

## Rapid Watershed Assessment Lower Pecos-Red Bluff Reservoir Watershed



The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



**Table of Contents**

Overview ..... 5  
 Physical Setting ..... 7  
 Precipitation ..... 11  
 Land Ownership ..... 12  
 Land Use / Land Cover ..... 14  
 Hydrology ..... 18  
 Threatened and Endangered Species ..... 25  
 Invasive Species ..... 25  
 Common Resource Areas ..... 27  
 Conservation ..... 28  
 Soil Resource Inventory ..... 31  
 Socioeconomic Data ..... 35  
 References ..... 36

**List of Tables**

Table 1. Lower Pecos-Red Bluff Reservoir Watershed acreage distribution. .... 6  
 Table 2. Land ownership in the Lower Pecos-Red Bluff Reservoir ..... 13  
 Table 3. Extent of NLCD classes in the Lower Pecos-Red Bluff Reservoir Watershed. .... 15  
 Table 4. SW Region Gap analysis ecosystem acreages. .... 17  
 Table 5. NHD Water Course Type and Extents ..... 19  
 Table 6. TCEQ Possible Causes of Impairment ..... 23  
 Table 7. Threatened and Endangered Plant and Animal Species and TPWD. .... 25  
 Table 8. Invasive Species Recognized by the SWEMP and USDA Plants. .... 26  
 Table 9. 5 year Trends in Applied Conservation Practices. Reported in Acres ..... 29  
 Table 10. 5 Year Trends in Location Specific Applied Conservation Practices. Reported in Feet if Linear (i.e. Fence) ..... 30  
 Table 11. Criteria Used for Soil Erosion Susceptibility Model. .... 32  
 Table 12. Soil Erosion Potential Model Results. A greater rank indicates greater potential for erosion ..... 34  
 Table 13. Socioeconomic Data of the Counties in the Watershed (2000). .... 35



**List of Figures**

Figure 1. Lower Pecos-Red Bluff Reservoir Watershed Overview..... 5  
 Figure 2. Lower Pecos-Red Bluff Reservoir Watershed Hydrologic Soil Group.....9  
 Figure 3. Lower Pecos-Red Bluff Reservoir Watershed Shaded Relief..... 10  
 Figure 4. Lower Pecos-Red Bluff Reservoir Watershed Annual Precipitation. .... 11  
 Figure 5. Lower Pecos-Red Bluff Reservoir Watershed Land Ownership..... 12  
 Figure 6. Subset of the National Land Cover Dataset over the Lower Pecos-Red Bluff Reservoir Watershed ..... 14  
 Figure 7. Subset of the SWREGAP over the Lower Pecos-Red Bluff Reservoir Watershed ..... 16  
 Figure 8. National Hydrologic Dataset (NHD) of the Lower Pecos-Red Bluff Reservoir Watershed . .... 18  
 Figure 9. Gauging Stations in the Lower Pecos-Red Bluff Reservoir..... 20  
 Figure 10. Monthly Average of Mean Annually Flow on the Pecos River near Orla, TX. Period of observation: 1937 - 2011. .... 21  
 Figure 11. 303(d) Impaired Waters..... 22  
 Figure 12. Declared Groundwater Basins of the Lower Pecos-Red Bluff Reservoir. .... 24  
 Figure 13. Common Resource Areas of the Lower Pecos-Red Bluff Reservoir. .... 27  
 Figure 14. National Cooperative Soil Survey coverage of the Lower Pecos-Red Bluff Reservoir Watershed. .... 31  
 Figure 15. Lower Pecos-Red Bluff Reservoir Watershed Erosion Potential..... 33



