

Rapid Watershed Assessment Mimbres Watershed



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Overview

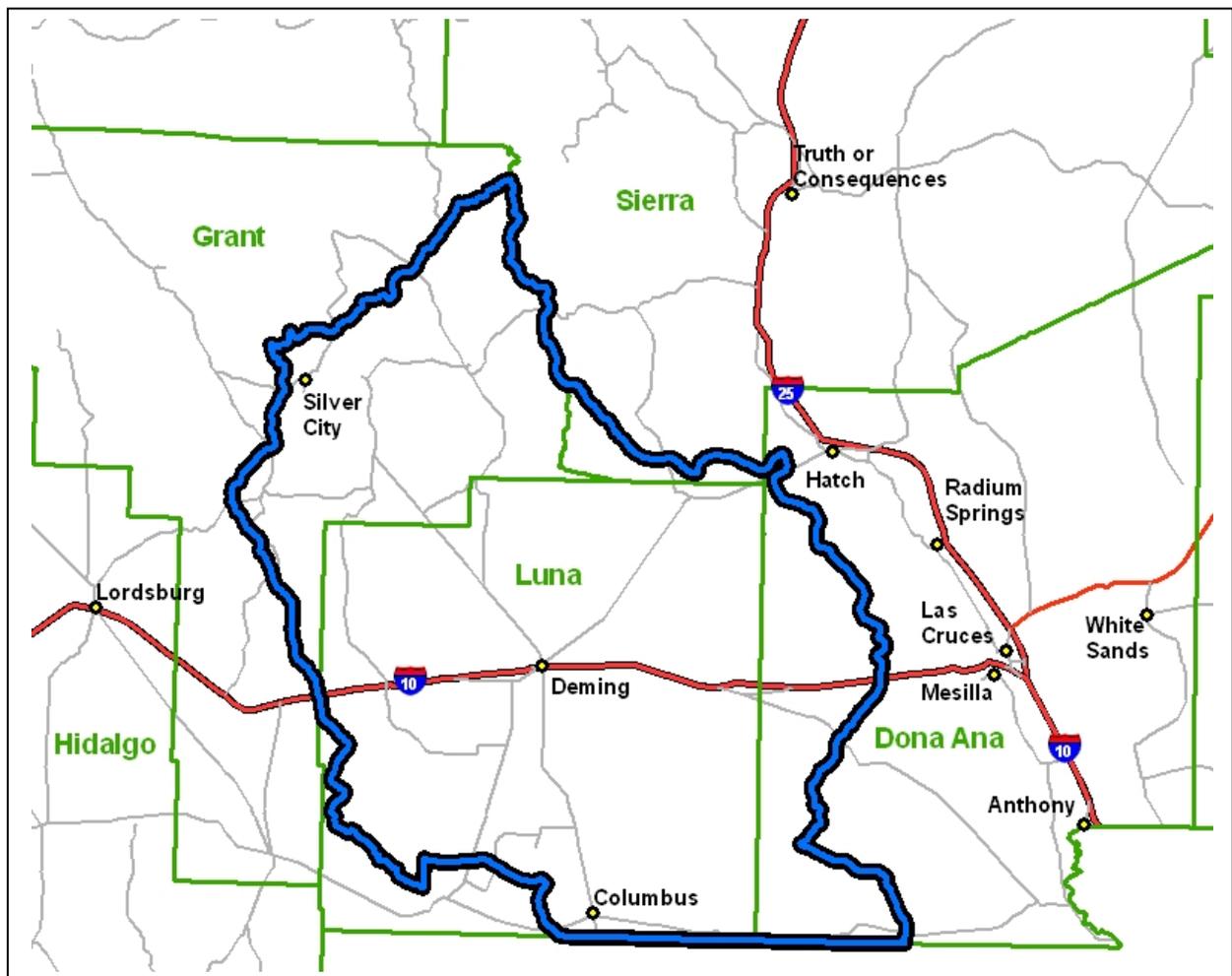
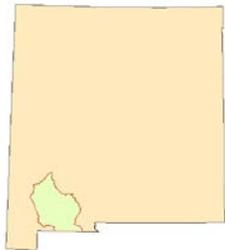


Figure 1. Mimbres watershed overview.



Overview

The Mimbres Watershed is located in southwest New Mexico and covers 2.94 million acres (12,000 sq. km). Portions of the Mimbres watershed extend into Doña Ana, Grant, Luna, and Sierra counties. The majority of the watershed falls in Luna Co. which also shares the largest extent of its boundary with the watershed. Table 1 summarizes the distribution of the Mimbres watershed.

COUNTY	Co. Acres Total	Acres in HUC	% of HUC in Co.	% of Co. in HUC
Doña Ana	2,441,264	408,360	13.9	16.7
Grant	2,543,509	743,024	25.3	29.2
Luna	1,899,449	1,720,088	58.4	90.6
Sierra	2,711,922	72,058	2.4	2.7
Sum (Σ)	--	2,943,530	100	--

Table 1. Mimbres watershed acreage distribution.



General History of the area:

This watershed has natural resources that can be used with proper management. From its forested mountains in three sides, down to the rangelands of the valley, it has many windmills for watering livestock and wildlife. The waters of the Gila and Mimbres rivers bring life to the valley and help the agricultural land flourish. The area is historically rich and has had an extremely vibrant past. From 800 to 1100 years ago, various different native people (Clovis, Mogollon, Mimbres, and others) lived and used the Gila and Mimbres river systems on a day to day basis for their livelihood. These people grew corn, beans, and were also hunters/gatherers. The pueblo consisted of pit houses or pueblo groupings, and usually had a large ceremonial structure known as a kiva. The Mimbres people disappeared from the area between the 1100's and 1300's.

Then came the arrival of the Spaniards in the area: Francisco Vázquez de Coronado led the first expedition- the "Tierra Nueva expedition" from 1540 to 1542 A.D. Coronado and approximately 300 of his men and several hundred Indians traveled through the San Simon Valley, and passed through Rodeo, Lordsburg and Reserve up to present day Zuni, NM before they returning to Mexico by way of Phoenix and Tucson AZ.

In the early years of southwestern New Mexico there were Apache raids. Bands of these fierce warriors travelled the area and were led by historically significant chiefs such as Chato, Cochise, Geronimo, Mangas, Coloradas (Red Sleeves), Nana, Natchez and Victorio. The rough terrain and strategic points on the landscape of the Gila Wilderness was a well fortified area where the Apaches felt safe from the U.S. and Mexican Army pursuits. Geronimo is said to have been born and raised in the Gila Wilderness area.

Frustrated with the appointed Spanish rulers the Mexican revolutionaries overthrew the Spanish dictators and established the republic of Mexico in 1821. Soon after the revolution, (25 years) the expansions of the Americas westward promoted a war against Mexico for the same piece of ground. The Treaty of Guadalupe Hidalgo (1821) and the Gadsden Purchase of 1854 claimed much of Mexico's northern lands (California, Arizona, New Mexico, Utah, Nevada and parts of Wyoming and Colorado) as part of the United States domain.

Also in the mid to late 1800's, American bandits Butch Cassidy and the Wild Bunch would frequent the saloons in Silver City. They would work as cowhands at a nearby ranch when they were not engaged in bank and train robberies. Murray Ryan Center in Silver City was once called home to the growing boy by the name of William Bonney or Patrick Henry McCarty, better known as Billy the Kid.

Transportation and the U.S. Mail: The Butterfield Overland Stage operated the Ox Bow route in the area delivering the U.S. Mail to stations and frontier forts between St. Louis, MO, and San Francisco, CA. The Pony Express was also a mail carrier that the Butterfield Stage merged with to create the Wells Fargo Co. The Gadsden Purchase made the planning and development of the second transcontinental railroad within the U.S. possible. The event was commemorated by the driving of a silver stake (1881), which marked the spot where the "Atchison, Topeka and Santa

Fe” completed its junction with the “Southern Pacific”. The railroad defined the town of Deming, NM as a link from the East to the West.

In the southern portion of the watershed lies the small border town of Columbus, NM. On March 9, 1916 Pancho Villa and around 1000 of his men crossed the border from Mexico and attacked the 13th Cavalry at Camp Furlong and the town of Columbus. Today the area is better known for its farming, ranching, and "Deming's future success will lie in its ability to balance growth with industry and economic development."

