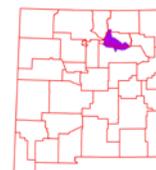


Rapid Watershed Assessment Mora Watershed



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

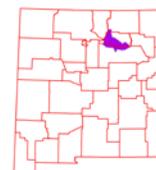
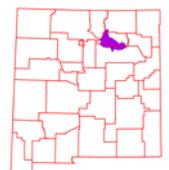


Table of Contents

Overview..... 5
 Physical Setting..... 7
 Precipitation 11
 Land Ownership..... 12
 Land Use / Land Cover 14
 Hydrology 18
 Threatened and Endangered Species 26
 Invasive Species..... 27
 Common Resource Areas 28
 Conservation 29
 Soil Resource Inventory..... 32
 Socioeconomic Data 36
 References..... 37

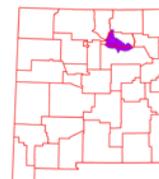
List of Tables

Table 1. Mora watershed acreage distribution..... 6
 Table 2. Land ownership in the Mora watershed..... 13
 Table 3. Extent of NLCD classes in the Mora watershed..... 15
 Table 4. SW Region Gap analysis ecosystem acreages..... 17
 Table 5. NHD Water Course Type and Extents..... 19
 Table 6. Listed Uses. NS = Not Supporting, NA = not assessed, x = Fully Supporting 22
 Table 7. Possible Causes of Impairment..... 24
 Table 8. Threatened and Endangered Plant and Animal Species. 26
 Table 9. Invasive Species Recognized by the SWEMP..... 27
 Table 10. 5 year Trends in Applied Conservation Practices. Reported in Acres..... 30
 Table 11. 5 Year Trends in Location Specific Applied Conservation Practices. Reported in Feet if Linear (i.e. Fence)..... 31
 Table 12. Criteria Used for Soil Erosion Susceptibility Model..... 33
 Table 13. Soil Erosion Potential Model Results. A greater rank indicates greater potential for erosion..... 35
 Table 14. Socioeconomic Data of the Counties in the Watershed (2010) except for green cells, not available yet from 2010 census so are 2000. 36



List of Figures

Figure 1. Mora Watershed Overview..... 5
 Figure 2. Hydrologic Soil Group 9
 Figure 3. Mora Watershed Shaded Relief..... 10
 Figure 4. Mora Watershed Annual Precipitation. 11
 Figure 5. Mora Watershed Land Ownership..... 12
 Figure 6. Subset of the National Land Cover Dataset over the Mora Watershed..... 14
 Figure 7. Subset of the SWREGAP over the Mora Watershed. The dominant ecosystems are displayed in the legend..... 16
 Figure 8. National Hydrologic Dataset (NHD) of the Mora..... 18
 Figure 9. Gauging Stations in the Mora Watershed..... 20
 Figure 10. Monthly Average of Mean Daily Flow on the Mora River near Golondrinas, NM... 21
 Figure 11. 303 (d) Impaired Waters..... 23
 Figure 12. Declared Groundwater Basins of the Mora..... 25
 Figure 13. Common Resource Areas of the Pecos Watershed 28
 Figure 14. National Cooperative Soil Suvey of Mora 32
 Figure 15. Erosion Potential of Mora Watershed 34



Overview

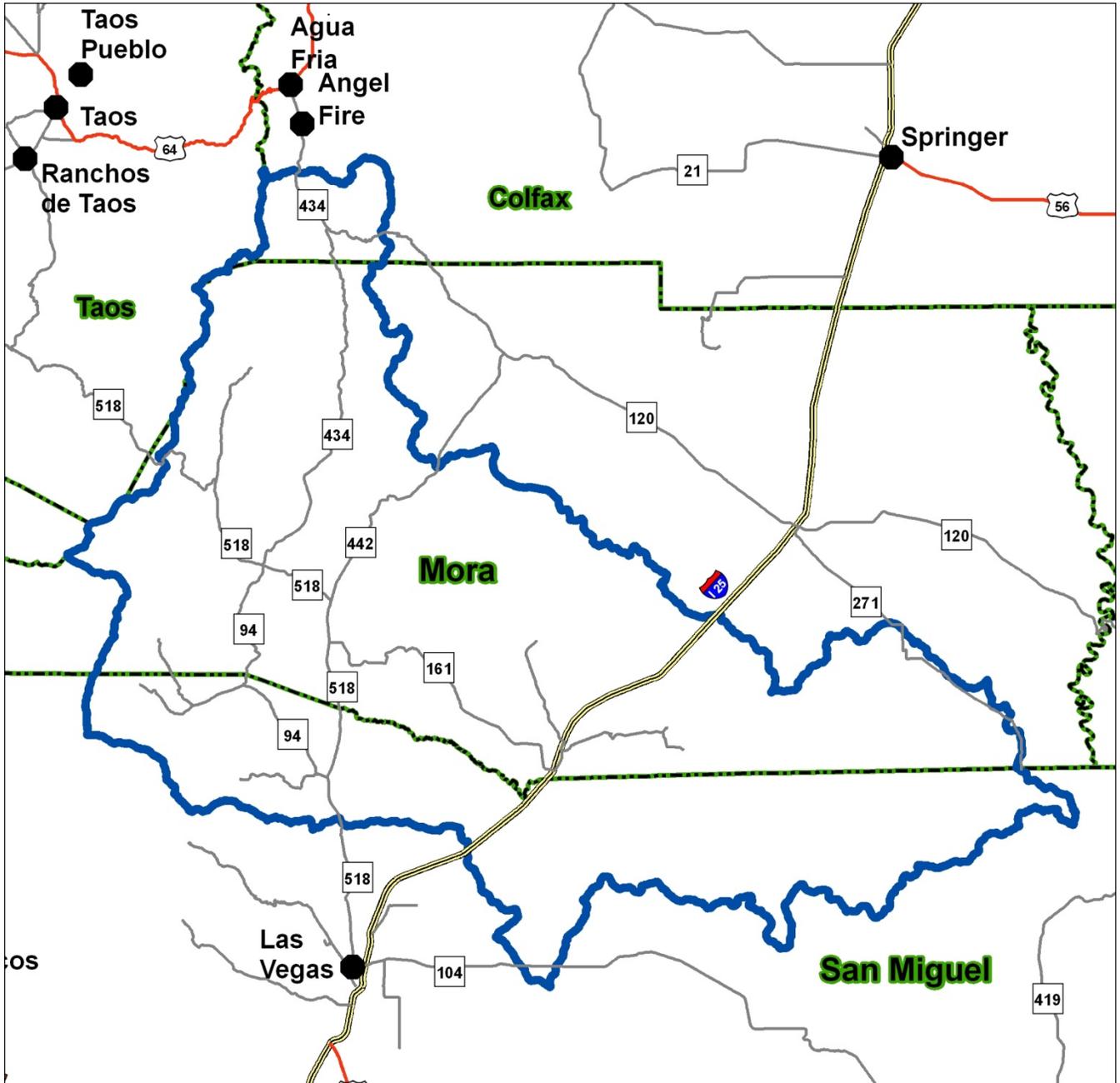
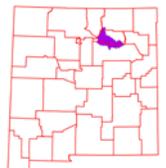


Figure 1. Mora Watershed Overview

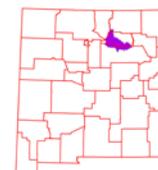


Overview

The Mora watershed is located in northeastern New Mexico. It covers 931,840 total acres (3,771 sq. km). Portions of the Mora watershed extend into Colfax, Mora, Rio Arriba, San Miguel, and Taos counties. Table 1 summarizes the distribution of the Mora watershed.

Table 1. Mora watershed acreage distribution.

	County Acres Total	Acres in HUC	% of HUC in County	% of County in HUC
Colfax	1,938,748	31,141	3	2
Mora	1,236,472	598,760	64	48
Rio Arriba	3,772,816	1	<1	<1
San Miguel	3,028,627	301,036	32	10
Taos	2,139,990	901	<1	<1
Sum (Σ)		931,840		



Physical Setting

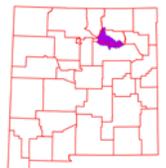
Geology: ¹

The Mora River originates in the Sangre de Cristo Mountains and flows east onto the high plains of New Mexico. The Mora River is a tributary to the Canadian River and joins it above Conchas Dam.

The Sangre de Cristo Mountains consist of various colored shales, siltstone, arkosic sandstone and clay shale; along with a core of granitic pluton. In the western region, rocks range from the Pre-Cambrian to Quaternary Period in age and consist of gray and red shale, thin strata of gray limestone and sandstone beds. In the eastern region, rocks are mostly Cretaceous Period in age with small areas of Jurassic and Triassic Period and consist of gray and red shale, thin strata of gray limestone and sandstone beds.

