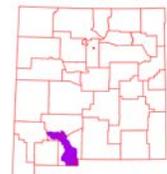


Rapid Watershed Assessment El Paso- Las Cruces Watershed



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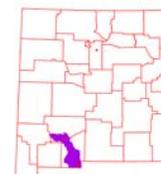
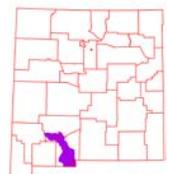


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Overview



Figure 1. El Paso-Las Cruces Watershed Overview

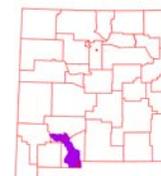


Overview

The El Paso-Las Cruces Watershed is located in southwestern central New Mexico and in extremely northwestern part of Texas and in some section of Northeast corner of Mexico covering 1,564,342 total acres (6,331 sq. km). Portions of the El Paso-Las Cruces Watershed are in the Dona Ana, Grant, and Sierra counties in New Mexico and in El Paso County, Texas and in part of the state of Chihuahua, Mexico. Table 1 summarizes the distribution of the El Paso-Las Cruces watershed.

County	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
Dona Ana CO, NM	2,441,262	1,157,994	74	47
El Paso CO, TX	648,847	63,883	4	10
Grant CO, NM	2,543,536	145	<1	<1
Sierra CO, NM	2,711,883	342,320	22	13
Chihuahua, Mexico	61,301,622	2,796	<1	<1
Sum (Σ)	--	1,564,342	100	--

Table 1. El Paso-Las Cruces Watershed acreage distribution.



Physical Setting

Geology:

This HUC is the portion of the Rio Grande watershed from Caballo Reservoir Dam to El Paso. It is bordered on the west by the Black Range, northern edge of the Godsight Mountains, the Sierra de Las Uvas, the Sleeping Lady Hills, the Aden Hills, Mount Aden, the West Portillo Mountains, Mount Riley, the East Portillo Mountains, and to just east of the site of Potrillo. The southern boundary follows the New Mexico-Mexico boundary into El Paso and Arena Park. The eastern border consists of the Caballo Mountains near Brushy Mountain, near the site of Alivio, Point of Rocks, and the Doña Ana Mountains; passes through the town of Organ to Baylor Peak in the Organ Mountains.

The Organ Mountains are a Tertiary Period granite intrusion. The Doña Ana Mountains, the Black Range, the Godsight Mountains, Sierra de Las Uvas, Sleeping Lady Hills, the Aden Hills, Mount Aden, and Point of Rocks are also Tertiary Period intrusive and volcanic rocks. The Caballo 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 valley floor contains small areas of Tertiary Period basaltic andesites and volcaniclastic sedimentary units. Most of the valley floor is Quaternary-Tertiary Period partly compacted sands and gravels of the Santa Fe group. 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, and alluvium are the rest of the sediments on the valley floor.

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.

Groundwater quality and quantity is a concern. Depth to groundwater is a concern if the shallow unconfined aquifer does not produce enough water for the resource or increased population demands are 'mining' the water. Groundwater in the limestone, igneous rocks and volcanics is usually along fracture zones which are hard to intercept with water wells. Groundwater quality ranges from good to fair for livestock or crops. Chloride and sulfate concentrations in sections of the watershed are also a concern. High nitrates/nitrites from confined animal operations have been measured in the Mesilla Valley.



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 El Paso-Las Cruces watershed are assigned to four groups (A, B, C, and D).



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



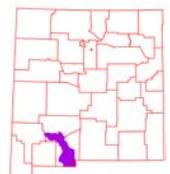
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.



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



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



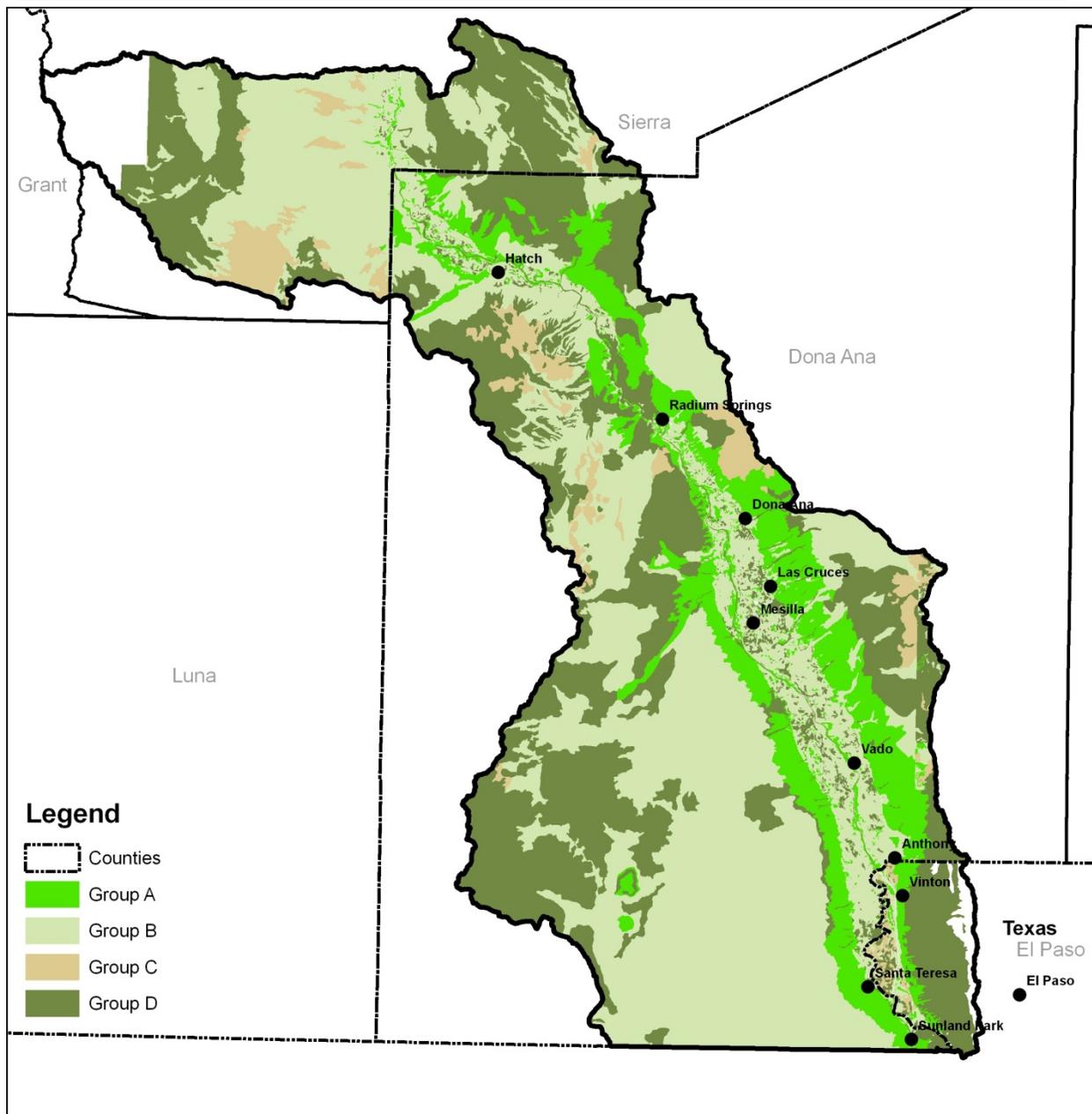
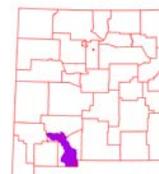


