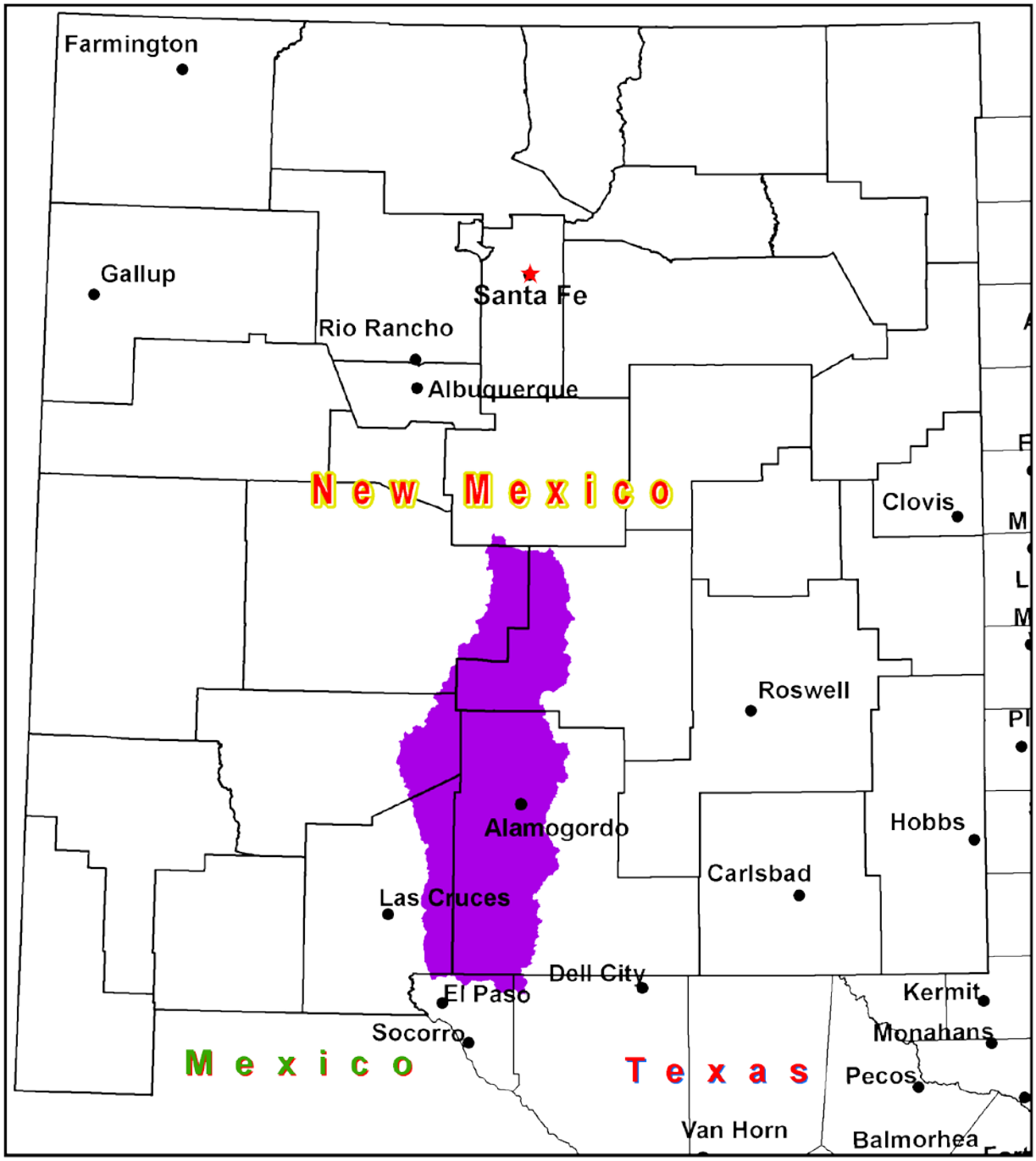
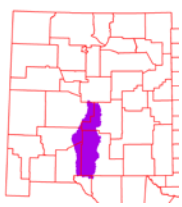
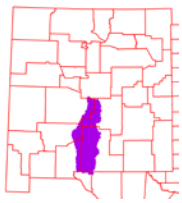


Rapid **W**atershed **A**ssessment
Tularosa Valley Watershed





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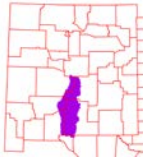

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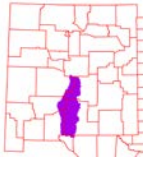


Overview

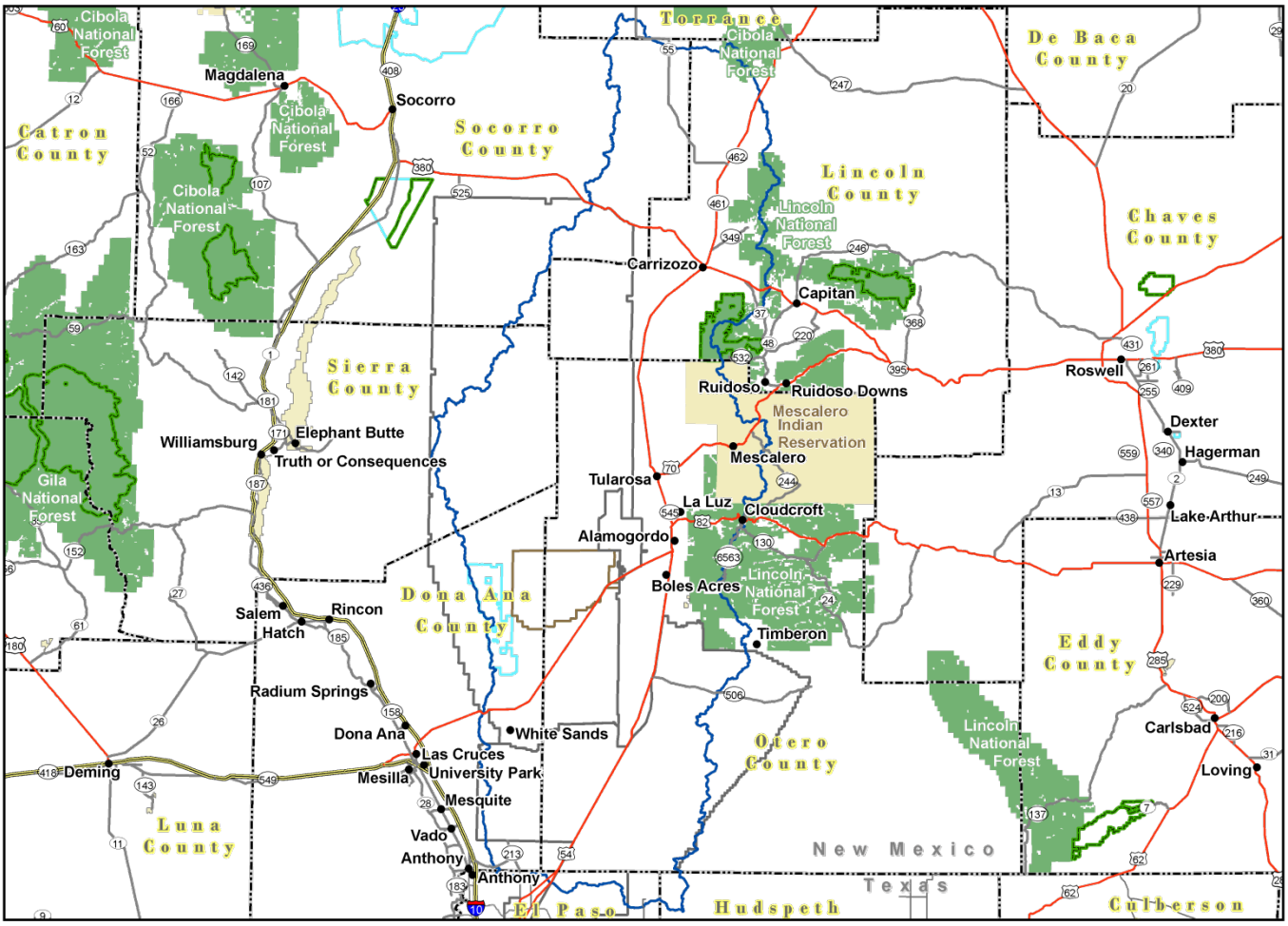
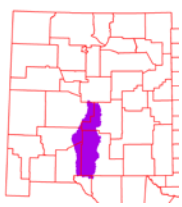


Figure 1. Tularosa Valley Watershed Overview.

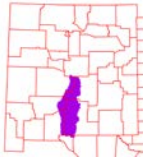


Overview

The Tularosa Valley Watershed is located in southern-central New Mexico and in the northwestern part of Texas. It covers 4,292,993 total acres (17,373 sq. km). Portions of the Tularosa Valley Watershed are in Dona Ana, Lincoln, Otero, Sierra, Socorro, and Torrance counties in New Mexico and in El Paso and Hudspeth counties in Texas. Table 1 summarizes the distribution of the Tularosa Valley Watershed.

County	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
Dona Ana, NM	2,441,223	504,641	12	21
Lincoln, NM	3,089,787	832,055	19	27
Otero, NM	4,238,818	2,058,873	48	49
Sierra, NM	2,711,883	382,135	9	14
Socorro, NM	4,255,295	426,967	10	10
Torrance, NM	2,139,978	12,212	0	1
El Paso, TX	649,004	57,524	1	9
Hudspeth, TX	2,922,491	18,578	0	1
Sum (∑)	--	4,292,993	100	--

Table 1. Tularosa Valley Watershed acreage distribution.



Physical Setting

Geology: The Tularosa Valley HUC has a northern boundary near Kerr Well near Gran Quivira. It is bounded on the west side by Chupadera Mesa, the Oscura Mountains, the San Andres Mountains, the Organ Mountains, and the Franklin Mountains. It is bounded on the east side by Atkinson flats, Gallinas Peak, Rough Mountain, Tecolote Peak, the Sacramento Mountains, the Vera Cruz Mountains, the Sacramento Mountains from Sierra Blanca to Culp Peak, Otero Mesa, and the Hueco Mountains.

