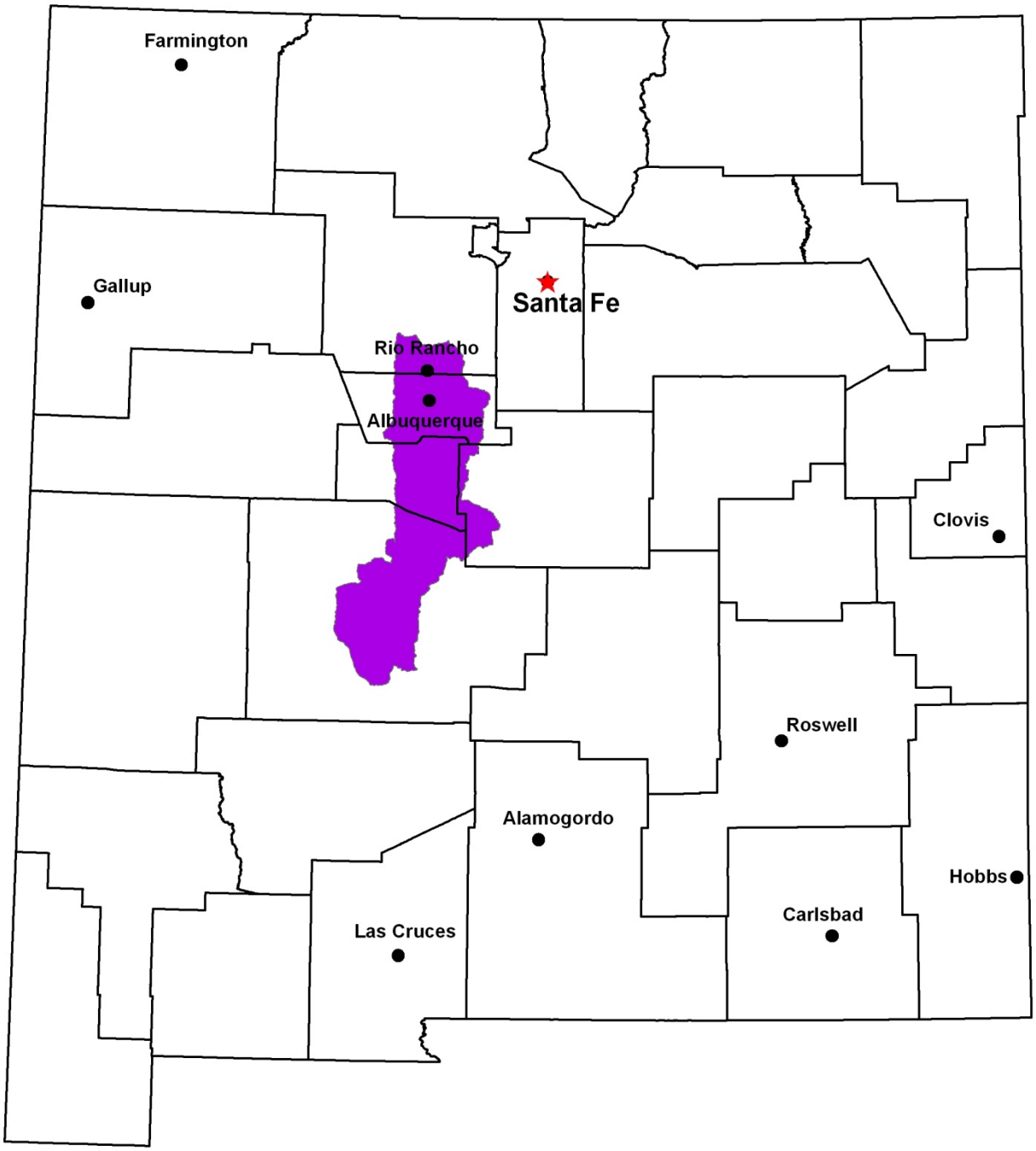
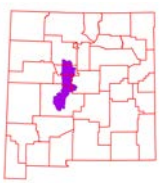


Rapid **W**atershed **A**ssessment
Rio Grande-Albuquerque Watershed



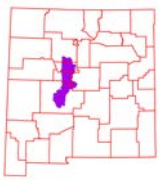
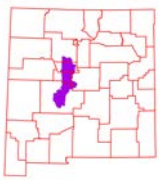
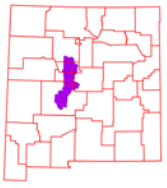


Table of Contents

List of Tables



List of Figures



Overview

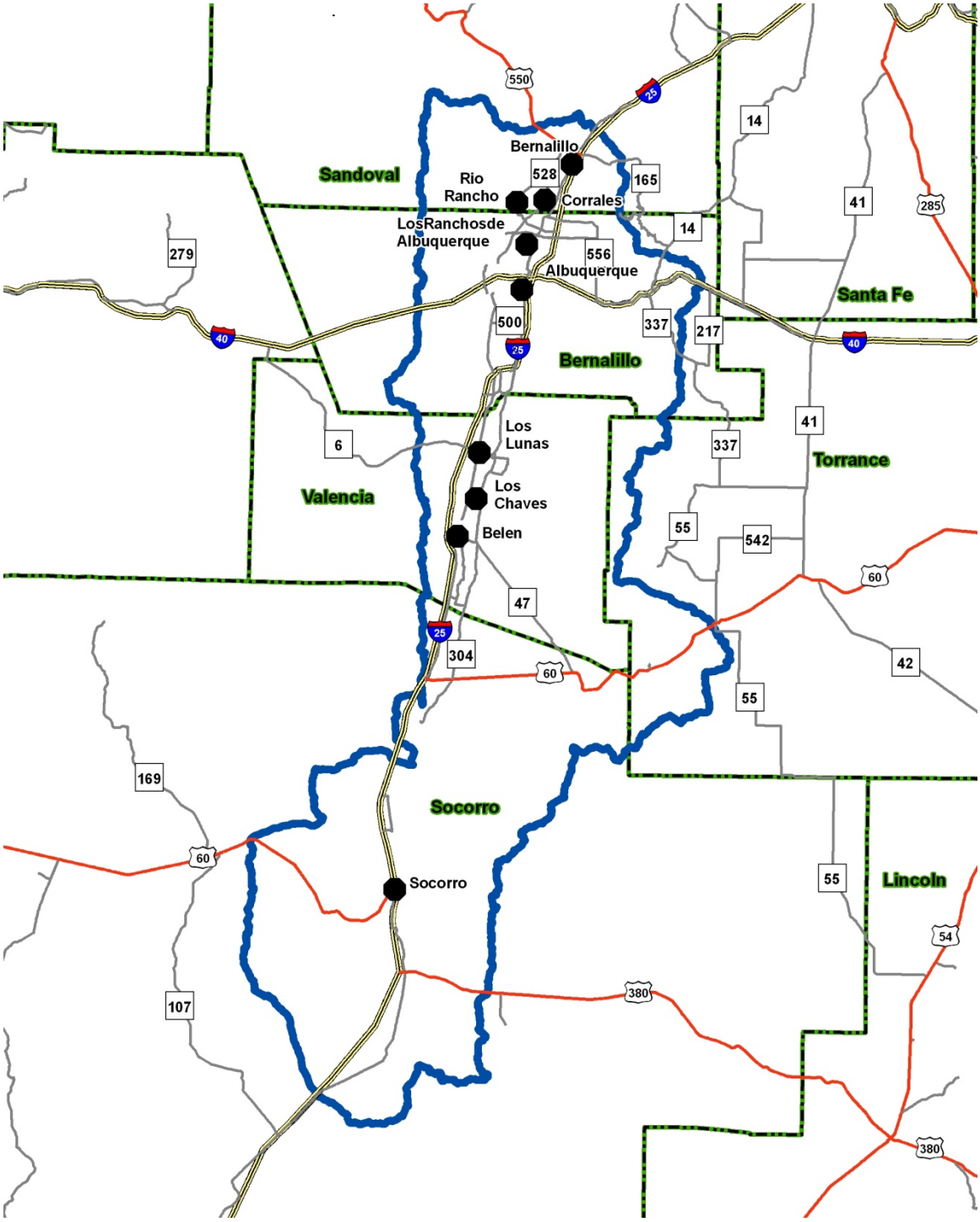
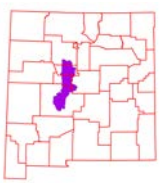


Figure 1. Rio Grande-Albuquerque Watershed Overview

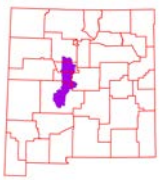


Overview

The Rio Grande-Albuquerque Watershed is located in north central New Mexico. It covers 2,057,543 total acres (8,327 sq. km). Portions of the Rio Grande-Albuquerque watershed extend into Bernalillo, Sandoval, Valencia, Socorro, and Torrance counties. Table 1 summarizes the distribution of the Rio Grande-Albuquerque watershed.