## Overview

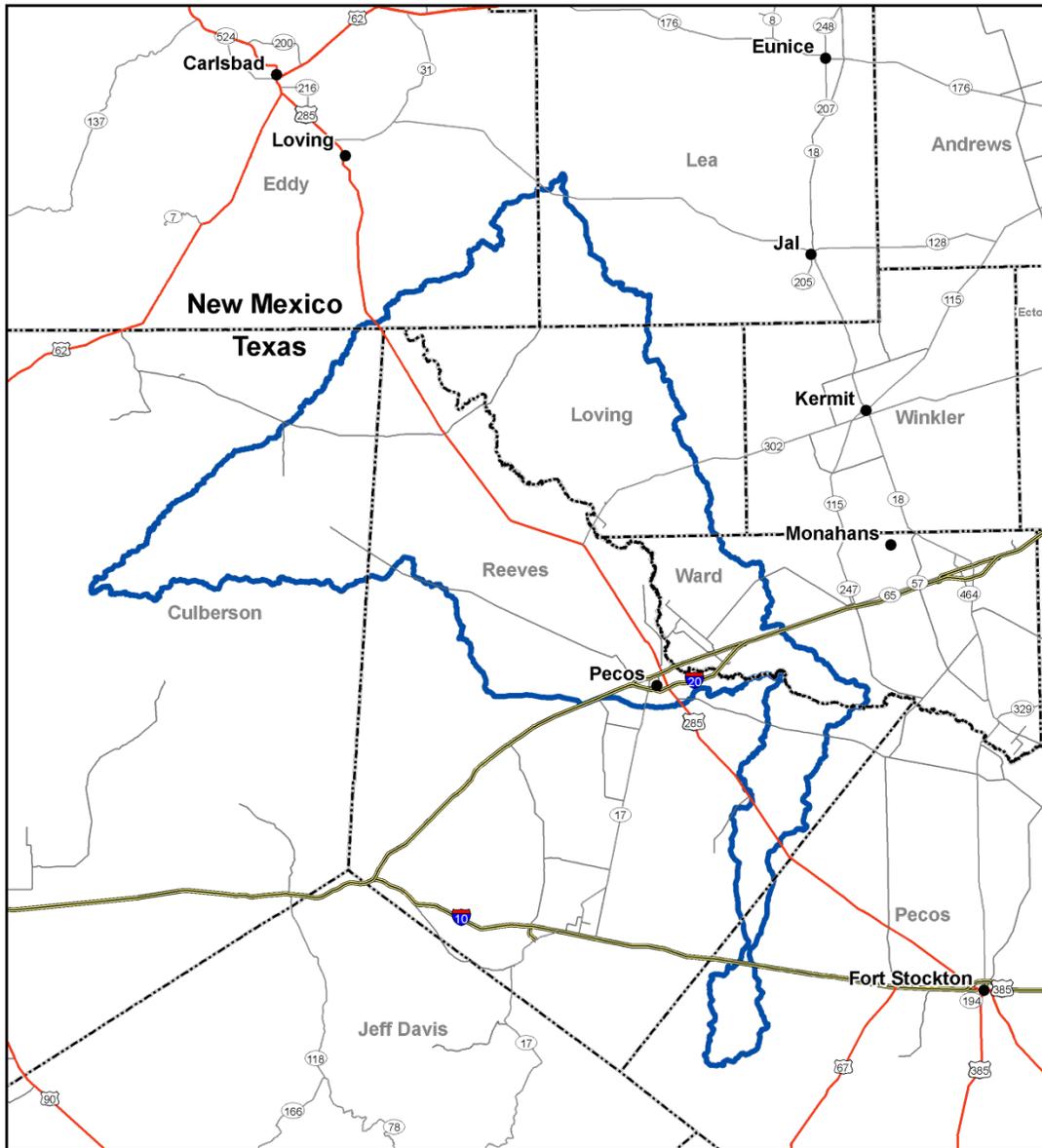


Figure 1. Lower Pecos-Red Bluff Reservoir Watershed Overview.



## Overview

The Lower Pecos-Red Bluff Reservoir Watershed is located in southeastern New Mexico and the northwestern part of Texas. It covers 1,594,267 total acres (6,452 sq. km). Portions of the Lower Pecos-Red Bluff Reservoir Watershed are in Eddy and Lea counties in New Mexico and Culberson, Hudspeth, Jeff Davis and Presidio counties in Texas. Table 1 summarizes the distribution of the Lower Pecos-Red Bluff Reservoir Watershed.

County	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
Eddy , NM	2,684,614	92,810	6	3
Lea , NM	2,811,565	75,594	5	3
Culberson, TX	2,439,575	296,788	19	12
Loving, TX	432,707	322,099	20	74
Pecos, TX	3,049,828	45,160	3	1
Reeves, TX	1,691,170	613,830	39	36
Ward, TX	534,894	148,012	9	28
Sum ( $\Sigma$ )	--	1,594,267	100	--

Table 1. Lower Pecos-Red Bluff Reservoir Watershed acreage distribution.



## **Physical Setting**

### **Geology:**

The HUC has a northeast boundary just north of Cotton Place in Lea County. The boundary proceeds southeastward east of Red Hill to Rattlesnake flat where it crosses into Texas; crosses State Route 302 just east of Anderson Ranch Road in Loving County; proceeds eastward and northeastward to cross State Road 115 in Winkler County just south of the town of Wink and north of Little Joe Road; continues southeastward through the town of Wickett; crosses State Route 18 north of County Road 338 north of the town of Royalty; passes around Horsehead Crossing on the Pecos River; proceeds southwestward to recross the Pecos River and Farm to Market Road 11 just north of the town of Girvin; crosses Interstate 10 just west of the junction with State Routes 385 and 67; Threemile Mesa east of Fort Stockton; crosses State Route 385 between Twelvemile Mesa and Sixshooter Draw; proceeds along the southern edge of the Glass Mountains; proceeds northward and passes east of Old Oscar Nance Place; crosses State Route 67 just west of the town of Chancellor; crosses Interstate 10 near its intersection with State Route 67; passes just south of the Pecos Municipal Airport and crosses Interstate 20 near Hermosa; crosses into Culberson County at the Rustler Hills; and turns northward at the eastern divide of Wild Horse Draw. The northwest boundary proceeds southeastward to the Buck Jackson Road and Rock Dove Road intersection; to the confluence with the Delaware River and Pecos River; and then follows the southern divide of the Delaware River.

The watershed consists of Quaternary eolian and piedmont deposits. The Tertiary Ogallala formation occasionally outcrops. Other ridges are formed by Cretaceous Period limestones and Triassic Period shales and sandstones. Alkali flats are also present.

The area contains many oil fields.

Resource concerns are high sediment erosion. In addition the lowering of valleys by river incision is a continuing process. 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 quality ranges from good to poor for livestock or crops, especially in the salt flats.



## 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 Lower Pecos-Red Bluff Reservoir 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. Lower Pecos-Red Bluff Reservoir Watershed Hydrologic Soil Groups.