Figure 2. Hydrologic Soil Group



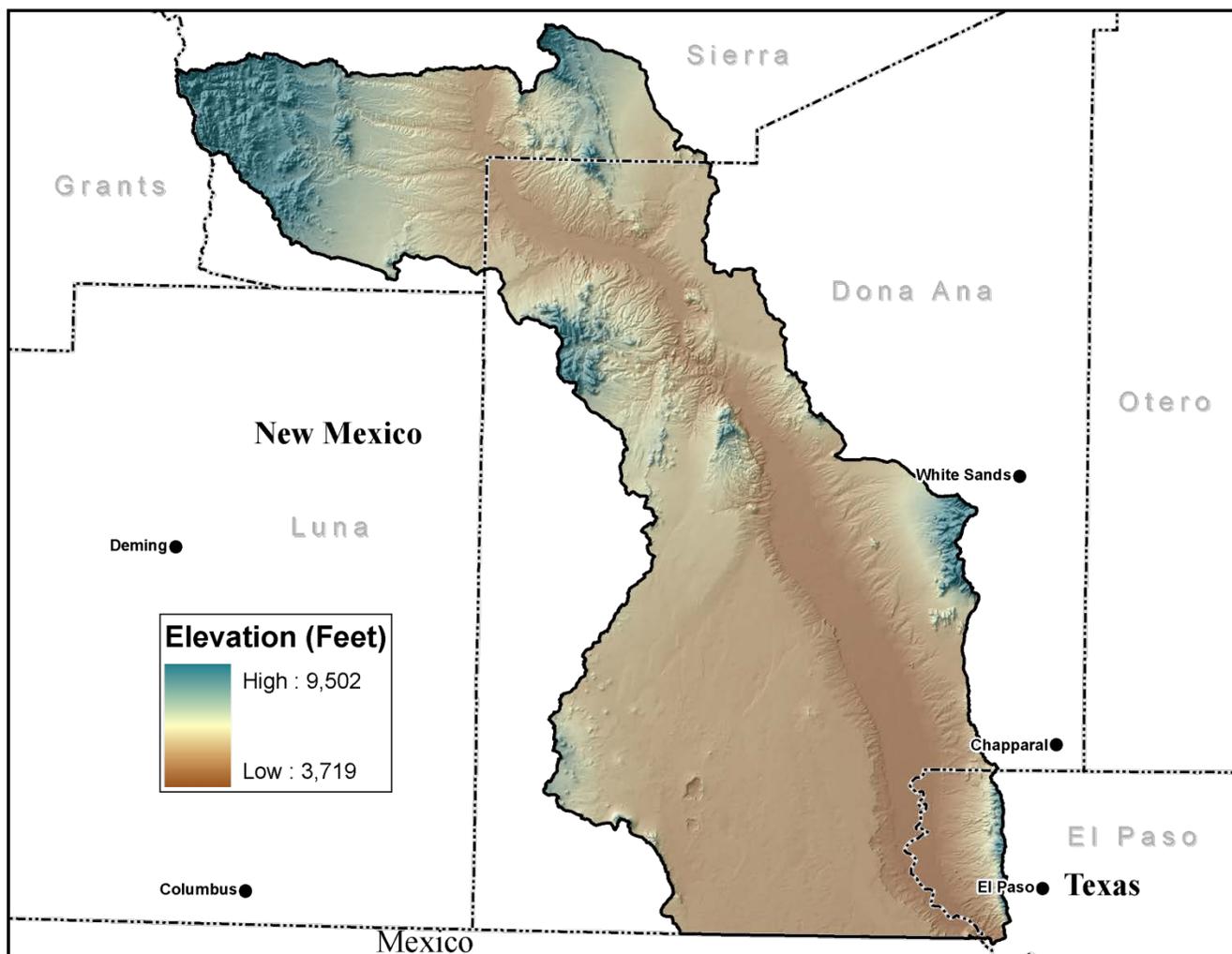


Figure 3. El Paso-Las Cruces Watershed Shaded Relief



Precipitation ¹

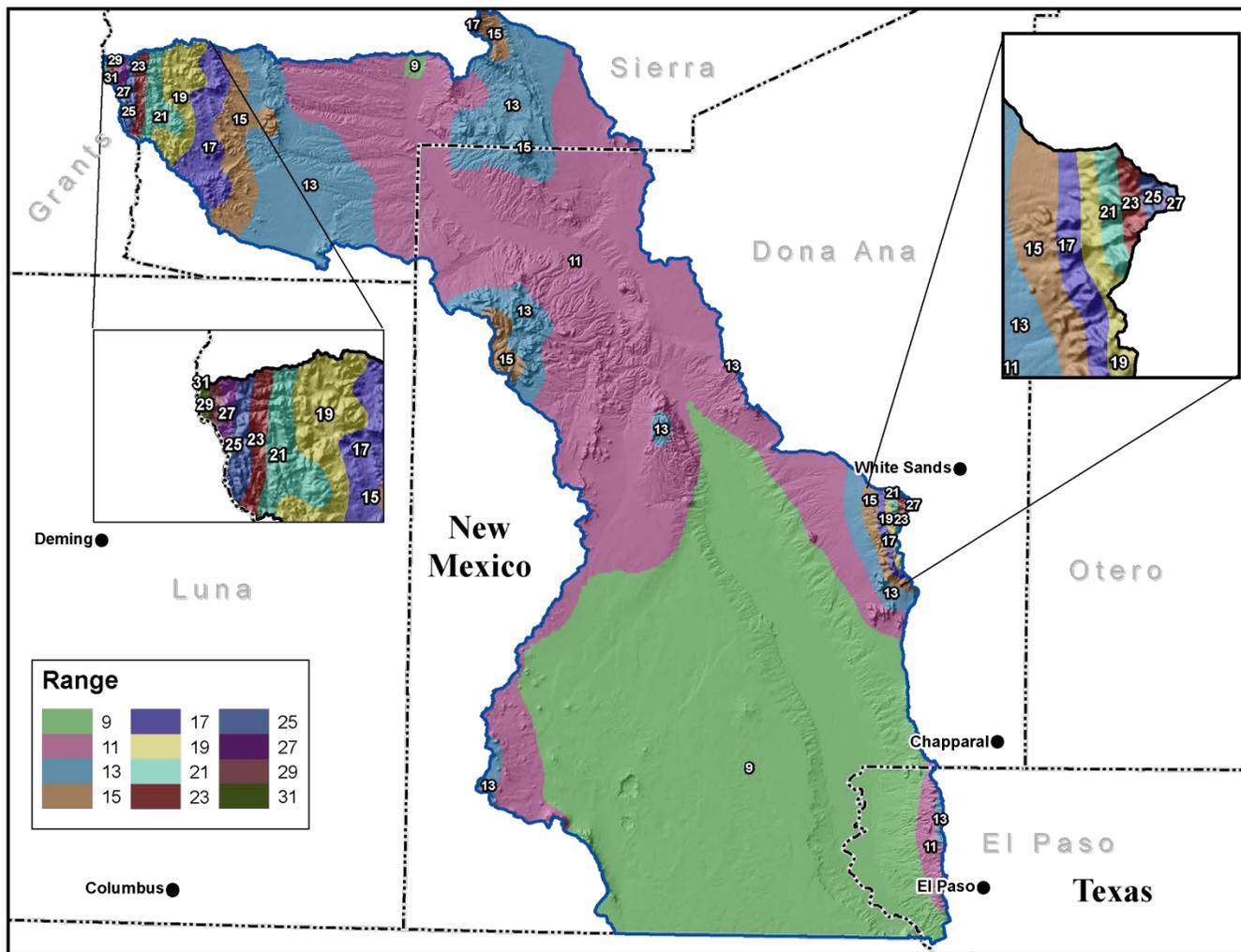
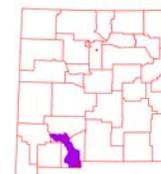


Figure 4. El Paso-Las Cruces Watershed Annual Precipitation.



Land Ownership ²

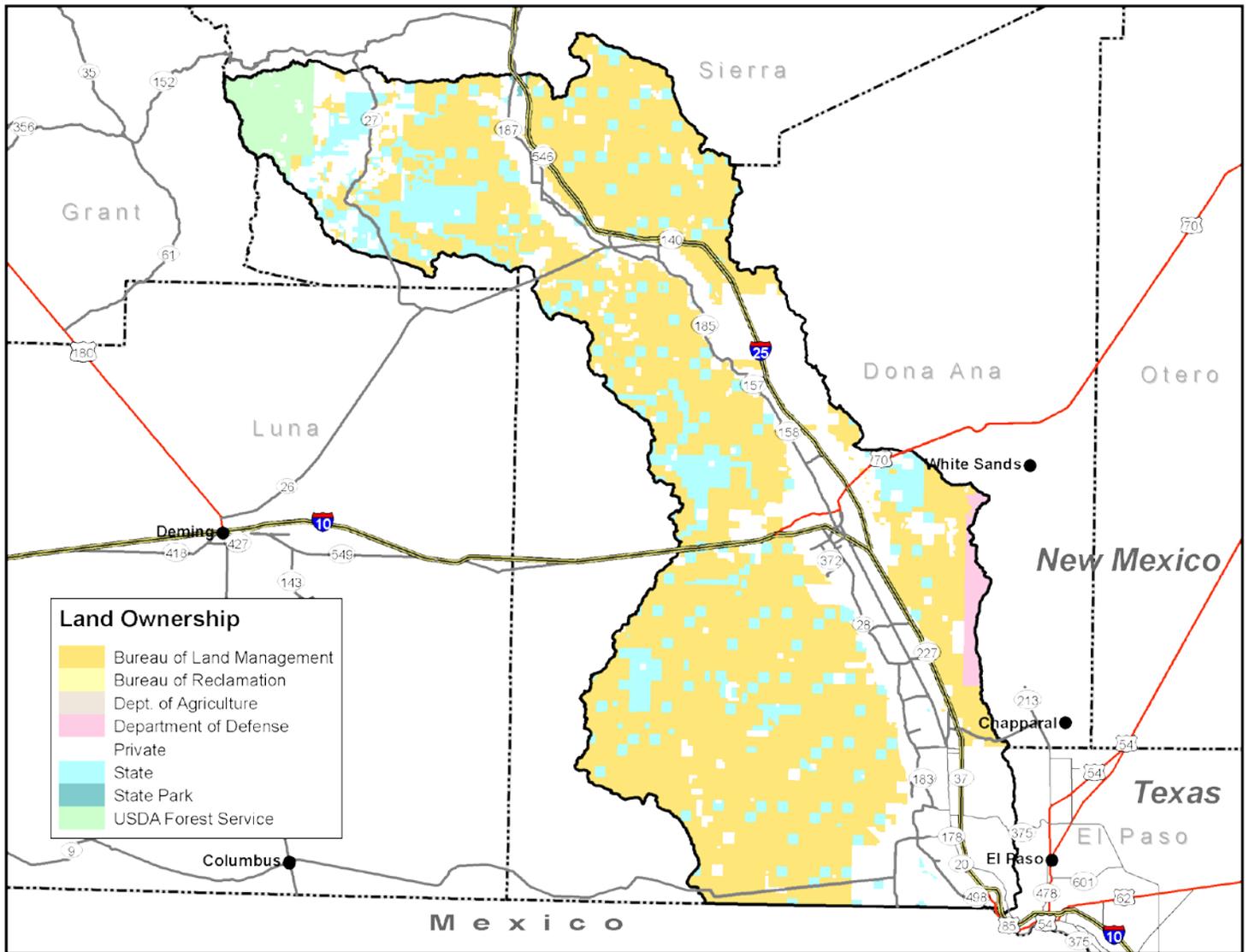
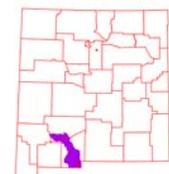


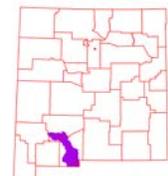
Figure 5. El Paso-Las Cruces Watershed Land Ownership.



