

Rapid Watershed Assessment San Simon Watershed



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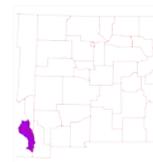


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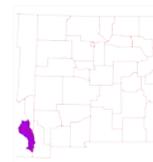
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Overview

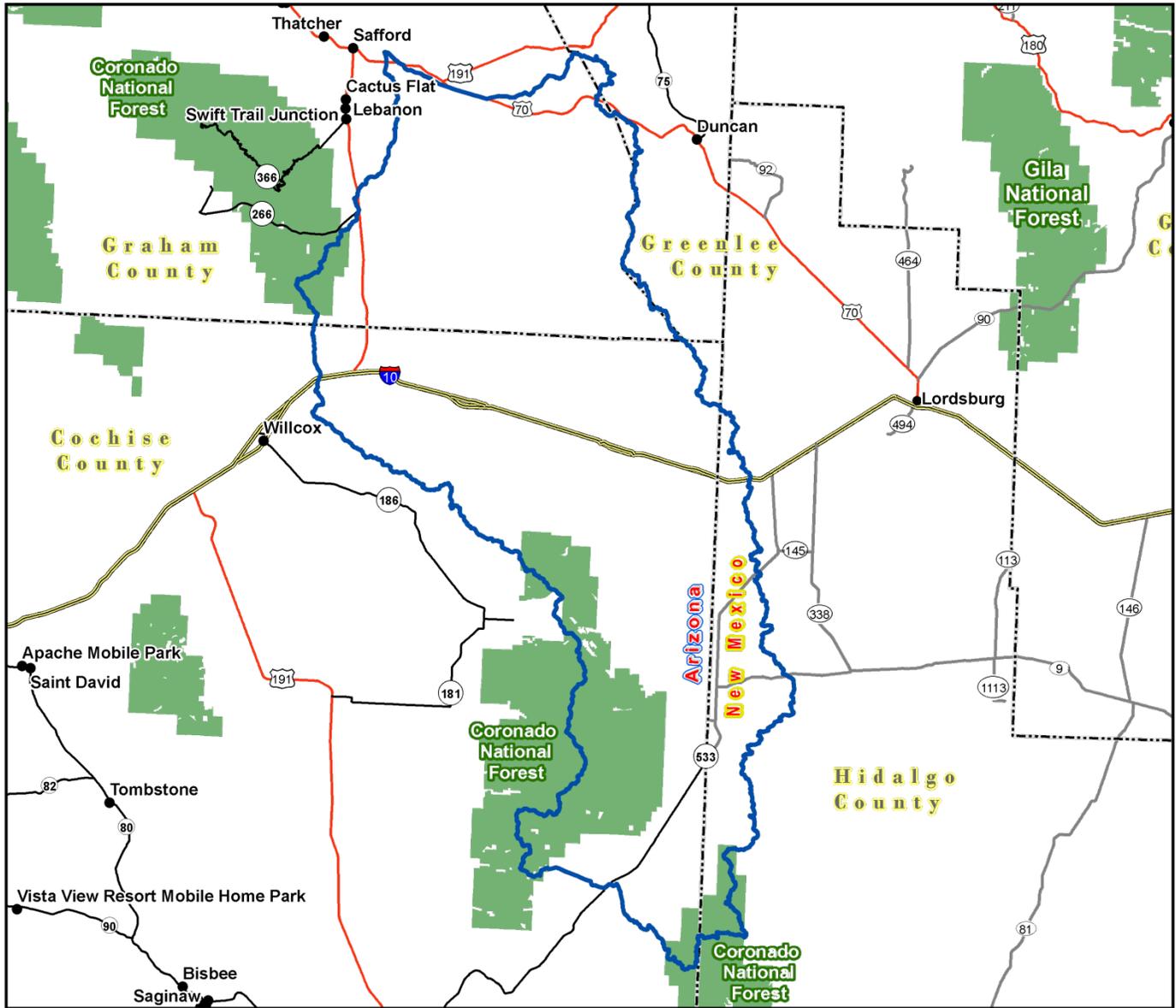


Figure 1. San Simon Watershed Overview.



Overview

The San Simon Watershed is located in extremely southwestern New Mexico and southeastern Arizona. It covers 1,445,214 total acres (5,849 sq. km). Portions of the San Simon Watershed are in Hidalgo County, New Mexico and Cochise, Graham and Greenlee counties in Arizona. Table 1 summarizes the distribution of the San Simon Watershed.

County	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
Hidalgo, NM	2,210,400	149,837	10%	7%
Cochise, AZ	3,978,378	832,294	58%	21%
Graham, AZ	2,968,819	453,748	31%	15%
Greenlee, AZ	1,182,841	8,725	1%	1%
Sum (Σ)	--	1,445,214	100	--

Table 1. San Simon Watershed acreage distribution.



Physical Setting

Geology:

The watershed is in the Mexican Highland section of the Basin and Range physiographic province. This physiographic province is dominated by faulting, volcanism, magma intrusion, erosion and sedimentation. This produces elongated valleys filled with sediment and rock debris with north to north-west trending fault-block or volcanic highlands.

Resource concerns are high sediment erosion with destruction of the adjacent river terraces through a rapid shift in flow direction of the main channel potentially causing loss of wildlife habitat. 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 fair for livestock or crops.

Soils:

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

The soils in the San Simon 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.

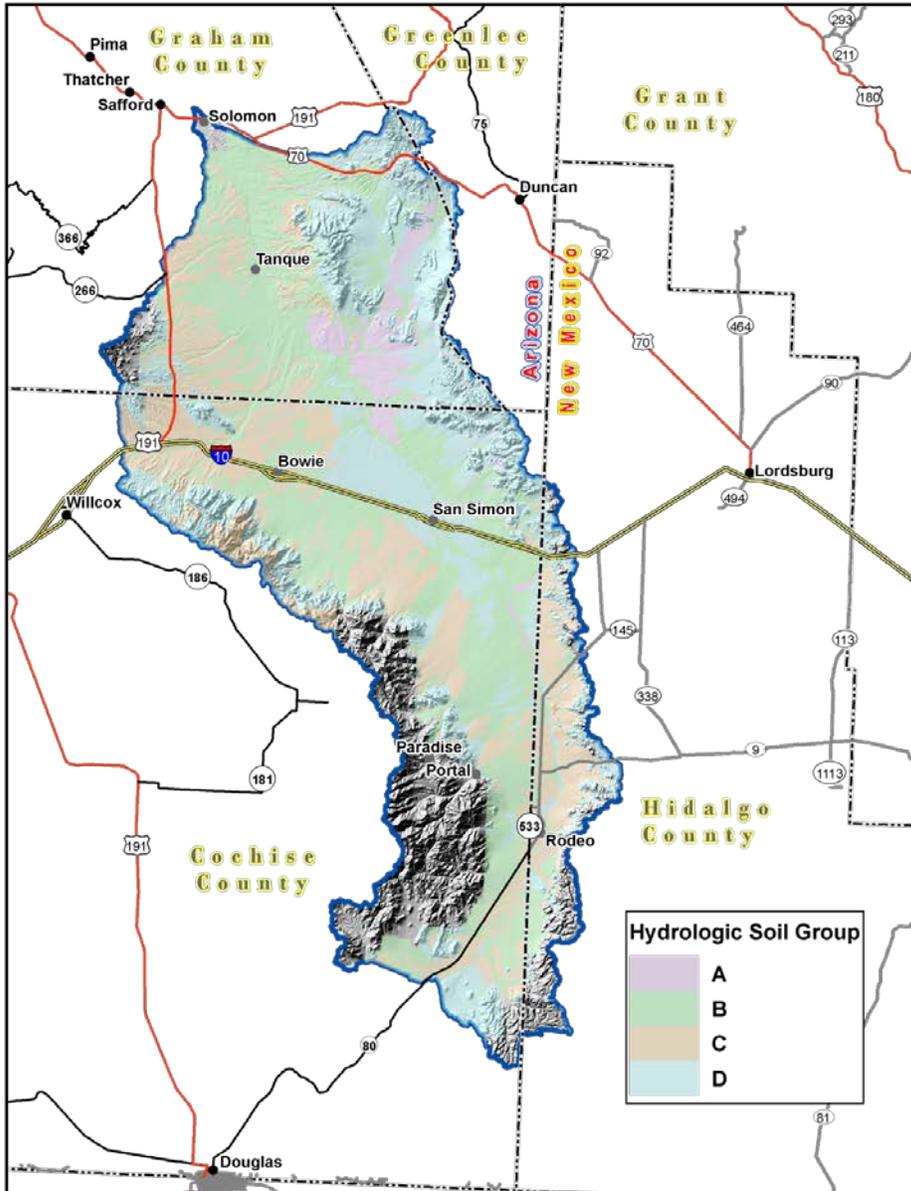


Figure 2. San Simon Watershed Hydrologic Soil Group.