The Tularosa Valley is an enclosed basin with no external outlet and is part of the Rio Grande Rift. A playa called Lake Lucero is the remains of the Pleistocene Epoch Lake Otero remains. Lake Lucero playa is rich in gypsum and other salts.

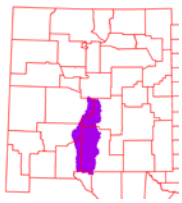
The San Andres Mountains, Chupadera Mesa, Oscura Mountains, Sacramento Mountains Otero Mesa, and the Hueco Mountains are composed of Pennsylvanian Period limestone at the crest, which changes to Permian Period limestones, sandstones, siltstones, anhydrite, gypsum, halite and dolomite until the valley floor is encountered. The limestone is porous. The Organ Mountains, Gallenas Peak, Rough Mountain, Tecolote Peak, Carrizo Mountain, Sierra Blanca, the Vera Cruz Mountains, and the Jarilla Mountains are Tertiary Period granite intrusions. Surrounding Sierra Blanca are middle Tertiary Period volcanics. Along the western mountains and especially the southern portion of the valley floor, Quaternary-Tertiary Period partly compacted sands and gravels of the Santa Fe group occur. 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. Quaternary Period piedmont alluvial sediments form alluvial fans along the mountains. In the north the Corrizozo lava flows are Quaternary period basaltic or andesitic flows. The north central portion of the valley is comprised of Quaternary Period eolian, gypsiferous eolian (White Sands), and lacustrine and playa deposits (Lake Lucero). The remainder of the valley floor is quaternary Period alluvium.

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 Tularosa Valley 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 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.

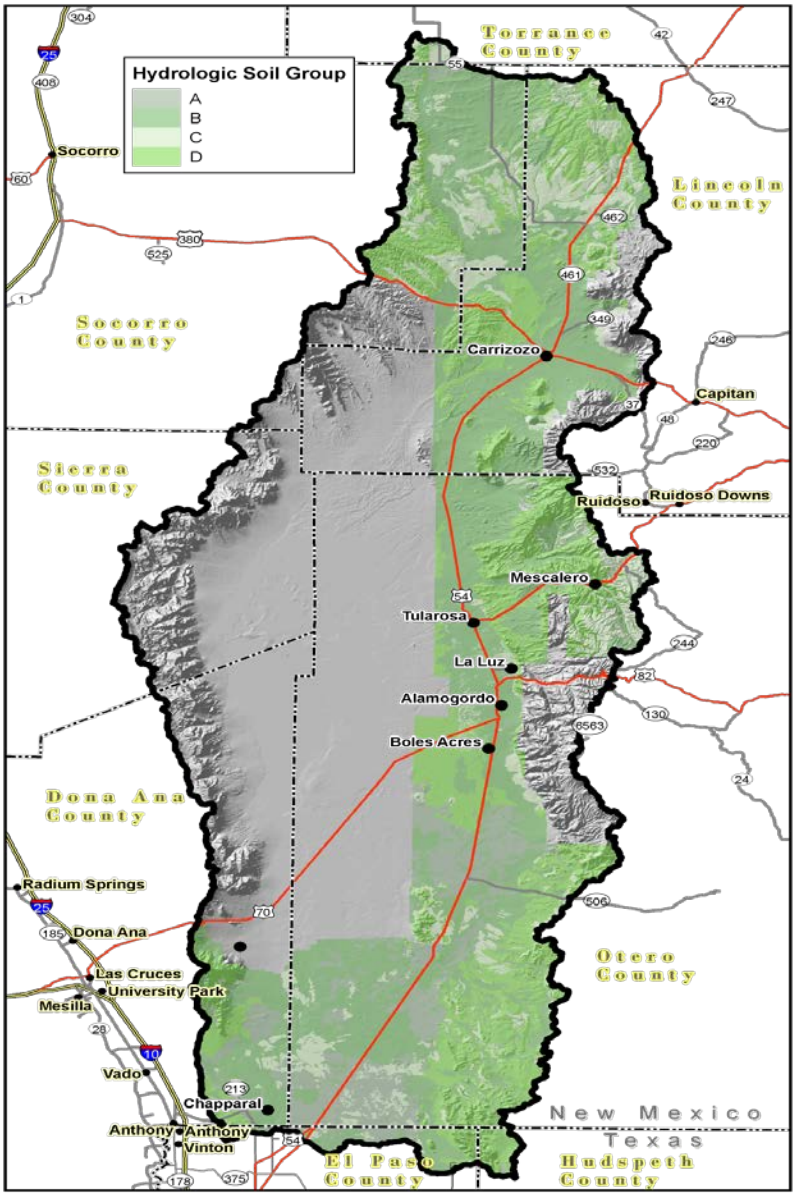
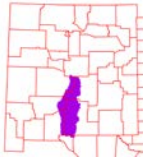


Figure 2. Tularosa Valley Hydrologic Soil Group.



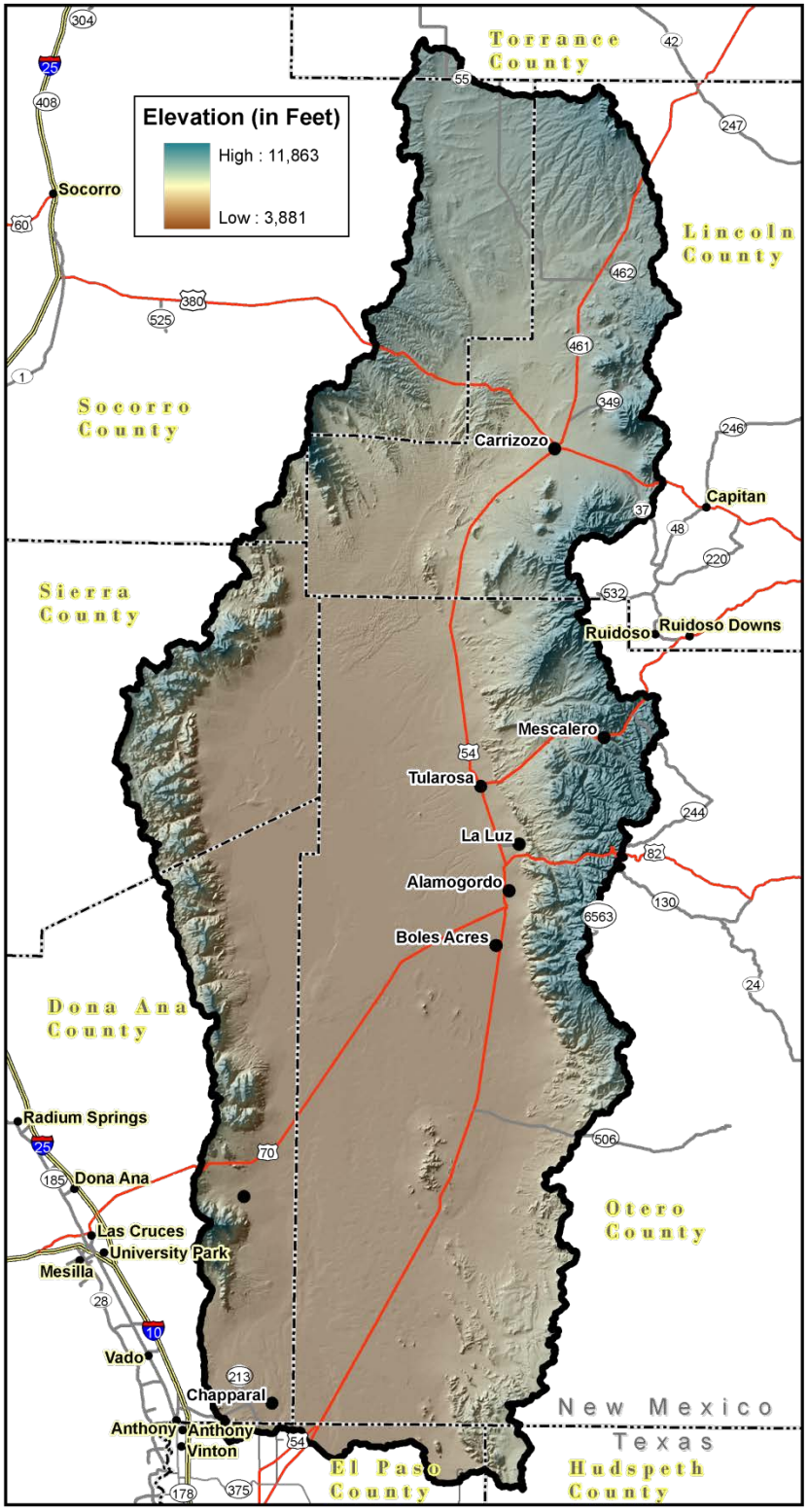
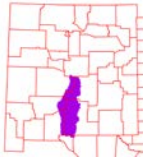


Figure 3. Tularosa Valley Watershed Shaded Relief.