Land Ownership

<u>COUNTY</u>	<u>BLM</u>	<u>Bureau of Reclamation</u>	<u>Department Of Agriculture</u>	<u>Department of Defense</u>	<u>Forest Service</u>	<u>Private</u>	<u>State</u>	<u>State Park</u>
Dona Ana	696,612	837	14	15,042		318,332	126,843	271
Grant					145			
Sierra	162,061	40			37,463	62,522	79,160	1,074
El Paso CO, TX						63,923		
Watershed (Σ)	858,673	877	14	15,042	37,608	447,777	206,003	1,345
% Watershed	55	< 1	< 1	1	2	29	13	< 1

Table 2. Land ownership in the El Paso-Las Cruces Watershed.



Land Use / Land Cover ^{3,4}

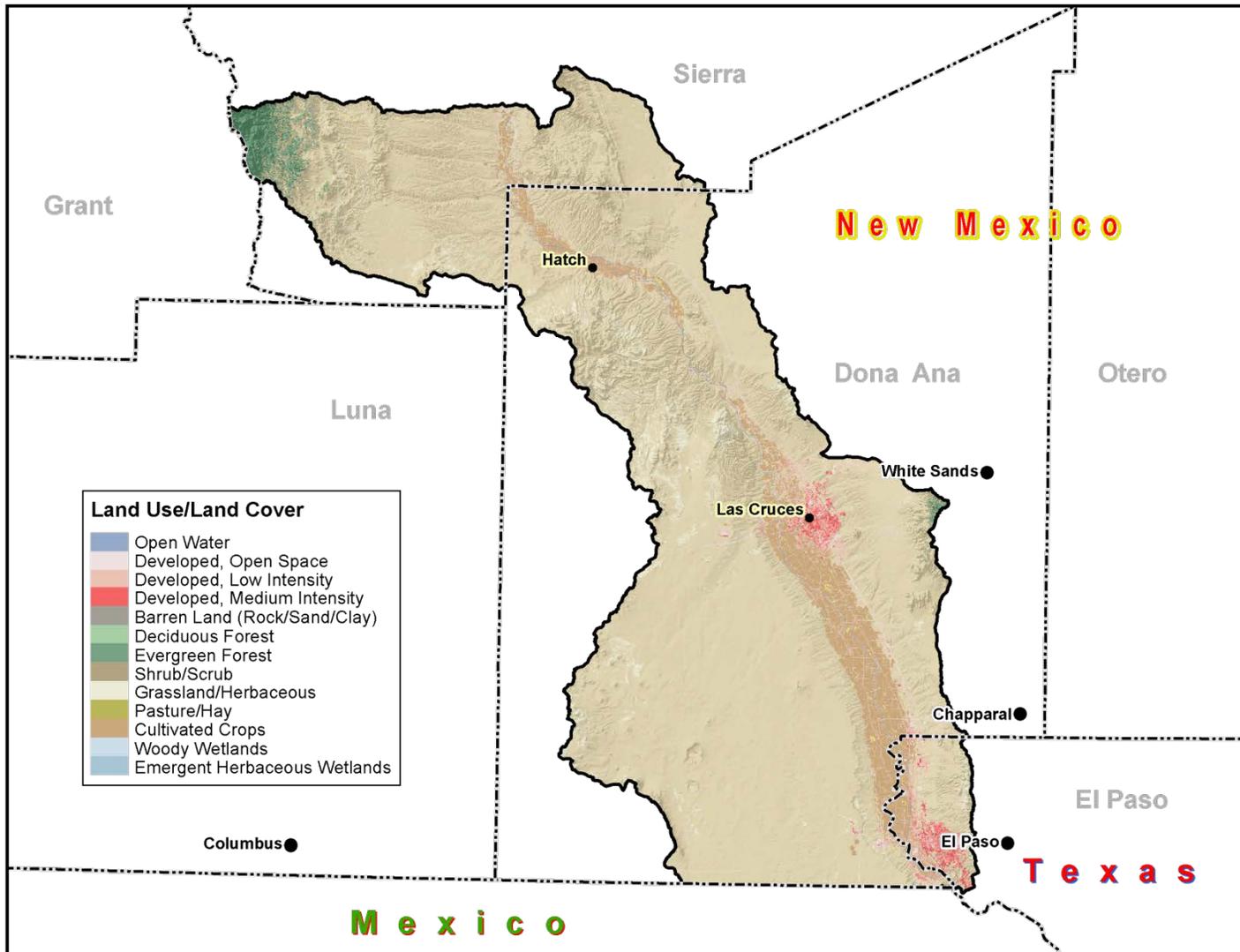
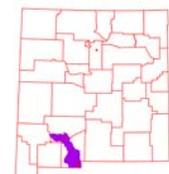


Figure 6. National Land Cover Dataset in the El Paso-Las Cruces Watershed.

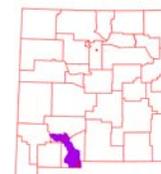


Land Use / Land Cover

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>
Shrub/Scrub	1,300,003	83
Cultivated Crops	104,972	7
Grassland/Herbaceous	56,555	4
Developed, Low Intensity	30,765	2
Evergreen Forest	26,721	2
Developed, Open Space	23,637	2
Developed, Medium Intensity	9,459	1
Barren Land (Rock/Sand/Clay)	3,461	<1
Open Water	3,384	<1
Pasture/Hay	2,533	<1
Developed, High Intensity	2,102	<1
Woody Wetlands	419	<1
Emergent Herbaceous Wetlands	237	<1
Deciduous Forest	18	<1

Table 3. Extent of NLCD classes in the El Paso-Las Cruces Watershed.