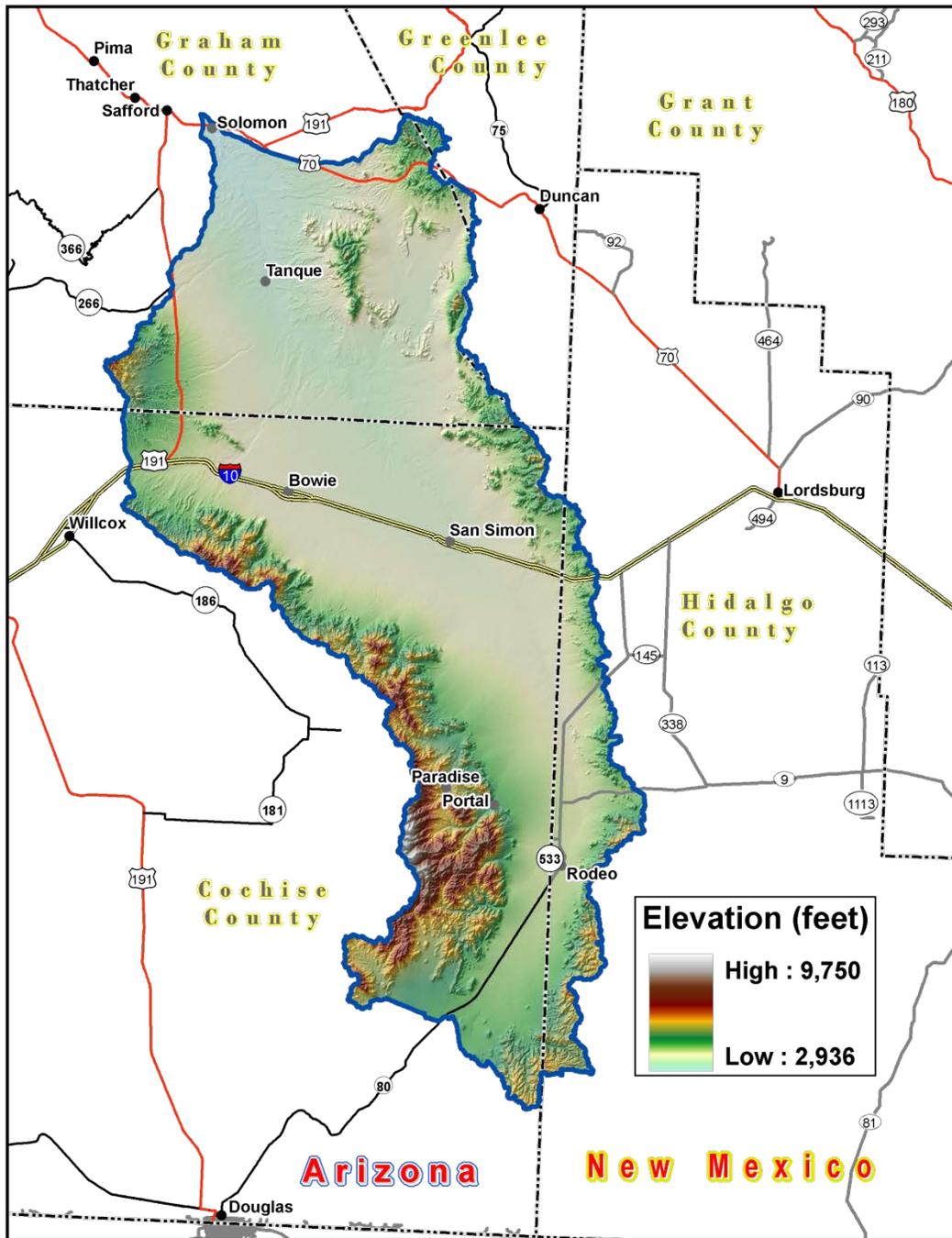


Figure 3. San Simon Watershed Shaded Relief.



Precipitation¹

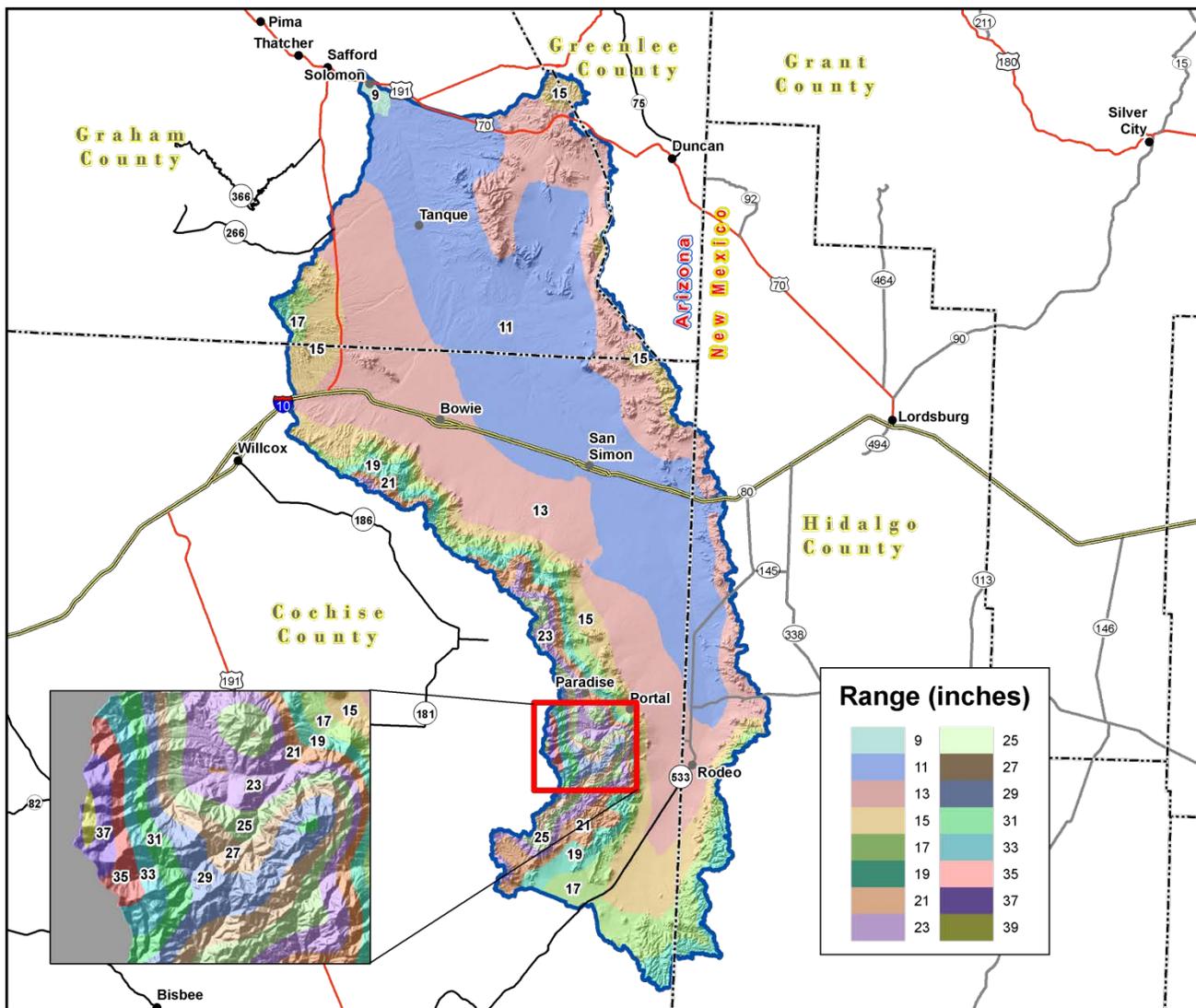


Figure 4. San Simon Watershed Annual Precipitation.