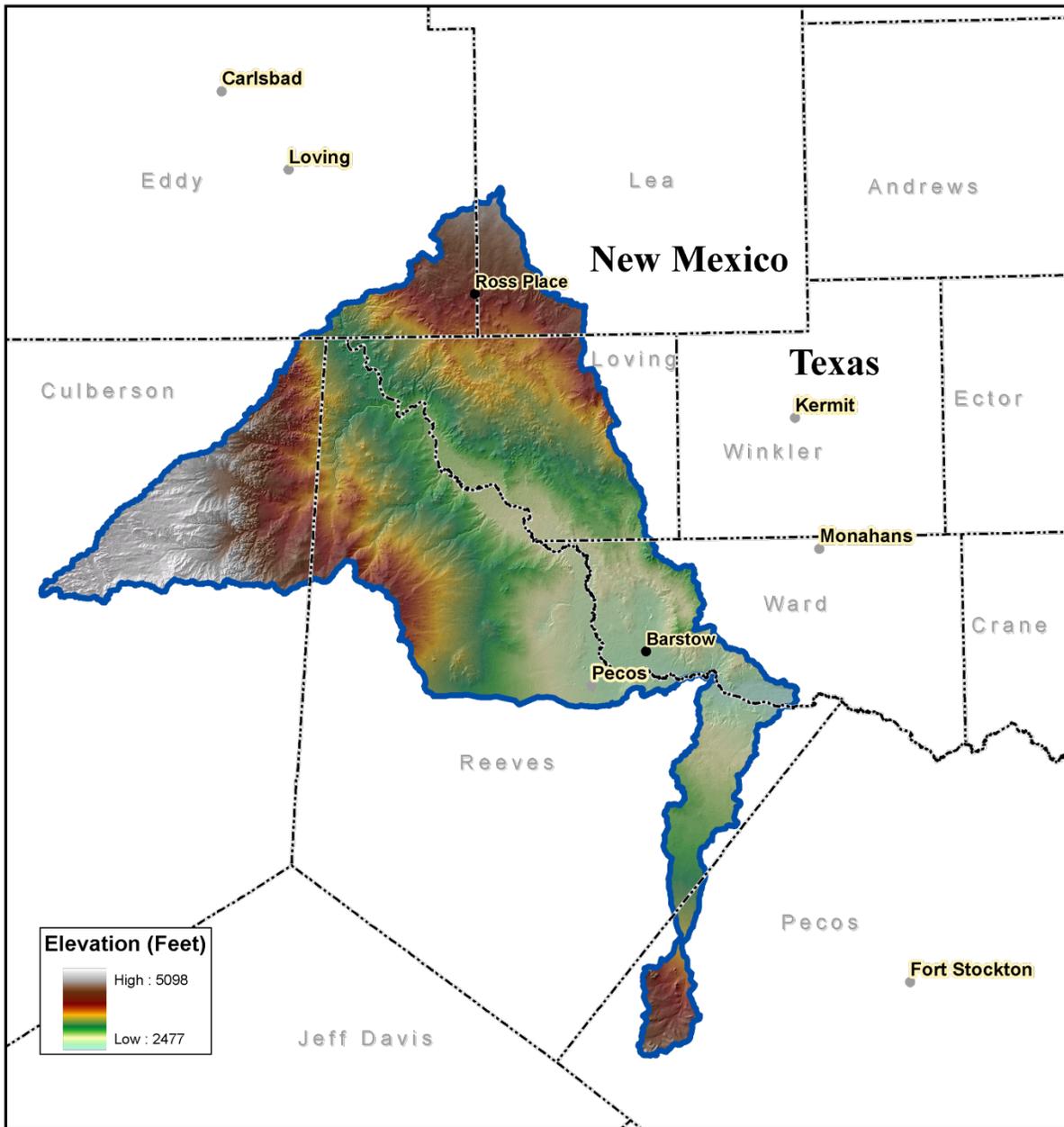


Figure 3. Lower Pecos-Red Bluff Reservoir Watershed Shaded Relief.



## Precipitation <sup>1</sup>



Figure 4. Lower Pecos-Red Bluff Reservoir Watershed Annual Precipitation.



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



Figure 5. Lower Pecos-Red Bluff Reservoir Watershed Land Ownership.



**Land Ownership**

<u>County</u>	<u>BLM</u>	<u>Private</u>	<u>State</u>
<b>Eddy, NM</b>	<b>80,762</b>	<b>3,544</b>	<b>8,635</b>
<b>Lea, NM</b>	<b>62,960</b>	<b>6,194</b>	<b>6,463</b>
<b>Culberson, TX</b>		<b>296,784</b>	
<b>Loving, TX</b>		<b>321,927</b>	
<b>Pecos, TX</b>		<b>45,160</b>	
<b>Reeves, TX</b>		<b>613,827</b>	
<b>Ward, TX</b>		<b>148,012</b>	
<b>Sum (<math>\Sigma</math>)</b>	<b>143,722</b>	<b>1,435,447</b>	<b>15,098</b>

Table 2. Land ownership in the Lower Pecos-Red Bluff Reservoir Watershed.



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



**Figure 6. Subset of the National Land Cover Dataset in the Lower Pecos-Red Bluff Reservoir Watershed.**



## Land Use / Land Cover

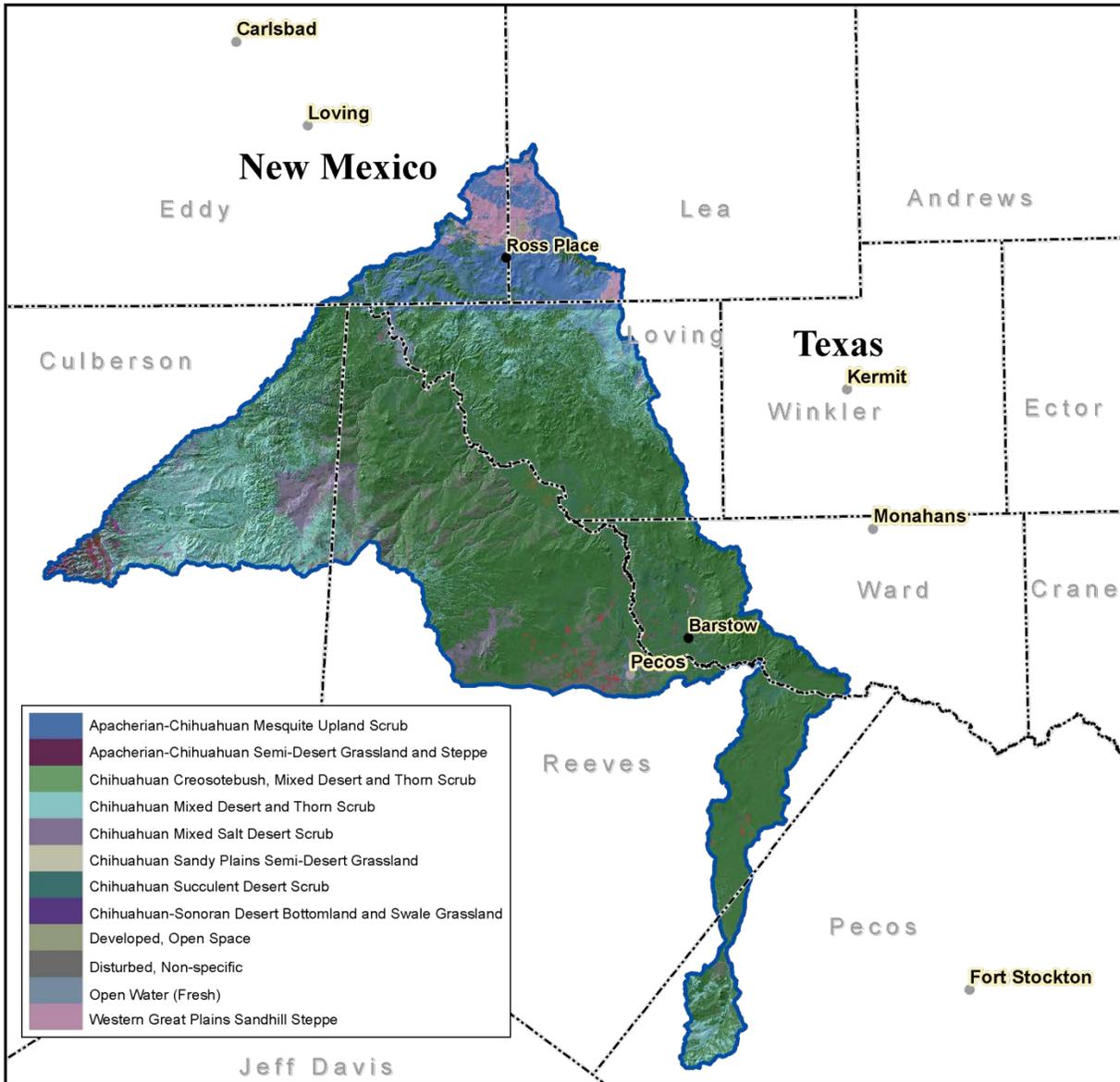
The U.S. Geological Survey (USGS) produced the National Land Cover Dataset (NLCD) as part of a cooperative project between the USGS and the U.S. Environmental Protection Agency (USEPA). The goal of this project was to produce a consistent land cover data layer for the conterminous United States. The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