Resource concerns are high sediment erosion and water runoff mainly due to wildfires. 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. This can be exasperated by the mining of sand and gravel from the river channels.

Groundwater quality and quantity is a concern. Surface water in the eastern portion of the watershed is being diverted to acequias for irrigation purposes. Groundwater occurs to a greater or lesser extent in all of these geologic units. 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 igneous rocks and volcanics is usually along fracture zones which are hard to intercept with water wells. Groundwater quality ranges from good to poor 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 Rio Grande-Albuquerque 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.



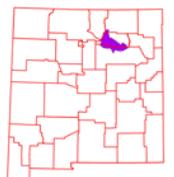
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.



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.



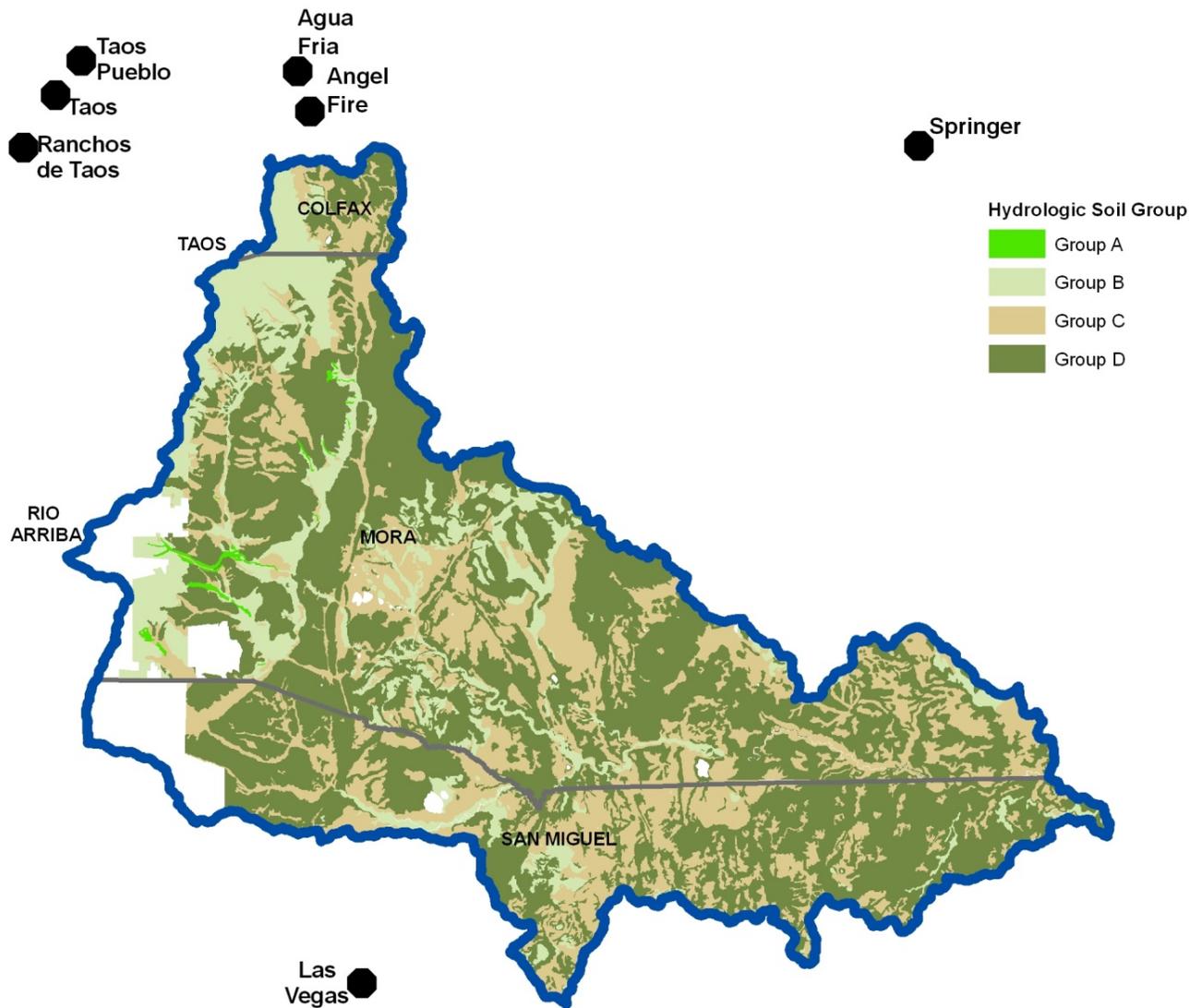
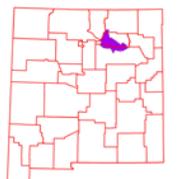


Figure 2. Hydrologic Soil Group



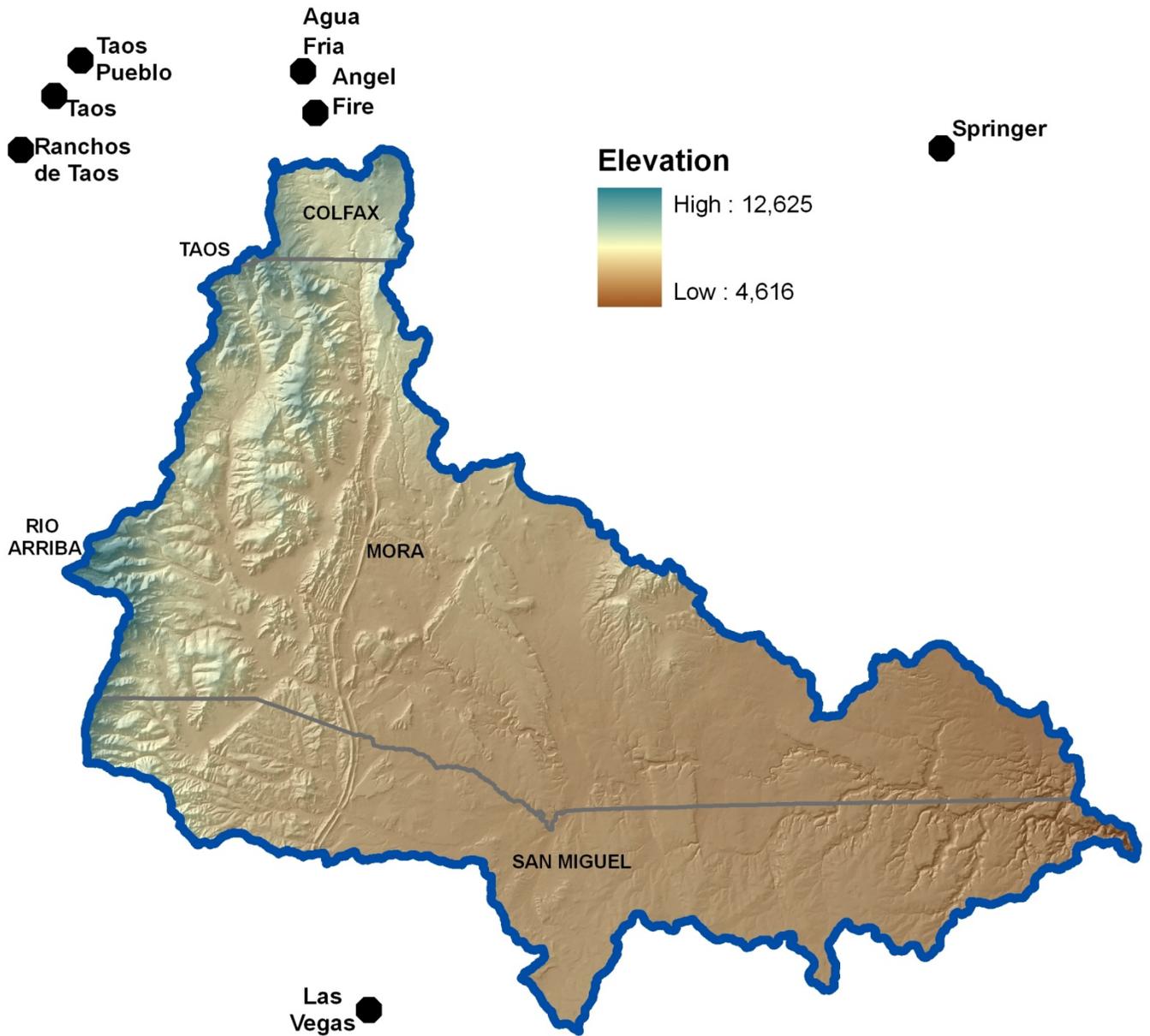
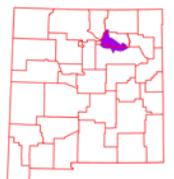


