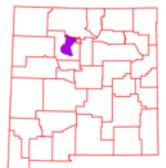
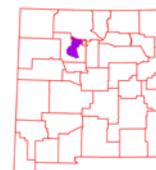


# Rapid Watershed Assessment Jemez Watershed



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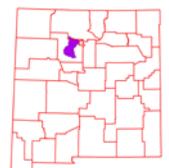


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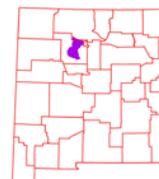
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## Overview

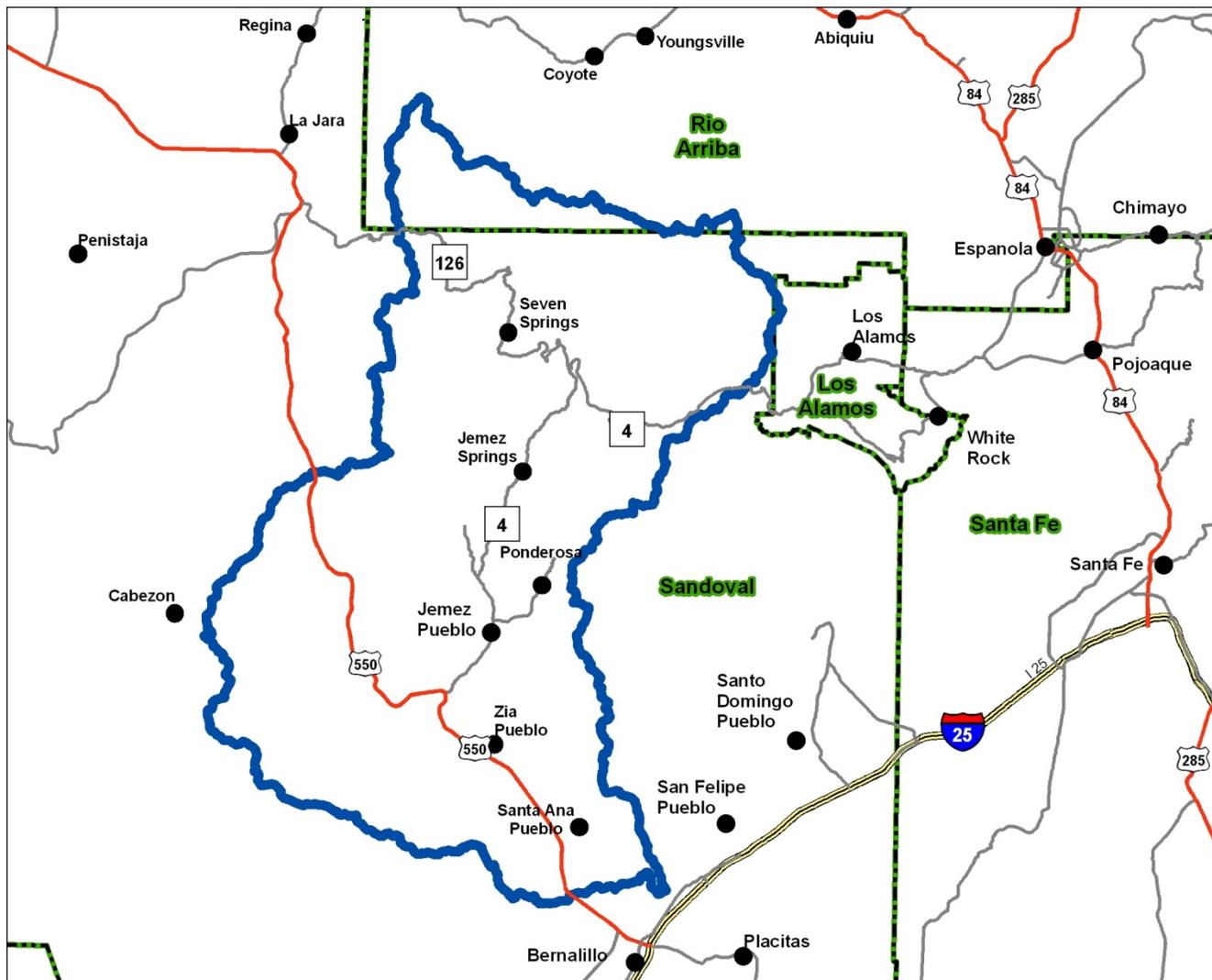
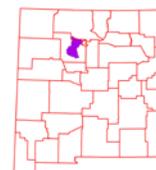


Figure 1. Jemez Watershed Overview

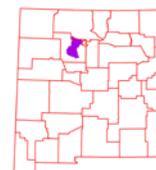


## Overview

The Jemez Watershed is located in north central New Mexico. It covers 664,810 total acres (2,690 sq. km). Portions of the Jemez watershed extend into Bernalillo, Los Alamos, San Miguel, Sandoval, and Santa Fe counties. Table 1 summarizes the distribution of the Jemez watershed.

**Table 1. Jemez watershed acreage distribution.**

	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
<b>Los Alamos</b>	<b>69,949</b>	<b>316</b>	<b>&lt;1</b>	<b>&lt;1</b>
<b>Rio Arriba</b>	<b>3,772,816</b>	<b>41,743</b>	<b>6</b>	<b>1</b>
<b>Sandoval</b>	<b>2,377,011</b>	<b>622,752</b>	<b>94</b>	<b>26</b>
<b>Sum (<math>\Sigma</math>)</b>	<b>--</b>	<b>664,810</b>	<b>100</b>	<b>--</b>



## **Physical Setting**

### **Geology:**

The Jemez River originates in the Southern Rocky Mountain physiographic province on the west side of the Rio Grande Rift zone in the Valles Caldera and the west flank of the Jemez Mountains. The Jemez River is formed by the East Fork of the Jemez River and San Antonio Creek and flows through Cañon de San Diego between the Jemez Mountains and Sierra Nacimiento.

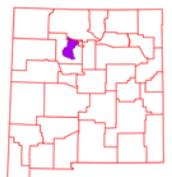
The Jemez Mountains are comprised of Tertiary Period aged volcanic (basalt, basaltic-andesite or rhyolite) and pyroclastic flow breccias, and Quaternary Period welded tuffs. Further down the flanks, Pennsylvanian Period limestones, Permian Period red beds, and Triassic Period sandstones and shales are encountered. Around San Ysidro, Triassic and Jurassic Period sedimentary rocks are found, including gypsum beds.

The Sierra Nacimiento has a core of Pre-Cambrian granite and metamorphic rock flanked by Triassic Period sandstones and shales.

The valley floors consist of Tertiary Period partly compacted sands and gravels of the Santa Fe group or Quaternary Period alluvium. The Santa Fe Group consists of alluvial fans, river channel deposits and inter-bedded volcanic rocks preserved in a complex of depressed fault blocks within the Rio Grande depression.

Several of the mesas are capped by Triassic Period basaltic to andesitic lava flows. Resource concerns are high sediment erosion and water runoff as the result of forest fires. In addition the lowering of valleys by river incision is a continuing process. Many valleys are flanked by terraces. Rivers respond by aggrading during climates that promote large sediment yield and large, stable discharges; and incise during climates that produce flashy flows and reduce the sediment supply.

Groundwater quality and quantity is a concern. Depth to groundwater is a concern if the shallow unconfined aquifer does not produce enough water for the resource or increased population demands are 'mining' the water. Groundwater in the igneous rocks and volcanics is usually along fracture zones which are hard to intercept with water wells. Groundwater quality ranges from fair to poor for livestock or crops. There are several hot springs in the Jemez Mountains.



## 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 Rio Grande-Albuquerque 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.



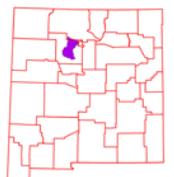
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.



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.



