch (acres)	964	742	927	691	996
Median size farm (acres)	159	82	160	160	385
Average age of farmer or rancher	54.6	53.1	52.8	54.1	52.9
Net cash return from ag sales ($1,000)	6,721	1,897	108	2,485	18,627
Cattle and calves (number)	10,000	6,000	36,000	26,000	242,000

Identified Long Range Resource Concerns

Top Three Concerns within Conservation Districts

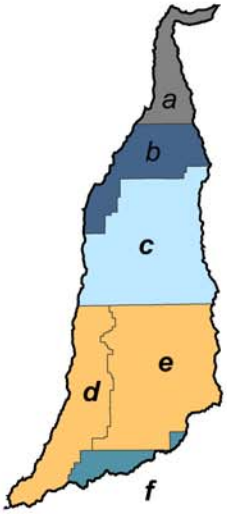
Conservation Districts
- *a Morgan*
- *b East Adams*
- *c Deer Trail*
- *d Kiowa*
- *e Agate*
- *f Double El*

#1



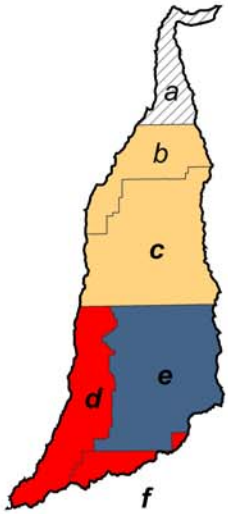
- Funding
- Grazing Management
- Production Agriculture/ Urbanization
- Rangeland
- Wind & Water Erosion

#2



- Wind & Water Erosion
- Noxious Weeds
- Land Use Changes
- Water Quality & Conservation
- Water Quality/Quantity

#3



- None
- Noxious Weed Management & Education
- Small Acreage Development & Management
- Water Quiality/Quantity
- Wind & Water Erosion

Selected Conservation Application Data Bijou 10190010

	FY 2004	FY 2005	FY 2006	FY 2007	Total
Practices					
Prescribed Grazing	17,076	20,236	9,822	5,892	53,026
Irrigation Water Management	2,603	698	1,108	1,674	6,083
Conservation Cropping Rotation	3,193	2,565	2,704	3,033	11,495
Terraces	34,564	10,178	69,122	12,788	126,652
Residue Management (all types)	5,398	4,667	5,796	2,122	17,983

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 300,000 acres need to be treated on median sized ranches of 2,000 acres.			**Based on Conservation System Guide Code:** CO 67B.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 2,000 acres	No.	150	54,842	8,226,300
			Subtotal Rangeland costs:	**$8,226,300**

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

Primary Resource Concern:	**Soil Erosion By Wind on dryland crops**			
Conservation System Description:	Seasonal residue management with Conservation crop rotation, Nutrient and Pest Mgt			**Reference Conservation System Guide Code:** CO 67B.1-CR-Dryland-R-2
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Residue Management	Ac	80,500	10	805,000
Terraces	Ft	1,000,000	1	1,000,000
Nutrient Management	Ac	80,500	5.5	442,750
Pest Management	Ac	80,500	15	1,207,500
			Subtotal Costs Dryland Crops:	**$3,455,250**

Primary Resource Concern:	**Water Quality/Quantity**			
Conservation System Description:	Upgrading Sprinkler irrigation system with IWM, Crop rotation, Nutrient and Pest Management			**Reference Conservation System Guide Code:** CO 67B.1-CR-Sprinkler-R-2
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Irrigation Water Management (449)-includes re-bowl, renozzle, and IWM	Ac	8,000	10.20	81,600
Nutrient Management (590)	Ac	15,000	5	45,000
Pest Management (595)	Ac	15,000	15	225,000
			Subtotal Irrigation Costs:	**$351,600**

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. Wildlife habitat is sustained or improved.	**8,226,300**
Dryland Crop	Soil	409,000 Total Tons/Year saved	Cropland sustainability	**$3,455,250**
Irrigated Crop	Water		Use efficiency	**$351,600**
			Estimated Total Costs to Address Major Resource Concerns:	**$12,033,150**

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.

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

Adams County Area (CO001) Published 01/11/2008	Elbert County W (CO623) Published 12/20/2006
Arapahoe County (CO005) Published 01/25/2008	Elbert County E (CO624) Published 12/16/2005
Morgan County (CO087) Published 11/28/2006	El Paso County Area (CO625) Published 12/19/2005

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. 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.

Cost Data and estimates were derived from the EQIP Cost Lists for the watershed.