Land Use / Land Cover

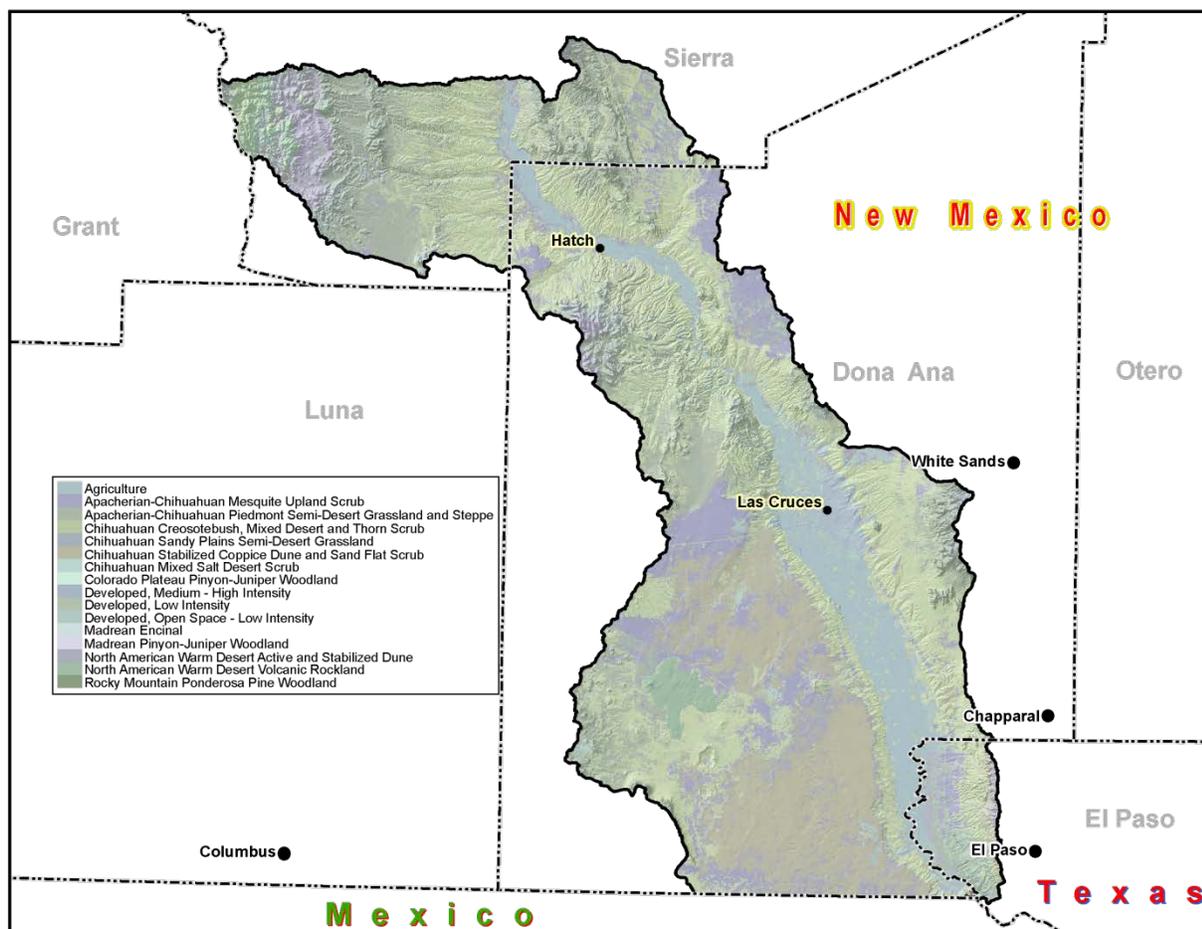


Figure 7. Subset of the SWREGAP over the El Paso-Las Cruces Watershed. The 16 dominant ecosystems are displayed in the legend.

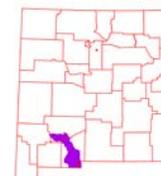


Land Use / Land Cover

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
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	520,508	33
Apacherian-Chihuahuan Piedmont Semi-Desert Grassland and Steppe	274,887	18
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	229,140	15
Apacherian-Chihuahuan Mesquite Upland Scrub	163,120	10
Agriculture	100,104	6
Madrean Pinyon-Juniper Woodland	41,521	3
North American Warm Desert Active and Stabilized Dune	31,963	2
Developed, Medium - High Intensity	27,639	2
Developed, Open Space - Low Intensity	21,518	1
Chihuahuan Mixed Salt Desert Scrub	19,819	1
North American Warm Desert Volcanic Rockland	16,798	1
Madrean Encinal	16,396	1
Rocky Mountain Ponderosa Pine Woodland	11,769	1
Chihuahuan Sandy Plains Semi-Desert Grassland	10,168	1
Colorado Plateau Pinyon-Juniper Woodland	9,989	1
Developed, Low Intensity	8,851	1

Table 4. SW Region Gap analysis ecosystem acreages.



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

The National Hydrography Dataset (NHD) is a comprehensive set of data that encodes information about naturally occurring and constructed bodies of water, paths through which water flows, and related entities. The NHD identifies 5,563 miles (8,953 km) of water courses in the El Paso-Las Cruces River Watershed. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

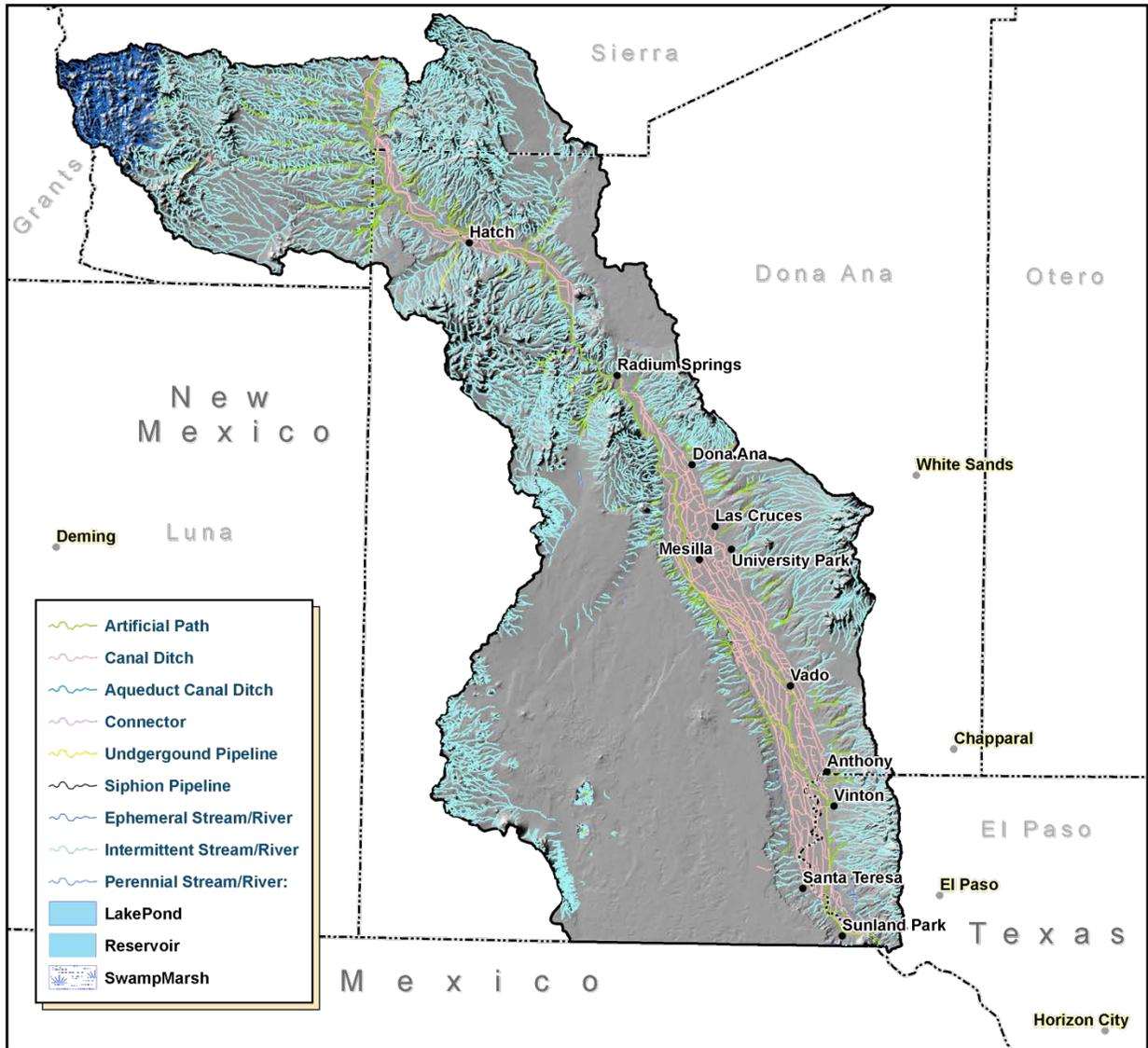


Figure 8. National Hydrologic Dataset (NHD) of the El Paso-Las Cruces Watershed.



Water Course Type	Miles
Artificial Path	423
Canal/Ditch	627
Connector	2
Underground Pipeline	4
Siphon Pipeline	2
Ephemeral Stream/River	255
Intermittent Stream / River	4,243
Perennial Stream / River	7
Sum (Σ)	5,563

Table 5. NHD Water Course Type and Extents

Gauging Stations:

There are 51 water gauging stations in the watershed. USGS Site 08362500 is located in the NW corner of the watershed on the Rio Grande BLW at Caballo Dam. During the period 1938 – 2009, this site has had mean annual discharge of 26,298 cubic feet per second ranging from 0.203 (1972) to 4,075 (1995) cubic feet per second. (See picture next page).