<u>Ecosystem</u>	<u>Acres</u>	<u>% of Watershed</u>
<b>Shrub/Scrub</b>	<b>1,546,656</b>	<b>97</b>
<b>Barren Land (Rock/Sand/Clay)</b>	<b>10,572</b>	<b>1</b>
<b>Developed, Open Space</b>	<b>9,546</b>	<b>1</b>
<b>Grassland/Herbaceous</b>	<b>8,556</b>	<b>1</b>
<b>Open Water</b>	<b>6,046</b>	<b>&lt; 1</b>
<b>Cultivated Crops</b>	<b>4,905</b>	<b>&lt; 1</b>
<b>Developed, Low Intensity</b>	<b>3,104</b>	<b>&lt; 1</b>
<b>Woody Wetlands</b>	<b>1,785</b>	<b>&lt; 1</b>
<b>Emergent Herbaceous Wetlands</b>	<b>1,540</b>	<b>&lt; 1</b>
<b>Developed, Medium Intensity</b>	<b>1,297</b>	<b>&lt; 1</b>
<b>Developed, High Intensity</b>	<b>241</b>	<b>&lt; 1</b>

Table 3. Extent of NLCD classes in the Lower Pecos-Red Bluff Reservoir Watershed.



## Land Use / Land Cover



**Figure 7. Subset of the SWREGAP over the Lower Pecos-Red Bluff Reservoir Watershed. The 12 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.

<b>COSYSTEM</b>	<b>Acres</b>	<b>% of Watershed</b>
<b>Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub</b>	<b>975,125</b>	<b>61</b>
<b>Chihuahuan Mixed Desert and Thorn Scrub</b>	<b>236,006</b>	<b>15</b>
<b>Apacherian-Chihuahuan Mesquite Upland Scrub</b>	<b>123,555</b>	<b>8</b>
<b>Disturbed, Non-specific</b>	<b>86,830</b>	<b>5</b>
<b>Chihuahuan Succulent Desert Scrub</b>	<b>42,399</b>	<b>3</b>
<b>Chihuahuan Mixed Salt Desert Scrub</b>	<b>38,963</b>	<b>2</b>
<b>Western Great Plains Sandhill Steppe</b>	<b>32,793</b>	<b>2</b>
<b>Apacherian-Chihuahuan Semi-Desert Grassland and Steppe</b>	<b>18,118</b>	<b>1</b>
<b>Open Water (Fresh)</b>	<b>5,098</b>	<b>&lt; 1</b>
<b>Developed, Open Space</b>	<b>4,805</b>	<b>&lt; 1</b>
<b>Chihuahuan Sandy Plains Semi-Desert Grassland</b>	<b>4,666</b>	<b>&lt; 1</b>
<b>Chihuahuan-Sonoran Desert Bottomland and Swale Grassland</b>	<b>4,602</b>	<b>&lt; 1</b>

Table 4. SW Region Gap analysis ecosystem acreages.



## Hydrology <sup>5,6,7,8,9,10</sup>

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 2,806 miles (4,517 km) of water courses in the Lower Pecos-Red Bluff Reservoir Watershed. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