Land Ownership ^{2.3}

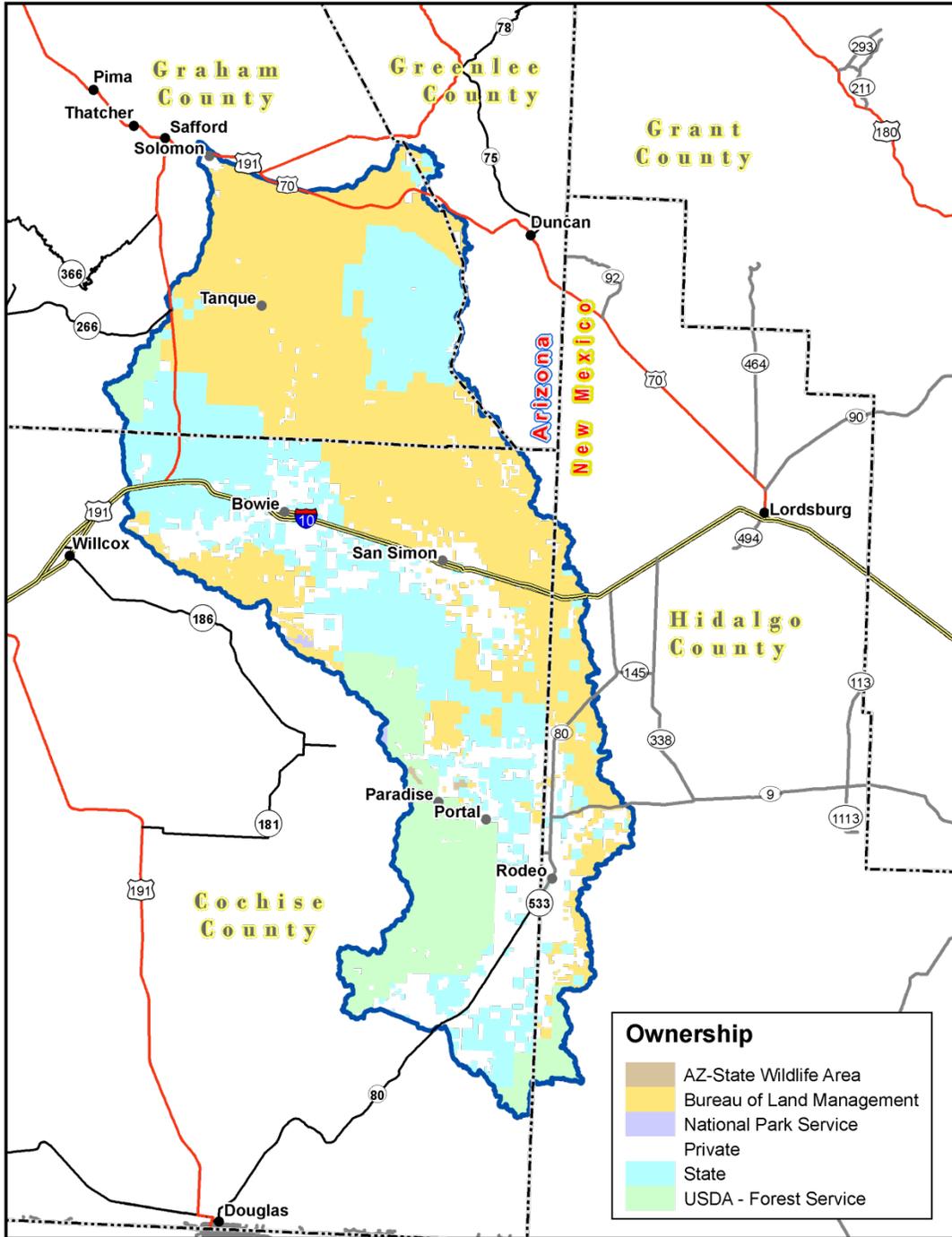


Figure 5. San Simon Watershed Land Ownership.



Land Ownership

<u>COUNTY</u>	<u>BLM</u>	<u>National Park</u>	<u>Private</u>	<u>State AZ</u>	<u>AZ State Wildlife Area</u>	<u>State NM</u>	<u>USDA Forest Service</u>
Hidalgo, NM	70,503		49,915			15,505	13,915
Cochise, AZ	215,891	1,896	215,844	87	1,092		153,085
Graham, AZ	309,539		10,283	120,529			13,397
Greenlee, AZ	5,553		847	2,326			
Watershed (Σ)	601,486	1,896	276,889	122,942	1,092	15,505	180,397
% Watershed	42%	<1%	19%	9%	<1%	1%	12%

Table 2. Land Ownership in the San Simon Watershed.



Land Use / Land Cover 4.5

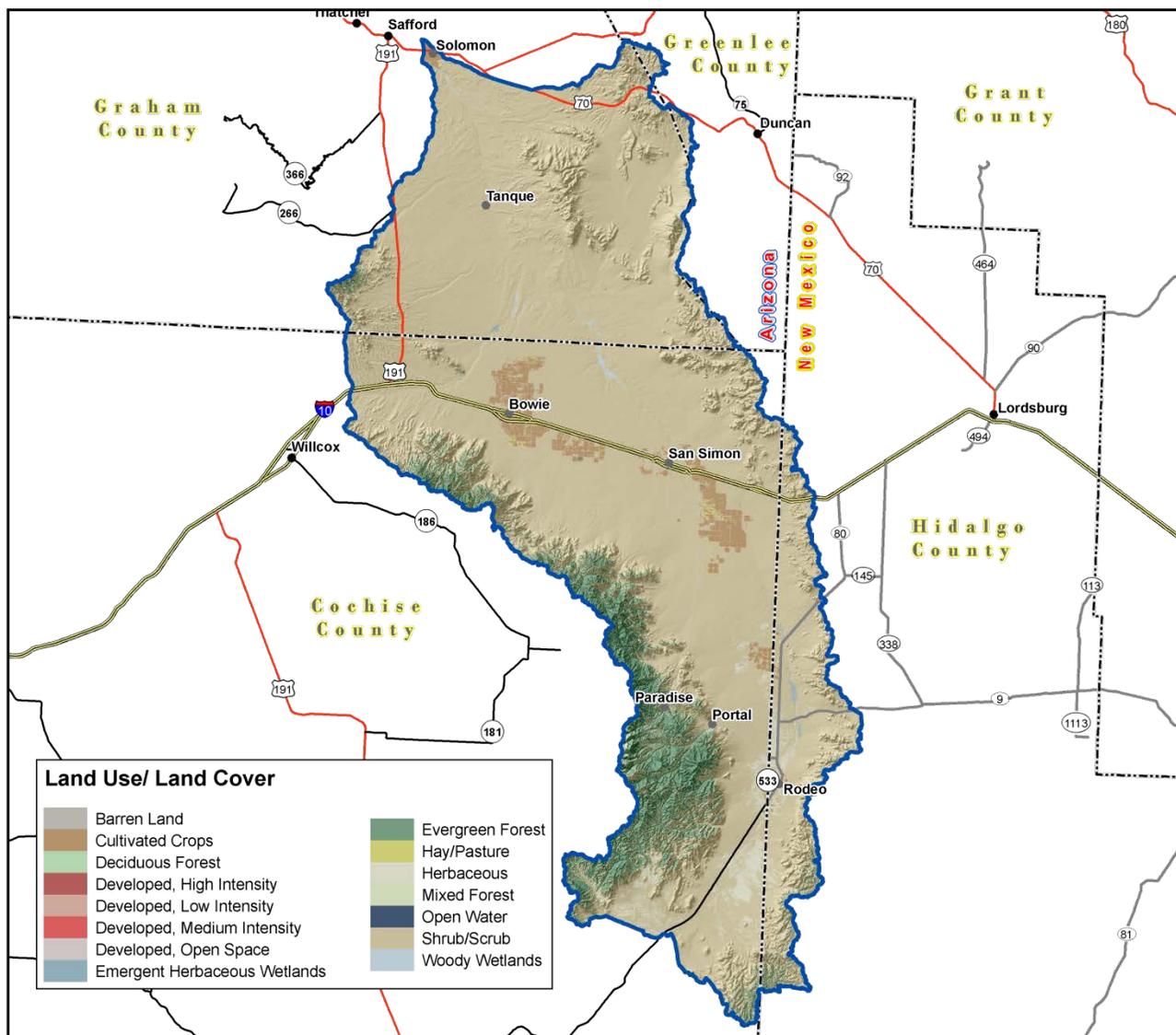
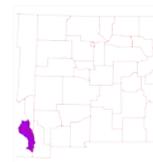


Figure 6. Subset of the National Land Cover Dataset in the San Simon Watershed.



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>Land Use/ Land Cover</u>	<u>Acres</u>	<u>% of Watershed</u>
Shrub/Scrub	1,243,741	86%
Evergreen Forest	99,836	7%
Cultivated Crops	36,864	3%
Herbaceous	29,339	2%
Mixed Forest	18,681	1%
Developed, Open Space	9,842	1%
Woody Wetlands	2,127	< 1%
Developed, Low Intensity	1,382	< 1%
Hay/Pasture	1,281	< 1%
Emergent Herbaceous Wetlands	1,251	< 1%
Barren Land	735	< 1%
Developed, Medium Intensity	69	< 1%
Open Water	29	< 1%
Developed, High Intensity	6	< 1%
Deciduous Forest	4	< 1%

Table 3. Extent of NLCD classes in the San Simon Watershed.