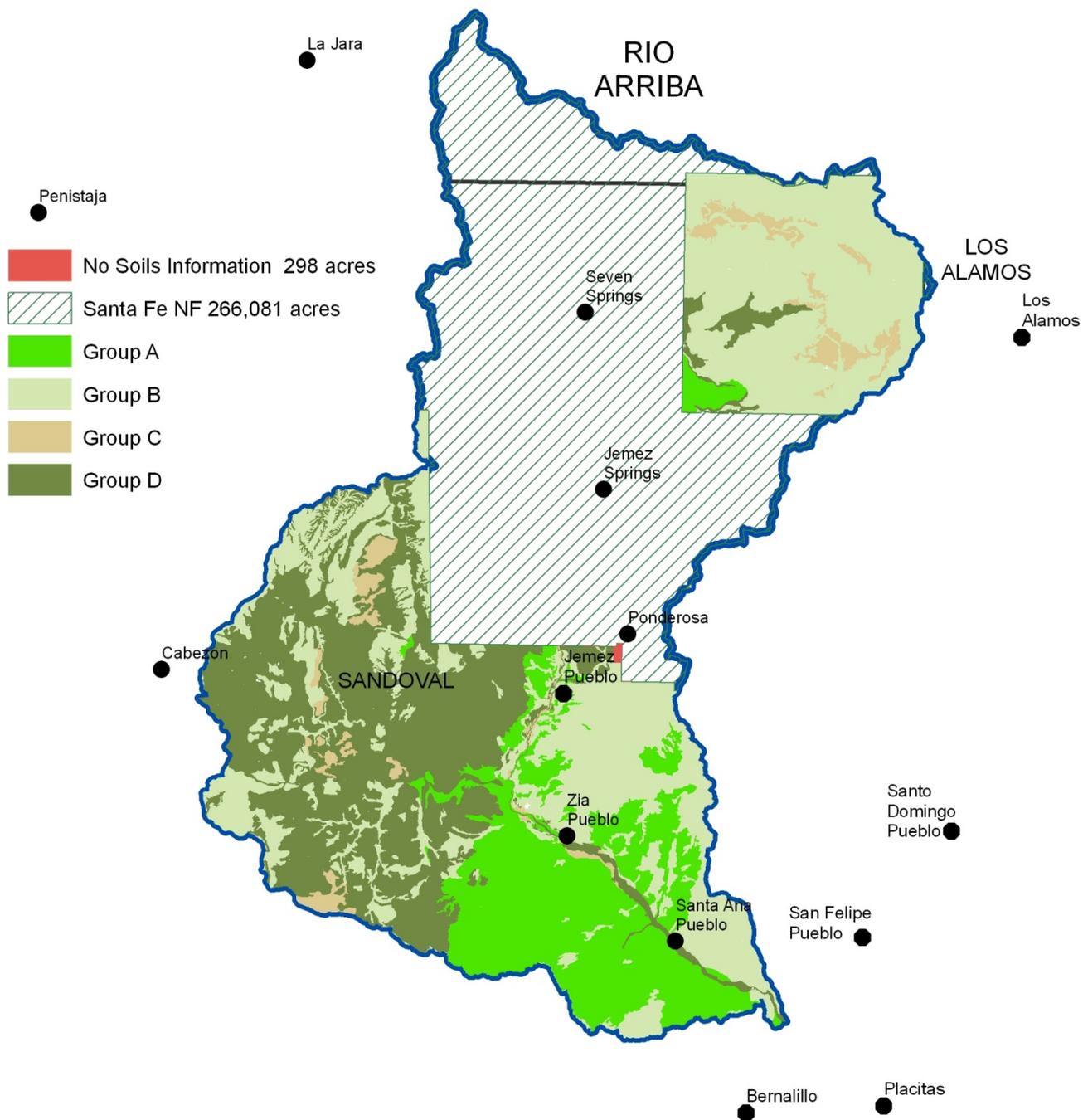
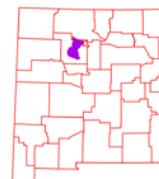


Figure 2. Hydrologic Soil Groups



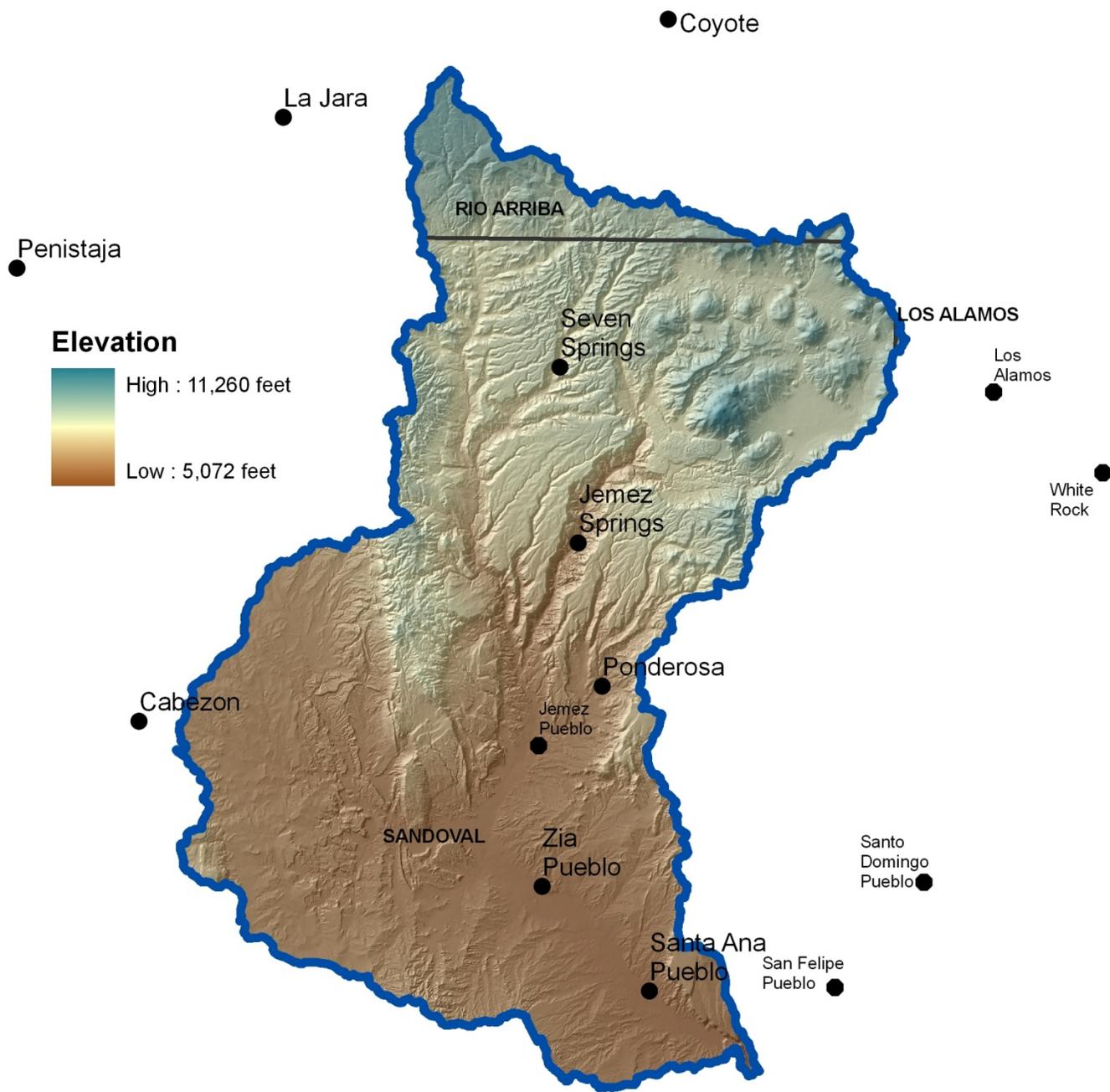
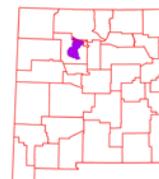


Figure 3. Jemez Watershed Shaded Relief



## Precipitation <sup>1</sup>

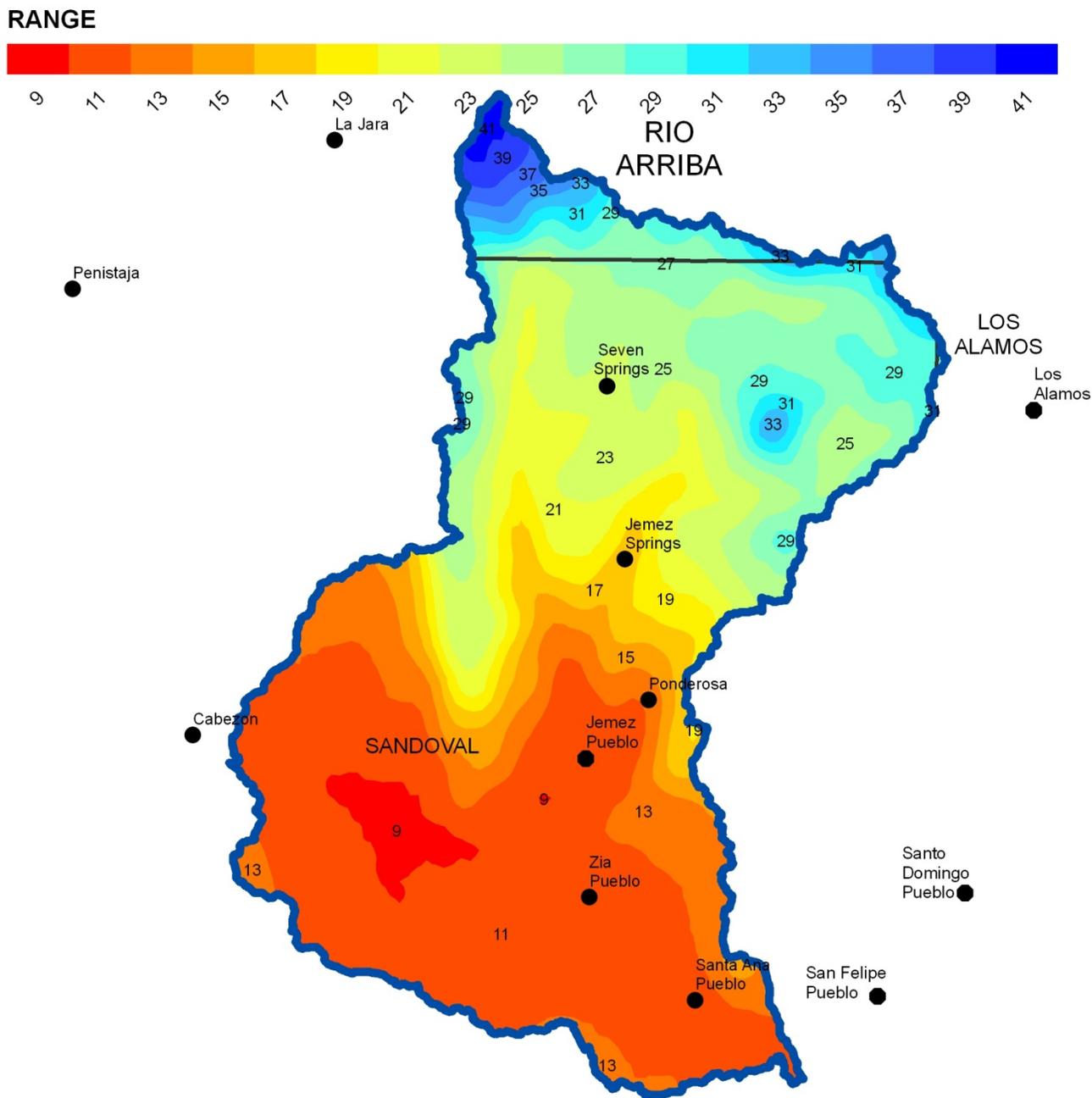
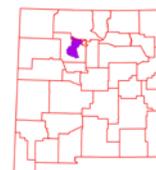


