

Rapid Watershed Assessment Cloverdale and San Bernardino Valley Watershed



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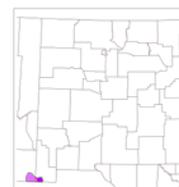
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Overview

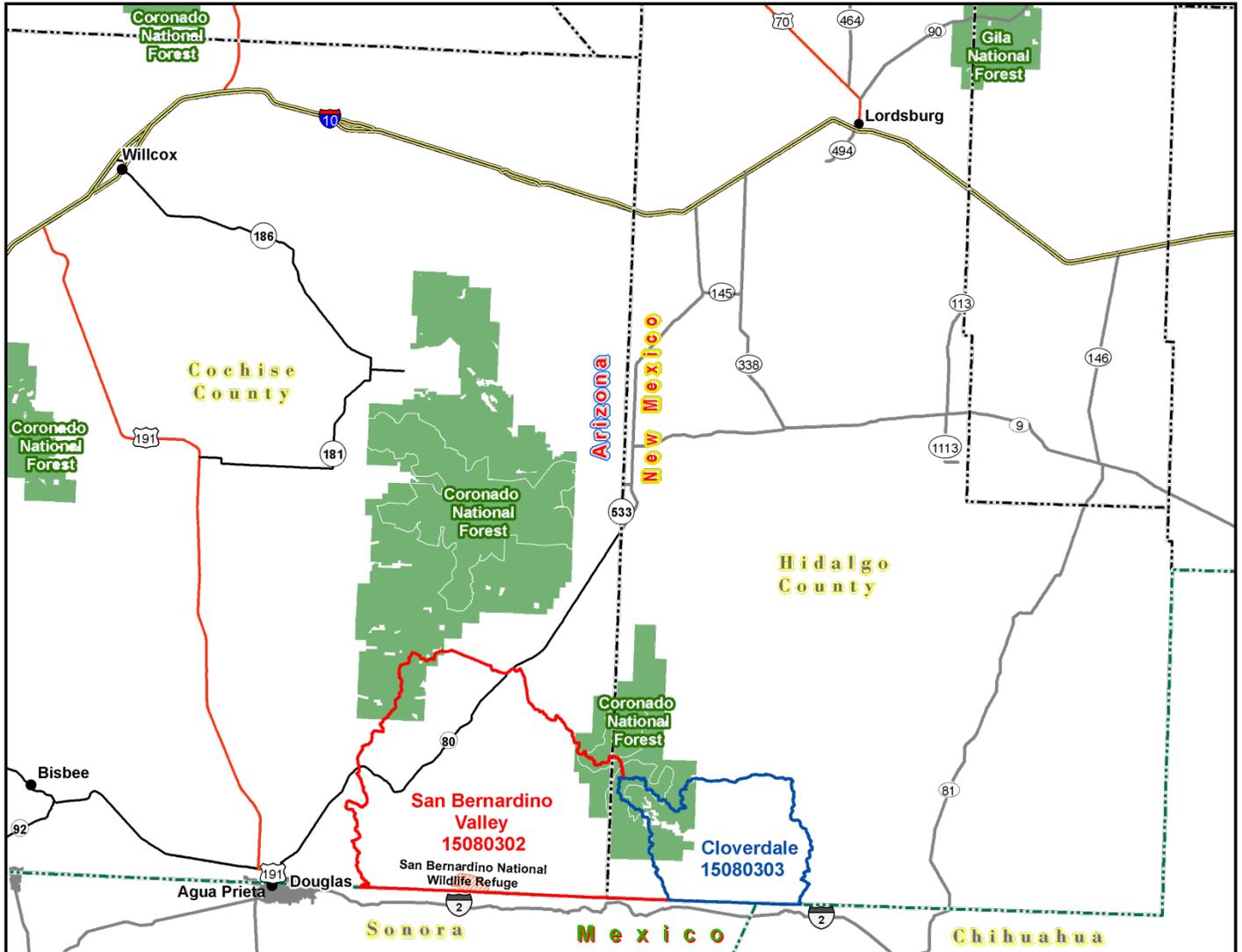


Figure 1. Cloverdale and San Bernardino Valley Watersheds Overview

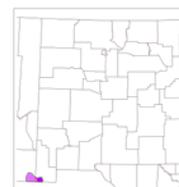


Overview

The Cloverdale and San Bernardino Valley Watersheds are located in southwestern New Mexico and in extremely southeastern Arizona. They cover 371,720 total acres (1,504 sq. km). The Cloverdale and San Bernardino Valley Watersheds are in Cochise county, Arizona and Hidalgo county, New Mexico. The rest of the watersheds go into Mexico. Table 1 summarizes the distribution of the Cloverdale and San Bernardino Valley Watershed in Arizona and New Mexico.

County	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
Cochise, AZ	3,978,378	277,232	75%	7%
Hidalgo, NM	2,210,400	94,488	25%	4%
Sum (Σ)	--	371,720	100	--

Table 1. Cloverdale and San Bernardino Valley Watersheds acreage distribution.



Physical Setting

Geology: The southwestern part of New Mexico is characterized by the Mexican Highland Section of the Basin and Range physiographic province. The mountains and hills are north to north-west trending fault blocks with pediments that grade into broad, gently-sloping bajadas which extend many miles to basin center closed or nearly closed playas. Rock units are aged from the Pre-Cambrian to the Recent with the exception of the Triassic and Jurassic Periods. Many of the mountain ranges contain historic mining districts for copper-lead-zinc-silver-tungsten deposits.

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.

In addition gully erosion on the steeper slopes leads to dissection of the landscape, dewatering of the adjacent land causing a change in plant species, and sedimentation of flatter lands. Wind erosion when the playas dry out cause dust storms that effect health and vehicular traffic.

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 Cloverdale and San Bernardino Valley Watersheds 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.