Land Use / Land Cover

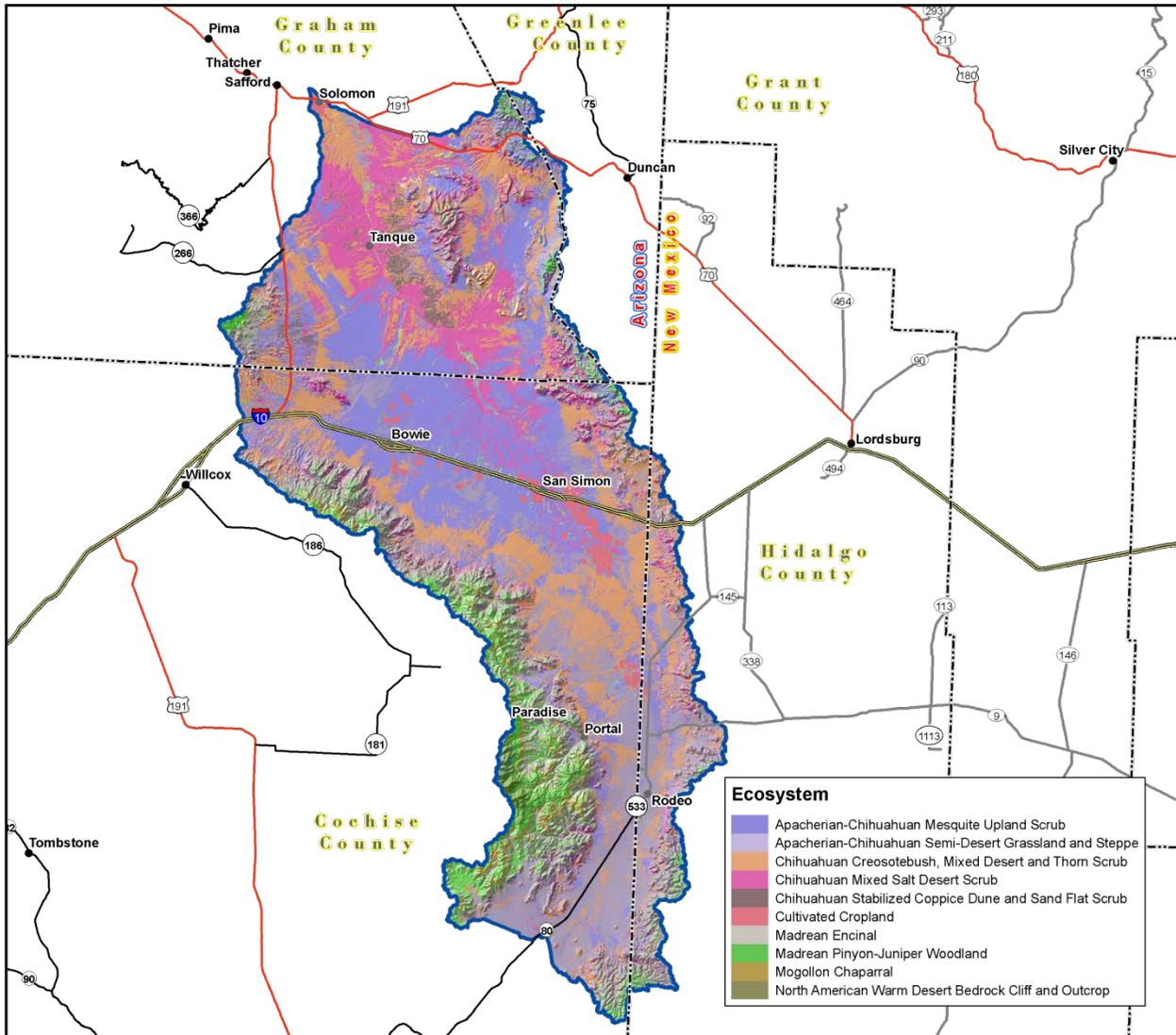


Figure 7. Subset of the SWREGAP over the San Simon Watershed. The 10 dominant ecosystems are displayed in the legend.



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 Mesquite Upland Scrub	351,318	24%
Apacherian-Chihuahuan Semi-Desert Grassland and Steppe	302,539	21%
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	300,721	21%
Chihuahuan Mixed Salt Desert Scrub	172,988	12%
Madrean Encinal	115,463	8%
Madrean Pinyon-Juniper Woodland	70,609	5%
Mogollon Chaparral	21,975	2%
Cultivated Cropland	19,529	1%
Chihuahuan Stabilized Coppice Dune and Sand Flat Scrub	19,393	1%
North American Warm Desert Bedrock Cliff and Outcrop	15,730	1%

Table 4. SW Region Gap analysis ecosystem acreages.



Hydrology 6,7,8,9,10,11,12

The National Hydrography Dataset (NHD) is a comprehensive set of data that encodes information about naturally occurring and constructed bodies of water, paths through which water flows, and related entities. The NHD identifies 7,411 miles (11,928 km) of water courses in the San Simon Watershed. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

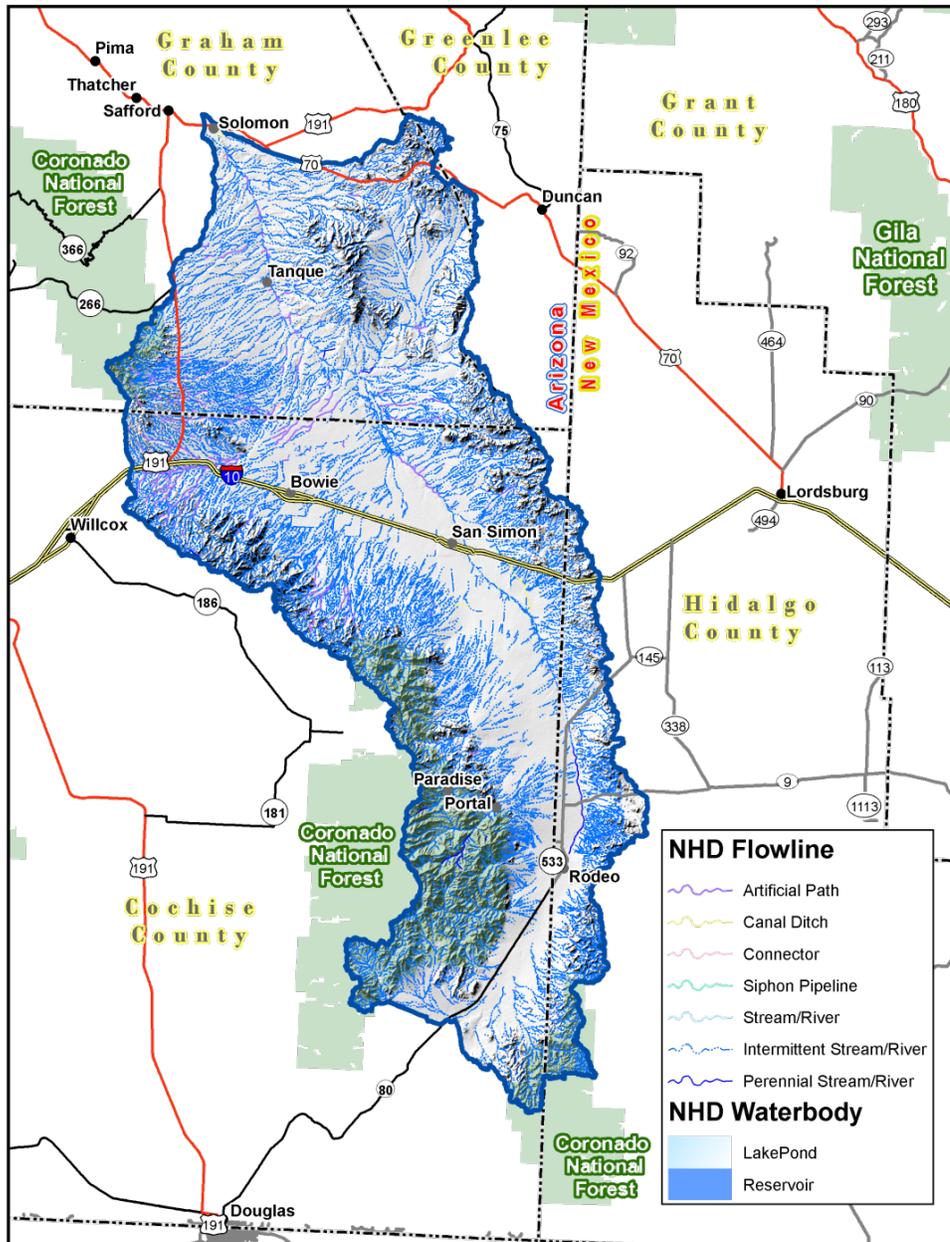
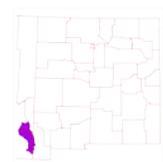


Figure 8. National Hydrologic Dataset (NHD) of the San Simon Watershed.



Water Course Type	Miles
Artificial Path	117
Canal / Ditch	12
Connector	5
Intermittent Stream/River	7,145
Perennial Stream / River	78
Siphon Pipeline	0
Stream/River	0
Sum (Σ)	7,411

Table 5. NHD Water Course Type and Extents



Gauging Stations:

There are 23 water-gauging stations in the watershed. USGS Site 09457000 is located in the northwest corner of the watershed near the San Simon River near Solomon, Arizona. During the period 1931 – 1982, this site has had mean annual discharge of 12 cubic feet per second ranging from 1.41 (1970) to 38.1 (1954) cubic feet per second.