Figure 4. Jemez Watershed Annual Precipitation.



## Land Ownership <sup>2</sup>

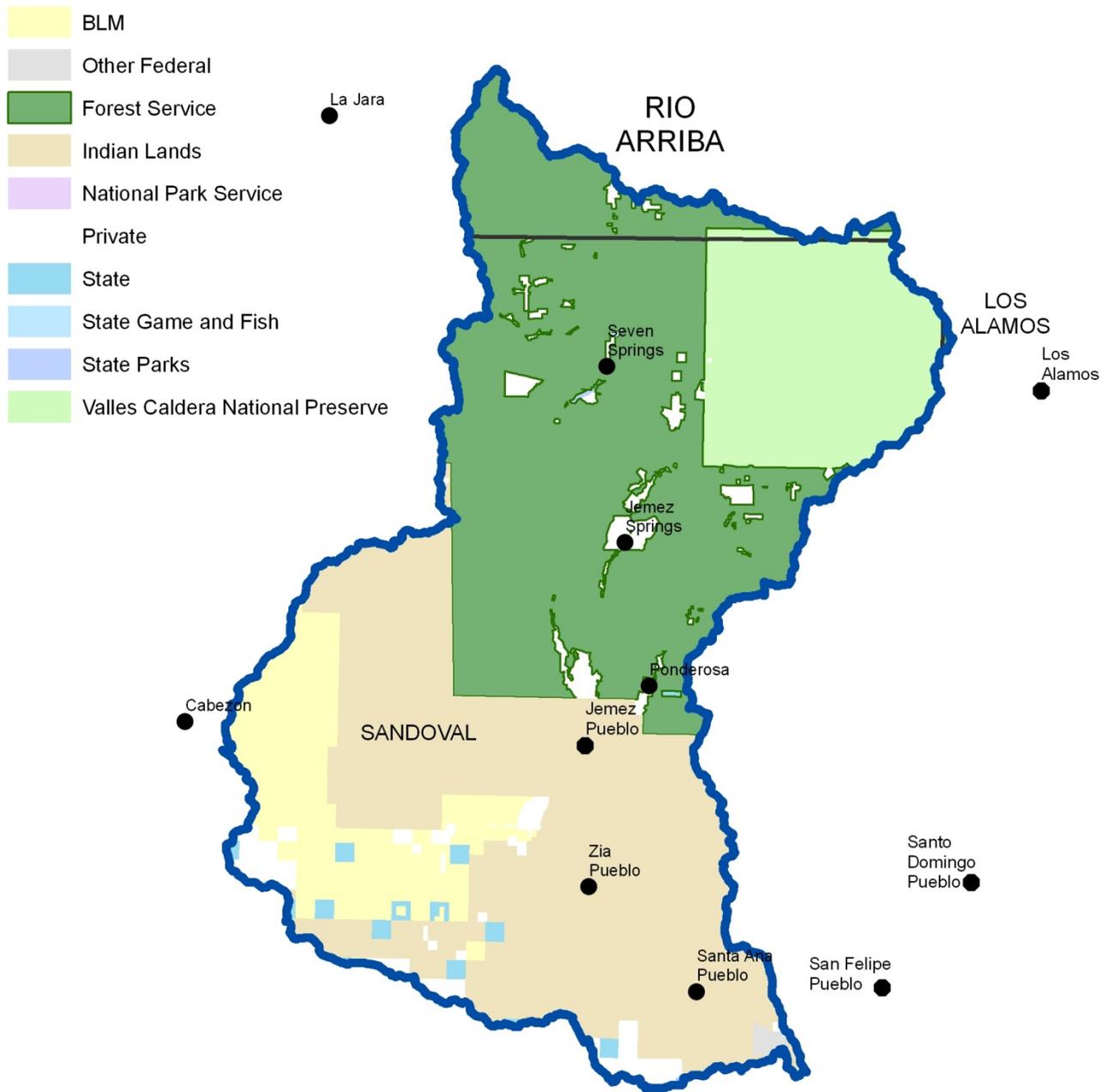
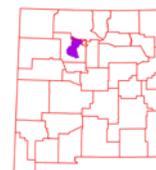


Figure 5. Jemez Watershed Land Ownership.



### Land Ownership

<u>COUNTY</u>	<u>BLM</u>	<u>DoD</u>	<u>FS</u>	<u>Indian Lands</u>	<u>NPS</u>	<u>Private</u>	<u>State</u>	<u>State G&amp;F</u>	<u>State Parks</u>	<u>VCNP</u>
Los Alamos			316							
Rio Arriba			38,427	16		944				2,355
Sandoval	62,871	1,498	212,404	222,204	53	31,168	6,829	73	268	85,384
Watershed (Σ)	62,871	1,498	251,147	222,220	53	32,112	6,829	73	268	87,739
% Watershed	9	<1	38	33	<1	5	1	<1	<1	13

Table 2. Land ownership in the Jemez watershed.



## Las Conchas Fire

Date Started: June 26, 2011

Cause: Human

Size: 156,593 acres total, 31,800 in the Jemez watershed

Residences: 63 destroyed

Outbuildings: 49 destroyed; 2 damaged

Location: On Santa Fe National Forest in Sandoval, Los Alamos, and Rio Arriba Counties; Santa Clara Pueblo; Jemez Pueblo; Cochiti Pueblo; Santo Domingo Pueblo; Bandelier National Monument; Valles Caldera National Preserve; and state and private in-holdings.

Safety and Health: Flash floods on and near burn scars can be life threatening. Monitor forecasts and prepare to take action or evacuate should flash flood warnings be issued. Thunderstorms can form, and subsequently produce lightning and heavy rainfall within 30 minutes.

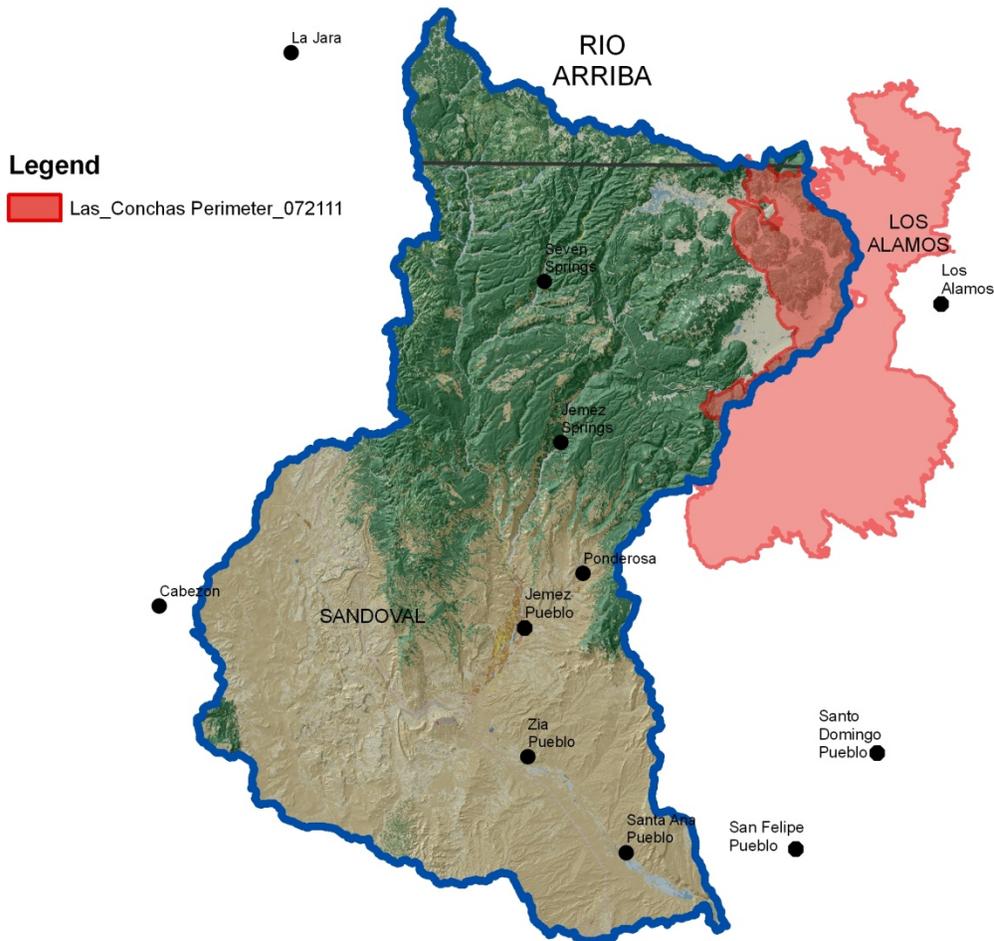
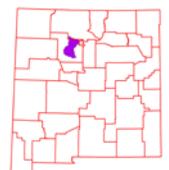