Physical Setting

Geology:

The headwaters of the Mimbres watershed consist of Tertiary aged volcanic materials consisting of basaltic andesites and rhyolitic pyroclastic ash-flow tuffs. Upon leaving the mountains, the Mimbres River flows through Quaternary aged, conglomerate, piedmont alluvium and basin fill, and modern alluvial sediments. The watershed is characterized with high relief in Gila Mountains Region at the northern end of the watershed and moderate to low relief in the alluvial plains of the central and southern regions. The watershed ranges in elevation from approximately 3950 ft. (1205 m.) 13 mile southeast of Columbus, NM to approximately 10,160 ft.(3095 m.) in the Black Range along Grant Co. and Sierra Co. border. Precipitation ranges from 9 to 37 in. (230 mm to 940 mm), principally a function of elevation. Approximately 80% of the watershed is less than or equal to 10 percent slope, and the two dominant aspects are flat (no aspect) and southern at 23% and 25%, respectively.

The Mimbres watershed is almost entirely a closed and partially drained system. It is considered to be in the Mexican Highlands section of the Basin and Range physiographic province. The Mimbres River is the largest perennial stream in the basin with its headwaters originating in the most northern part of the watershed. The soils within the watershed are greatly influenced by the five mountain ranges: Cooke's and Black Range in the north, the Florida Mountains on the southeastern side of Deming near the center of the county, Mogollon Mountains in the west and the Tres Hermanas Mountains in the southern part of the county near Columbus.

The mountain ranges are made up of a variety of bedrocks: Sedimentary rocks are dominantly limestone and some sandstone and shale. Acid to intermediate igneous intrusive and metamorphic rocks are mainly granite, granodiorite, monzonite, gneiss, schist, and quartzite. Volcanic rocks are acid, intermediate and basic in composition. The bolson or basin floor shows several ages of alluvial deposition near the mouth of the Mimbres river system. The bolsom is a broad, nearly level area that occupies most center and southern portion of the watershed.

A narrow north-south oriented belt of windblown sand occupies the transition zone between the basin floor, and the piedmont slopes in the southeastern part of the watershed. It has been suggested that since this strip of sand dunes are on the leeward side of the watershed, that it could have been removed from the basin floor and re-deposited by wind forces.



Soils:

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. The soils in the Mimbres Watershed are assigned to four groups (A, B, C, and D).



Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.



Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.



Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.



Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

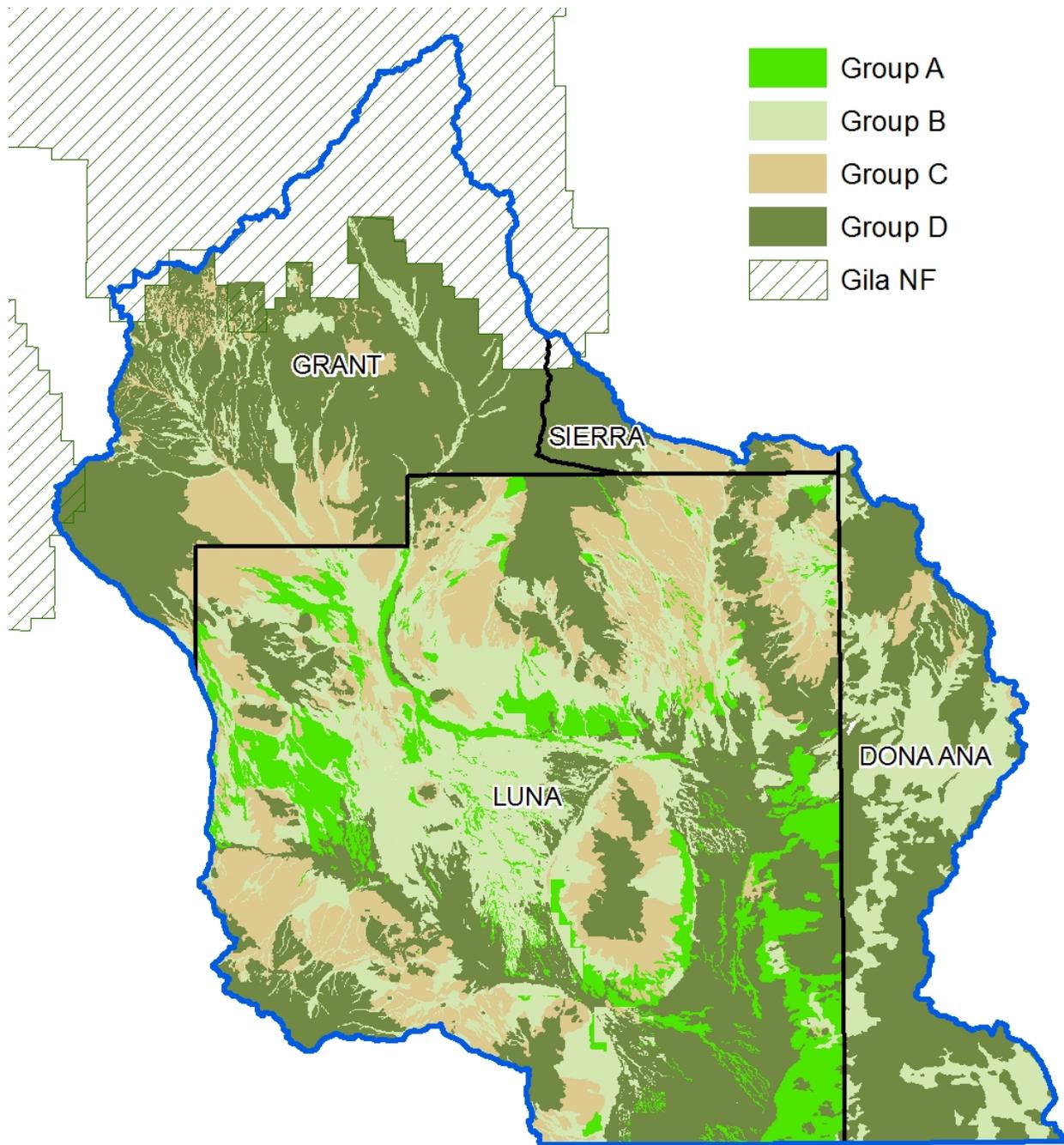


Figure 2. Hydrologic Soil Group

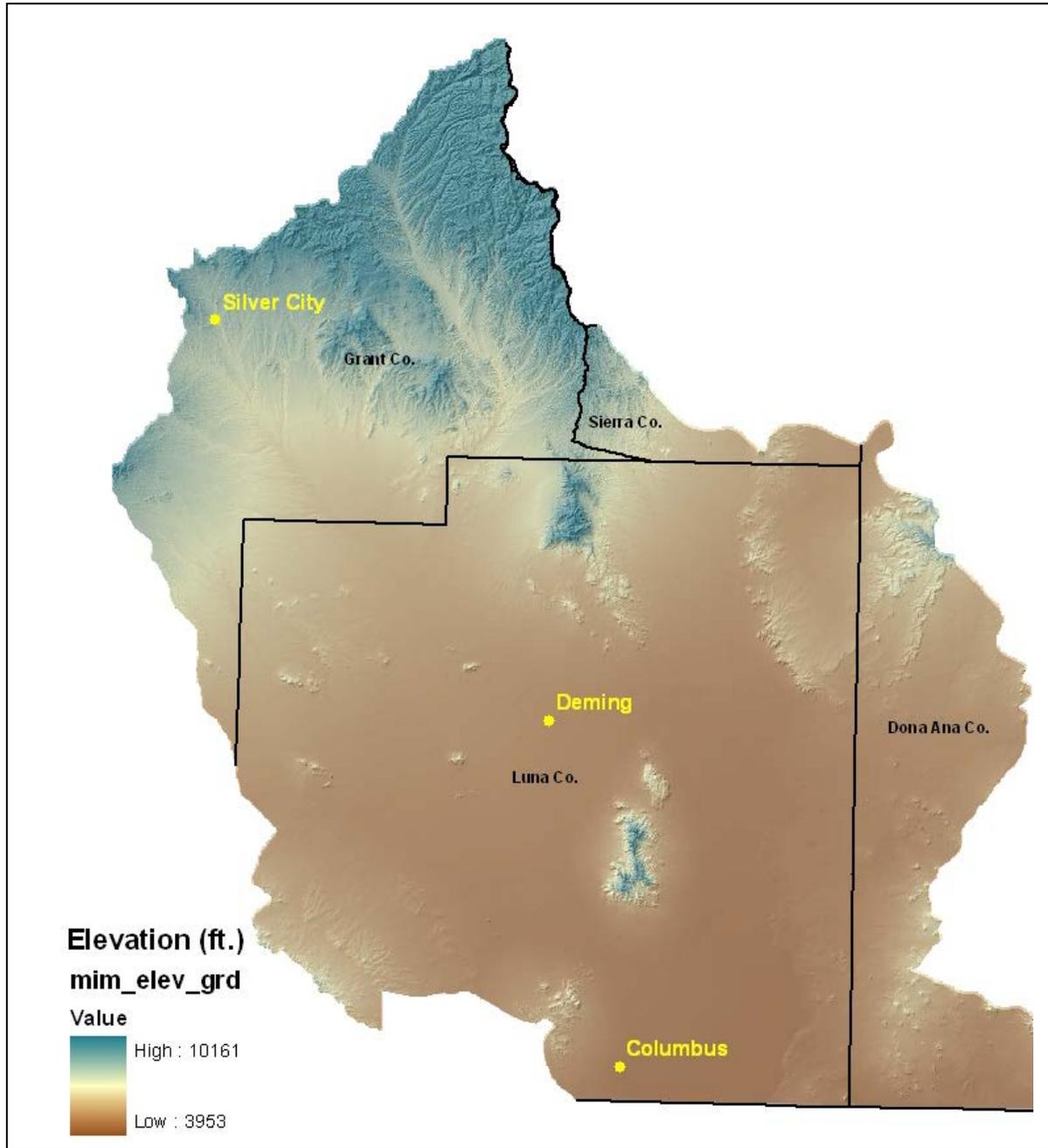


Figure 3. Mimbres watershed shaded relief.