	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
Bernalillo	**747,774**	**444,260**	**22**	**59**
Sandoval	**2,377,011**	**163,775**	**8**	**7**
Socorro	**4,255,339**	**914,781**	**44**	**21**
Torrance	**2,139,990**	**142,614**	**7**	**7**
Valencia	**683,583**	**392,113**	**19**	**57**
Sum (∑)	**--**	**2,057,543**	**100**	**--**

Table 1. Rio Grande-Albuquerque watershed acreage distribution.



Physical Setting

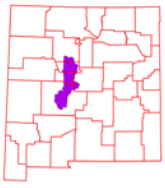
Geology: [1]

The watershed is part of the Rio Grande Rift physiographic province from the confluence with the Jemez River to San Marcial. The rift is a graben with fault block mountains forming the eastern and western boundaries. Mountains to the west are usually volcanic in origin and to the east volcanic or sedimentary.

The mountain ranges consist of Paleoproterozoic Eon aged granitic plutons or quartzite; Tertiary Period aged volcanic (basalt, basaltic-andesite or rhyolite); and Paleoproterozoic Eon aged or earlier volcanic or metamorphic rocks. Pennsylvanian limestone, shale and sandstone occur in a few outcrops on the west side of the pre-Cambrian massif. 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. The ancestral Middle Rio Grande developed into a single river system about 5 million years ago (Crawford et al. 1993). Incision of the Middle Rio Grande Valley has been cyclic, and has produced gravel, sand, and silt terraces 9 to 53 meters (m) (30 to 175 feet (ft)) above the current floodplain. The Rio Grande is thought to have reached maximum entrenchment between 10,000 and 20,000 years ago, at a depth 18 to 40 m (60 to 130 ft) below the current valley floor. Since that time, sediment influx from tributaries has resulted in a gradual aggradation of the river bed. Historically, this process led to frequent avulsions of the river channel. The historic river channel was braided and sinuous with a shifting sand substrate that freely migrated across the floodplain, limited only by valley terraces and bedrock outcroppings (Crawford et al. 1993).

Resource concerns are high sediment erosion and water runoff. 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. This can be exasperated by the mining of sand and gravel from the river channels.

Groundwater quality and quantity is a concern. Groundwater occurs to a greater or lesser extent in all of these geologic units. The most significant aquifer is the Santa Fe Group, particularly its lower member, the Tesuque Formation. The upper member, the Ancha, is typically more conductive than the Tesuque but occurs above the water table in much of the Santa Fe watershed. Deeper groundwater is nearly continuous in the Tesuque Formation throughout the watershed area, to depths of 2000 feet or greater in some areas. This deep groundwater dates from the Ice Age and is recharged little if at all by present-day rainfall and snowmelt. Volcanics often serve as a “floor” or channel to concentrate percolating groundwater and cause it to emerge as spring flow.



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 good to poor for livestock or crops.

Soils:

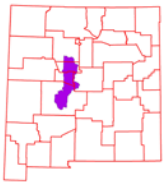
Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.
The soils in the Rio Grande-Albuquerque 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.



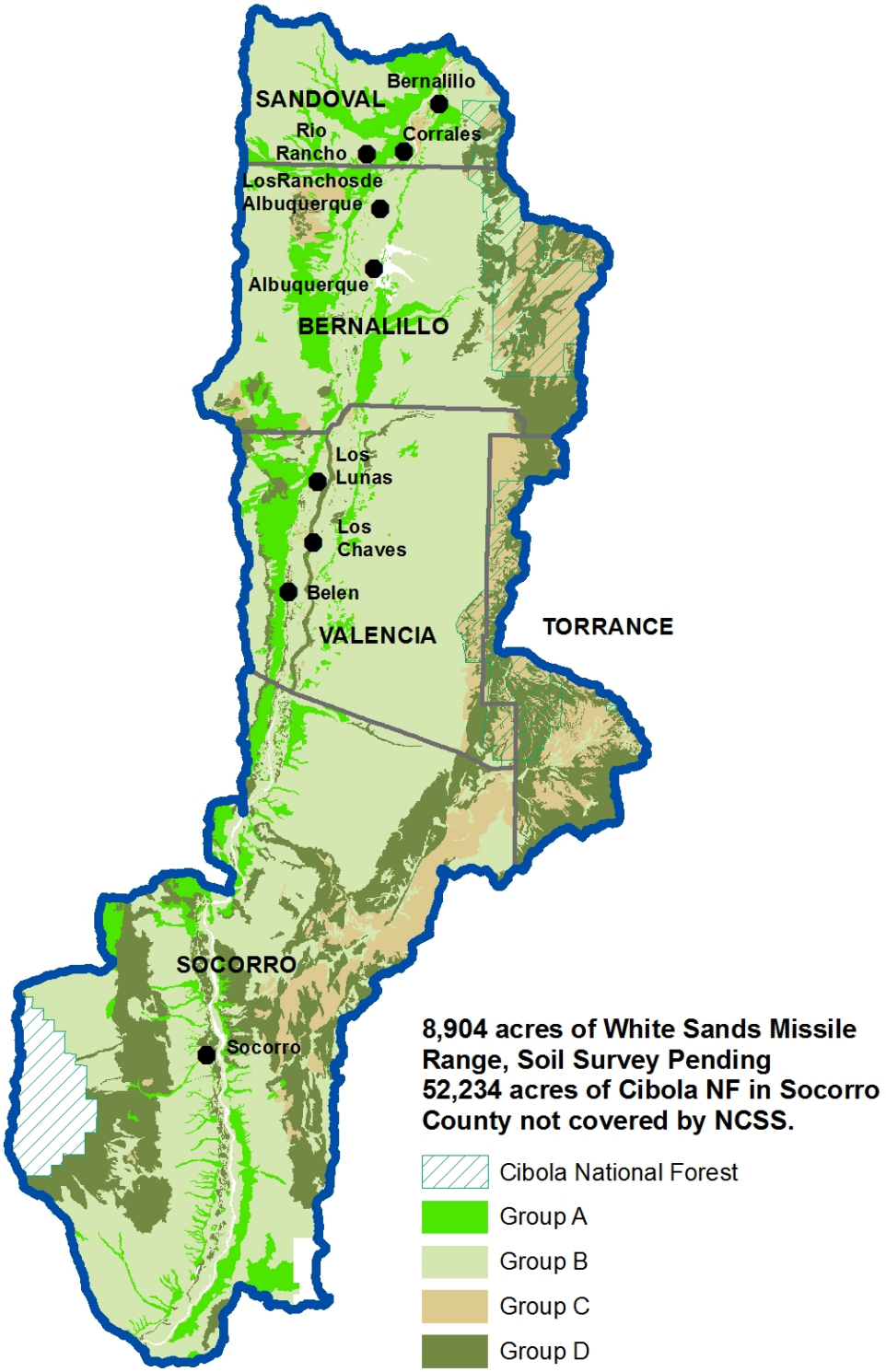


Figure 2. Hydrologic Soils Group

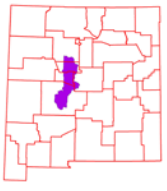
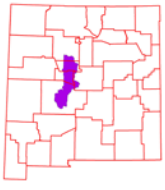


Figure 3. Rio Grande-Albuquerque Watershed Shaded Relief



Precipitation [2]