Precipitation [1]

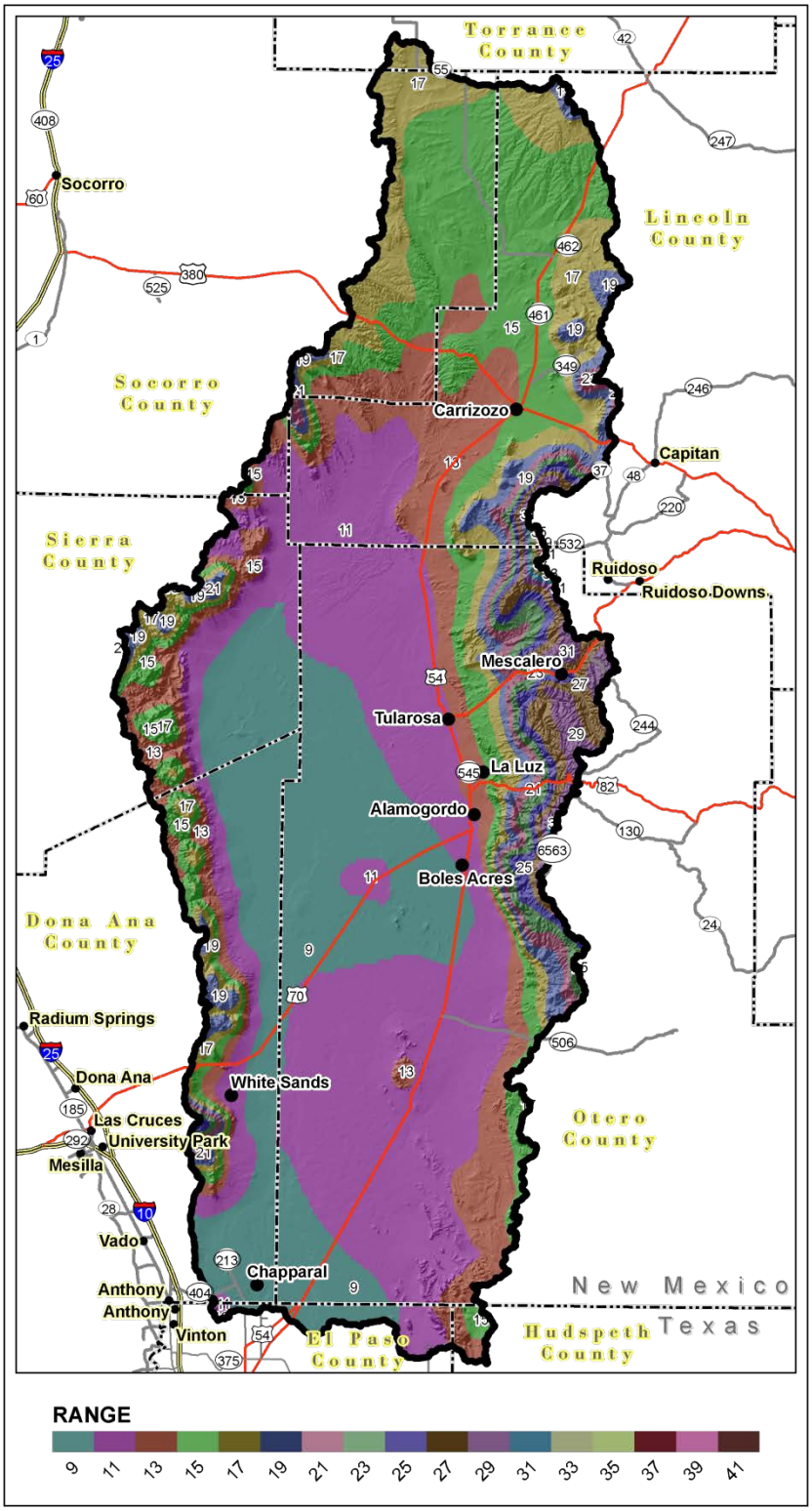
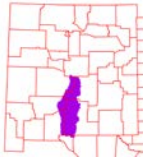


Figure 4. Tularosa Valley Watershed Annual Precipitation.



Land Ownership [2]

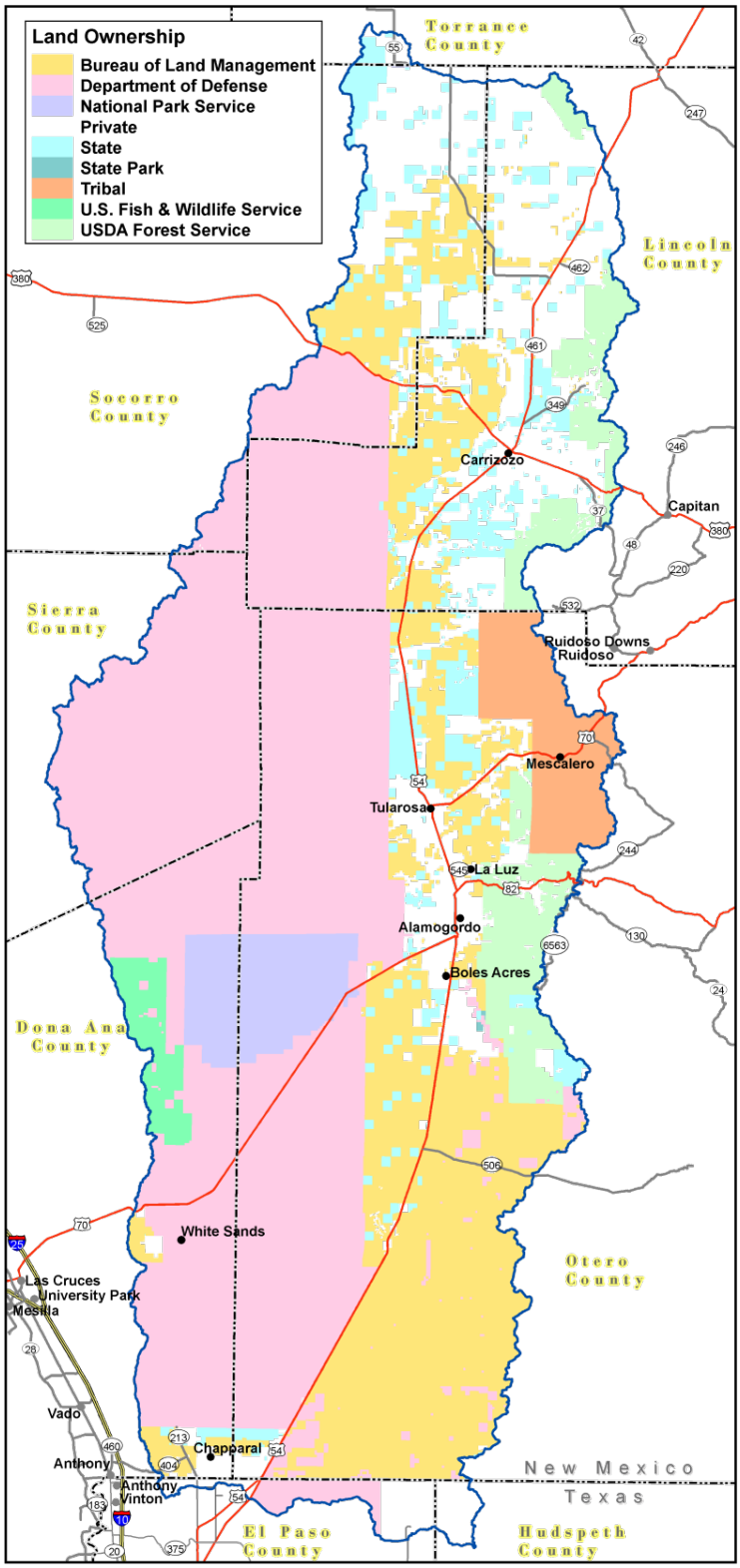
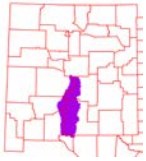


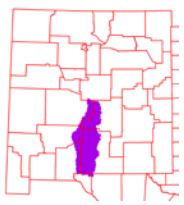
Figure 5. Tularosa Valley Watershed Land Ownership.



Land Ownership

COUNTY	BLM	DOD	FS	FWS	Indian Lands	NPS	Private	State	State Park
Dona Ana	24,415	353,850		54,649		52,289	15,426	4,012	
Lincoln	104,770	181,014	100,198				347,385	98,688	
Otero	668,648	753,732	123,054		146,728	92,135	178,051	95,886	639
Sierra		382,135							
Socorro	108,464	105,806				376	153,949	58,371	
Torrance						237	6,837	5,138	
El Paso, TX		25,760					31,764		
Hudspeth, TX							18,578		
Watershed (∑)	906,297	1,802,297	223,252	54,649	146,728	145,037	751,990	262,095	639
% Watershed	21	42	5	< 1	3	3	18	6	<1

Table 2. Land ownership in the Tularosa Valley Watershed.



Land Use / Land Cover [3, 4]