Precipitation

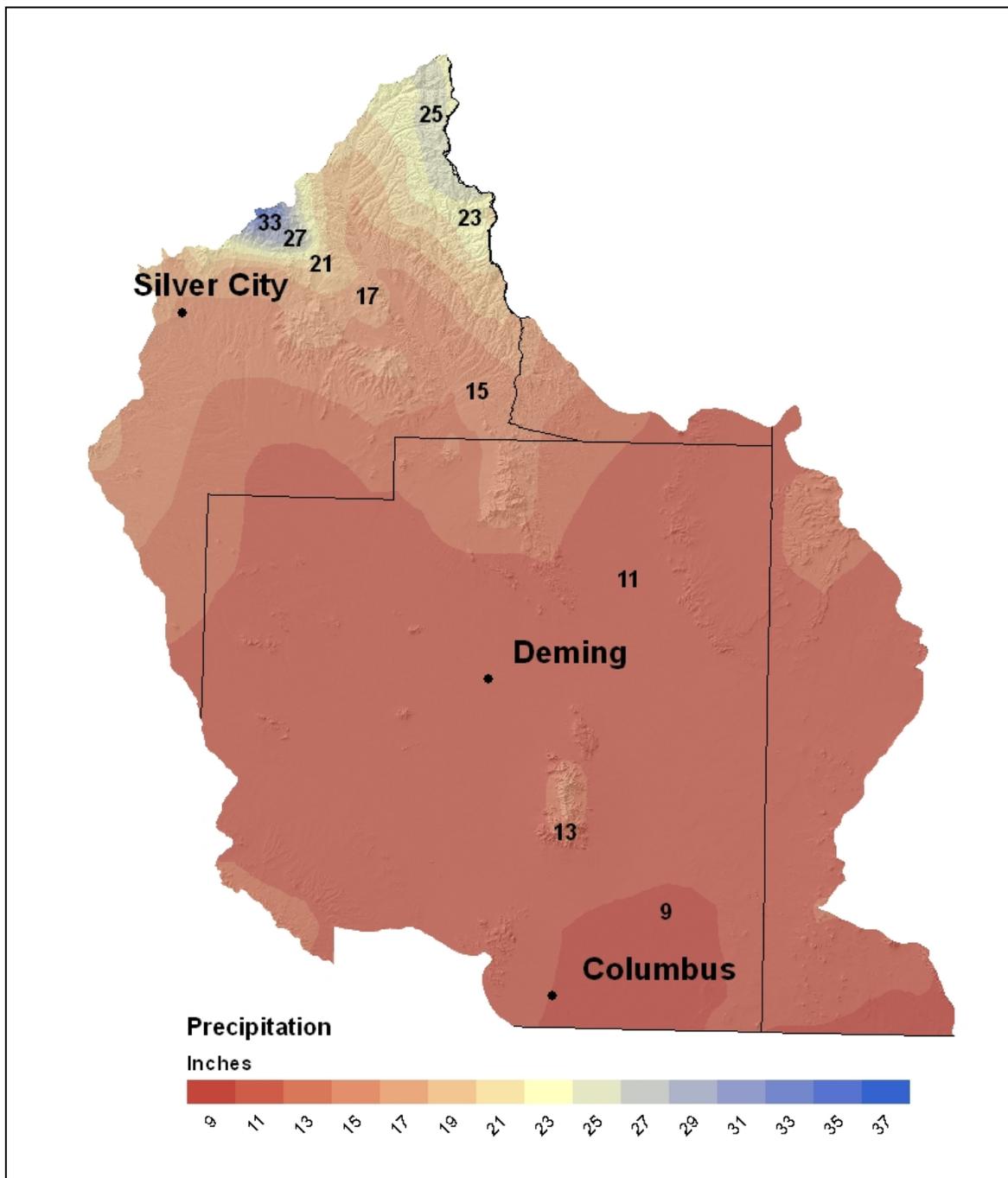


Figure 4. Mimbres watershed annual precipitation.



Land Ownership ²

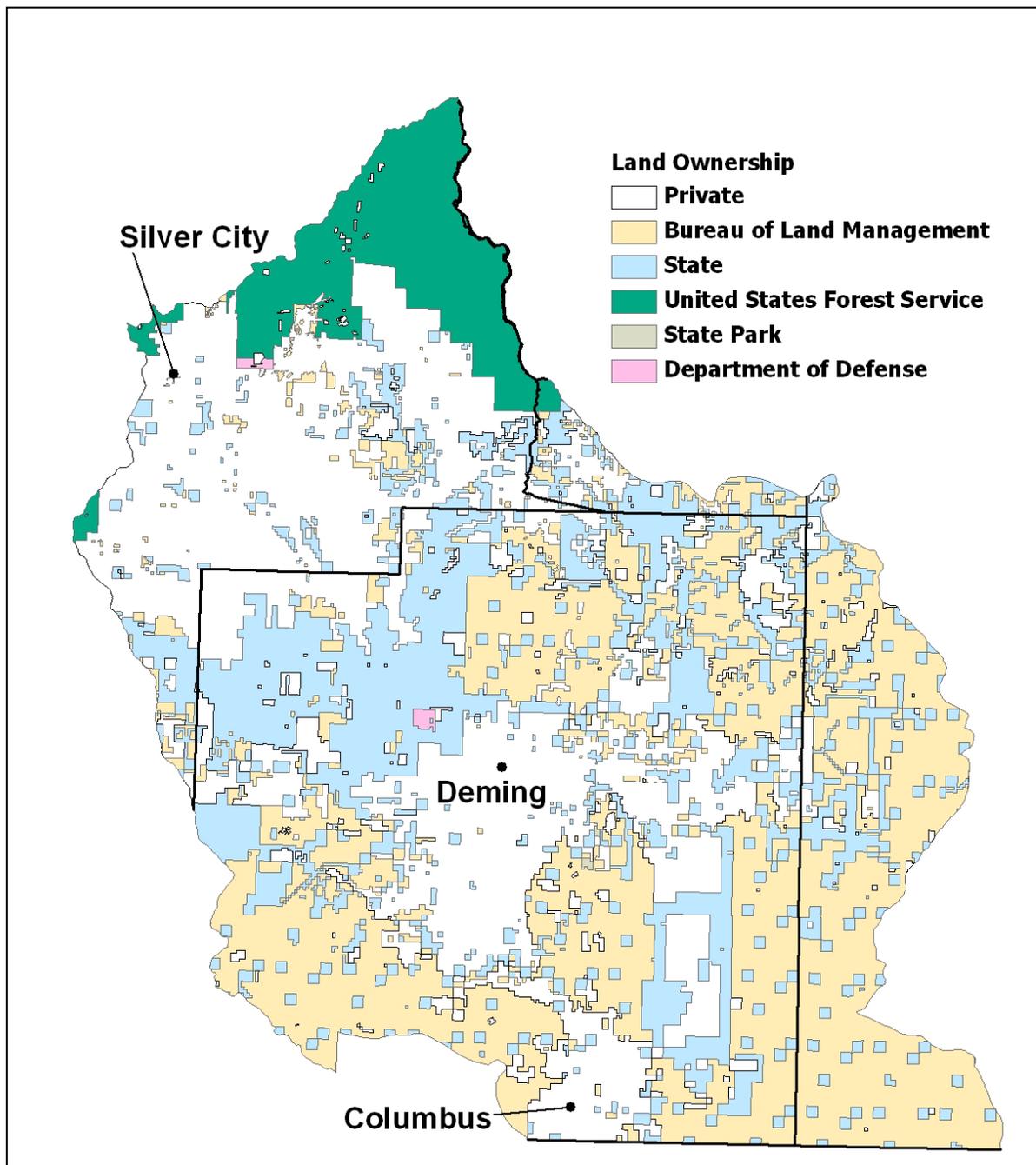


Figure 5. Mimbres watershed land ownership.