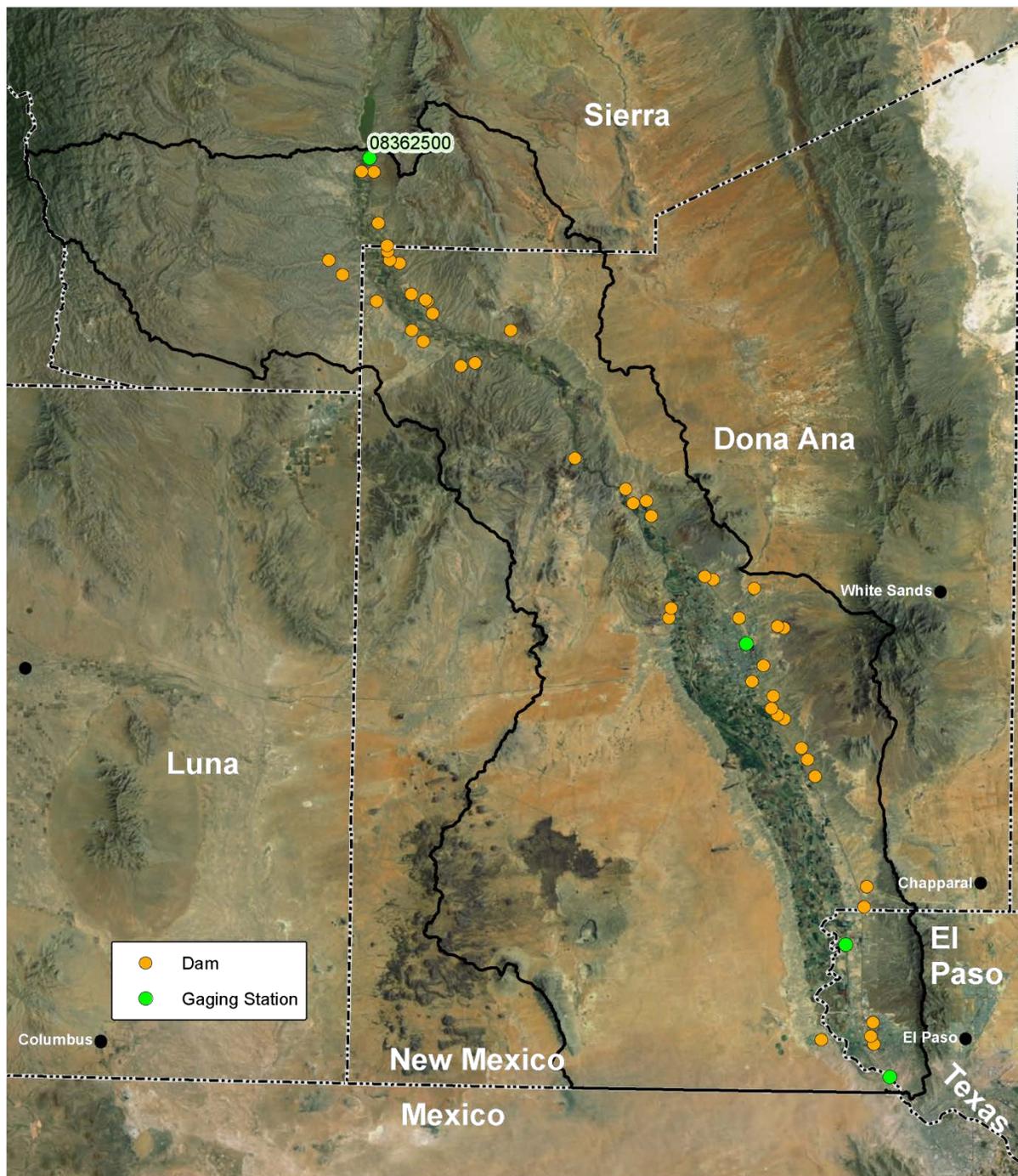


Figure 9. Gauging Stations in the El Paso- Las Cruces Watershed.



Hydrology

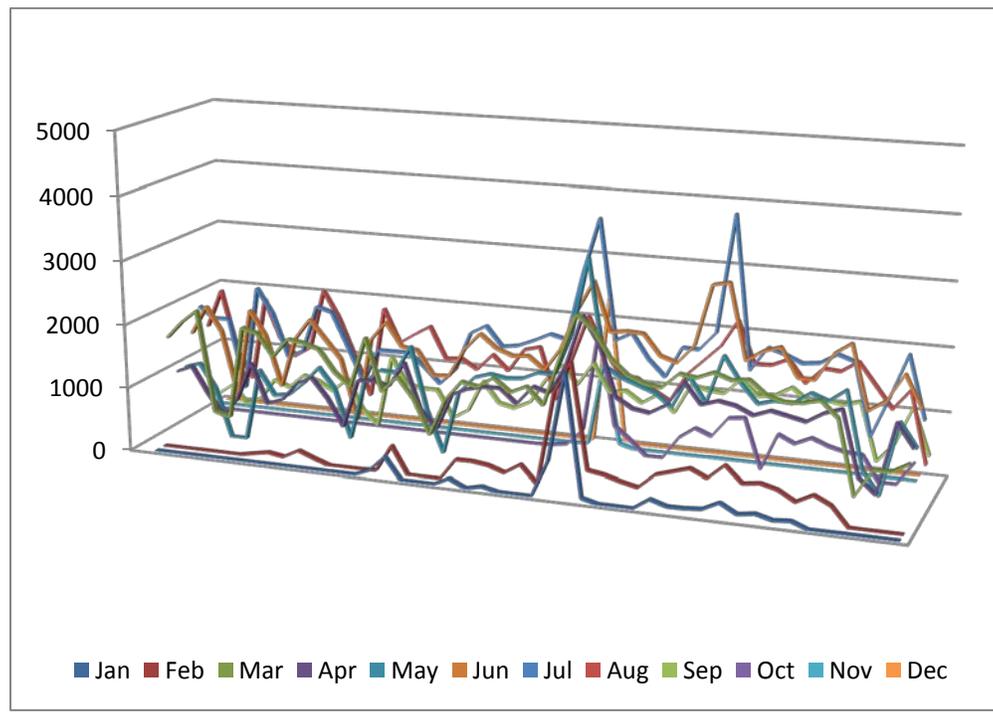
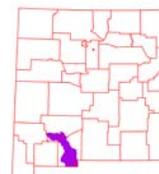


Figure 10. Monthly average of Mean Daily Flow on the El Paso-Las Cruces at Rio Grande BLW at Caballo Dam, NM. Period of observation: 1938-2009.



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 NMWQCC has defined the El Paso-Las Cruces watershed as part of the Lower Rio Grande Basin.

The El Paso- Las Cruces watershed has the following reaches listed as 303 (d) Impaired Surface Waters:

1. Burn Lake (Doña Ana)

<u>Use</u>	Burn Lake
Livestock Watering	X
Marginal Coldwater Aquatic Life	NS
Primary Contact	X
Warmwater Aquatic Life	NS
Wildlife Habitat	X

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



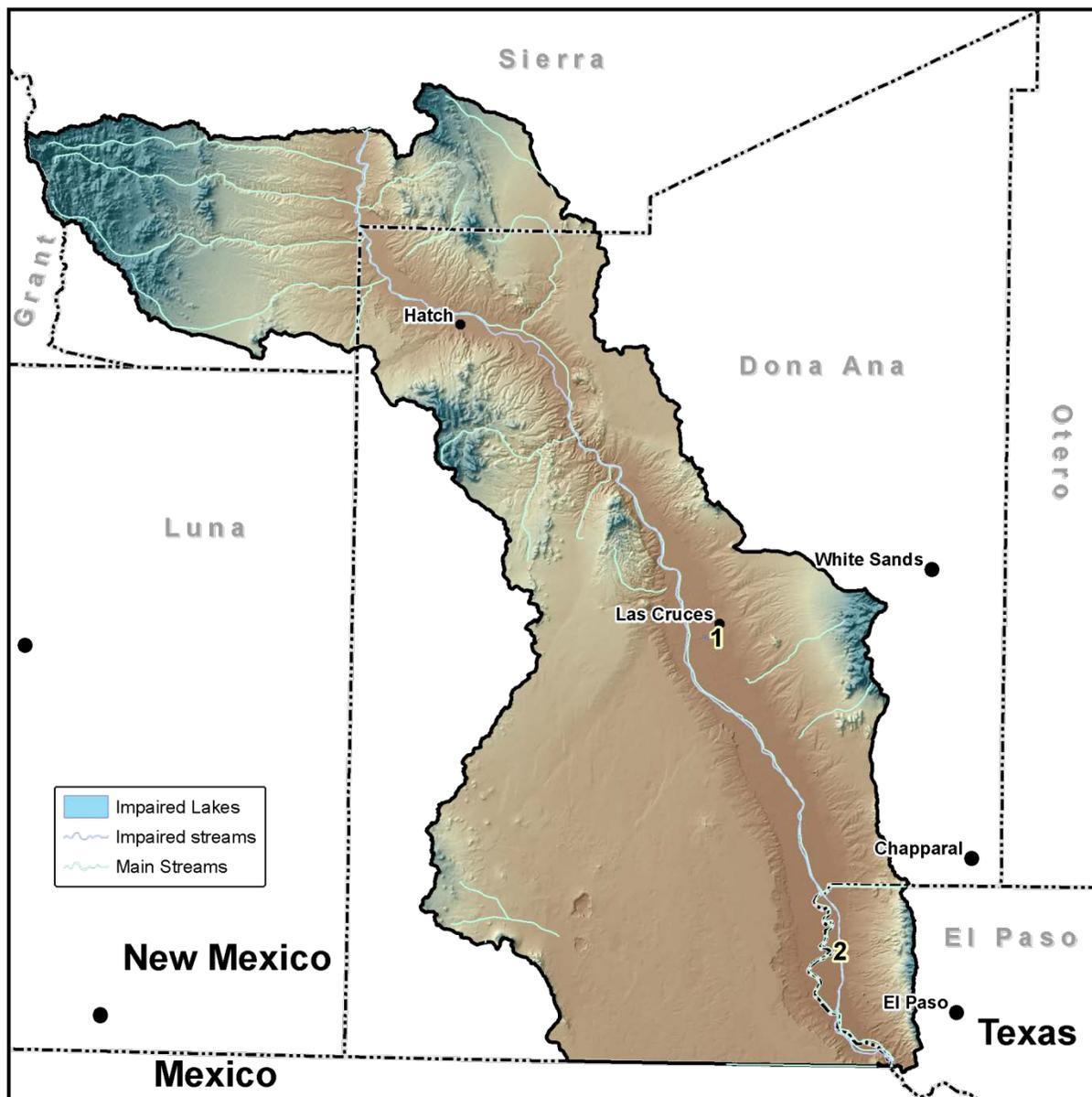


Figure 11. 303(d) Impaired Waters



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 El Paso- Las Cruces Watershed, there is one water body that is listed as impaired as of the 2010-12 listing cycle (Burn Lake Dona Ana).