Figure 3. Mora Watershed Shaded Relief



Precipitation ²

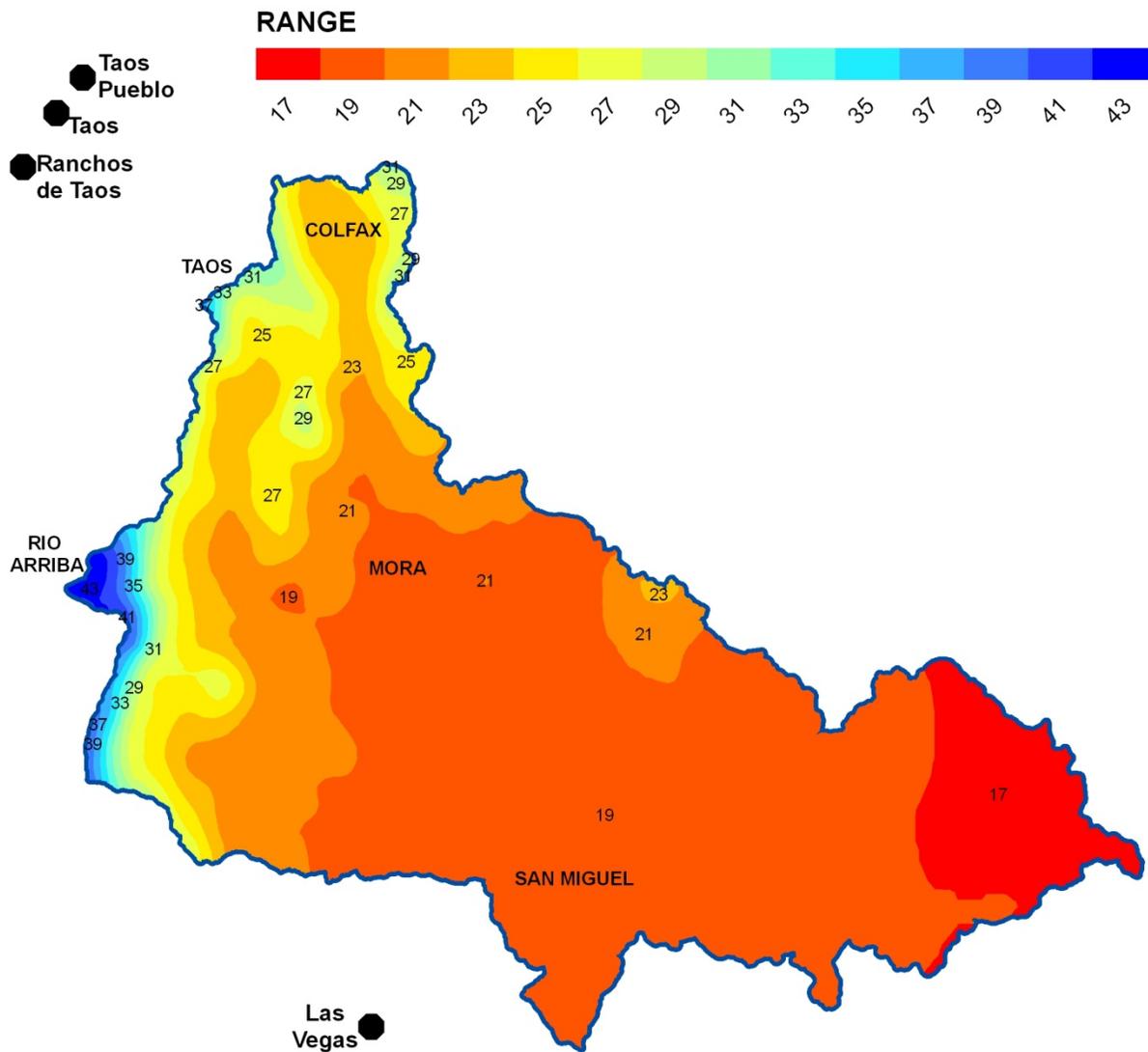
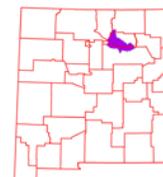


Figure 4. Mora Watershed Annual Precipitation.



Land Ownership ³

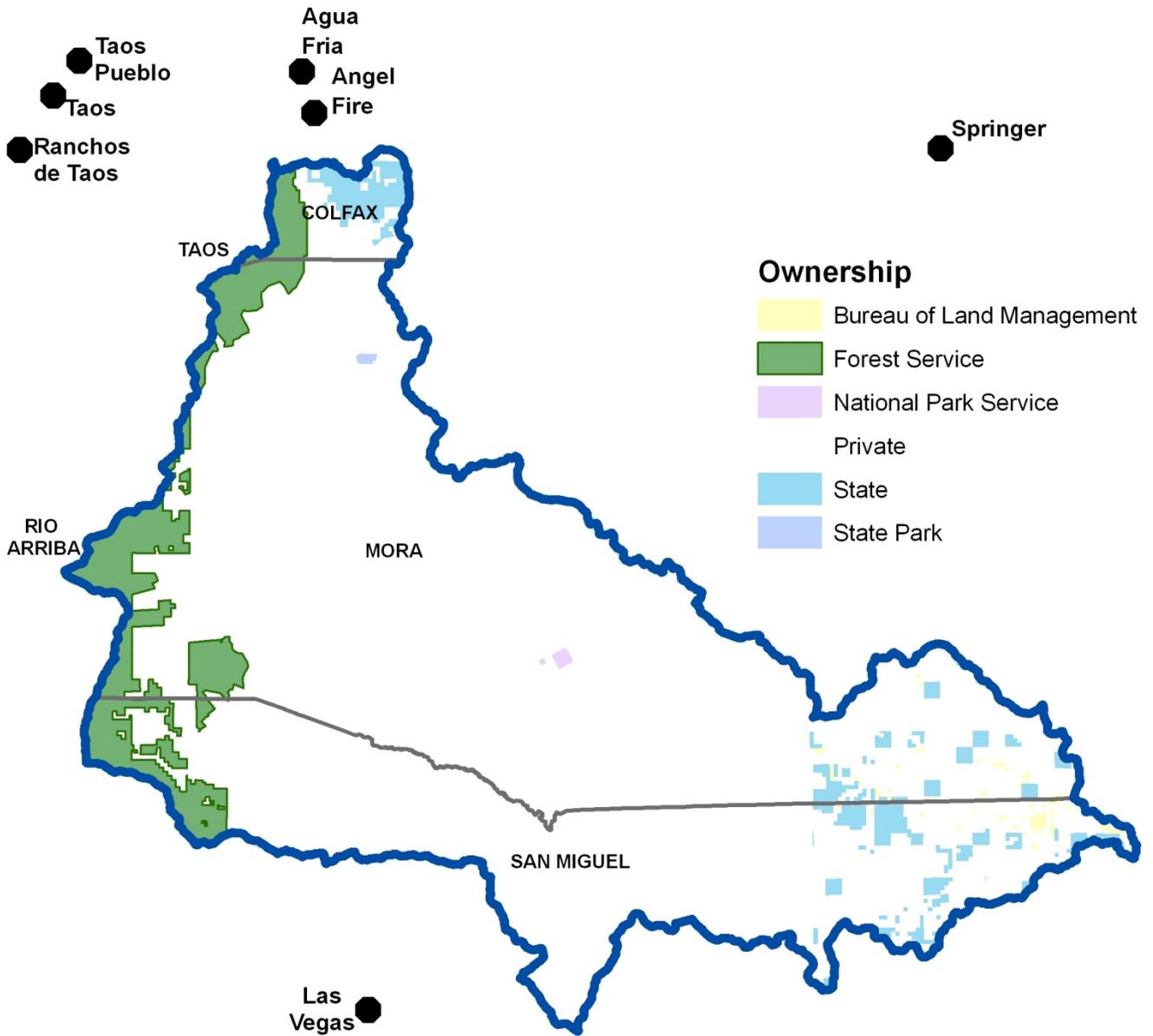
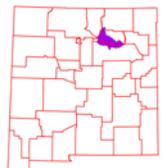


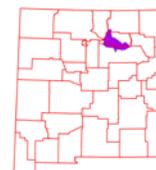
Figure 5. Mora Watershed Land Ownership.