Land Ownership

COUNTY	BLM	Private	State	USFS	DoD	State Park
Doña Ana	307,900	20,00	80,400			
Grant	29,200	433,000	77,000	202,200	1,700	
Luna	620,000	574,000	522,900	5,000	2,100	800
Sierra	16,300	21,800	29,000			
Watershed (Σ)	973,600	1,048,700	709,300	207,300	3,800	800
% Watershed	33	36	24	7	< 1	<1

Table 2. Land ownership in the Mimbres watershed. Reported to the nearest hundred acres.



Land Use / Land Cover ^{3,4}

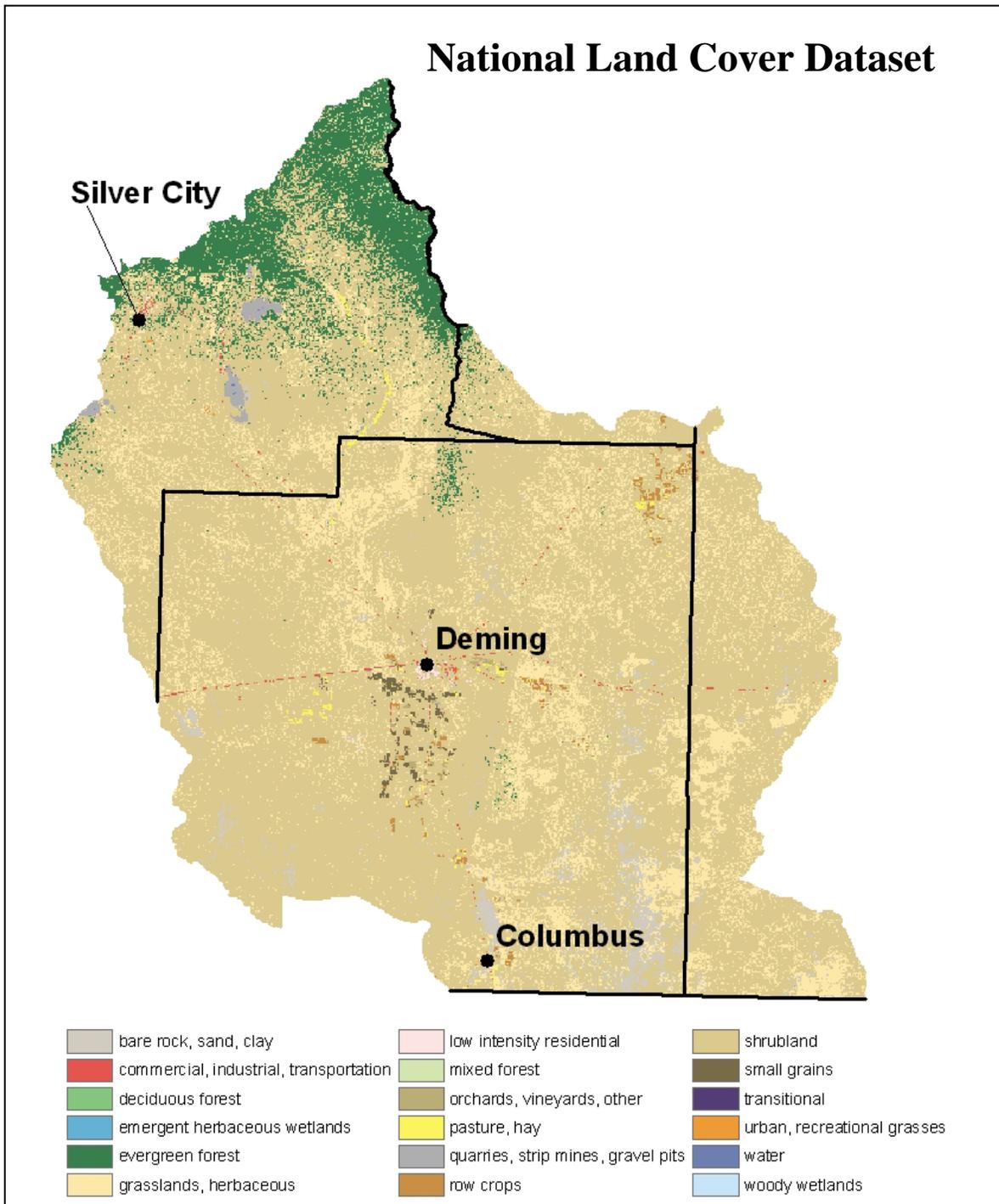


Figure 6. Subset of the National Land Cover Dataset over the Mimbres watershed.



Land Use / Land Cover

The U.S. Geological Survey (USGS) produced the National Land Cover Dataset (NLCD) as part of a cooperative project between the USGS and the U.S. Environmental Protection Agency (USEPA). The goal of this project was to produce a consistent land cover data layer for the conterminous United States. The Multiresolution Land Characterization (MRLC) Consortium collected the data used to compile the NLCD. The MRLC Consortium is a partnership of Federal agencies that produce or use land cover data; partners include the UNITED STATES GEOLOGICAL SURVEY (National Mapping, Biological Resources, and Water Resources Divisions), USEPA, the U.S. Forest Service, and the National Oceanic and Atmospheric Administration.

<u>Land use / Land cover</u>	<u>Acres</u>	<u>% of Watershed</u>
shrubland	2,086,700	71%
grasslands, herbaceous	530,000	18%
evergreen forest	201,200	7%
bare rock, sand, clay	69,600	2%
row crops	11,300	< 1%
quarries, strip mines, gravel pits	11,000	< 1%
small grains	8,700	< 1%
pasture, hay	7,500	< 1%
commercial, industrial, transportation	6,500	< 1%
mixed forest	4,700	< 1%
low intensity residential	3,600	< 1%
orchards, vineyards, other	2,700	< 1%
woody wetlands	500	< 1%
urban, recreational grasses	500	< 1%
water	400	< 1%
deciduous forest	300	< 1%
emergent herbaceous wetlands	100	< 1%

Table 3. Extent of NLCD classes in the Mimbres watershed. Reported to the nearest hundred acres.