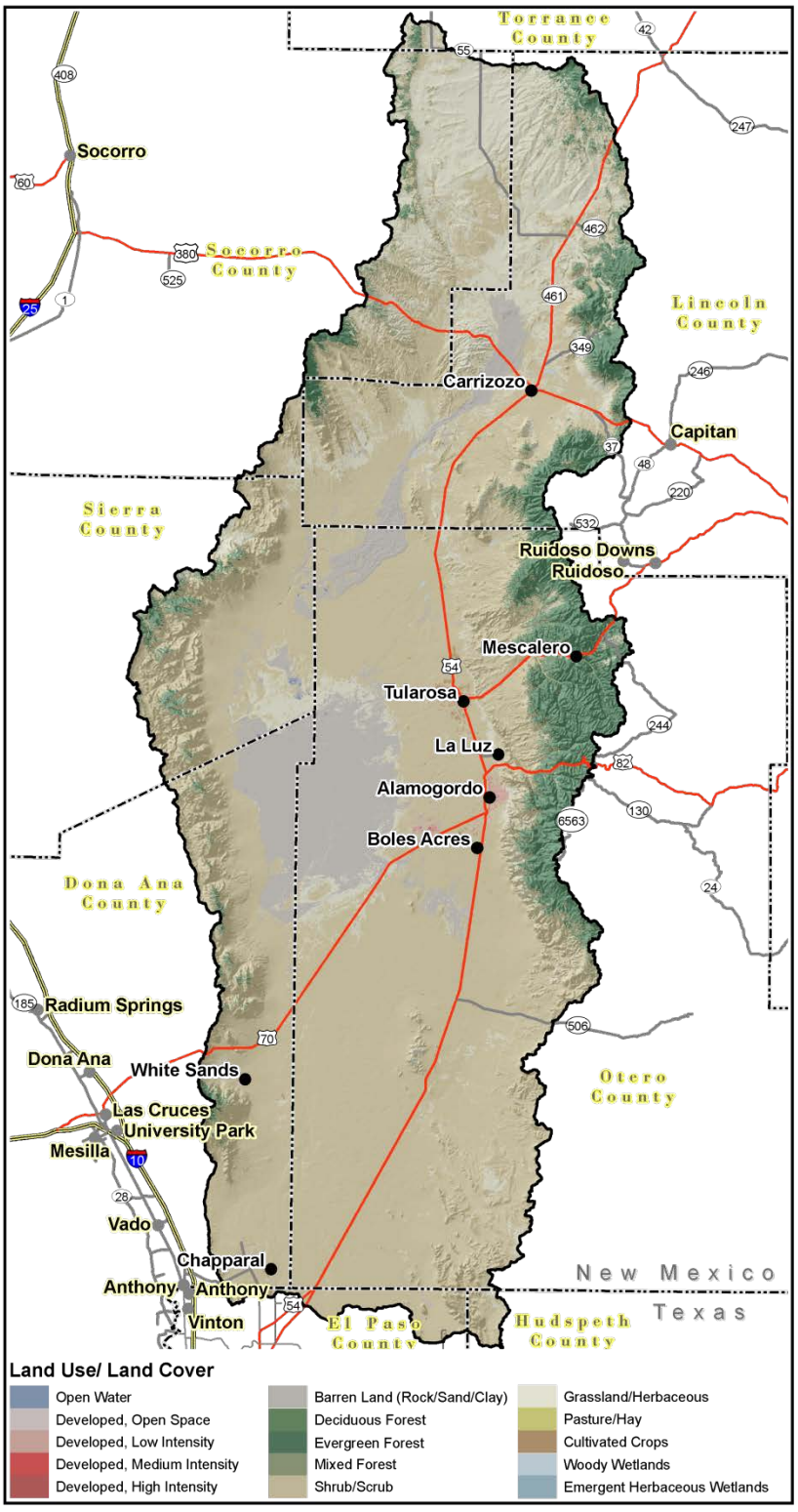
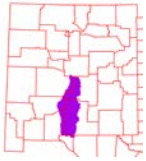


Figure 6. Subset of the National Land Cover Dataset in the Tularosa Valley Watershed.

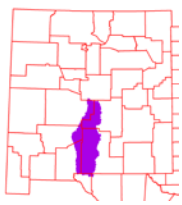


Land Use / Land Cover

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.

Land Use/ Land Cover	Acres	% of Watershed
Shrub/Scrub	2,789,566	65
Grassland/Herbaceous	684,601	16
Evergreen Forest	390,042	9
Barren Land (Rock/Sand/Clay)	375,189	9
Developed, Open Space	24,721	1
Developed, Low Intensity	8,295	< 1
Cultivated Crops	7,605	< 1
Woody Wetlands	5,537	< 1
Pasture/Hay	1,654	< 1
Deciduous Forest	1,459	< 1
Emergent Herbaceous Wetlands	1,445	< 1
Open Water	1,410	< 1
Developed, Medium Intensity	1,194	< 1
Developed, High Intensity	196	< 1
Mixed Forest	2	< 1

Table 3. Extent of NLCD classes in the Tularosa Valley Watershed.



Land Use / Land Cover

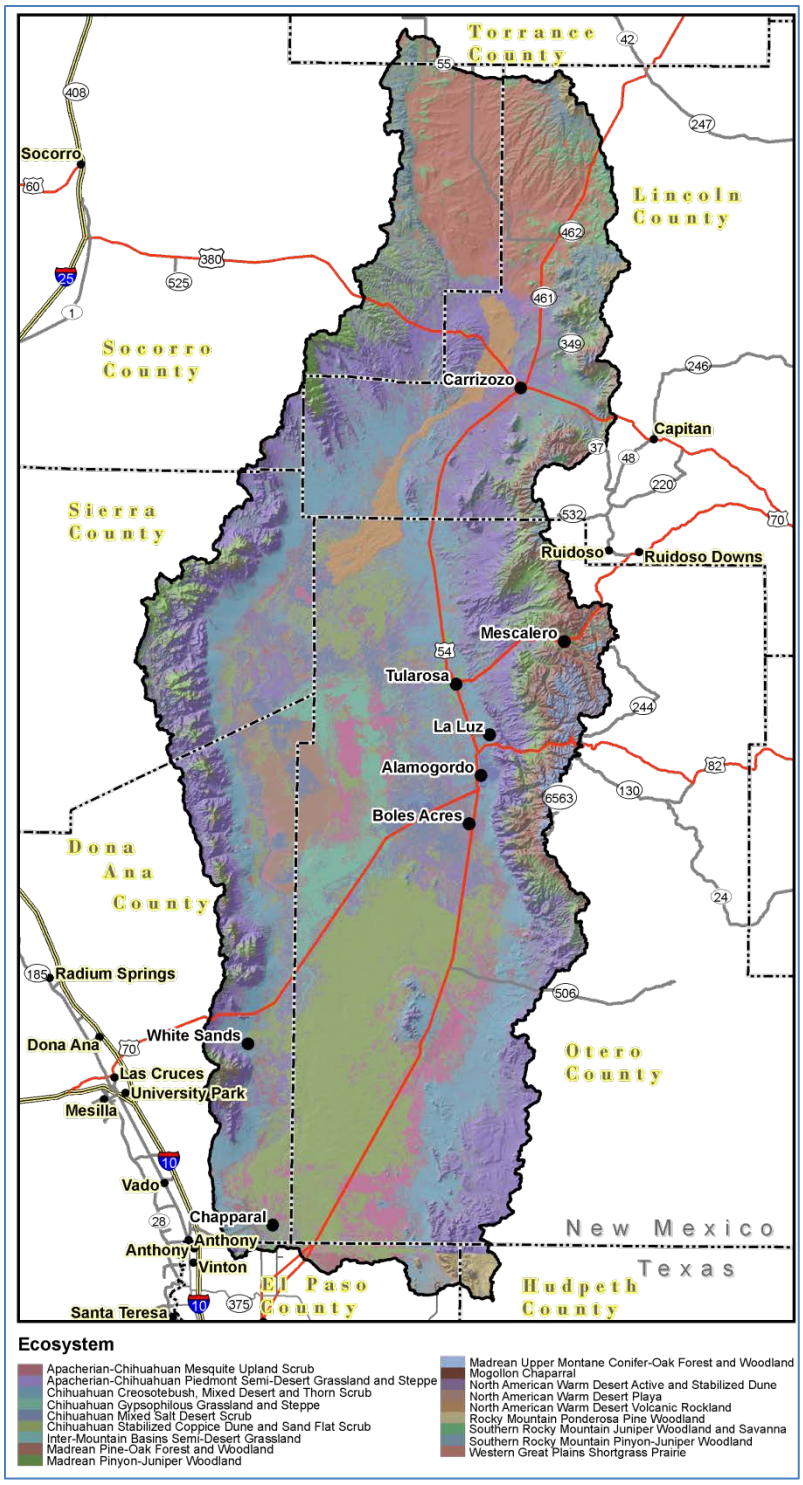
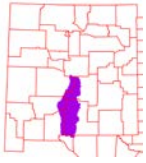


Figure 7. Subset of the SWREGAP over the Tularosa Valley Watershed. The 18 dominant ecosystems are displayed in the legend.

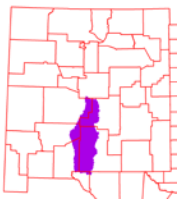


Land Use / Land Cover

The land cover 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
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	995,349	23
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	725,712	17
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	655,116	15
Western Great Plains Shortgrass Prairie	327,795	8
Madrean Pinyon-Juniper Woodland	237,264	6
Chihuahuan Mixed Salt Desert Scrub	176,521	4
North American Warm Desert Active and Stabilized Dune	153,250	4
Chihuahuan Gypsophilous Grassland and Steppe	137,403	3
Southern Rocky Mountain Pinyon-Juniper Woodland	117,031	3
Madrean Pine-Oak Forest and Woodland	114,475	3
North American Warm Desert Playa	109,303	3
Apacherian-Chihuahuan Mesquite Upland Scrub	100,955	2
Southern Rocky Mountain Juniper Woodland and Savanna	85,130	2
North American Warm Desert Volcanic Rockland	77,075	2
Madrean Upper Montane Conifer-Oak Forest and Woodland	47,533	1
Mogollon Chaparral	39,524	1
Rocky Mountain Ponderosa Pine Woodland	26,710	1
Inter-Mountain Basins Semi-Desert Grassland	23,507	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 10,720 miles (17,252 km) of water courses in the Tularosa Valley Watershed. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