Figure 6: Las Conchas Fire, Summer 2011



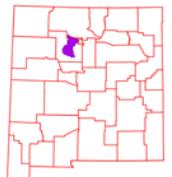
**Land Use / Land Cover** <sup>3, 4</sup>

**Legend**

- Open Water
- Low Intensity Residential
- High Intensity Residential
- Bare Rock/Sand/Clay
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrubland
- Grasslands, Herbaceous
- Pasture/Hay
- Row crops
- Woody Wetlands
- Emergent Herbaceous Wetlands



**Figure 7. Subset of the National Land Cover Dataset over the Jemez Watershed.**

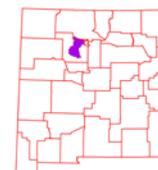


## Land Use / Land Cover

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 Multi Resolution 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>
Evergreen Forest	266,750	40
Shrubland	262,761	40
Grasslands, Herbaceous	87,098	13
Deciduous forest	23,733	4
Mixed Forest	7,151	1
Woody Wetlands	5,663	1
Low Intensity Residential	3,256	< 1
Row crops	2,377	< 1
Emergent Herbaceous Wetlands	2,373	< 1
Bare Rock/Sand/Clay	1,758	< 1
Pasture/hay	1,005	< 1
High Intensity Residential	589	< 1

Table 3. Extent of NLCD classes in the Jemez watershed.



## Land Use / Land Cover

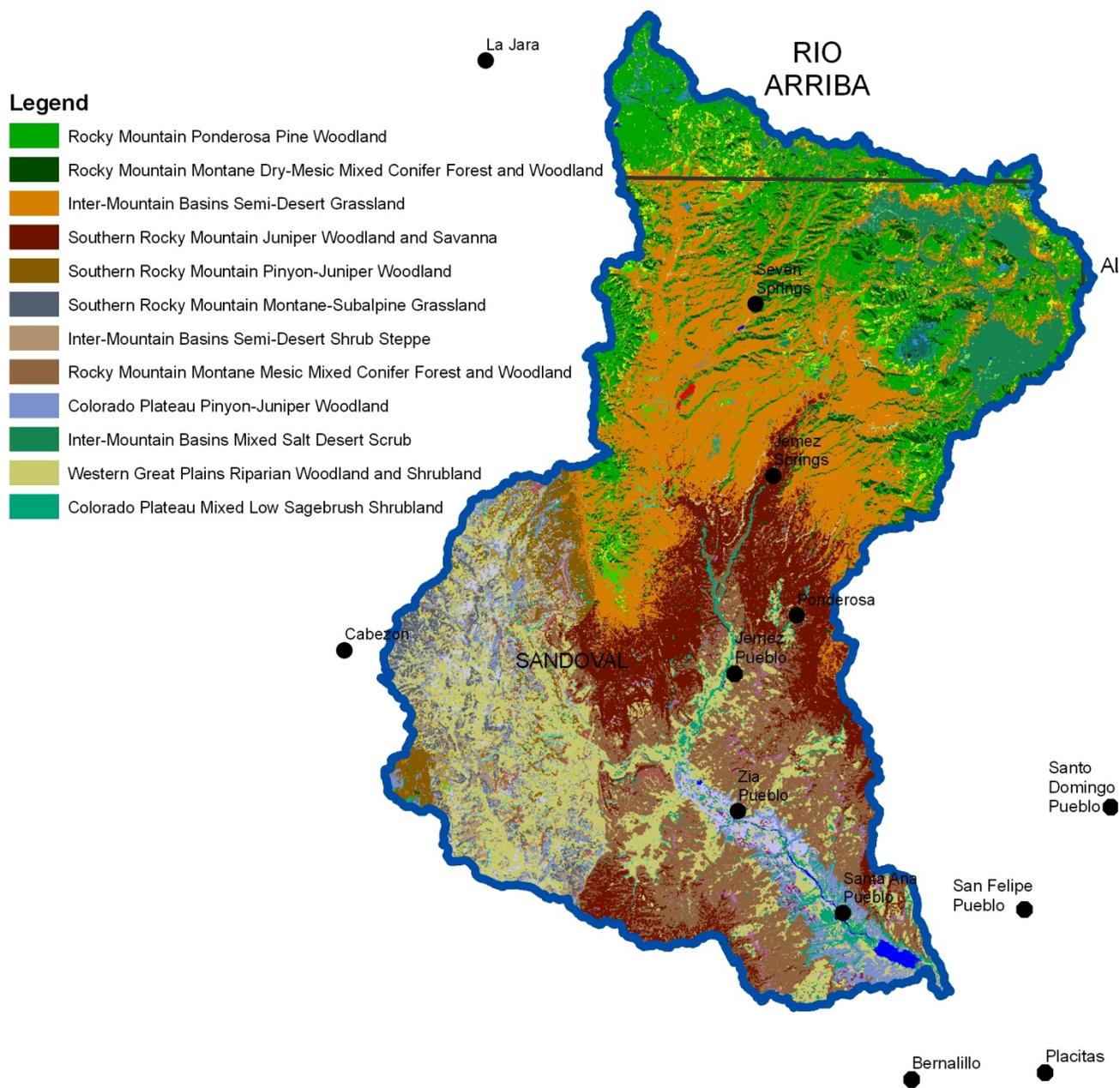
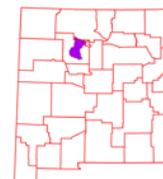


Figure 8. Subset of the SWREGAP over the Jemez Watershed. The 12 dominant ecosystems are displayed in the legend.

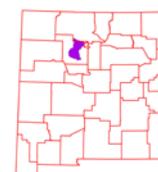


## Land Use / Land Cover

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>
Rocky Mountain Ponderosa Pine Woodland	140148	21
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	95589	14
Inter-Mountain Basins Semi-Desert Grassland	87273	13
Southern Rocky Mountain Juniper Woodland and Savanna	77557	12
Southern Rocky Mountain Pinyon-Juniper Woodland	74722	11
Southern Rocky Mountain Montane-Subalpine Grassland	29318	4
Inter-Mountain Basins Semi-Desert Shrub Steppe	25429	4
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	23941	4
Colorado Plateau Pinyon-Juniper Woodland	15875	2
Inter-Mountain Basins Mixed Salt Desert Scrub	12305	2
Western Great Plains Riparian Woodland and Shrubland	12042	2
Colorado Plateau Mixed Low Sagebrush Shrubland	10819	2
Rocky Mountain Aspen Forest and Woodland	9562	1
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	6413	1
Colorado Plateau Mixed Bedrock Canyon and Tableland	6083	1
Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	5959	1
Inter-Mountain Basins Greasewood Flat	5183	1
Apacherian-Chihuahuan Mesquite Upland Scrub	4298	1
Rocky Mountain Cliff and Canyon	3594	1
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	2812	< 1

**Table 4. SW Region Gap analysis ecosystem acreages.**

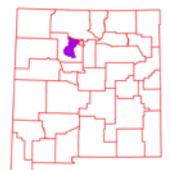


**Hydrology** 5, 6, 7, 8, 9

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 2,848 miles (4,583 km) of water courses in the Jemez River Watershed. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

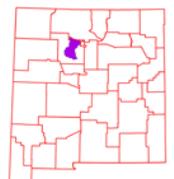


Figure 9. National Hydrologic Dataset (NHD) of the Jemez.



<b>Water Course Type</b>	<b>Miles</b>
Artificial path	120
Connector	10
Canal / Ditch	43
Intermittent Stream / River	2,345
Perennial Stream / River	330
Sum ( $\Sigma$ )	2,848

**Table 5. NHD Water Course Type and Extents**



There are 6 water gauging stations in the watershed. USGS Site 08329000 is near the southeast corner of the watershed on the Jemez River below Jemez Canyon Dam, NM. During the period 1944 – 2009, this site has had mean annual discharge of 47.93 cubic feet per second ranging from 10.6 (1953) to 178.1(1973) cubic feet per second.