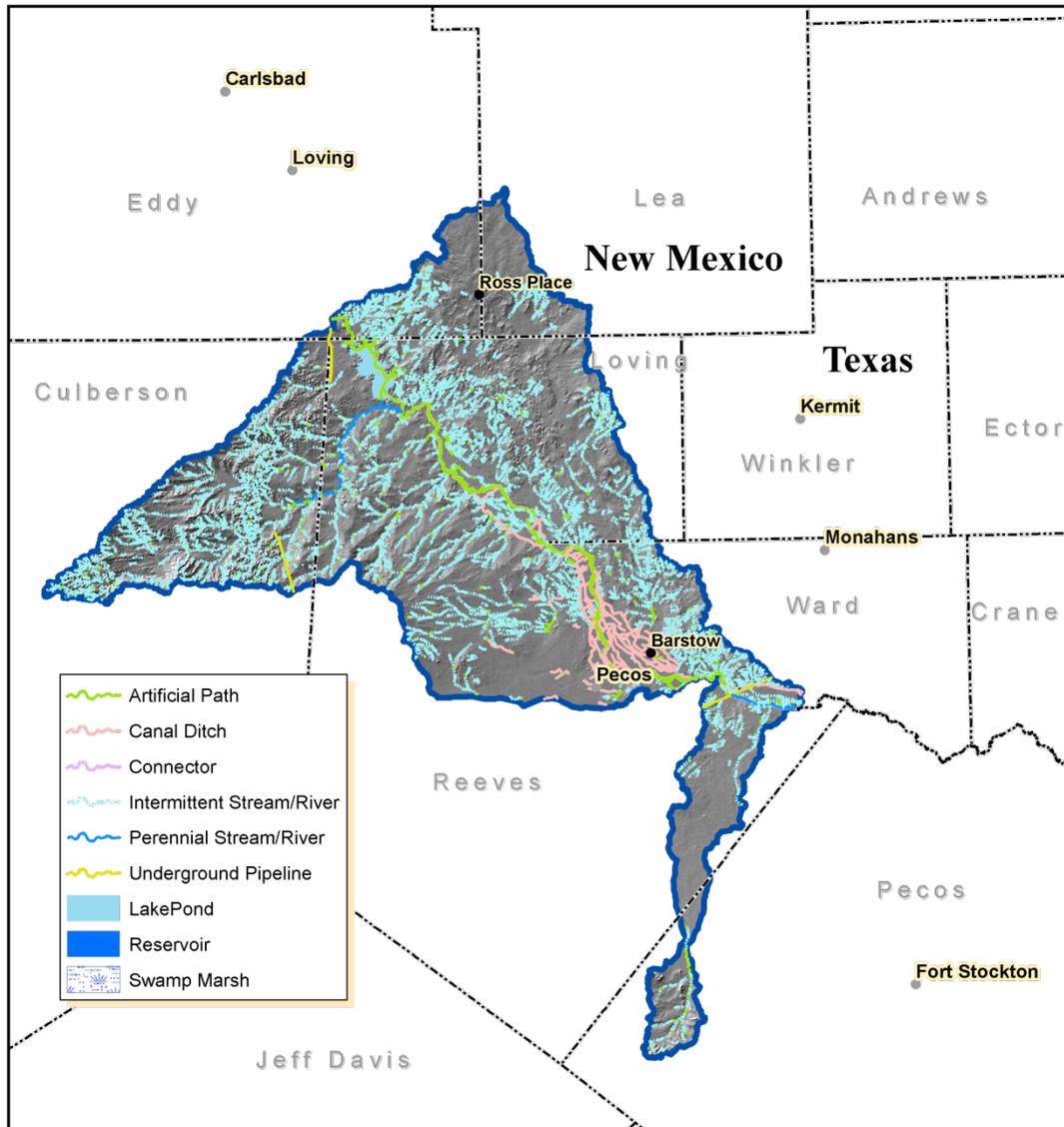


Figure 8. National Hydrologic Dataset (NHD) of the Lower Pecos-Red Bluff Reservoir Watershed.



<b>Water Course Type</b>	<b>Miles</b>
<b>Artificial Path</b>	<b>170</b>
<b>Canal/Ditch</b>	<b>214</b>
<b>Connector</b>	<b>1</b>
<b>Intermittent Stream/River</b>	<b>2,364</b>
<b>Perennial Stream/River</b>	<b>36</b>
<b>Underground Pipeline</b>	<b>22</b>
<b>Sum (<math>\Sigma</math>)</b>	<b>2,807</b>

Table 5. NHD Water Course Type and Extents.



**Gauging Stations:**

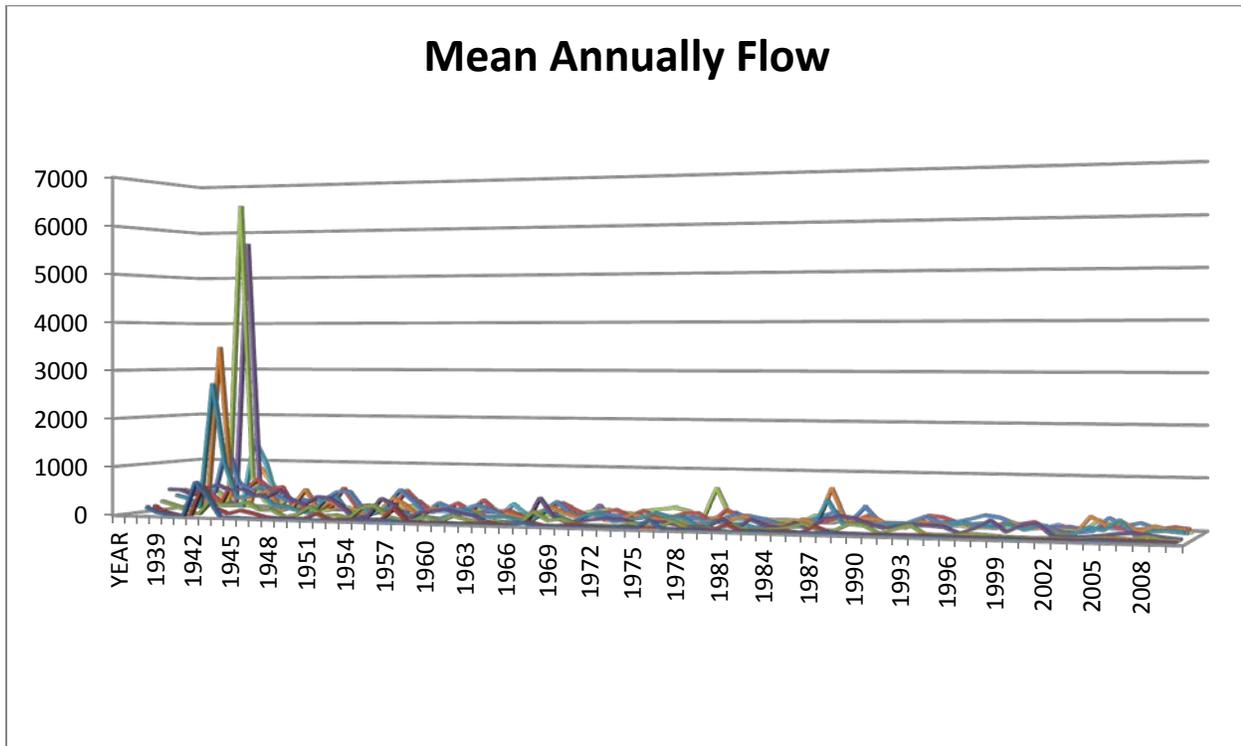
There are 13 water gauging stations in the watershed. USGS Site 08412500 is in the northwest section of the watershed on the Pecos River near Orla, TX. During the period 1937- 2011, this site has had mean annual discharge 274.70 cubic feet per second ranging from 0.461 in February (1965) to 6,515 in September (1941) cubic feet per second.



**Figure 9. Gauging Stations in the Lower Pecos-Red Bluff Reservoir Watershed.**



## Hydrology



**Figure 10. Annually average of Mean Annually Flow on the Pecos River near Orla, TX. Period of observation: 1937-2011.**



**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. There are no Impaired Surface Waters in the New Mexico portion of the Lower Pecos-Red Bluff Reservoir watershed.

**Figure 11. 303(d) Impaired Waters**



## Hydrology

### 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. The Texas Commission on Environmental Quality (TCEQ) use the following chart to designate the impaired waters. The listed waters are dated March 19, 2008.

*Category 5:* The water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants.

*Category 5a* - A TMDL is underway, scheduled, or will be scheduled.

*Category 5b* - A review of the water quality standards for this water body will be conducted before a TMDL is scheduled.

*Category 5c* - Additional data and information will be collected before a TMDL is scheduled.

There are two listed impaired waters in the Texas portion of the watershed.