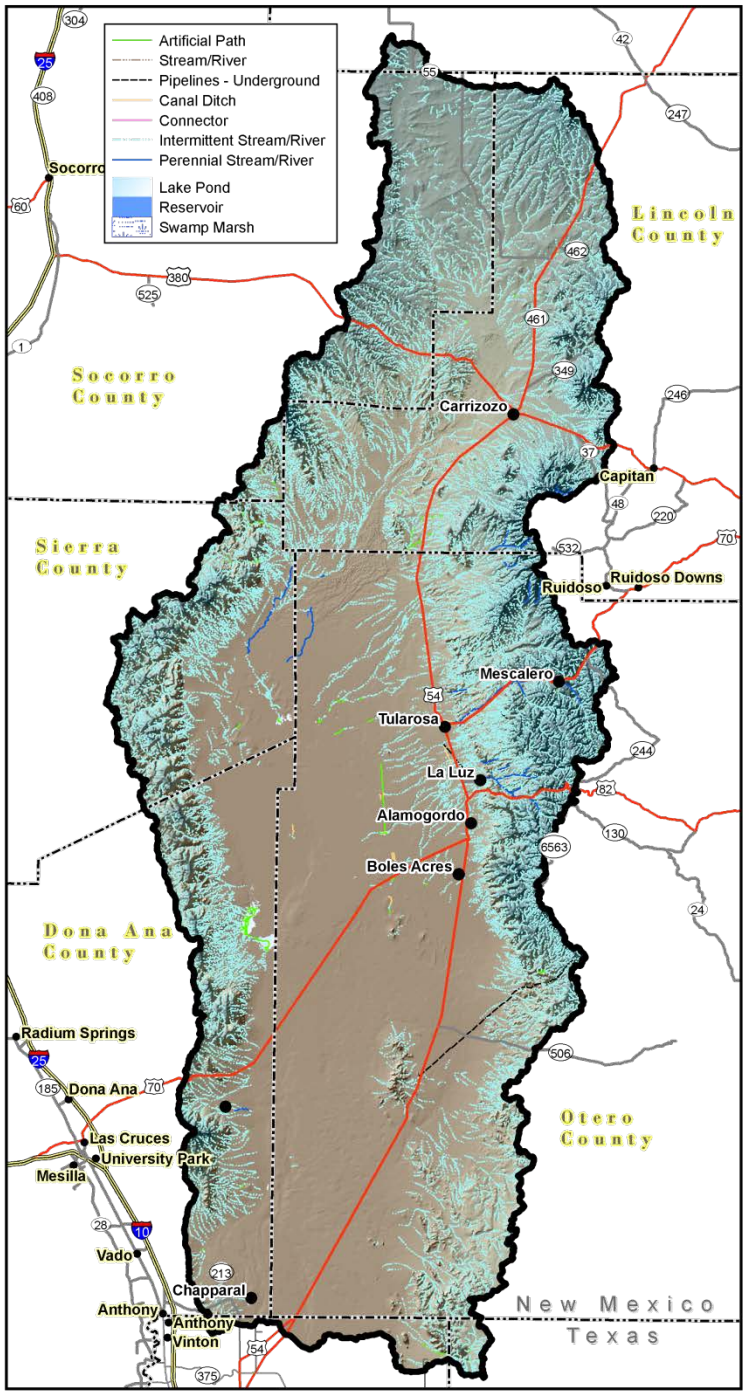
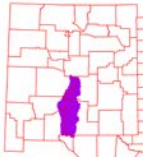
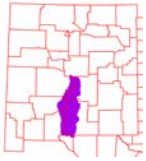


Figure 8. National Hydrologic Dataset (NHD) of the Tularosa Valley Watershed.



Water Course Type	Miles
Artificial Path	90
Connector	2
Canal / Ditch	14
Intermittent Stream / River	10,478
Perennial Stream / River	104
Underground Pipelines	32
Sum (∑)	10,720

Table 5. NHD Water Course Type and Extents



Gauging Stations:

There are 8 water gauging stations in the watershed. USGS Site 08480595 is located in the middle of the east side of the watershed on the Salt Creek near Tularosa, NM. During the period 1995 –2010, this site has had mean annual discharge of 26,298 cubic feet per second ranging from 0 (2006) to 13.5 (2008) cubic feet per second.

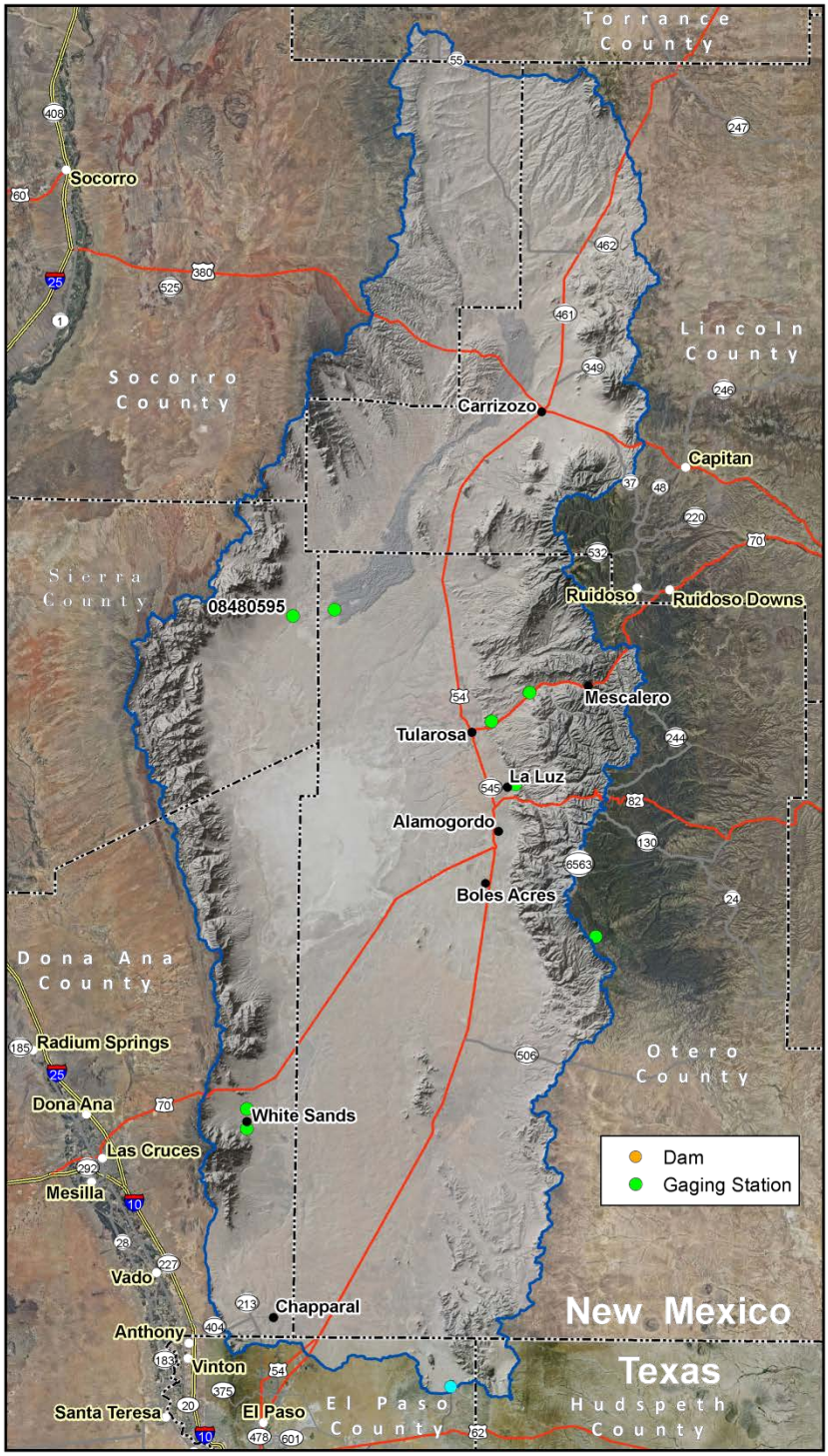
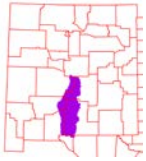


Figure 9. Gauging Stations in the Tularosa Valley Watershed.



Hydrology

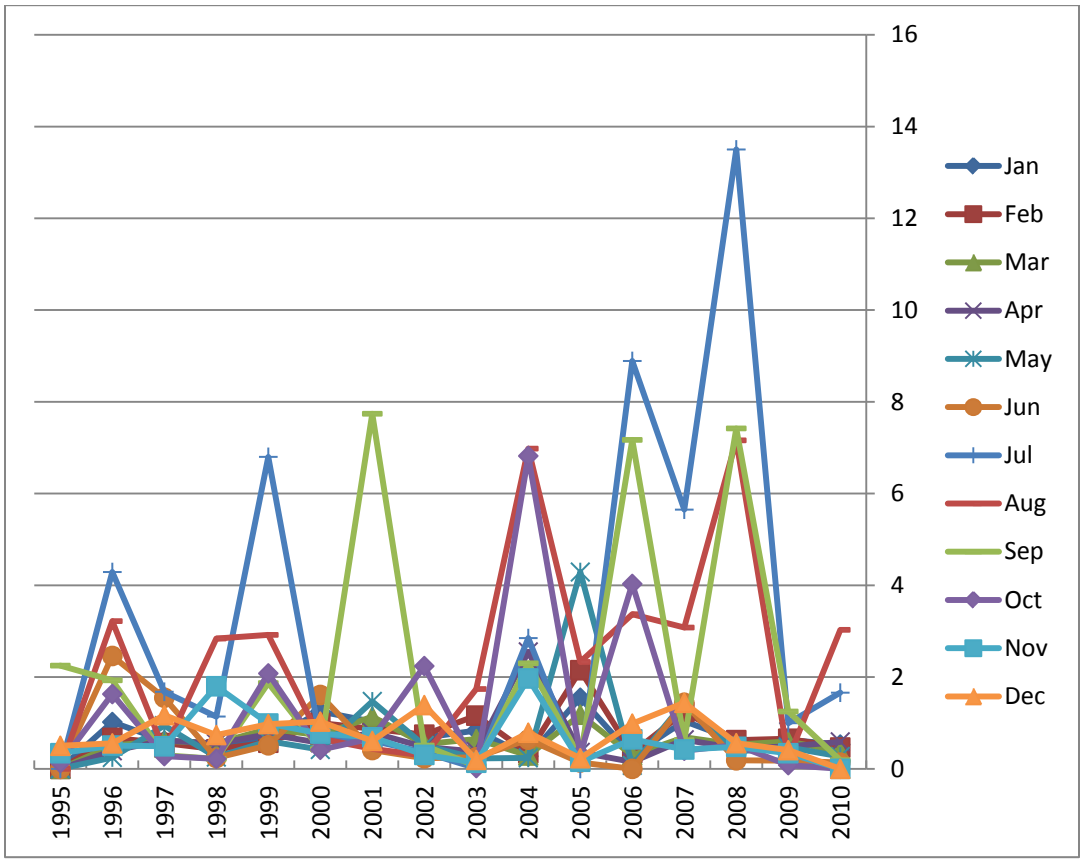
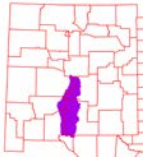


Figure 10. Monthly average of Mean Daily Flow on the Tularosa Valley Watershed at Salt Creek near Tularosa, NM. Period of observation: 1995-2010.