Land Ownership

<u>COUNTY</u>	<u>BLM</u>	<u>FS</u>	<u>NPS</u>	<u>Private</u>	<u>State</u>	<u>State Parks</u>
Colfax		6,984		13,976	10,181	
Mora	1,428	42,004	719	575,744	8,410	455
Rio Arriba		1				
San Miguel	2,114	19,298		266,732	12,891	
Taos		900		1		
Watershed (Σ)	3,542	69,187	719	856,453	31,482	455
% Watershed	<1	7	<1	92	3	<1

Table 2. Land ownership in the Mora watershed.



Land Use / Land Cover 4.5

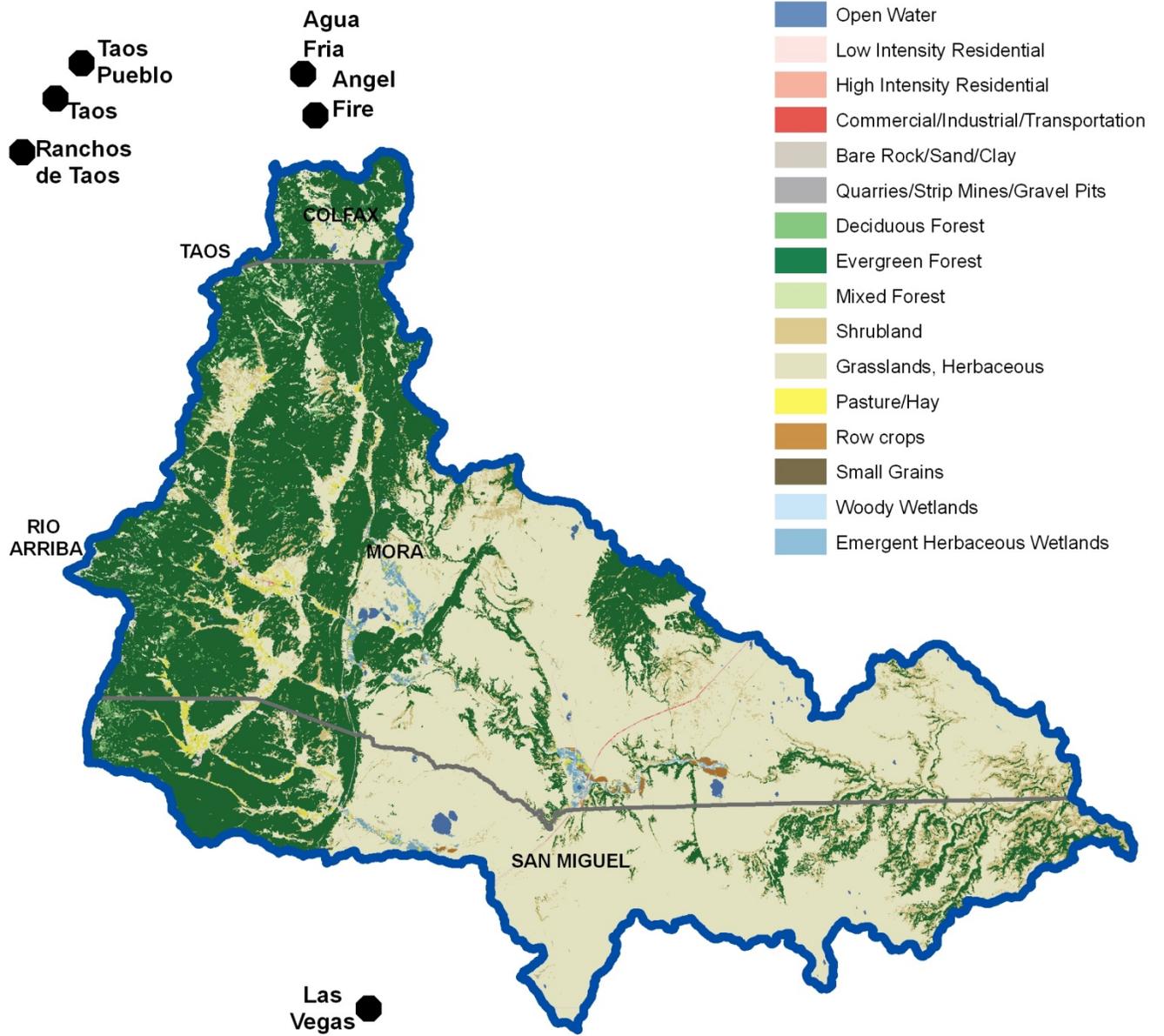
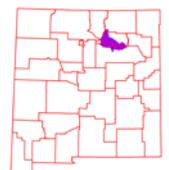


Figure 6. Subset of the National Land Cover Dataset over the Mora Watershed.

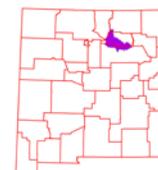


Land Use / Land Cover

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>
grasslands, herbaceous	488,333	52
evergreen forest	336,933	36
shrubland	72,174	8
Deciduous forest	8,036	1
pasture/hay	7,772	1
Emergent Herbaceous Wetlands	5,712	1
Low Intensity Residential	3,517	< 1%
Open Water	3,019	< 1%
Woody Wetlands	2,056	< 1%
Row Crops	1,576	< 1%
Mixed Forest	1,147	< 1%
Bare Rock/Sand/Clay	1,057	< 1%

Table 3. Extent of NLCD classes in the Mora watershed.



Land Use / Land Cover

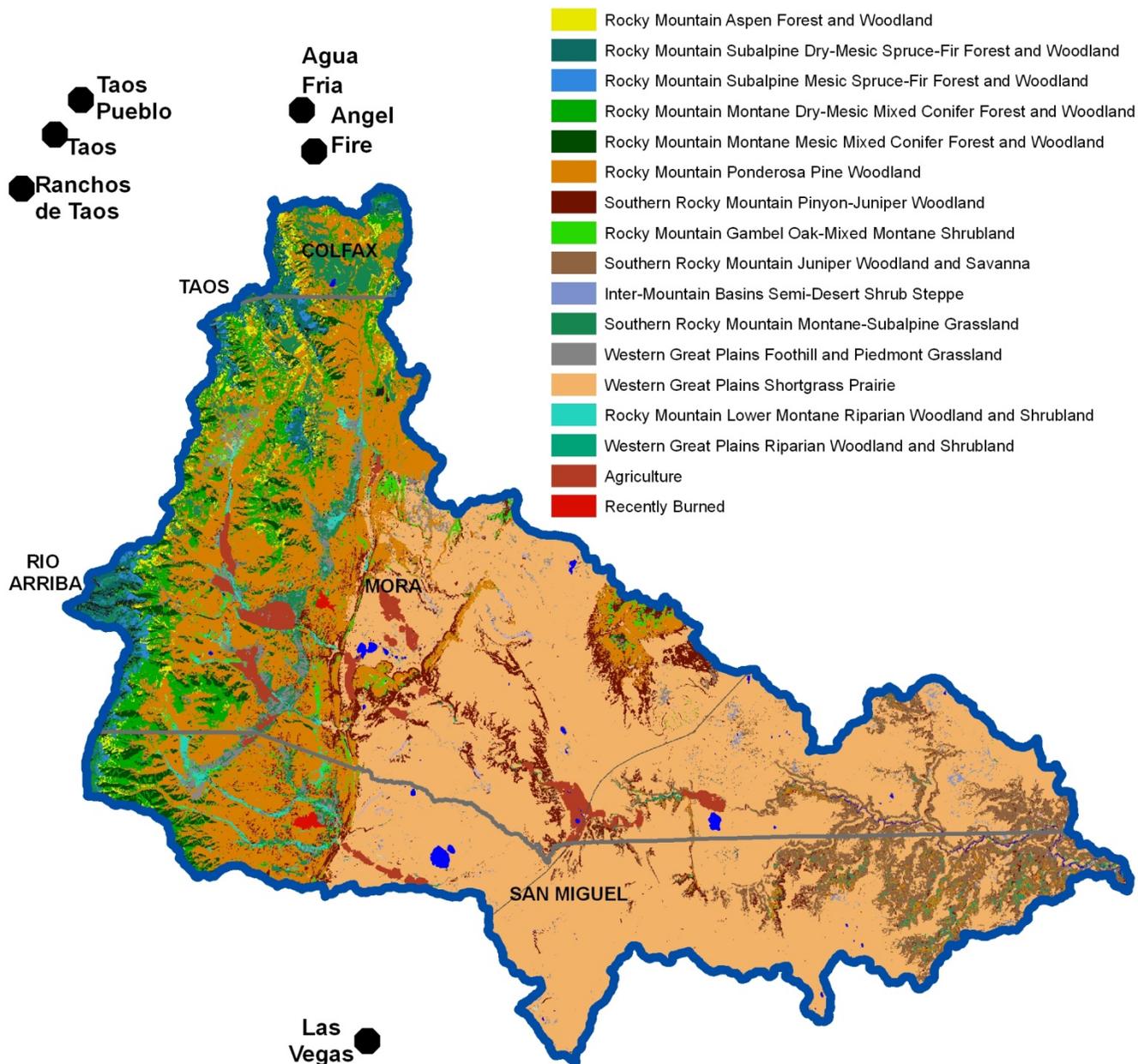
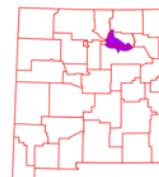


Figure 7. Subset of the SWREGAP over the Mora Watershed. The dominant ecosystems are displayed in the legend.