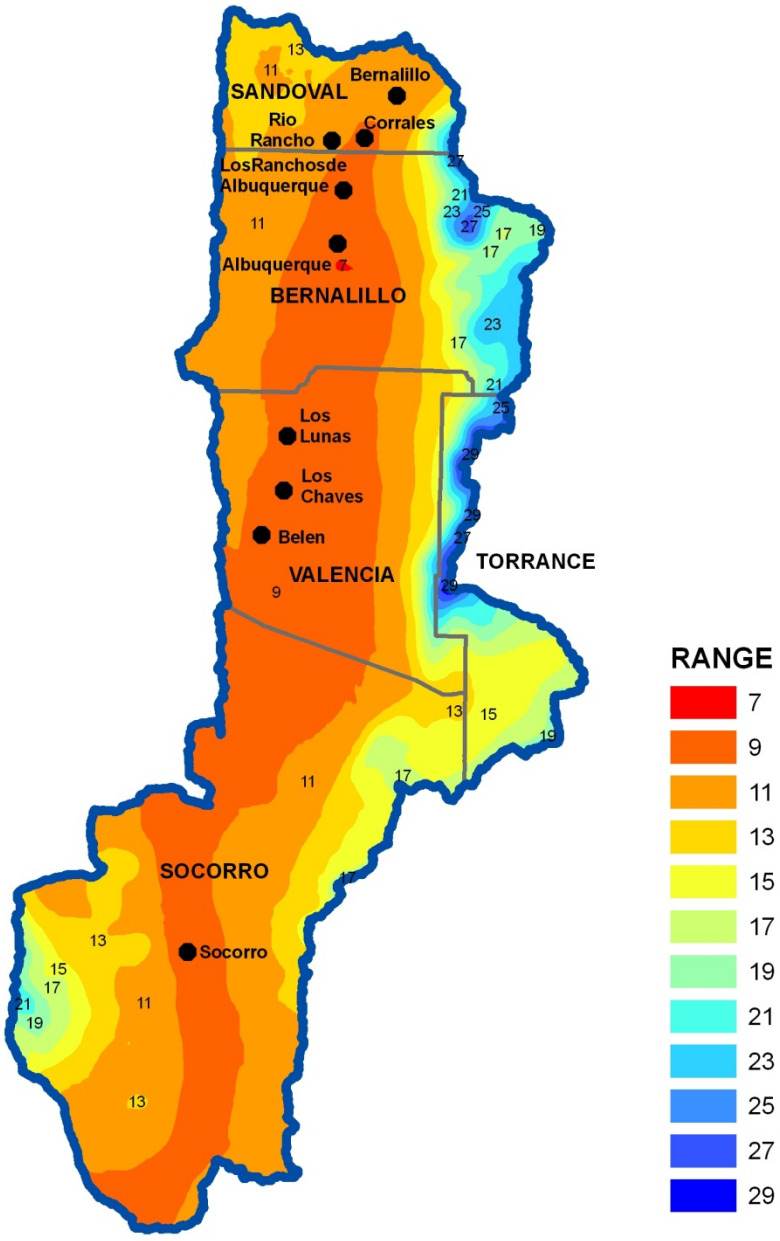
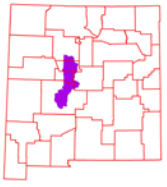


Figure 4. Rio Grande-Albuquerque Watershed Annual Precipitation.



Land Ownership [3]

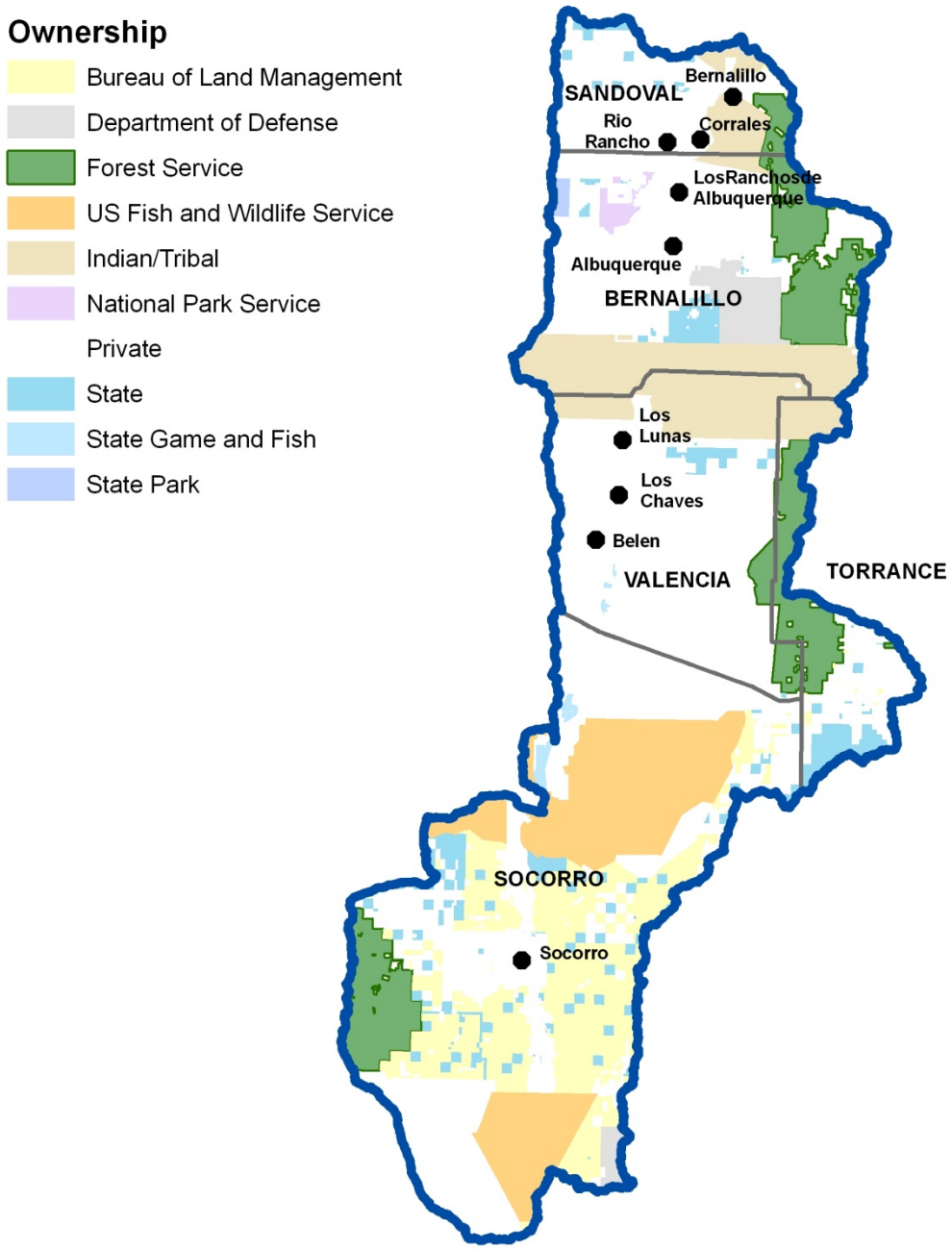
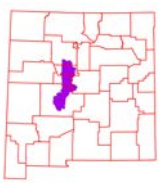


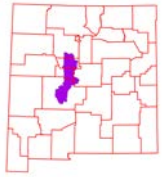
Figure 5. Rio Grande-Albuquerque Watershed Land Ownership.



Land Ownership

COUNTY	BLM	DoD	FS	Indian/ Tribal	NPS	Private	State	State G&F	State Park	USFWS
Bernalillo	1	32,010	66,145	95,415	7,098	223,890	15,375		4,327	
Sandoval	557	704	10,576	27,843		115,833	8,145		117	
Socorro	229,961	8,731	51,006			356,351	50,829	5,525	52	212,327
Torrance	2,269		48,625	16,308		56,544	18,869			
Valencia	70		15,913	68,038		299,660	7,567	880		
Watershed (∑)	232,858	41,445	192,265	207,604	7,098	1,052,278	100,785	6,405	4,496	212,327
% Watershed	11	2	9	10	<1	51	5	<1	<1	10

Table 2. Land ownership in the Rio Grande-Albuquerque watershed.