New Mexico Water Quality Control Commission (NMWQCC):

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 New Mexico portion of the Tularosa Valley watershed has the following reaches listed as 303 (d) Impaired Surface Waters:

1. **Dog Canyon Creek (perennial portions)**
2. **Lake Holloman**
3. **Three Rivers (USFS bnd to headwaters)**

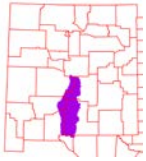
Use	1	2	3
Coldwater Aquatic Life	NS		
Domestic Water Supply			X
Fish Culture	X		
High Quality Coldwater Aquatic Life			X
Industrial Water Supply	X		
Irrigation	X		X
Livestock Watering	X	X	X
Municipal Water Supply	X		
Primary Contact		X	
Secondary Contact	X		NS
Warmwater Aquatic Life		NS	
Wildlife Habitat	X	X	X

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

Texas Commission on Environmental Quality (TCEQ):

The Texas Commission on Environmental Quality (TCEQ) is the issuing agency of water quality standards for interstate and intrastate waters in Texas.

There are no impaired surface and water bodies in the Texas portion of the Tularosa Valley Watershed as of March 19, 2008.



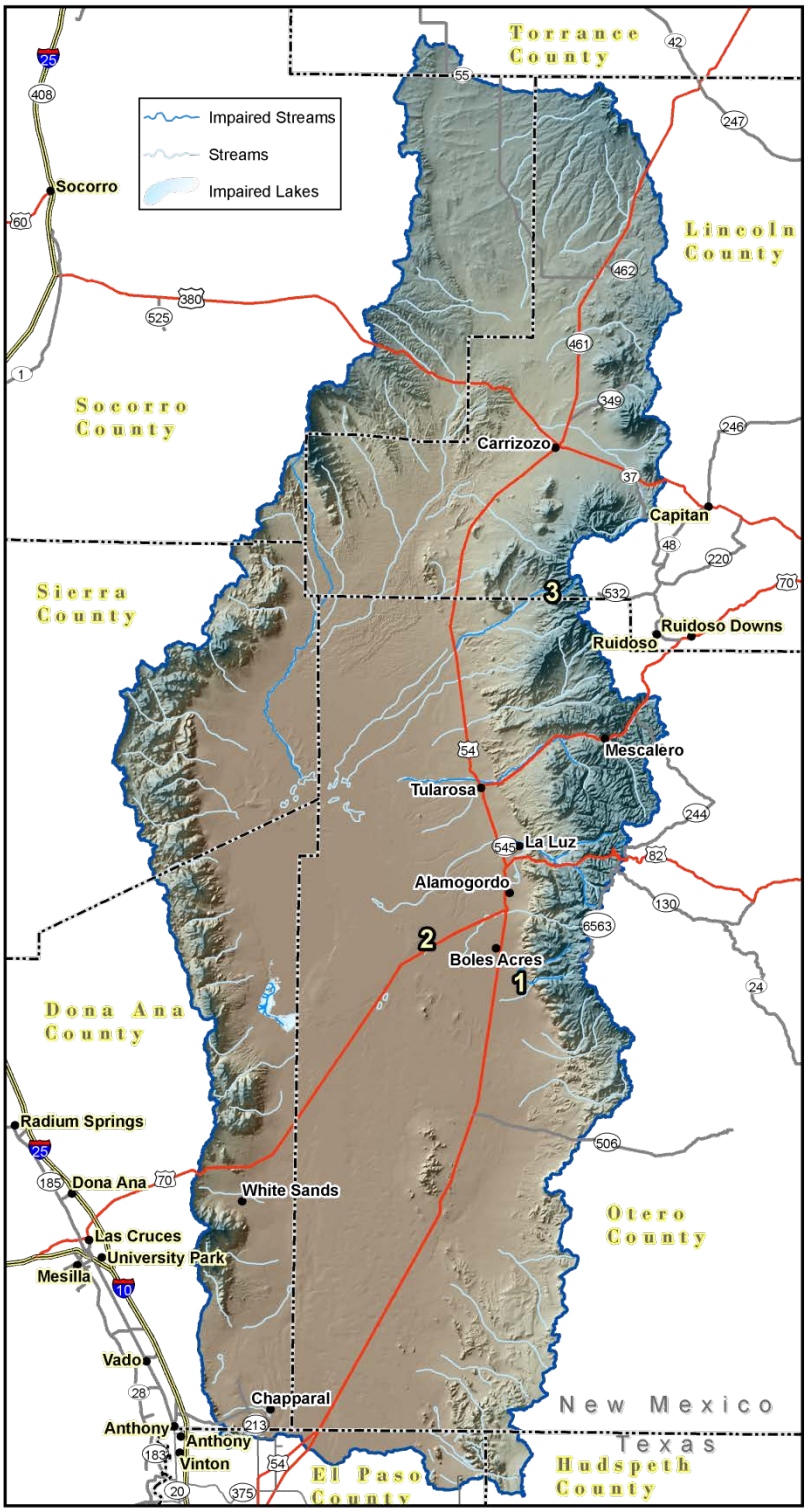
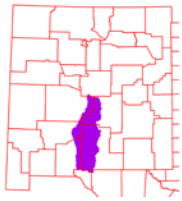


Figure 11. 303(d) Impaired Waters.

Hydrology



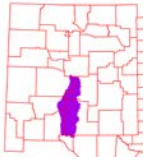
Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes, are required to develop lists of impaired waters. These are waters for which technology-based regulations and other required controls are not stringent enough to meet the water quality standards set by states. The 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 Tularosa Valley Watershed, there are three reaches that are listed as impaired as of the 2010-12 listing cycle: Dog Canyon Creek (perennial portions), Lake Holloman, and Three Rivers (USFS bnd to headwaters).

The river and stream reaches total 5.8 miles (16.1 km) and the listed water body covers 151 acres (0.6 sq. km).

	Impairment		
Probably Causes of Impairment	**1**	**2**	**3**
Temperature, water	X		
Arsenic		X	
E. coli			X

Table 7. Possible Causes of Impairment.

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. There are eight declared groundwater basins in the Tularosa Valley Watershed: Hondo, Hueco, Lower Rio Grande, Penasco, Rio Grande, Roswell, Salt, and Tularosa in New Mexico and GMA 4 and GMA 5 in Texas.



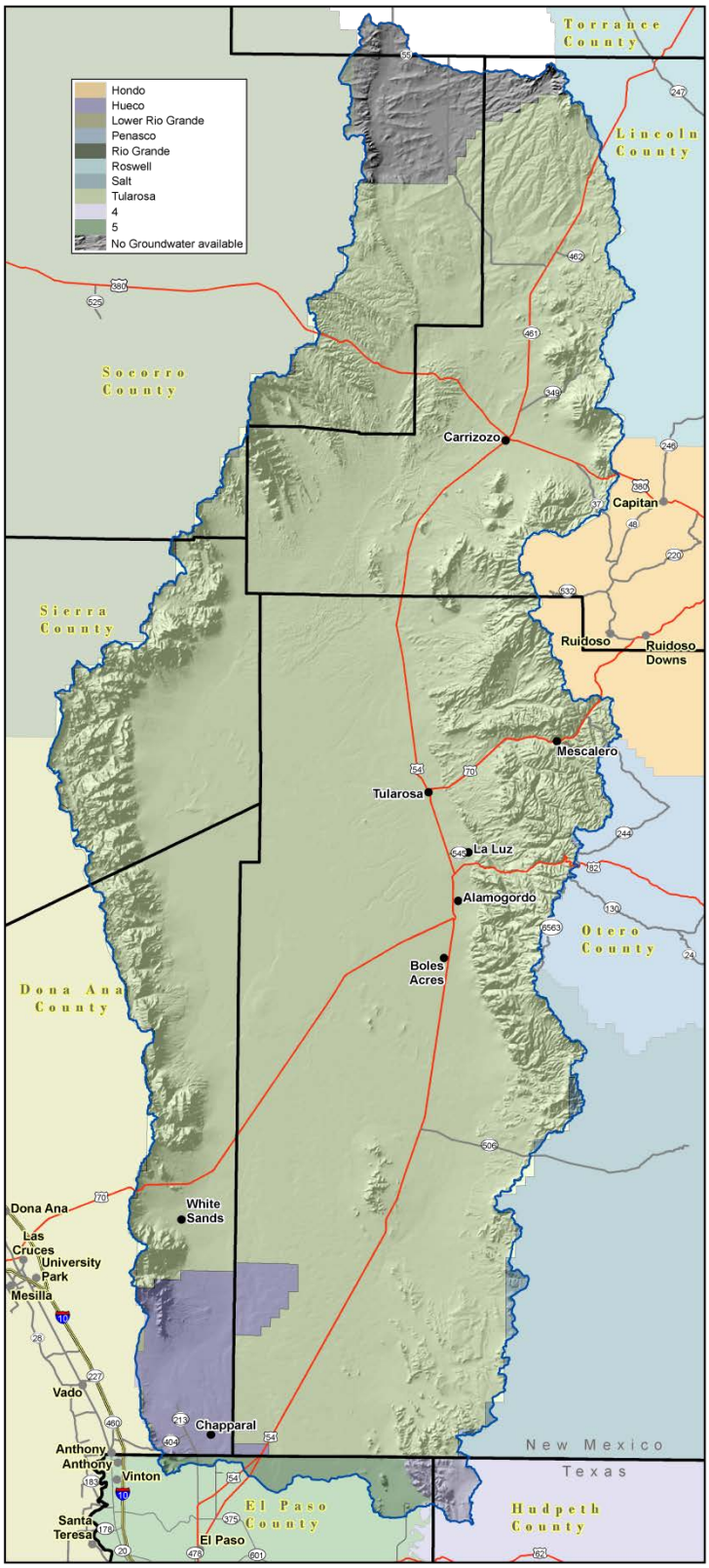
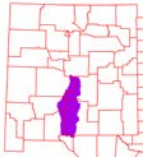


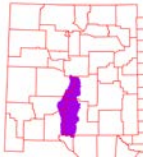
Figure 12. Declared Groundwater Basins of the Tularosa Valley.