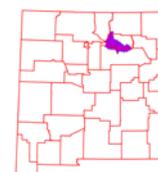


Land Use / Land Cover

The landcover 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.

<u>Ecosystem</u>	<u>Acres</u>	<u>% of Watershed</u>
Western Great Plains Shortgrass Prairie	440,262	47
Rocky Mountain Ponderosa Pine Woodland	187,560	20
Southern Rocky Mountain Juniper Woodland and Savanna	57,382	6
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	42,661	5
Southern Rocky Mountain Pinyon-Juniper Woodland	40,718	4
Southern Rocky Mountain Montane-Subalpine Grassland	30,129	3
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	22,871	2
Agriculture	17,796	2
Western Great Plains Foothill and Piedmont Grassland	15,808	2
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	14,078	2
Rocky Mountain Aspen Forest and Woodland	12,946	1
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	11,933	1
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	7,445	1
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	7,440	1
Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland	4,399	< 1
Open Water	3,418	< 1
Western Great Plains Riparian Woodland and Shrubland	3,415	< 1
Inter-Mountain Basins Semi-Desert Shrub Steppe	2,654	< 1
Western Great Plains Cliff and Outcrop	1,735	< 1
Recently Burned	1,207	< 1

Table 4. SW Region Gap analysis ecosystem acreages.



Hydrology 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 3,058 miles (4,921 km) of water courses in the Mora River Watershed. The majority of these courses typically flow intermittently in summer months during periods associated with high intensity convective thunderstorms.

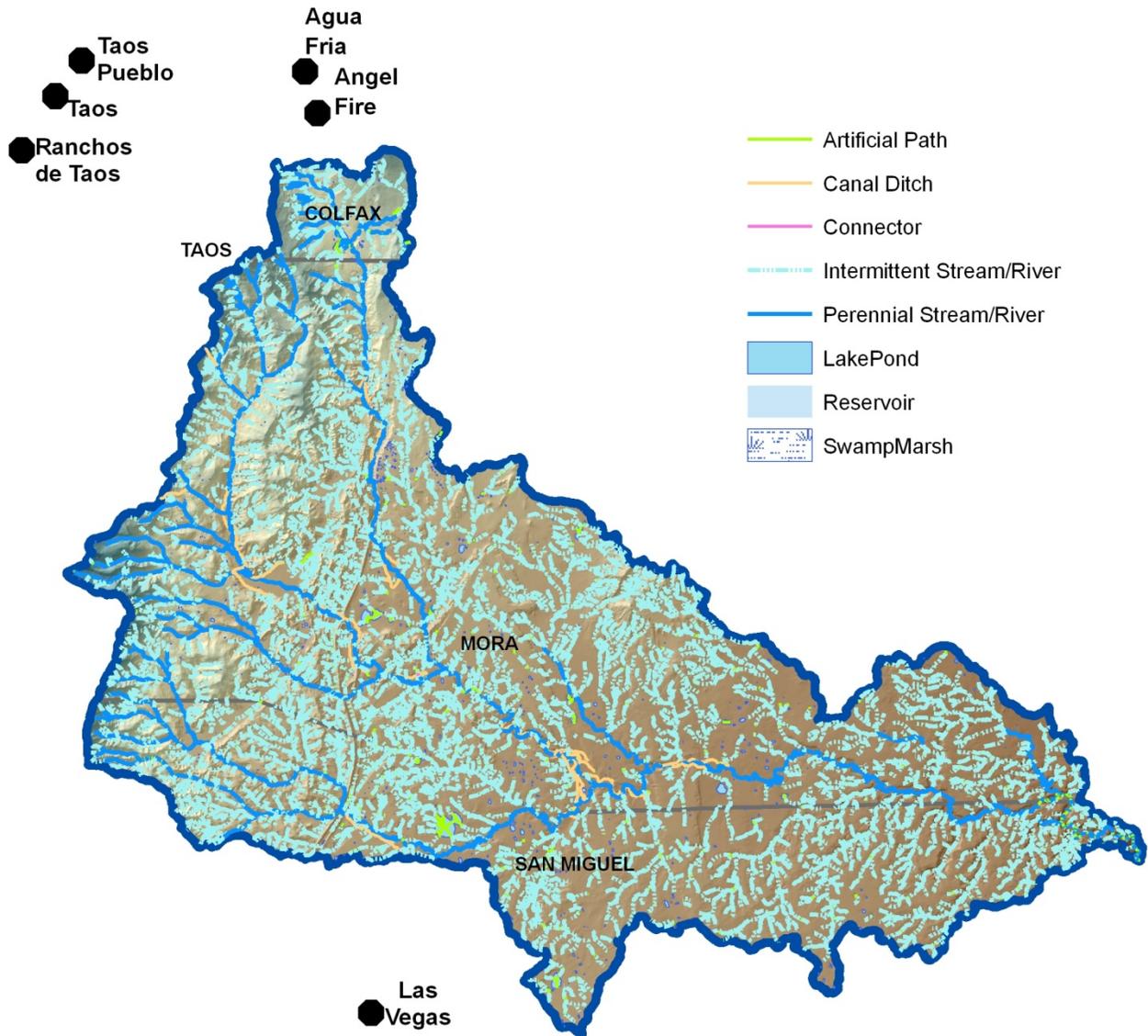
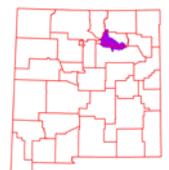
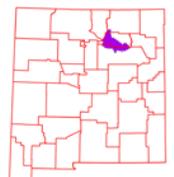


Figure 8. National Hydrologic Dataset (NHD) of the Mora.



Water Course Type	Miles
Artificial path	66
Canal / Ditch	83
Intermittent Stream / River	2,482
Perennial Stream / River	426
Sum (Σ)	3,058

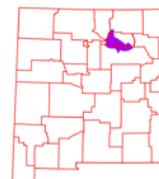
Table 5. NHD Water Course Type and Extents



There are 16 water gauging stations and 4 dams in the watershed. USGS Site 07216500 is in the middle of the watershed on the Mora River near Golondrinas, NM. During the period 1916 – 2011, this site has had mean annual discharge of 32.6 cubic feet per second ranging from 2.3 (2003) to 144.5 (1941) cubic feet per second.



Figure 9. Gauging Stations in the Mora Watershed



Hydrology

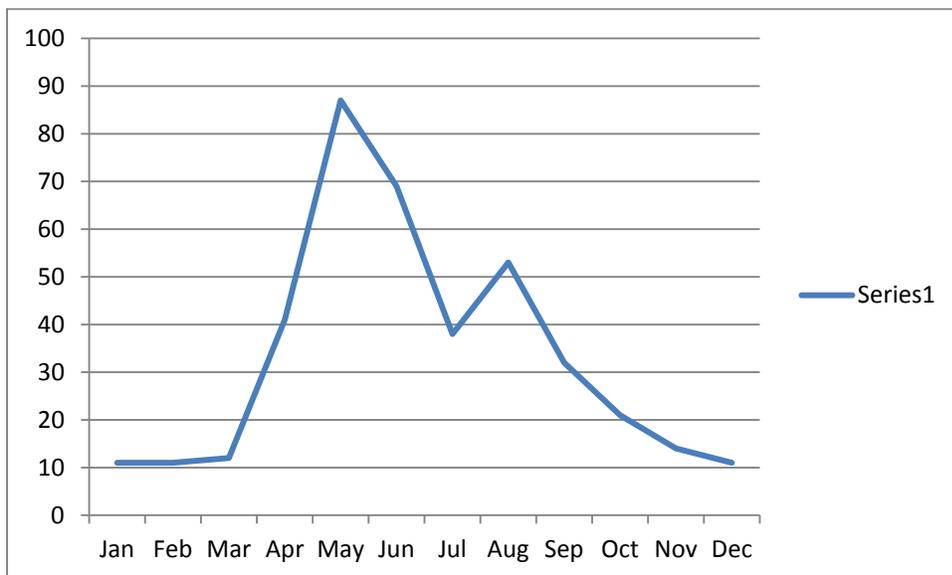
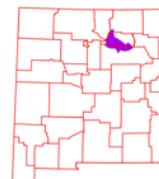


Figure 10. Monthly Average of Mean Daily Flow on the Mora River near Golondrinas, NM. Period of observation: 1915-2011.