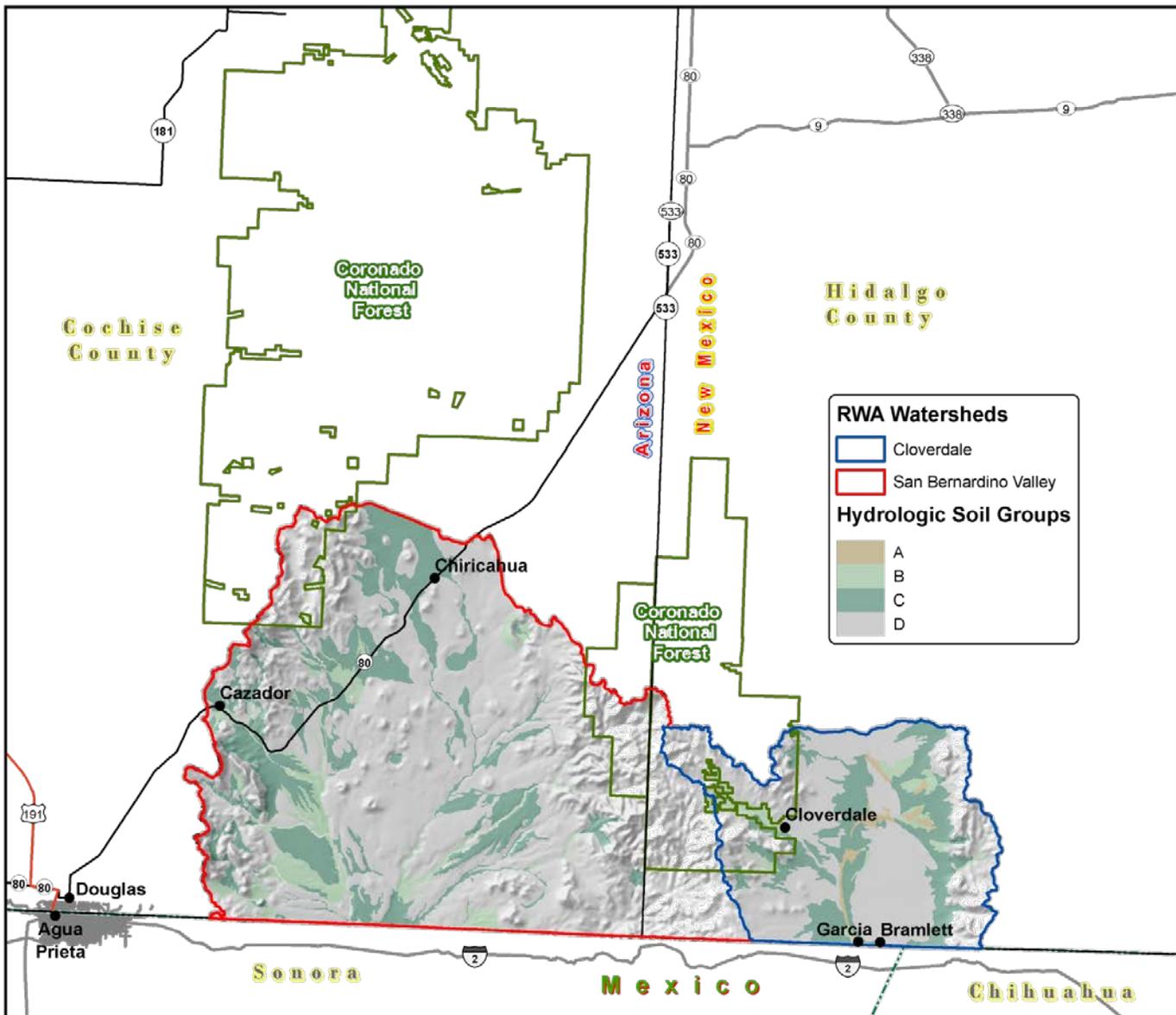


Figure 2. Cloverdale and San Bernardino Valley Watersheds Hydrologic Soil Group



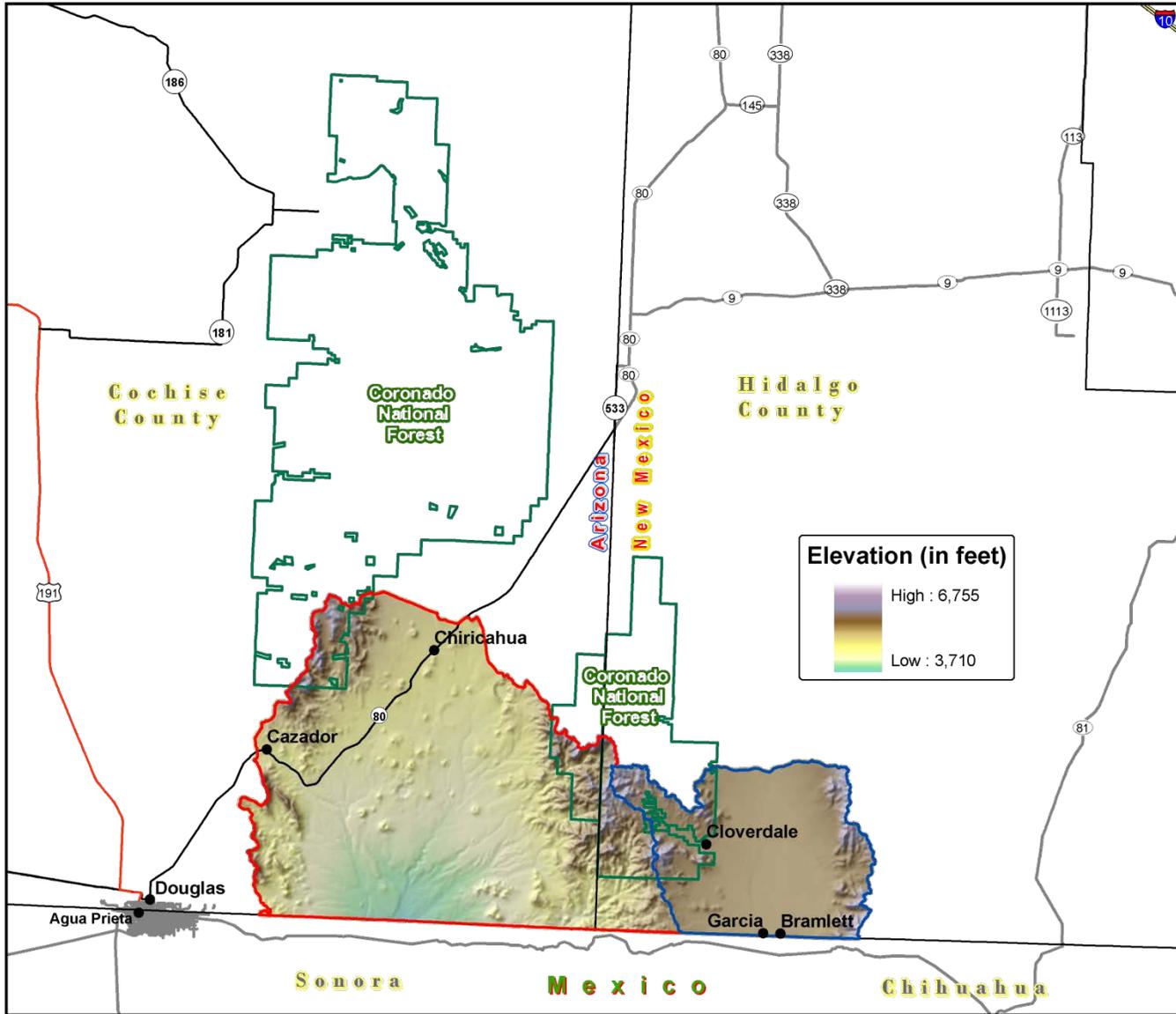


Figure 3. Cloverdale and San Bernardino Valley Watersheds Shaded Relief



Precipitation ¹

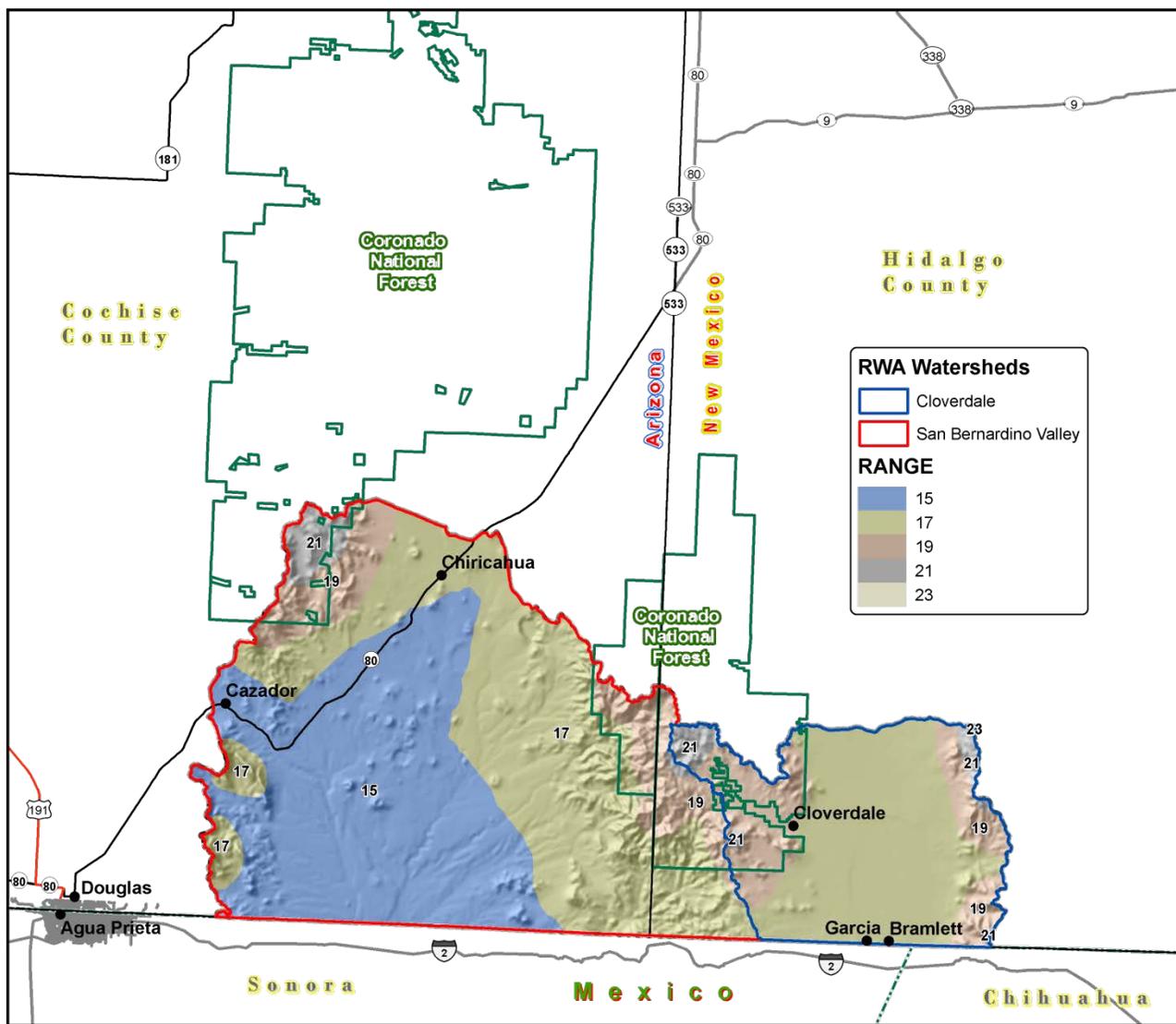
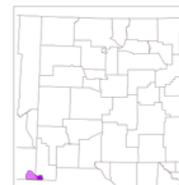


Figure 4. Cloverdale and San Bernardino Valley Watersheds Annual Precipitation