Land Use / Land Cover

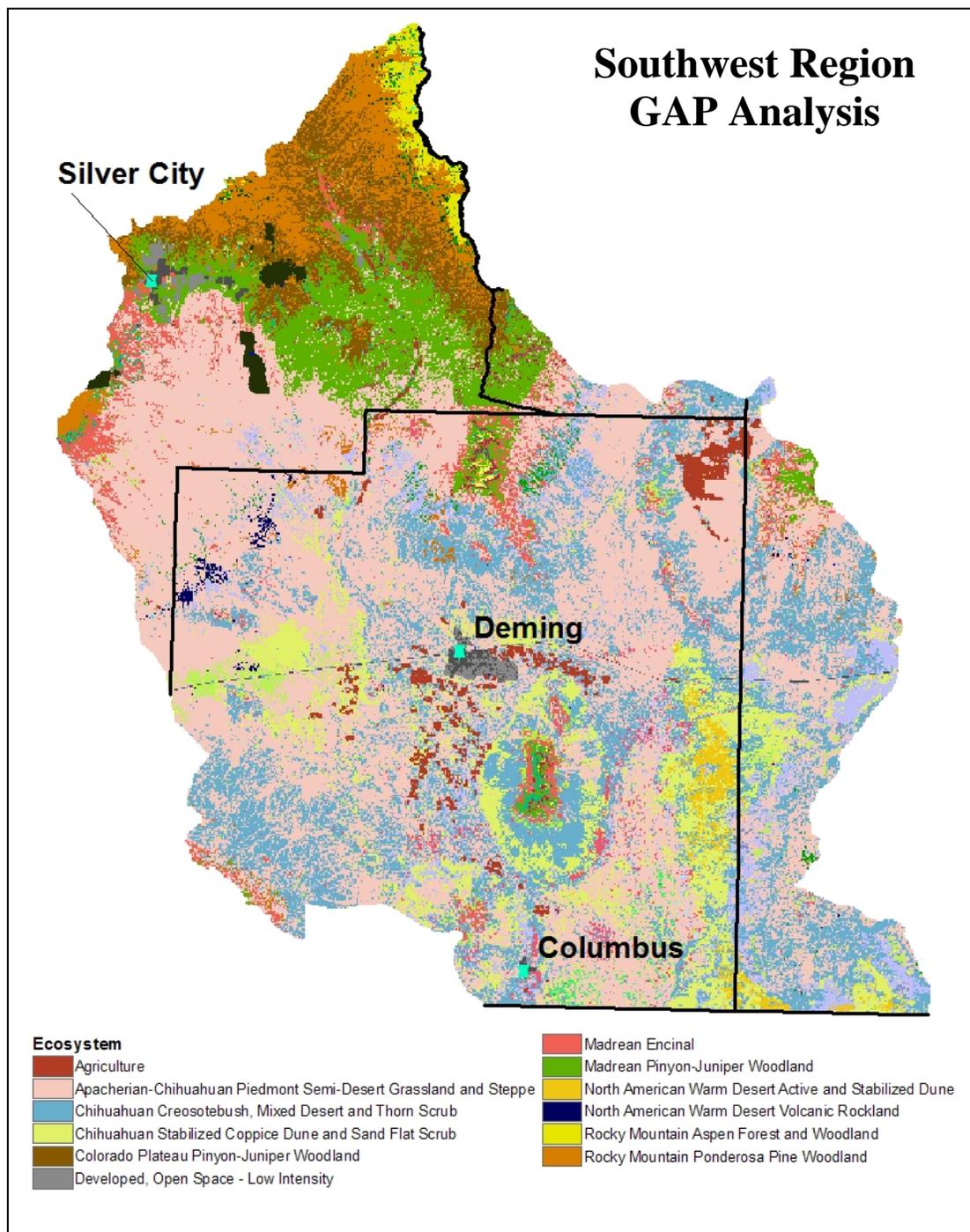


Figure 7. Subset of the SWREGAP over the Mimbres watershed. The 12 dominant ecosystems are displayed in the legend.



Land Use / Land Cover

The landcover mapping effort for the Southwest Region Gap Analysis Project was a coordinated multi-institution endeavor. This dataset was created for regional terrestrial biodiversity assessment. Additional objectives were to establish a coordinated mapping approach to create detailed, seamless maps of land cover, all native terrestrial vertebrate species, land stewardship, and management status, and to analyze this information to identify those biotic elements that are underrepresented on lands managed for their long term conservation.

<u>Ecosystem</u>	<u>Acres</u>	<u>% of Watershed</u>
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	1,250,900	42
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	529,000	18
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	233,800	8
Madrean Pinyon-Juniper Woodland	178,600	6
Apacherian-Chihuahuan Mesquite Upland Scrub	129,500	4
Rocky Mountain Ponderosa Pine Woodland	128,700	4
Colorado Plateau Pinyon-Juniper Woodland	108,700	4
Madrean Encinal	82,300	3
Agriculture	45,100	2
Chihuahuan Mixed Salt Desert Scrub	35,300	1
North American Warm Desert Active and Stabilized Dune	27,700	1
Rocky Mountain Aspen Forest and Woodland	26,300	1
Chihuahuan Sandy Plains Semi-Desert Grassland	23,800	1
Developed, Open Space - Low Intensity	14,700	< 1
Mogollon Chaparral	14,500	< 1
North American Warm Desert Pavement	14,500	< 1
Developed, Medium - High Intensity	14,000	< 1
Recently Mined or Quarried	13,800	< 1
Madrean Juniper Savanna	12,900	< 1
Madrean Pine-Oak Forest and Woodland	9,700	< 1
North American Warm Desert Lower Montane Riparian Woodland and Shrubland	8,100	< 1
Chihuahuan Succulent Desert Scrub	7,100	< 1
North American Warm Desert Volcanic Rockland	6,000	< 1
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	5,100	< 1
Colorado Plateau Mixed Bedrock Canyon and Tableland	4,600	< 1

Table 4. SW Region Gap analysis ecosystem acreages. Reported to the nearest hundred acre



Land Use / Land Cover

<u>Ecosystem</u>	<u>Acres</u>	<u>% of Watershed</u>
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	3,700	< 1
Inter-Mountain Basins Semi-Desert Shrub Steppe	3,600	< 1
North American Warm Desert Bedrock Cliff and Outcrop	3,000	< 1
North American Warm Desert Wash	2,200	< 1
Inter-Mountain Basins Semi-Desert Grassland	1,900	< 1
Rocky Mountain Cliff and Canyon	1,500	< 1
Chihuahuan Gypsophilous Grassland and Steppe	1,300	< 1
North American Warm Desert Riparian Woodland and Shrubland	900	< 1
North American Warm Desert Playa	800	< 1
Madrean Upper Montane Conifer-Oak Forest and Woodland	400	< 1
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	300	< 1
Open Water	300	< 1
Inter-Mountain Basins Juniper Savanna	200	< 1
Southern Rocky Mountain Pinyon-Juniper Woodland	100	< 1
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	100	< 1
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	100	< 1
Southern Rocky Mountain Montane-Subalpine Grassland	100	< 1
North American Warm Desert Riparian Mesquite Bosque	100	< 1

Table 4 cont'd. SW Region Gap analysis ecosystem acreages.



Hydrology 5, 6, 7, 8, 9, 10

The National Hydrography Dataset (NHD) is a comprehensive set of data that encodes information about naturally occurring and constructed bodies of water, paths through which water flows, and related entities. The NHD identifies about 9, 015 miles (14, 500 km) of water courses in the Mimbres River Watershed. The majority of these courses are ephemeral and typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms. The Mimbres River, at the town of Mimbres, through the period 1979 – 2003 has had mean annual discharge of 19.0 cubic feet per second ranging from 3.1 to 41.7 cubic feet per second.

The New Mexico Water Quality Control Commission (NMWQCC) is the issuing agency of water quality standards for interstate and intrastate waters. The NMWQCC has defined the Mimbres watershed as one of four closed river basins in New Mexico. The Mimbres River has been subdivided into four reaches:

1. Mimbres River perennial reaches below Mimbres, NM (Willow Springs Canyon)
2. Mimbres River perennial reaches above Mimbres, NM (Willow Springs Canyon)
3. Mimbres River at Bear Canyon Reservoir
4. Ephemeral and intermittent tributaries

The listed uses for these reaches of the Mimbres River have been designated as-

Use	Upstream of Mimbres, NM	Downstream of Mimbres, NM	Bear Canyon Reservoir	Ephemeral or Intermittent
high quality coldwater aquatic life	x			
coldwater aquatic life	x	x	x	
irrigation	x	x	x	
domestic water supply	x			
livestock watering	x	x	x	x
wildlife habitat	x	x	x	x
aquatic life or limited aquatic life				x
secondary contact	x	x	x	x

Table 5. Listed uses of the Mimbres River.



Hydrology

Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes, are required to develop lists of impaired waters. These are waters for which technology-based regulations and other required controls are not stringent enough to meet the water quality standards set by states. The law requires that states establish priority rankings for waters on the lists and develop Total Maximum Daily Loads (TMDLs), for these waters. A TMDL is a calculation of the maximum amount of a pollutant a water body can receive and still safely meet water quality standards. Within the Mimbres Watershed, 3 bodies of water are listed as impaired as of the 2002 listing cycle. The river and stream reaches total 96 miles (1542 km) and the listed water body, Bear Canyon Reservoir, covers 8.8 ac (0.04 sq. km).

	Impairment					
	Dissolved Oxygen	Temperature	Eutrophication	Total Fecal and Coliform	Mercury	Sedimentation
Bear Canyon Reservoir	x		x		x	x
Mimbres River--Perennial reaches downstream of Mimbres, NM		x		x		
Mimbres River--Perennial reaches Mimbres, NM to Cooney Canyon	x	x				

Table 6. Clean Water Act reaches and impairments within the Mimbres watershed.

Bear Canyon Reservoir, approximately 2 miles above the town of Mimbres, NM, supports a non-native sport fishery including channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), and rainbow trout (*Oncorhynchus mykiss*). Sediment accumulation in Bear Canyon Reservoir in the past has prompted draining and excavation to improve sportfish habitat. Though the rate of sediment deposition is expected to diminish as watershed conditions improve, excavation is likely to again be necessary.