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 Mora watershed as part of the Rio Grande River Basin.

The Mora watershed has no reaches listed as impaired, and one waterbody listed as 303 (d) Impaired Surface Waters:

1. Morphy (Murphy) Lake

The listed uses for this waterbody have been designated in Table 6.

Use	Morphy (Murphy) Lake
high quality coldwater aquatic life	
marginal coldwater aquatic life	NS
Irrigation/irrigation storage	NA
domestic water supply	
livestock watering	X
wildlife habitat	X
warmwater aquatic life	NS
Primary contact	NA
secondary contact	
Fish culture	
Limited Aquatic Life	
Industrial Water Supply	
Municipal Water Supply	

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

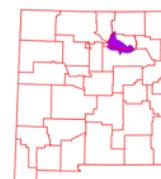
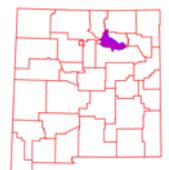




Figure 11. 303 (d) Impaired Waters



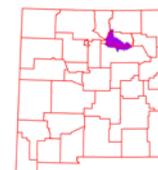
Hydrology

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 Mora Watershed, there is one body of water that is listed as impaired as of the 2010-12 listing cycle.

The listed water body covers 13 acres (.05 sq. km).

Probable Causes of Impairment	Morphy (Murphy) Lake
Aluminum	
Benthic-Macroinvertebrate Bioassessments	
Copper	
Dissolved Oxygen	X
Total Fecal and Coliform	
Gross Alpha - Adjusted	
Mercury	
Nutrient/Eutrophication	X
pH	X
Sedimentation/Siltation	
Specific Conductance	
Temperature	
Turbidity	
Zinc	
Ammonia (Un-ionized)	
Nitrogen, Nitrate	
Arsenic	

Table 7. Possible Causes of Impairment



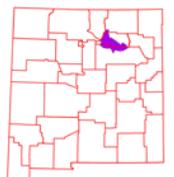
Hydrology - Declared Groundwater Basins

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. The Mora watershed is within two Underground Water Basins: the Canadian River and the Upper Pecos. Three percent of the watershed is not in a declared groundwater basin.

Groundwater Basin	Acres in Basin	Watershed Acres	% of Declared Basin
Canadian River	3,714,061	912,650	25%
Upper Pecos	2,425,228	6,262	<1%



Figure 12. Declared Groundwater Basins of the Mora.

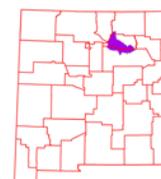


Threatened and Endangered Species ¹¹

Endangered species are those that are at risk of extinction throughout all or a significant portion of its native range. A threatened species is one that is likely to become endangered in the foreseeable future. The New Mexico Natural Heritage program tracks the status of threatened and endangered species which are listed on both federal and state lists. Table 8 lists those species which are currently listed and tracked in the Mora River Watershed.

<u>Common Name</u>	<u>Scientific Name</u>	<u>Tax.Class</u>	<u>Family</u>	<u>Fed Status</u>	<u>State Status</u>
<u>Southern Redbelly Dace</u>	<u><i>Phoxinus erythrogaster</i></u>	Actinopterygii	Cyprinidae		E
<u>Rio Grande Cutthroat Trout</u>	<u><i>Oncorhynchus clarkii virginialis</i></u>	Actinopterygii	Salmonidae	C	
<u>Bald Eagle</u>	<u><i>Haliaeetus leucocephalus</i></u>	Aves	Accipitridae		T
<u>American Peregrine Falcon</u>	<u><i>Falco peregrinus anatum</i></u>	Aves	Falconidae		T
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Aves	Strigidae	LT	
<u>Southwestern Willow Flycatcher</u>	<u><i>Empidonax traillii extimus</i></u>	Aves	Tyrannidae	LE	E
<u>Star Gyro</u>	<u><i>Gyraulus crista</i></u>	Gastropoda	Planorbidae		T

Table 8. Threatened and Endanged Plant and Animal Species.

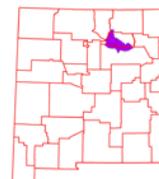


Invasive Species ¹²

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 Mora watershed, the SWEMP has identified 6 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>Cardaria draba (L.) Desv.</i>	Hoary Cress (Whitetop)
<i>Euphorbia esula L.</i>	Leafy Spurge
<i>Carduus natuans L.</i>	Musk Thistle
<i>Acroptilon repens L.</i>	Russian Knapweed
<i>Centaurea maculosa Lam.</i>	Spotted Knapweed
<i>Centaurea solstitialis L.</i>	Yellow Starthistle

Table 9. Invasive Species Recognized by the SWEMP.



Common Resource Areas¹³

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..

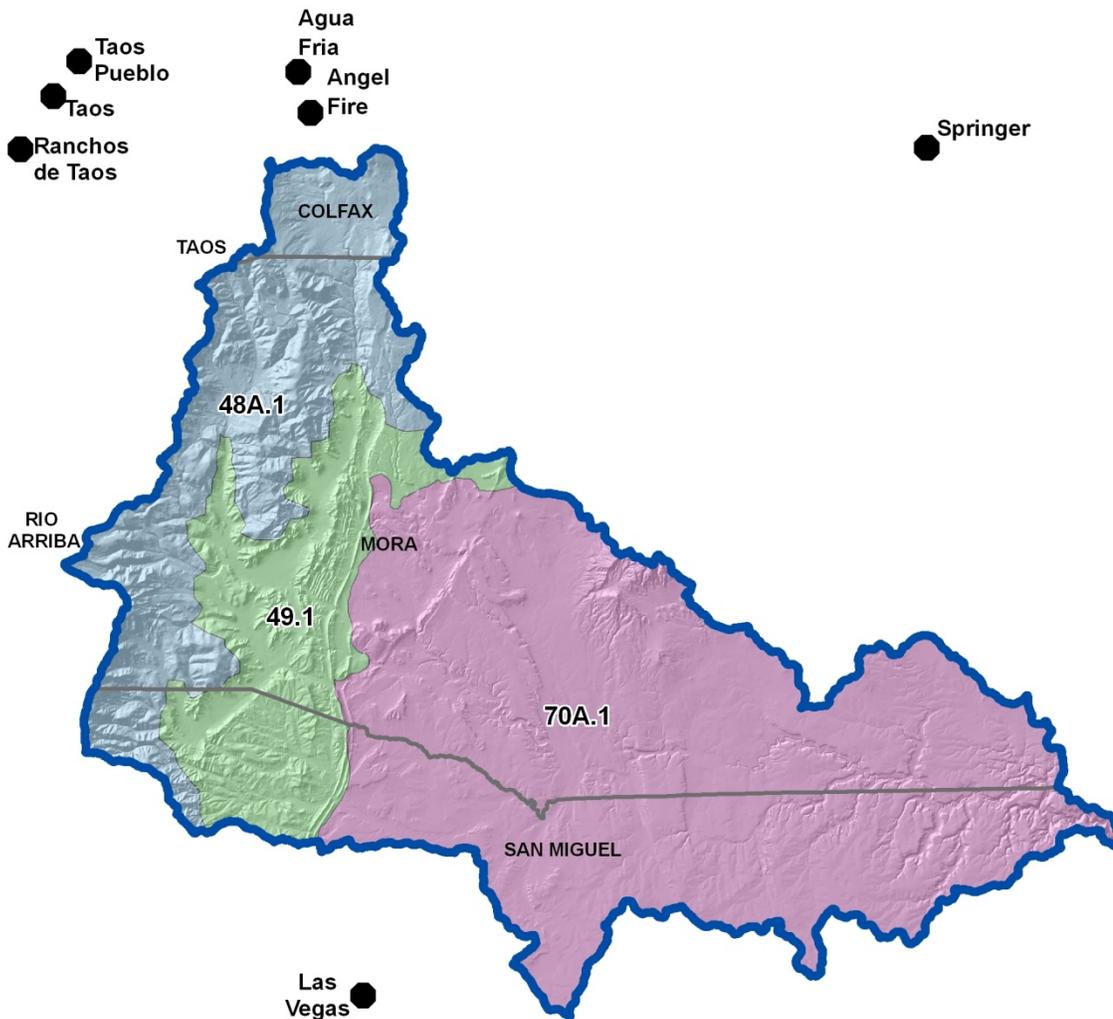
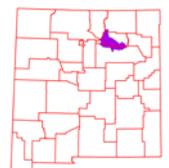


Figure 13. Common Resource Areas of the Mora Watershed



48.1 – Southern Rocky Mountains – High Mountains and Valleys

This area is best characterized by steep, high mountain ranges and associated mountain valleys. The temperature regimes are mostly frigid and cryic; moisture regimes are mainly ustic and udic. Vegetation is sagebrush-grass at low elevations, and with increasing elevation ranges from coniferous forest to alpine tundra. Elevations range from 6,500 to 14,400 feet.