1. Upper Pecos River reaches total 110 miles (178 km).
2. Red Bluff Reservoir water body covers 5,214 acres.

	<b>Impairment</b>
<b><u>Probably Causes of Impairment</u></b>	<b>1, 2</b>
<b>Depressed dissolved oxygen</b>	<b>5c</b>

Table 6. TCEQ Possible causes of Impairment.





**Figure 12. Declared Groundwater Basins of the Lower Pecos-Red Bluff Reservoir.**

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 4 declared groundwaters in the Lower Pecos-Red Bluff Reservoir Watershed: Carlsbad, GMA 3, GMA 4, and GMA 7.



## Threatened and Endangered Species <sup>11, 12</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 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 7 lists those species which are currently listed and tracked in the Lower Pecos-Red Bluff Reservoir Watershed.

<u>Common Name</u>	<u>Scientific Name</u>	<u>Tax Class</u>	<u>Family</u>	<u>Federal Status</u>	<u>State Status</u>
American Peregrine Falcon	<i>Falco peregrinus anatum</i>				T
Bald Eagle	<i>Haliaeetus leucocephalus</i>				T
Black-capped Vireo	<i>Vireo atricapilla</i>			LE	E
Black-footed ferret	<i>Mustela nigripes</i>			LE	
Chihuahuan Desert lyre snake	<i>Trimorphodon vilkinsonii</i>				T
Comanche Springs pupfish	<i>Cyprinodon elegans</i>			LE	E
Common Black-Hawk	<i>Buteogallus anthracinus</i>				T
False spike mussel	<i>Quadrula mitchelli</i>				T
Gray wolf	<i>Canis lupus</i>			LE	E
Interior Least Tern	<i>Sterna antillarum athalassos</i>			LE	E
Leon Springs pupfish	<i>Cyprinodon bovinus</i>			LE	E
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>			LT	T
Mountain short-horned lizard	<i>Phrynosoma hernandesi</i>				T
Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>			LE	E
Pecos assiminea snail	<i>Assiminea pecos</i>				E
Pecos gambusia	<i>Gambusia nobilis</i>			LE	E
Pecos Pupfish	<i>Cyprinodon pecosensis</i>	Actinopterygii	Cyprinodontidae		T
Pecos/Puzzle sunflower	<i>Helianthus paradoxus</i>			LT	T
Proserpine shiner	<i>Cyprinella proserpina</i>				T
Reddish Egret	<i>Egretta rufescens</i>				T
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>			LE	E
Texas horned lizard	<i>Phrynosoma cornutum</i>				T
Trans-Pecos black-headed snake	<i>Tantilla cucullata</i>				T
Zone-tailed Hawk	<i>Buteo albonotatus</i>				T

Table 7. Threatened and Endangered Plant and Animal Species.



**Invasive Species** <sup>13,14</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 Lower Pecos-Red Bluff Reservoir Watershed, the SWEMP and Texas Invasives.org have identified 10 species of invasive plants (Table 8). 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>
<i>Zygophyllaceae (Caltrop Family)</i>	African Rue
<i>Asteraceae (Sunflower Family)</i>	Russian Knapweed
<i>Asteraceae (Sunflower Family)</i>	Yellow Starthistle
<i>Poaceae (Grass Family)</i>	Giant reed
<i>Tamaricaceae (Tamarisk Family)</i>	Salt Cedar
<i>Solanaceae (Potato Family)</i>	Tree tobacco
<i>Zygophyllaceae (Creosote-Bush Family)</i>	Puncturevine
<i>Poaceae (Grass Family)</i>	King Ranch bluestem
<i>Chenopodiaceae (Goosefoot Family)</i>	Prickly Russian thistle
<i>Poaceae (Grass Family)</i>	Buffelgrass

**Table 8. Invasive Species Recognized by the SWEMP and texasinvasives.org.**



## Common Resource Areas<sup>15</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 13. Common Resource Areas of the Lower Pecos-Red Bluff Reservoir Watershed.



## **Common Resource Areas**

### **42.3 - Chihuahuan Desert Grassland**

This unit occurs within the Basin and Range Physiographic Province and is characterized by valley plains and alluvial fans broken by the Pecos River. Drainage divides are low and inconspicuous forming one great plain. Elevations range from 2800 to 5000 feet. Precipitation ranges from 8 to 13 inches per year. The soil temperature regime is thermic. The soil moisture regime is aridic. Vegetation includes tobosa, alkali sacaton, black grama, burrograss, creosote bush, tarbush, soap tree yucca, catclaw, fourwing saltbush, winterfat, mesquite and desert willow.

## **Conservation** <sup>17</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 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								
Brush Management	2	14,870	2	39,339	1	1,145	1	48,848	2	3,483	8	107,684
Conservation Cover					1	84	1	421	2	1,675	4	1,759
Conservation Crop Rotation					1	324	1	130			2	454
Forage and Biomass Planting			1	21	2	270	1	348			4	639
Forage Harvest Management			2	58	1	251	1	348			4	657
Integrated Pest Management					1	84	1	241	3	5,746	5	6,070
Irrigation Land Leveling	1	12	2	104	2	294	2	229			7	638
Irrigation System, Sprinkler							1	118			1	118
Irrigation System, Surface and Subsurface			2	54	1	230	1	244			4	526
Irrigation Water Management			2	913	2	574	1	776			5	2,263
Prescribed Grazing	1	4,386	4	177,26	2	132,252	3	151,076	3	51,537	13	516,512
Residue Management, Seasonal							1	130			1	130
Riparian Forest Buffer	1	15,193									1	15,193
Surface Roughening							1	118			1	118
Upland Wildlife Habitat Management	3	425,681	2	147,467	4	137,813	2	68,715	5	83,233	16	862,909
SUM (Σ)	8	460,142	17	187,956	18	273,321	18	271,742	15	145,674	76	1,515,670

Table 9. 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	
Fence	1	107,763	2	85,449	1	34,097	1	133,415	2	38,013	7	398,736
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	1	150					1	61			2	211
Pipeline	1	91,118	2	15,412	2	158,511	1	47,917			6	312,958
Pumping Plant			1		1		1		1		4	
Structure for Water Control	1		2		1						4	
Water Well	1		1		1		1				4	
Watering Facility	2		2		2		1		1		8	
<b>SUM (Σ)</b>	<b>7</b>	<b>199,031</b>	<b>11</b>	<b>100,861</b>	<b>8</b>	<b>192,608</b>	<b>6</b>	<b>181,332</b>	<b>6</b>	<b>38,013</b>	<b>36</b>	<b>711,905</b>

Table 10. 5 Year Trends in Location Specific Applied Conservation Practices. Reported in Feet if Linear (i.e. Fence)



## Soil Resource Inventory<sup>18</sup>

The Lower Pecos-Red Bluff Reservoir Watershed has a number of certified National Cooperative Soil Survey (NCSS) inventories. 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>.