The water body covers 23 acres (.092 sq. km).

	Impairment
<u>Probably Causes of Impairment</u>	Burn Lake
Aluminum	X

Table 7. Possible Causes of Impairment

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 TCEQ has defined the El Paso-Las Cruces watershed as part of the Lower Rio Grande Basin. Parts of the Lower El Paso- Las Cruces watershed within the El Paso County have the following chart they designated the impairment waters. They have assigned subcategory to define the category. The listed here is dated as of 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.

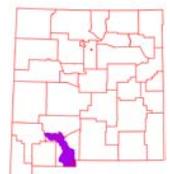
Category 5b - A review of the water quality standards for this water body will be conducted before a TMDL is scheduled.

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

This freshwater stream, the Rio Grande, reaches total 11 miles (17 km).

	Impairment
<u>Probably Causes of Impairment</u>	Rio Grande (Texas)
Bacteria	5c

Table 8. TCEQ Possible Causes of Impairment



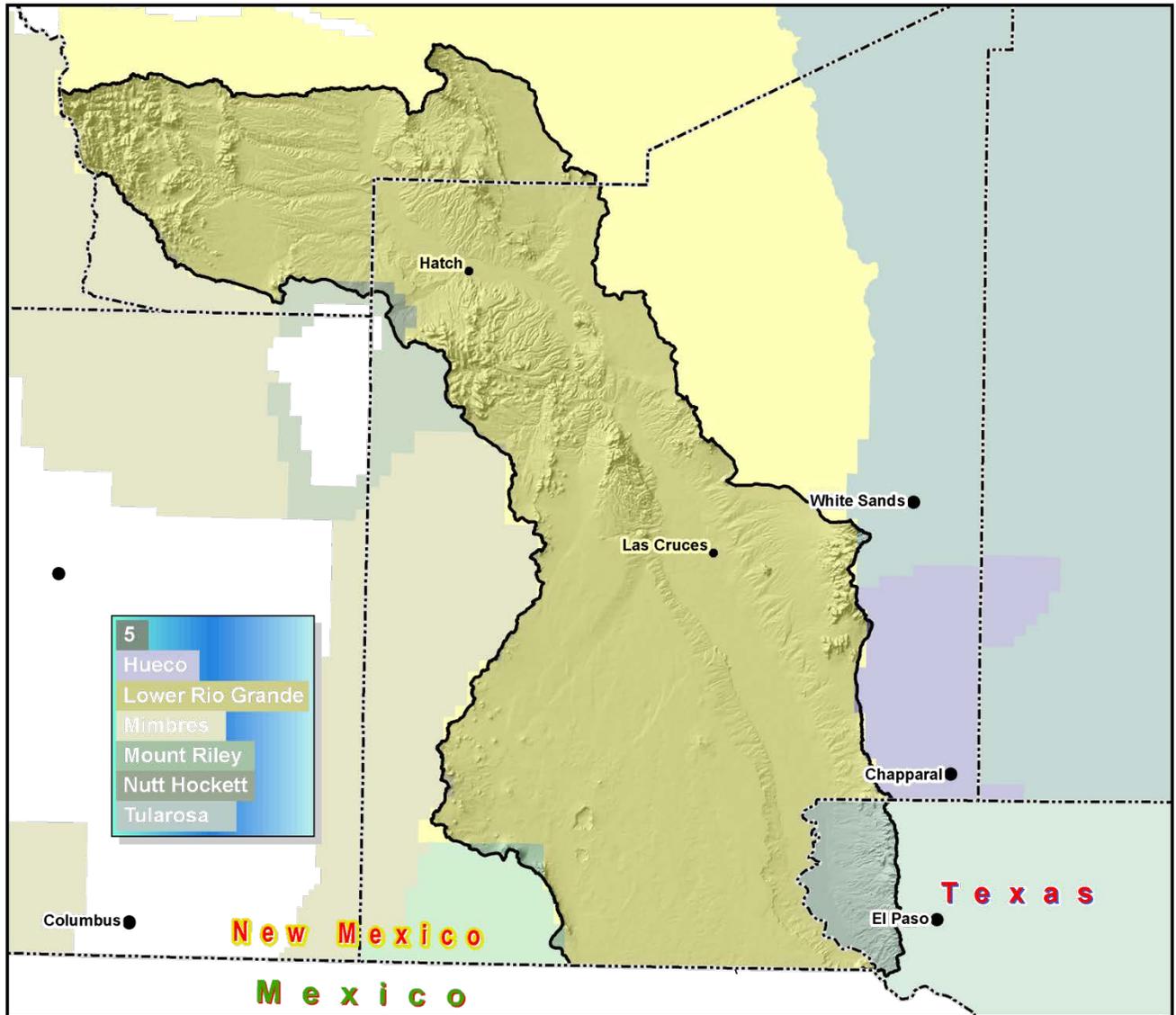
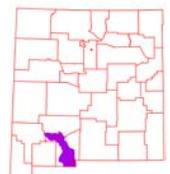


Figure 12. Declared Groundwater Basins of the El Paso-Las Cruces.

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 seven declared groundwaters in the El Paso- Las Cruces watershed: 5 (Five), Hueco, Lower Rio Grande, Mimbres, Mount Riley, Nutt Hockett, and Tularosa. The surface watershed in NM covers 1,500,767 and with a small portion of surface watershed in TX covers 63,524 acres and the approximately million acres of the 9,458,280 underground water basins in NM and TX.



Threatened and Endangered Species ^{11,12}

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 program track the status of threatened and endangered species which are listed on both federal and state lists. Table 9 lists those species which are currently listed and tracked in the El Paso-Las Cruces Watershed.

<u>Common Name</u>	<u>Scientific Name</u>	<u>Tax Class</u>	<u>Family</u>	<u>Federal Status</u>	<u>State Status</u>
Dona Ana Talussnail	<i>Sonorella todseni</i>				T
Ovate Vertigo	<i>Vertigo ovata</i>				T
Mexican Tetra	<i>Astyanax mexicanus</i>	Actinopterygii	Characidae		T
Rio Grande Silvery Minnow	<i>Hybognathus amarus</i>	Actinopterygii	Cyprinidae	LE	E
Common Ground-Dove	<i>Columbina passerina</i>	Aves	Columbidae		E
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Aves	Falconidae		T
Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>	Aves	Falconidae	LE	E
Broad-billed Hummingbird	<i>Cynanthus latirostris</i>	Aves	Trochilidae		T
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	Aves	Tyrannidae	LE	E
Bell's Vireo	<i>Vireo bellii</i>	Aves	Vireonidae		T
Gray Vireo	<i>Vireo vicinior</i>	Aves	Vireonidae		T
Desert Night-blooming Cereus	<i>Peniocereus greggii var. greggii</i>	Dicotyledoneae	Cactaceae		E
Organ Mountain Foxtail-cactus	<i>Escobaria organensis</i>	Dicotyledoneae	Cactaceae		E
Sand Prickly-pear	<i>Opuntia arenaria</i>	Dicotyledoneae	Cactaceae		E
Sneed Pincushion Cactus	<i>Escobaria sneedii var. sneedii</i>	Dicotyledoneae	Cactaceae	LE	E
Desert Bighorn Sheep	<i>Ovis canadensis mexicana</i>	Mammalia	Bovidae		T
Organ Mountains Chipmunk	<i>Neotamias quadrivittatus australis</i>	Mammalia	Sciuridae		T
Gila Monster	<i>Heloderma suspectum</i>	Reptilia	Helodermatidae		E
Interior Least Tern	<i>Sterna antillarum athalassos</i>	Aves	Sternidae	LE	E
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Aves	Strigidae	LT	T
Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>	Aves	Falconidae	LE	E
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	Aves	Tyrannidae	LE	E
Rio Grande silvery minnow	<i>Hybognathus amarus</i>	Actinopterygii	Cyprinidae	LE	E
Bluntnose shiner	<i>Notropis simus simus</i>	Actinopterygii	Cyprinidae		T
Black-footed ferret	<i>Mustela nigripes</i>	Mammalia	Mustelidae	LE	
Gray wolf	<i>Canis lupus</i>	Mammalia	Canidae	LE	E
Chihuahuan Desert lyre snake	<i>Trimorphodon vilkinsonii</i>	Reptilia			T
Mountain short-horned lizard	<i>Phrynosoma hernandesi</i>	Reptilia	Phrynosomatidae		T
Texas horned lizard	<i>Phrynosoma cornutum</i>	Reptilia	Phrynosomatidae		T
Sneed's pincushion cactus	<i>Escobaria sneedii var sneedii</i>	Magnoliopsida	Cactaceae	LE	E

Table 9. Threatened and Endangered Plant and Animal Species.



Invasive Species ^{13,14}

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 El Paso-Las Cruces watershed, the SWEMP has identified 7 species of invasive plants (Table 10). Each of these species is defined as non-native by the USDA PLANTS database.