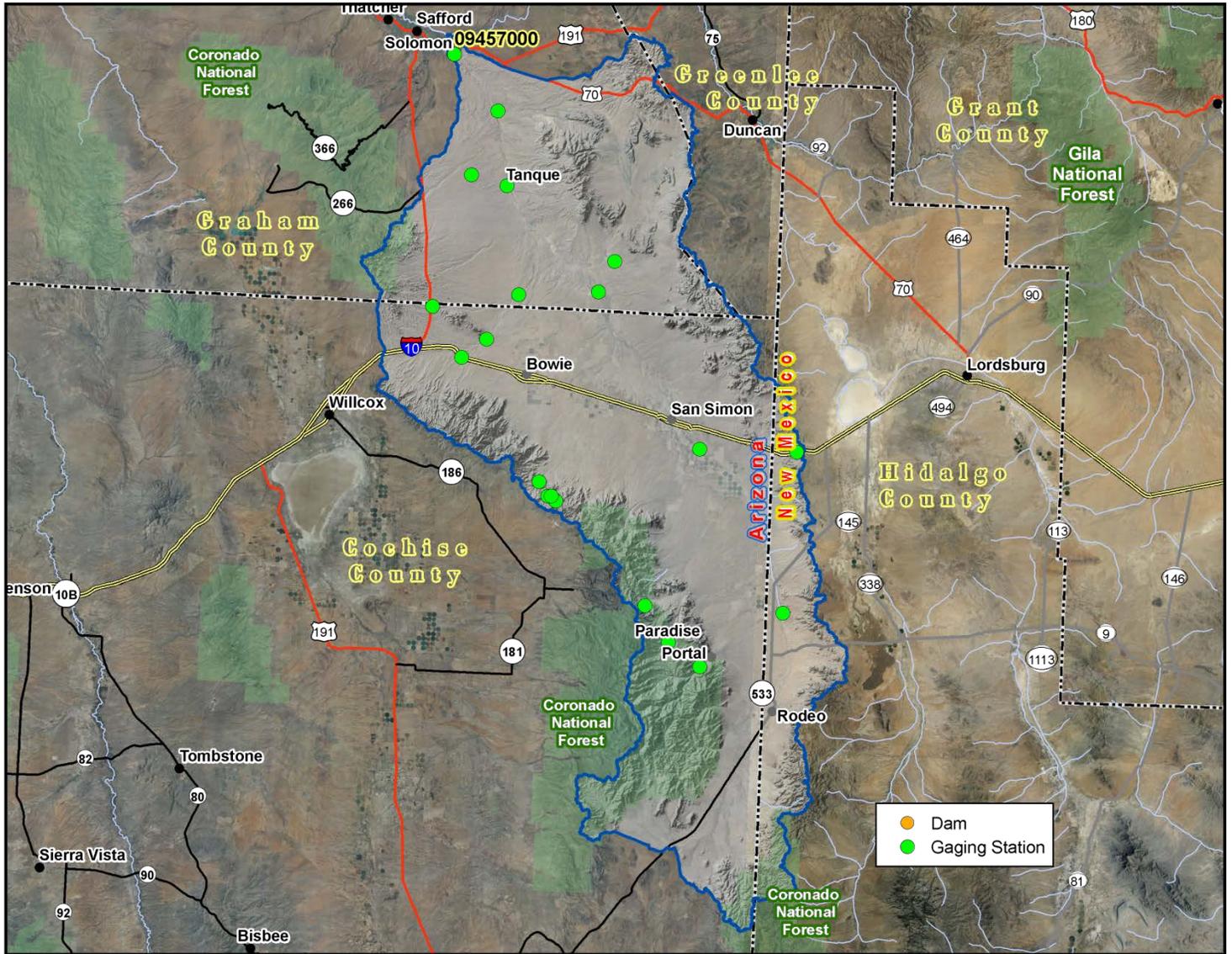


Figure 9. Gauging Stations in the San Simon Watershed.



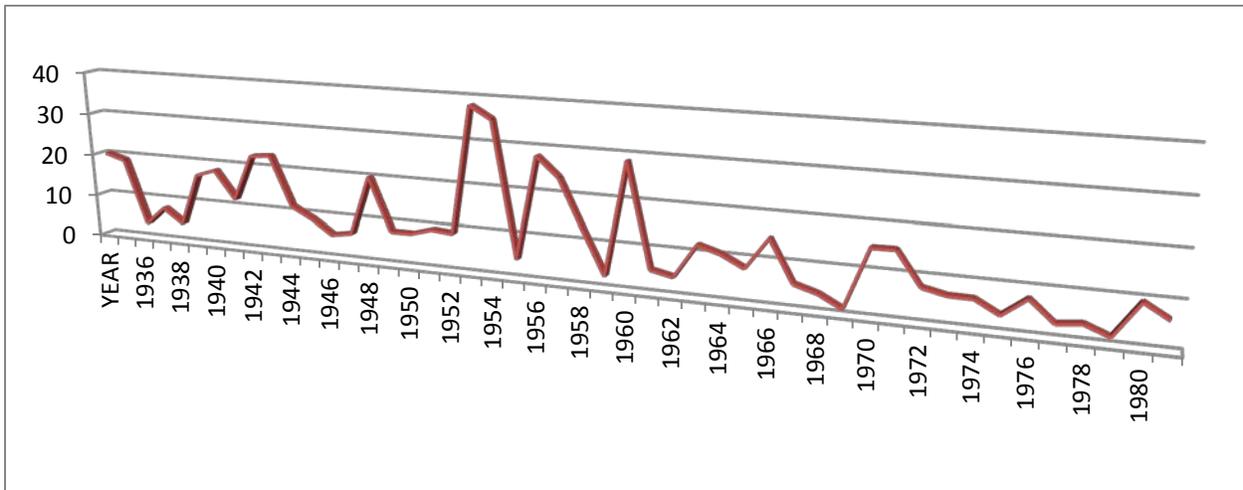


Figure 10. Annual average of Mean Annual Flow on the San Simon Watershed at San Simon River near Solomon, Arizona. Period of observation: 1931-1982.

New Mexico Water Quality Control Commission (NMWQCC):

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.

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There are no designated impaired surface waters or water bodies for the New Mexico portion of the San Simon watershed.

Arizona Department of Environmental Quality (ADEQ):

Arizona's Integrated 305(b) Assessment and 303(d) Listing Report describes the status of surface water in Arizona in relation to state water quality standards. The report contains a 303(d) list of Arizona's impaired surface waters requiring the development of a Total Maximum Daily Load (TMDL) and fulfills requirements of the federal Clean Water Act sections 305(b) (assessments), 303(d) (impaired water identification), and 314 (status of lake water quality).

1. Headwaters - South Fork Cave Creek



The impaired river and stream reaches in the Arizona portion of the watershed total 8 miles (12 km).

Probable Causes of Impairment	1
Selenium(total) (2004)	x

Table 6. Possible Causes of Impairment of San Simon Watershed in Arizona.

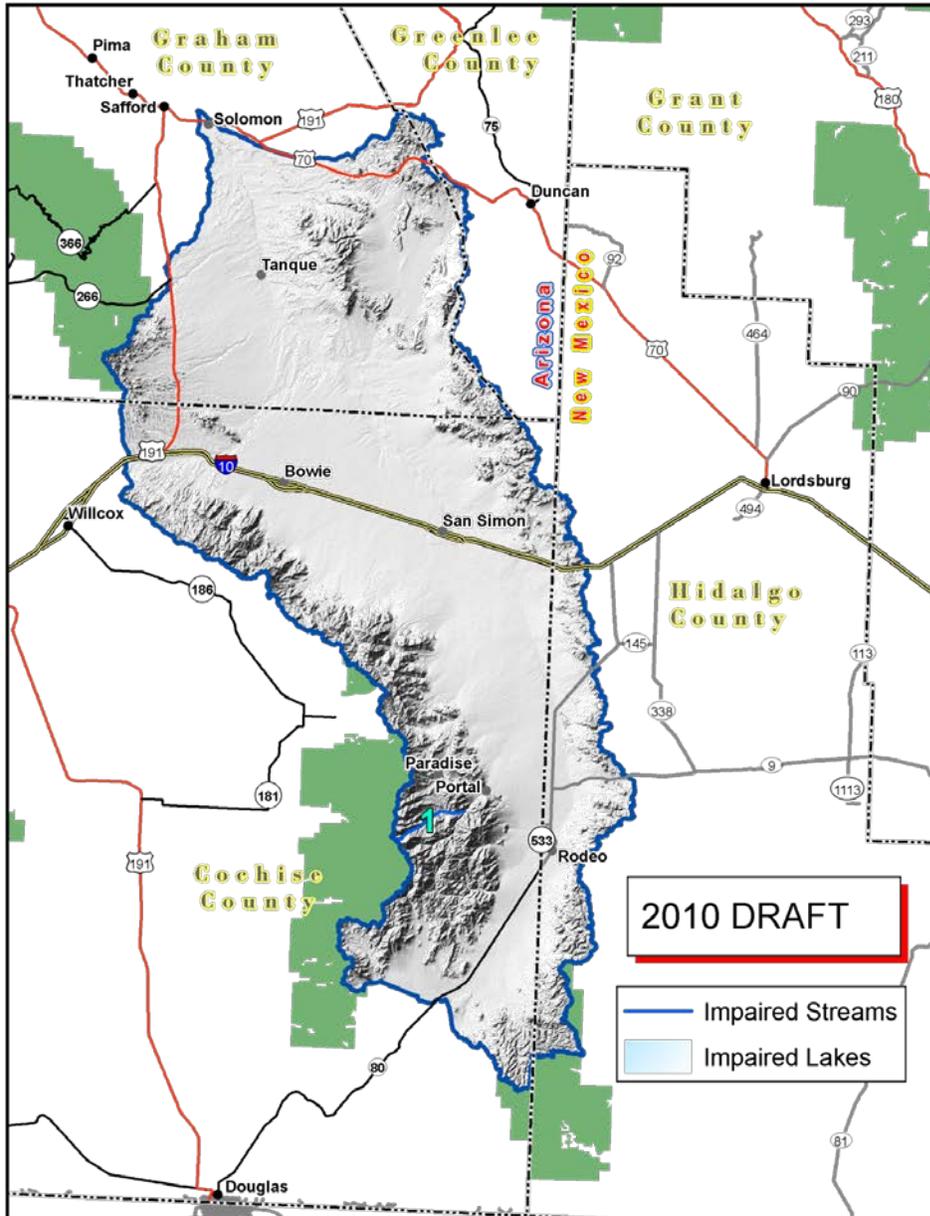


Figure 11. Draft 303(d) Impaired Waters.