Threatened and Endangered Species [10, 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 and the Texas Parks & Wildlife Department programs track 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 Tularosa Valley Watershed.

Common Name	Scientific Name	Tax Class	Family	Federal Status	State Status
White Sands Pupfish	*Cyprinodon tularosa*	Actinopterygii	Cyprinodontidae		T
Sacramento Mountain Salamander	*Aneides hardii*	Amphibia	Plethodontidae		T
Bald Eagle	*Haliaeetus leucocephalus*	Aves	Accipitridae		T
Varied Bunting	*Passerina versicolor*	Aves	Cardinalidae		T
Baird's Sparrow	*Ammodramus bairdii*	Aves	Emberizidae		T
American Peregrine Falcon	*Falco peregrinus anatum*	Aves	Falconidae		T
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	Aves	Falconidae	LE	E
Interior Least Tern	*Sterna antillarum athalassos*	Aves	Laridae		E
Brown Pelican	*Pelecanus occidentalis*	Aves	Pelecanidae		E
Costa's Hummingbird	*Calypte costae*	Aves	Trochilidae		T
Bell's Vireo	*Vireo bellii*	Aves	Vireonidae		T
Gray Vireo	*Vireo vicinior*	Aves	Vireonidae		T
Sacramento Mountains Thistle	*Cirsium vinaceum*	Dicotyledoneae	Asteraceae	LT	E
	Escobaria villardii	Dicotyledoneae	Cactaceae		E
Desert Night-blooming Cereus	*Peniocereus greggii var. greggii*	Dicotyledoneae	Cactaceae		E
Kuenzler's Hedgehog Cactus	*Echinocereus fendleri var. kuenzleri*	Dicotyledoneae	Cactaceae	LE	E
Organ Mountain Foxtail-cactus	*Escobaria organensis*	Dicotyledoneae	Cactaceae		E
Scheer Cory Cactus	*Coryphantha scheeri var. uncinata*	Dicotyledoneae	Cactaceae		E
Sneed Pincushion Cactus	*Escobaria sneedii var. sneedii*	Dicotyledoneae	Cactaceae	LE	E
Todsen's Pennyroyal	*Hedeoma todsenii*	Dicotyledoneae	Lamiaceae	LE	E
Sacramento Prickly-poppy	*Argemone pleiacantha ssp. pinnatisecta*	Dicotyledoneae	Papaveraceae	LE	E
Mescalero Milkwort	*Polygala rimulicola var. mescalerorum*	Dicotyledoneae	Polygalaceae		E
Desert Bighorn Sheep	*Ovis canadensis mexicana*	Mammalia	Bovidae		T



Organ Mountains Chipmunk	***Neotamias quadrivittatus australis***	**Mammalia**	**Sciuridae**		**T**
Spotted Bat	***Euderma maculatum***	**Mammalia**	**Vespertilionidae**		**T**
Crested Coralroot	***Hexalectris spicata***	**Monocotyledoneae**	**Orchidaceae**		**E**
Narrowhead Garter Snake	***Thamnophis rufipunctatus***	**Reptilia**	**Colubridae**		**T**

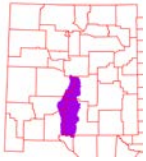
Table 8. Threatened and Endangered Plant and Animal Species.

Invasive Species [12,13]

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 Tularosa Valley Watershed, the SWEMP and Texas Invasives.org have 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
***Zygophyllaceae* (Caltrop Family)**	**African Rue**
Fabaceae (Pea Family)	**Camelthorn**
Scrophulariaceae (Figwort Family)	**Dalmatian Toadflax**
Brassicaceae (Mustard Family)	**Hoary Cress (Whitetop)**
Euphorbiaceae (Spurge Family)	**Leafy Spurge**
Asteraceae (Sunflower Family)	**Musk Thistle**
Brassicaceae (Mustard Family)	**Perennial Pepperweed (Tall Whitetop)**
***Asteraceae* (Sunflower Family)**	**Russian Knapweed**
Asteraceae (Sunflower Family)	**Spotted Knapweed**

Table 9. Invasive Species Recognized by the SWEMP and Texas Invasives.org.



Common Resource Areas [14]

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.

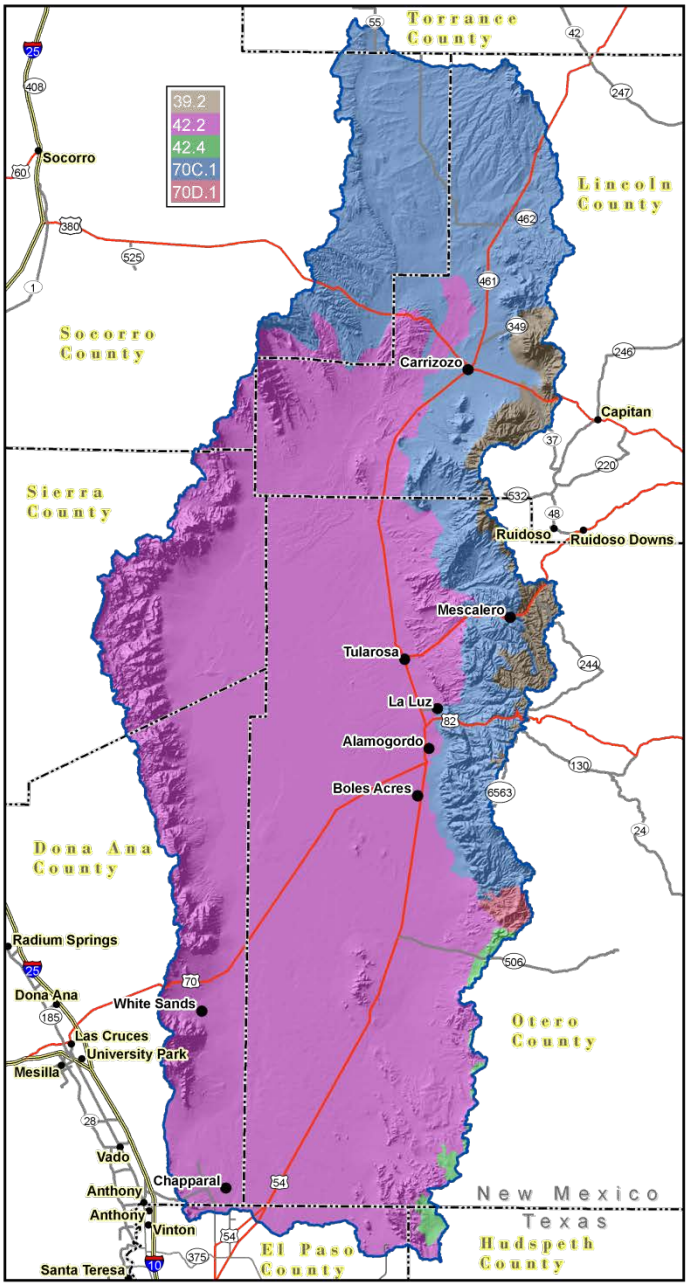
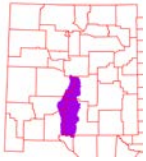


Figure 13. Common Resource Areas of the Tularosa Valley Watershed.



Common Resource Areas

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.

42.2 - 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.

42.4 - Dry Mixed Prairie

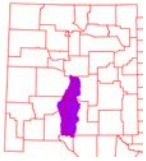
This unit occurs within the Basin and Range Physiographic Province and is characterized by broad prairie grassland. Elevations range from 4700 to 6000 feet. Precipitation ranges from 12 to 14 inches per year. The soil temperature regime is thermic. The soil moisture regime is ustic aridic . Vegetation consists primarily of blue gramma, black grama, and yucca. Swales and drainages include tobosa and alkali sacaton. Creosote and mesquite are common shrubs.

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)

70D.1 - Southern New Mexico Foothills

This unit is characterized by nearly level to steep limestone hills with steep, narrow drainageways. Elevation ranges from 4,000 to 7,000 feet and average annual precipitation is 13 to 18 inches. Native vegetation is sparse and consists of pinyon, juniper, algerita, agave, yucca and cacti. Grasses include blue and black grama, little bluestem, and muhly species. Shrubs include catclaw, ocotillo, sotol and fourwing saltbush. Much of the area is federally owned. Federal and private lands are used for grazing, wildlife habitat, and military training.

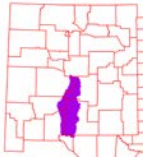


Conservation [15]

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.