Land Use / Land Cover [4,5]

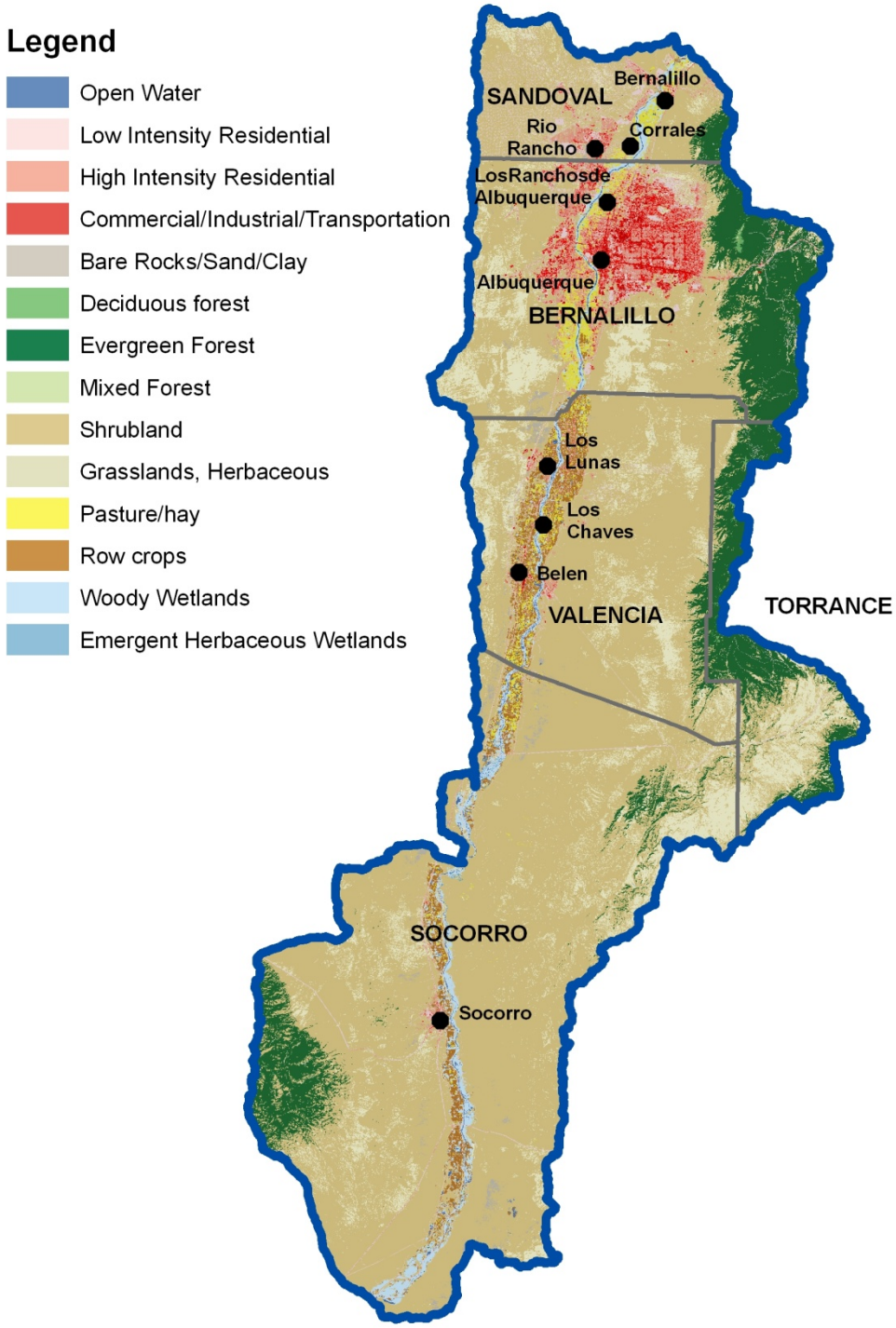
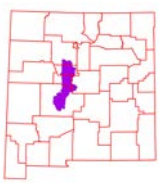


Figure 6. Subset of the National Land Cover Dataset over the Rio Grande-Albuquerque Watershed.

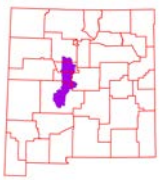


Land Use / Land Cover

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.

Land use / Land cover	Acres	% of Watershed
Shrubland	1,300,974	63
Grasslands, Herbaceous	233,498	11
Evergreen Forest	218,654	11
High Intensity Residential	69,616	3
Low Intensity Residential	68,014	3
Row crops	43,001	2
Woody Wetlands	40,478	2
Pasture/hay	31,639	2
Commercial/Industrial/Transportation	28,476	1
Bare Rocks/Sand/Clay	12,649	1
Open Water	6,698	<1
Deciduous forest	3,168	<1

Table 3. Extent of NLCD classes in the Rio Grande-Albuquerque watershed.



Land Use / Land Cover

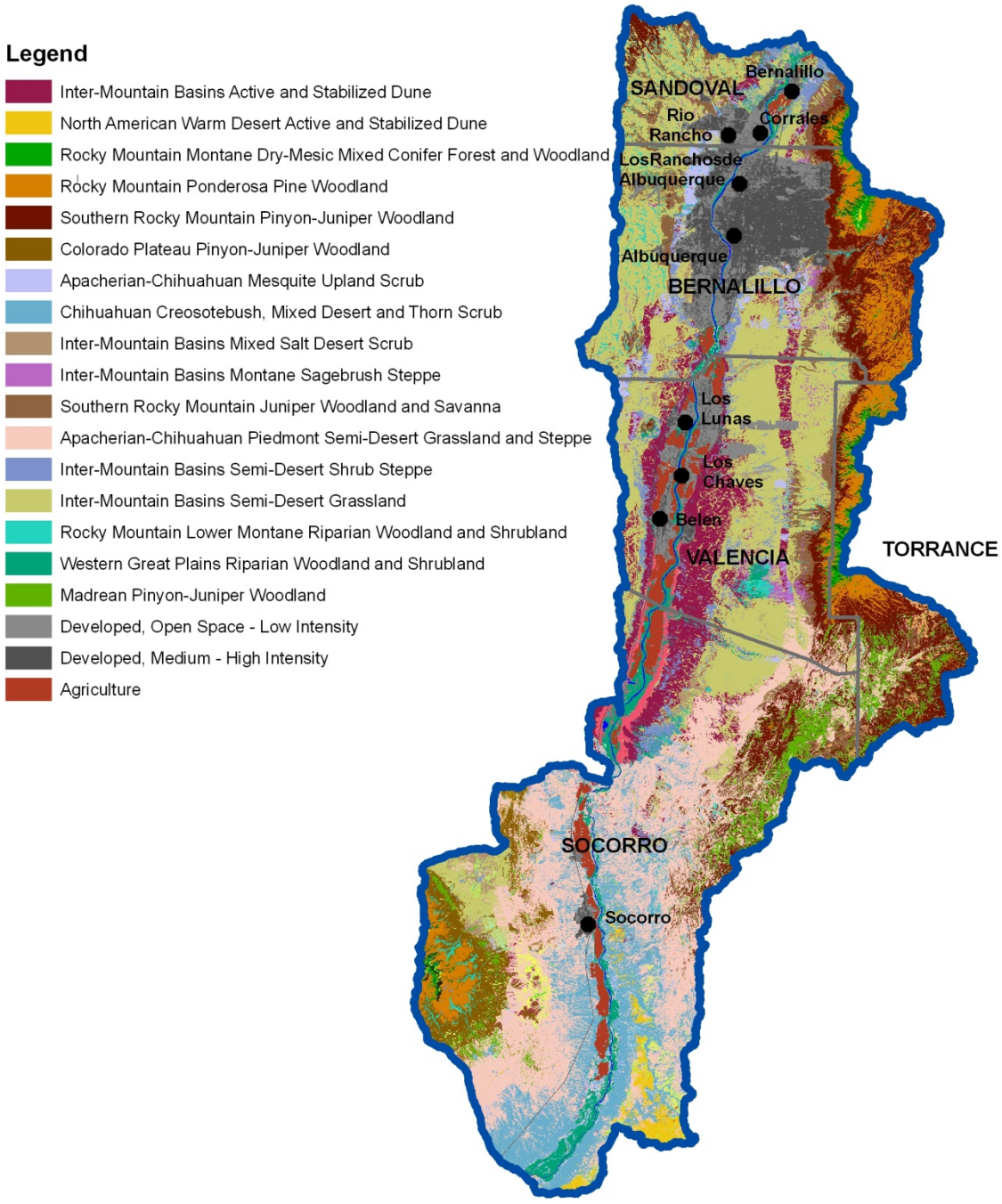
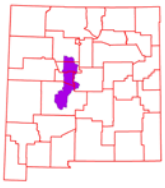


Figure 7. Subset of the SWREGAP over the Rio Grande-Albuquerque Watershed. The 20 dominant ecosystems are displayed in the legend.

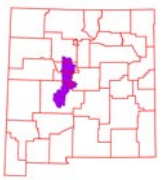


Land Use / Land Cover

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.