49.1 – Southern Rocky Mountain Foothills

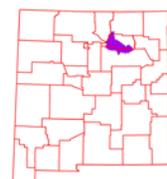
This area is generally a transition between the Great Plains and the Southern Rocky Mountains. The temperature regime is mesic or frigid, and moisture regime is ustic. Characteristic native vegetation ranges from grasslands and shrubs to ponderosa pine and Rocky Mountain Douglas fir forest.

70A.1 – Northern New Mexico Highlands

This unit is characterized by broad, rolling plains broken by closed basins and drainageways that have smooth-shaped valley floors. Rugged breaks are common in the northern part of the area. Native vegetation is mid- to short-grass prairie species in the lowlands, with pinyon and juniper in the higher elevations and on the breaks. The soils are formed in weathered sedimentary rocks of Cretaceous age and igneous rocks of Tertiary and Quaternary age.

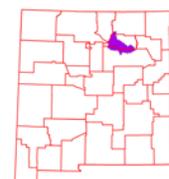
Conservation ¹⁴

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



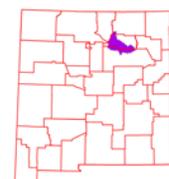
Conservation Practice	2007		2008		2009		2010		2011		TOTAL	
	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres	#	Acres
Access Control			10	173							10	173
Brush Management	4	37	2	82	3	44			3	13	12	176
Cover Crop							2	6			2	6
Critical Area Planting			1	2							1	2
Forage and Biomass Planting	2	29			4	37	6	110	6	45	18	221
Forage Harvest Management					4	21					4	21
Forest Stand Improvement	11	198	4	120	11	149	30	573	31	435	87	1475
Fuel Break									4	24	4	24
Integrated Pest Management							4	997	1	2160	5	3157
Irrigation System, Sprinkler							3	136			3	136
Irrigation Water Management					1	3	1	10	1	10	3	23
Land Smoothing	1	3	1	5			1	37	2	35	5	80
Monitor Key Grazing Areas to Improve Grazing Management									1	135	1	135
Prescribed Grazing	3	102	13	783	7	7567	23	3299	13	1106	59	12857
Range Planting					3	7	1	3	2	9	6	19
Rotation of Supplement and Feeding Areas									1	135	1	135
Tree/Shrub Establishment	1	2									1	2
Tree/Shrub Site Preparation									1	2160	1	2160
Upland Wildlife Habitat Management	3	102	20	1026	10	7552	28	4713	14	747	75	14140
Woody Residue Treatment					2	12	21	343	29	400	52	755
SUM (Σ)	25	473	51	2191	45	15392	120	10227	109	7414	350	35697

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
Above-Ground, Multi-Outlet Pipeline					1	300					1	300
Diversion			1	4	5	1000					6	1004
Fence	7	7104	1	1608	3	7640			3	6942	14	23294
Forest Trails and Landings									1	2160	1	2160
Grade Stabilization Structure			1		2		9		11		23	
Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic			1	980	3	2968	2	35	1	829	7	4812
Irrigation Water Conveyance, Pipeline, Low-Pressure, Underground, Plastic	1	1551			2	1402	1	3310	1	1363	5	7626
Irrigation Water Conveyance, Pipeline, Rigid Gated Pipeline	2	2600			1	800					3	3400
Pipeline	1	1988					2	3652	7	26302	10	31942
Pond					2		1		1		4	
Pumping Plant	3				2		8		7		20	
Recycle 100% of Farm Lubricants									1		1	
Retrofit Watering Facility for Wildlife Escape									1		1	
Spring Development							1		1		2	
Structure for Water Control	4		4		11		4		5		28	
Water Well	3		2		3		4		5		17	
Watering Facility	3		3		6		13		17		42	
SUM (Σ)	24	13243	13	2592	41	14110	45	6997	62	37596	185	74538

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



Soil Resource Inventory ¹⁵

The Mora Watershed has a number of certified National Cooperative Soil Survey (NCSS) inventories. The National Forests in New Mexico generally 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.

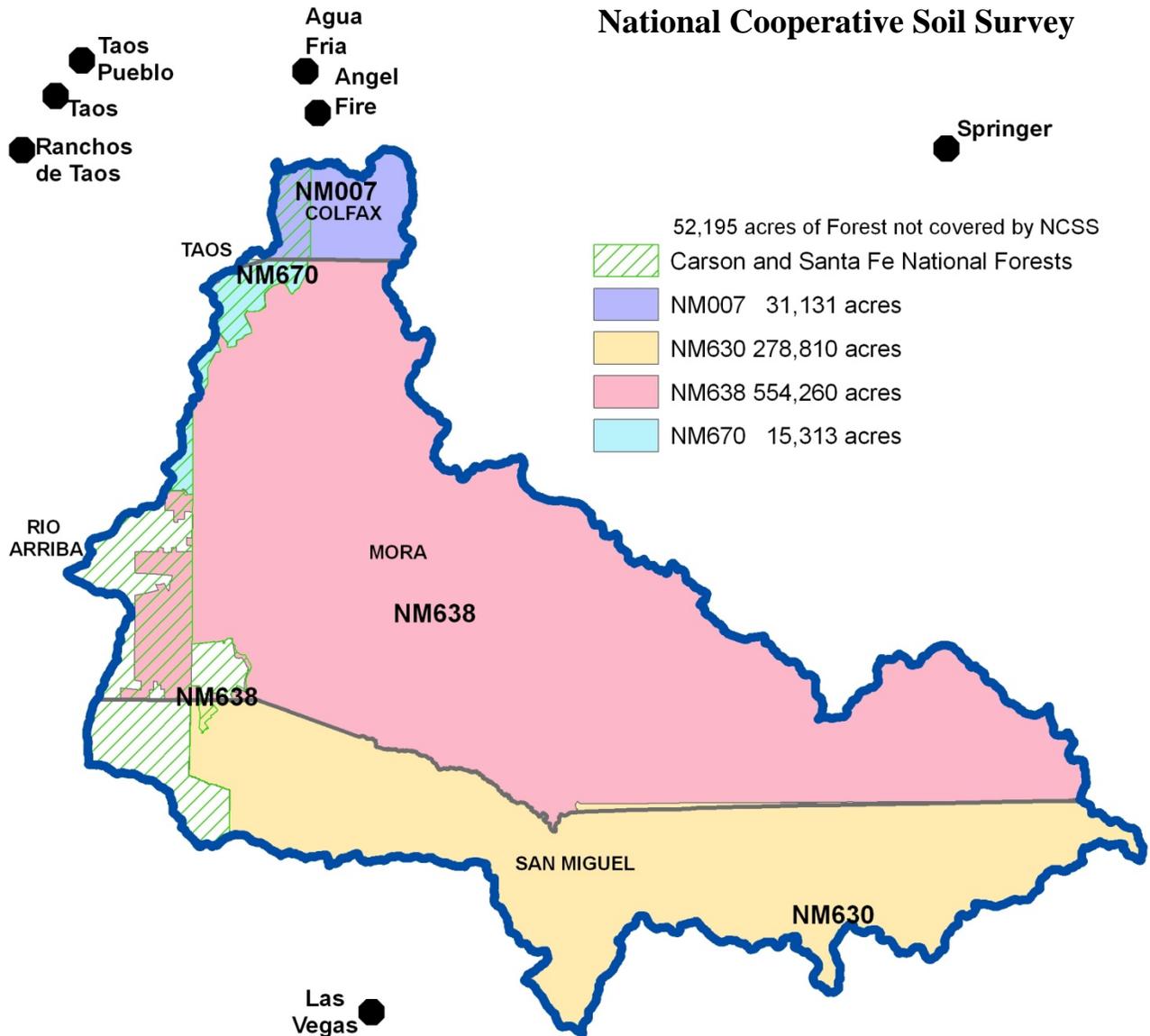
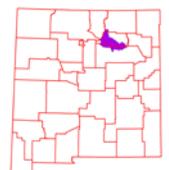


Figure 14. National Cooperative Soil Survey of Mora

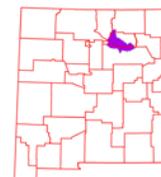


Soil Resource Inventory

In order to evaluate the susceptibility of erosion within the Mora 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 mapunit 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
100.0 - 10.0	High	1
10.0 - 1.0	Moderately High	2
1.0 - 0.1	Moderately Low	3
0.1 - 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 this time.