Hydrology

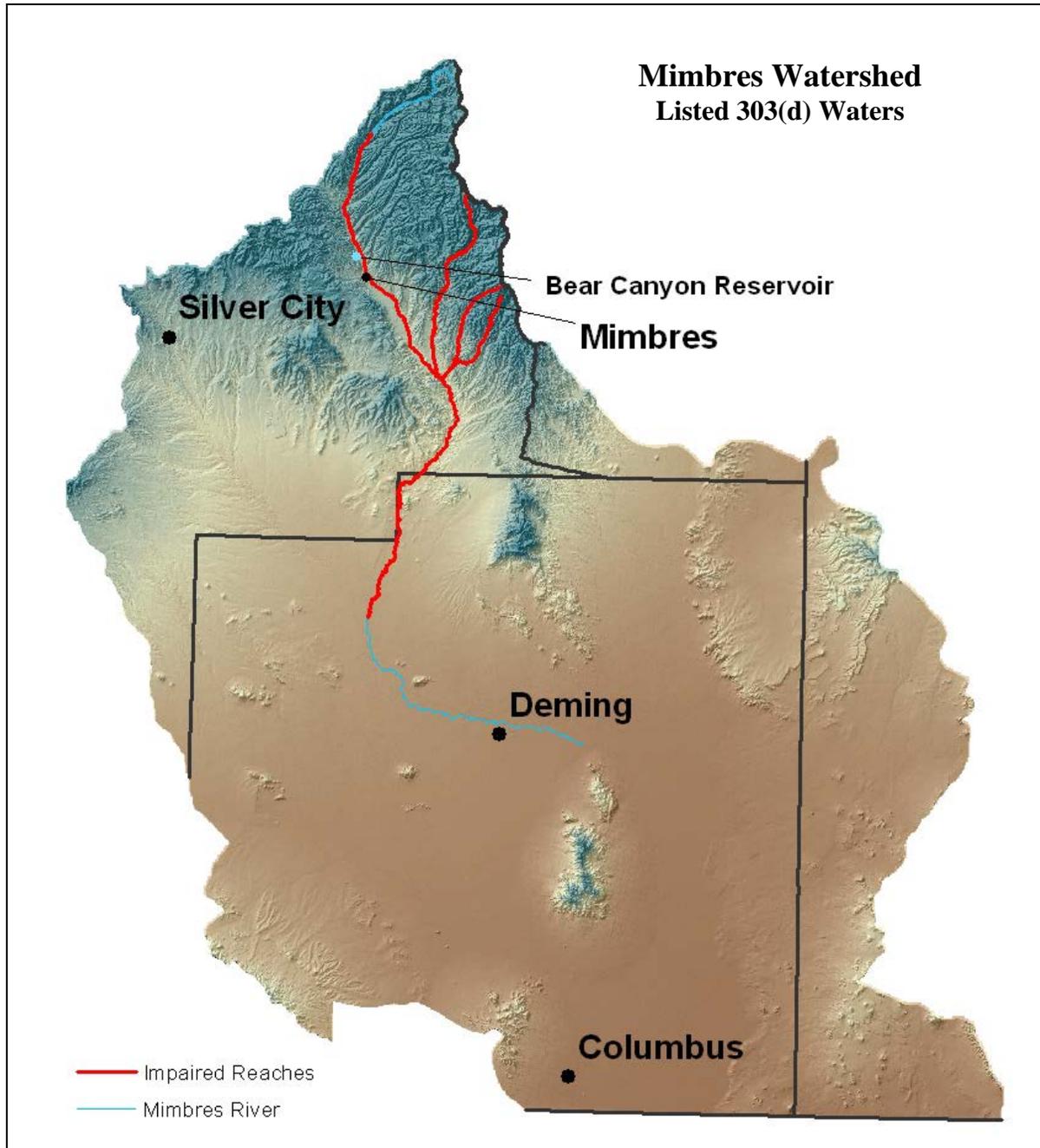


Figure 8. Impaired reaches of the Mimbres River.



Hydrology

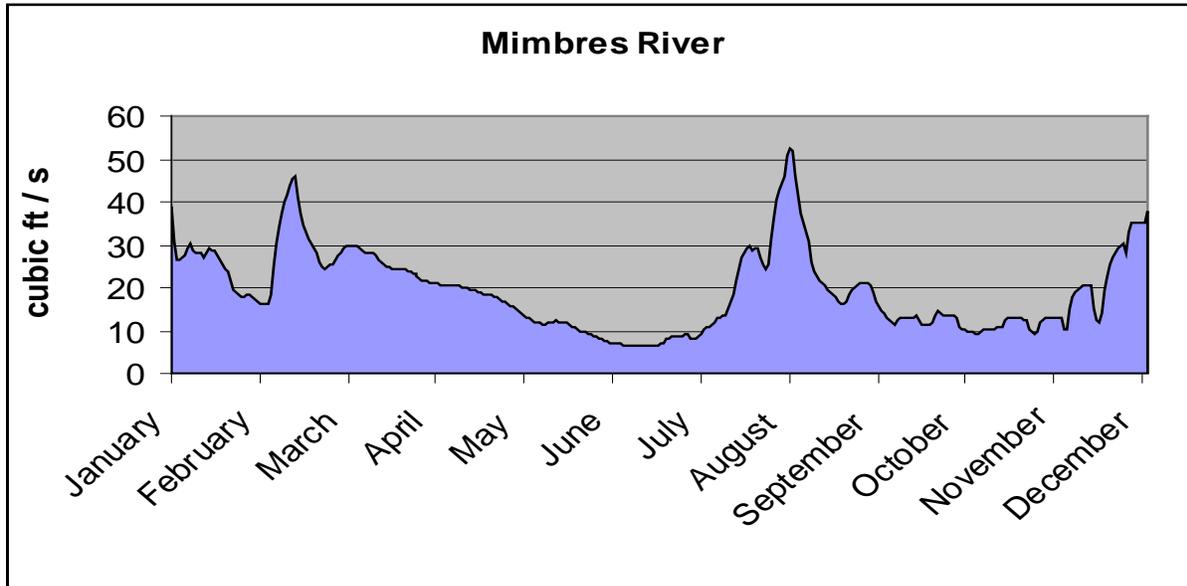


Figure 9. 10 day running mean of daily flow on the Mimbres River at Mimbres, NM. Period of observation: 1979 – 2007.

The Mimbres River system was identified as a priority participant for the Office of the State Engineer’s Active Water Resource Management (AWRM) plan. The AWRM initiative was launched in January 2004 in response to continued drought conditions in New Mexico. Active Water Resource Management refers to the essential tools and elements needed to enable the State Engineer to actively manage the state’s limited water resources. In New Mexico, the state constitution makes priority of right the basis for water administration. However, recent drought years have compelled the State Engineer to realize that, should it become necessary to conduct priority administration, the tools necessary to do so are not yet in place. The tools for AWRM include: measuring and metering, rules and regulations, creation of water districts and appointment of water masters, and development of water master manuals.

There are two declared groundwater basins in the Mimbres watershed. A declared groundwater basin is an area of the state proclaimed by the State Engineer to be underlain by a groundwater source having reasonably ascertainable boundaries. By such proclamation the State Engineer assumes jurisdiction over the appropriation and use of groundwater from the source. The Mimbres and Nutt-Hockett are the two groundwater basins that are recognized within this watershed and cover approximately 2.7 million acres (10, 900 sq. km) and 80 thousand acres (320 sq. km.), respectively.



Threatened and Endangered Species ¹¹

Endangered species are those that are at risk of extinction throughout all or a significant portion of its native range. A threatened species is one that is likely to become endangered in the foreseeable future. The New Mexico Natural Heritage program tracks the status of threatened and endangered species which are listed on both federal and state lists. Table 7 lists those species which are currently listed and tracked in the Mimbres River Watershed.

<u>Common Name</u>	<u>Scientific Name</u>	<u>Tax.Class</u>	<u>Family</u>	<u>Fed Status</u>	<u>State Status</u>
Terrestrial Snail	<i>Oreohelix florida</i>				E
Cook's Peak Woodland snail	<i>Ashmunella macromphala</i>				T
Beautiful Shiner	<i>Cyprinella formosa</i>	Actinopterygii	Cyprinidae	T	
Chihuahua Chub	<i>Gila nigrescens</i>	Actinopterygii	Cyprinidae	T	E
Gila Trout	<i>Oncorhynchus gilae gilae</i>	Actinopterygii	Salmonidae	E	T
Chiricahua Leopard Frog	<i>Rana chiricahuensis</i>	Amphibia	Ranidae	T	
Common Black-Hawk	<i>Buteogallus anthracinus</i>	Aves	Accipitridae		T
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Aves	Strigidae	T	
Desert Night-blooming Cereus	<i>Peniocereus greggii</i> var. <i>greggii</i>	Dicotyledoneae	Cactaceae		E
Sand Prickly-pear	<i>Opuntia arenaria</i>	Dicotyledoneae	Cactaceae		E
Parish's Alkali Grass	<i>Puccinellia parishii</i>	Monocotyledoneae	Poaceae		E

Table 7. Threatened and endangered plant and animal species.

Invasive Species ¹²

Invasive species are those which have been introduced into a region or ecosystem and have the ability to out-compete native species for resources (i.e. water, nutrients, sunlight, etc.) The Southwest Exotic Plant Mapping Program (SWEMP) is a collaborative effort between the United States Geological Survey and federal, tribal, state, county and non-government organization partners in the southwest which maintains ongoing efforts to compile and distribute regional data on the occurrence of non-native invasive plants in the southwestern United States. Within the Mimbres watershed, the SWEMP has identified 3 species of invasive plants (Table 8). Each of these species is defined as non-native by the USDA PLANTS database.