Land Ownership ^{2.3}

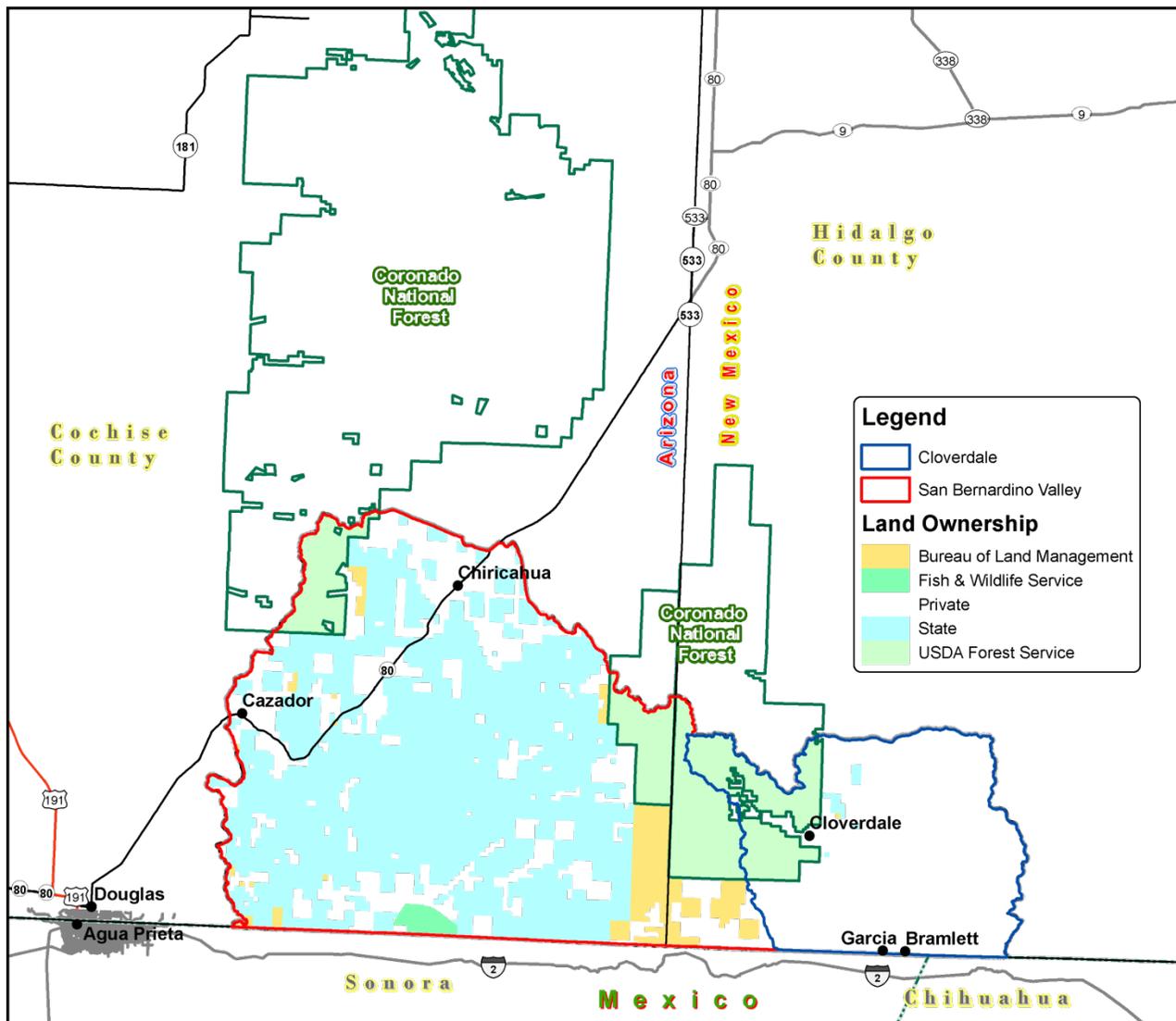


Figure 5. Cloverdale and San Bernardino Valley Watersheds Land Ownership



Land Ownership

<u>COUNTY</u>	<u>BLM</u>	<u>FWS</u>	<u>Private</u>	<u>State - AZ</u>	<u>State - NM</u>	<u>USDA Forest Service</u>
Cochise, AZ	10,993	2,351	61,857	160,669		17,447
Hidalgo, NM	4,843		83,511		969	29,076
Watershed (Σ)	15,836	2,351	145,368	160,669	969	46,523
% Watershed	4	1	39	43	0	13