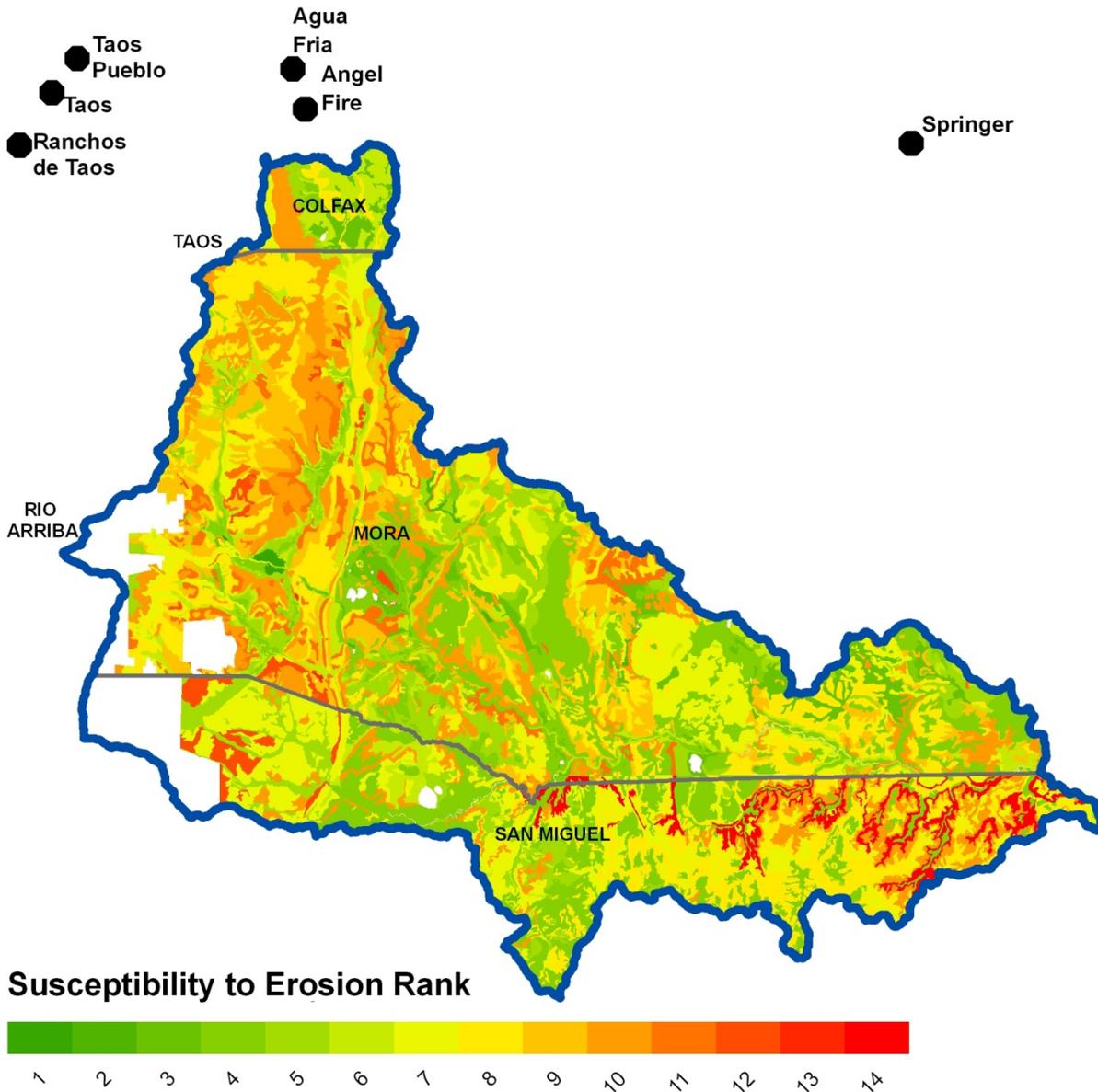
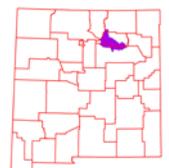


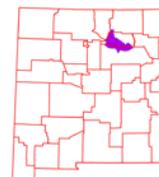
Figure 15. Erosion Potential of Mora Watershed



Soil Resource Inventory

Rank	Acres
1	1,186
2	1,176
3	28,481
4	161,345
5	80,287
6	58,283
7	136,788
8	150,866
9	75,945
10	118,356
11	30,542
12	12,110
13	189
14	21,226
Sum(Σ)	876,781

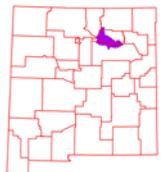
Table 13. Soil Erosion Potential Model Results. A greater rank indicates greater potential for erosion.



Socioeconomic Data ¹⁶

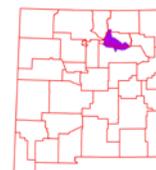
COUNTY	Total population: Total	Total population: Urban	Total population: Rural	Total Pop.: Rural Farm	Total Pop.: Rural Nonfarm	Total population: Hispanic or Latino	Total population: White alone	Total population: Black or African American alone	Total population: American Indian and Alaska Native alone	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 2010
Colfax	13,750	6,789	7,400	320	7,080	6,488	11,522	64	202	49	7	1,412	494	N/A
Mora	4,881	0	5,180	296	4,884	3,953	3,462	32	64	13	1	1,149	160	N/A
Rio Arriba	40,246	7,152	10,864	217	10,647	28,703	20,778	204	6,447	170	13	11,288	1,346	N/A
San Miguel	29,393	7,447	6,807	157	6,650	22,583	19,583	412	508	228	37	7,478	1,147	N/A
Taos	32,937	6,010	11,394	116	11,278	18,381	22,639	143	2,031	219	10	6,296	1,599	N/A

Table 14. Socioeconomic Data of the Counties in the Watershed (2010) except for green cells, not available yet from 2010 census so are 2000.

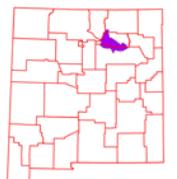


References

1. Thompson, B. and Ali, A., ed., 2009, *Water Resources Assessment of the Mora River*. Water Resources Program, UNM
<http://repository.unm.edu/bitstream/handle/1928/9704/june2009.pdf?sequence=1>
2. 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/>
3. Bureau of Land Management – New Mexico State Office. -
http://www.blm.gov/nm/st/en/prog/more/geographic_sciences/spatial_data_metadata.html
4. UNITED STATES GEOLOGICAL SURVEY - National Land Cover Dataset.
<http://landcover.United States Geological Survey.gov/>
5. Southwest Regional Gap Analysis Project (SWReGAP). <http://earth.gis.usu.edu/swgap/>
- 6.. UNITED STATES GEOLOGICAL SURVEY – National Hydrography Dataset.
<http://nhd.United States Geological Survey.gov/>
7. UNITED STATES GEOLOGICAL SURVEY - National Water Information System.
<http://waterdata.usgs.gov/nwis/rt>
8. State of New Mexico Clean Water Act 303(d)/305(b) Integrated Report
<ftp://ftp.nmenv.state.nm.us/www/swqib/303d-305b/2010/USEPA-Approved303dList.pdf>
9. United States Environmental Protection Agency -
http://cfpub.epa.gov/surf/huc.cfm?huc_code=11080004
10. New Mexico - Office of the State Engineer- http://www.ose.state.nm.us/water_info_data.html
11. New Mexico Natural Heritage Program - <http://nhnm.unm.edu/>
12. Southwest Exotic Plant Mapping Program -
<http://www.invasiveweeds.com/mapping/welcome.html>
13. Natural Resources Conservation Service – National Coordinated Common Resource Area (CRA) Geographic Database <http://soils.usda.gov/survey/geography/cra.html>
14. Natural Resources Conservation Service – Performance Results System
<http://ias.sc.egov.usda.gov/PRSHOME/>
15. Natural Resources Conservation Service – Soil Data Mart
<http://soildatamart.nrcs.usda.gov/>



16. United States Census Bureau - <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>



Helping People Help the Land

An Equal Opportunity Provider and Employer