<u>Scientific Name</u>	<u>Common Name</u>
<i>Zygophyllaceae (Caltrop Family)</i>	African Rue
<i>Scrophulariaceae (Figwort Family)</i>	Dalmatian Toadflax
<i>Brassicaceae (Mustard Family)</i>	Hoary Cress (Whitetop)
<i>Lythraceae (Loosestrife Family)</i>	Purple Loosestrife
<i>Asteraceae (Sunflower Family)</i>	Russian Knapweed
<i>Asteraceae (Sunflower Family)</i>	Yellow Starthistle
<i>Arundo donax L</i>	Giant Reed

Table 10. Invasive Species Recognized by the SWEMP and Texas Parks and Wildlife Department.



Common Resource Areas ¹⁵

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.

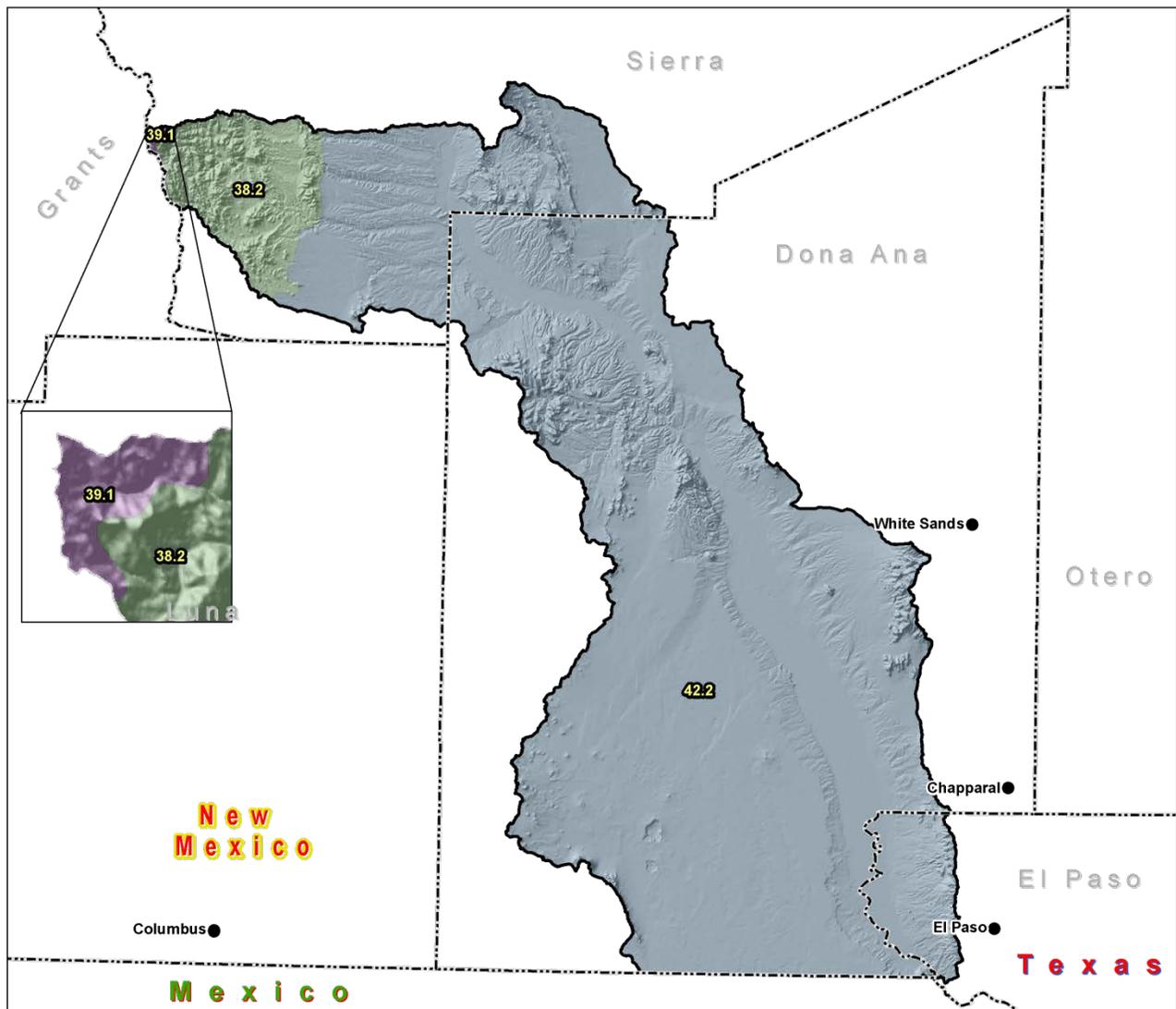


Figure 13. Common Resource Areas of the El Paso-Las Cruces Watershed.



Common Resource Areas

38.2 - Interior Chaparral – Woodlands

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

39.1 - Mogollon Plateau Coniferous Forests

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

42.2 - Chihuahuan Desert Shrubs

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



Conservation ¹⁶

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
Brush Management			1	5,685	2	6					3	5,690
Conservation Crop Rotation	2	115			1	247	2	399	2	696	7	1,456
Cover Crop	2	138			1	76	1	125	2	59	6	397
Forage and Biomass Planting			1	6							1	6
Forage Harvest Management	1	6									1	6
Forest Stand Improvement			1	1,981	1	1,981	3	1,220	3	1,466	8	6,648
Integrated Pest Management	1	153			2	571					3	724
Irrigation Land Leveling			1	13	1	10	1	55	2	88	5	167
Irrigation System, Microirrigation	2	240	1	141	1	167	1	547	2	136	7	1,231
Irrigation System, Sprinkler					1	43	1	64			2	107
Irrigation System, Surface and Subsurface					1	202	1	15	1	5	3	223
Irrigation Water Management	2	197	1	151	2	722	3	1,476	3	1,583	9	4,130
Land Smoothing									1	5	11	5
Nutrient Management	1	128	1	77	2	571	3	1,214	3	1,628	10	3,618
Prescribed Grazing	1	15,439	1	7,613			1	6			3	23,058
Range Planting							1	1			1	1
Residue Management, Mulch Till	2	115					2	205	1	55	5	374
Residue Management, Seasonal	1	29			1	196	1	340	2	864	5	1,429
Tree/Shrub Establishment							1	1			1	1
Upland Wildlife Habitat Management	1	52,965	1	20,410	2	359	1	8,2634	3	17,065	8	99,063
Waste Utilization					1	62					1	62
Wetland Restoration	1	65									1	65
SUM (Σ)	17	69,589	9	36,077	19	5,213	23	13,932	25	23,650	101	148,460

Table 11. 5 year Trends in Applied Conservation Practices. Reported in Acres.



Conservation Practice	2006		2007		2008		2009		2010		TOTAL	
	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet
Comprehensive Nutrient Management Plan	1		1		3						5	
Comprehensive Nutrient Management Plan - Applied							1				1	
Conservation Completion Incentive First Year			1		1						2	
Dam, Diversion					1						1	
Fence							1	6	1	4,219	2	4,224
Irrigation Water Conveyance, Ditch and Canal Lining, Plain Concrete	3	135	3	413	2	205	4	112	1	242	13	1,107
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic					1	24	1	4	1	6	3	34
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	1	31	1	81	2	113	2	102	1	130	7	456
Irrigation Water Conveyance, Pipeline, Steel	1	6			1	23			1	1	3	30
Monitoring Well					1		1		1		3	
Pipeline			1	20,410			2	26,583	1	4,502	4	51,495
Pond					1		1				2	
Pond Sealing or Lining, Flexible Membrane	1				1						2	
Pumping Plant			1						1		2	
Roof Runoff Structure			2		2				1		5	
Structure for Water Control	3		3		2		4		2		14	
Waste Storage Facility					2		1		1		4	
Waste Transfer	1				1		1		1		4	
Waste Treatment Lagoon					1						1	
Water Well							1	4,219			1	4,219
Watering Facility			1				2	1	2		5	
Wildlife Watering Facility							1					
Windbreak/Shelterbelt Establishment							3	4	1	8	4	12.01
SUM (Σ)	11	172	14	20,904	22	365	26	31,031	16	9,108	89	61,577

Table 12. 5 Year Trends in Location Specific Applied Conservation Practices. Reported in Feet if Linear (i.e. Fence).



Soil Resource Inventory¹⁷

The El Paso-Las Cruces watershed has a number of certified National Cooperative Soil Survey (NCSS) inventories. The National Forests 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.