Table 2. Land ownership in the Cloverdale and San Bernardino Valley Watersheds



Land Use / Land Cover ^{4,5}

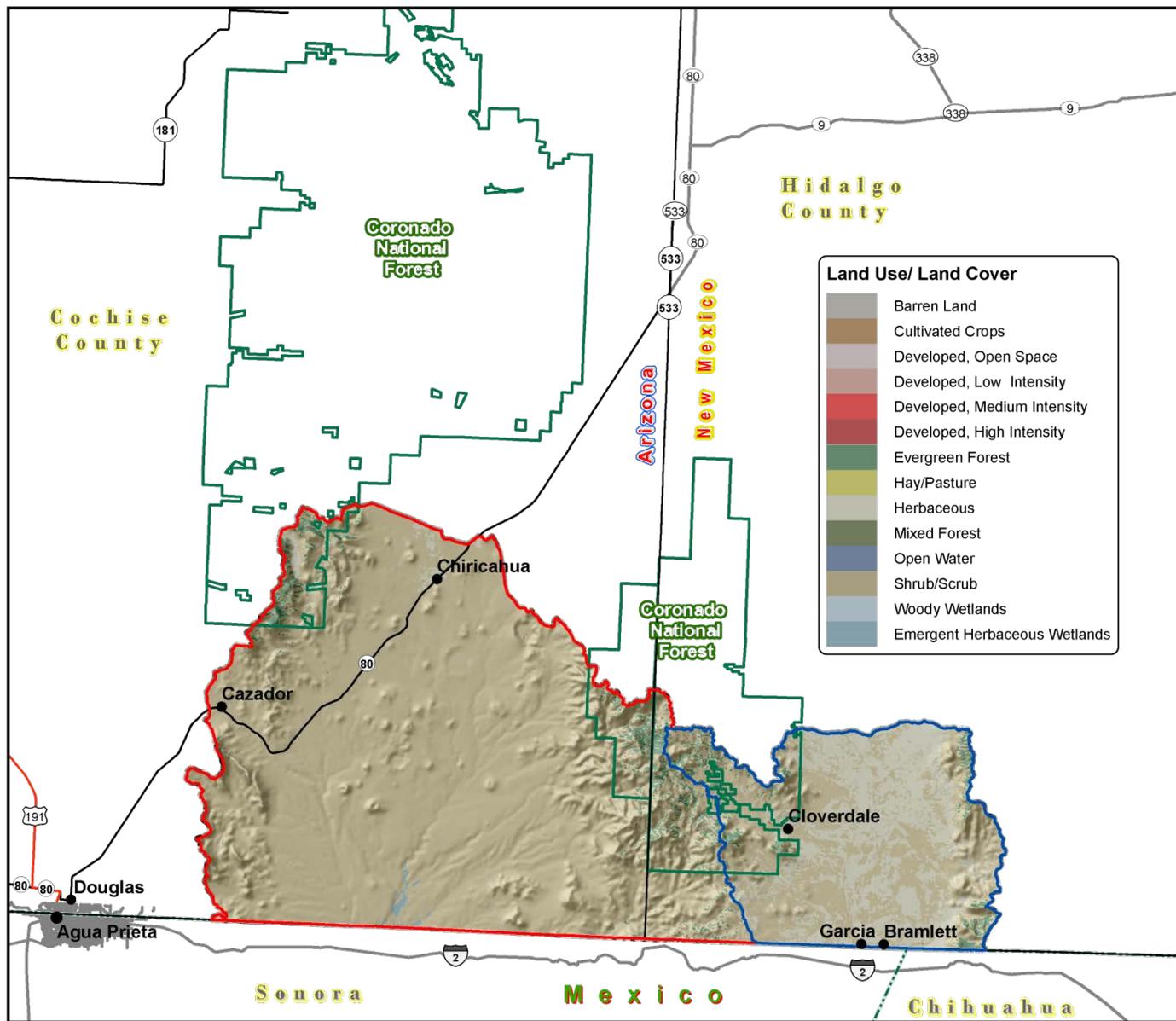
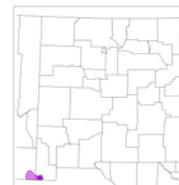


Figure 6. Subset of the National Land Cover Dataset in the Cloverdale and San Bernardino Valley Watersheds.



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	316,833	85
Herbaceous	42,027	11
Evergreen Forest	11,136	3
Emergent Herbaceous Wetlands	679	< 1
Developed, Open Space	436	< 1
Mixed Forest	295	< 1
Cultivated Crops	89	< 1
Woody Wetlands	62	< 1
Barren Land	54	< 1
Developed, Low Intensity	12	< 1
Open Water	11	< 1
Hay/Pasture	2	< 1

Table 3. Extent of NLCD classes in the Cloverdale and San Bernardino Valley Watersheds.



Land Use / Land Cover

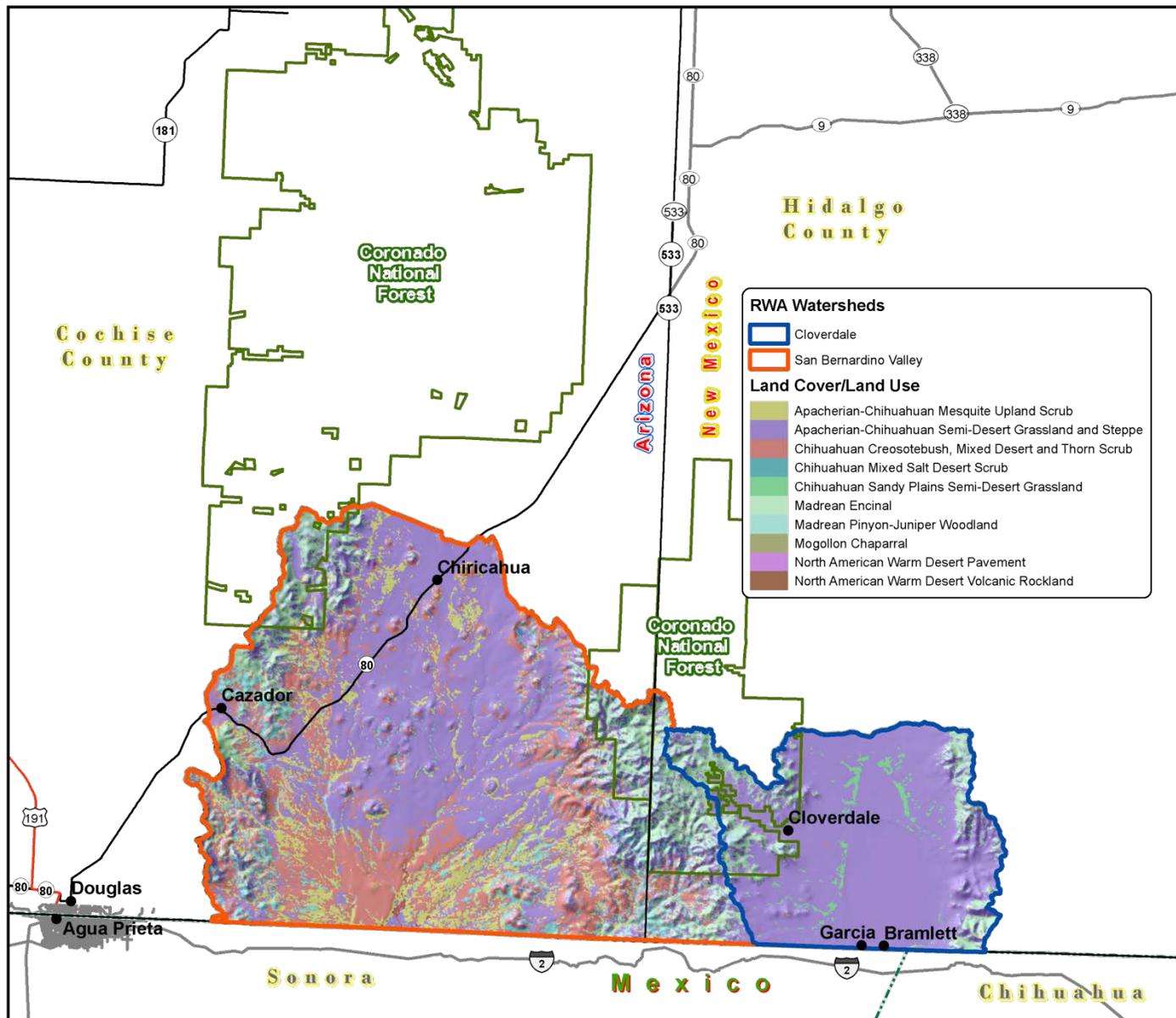


Figure 7. SWREGAP over the Cloverdale and San Bernardino Valley Watersheds. The 10 dominant ecosystems are displayed in the legend.