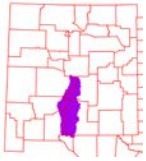
Conservation Practice	2006		2007		2008		2009		2010		TOTAL	
	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres
Access Control	1	10			1	10	1	10			3	30
Brush Management	1	51,924	2	56,928	1	103,480	2	110,993	3	74,925	9	
Conservation Crop Rotation	1	250			2	243	1	441			4	534
Cover Crop							1	100	1	106	2	206
Forest Stand Improvement							1	455,422			1	455,422
Integrated Pest Management	2	119	2	196	2	257	1	171	1	66	8	808
Irrigation System, Microirrigation	4	288	1	91			2	277	1	30	8	687
Irrigation System, Sprinkler			1	158	1	4	1	24			3	186
Irrigation Water Management	1	343	3	674	2	257	2	98			8	1,370
Nutrient Management	1	47	2	118	2	257	1	151	1	66	7	639
Obstruction Removal			1	65							1	65
Prescribed Grazing	5	90,530	7	76,563	3	84,147	4	58,781	6	446,180	25	756,201
Range Planting	1	20	1	5,108	1	4,145	1	3,142	1	2,995	5	15,410
Residue Management, Seasonal			1	32	2	243	1	143	1	188	5	606
Spring Development									1	354	1	354
Tree/Shrub Establishment	1	10									1	10
Upland Wildlife Habitat Management	5	45,047	5	26,104	4	81,843	6	56,323	6	446,097	26	655,414
Wetland Wildlife Habitat Management							1	92			1	92
SUM (∑)	23	188,588	26	166,037	21	274,886	26	686,168	22	971,007	118	1,888,034

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
Conservation Completion Incentive First Year			1								1	
Dam, Diversion	1		1		1						3	
Fence	1	10,898.00					1	1,346.90	2	13303.40	4	25,548.30
Irrigation Water Conveyance, Ditch and Canal Lining, Plain Concrete	1	6.90									1	6.90
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic	1	3.40	3	498.80	1	29.50	2	236.20			7	767.90
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic							1	12.10	1	35.10	2	47.20
Irrigation Water Conveyance, Pipeline, Steel			1	23.30	1	3.70					2	27.00
Pipeline	1	16,894.50	2	8,287.90	1	6,546.20	2	13,443.30	1	4,278.80	8	49,450.70
Pond	1		1						1		3	
Pumping Plant					1		1		1		3	
Spring Development									1		1	
Structure for Water Control	1		1				1		1		4	
Water Well	1				1				1		3	
Watering Facility	1		1		1		1		1		4	
Wildlife Watering Facility							1		1		2	
Windbreak/Shelterbelt Establishment	1	305.00					2	351.70	1	19.00	4	675.70
SUM (∑)	10	28,107.80	10	8,810.00	7	6,579.40	12	15,390.20	12	17,636.30	52	76,523.70

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



Soil Resource Inventory [16]

The Tularosa Valley Watershed has a number of certified National Cooperative Soil Survey (NCSS) inventories. The National Forest in New Mexico 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. Soils data is available from the NRCS Soil Data Mart at http://soildatamart.nrcs.usda.gov/ and/or the NRCS Geospatial Data Gateway at http://datagateway.nrcs.usda.gov .

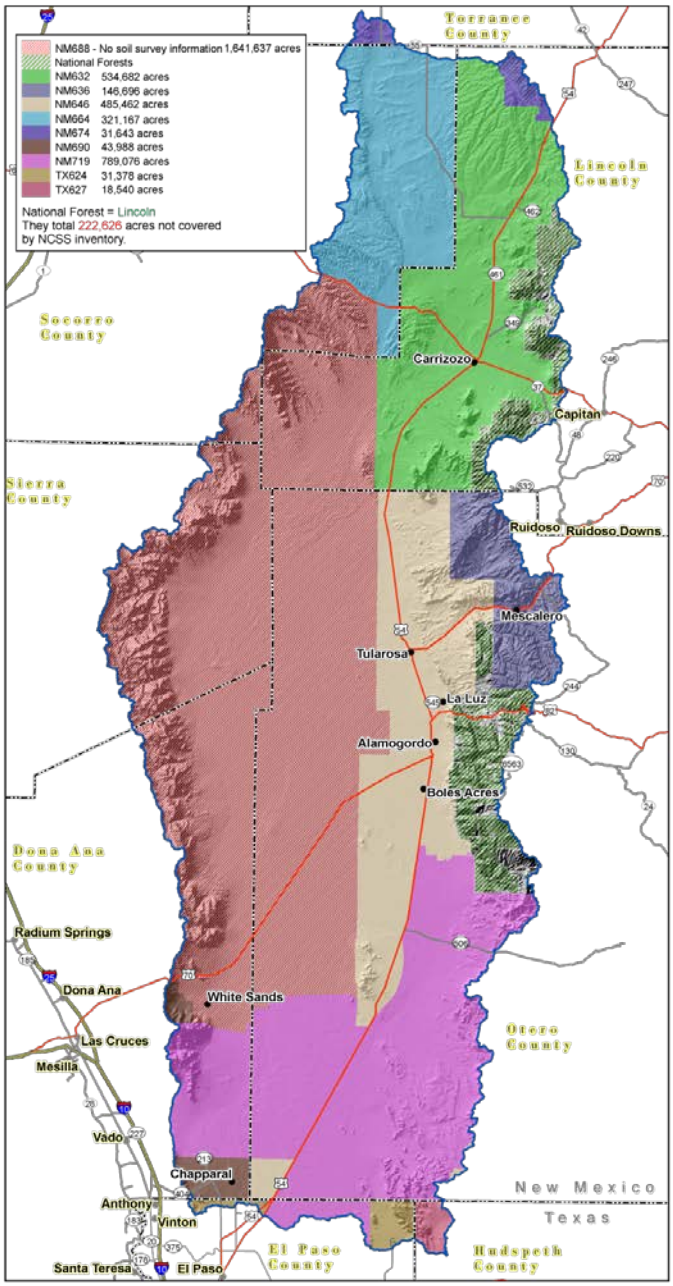
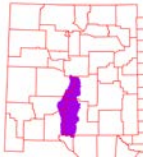


Figure 14. National Cooperative Soil Survey coverage of the Tularosa Valley Watershed

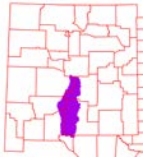


Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the Tularosa Valley 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 map unit 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
99.9 - 10.0	High	1
9.9 - 1.0	Moderately High	2
0.9 - 0.1	Moderately Low	3
0.09 - 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 his time.

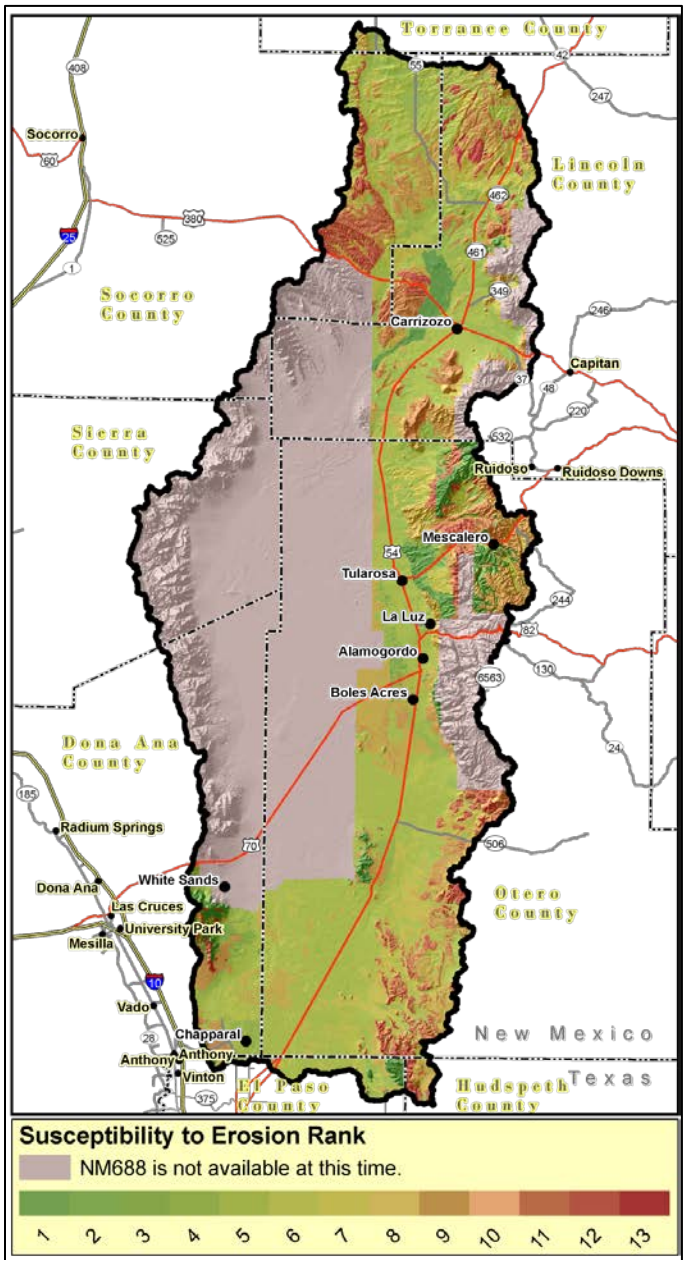
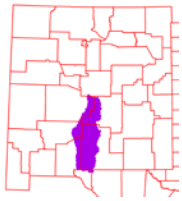


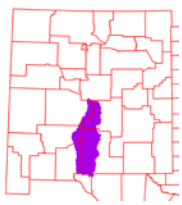
Figure 15. Tularosa Valley Watershed Erosion Potential.



Soil Resource Inventory

Rank	Acres
1	1,970
2	742
3	11,487
4	306,944
5	815,420
6	126,121
7	153,801
8	284,622
9	214,172
10	124,384
11	85,934
12	104,222
13	21,703
Sum(∑)	2,251,522

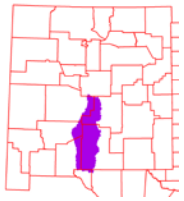
Table 13. Soil Erosion Potential Model Results. A greater rank Indicates greater potential for erosion.



Socioeconomic Data [17]

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 adj. 2010
Dona Ana	209,233	137,514	154,989	3,656	3,147	2,227	185	38,685	6,344	43,184
Lincoln	20,497	4,978	17,439	96	489	75	10	1,880	508	53,871
Otero	63,797	22,026	46,352	2,251	4,271	749	153	7,352	2,669	46,210
Sierra	11,988	3,352	10,265	49	199	49	3	1,032	391	38,641
Socorro	17,866	8,664	13,424	188	2,082	219	8	1,442	503	41,964
Torrance	16,383	6,399	12,460	219	383	71	8	2,535	707	43,914
El Paso, TX	800,647	658,134	656,993	24,864	6,007	8,284	999	83,796	19,704	40,329
Hudspeth, TX	3,476	2,768	2,738	48	38	16	0	561	75	28,125

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



References

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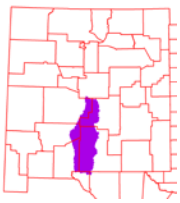

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