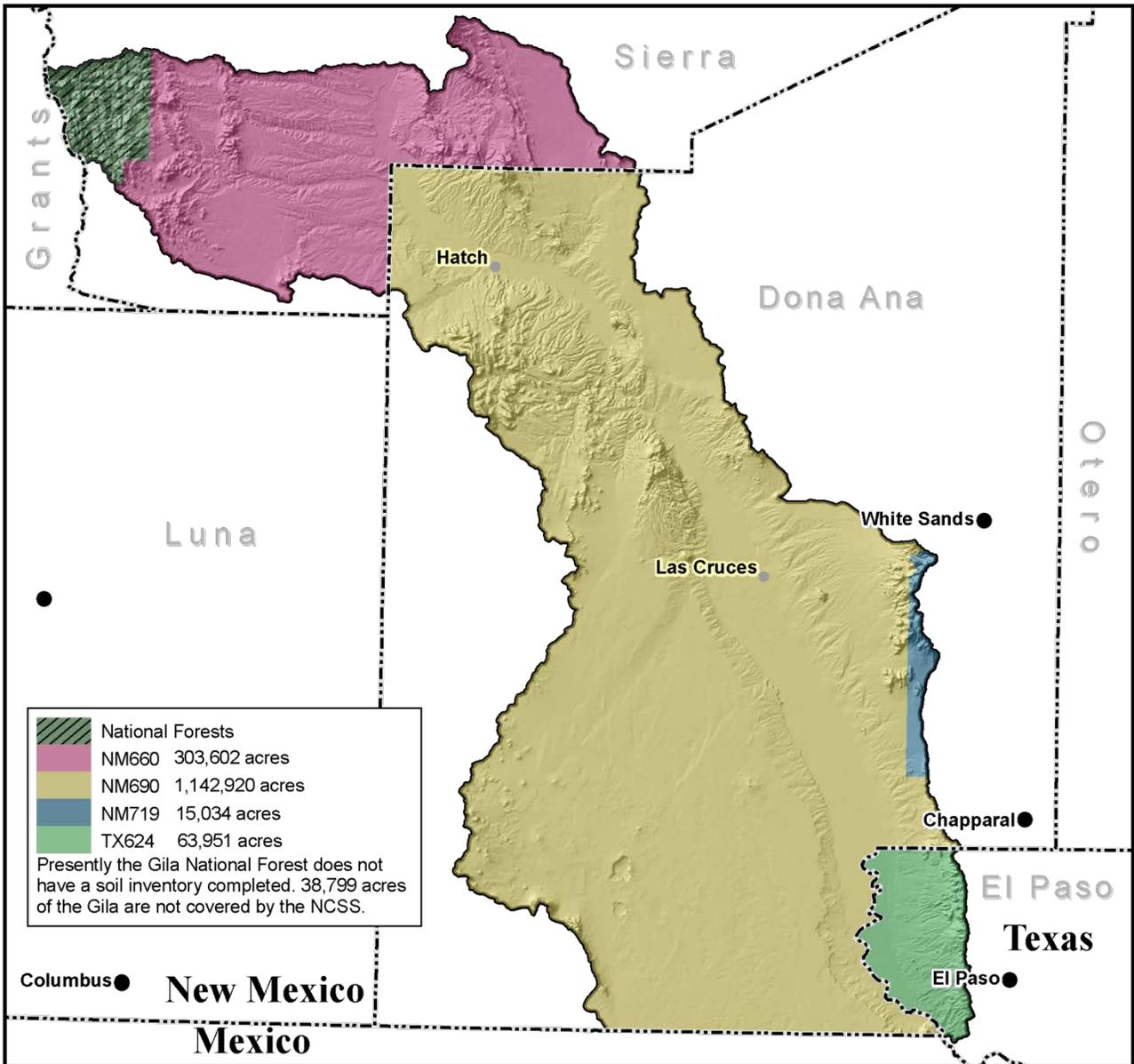


Figure 14. National Cooperative Soil Survey coverage of the El Paso-Las Cruces Watershed.

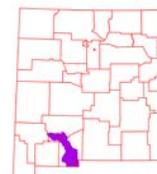


Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the El Paso-Las Cruces 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>
Saturated Hydraulic Conductivity		
$\mu\text{m} / \text{s}$		
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
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 13. 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.

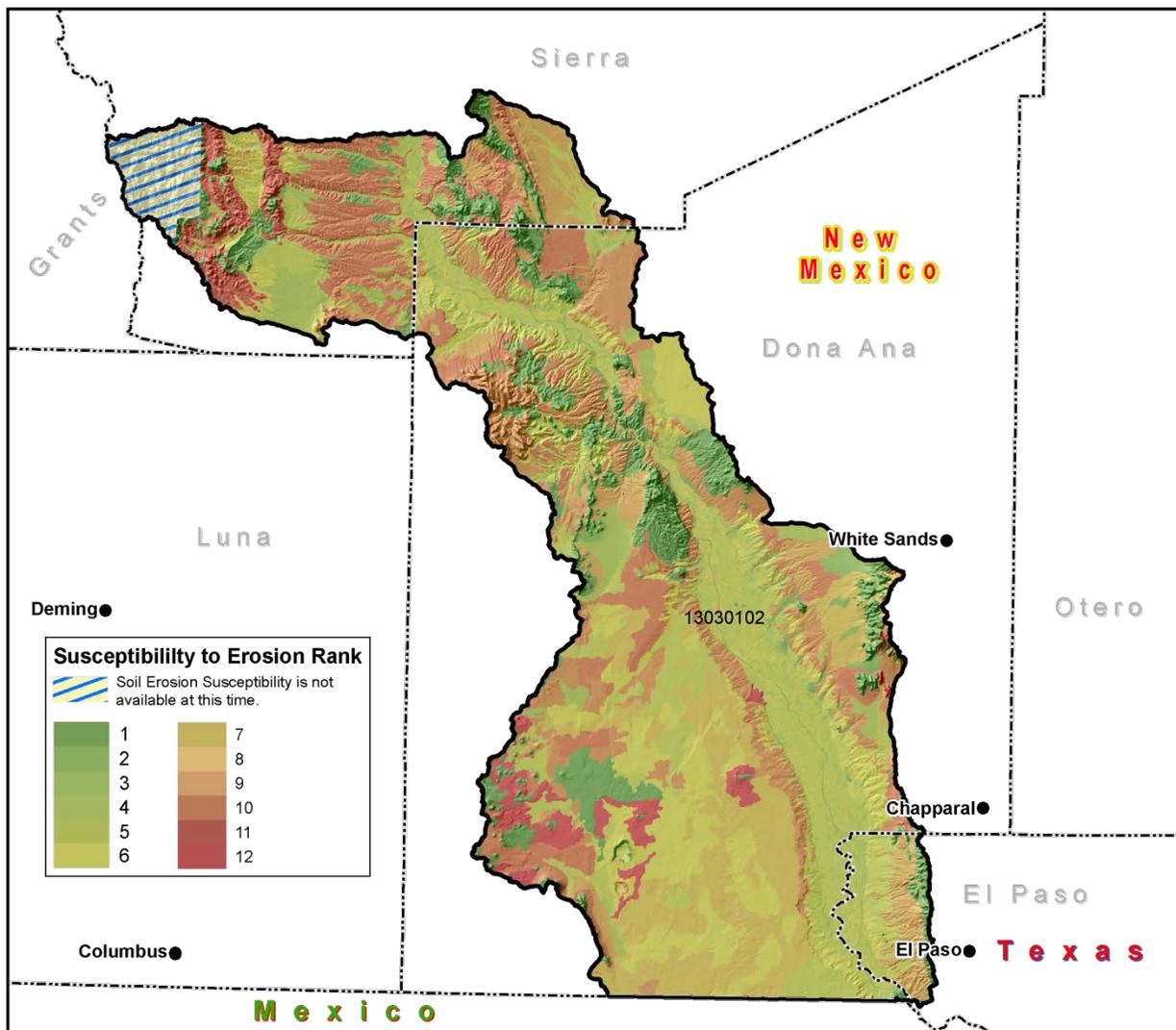


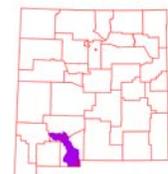
Figure 15. El Paso-Las Cruces Watershed Erosion Potential.



Soil Resource Inventory

<u>Rank</u>	<u>Acres</u>
1	5,835
2	9,760
3	3,117
4	99,630
5	284,220
6	210,026
7	180,918
8	100,149
9	175,537
10	192,313
11	39,022
12	38,430
Sum(Σ)	1,338,957

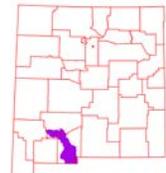
Table 14. Soil Erosion Potential Model Results. A greater rank indicates greater potential for erosion.



Socioeconomic Data ¹⁸

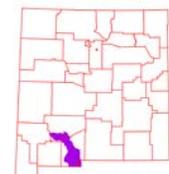
COUNTY	Total population: Total	Total population: Urban	Total population: Rural	Total Pop.: Rural Farm	Total Pop.: Rural Nonfarm	Total population: Hispanic or Latino	Total population: White alone	Total population: Black or African American alone	Total population: American Indian and Alaska Native alone	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
Dona Ana	174,682	138,130	36,552	1,706	34,846	110,665	118,478	2,723	2,580	1,330	117	43,209	6,245	41,118
El Paso, TX	679,622	658,801	20,821	703	20,118	531,654	502,579	20,809	5,559	6,633	669	121,721	21,652	39,116
Grant	31,002	17,531	13,471	330	13,141	15,126	23,459	162	419	89	10	5,898	965	43,273
Sierra	13,270	8,576	4,694	251	4,443	3,488	11,541	64	197	23	11	1,097	337	34,571

Table 15. Socioeconomic Data of the Counties in the 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
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 – National Water Information System. <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=13030102
9. New Mexico - Office of the State Engineer- http://www.ose.state.nm.us/water_info_data.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://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