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 Semi-Desert Grassland and Steppe	203,616	55
Chihuahuan Creosotebush, Mixed Desert and Thorn Scrub	58,938	16
Madrean Encinal	37,430	10
Apacherian-Chihuahuan Mesquite Upland Scrub	30,098	8
Chihuahuan Mixed Salt Desert Scrub	18,592	5
Madrean Pinyon-Juniper Woodland	7,886	2
Mogollon Chaparral	5,862	2
Chihuahuan Sandy Plains Semi-Desert Grassland	2,917	1
North American Warm Desert Volcanic Rockland	1,185	< 1
North American Warm Desert Pavement	985	< 1

Table 4. SW Region Gap analysis ecosystem acreages.



Hydrology 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 1,635 miles (2,632 km) of water courses in the Cloverdale and San Bernardino Valley Watersheds. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

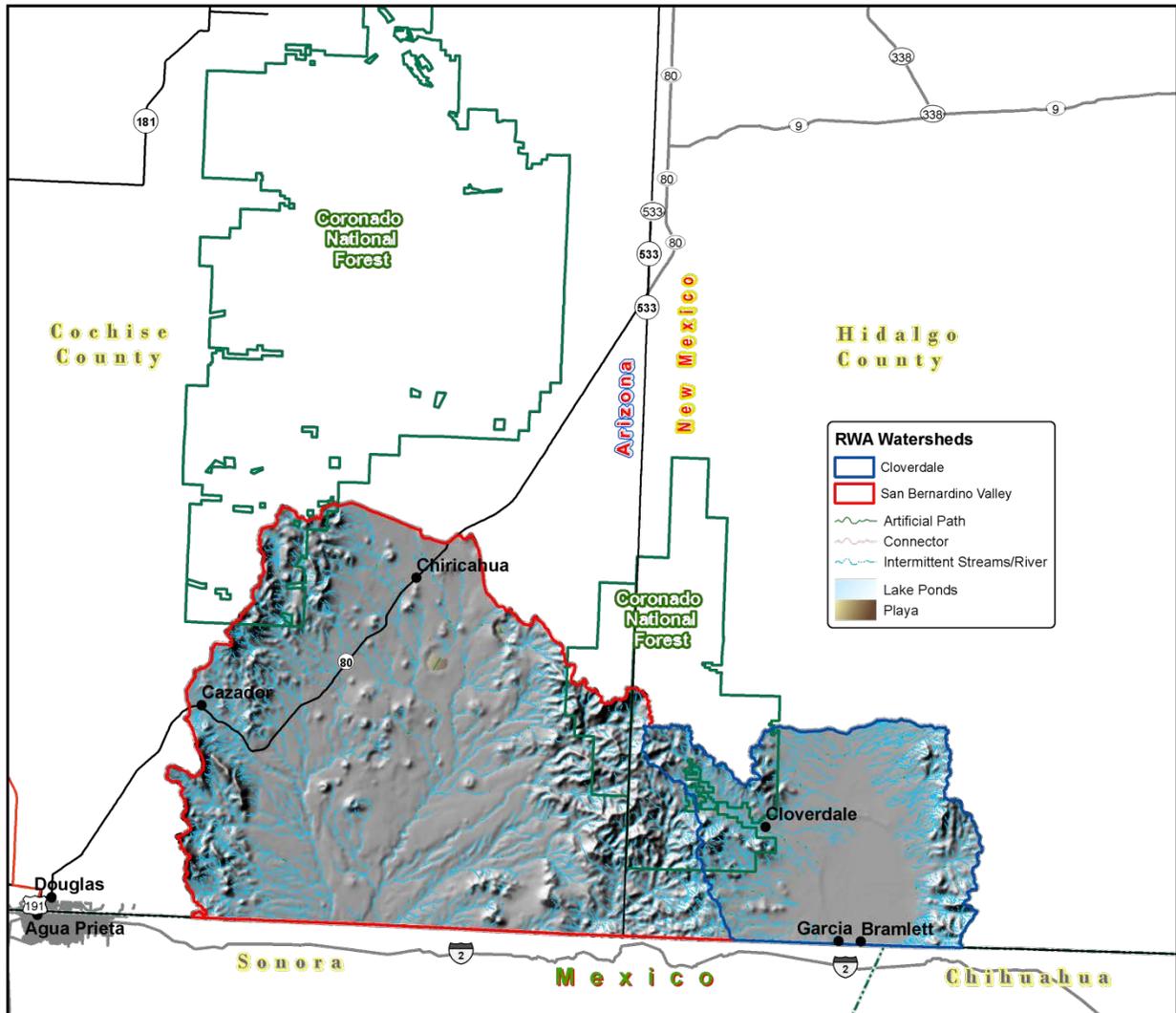


Figure 8. National Hydrologic Dataset (NHD) of the Cloverdale and San Bernardino Valley Watersheds.



Water Course Type	Miles
Artificial Path	12
Intermittent Stream / River	1,623
Sum (Σ)	1,635

Table 5. NHD Water Course Type and Extents



Hydrology

Gauging Stations:

There are no Gauging stations for this watershed

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.

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.

There are no designated impaired surface waters or water bodies for the New Mexico portion of the Cloverdale and San Bernardino Valley watersheds.

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).

There are no designated water bodies for the Arizona portion of the Cloverdale and San Bernardino Valley Watersheds as of June 2012.