### National Cooperative Soil Survey:

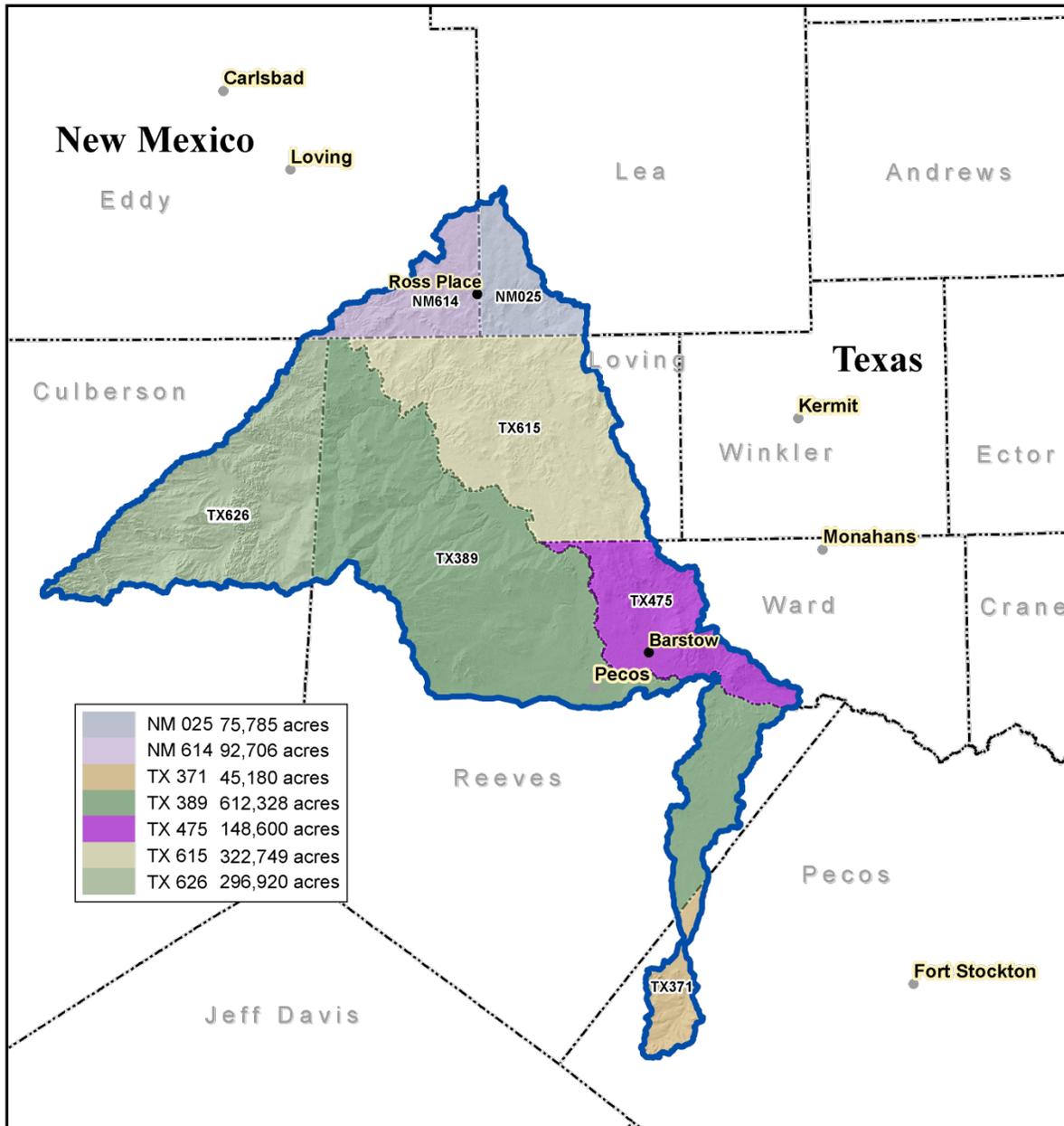


Figure 14. National Cooperative Soil Survey coverage of the Lower Pecos-Red Bluff Reservoir Watershed.



## Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the Lower Pecos-Red Bluff 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 -

<u>SSURGO Value</u>	<u>Nominal Description</u>	<u>Model Rank</u>
<b>Saturated Hydraulic Conductivity</b>		
$\mu\text{m} / \text{s}$		
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
<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 11. Criteria Used for Soil Erosion Susceptibility Model.**



## Soil Resource Inventory

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

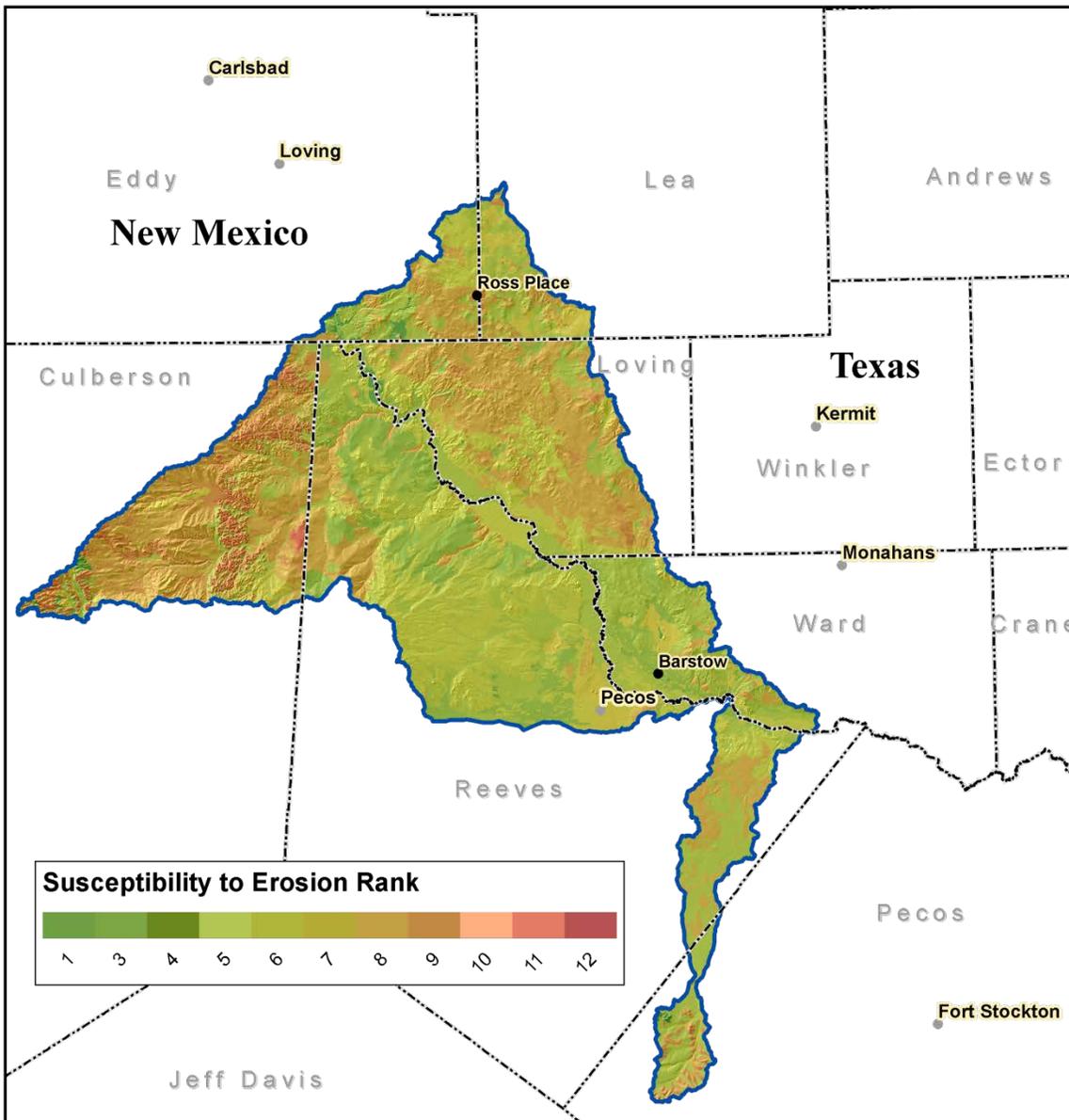
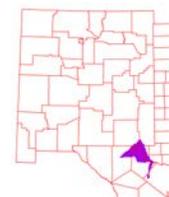


Figure 15. Lower Pecos-Red Bluff Reservoir Watershed Erosion Potential.



## Soil Resource Inventory

<u>Rank</u>	<u>Acres</u>
1	729
3	653
4	156,509
5	409,903
6	323,545
7	92,595
8	473,566
9	82,751
10	35,631
11	4,307
12	0
<b>Sum( <math>\Sigma</math> )</b>	<b>1,580,189</b>

Table 12. Soil Erosion Potential Model Results. A greater rank indicates greater potential for erosion.



**Socioeconomic Data** <sup>19</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
Eddy , NM	51,658	38,836	12,822	675	12,678	20,023	39,438	805	646	231	47	9,129	1,362	54,824
Lea, NM	55,511	43,665	11,846	377	11,469	22,010	37,263	2,426	551	216	24	13,217	1,814	46,236
Culberson, TX	2,975	0	2,975	44	2,931	2,149	2,051	21	14	17	0	807	65	41,378
Loving, TX	67	0	67	7	60	7	60	0	0	0	0	6	1	81,641
Pecos, TX	16,809	9,908	6,901	217	6,684	10,262	12,349	738	71	86	1	2,711	453	42,649
Reeves, TX	13,137	10,838	2,304	38	2,266	9,640	10,421	276	67	46	1	1,974	352	41,099
Ward, TX	10,909	7,351	3,558	154	3,404	4,580	8,704	503	72	31	3	1,366	230	46,844

**Table 13. Socioeconomic Data of the Counties in the Lower Pecos-Red Bluff Reservoir Watershed (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/>
2. Bureau of Land Management – New Mexico State Office. - [http://www.blm.gov/nm/st/en/prog/more/geographic\\_sciences/spatial\\_data\\_metadata.html](http://www.blm.gov/nm/st/en/prog/more/geographic_sciences/spatial_data_metadata.html)
3. UNITED STATES GEOLOGICAL SURVEY - National Land Cover Dataset. <http://landcover.United States Geological Survey.gov/>
4. Southwest Regional Gap Analysis Project (SWReGAP). <http://earth.gis.usu.edu/swgap/>
5. UNITED STATES GEOLOGICAL SURVEY – National Hydrography Dataset. <http://nhd.United States Geological Survey.gov/>
6. UNITED STATES GEOLOGICAL SURVEY - <http://waterdata.usgs.gov/nwis/rt>
7. State of New Mexico Environment Department - <ftp://ftp.nmenv.state.nm.us/www/swqb/303d-305b/2010/USEPA-Approved303dList.pdf>
8. United States Environmental Protection Agency - [http://cfpub.epa.gov/surf/huc.cfm?huc\\_code=13070001](http://cfpub.epa.gov/surf/huc.cfm?huc_code=13070001)
9. New Mexico - Office of the State Engineer- [http://www.ose.state.nm.us/water\\_info\\_awrm.html](http://www.ose.state.nm.us/water_info_awrm.html)
10. Texas Commission on Environmental Quality - <http://www.tceq.texas.gov/>
11. New Mexico Natural Heritage Program - <http://nhnm.unm.edu/>
12. Texas Parks & Wildlife Department - <http://www.tpwd.state.tx.us/>
13. Southwest Exotic Plant Mapping Program - <http://www.invasiveweeds.com/mapping/welcome.html>
14. Texas Invasives - <http://www.texasinvasives.org/>
15. Natural Resources Conservation Service – National Coordinated Common Resource Area (CRA) Geographic Database <http://soils.usda.gov/survey/geography/cra.html>
16. Natural Resources Conservation Service – Performance Results System <http://ias.sc.egov.usda.gov/PRSHOME/>



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

18. United States Census Bureau - [http://factfinder.census.gov/home/saff/main.html?\\_lang=en](http://factfinder.census.gov/home/saff/main.html?_lang=en)