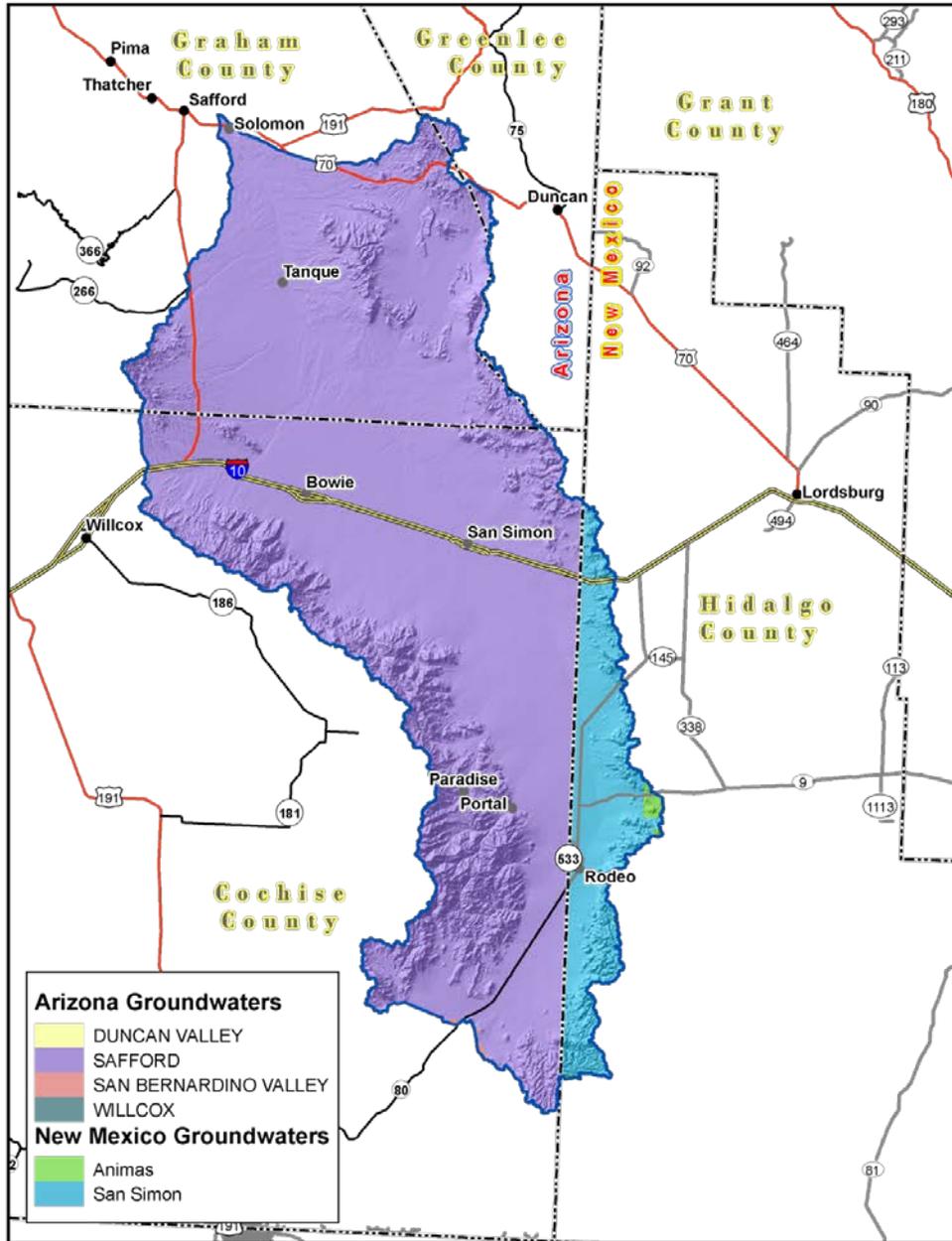


Figure 12. Declared Groundwater Basins of the San Simon.

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 6 declared groundwaters in the San Simon Watershed: Animas, and San Simon Underground Water Basin in New Mexico, and while in Arizona portions are in the Duncan Valley, Safford, San Bernardino Valley and Willcox groundwater basins.



Threatened and Endangered Species ^{13,14}

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 Arizona Game and Fish Department program track the status of threatened and endangered species which are listed on both federal and state lists. Tables 7 and 8 show those species which are currently listed and tracked in the San Simon Watershed.

LT/LE = Listed Threatened /Listed Endangered
T/E = Threatened/Endangered

<u>Common Name</u>	<u>Scientific Name</u>	<u>Tax Class</u>	<u>Family</u>	<u>Federal Status</u>	<u>State Status</u>
Bald Eagle	Haliaeetus leucocephalus	Aves	Accipitridae		T
Chiricahua Leopard Frog	Rana chiricahuensis	Amphibia	Ranidae	LT	
Common Black-Hawk	Buteogallus anthracinus	Aves	Accipitridae		T
Common Ground-Dove	Columbina passerina	Aves	Columbidae		E
Duncan's Corycactus	Escobaria dasyacantha var. duncanii	Dicotyledoneae	Cactaceae		E
Gray Redhorse	Scartomyzon congestus	Actinopterygii	Catostomidae		E
Mexican Spotted Owl	Strix occidentalis lucida	Aves	Strigidae	LT	
Mineral Creek Mountainsnail	Oreohelix pilsbryi				T

Table 7. Threatened and Endangered Plant and Animal Species for New Mexico.

C = Candidate. Species for which USFWS has sufficient information on biological vulnerability and threats to support proposals to list as Endangered or Threatened under ESA. However, proposed rules have not yet been issued because such actions are precluded at present by other listing activity.

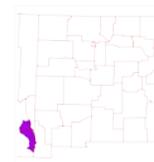
HS = Highly Safeguarded: no collection allowed

PS: C = Partial Status: listed Endangered or Threatened, but not in entire range. Candidate. Species for which USFWS has sufficient information on biological vulnerability and threats to support proposals to list as Endangered or Threatened under ESA. However, proposed rules have not yet been issued because such actions are precluded at present by other listing activity.

SC = Species of Concern

WSC = Wildlife of Special Concern in Arizona

SR = Salvage Restricted: collection only with permit (Plants - NPL Arizona Native Plant Law 2008)

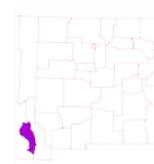


<u>Common Name</u>	<u>Scientific Name</u>	<u>Federal Status</u>	<u>State Status</u>
Chiricahua Leopard Frog	Lithobates chiricahuensis	LT	WSC
Northern Goshawk	Accipiter gentilis	SC	WSC
Violet-crowned Hummingbird	Amazilia violiceps		WSC
Baird's Sparrow	Ammodramus bairdii	SC	WSC
Western Burrowing Owl	Athene cunicularia hypugaea	SC	
Yellow-billed Cuckoo (Western U.S. DPS)	Coccyzus americanus	PS:C	WSC
Gray Catbird	Dumetella carolinensis		WSC
Northern Buff-breasted Flycatcher	Empidonax fulvifrons pygmaeus	SC	WSC
Southwestern Willow Flycatcher	Empidonax traillii extimus	LE	WSC
American Peregrine Falcon	Falco peregrinus anatum	SC	WSC
Mexican Spotted Owl	Strix occidentalis lucida	LT	WSC
Elegant Trogon	Trogon elegans		WSC
Desert Pupfish	Cyprinodon macularius	LE	WSC
Gila Topminnow	Poeciliopsis occidentalis occidentalis	LE	WSC
Speckled Dace	Rhinichthys osculus	SC	
Maricopa Tiger Beetle	Cicindela oregona maricopa	SC	
Arizona Water Penny Beetle	Psephenus arizonensis	SC	
Mexican Long-tongued Bat	Choeronycteris mexicana	SC	WSC
Pale Townsend's Big-eared Bat	Corynorhinus townsendii pallescens	SC	
Greater Western Bonneted Bat	Eumops perotis californicus	SC	
Allen's Lappet-browed Bat	Idionycteris phyllotis	SC	
Western Red Bat	Lasiurus blossevillii		WSC
Western Yellow Bat	Lasiurus xanthinus		WSC
Lesser Long-nosed Bat	Leptonycteris curasoae yerbabuena	LE	WSC
Western Small-footed Myotis	Myotis ciliolabrum	SC	
Arizona Myotis	Myotis occultus	SC	
Fringed Myotis	Myotis thysanodes	SC	
Cave Myotis	Myotis velifer	SC	
Long-legged Myotis	Myotis volans	SC	
Yuma Myotis	Myotis yumanensis	SC	
Big Free-tailed Bat	Nyctinomops macrotis	SC	
Chiricahua Fox Squirrel	Sciurus nayaritensis chiricahuae	SC	
Yellow-nosed Cotton Rat	Sigmodon ochrognathus	SC	