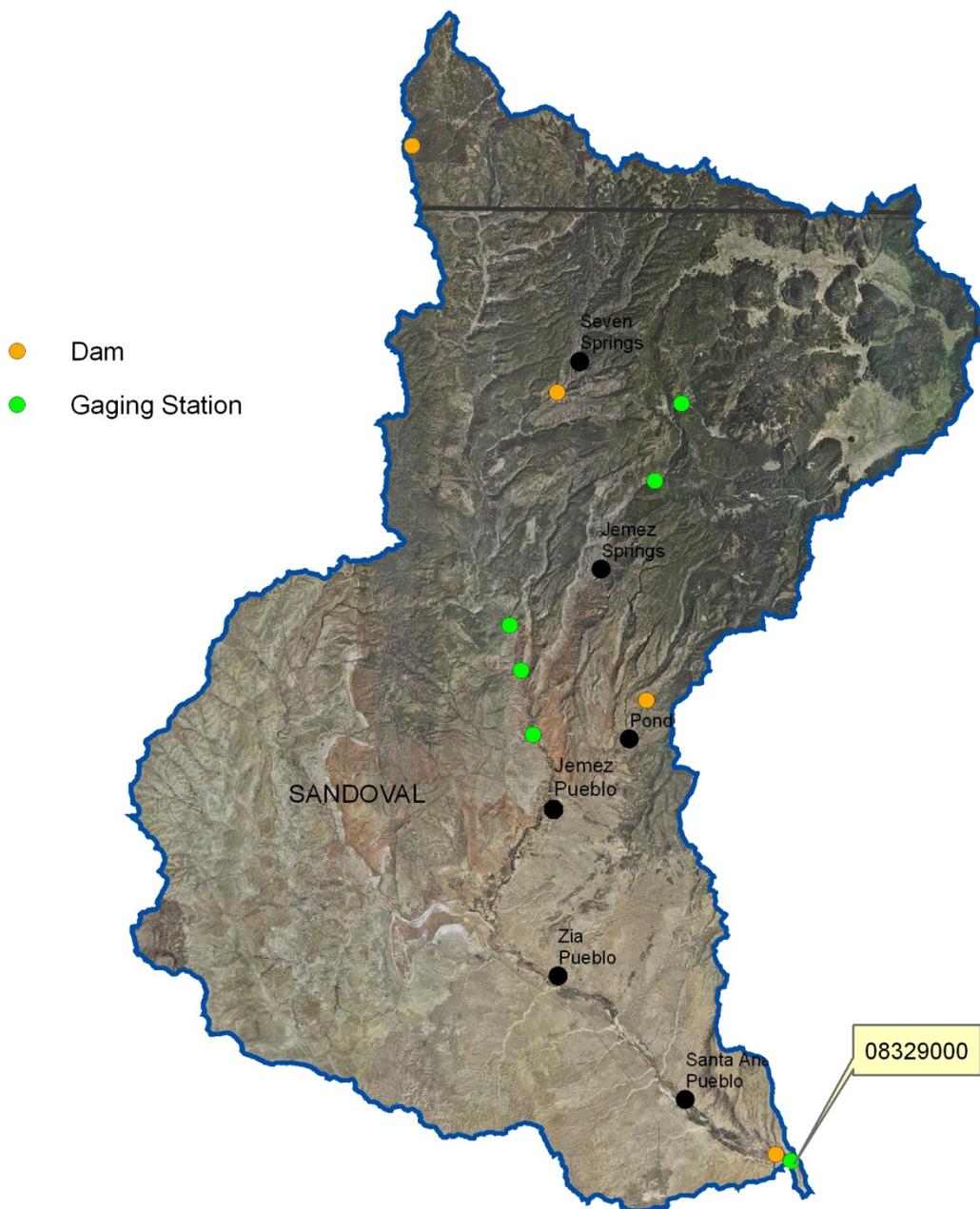
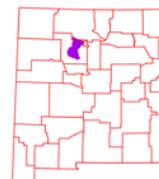
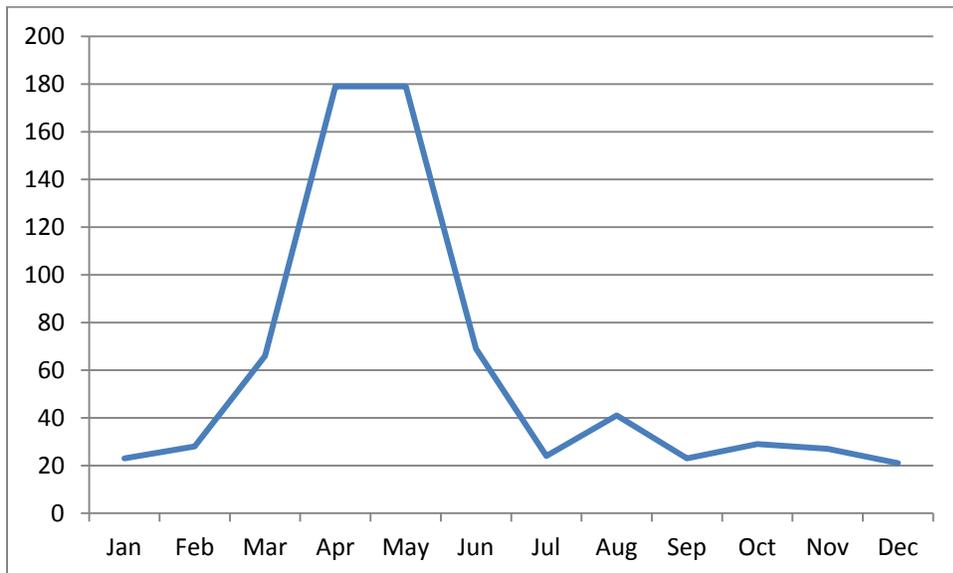


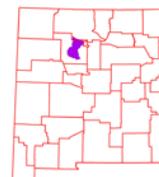
Figure 10. Gauging Stations in the Jemez Watershed



## Hydrology



**Figure 11. Monthly Average of Mean Daily Flow on the Jemez River below Jemez Canyon Dam, NM. Period of Observation: 1943-2009.**

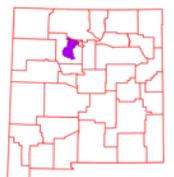


The New Mexico Water Quality Control Commission (NMWQCC) is the issuing agency of water quality standards for interstate and intrastate waters in New Mexico. The NMWQCC has defined the Jemez watershed as part of the Rio Grande River Basin.

Within the Jemez Watershed, there is one body of water, Fenton Lake, that is listed as impaired as of the 2010-12 listing cycle (23.81 acres). The river and stream reaches total 145.58 miles (234.29 km).

The Jemez watershed has the following reaches listed as 303 (d) Impaired Surface Waters:

1. Clear Creek (Rio de las Vacas to San Gregorio Lake)
2. East Fork Jemez (San Antonio Creek to VCNP bnd)
3. East Fork Jemez (VCNP to headwaters)
4. Fenton Lake
5. Jaramillo Creek (East Fork Jemez to headwaters)
6. Jemez River (Jemez Pueblo bnd to Rio Guadalupe)
7. Jemez River (Soda Dam near Jemez Springs to East Fork)
8. La Jara Creek (East Fork Jemez to headwaters)
9. Redondo Creek (VCNP bnd to headwaters)
10. Rio Cebolla (Fenton Lake to headwaters)
11. Rio de las Vacas (Clear Creek to headwaters)
12. Rito de las Palomas (Rio de las Vacas to headwaters)
13. Rito de los Indios (San Antonio Creek to headwaters)
14. Rito Penas Negras (Rio de las Vacas to headwaters)
15. San Antonio Creek (East Fork Jemez to VCNP bnd)
16. San Antonio Creek (VCNP bnd to headwaters)
17. Sulphur Creek (San Antonio Creek to Redondo Creek)
18. Sulphur Creek (VCNP bnd to headwaters)
19. Vallecito Creek (Perennial Part Div above Ponderosa to headwaters)



The listed uses for these reaches have been designated in Table 6.

<b>Use</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Coldwater Aquatic Life</b>						NS				
<b>Domestic Water Supply</b>	X	X	X	NA	X		NS	X	X	X
<b>Fish Culture</b>	X	X	X	NA	X		X	X	X	X
<b>High Quality Coldwater Aquatic Life</b>	NS	NS	NS	NS	NS		NS	NS	NS	NS
<b>Irrigation/Irrigation Storage</b>	X	X	X	NA	X	NS	X	X	X	X
<b>Livestock Watering</b>	X	X	X	NA	X	X	X	X	X	X
<b>Primary Contact</b>						X				
<b>Secondary Contact</b>	X	X	X	NA	X		X	X	X	X
<b>Wildlife Habitat</b>	X	X	X	NA	X	X	X	X	X	X

Table 6. Listed Uses. NS = Not Supporting, NA = not assessed, X = Fully Supporting



<u>Use</u>	11	12	13	14	15	16	17	18	19
<b>Coldwater Aquatic Life</b>									<b>NS</b>
<b>Domestic Water Supply</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>NS</b>	<b>X</b>	<b>X</b>		
<b>Fish Culture</b>	<b>X</b>								
<b>High Quality Coldwater Aquatic Life</b>	<b>NS</b>								
<b>Irrigation/Irrigation Storage</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>NS</b>		<b>X</b>
<b>Limited Aquatic Life</b>								<b>NS</b>	
<b>Livestock Watering</b>	<b>X</b>								
<b>Primary Contact</b>									<b>X</b>
<b>Secondary Contact</b>	<b>X</b>	<b>X</b>	<b>NA</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>NA</b>	
<b>Wildlife Habitat</b>	<b>X</b>								

Table 6 continued. Listed Uses. NS = Not Supporting, NA = not assessed, x = Fully Supporting

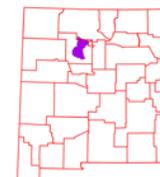
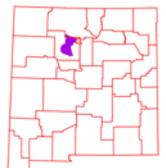




Figure 12. 303(d) Impaired waters (numbers reference Table 6 Stream Reaches)

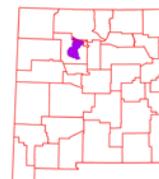


## Hydrology

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 Jemez Watershed, there is one body of water, Fenton Lake, that is listed as impaired as of the 2010-12 listing cycle (23.81 acres). The river and stream reaches total 145.58 miles (234.29 km).

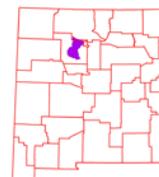
Probable Causes of Impairment	Stream Number									
	1	2	3	4	5	6	7	8	9	10
Aluminum		X	X		X	X	X	X	X	X
Arsenic		X				X	X			
Benthic-Macroinvertebrate Bioassessments	X									
Boron						X				
Nutrient/Eutrophication				X						
Oxygen, Dissolved			X			X				
PCB's										
pH			X				X			
Sedimentation, Siltation										X
Temperature, Water		X	X		X		X		X	
Turbidity			X		X	X	X		X	X

Table 7. Possible Causes of Impairment

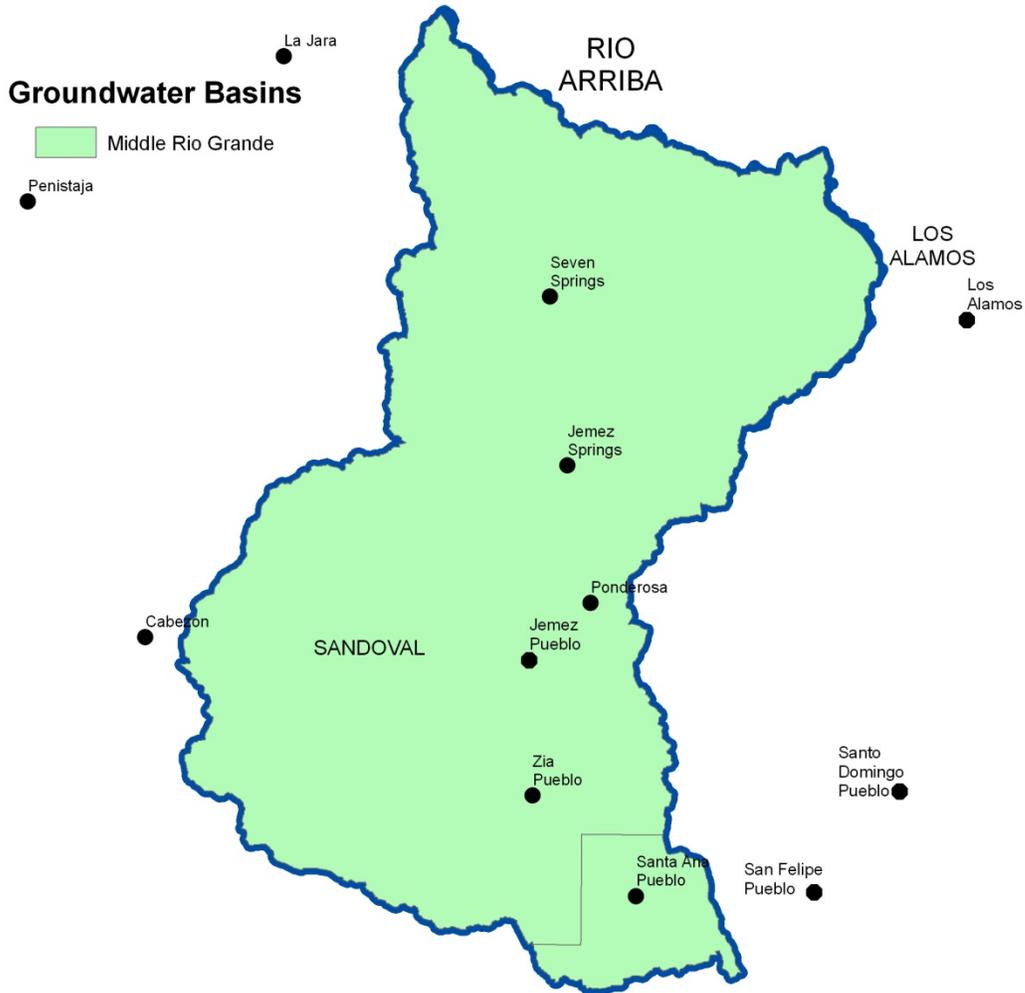


Probable Causes of Impairment	Stream Number								
	11	12	13	14	15	16	17	18	19
Aluminum	X		X		X		X	X	X
Arsenic					X				
Nutrient/Eutrophication				X					
Oxygen, Dissolved						X			
pH						X	X		
Sedimentation, Siltation		X		X					
Specific Conductance							X		
Temperature, Water		X			X	X			
Turbidity		X		X	X		X		X

Table 7-Continued. Possible Causes of Impairment

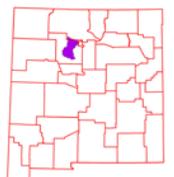


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**Figure 13: Declared Groundwater Basins of the Jemez.**

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 Jemez watershed is within the Middle Rio Grande Underground Water Basin

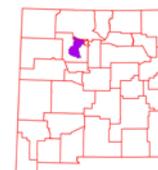


## Threatened and Endangered Species <sup>10</sup>

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 8 lists those species which are currently listed and tracked in the Jemez 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>
Rio Grande Silvery Minnow	<i>Hybognathus amarus</i>	Actinopterygii	Cyprinidae	LE	E
<a href="#">Rio Grande Cutthroat Trout</a>	<a href="#">Oncorhynchus clarkii virginialis</a>	Actinopterygii	Salmonidae	C	
Jemez Mountains Salamander	<i>Plethodon neomexicanus</i>	Amphibia	Plethodontidae		E
<a href="#">American Peregrine Falcon</a>	<a href="#">Falco peregrinus anatum</a>	Aves	Falconidae		T
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Aves	Strigidae	LT	
<a href="#">Gray Vireo</a>	<a href="#">Vireo vicinior</a>	Aves	Vireonidae		T
<a href="#">Wrinkled Marshsnail</a>	<a href="#">Stagnicola caperata</a>	Gastropoda	Lymnaeidae		E
<a href="#">New Mexican Jumping Mouse</a>	<a href="#">Zapus hudsonius luteus</a>	Mammalia	Dipodidae		E
<a href="#">Spotted Bat</a>	<a href="#">Euderma maculatum</a>	Mammalia	Vespertilionidae		T
Wood Lily	<i>Lilium philadelphicum var. andinum</i>	Monocotyledoneae	Liliaceae		E

**Table 8. Threatened and Endangered Plant and Animal Species.**

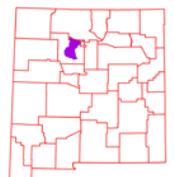


## Invasive Species <sup>11</sup>

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 Jemez watershed, the SWEMP has identified 7 species of invasive plants (Table 9). Each of these species is defined as non-native by the USDA PLANTS database.

<b><u>Scientific Name</u></b>	<b><u>Common Name</u></b>
<b><i>Scrophylariaceae</i> (Figwort Family)</b>	<b>Dalmatian Toadflax</b>
<b><i>Brassicaceae</i> (Mustard Family)</b>	<b>Hoary Cress (Whitetop)</b>
<b><i>Euphorbicaceae</i> (Spurge Family)</b>	<b>Leafy Spurge</b>
<b><i>Asteraceae</i> (Sunflower Family)</b>	<b>Musk Thistle</b>
<b><i>Brassicaceae</i> (Mustard Family)</b>	<b>Perennial Pepperweed (Tall Whitetop)</b>
<b><i>Asteraceae</i> (Sunflower Family)</b>	<b>Russian Knapweed</b>
<b><i>Asteraceae</i> (Sunflower Family)</b>	<b>Spotted Knapweed</b>

Table 9. Invasive Species Recognized by the SWEMP.



## Common Resource Areas<sup>12</sup>

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..

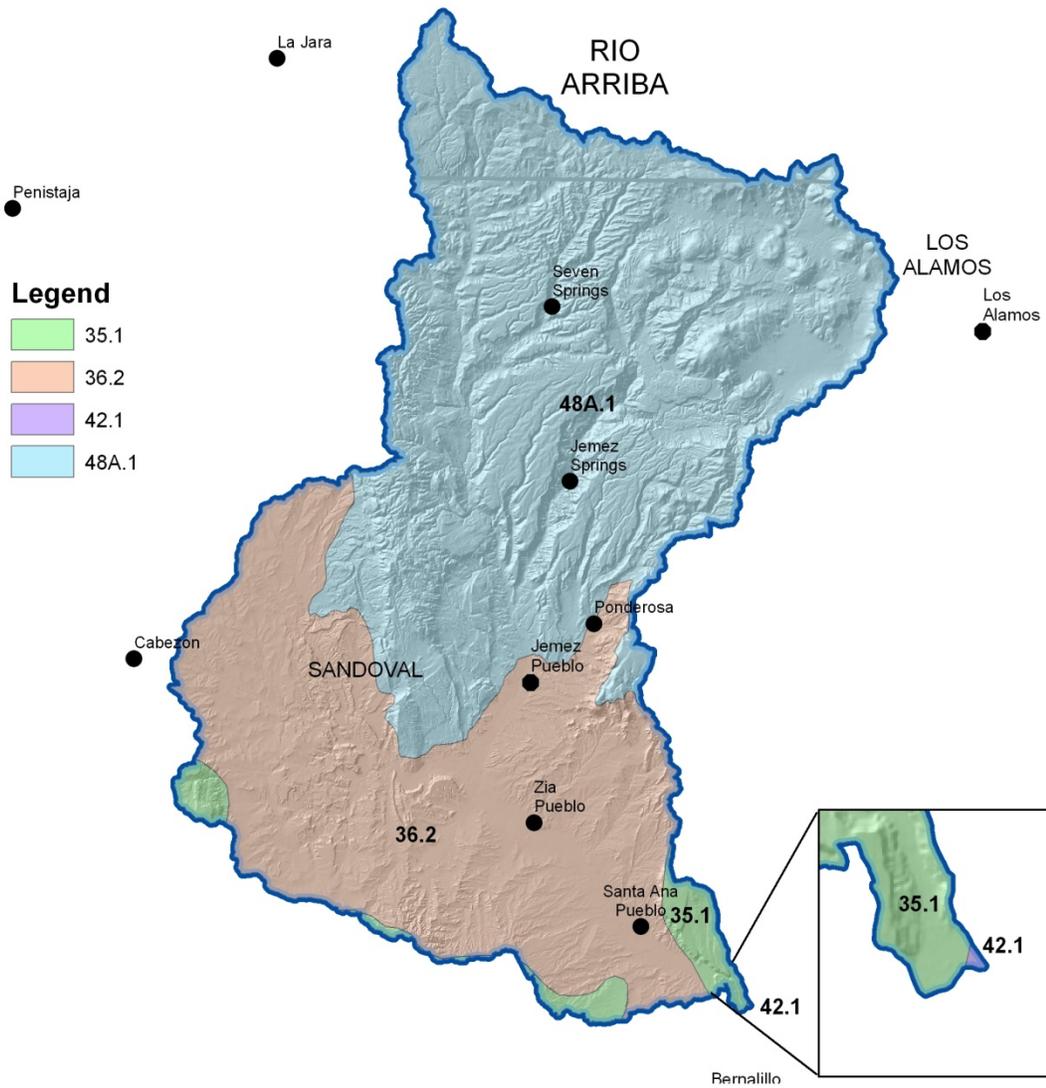
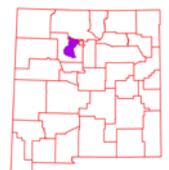


Figure 14. Common Resource Areas of the Jemez



## **Common Resource Areas**

### **35.1 – Colorado Plateau Mixed Grass Plains**

This unit occurs within the Colorado Plateau Physiographic Province and is characterized by flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons.

### **36.2 – Southwest Plateaus, Mesas, and Foothills – Warm Semiarid Mesas and Plateaus**

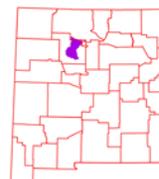
This area encompasses the lower elevation mesas and plateaus. The temperature regime is mesic and the moisture regime is transitional from ustic to aridic. Vegetation is typically twoneedle pinyon, Utah juniper, and big sagebrush. Cropland is a significant land use in parts of this area, particularly 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.

### **42.1 – Upper Rio Grande Rift Valley**

This unit occurs within the Basin and Range Physiographic Province and contains the upper Rio Grande Rift Valley. Elevations range from 4500 to 5500 feet. Precipitation ranges from 8 to 11 inches per year. The soil temperature regime ranges thermic to mesic. The soil moisture regime is typical aridic. Indian ricegrass, New Mexico feathergrass, galleta, blue grama and bottlebrush squirreltail characterize vegetation in the cooler portions. Warmer portions include black grama and tobosa. Alkali sacaton, dropseed and threeawns are common.

### **48.1 – 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.



## Conservation <sup>13</sup>

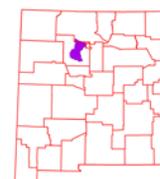
The USDA-Natural Resources Conservation Service (NRCS) focuses on the development and delivery of high quality products and services that enable people to be good stewards of our Nation's soil, water, and related natural related resources on non-Federal lands. The Natural Resources Conservation Service's 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.

Conservation Practice	2006		2007		2008		2009		2010		TOTAL	
	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres
Forage and Biomass Planting					6	39	1	5	4	28	11	72
Irrigation Land Leveling			2	9	3	27	5	36	1	1	11	73
Irrigation Water Management	1	2			1	7					2	9
Land Smoothing					1	2			1	2	2	4
Prescribed Grazing	1	2					1	10	1	31	3	43
Tree/Shrub Establishment					1	1					1	1
Upland Wildlife Habitat Management									1	16000	1	16000
<b>SUM (Σ)</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>9</b>	<b>12</b>	<b>76</b>	<b>7</b>	<b>51</b>	<b>8</b>	<b>16062</b>	<b>31</b>	<b>16202</b>

Table 10. 5 year Trends in Applied Conservation Practices. Reported in Acres.

Conservation Practice	2006		2007		2008		2009		2010		TOTAL	
	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet
Fence					2	1055	2	2000			4	3055
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic									1	1080	1	1080
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	1	400					1	273	5	9679	7	10352
Pipeline					1	1340					1	1340
Pond									1		1	NA
Pumping Plant					1						1	NA
Structure for Water Control									5		5	NA
Water Well					2						2	NA
Watering Facility	1										1	NA
<b>SUM (Σ)</b>	<b>2</b>	<b>NA</b>	<b>0</b>	<b>NA</b>	<b>6</b>	<b>NA</b>	<b>3</b>	<b>NA</b>	<b>12</b>	<b>NA</b>	<b>23</b>	<b>NA</b>

Table 11. 5 Year Trends in Location Specific Applied Conservation Practices. Reported in Feet if Linear (i.e. Fence)



## Soil Resource Inventory <sup>14</sup>

The Jemez Watershed has a number of certified National Cooperative Soil Survey (NCSS) inventories. The National Forests in New Mexico mostly are not covered, but have soils information available through their Terrestrial Ecosystem Unit Inventories. These will be integrated with the National Cooperative Soil Survey (NCSS) inventories in the next few years.

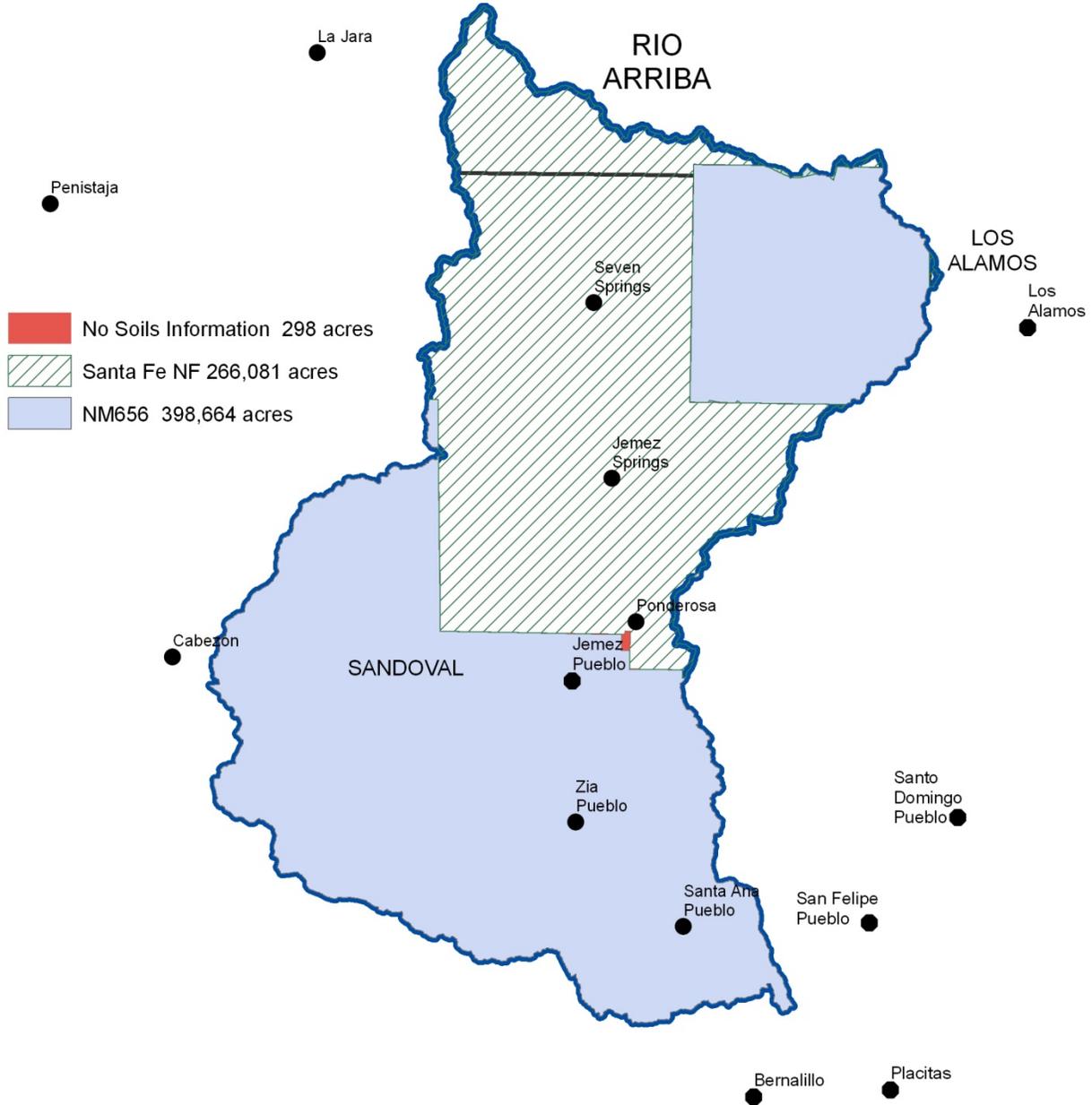
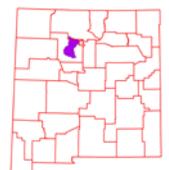


Figure 15. National Cooperative Soil Survey coverage of the Jemez Watershed

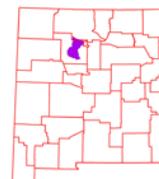


## Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the Jemez 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>
<b>Saturated Hydraulic Conductivity</b>		
µm / 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
<b>Slope %</b>		
0 - 5		0
6 - 10		1
11 - 15		2
16 - 25		3
> 25		4
<b>Soil Loss Tolerance</b>		
5	High Tolerance For loss	0
4	↓	1
3	↓	2
2	↓	3
1	Low Tolerance For Loss	4
<b>Wind Erodibility Group</b>		
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 12. 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. Forest Service Soils are not able to be included in the model at this time.

### Susceptibility to Erosion Rank

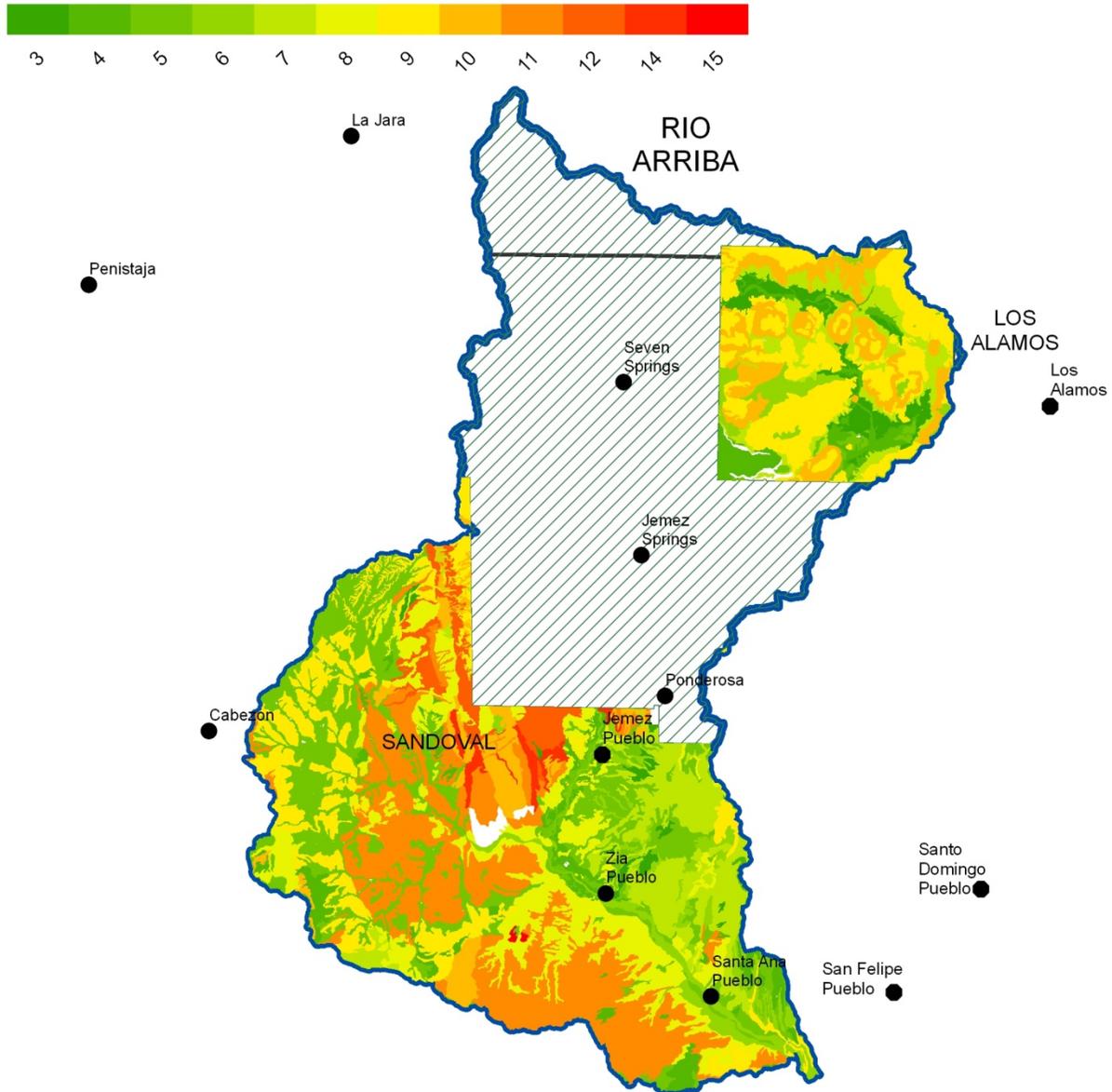
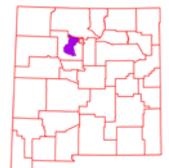


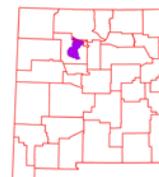
Figure 16. Jemez Watershed Erosion Potential



## Soil Resource Inventory

<b>Rank</b>	<b>Acres</b>
3	10,748
4	21,489
5	64,785
6	18,836
7	41,890
8	47,848
9	68,782
10	32,542
11	74,169
12	10,868
14	3,724
15	263
<b>Sum( <math>\Sigma</math> )</b>	<b>395,945</b>

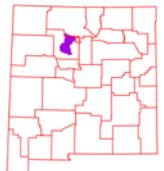
**Table 13. Soil Erosion Potential Model Results. A greater rank indicates greater potential for erosion.**



**Socioeconomic Data** <sup>15</sup>

COUNTY	Total population: Total	Total population: Urban	Total population: Rural	Total Pop.: Rural Farm	Total Pop.: 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 adj. 2009
<b>Los Alamos</b>	17,950	16,215	2,128	0	2,128	2,646	15,765	102	142	1,071	10	393	467	\$117,453
<b>Rio Arriba</b>	40,246	17,678	23,512	544	22,968	28,703	20,778	204	6,447	170	13	11,288	1,346	\$41,387
<b>Sandoval</b>	131,561	68,906	21,002	161	20,841	46,129	89,482	2,800	16,945	1,922	169	15,139	5,104	\$65,693

Table 14. Socioeconomic Data of the Counties in the Watershed (2010) except for green cells, not available yet from 2010 census so are 2000.



## References

1. Parameter-elevation Regressions on Independent Slopes Model (PRISM). PRISM is a unique knowledge-based system that uses point measurements of precipitation, temperature, and other climatic factors to produce continuous, digital grid estimates of monthly, yearly, and event-based climatic parameters. <http://www.prism.oregonstate.edu/>
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7. State of New Mexico Environment Department - <ftp://ftp.nmenv.state.nm.us/www/swqb/303d-305b/2010/USEPA-Approved303dList.pdf>
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9. New Mexico - Office of the State Engineer- [http://www.ose.state.nm.us/water\\_info\\_data.html](http://www.ose.state.nm.us/water_info_data.html)
10. New Mexico Natural Heritage Program - <http://nhnm.unm.edu/>
11. Southwest Exotic Plant Mapping Program - <http://www.invasiveweeds.com/mapping/welcome.html>
12. National Coordinated Common Resource Area (CRA) Geographic Database <http://soils.usda.gov/survey/geography/cra.html>
13. Natural Resources Conservation Service – Performance Results System <http://ias.sc.egov.usda.gov/PRSHOME/>
14. Natural Resources Conservation Service – Soil Data Mart <http://soildatamart.nrcs.usda.gov/>
15. United States Census Bureau - <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