Ecosystem	Acres	% of Watershed
Inter-Mountain Basins Semi-Desert Grassland	420,233	20
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	344,589	17
Southern Rocky Mountain Pinyon-Juniper Woodland	164,324	8
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	138,688	7
Inter-Mountain Basins Active and Stabilized Dune	115,616	6
Rocky Mountain Ponderosa Pine Woodland	106,563	5
Developed, Medium - High Intensity	104,896	5
Southern Rocky Mountain Juniper Woodland and Savanna	101,458	5
Developed, Open Space - Low Intensity	85,217	4
Western Great Plains Riparian Woodland and Shrubland	55,975	3
Inter-Mountain Basins Semi-Desert Shrub Steppe	55,681	3
Madrean Pinyon-Juniper Woodland	55,523	3
Colorado Plateau Pinyon-Juniper Woodland	46,701	2
Agriculture	46,074	2
Apacherian-Chihuahuan Mesquite Upland Scrub	30,452	1
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	25,994	1
North American Warm Desert Active and Stabilized Dune	18,668	1
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	18,540	1
Inter-Mountain Basins Mixed Salt Desert Scrub	18,254	1
Inter-Mountain Basins Montane Sagebrush Steppe	17,539	1

Table 4. SW Region Gap analysis ecosystem acreages.



Hydrology[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 7,180 miles (11,555 km) of water courses in the Rio Grande-Albuquerque River Watershed. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

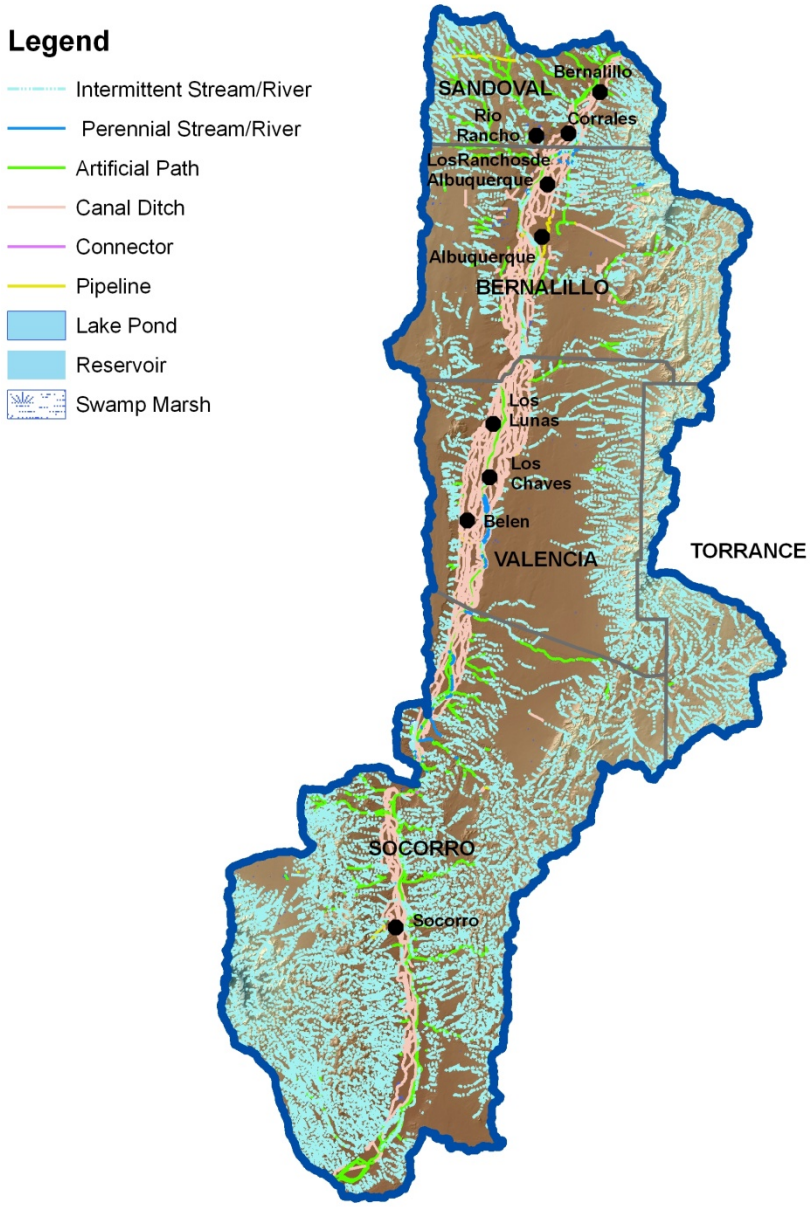
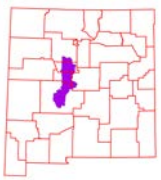
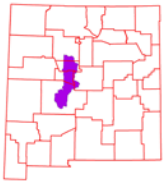


Figure 8. National Hydrologic Dataset (NHD) of the Rio Grande-Albuquerque.



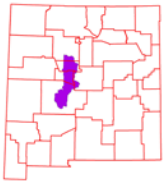
Water Course Type	Miles
Artificial path	549
Connector	1
Canal / Ditch	1,038
Intermittent Stream / River	5,528
Perennial Stream / River	35
Pipeline	29
Sum (∑)	7,180

Table 5. NHD Water Course Type and Extents



There are 26 water gauging stations in the watershed. USGS Site 08355050 is the Rio Grande at Bridge near Escondida, NM. During the period 2006 – 2011, this site has had mean annual discharge of 773 cubic feet per second ranging from 344 (2011) to 1,283 (2008) cubic feet per second.

Figure 9. Gauging Stations in the Rio Grande-Albuquerque Watershed



Hydrology

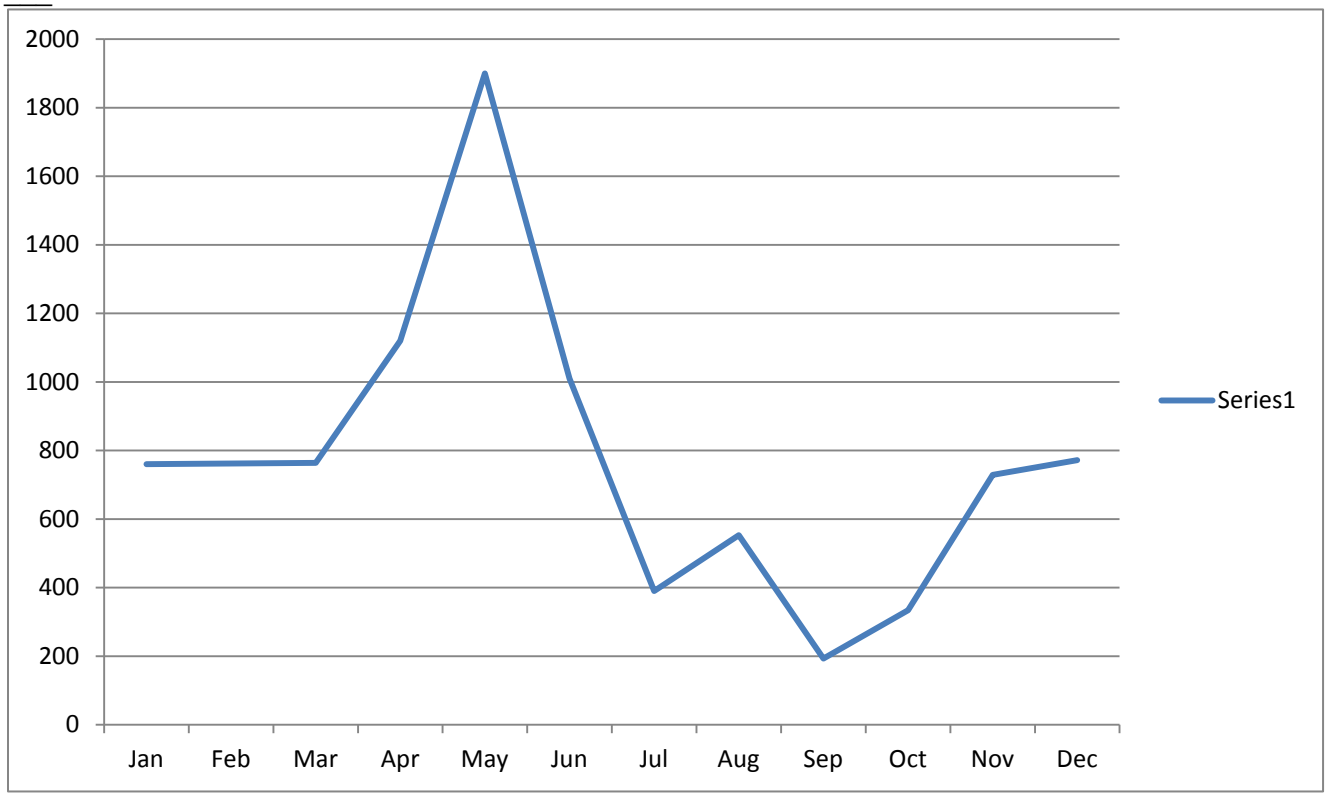
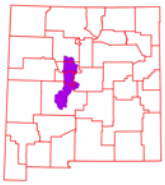


Figure 10. Monthly Average of Mean Daily Flow on the Rio Grande at bridge near Escondida, NM. Period of Observation: October 2005 to September 2011.