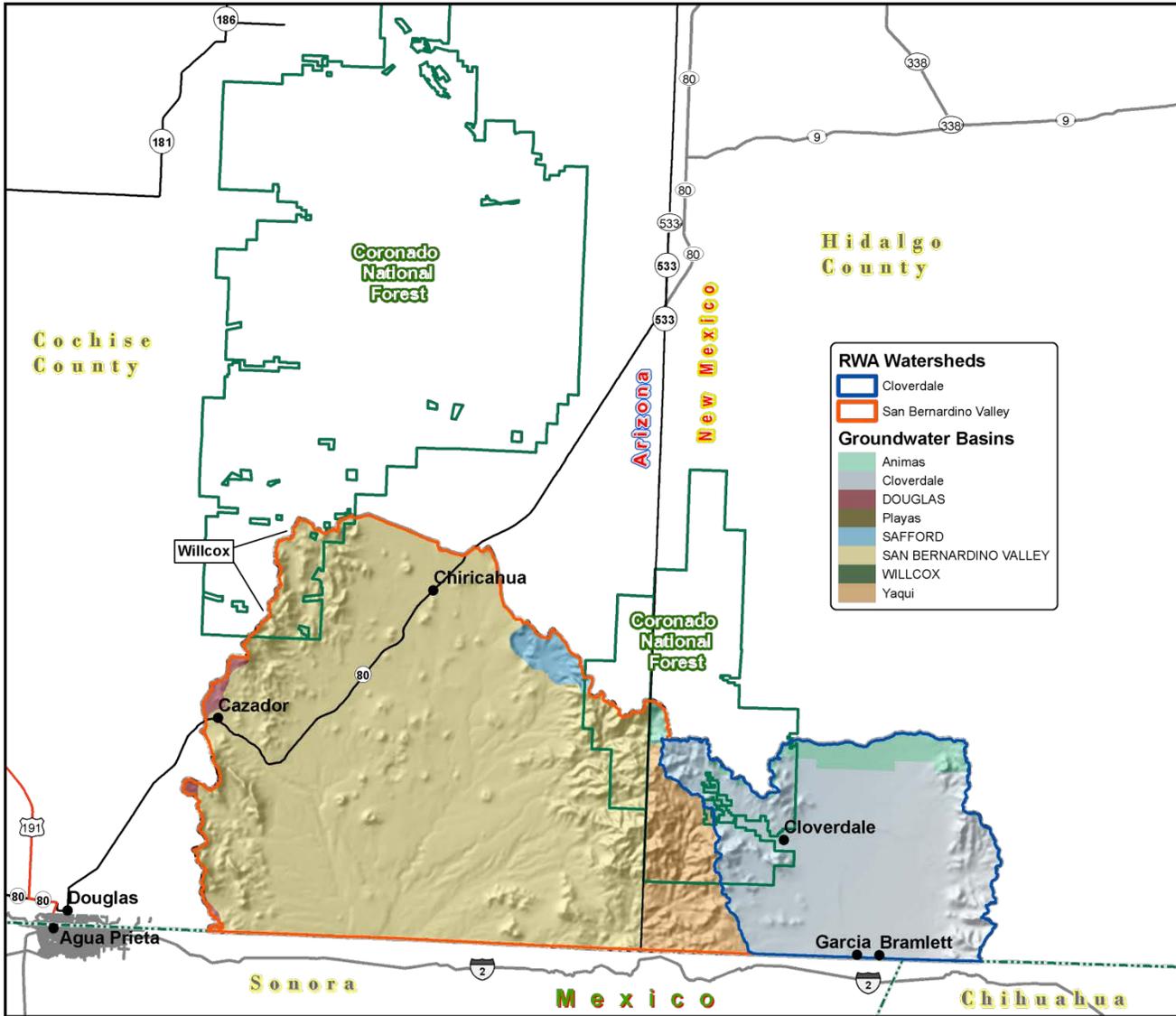


Figure 9. Declared Groundwater Basins of the Cloverdale and San Bernardino Valley Watersheds

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 8 declared groundwaters in the Cloverdale and San Bernardino Valley watersheds: Douglas, Safford, San Bernardino Valley, and Willcox in portions of Southeastern Arizona, and the Animas, Cloverdale, Playas, and Yaqui Underground Water Basin in Southwestern New Mexico.



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 6 and 7 show those species which are currently listed and tracked in the Cloverdale and San Bernardino Valley Watersheds.

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>
Baird's Sparrow	<i>Ammodramus bairdii</i>	Aves	Emberizidae		T
Bell's Vireo	<i>Vireo bellii</i>	Aves	Vireonidae		T
Broad-billed Hummingbird	<i>Cynanthus latirostris</i>	Aves	Trochilidae		T
Buff-collared Nightjar	<i>Caprimulgus ridgwayi</i>	Aves	Caprimulgidae		E
Chiricahua Leopard Frog	<i>Rana chiricahuensis</i>	Amphibia	Ranidae	LT	
Colorado River Toad	<i>Bufo alvarius</i>	Amphibia	Bufo		T
Costa's Hummingbird	<i>Calypte costae</i>	Aves	Trochilidae		T
Desert Tortoise	<i>Gopherus agassizii</i>	Chelonia	Testudinidae	LT, SAT	
Gila Monster	<i>Heloderma suspectum</i>	Reptilia	Helodermatidae		E
Gila Woodpecker	<i>Melanerpes uropygialis</i>	Aves	Picidae		T
Gray Vireo	<i>Vireo vicinior</i>	Aves	Vireonidae		T
Lesser Long-nosed Bat	<i>Leptonycteris curasoae yerbabuenae</i>	Mammalia	Phyllostomidae	LE	
Mexican Tetra	<i>Astyanax mexicanus</i>	Actinopterygii	Characidae		T
Mexican Wolf	<i>Canis lupus baileyi</i>	Mammalia	Canidae		E
New Mexico Ridgenose Rattlesnake	<i>Crotalus willardi obscurus</i>	Reptilia	Viperidae	LT	E
Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>	Aves	Falconidae	LE	E
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>	Aves	Tyrannidae		E
Sand Prickly-pear	<i>Opuntia arenaria</i>	Dicotyledoneae	Cactaceae		E
Slevin's Bunchgrass Lizard	<i>Sceloporus slevini</i>	Reptilia	Phrynosomatidae		T
Thick-billed Kingbird	<i>Tyrannus crassirostris</i>	Aves	Tyrannidae		E
Varied Bunting	<i>Passerina versicolor</i>	Aves	Cardinalidae		T
Violet-crowned	<i>Amazilia violiceps</i>	Aves	Trochilidae		T



Hummingbird				
Western Yellow Bat	<i>Lasiurus xanthinus</i>	Mammalia	Vespertilionidae	T
White-sided Jackrabbit	<i>Lepus callotis</i>	Mammalia	Leporidae	T
Wilcox Fishhook Cactus	<i>Mammillaria wrightii</i> var. <i>wilcoxii</i>	Dicotyledoneae	Cactaceae	E

Table 6. 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>
Baird's Sparrow	<i>Ammodramus bairdii</i>	SC, S	WSC
Arizona grasshopper sparrow	<i>Ammodramus savannarum ammolegus</i>	S	
Golden Eagle	<i>Aquila chrysaetos</i>	S,3	
Zone-tailed Hawk	<i>Buteo albonotatus</i>	S	
Swainson's Hawk	<i>Buteo swainsoni</i>	S	
Lucifer Hummingbird	<i>Calothorax lucifer</i>	S	
Northern Beardless-Tyrannulet	<i>Camptostoma imberbe</i>	S	
Buff-collared Nightjar	<i>Caprimulgus ridgwayi</i>	S	
Yellow-billed Cuckoo (Western U.S. DPS)	<i>Coccyzus americanus</i>	PS:C,S,2	WSC
Thick-billed Kingbird	<i>Tyrannus crassirostris</i>	S	WSC
Tropical Kingbird	<i>Tyrannus melancholicus</i>		WSC
Yaqui Longfin Dace	<i>Aqosia chrysoqaster ssp. 1</i>	SC,S,S	
Mexican Stoneroller	<i>Campostoma ornatum</i>	SC,S	WSC
Beautiful Shiner	<i>Cyprinella formosa</i>	LT	WSC
Yaqui Chub	<i>Gila purpurea</i>	LE	WSC
Yaqui Catfish	<i>Ictalurus pricei</i>	LT	WSC
Yaqui Topminnow	<i>Poeciliopsis occidentalis</i>	LE	WSC



	<u>sonoriensis</u>		
San Bernardino Springsnail	<u>Pyrgulopsis bernardina</u>	LT,S	
Northern Pygmy Mouse	<u>Balomys taylori</u>	S	
Mexican Long-tongued Bat	<u>Choeronycteris mexicana</u>	SC,S,S	WSC
Western Red Bat	<u>Lasiurus blossevillii</u>	S	WSC
Western Yellow Bat	<u>Lasiurus xanthinus</u>	S	WSC
Lesser Long-nosed Bat	<u>Leptonycteris curasoae verbabuenae</u>	LE	WSC
Western Small-footed Myotis	<u>Myotis ciliolabrum</u>	SC	
Fringed Myotis	<u>Myotis thysanodes</u>	SC	
Cave Myotis	<u>Myotis velifer</u>	SC,S	
Jaguar	<u>Panthera onca</u>	LE	WSC
Fulvous Harvest Mouse	<u>Reithrodontomys fulvescens</u>	S	
Plains Harvest Mouse	<u>Reithrodontomys montanus</u>	S	
Coppermine Milk-vetch	<u>Astragalus cobrensis var. maquirei</u>	SC,S	SR
Chihuahuan Sedge	<u>Carex chihuahuensis</u>	S	
Playa Spider Plant	<u>Cleome multicaulis</u>	SC	SR
Cochise Pincushion Cactus	<u>Coryphantha robbinsorum</u>	LT	HS
Devil-thorn	<u>Echinocereus pseudopectinatus</u>		SR
Huachuca Water-umbel	<u>Lilaeopsis schaffneriana var. recurva</u>	LE	HS
Night-blooming Cereus	<u>Peniocereus greggii var. greggii</u>	SC	SR
Broad-leaf Ground-cherry	<u>Physalis latiphysa</u>	S	
Limestone Arizona Rosewood	<u>Vauquelinia californica ssp. pauciflora</u>	SC	SR
Giant Spotted Whiptail	<u>Aspidoscelis burti stictogrammus</u>	SC,S	
Reticulate Gila Monster	<u>Heloderma suspectum suspectum</u>	S	
Texas Horned Lizard	<u>Phrynosoma cornutum</u>	SC	
Slevin's Bunchgrass Lizard	<u>Sceloporus slevini</u>	S,S	
Northern Green Ratsnake	<u>Senticolis triaspis intermedia</u>	S	
Desert Massasauga	<u>Sistrurus catenatus edwardsii</u>		WSC
Desert Box Turtle	<u>Terrapene ornata luteola</u>	S	
Northern Mexican Gartersnake	<u>Thamnophis eques megalops</u>		WSC

Table 7. 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 Cloverdale and San Bernardino Valley Watershed, the SWEMP has identified 5 species of invasive plants (Table 8). 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 8. 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.