Arizona Shrew	<i>Sorex arizonae</i>	SC	WSC
Mearns' Southern Pocket Gopher	<i>Thomomys bottae mearnsi</i>	SC	
Plummer Onion	<i>Allium plummerae</i>		SR
Redflower Onion	<i>Allium rhizomatum</i>		SR
Chiricahua Rock Flower	<i>Apacheria chiricahuensis</i>		SR
Coppermine Milk-vetch	<i>Astragalus cobrensis</i> var. <i>maguirei</i>	SC	SR
Carpet Foxtail Cactus	<i>Coryphantha sneedii</i>		SR
Standley Whitlow-grass	<i>Draba standleyi</i>	SC	
Pinaleno Hedgehog Cactus	<i>Echinocereus ledingii</i>		SR
Chiricahua Fleabane	<i>Erigeron kuschei</i>	SC	SR
Wislizeni Gentian	<i>Gentianella wislizeni</i>	SC	SR
Bartram Stonecrop	<i>Graptopetalum bartramii</i>	SC	SR
Crested Coralroot	<i>Hexalectris spicata</i>		SR
Lemmon Lily	<i>Lilium parryi</i>	SC	SR
Purple Adder's Mouth	<i>Malaxis porphyrea</i>		SR
Slender Adders Mouth	<i>Malaxis tenuis</i>		SR
Varied Fishhook Cactus	<i>Mammillaria viridiflora</i>		SR
Wilcox Fishhook Cactus	<i>Mammillaria wrightii</i> var. <i>wilcoxii</i>		SR
Night-blooming Cereus	<i>Peniocereus greggii</i> var. <i>greggii</i>	SC	SR
Chiricahua Rock Daisy	<i>Perityle cochisensis</i>		SR
Hinckley's Ladder	<i>Polemonium pauciflorum</i> ssp. <i>hinckleyi</i>	SC	
Blumer's Dock	<i>Rumex orthoneurus</i>	SC	HS
Fallen Ladies'-tresses	<i>Schiedeella arizonica</i>		SR
New Mexico Ridge-nosed Rattlesnake	<i>Crotalus willardi obscurus</i>	LT	
Sonoran Desert Tortoise	<i>Gopherus agassizii</i> (Sonoran Population)	C	WSC
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	SC	

Table 8 . Threatened and Endangered Plant and Animal Species for Arizona.

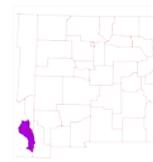


Invasive Species ¹⁵

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 San Simon Watershed, the SWEMP has identified 5 species of invasive plants (Table 9). 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>Fabaceae (Pea Family)</i>	Camelthorn
<i>Brassicaceae (Mustard Family)</i>	Hoary Cress (Whitetop)
<i>Euphorbiaceae (Spurge Family)</i>	Leafy Spurge
<i>Asteraceae (Sunflower Family)</i>	Russian Knapweed

Table 9. Invasive Species Recognized by the SWEMP



Common Resource Areas¹⁶

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.

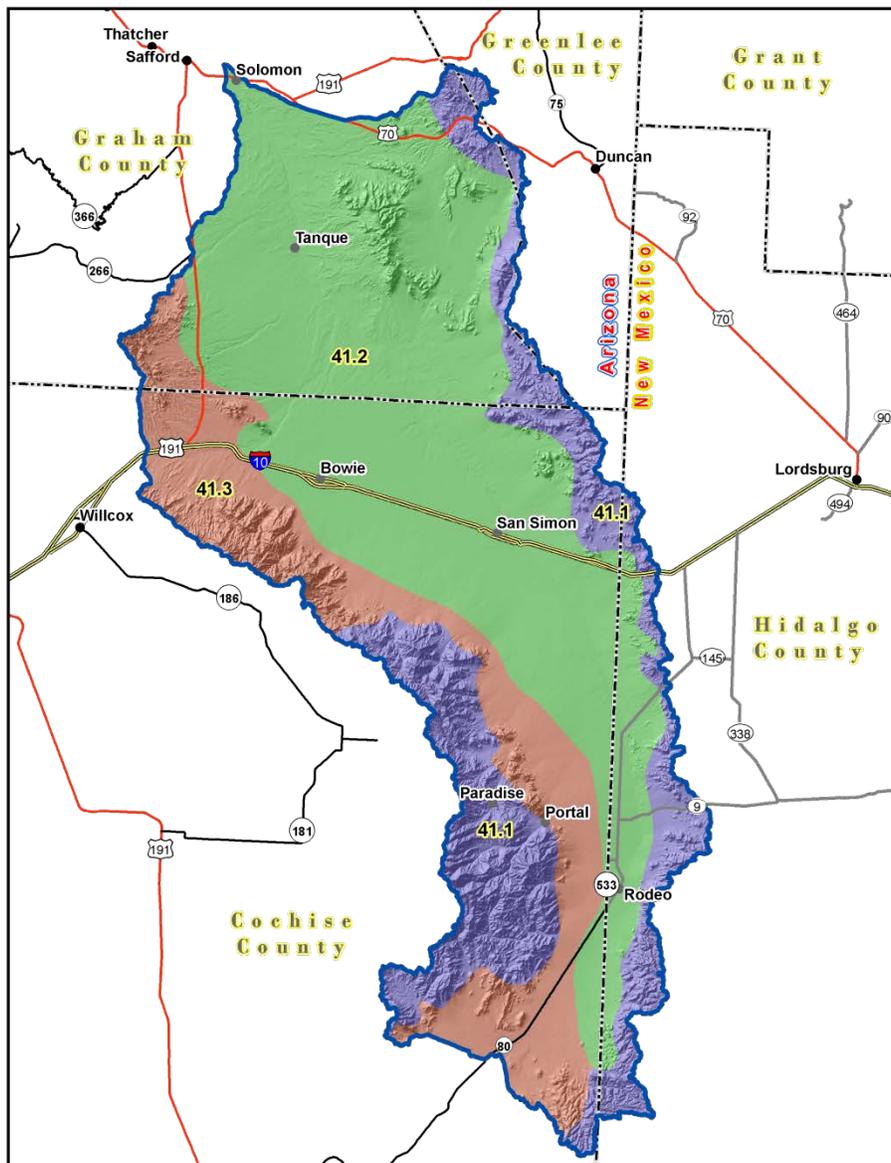


Figure 13. Common Resource Areas of the San Simon Watershed.



Common Resource Areas

41.1 Mexican Oak-Pine Forest and Oak Savannah

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.

41.2 Chihuahuan – Sonoran 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 2600 to 4000 feet. Precipitation ranges from 8 to 12 inches per year. The soil temperature regime is thermic and the soil moisture regime is typic aridic. Vegetation includes mesquite, catclaw acacia, whitethorn, bush muhly and threeawns.

41.3 Chihuahuan – Sonoran Semidesert Grasslands

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 3200 to 5000 feet. Precipitation ranges from 12 to 16 inches per year. The soil temperature regime is thermic and the soil moisture regime is ustic aridic. Vegetation includes sideoats grama, black grama, plains lovegrass, and tobosa.



Conservation ¹⁷

The USDA-Natural Resources Conservation Service (NRCS) focuses on the development and delivery of high quality products and services that enable people to be good stewards of our Nation's soil, water, and related natural related resources on non-Federal lands. The Natural Resources Conservation Service's conservation programs aid agricultural producers in their efforts to reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters. Public benefits include enhanced natural resources that help sustain agricultural productivity and environmental quality while supporting continued economic development, recreation, and scenic beauty.



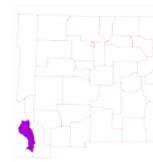
Conservation Practice	2007		2008		2009		2010		2011		TOTAL	
	#	Acres	#	Acres								
Brush Management			2	3,036	1	3,616	1	1,757	1	1,624	5	10,033
Conservation Cover			1	535							1	535
Conservation Crop Rotation	2	2,080	1	472	2	20	1	245	1	19	7	2,835
Cover Crop							1	15	1	4	2	19
Forage Harvest Management	2	178							1	108	3	287
Grazing Land Mechanical Treatment			1	2,725	1	3,616					2	6,341
Integrated Pest Management (IPM)	3	2,006	2	274	1	6	1	245	3	127	10	2,657
Irrigation Land Leveling			1	21							1	21
Irrigation System, Microirrigation	1	131			2	92	1	15	2	881	6	1,118
Irrigation System, Sprinkler	4	308	3	120	1	154	2	598			10	1,179
Irrigation Water Management	5	2,501	4	662	3	110	3	463	3	727	18	4,462
Nutrient Management	3	2,126	1	200	2	96	1	245	3	127	10	2,793
Prescribed Grazing	5	56,192	4	41,938	2	21,914	3	10,322	2	16,562	16	146,929
Range Planting			1	2,725			1	38			2	2,763
Residue and Tillage Management, No-Till/Strip Till/Direct Seed									2	642	2	642
Residue Management, Mulch Till			2	355							2	355
Residue Management, Seasonal	1	1,976					1	245			2	2,221
Upland Wildlife Habitat Management	3	5,040					1	3,585			4	8,625
Waste Recycling									1	4	1	4
SUM (Σ)	29	72,537	23	53,064	15	29,621	17	17,772	20	20,823	104	193,818

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



Conservation Practice	2007		2008		2009		2010		2011		TOTAL	
	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet
Fence	1	5,402			1	8,428	2	4,077	3	7,729	7	25,636
Irrigation Pipeline									1	143	1	143
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic	4	339	1	74	2	80					7	493
Irrigation Water Conveyance, Pipeline, Steel	4	195			1	7	1	239	1	14	7	455
Pipeline	1	129	2	2,960	2	6,893	3	7,380	3	16,508	11	33,870
SUM (Σ)	10	6,064	3	3,034	6	15,408	6	11,696	8	24,394	33	60,596

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



Soil Resource Inventory¹⁸

The San Simon Watershed has a number of certified National Cooperative Soil Survey (NCSS) inventories. The National Forests of the southwest 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>.