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 Rio Grande-Albuquerque watershed as part of the Rio Grande River Basin.

Within the Rio Grande-Albuquerque Watershed, there are no bodies of water that are listed as impaired as of the 2010-12 listing cycle. The river and stream reaches total 186.74 miles (300.53 km).

The Rio Grande-Albuquerque watershed has the following reaches listed as 303 (d) Impaired Surface Waters:

1. Rio Grande (Isleta Pueblo bnd to Alameda Bridge)
2. Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)
3. Rio Grande (Rio Puerco to Isleta Pueblo bnd)
4. Rio Grande (San Marcial at USGS gage to Rio Puerco)
5. Tijeras Arroyo (Rio Grande to headwaters)

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

Use	1	2	3	4	5
high quality coldwater aquatic life					
marginal coldwater aquatic life					
Irrigation/irrigation storage	X	X	X	X	
domestic water supply					
livestock watering	X	X	X	X	X
wildlife habitat	X	X	X	X	X
marginal warmwater aquatic life	X	X	NS	NS	NS
Primary Contact					X
Secondary Contact	X	X	NS	NS	
Fish culture					
Limited Aquatic Life					
Industrial Water Supply					
Municipal Water Supply					

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

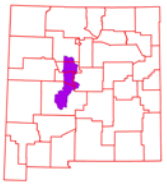
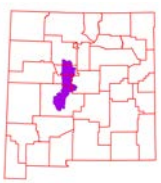


Figure 11. 303(d) Impaired waters (numbers reference Table 6 Stream Reaches)



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 Rio Grande-Albuquerque Watershed, there are no bodies of water that are listed as impaired as of the 2010-12 listing cycle. The river and stream reaches total 186.74 miles (300.53 km).

	Impairment				
Probable Causes of Impairment	**1**	**2**	**3**	**4**	**5**
Ambient Bioassays – Acute Aquatic Toxicity		X			
Aluminum				X	
E. Coli	X	X	X	X	
Benthic-Macroinvertebrate Bioassessments (Streams)					X
Nutrient/Eutrophication					X
PCB's	X	X			
Oxygen, dissolved	X	X			
Temperature	X		X		

Table 7. Possible Causes of Impairment

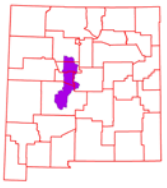
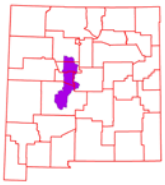


Figure 12. Declared Groundwater Basins of the Rio Grande-Albuquerque.

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 Rio Grande-Albuquerque watershed is mainly within the Middle Rio Grande (2,031,314 acres), and also the Sandia (15,923 acres), and Estancia (8,782 acres) Underground Water Basins.

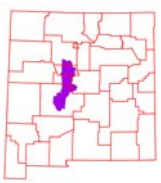


Threatened and Endangered Species [11]

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 8 lists those species which are currently listed and tracked in the Rio Grande-Albuquerque River Watershed.

Common Name	Scientific Name	Tax.Class	Family	Fed Status	State Status
Chupadera Springsnail	*Pyrgulopsis chupaderae*			C	E
Socorro Isopod	*Thermosphaeroma thermophilum*			LE	E
Socorro Springsnail	*Pyrgulopsis neomexicana*			LE	E
Rio Grande Silvery Minnow	*Hybognathus amarus*	Actinopterygii	Cyprinidae	LE	E
Bald Eagle	*Haliaeetus leucocephalus*	Aves	Accipitridae		T
Common Black-Hawk	*Buteogallus anthracinus*	Aves	Accipitridae		T
Piping Plover	*Charadrius melodus*	Aves	Charadriidae	LE,LT	T
Whooping Crane	*Grus americana*	Aves	Gruidae	LE	E
Mexican Spotted Owl	*Strix occidentalis lucida*	Aves	Strigidae	LT	
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Aves	Tyrannidae	LE	E
Bell's Vireo	*Vireo bellii*	Aves	Vireonidae		T
Gray Vireo	*Vireo vicinior*	Aves	Vireonidae		T
Pecos Sunflower	*Helianthus paradoxus*	Dicotyledoneae	Asteraceae	LT	E
New Mexican Jumping Mouse	*Zapus hudsonius luteus*	Mammalia	Dipodidae		E
Spotted Bat	*Euderma maculatum*	Mammalia	Vespertilionidae		T

Table 8. Threatened and Endangered Plant and Animal Species.

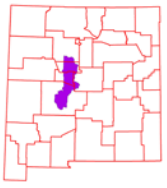


Invasive Species [12]

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

Scientific Name	Common Name
Peganum harmala L.	**African Rue**
Alhagi pseudalhagi (Bieb) Desv.	**Camelthorn**
***Scrophylariaceae* (Figwort Family)**	**Dalmatian Toadflax**
Cardaria draba (L.) Desv.	**Hoary Cress (Whitetop)**
Carduus natuans L.	**Musk Thistle**
Lepidium latifolium L.	**Perennial Pepperweed (Tall Whitetop)**
Lythrum salicaria L.	**Purple Loosestrife**
Acroptilon repens L.	**Russian Knapweed**
Linaria vulgaris Mill.	**Yellow Toadflax**

Table 9. Invasive Species Recognized by the SWEMP.



Common Resource Areas[13]

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.

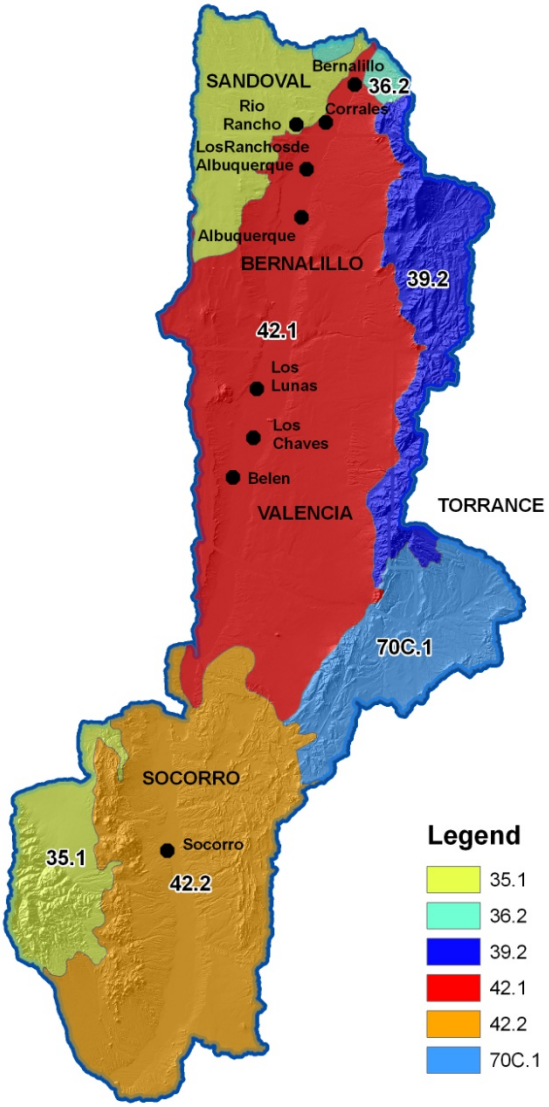
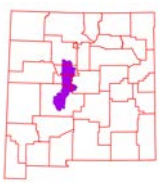


Figure 13. Common Resource Areas of the Rio Grande-Albuquerque



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.