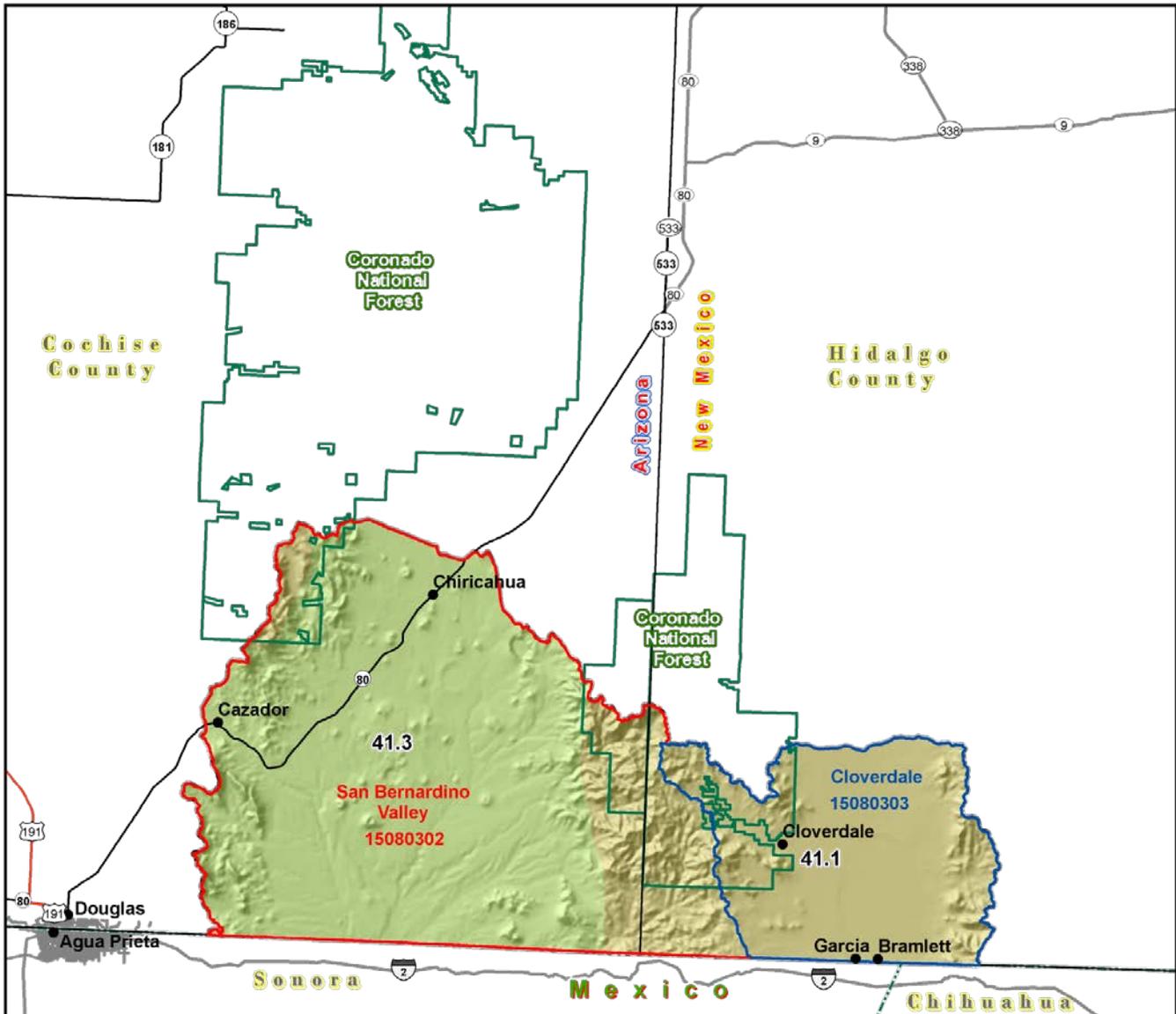


Figure 10. Common Resource Areas of the Cloverdale and San Bernardino Valley Watershed.



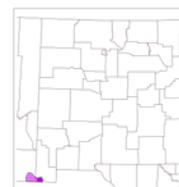
Common Resource Areas

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.

41.3 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	2008		2009		2010		2011		2012		TOTAL	
	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres
Brush Management					1	770	1	1,631	1	2,456	3	4,857
Grazing management to improve wildlife habitat									1	43,932	1	43,932
Monitor key grazing areas to improve grazing management							1	20,805	1	160,299	2	181,104
Monitoring nutritional status of livestock using the NUTBAL PRO System									1	139,494	1	139,494
Non-Chemical Pest Mgmt for Livestock							1	20,805	1	20,805	2	41,610
Prescribed Burning	1	2,424									1	2,424
Prescribed Grazing	1	6,130	1	12,654	2	11,859	1	12,288			5	42,931
Restoration and Management of Rare and Declining Habitats							1	47,781			1	47,781
Riparian Herbaceous Cover							1	47,781			1	47,781
Rotation of supplement and feeding areas									1	139,494	1	139,494
Upland Wildlife Habitat Management	1	34,281	1	34,281	1	34,281					3	102,842
SUM (Σ)	3	42,835	2	46,934	4	46,910	6	151,091	6	506,481	21	794,252

Table 9 . 5 year Trends in Applied Conservation Practices. Reported in Acres.



Conservation Practice	2008		2009		2010		2011		2012		TOTAL	
	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet	#	Feet
Fence							1	47,781			1	47,781
Pipeline	1	6,329			1	960			1	4,213	3	11,502
SUM (Σ)	1	6,329			1	960	1	47,781	1	4,213	4	59,283

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



Soil Resource Inventory¹⁸

The Cloverdale and San Bernardino Valley 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 (AZ723, not currently available). 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:

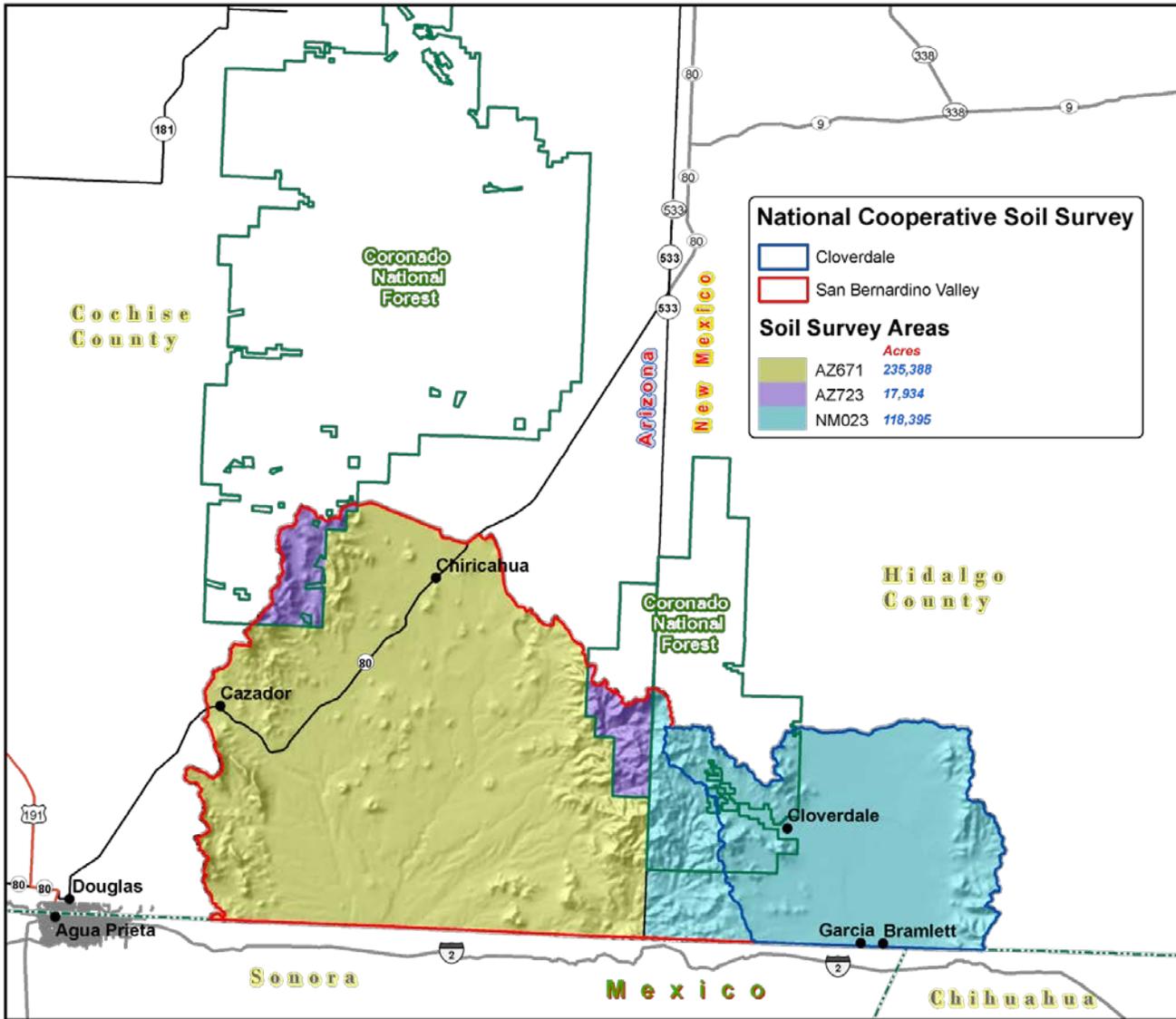


Figure 11. National Cooperative Soil Survey coverage of the Cloverdale and San Bernardino Valley Watersheds



Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the Cloverdale and San Bernardino Valley Watershed, a model was developed using Soil Survey Geographic Database (SSURGO) information. The soil properties saturated hydraulic conductivity, soil loss tolerance, and wind erodibility group were used in conjunction with slope to assess soil map unit potential for erosion. Saturated hydraulic conductivity and slope are reported in SSURGO databases as interval/ratio data whereas wind erodibility and soil loss tolerance are ordinal data. Data transformations for the model are listed

<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 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. Forest Service Soils are not able to be included in the model at this time.

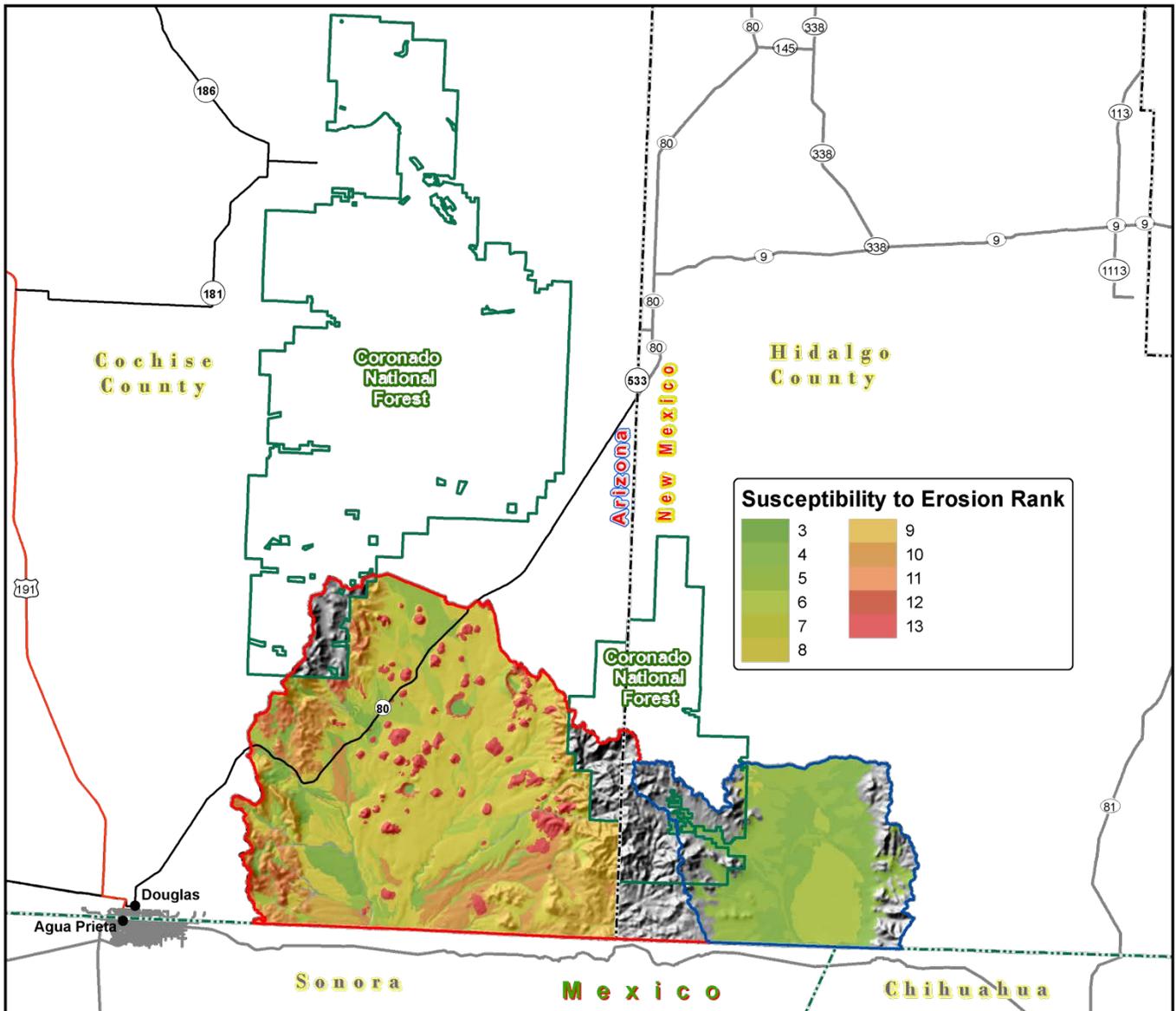


Figure 12. Cloverdale and San Bernardino Valley Watersheds Erosion Potential.



Soil Resource Inventory

<u>Rank</u>	<u>Acres</u>
3	1,006
4	43,105
5	32,043
6	38,227
7	6,675
8	92,876
9	34,171
10	28,360
11	7,852
12	1,671
13	14,627
Sum(Σ)	371,718

Table 12. 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	45,213

Table 13. Socioeconomic Data of the Counties in the Watershed (2010)



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19. United States Census Bureau - <http://www.census.gov/>