National Cooperative Soil Survey:

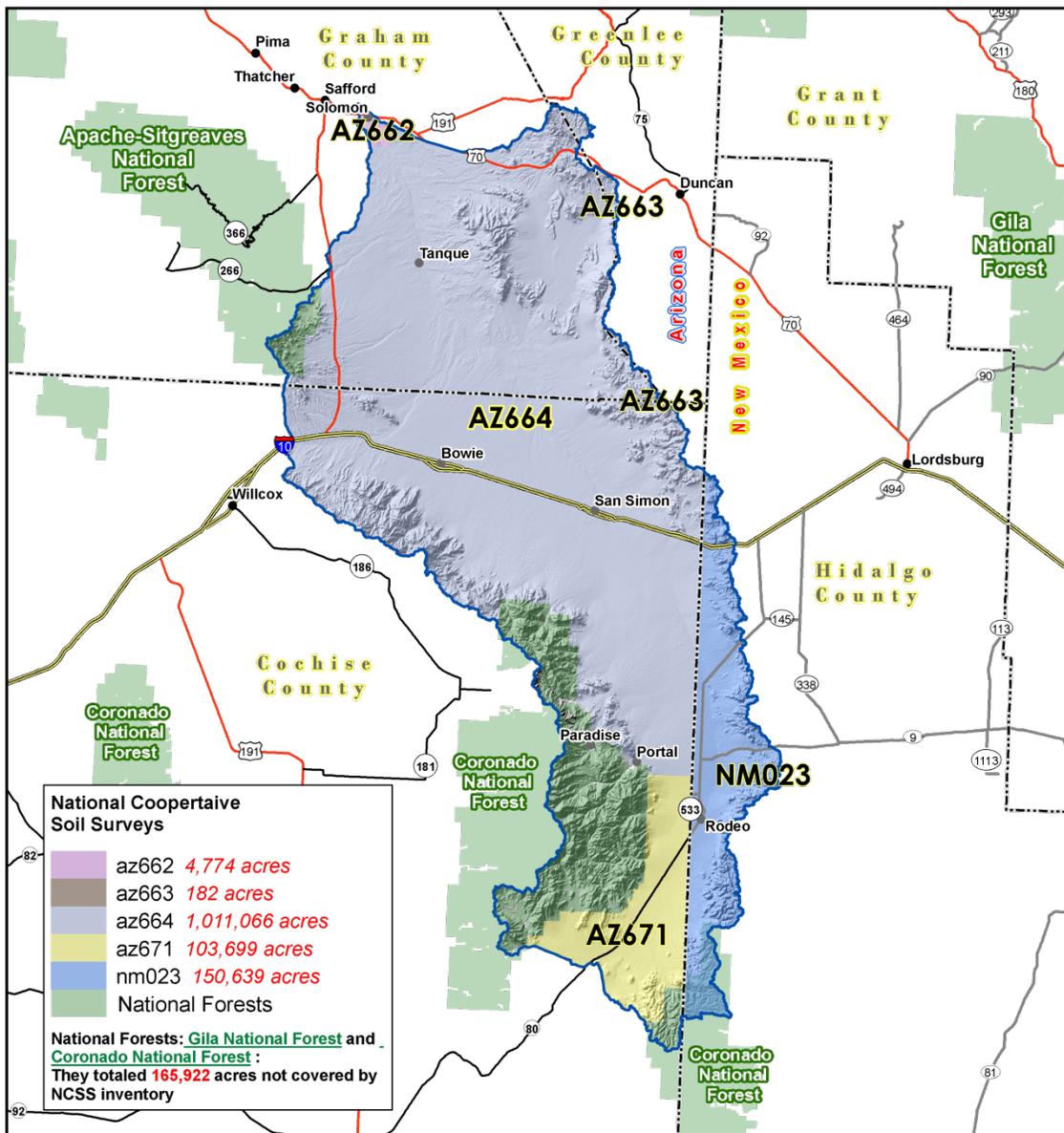
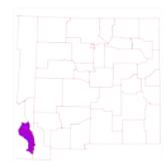


Figure 14. National Cooperative Soil Survey coverage of the San Simon Watershed.



Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the San Simon 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		
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.

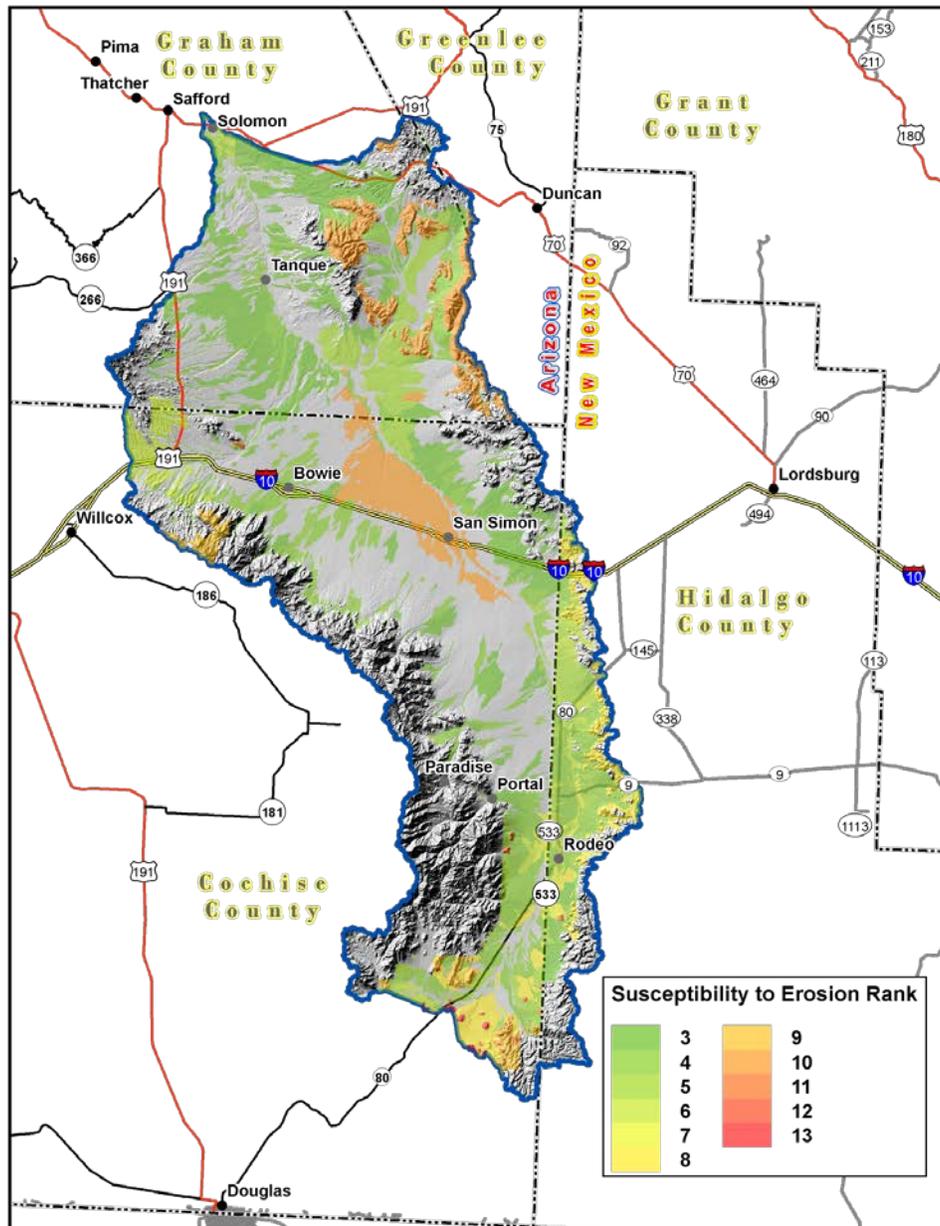


Figure 15. San Simon Watershed Erosion Potential.



Soil Resource Inventory

<u>Rank</u>	<u>Acres</u>
3	189,179
4	164,247
5	78,479
6	36,294
7	7,216
8	43,225
9	15,170
10	102,410
11	660
12	395
13	1,660
Sum(Σ)	638,936

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



Socioeconomic Data (2010) ¹⁹

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
Hidalgo, NM	4,894	2,769	4,177	29	41	23	2	536	86	41,594
Cochise, AZ	131,346	42,543	103,085	5,465	1,589	2,525	418	12,,989	5,275	53,077
Greenlee, AZ	8,437	4,040	6,517	89	195	46	5	1,268	320	51,729
Graham, AZ	37,220	10,727	25,771	912	5,822	270	52	3,987	763	48,005

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



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<http://soildatamart.nrcs.usda.gov/>

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