39.2 – Central New Mexico Mountains

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 12000 feet. Precipitation ranges 17 to 25 inches per year. The soil temperature regime ranges from mesic to frigid. Vegetation includes corkbark, Douglas and white fir, Englemann spruce, pinyon and southwestern white pine, and aspen. Grasslands include tufted hairgrass, sedges, and Arizona and Thurber fescue.

42.1 – Upper Rio Grande Rift Valley

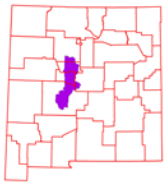
This unit occurs within the Basin and Range Physiographic Province and contains the upper Rio Grande Rift Valley. Elevations range from 4500 to 5500 feet. Precipitation ranges from 8 to 11 inches per year. The soil temperature regime ranges thermic to mesic. The soil moisture regime is typic aridic. 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.

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, soaptree yucca, torrey yucca, tobosa, and alkali sacaton..

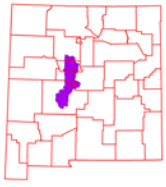
70C.1 – Central New Mexico Highlands

Tablelands and mesas separated by broad plains and small terraces characterize this area. Elevation is 5,000 to 7,200 feet and precipitation is 12 to 17 inches. The soil moisture regime is aridic to ustic and the soil temperature regime is mesic. Pinyon-juniper savannah and pinyon juniper woodlands at higher elevations, and broad mid- to short-grass prairies and basins at lower elevations dominate the area. Current land use is livestock grazing. The soils formed in Quaternary alluvium, eolian sands, and sedimentary rocks of Permian age. (Old CP-3)

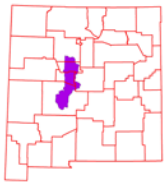


Conservation [14]

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.

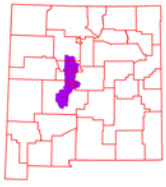


Conservation Practice	2007		2008		2009		2010		2011		TOTAL	
	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres
Atmospheric Resource Quality Mgmt					2	9					2	9
Brush Management	6	621	9	649	12	1207	9	335	1	1800	37	4612
Conservation Crop Rotation	47	310	33	453	69	241	20	360	45	1055	214	2419
Cover Crop							1	1			1	1
Critical Area Planting	4	20					1	6			5	26
Forage and Biomass Planting	40	144	53	300	14	96	52	423	11	15	170	978
Forage Harvest Management	49	197	21	122	39	129	40	200	20	130	169	778
Integrated Pest Management	80	382	67	678	111	344	35	519	52	1386	345	3309
Irrigation Land Leveling	103	2795	88	622	34	336	64	1215	29	177	318	5145
Irrigation System, Microirrigation	6	57	2	25	4	5	6	75			18	162
Irrigation System, Sprinkler	3	2			5	36	3	57			11	95
Irrigation System, Surface and Subsurface	4	52			14	281	11	220	3	35	32	588
Irrigation Water Management	97	471	74	749	126	616	160	2592	66	527	523	4955
Nutrient Management	83	745	70	779	111	338	42	657	38	1059	344	3578
Prescribed Grazing	34	784	33	21394	17	9362	12	2901	16	13708	112	48149
Residue and Tillage Mgmt, No-Till/Strip Till/Direct Seed			1	104			3	15			4	119
Residue Mgmt, Seasonal	36	238	29	301	69	259	57	1083	22	300	213	2181
Restoration and Mgmt of Rare and Declining Habitats							1	55			1	55
Riparian Herbaceous Cover	1	1									1	1
Tree/Shrub Establishment	10	6	6	130	1	1	4	8			21	145
Upland Wildlife Habitat	15	8058	33	28846	103	21519	123	42880	24	1549	298	102852

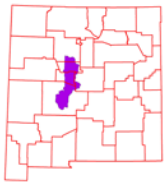


Management												
Waste Recycling					1	1	1	15			2	16
Wetland Enhancement			1	1			28	183			29	184
Wetland Restoration	1	1					30	235			31	236
Wetland Wildlife Habitat Management	4	20	1	1			24	122			29	143
SUM (∑)	623	14904	521	55154	732	34780	727	54157	327	21741	2930	180736

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

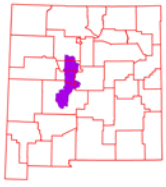


Conservation Practice	2007		2008		2009		2010		2011		TOTAL	
	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet
Above-Ground, Multi-Outlet Pipeline							2	1390			2	1390
Comprehensive Nutrient Management Plan	1		2		1		3				7	0
Conservation Completion Incentive First Year	12		3								15	0
Conservation Completion Incentive Second Year					1						1	0
Dike	2	1075									2	1075
Diversion					1						1	0
Fence	2	200	3	6525	10	15033			1	2961	16	24719
Fishpond Management	2										2	0
Grade Stabilization Structure					2						2	0
Irrigation Ditch Lining									3	2001	3	2001
Irrigation Pipeline									4	3425	4	3425
Irrigation Water Conveyance, Ditch and Canal Lining, plain concrete	14	13655	19	24280	11	12871	8	6607	22	15004	74	72417
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic	9	700	28	13012	6	888	28	25509	8	4330	79	44439
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	19	7420	21	19964	8	3121	17	9775	10	5723	75	46003
Irrigation Water Conveyance, Pipeline, Steel	3	139	2	40					1	120	6	299
Pipeline	3	10080					3	18766	4	2053	10	30899
Pond	1						2				3	0
Pond Sealing or Lining, Flexible Membrane	1		1				1				3	0
Pumping Plant	5				2		2		2		11	0
Sediment Basin			1								1	0
Structure for Water Control	45		32		19		42		33		171	0
Waste Storage Facility			1				1				2	0
Waste Transfer			1		1						2	0
Waste Treatment Lagoon			2								2	0
Water Well	2						1		2		5	0
Watering Facility	32		17		9		13		10		81	0



Windbreak/Shelterbelt Estab.					**2**	**2000**	**3**	**1405**			**5**	**3405**
Windbreak/Shelterbelt Renovate							**1**	**800**			**1**	**800**
SUM (∑)	**121**	**33269**	**116**	**63821**	**62**	**31913**	**110**	**62047**	**90**	**35617**	**499**	**226667**

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



Soil Resource Inventory [15]

The Rio Grande-Santa Fe 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.

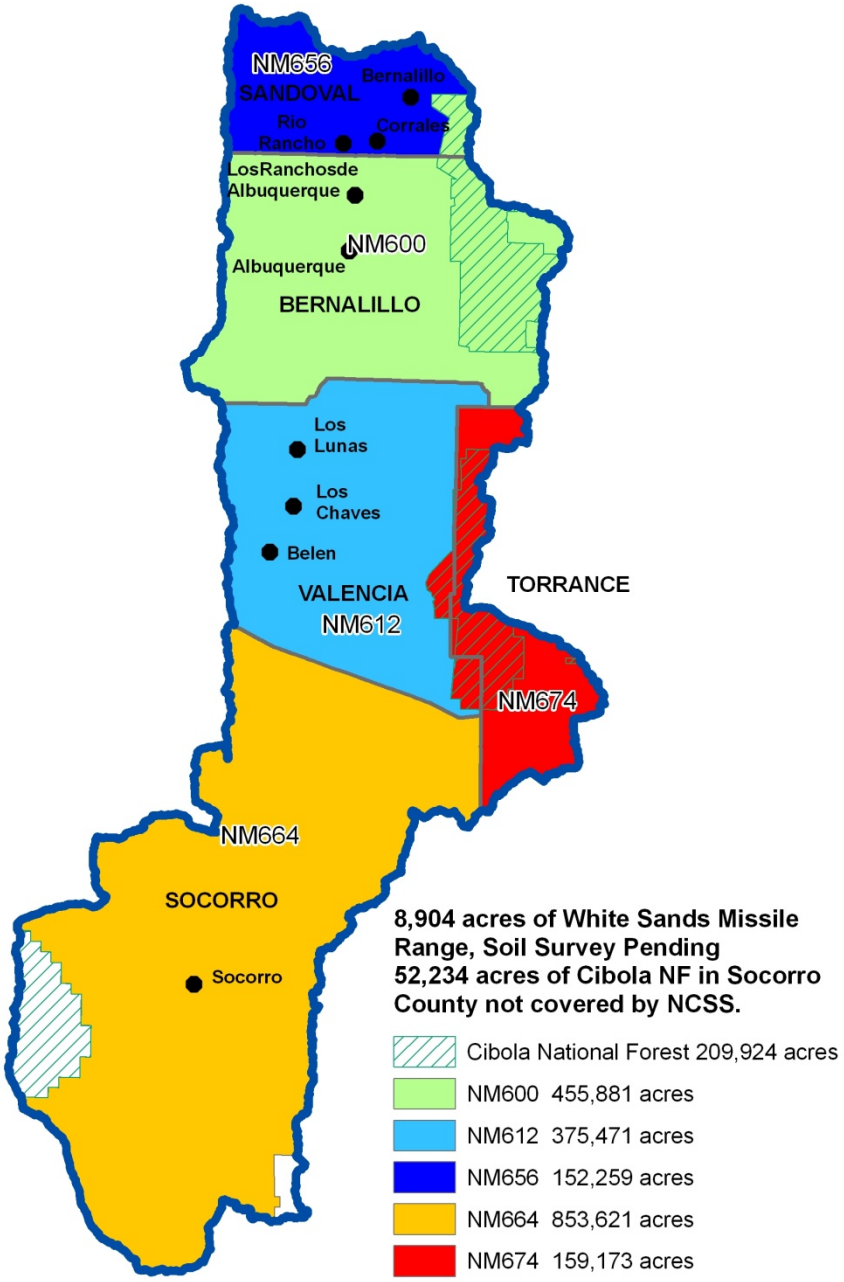
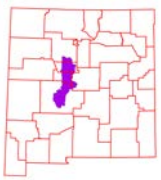