<u>Scientific Name</u>	<u>Common Name</u>
<i>Alhagi maurorum</i>	camelthorn
<i>Centaurea melitensis</i>	Maltese star-thistle
<i>Peganum harmala</i>	African rue

Table 8. Invasive species recognized by the SWEMP.



Common Resource Areas

A Common Resource Area (CRA) is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) designation. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area.

Each Common Resource Area will have multiple Conservation System Guides associated with it. A Conservation System Guide associates, for a given CRA and land use, different components of Resource Management Systems and their individual effect on conserving soil and water resources.

39.1 - Mogollon Plateau Coniferous Forests

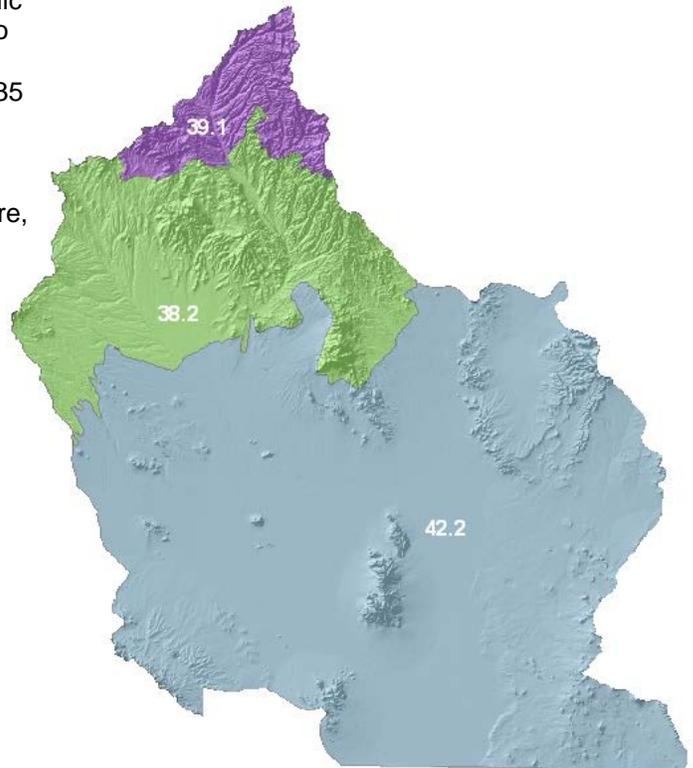
This unit occurs within the Colorado Plateau Physiographic Province and is characterized by volcanic fields and gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Elevations range from 7000 to 12500 feet. Precipitation averages 20 to 35 inches per year. The soil temperature regime ranges from mesic to frigid. The soil moisture regime ranges from typic ustic to udic ustic. Vegetation includes ponderosa pine, Gambel oak, Arizona walnut, sycamore, and Douglas fir.

38.2 - Interior Chaparral – Woodlands

This unit occurs within the Transition Zone Physiographic Province and is characterized by canyons and structural troughs or valleys. Igneous, metamorphic and sedimentary rock occurs on rough mountainous terrain. Elevations range from 4000 to 5500 feet. Precipitation averages 16 to 20 inches per year. The soil temperature regime ranges from thermic to mesic. The soil moisture regime is aridic ustic. Vegetation includes turbinella oak, silktassel, juniper, pinyon, sugar sumac, and bullgrass.

42.2 - Chihuahuan Desert Shrubs

This unit occurs within the Basin and Range Physiographic Province and is characterized by valley plains, alluvial fans, and mountains. Sediments are from fluvial, lacustrine, colluvial and alluvial deposits. Igneous and metamorphic rock dominate the mountain ranges. Elevations range from 3800 to 5200 feet. Precipitation ranges from 8 to 10 inches per year. The soil temperature regime is thermic. The soil moisture regime is typic aridic. Vegetation includes Creosote, tarbush, soap tree yucca, torrey yucca, tobosa, and alkali sacaton.



Conservation ¹³

The USDA-Natural Resources Conservation Service (NRCS) focuses on the development and delivery of high quality products and services that enable people to be good stewards of our Nation's soil, water, and related natural related resources on non-Federal lands. The Natural Resources Conservation Service's conservation programs aid agricultural producers in their efforts to reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters. Public benefits include enhanced natural resources that help sustain agricultural productivity and environmental quality while supporting continued economic development, recreation, and scenic beauty. In fiscal year 2008 there were 558 planned conservation practices covering more than 630,000 acres in the Mimbres watershed. Tables 9 and 10 summarize these practices.

Conservation Practice	Doña Ana	Grant	Luna	Total
Brush Management	5,350	....	6,799	12,149
Conservation Cover	161	....	....	161
Conservation Crop Rotation	1,915	....	....	1,915
Cover Crop	....	....	114	114
Forage Harvest Management	....	12	4	16
Irrigation Land Leveling	....	11	4	15
Irrigation System, Microirrigation	....	....	778	778
Irrigation Water Management	....	35	2,050	2,085
Nutrient Management	....	35	2,050	2,085
Pasture and Hay Planting	....	14	103	117
Pest Management	160	17	2,145	2,322
Prescribed Burning	....	....	94	94
Prescribed Grazing	39,353	4,635	101,849	145,837
Range Planting	....	....	94	94
Residue Management, Seasonal	....	....	1,900	1,900
Upland Wildlife Habitat Management	118,128	98,415	233,093	449,636
Use Exclusion	10,700	....	....	10,700
SUM (Σ)	175,767	103,174	351,077	630,018

Table 9. 2008 planned conservation practices. Reported in acres.

Conservation

Conservation Practice	Doña Ana	Grant	Luna
Comprehensive Nutrient Management Plan	2
Diversion	19
Fence	8
Herbaceous Wind Barriers	2
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	5	4
Monitoring Well	2
Pipeline	8
Pumping Plant	1	10
Streambank and Shoreline Protection	2	....
Structure for Water Control	11	....
Waste Storage Facility	1
Water Well	1	2
Watering Facility	7	20
Windbreak/Shelterbelt Establishment	3
SUM (Σ)	27	81

Table 10. Counts of 2008 location specific planned conservation practices.



Soil Resource Inventory ¹⁴

Ninety-three percent (2.7 million acres) of the 2.94 million acres in the Mimbres River Watershed has a certified National Cooperative Soil Survey (NCSS) inventory. Of the remaining 7%, the USDA-USFS is the land manager on 97% of the area, 2.5% are privately owned lands, and the remaining area is managed by the State of New Mexico and Bureau of Land Management.

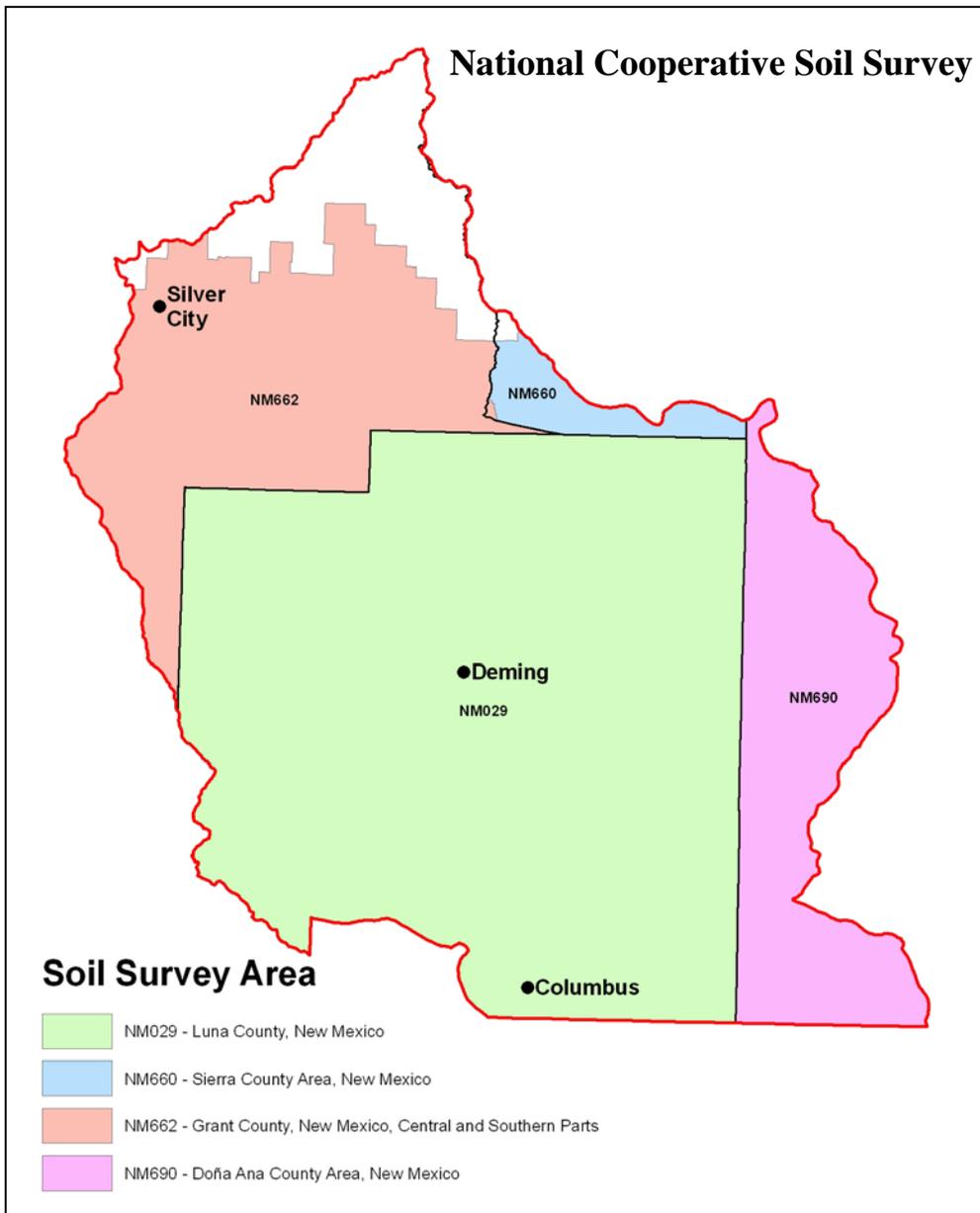


Figure 10. National Cooperative Soil Survey coverage of the Mimbres watershed.



Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the Mimbres watershed, a model was developed using Soil Survey Geographic Database (SSURGO) information. The soil properties saturated hydraulic conductivity, soil loss tolerance, and wind erodibility group were used in conjunction with slope to assess soil mapunit potential for erosion. Saturated hydraulic conductivity and slope are reported in SSURGO databases as interval/ratio data whereas wind erodibility and soil loss tolerance are ordinal data. Data transformations for the model are listed.

<u>SSURGO Value</u>	<u>Nominal Description</u>	<u>Model Rank</u>
Saturated Hydraulic Conductivity		
$\mu\text{m} / \text{s}$		
705.0 - 100.0	Very High	0
100.0 - 10.0	High	1
10.0 - 1.0	Moderately High	2
1.0 - 0.1	Moderately Low	3
0.1 - 0.01	Low	4
Slope %		
0 - 5		0
5 - 10		1
10 - 15		2
15 - 25		3
> 25		4
Soil Loss Tolerance		
5	High Tolerance For loss	0
4	↓	1
3	↓	2
2	↓	3
1	Low Tolerance For Loss	4
Wind Erodibility Group		
1	Very High	4
2	Very High	4
3	High	3
4	High	3
4L	High	3
5	Moderate	2
6	Moderate	2
7	Moderate	1
8	Slight	0

Table 11. Criteria used for soil erosion susceptibility model.



Soil Resource Inventory

For each soil map unit (discrete delineation), the soil properties (named above) of the dominant soil type was used as the condition to be evaluated in the susceptibility to erosion model. Miscellaneous areas such as gravel pits, water, riverwash, etc. were excluded from evaluation. Possible range of values for each map unit are 0 – 16. Increasing values represent a higher susceptibility to soil erosion.

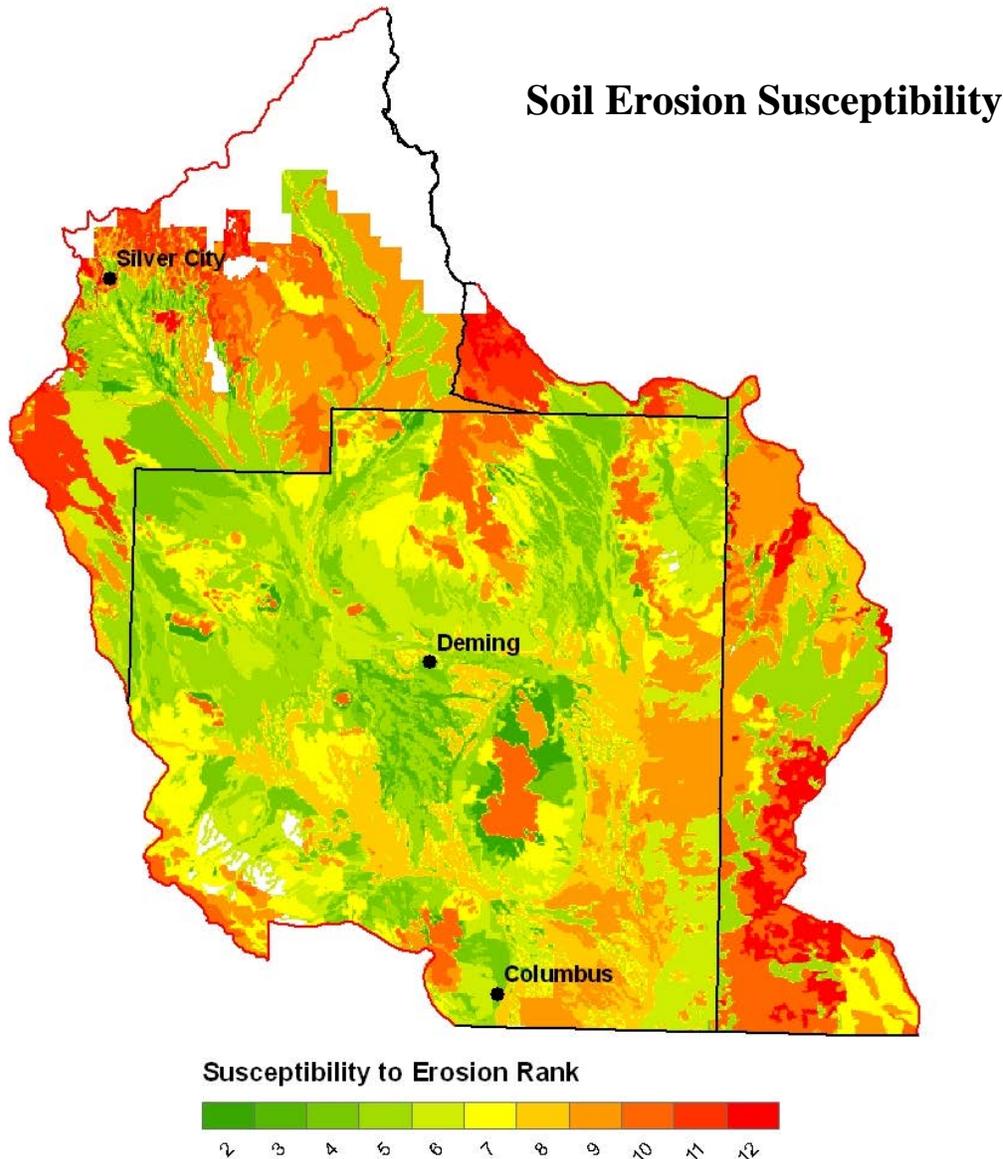


Figure 11. Mimbres watershed erosion potential.



Soil Resource Inventory

<u>Rank</u>	<u>Acres</u>
2	50,843
3	35,255
4	279,511
5	546,240
6	398,200
7	274,334
8	264,288
9	444,513
10	258,245
11	86,529
12	70,028
Sum(Σ)	2,707,987

Table 12. Soil erosion potential model results. A greater rank indicates greater potential for erosion.



Socioeconomic Data ¹⁵

COUNTY	Total population: Total	Total population: Urban	Total population: Rural	Total population: Rural; Farm	Total population: Rural; Nonfarm	Total population: Hispanic or Latino	Total population: White alone	Total population: Black or African American alone	Total population: American Indian and Alaska Native alone	Total population: Asian alone	Total population: Native Hawaiian and Other Pacific Islander alone	Total population: Some other race alone	Total population: Two or more races	Families: Median family income in 1999
Doña Ana	174,682	139,836	34,846	1,706	33,140	110,807	118,538	2,444	2,523	1,386	108	43,324	6,359	\$33,576
Grant	31,002	17,861	13,141	330	12,811	15,153	23,480	175	358	95	33	5,874	987	\$34,231
Luna	25,016	14,971	10,045	335	9,710	14,478	18,621	165	353	81		5,010	786	\$24,252
Sierra	13,270	8,827	4,443	251	4,192	3,477	11,578	39	194	14	4	1,137	304	\$29,787

Table 13. Socioeconomic data of counties found in the watershed.



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