Figure 14. National Cooperative Soil Survey coverage of the Rio Grande-Albuquerque Watershed

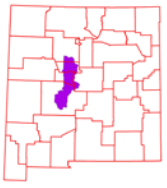


Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the Rio Grande-Albuquerque 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 -

SSURGO Value	Nominal Description	Model Rank
Saturated Hydraulic Conductivity		
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
Slope %		
0 - 5		0
6 - 10		1
11 - 15		2
16 - 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 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.

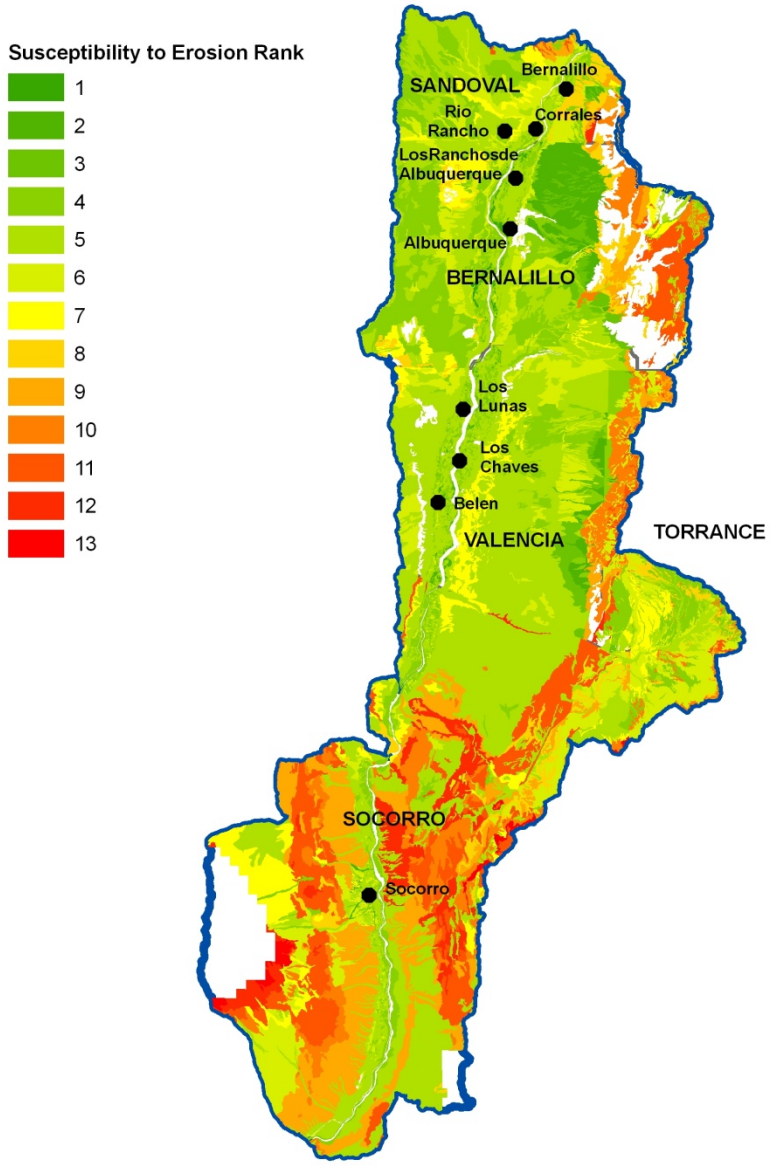
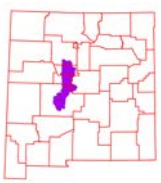


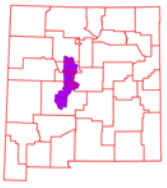
Figure 15. Rio Grande-Albuquerque Watershed Erosion Potential



Soil Resource Inventory

Rank	Acres
1	3,245
2	50,814
3	32,274
4	257,972
5	681,185
6	213,913
7	111,375
8	62,540
9	170,192
10	104,858
11	153,606
12	53,918
13	8,272
Sum(∑)	1,904,164

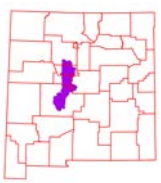
Table 13. Soil Erosion Potential Model Results. A greater rank indicates greater potential for erosion.



Socioeconomic Data [16]

COUNTY	Total population: Total	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 2010
Bernalillo	662,564	317,089	459,660	19,652	31,744	15,525	695	105,847	29,441	$47,624
Sandoval	131,561	46,129	89,482	2,800	16,945	1,922	169	15,139	5,104	$51,959
Socorro	17,866	8,664	13,424	188	2,082	219	8	1,442	503	NA
Torrance	16,383	6,399	12,460	219	383	71	8	2,535	707	NA
Valencia	76,569	44,605	56,027	1,071	2,915	406	55	13,046	3,049	$49,270

Table 14. Socioeconomic Data of the Counties in the Watershed (2010).



References

1. New Mexico Environmental Department-Surface Water Quality Bureau (SWQB) http://www.nmenv.state.nm.us/swqb/RioGrande/

2. 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/

3. Bureau of Land Management – New Mexico State Office. - http://www.blm.gov/nm/st/en/prog/more/geographic_sciences/spatial_data_metadata.html

4. UNITED STATES GEOLOGICAL SURVEY - National Land Cover Dataset. http://landcover.United States Geological Survey.gov/

5. Southwest Regional Gap Analysis Project (SWReGAP). http://earth.gis.usu.edu/swgap/

6. UNITED STATES GEOLOGICAL SURVEY – National Hydrography Dataset. http://nhd.United States Geological Survey.gov/

7. UNITED STATES GEOLOGICAL SURVEY – National Water Information System. http://waterdata.usgs.gov/nwis/nwisman/?site_no=08355050&agency_cd=USGS

8. State of New Mexico Clean Water Act 303(d)/305(b) Integrated Report ftp://ftp.nmenv.state.nm.us/www/swqb/303d-305b/2010/USEPA-Approved303dList.pdf

9. United States Environmental Protection Agency - http://cfpub.epa.gov/surf/huc.cfm?huc_code=13020203

10. New Mexico - Office of the State Engineer- http://www.ose.state.nm.us/water_info_data.html

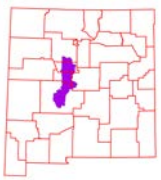
11. New Mexico Natural Heritage Program - http://nhnm.unm.edu/

12. Southwest Exotic Plant Mapping Program - http://www.invasiveweeds.com/mapping/welcome.html

13. Natural Resources Conservation Service – Common Resource Area (CRA) Geographic Database http://soils.usda.gov/survey/geography/cra.html

14. Natural Resources Conservation Service – Performance Results System http://ias.sc.egov.usda.gov/PRSHOME/

15. Natural Resources Conservation Service – Soil Data Mart http://soildatamart.nrcs.usda.gov/



16. United States Census Bureau - http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml