

**UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE**

**ECOLOGICAL SITE DESCRIPTION**

**ECOLOGICAL SITE CHARACTERISTICS**

**Site Type:** Rangeland

**Site ID:** R070XD156NM

**Site Name:** Gravelly

**Precipitation or Climate Zone:** 13 to 18 inches

**Phase:** \_\_\_\_\_

## **PHYSIOGRAPHIC FEATURES**

### **Narrative:**

This site occurs on upland plains, fans, mesas, and drainageways. Slopes range from 0 to 6 percent. Direction of slope varies but is not significant. Elevations range from 4,000 to 7,000 feet above sea level.

### **Land Form:**

1. Plain
2. Fan
3. Drainageway

### **Aspect:**

1. N/A
- 2.
- 3.

<b>Elevation (feet)</b>	<b>Minimum</b> 4,000	<b>Maximum</b> 7,000
<b>Slope (percent)</b>	0	6
<b>Water Table Depth (inches)</b>	N/A	N/A
<b>Flooding:</b>	<b>Minimum</b>	<b>Maximum</b>
<b>Frequency</b>	N/A	N/A
<b>Duration</b>	N/A	N/A
<b>Ponding:</b>	<b>Minimum</b>	<b>Maximum</b>
<b>Depth (inches)</b>	N/A	N/A
<b>Frequency</b>	N/A	N/A
<b>Duration</b>	N/A	N/A

### **Runoff Class:**

Negligible to medium.

## CLIMATIC FEATURES

### **Narrative:**

The climate of this area is “semi-arid continental.”

The annual average precipitation ranges from 13 to 18 inches. Variations of 5 inches, more or less, are not uncommon. Approximately 70 percent of this occurs from May through October. Most of the summer precipitation comes in the form of high-intensity, short-duration thunderstorms. Winter moisture is usually negligible.

Distinct seasonal changes and large annual diurnal temperature changes characterize temperatures. The average annual temperature ranges from 55 to 60 degrees F. Extremes of 20 degrees F below zero in the winter to 110 degrees F in the summer is not uncommon.

The average frost-free season is 180 to 200 days. The last killing frost is in early April and the first killing frost is in mid October.

Both temperature and moisture favor warm-season plant growth. Due to gravel in the soil profile, the water intake is fast and penetration is deep. Because the soil has a low water-holding capacity, plants of this site must be able to take advantage of rain when it falls. Strong winds from the west and southwest blow from February through June. This accelerates soil drying within the root zone and further discourages cool-season plant growth.

Climate data was obtained from <http://www.wrcc.sage.dri.edu/summary/climsmnm.html> web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

	<b>Minimum</b>	<b>Maximum</b>
<b>Frost-free period (days):</b>	<u>160</u>	<u>191</u>
<b>Freeze-free period (days):</b>	<u>180</u>	<u>221</u>
<b>Mean annual precipitation (inches):</b>	<u>13</u>	<u>18</u>

**Monthly moisture (inches) and temperature (°F) distribution:**

	Precip. Min.	Precip. Max.	Temp. Min.	Temp. Max.
January	.47	.56	21.4	56.6
February	.50	.54	23.8	62.1
March	.49	.57	28.5	68.5
April	.54	.60	35.0	76.7
May	1.13	1.44	43.2	83.5
June	1.78	1.84	51.6	92.2
July	1.87	2.98	55.7	92.1
August	2.29	3.26	54.2	90.3
September	2.67	2.80	48.2	84.3
October	1.24	1.40	37.6	76.7
November	.53	.55	27.5	65.5
December	.60	.68	21.6	57.8

**Climate Stations:**

Station ID	<u>292865</u>	Location	<u>Elk 2E</u>	From:	<u>6/1/1895</u>	To:	<u>12/31/00</u>
					Period		
Station ID	<u>294112</u>	Location	<u>Hope</u>	From:	<u>03/01/19</u>	To:	<u>12/31/00</u>

**INFLUENCING WATER FEATURES**

**Narrative:**

This site is not influenced by water from a wetland or stream.

**Wetland description:**

System	Subsystem	Class
N/A		

**If Riverine Wetland System enter Rosgen Stream Type:**

N/A

## REPRESENTATIVE SOIL FEATURES

### **Narrative:**

The soils of this site are deep to moderately deep and well drained. Surface textures are gravelly loams and gravelly fine sandy loams. Permeability is moderate to moderately rapid and water-holding capacity is low. Because the soils are well drained and have a low water-holding capacity, this site has a droughty appearance. Plant roots can be deep on shrub species.

**Parent Material Kind:** Alluvium

**Parent Material Origin:** Mixed

### **Surface Texture:**

1. Gravelly loam

2. Gravelly fine sandy loam

3.

### **Surface Texture Modifier:**

1. Gravel

2.

3.

**Subsurface Texture Group:** loamy

**Surface Fragments <=3" (% Cover):** 15 to 35

**Surface Fragments >3" (% Cover):** 15 to 35

**Subsurface Fragments <=3" (%Volume):** >60

**Subsurface Fragments >=3" (%Volume):** 35 to 60

	<b>Minimum</b>	<b>Maximum</b>
<b>Drainage Class:</b>	Well	Well
<b>Permeability Class:</b>	Moderately slow	Moderately rapid
<b>Depth (inches):</b>	60	>72
<b>Electrical Conductivity (mmhos/cm):</b>	Unknown	Unknown
<b>Sodium Absorption Ratio:</b>	Unknown	Unknown
<b>Soil Reaction (1:1 Water):</b>	Unknown	Unknown
<b>Soil Reaction (0.1M CaCl<sub>2</sub>):</b>	Unknown	Unknown
<b>Available Water Capacity (inches):</b>	3	6
<b>Calcium Carbonate Equivalent (percent):</b>	Unknown	Unknown

## **PLANT COMMUNITIES**

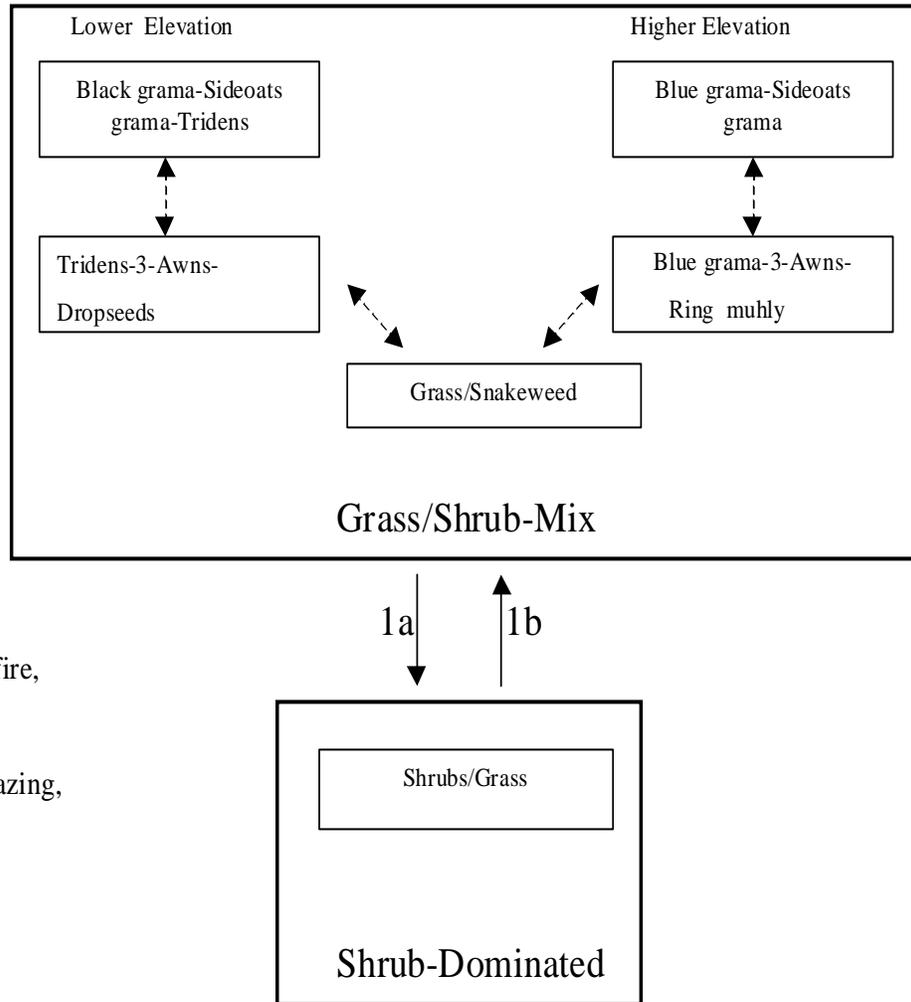
### **Ecological Dynamics of the Site:**

#### **Overview**

This site is associated with Limestone Hills and Shallow sites. The Gravelly site typically occurs in a mosaic with shallow sites, on valley terraces, and on fans at the base of Limestone Hills. The historic plant community of the Gravelly site is a grass/shrub-mix, dominated by grasses, with shrubs abundant and evenly distributed. Black grama is the dominant grass species at lower to mid-elevations, with blue grama dominating at higher elevations. This site is susceptible to encroachment by shrubs. Loss of grass cover, a decrease in natural fire regimes, and resource competition between shrubs and grasses may facilitate the transition to a shrub-dominated state.

**Plant Communities and Transitional Pathways (diagram)**

MLRA 70, CP-4 Gravelly



1a. Loss of grass cover, lack of fire, resource competition by shrubs.

1b. Brush control, prescribed grazing, prescribed fire.

State and Transition Model photos will be posted as they become available.

**Plant Community Name:** Historic Climax Plant Community

**Plant Community Sequence Number:** 1 **Narrative Label:** HCPC

**Plant Community Narrative:** State Containing Historic Climax Plant Community

**Grass/Shrub-Mix:**

In the historic plant community, black grama is the dominant grass species with sideoats grama occurring as the sub-dominant. Other species that occur in significant numbers include tridens species, blue grama, dropseeds, threeawns, ring muhly, and burrograss. At higher elevations blue grama typically dominates with sideoats grama as the sub-dominant. There is also an increase in cool season grasses such as New Mexico feathergrass and bottlebrush squirreltail. There is a wide variety of shrubs/succulents that can occur on this site. Species such as catclaw mimosa, yucca, creosotebush, javalina bush, sotol, and ocotillo are more typical of the lower to mid-elevations, while juniper, mountain mahogany, and skunkbush sumac are more common as elevation increases. Continuous heavy grazing will cause a decrease in black grama, sideoats grama, New Mexico feathergrass, fourwing saltbush, and winterfat. A corresponding increase in ring muhly, threeawns, tridens, dropseeds, and broom snakeweed will occur along with an increase in bare ground. At lower elevations a community with tridens, threeawns, and dropseeds as the dominant species may occur in response to grazing pressure and/or drought. At higher elevations blue grama may remain dominant with threeawns and ring muhly becoming sub-dominant. A Grass/Snakeweed community with broom snakeweed as the sub-dominant species may occur in response to increased fall/spring moisture, and livestock grazing pressure.

**Diagnosis:** Grass cover is relatively uniform, however, bare ground and rock fragments make up a large percent of the total ground cover, and grass production during unfavorable years may only average 200 pounds per acre. Shrubs/succulents are abundant with canopy cover averaging 12 percent. Evidence of erosion such as rills and gullies are infrequent.

**Canopy Cover:**

Trees	6 %
Shrubs and half shrubs	6 %
Ground Cover (Average Percent of Surface Area).	
Grasses & Forbs	28
Bare ground	37
Surface cobble and stone	15
Litter (percent)	8
Litter (average depth in cm.)	2

**Plant Community Annual Production (by plant type):** \_\_\_\_\_

Plant Type	Annual Production (lbs/ac)		
	Low	RV	High
Grass/Grasslike	189	410	630
Forb	30	65	100
Tree/Shrub/Vine	60	130	200
Lichen			
Moss			
Microbiotic Crusts			
<b>Total</b>	300	650	1,000

**Plant Community Composition and Group Annual Production:**

**Plant Type - Grass/Grasslike**

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
1	BOER4	Black Grama	130 – 228	130 – 228
2	BOCU	Sideoats Grama	98 – 163	98 – 163
3	TRIDE	Tridens spp.	65 – 130	65 – 130
4	BOGR2	Blue Grama	33 – 65	33 – 65
5	SPCR SPFL2 SPCO4	Sand Dropseed Mesa Dropseed Spike Dropseed	65 – 130	65 – 130
6	HENE5	New Mexico Feathergrass	13 – 33	13 – 33
7	ARIST	Threawn spp.	33 – 65	33 – 65
8	MUTO2 SCBR2	Ring Muhly Burrograss	33 – 65	33 – 65
9	2GRAM	Other Grasses	7 – 33	7 - 33

**Plant Type - Forb**

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
10	DYPA	Fetid Marigold	20 – 33	20 – 33
11	PLPA2	Wooly Indianwheat	20 – 33	20 – 33
12	CRTE4	Texas Croton	20 – 33	20 – 33
13	THAC ERIOG	Prickleleaf Dogweed Wildbuckwheat	13 – 26	13 – 26
14	2FORBS	Other Forbs	20 – 33	20 - 33

**Plant Type – Tree/Shrub/Vine**

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
15	ACGR	Catclaw Mimosa	33 – 65	33 – 65
16	YUCCA	Yucca spp.	20 – 33	20 – 33
17	GUSA2	Broom Snakeweed	7 – 20	7 – 20
18	FAPA	Apacheplume	7 – 20	7 – 20
19	ATCA2	Fourwing Saltbush	7 – 20	7 – 20
20	KRLA2	Winterfat	7 – 20	7 – 20
21	2SD	Other Shrubs	13 – 33	13 – 33

**Plant Type - Lichen**

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

**Plant Type - Moss**

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

**Plant Type - Microbiotic Crusts**

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

Other grasses that could appear on this site include: hairy grama, Hall’s panicum, bottlebrush squirreltail, plains lovegrass, plains bristlegrass, little bluestem, tobosa, wolftail, and curlyleaf muhly.

Other shrubs include: cactus spp., mariola, century plant, lechuguila, yerba-de-pasmo, algerita, creosotebush, mountainmahogany, ephedra spp., ocotillo, sotol, sumac spp., althorn, javelina bush, and sacahuista.

Other forbs include: desert holly, verbena, fleabane, senna spp., bladderpod, yarrow, globemallow spp., penstemon, wooly paperflower, and euphorbia spp.

**Plant Growth Curves**

Growth Curve ID 4606NM

Growth Curve Name: HCPC

Growth Curve Description: Perennial warm-season mid/short grassland with shrubs.

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0	0	3	5	10	10	25	30	12	5	0	0

**Additional States:**  
**Shrub-Dominated:**

This state is characterized by the predominance of shrubs, with perennial grasses as the subordinate component. Shrubs may become dominant with little initial increase in density as a result of decreased grass cover. Shrubs may also dominate as a result of shrub encroachment and increased shrub densities. Different species of shrubs may dominate depending on elevation and available soil moisture. Catclaw mimosa may dominate at lower elevations, usually forming thickets in localized areas with tridens and/or threeawns as the primary grasses. Juniper dominates at higher elevations with blue grama as the subordinate component. In the juniper-dominated community and the catclaw mimosa-dominated community, other succulents and shrubs such as yucca, cholla, pricklypear, sumac species, and algerita also typically increase in representation.

Diagnosis: Shrubs are dominant. Grass cover is patchy with large connected bare areas present. Threeawns, tridens and blue grama are the primary grass species.

**Transition to Shrub-Dominated (1a)** Loss of grass cover, resource competition between shrubs and grasses, and lack of fire are all believed to facilitate shrub dominance. Competition for resources in conjunction with drought, and overgrazing may favor shrub encroachment. During years of limited rainfall, good grass cover may suppress shrub seedling survival by competing directly for soil moisture. Competition is more important during shrub seedling establishment when their roots are in the same zone as the grasses.<sup>2</sup> During this time shrub seedlings and grasses may be competing directly for soil moisture. Overgrazing may facilitate the establishment of shrub seedlings by providing competition free areas, but livestock exclusion alone would not prevent shrub expansion. During wet years competition for available soil moisture is reduced and shrub seedlings may establish in good stands of grass,<sup>2</sup> and the natural spatial variability of ground cover may allow shrubs to establish on bare areas within good grass stands when adequate moisture is available.<sup>1</sup> If fire was historically important in the development of Gravelly Site plant communities, by suppressing shrub seed production and survival, then restoration of natural fire regimes may be valuable in maintaining grass dominance.

Key indicators of approach to transition:

- Decrease or change in composition or distribution of grass cover.
- Increase in size and frequency of bare patches.
- Increase in amount of shrub seedlings.

**Transition back to Grass/Shrub -Mix (1b)** Brush control is necessary to initiate the transition back to grass dominance. Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover. Once the transition back to the Grassland State is achieved prescribed fire may help in maintaining grass dominance.<sup>3</sup>

## **ECOLOGICAL SITE INTERPRETATIONS**

### **Animal Community:**

Habitat for Wildlife:

This site provides habitat for a resident animal community characterized by desert cottontail, spotted ground squirrel, Merriam's kangaroo rat, cactus mouse, white throated woodrat, coyote, Swainson's hawk, roadrunner, cactus wren, morning dove, scaled quail, leopard lizard, prairie rattlesnake, spadefoot toad, and marbled whiptail. Where associated with other sites, such as limestone hills, mule deer use this site for feeding.

### **Hydrology Functions:**

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups.

#### **Hydrologic Interpretations**

<b>Soil Series</b>	<b>Hydrologic Group</b>
Pena	B
Tencee	D

### **Recreational Uses:**

This site offers some recreation potential for horseback riding, hiking, rock hunting, nature photography, and bird hunting. Trapping for fur-bearing animals is good. During years of high moisture, a colorful display of wildflowers is present.

### **Wood Products:**

This site has no value for wood products.

**Other Products:****Grazing:**

This site is well suited for grazing by all kinds and classes of livestock, during all seasons of the year. Predator control is needed during calving season and if grazing sheep or goats. This site responds well to a system of grazing which rotates the season of use. Livestock management must be flexible to take advantage of extra production or to keep from harming desirable plant species during dry years. Under retrogression, there will be a decrease in black and sideoats grama, New Mexico feathergrass, fourwing saltbush, and winterfat. A corresponding increase in ring muhly, burrograss, threeawns, broom snakeweed and dropseeds will occur along with an increase in bare ground. In this condition, the water erosion hazard would increase.

**Other Information:****Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month**

<b>Similarity Index</b>	<b>Ac/AUM</b>
100 - 76	3.5 – 4.5
75 – 51	4.0 – 5.5
50 – 26	5.0 – 9.0
25 – 0	9.0+

Plant Part	Code	Species Preference	Code
Stems	S	None Selected	NS
Leaves	L	Preferred	P
Flowers	F	Desirable	D
Fruits/Seeds	F/S	Undesirable	U
Entire Plant	EP	Not Consumed	NC
Underground Parts	UP	Emergency	E
		Toxic	T

**Plant Preference by Animal Kind:**

**Animal Kind:** Livestock

**Animal Type:** Cattle

Common Name	Scientific Name	Plant Part	Forage Preferences												
			J	F	M	A	M	J	J	A	S	O	N	D	
Blue Grama	<i>Bouteloua gracilis</i>	EP	D	D	D	D	P	P	P	P	P	P	D	D	D
Black Grama	<i>Bouteloua eriopoda</i>	EP	P	P	P	D	D	D	D	D	D	D	D	P	P
Sideoats Grama	<i>Bouteloua curtipendula</i>	EP	P	P	P	P	P	P	P	P	P	P	P	P	P
New Mexico Feathergrass	<i>Hesperostipa neomexicana</i>	EP	D	D	P	P	P	D	D	D	D	D	D	D	D
Fourwing Saltbush	<i>Atriplex canescens</i>	EP	P	P	P	P	P	D	D	D	D	D	D	D	P
Winterfat	<i>Krascheninnikovia lanata</i>	EP	D	D	P	P	P	P	P	P	P	D	D	D	D

**Animal Kind:** Livestock

**Animal Type:** Sheep

Common Name	Scientific Name	Plant Part	Forage Preferences												
			J	F	M	A	M	J	J	A	S	O	N	D	
Blue Grama	<i>Bouteloua gracilis</i>	EP	D	D	D	D	P	P	P	P	P	P	D	D	D
Black Grama	<i>Bouteloua eriopoda</i>	EP	P	P	P	D	D	D	D	D	D	D	D	P	P
Sideoats Grama	<i>Bouteloua curtipendula</i>	EP	P	P	P	P	P	P	P	P	P	P	P	P	P
Fourwing Saltbush	<i>Atriplex canescens</i>	EP	D	D	P	P	P	P	P	P	P	D	D	D	D
Winterfat	<i>Krascheninnikovia lanata</i>	EP	P	P	P	P	P	P	P	P	P	P	P	P	P
Croton spp.	<i>Croton</i> spp.	EP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Wildbuckwheat	<i>Eriogonum</i> spp.	EP	U	U	D	D	D	D	D	D	D	U	U	U	U

**Animal Kind:** Livestock

**Animal Type:** Goats

Common Name	Scientific Name	Plant Part	Forage Preferences												
			J	F	M	A	M	J	J	A	S	O	N	D	
Fourwing Saltbush	<i>Atriplex canescens</i>	EP	P	P	D	D	D	D	D	D	D	D	D	D	P
Winterfat	<i>Krascheninnikovia lanata</i>	EP	D	D	D	D	D	D	D	D	D	D	D	D	D
Sideoats Grama	<i>Bouteloua curtipendula</i>	EP	P	P	P	P	P	P	P	P	P	P	P	P	P

**Animal Kind:** Wildlife

**Animal Type:** Quail

Common Name	Scientific Name	Plant Part	Forage Preferences											
			J	F	M	A	M	J	J	A	S	O	N	D
Black Grama	<i>Bouteloua eriopoda</i>	F/S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Sideoats Grama	<i>Bouteloua curtipendula</i>	F/S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Croton spp.	<i>Croton</i> spp.	F/S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Catclaw Mimosa	<i>Mimosa aculeaticarpa</i>	F/S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

## **SUPPORTING INFORMATION**

### **Associated sites:**

Site Name	Site ID	Site Narrative

### **Similar sites:**

Site Name	Site ID	Site Narrative

### **State Correlation:**

This site has been correlated with the following sites: \_\_\_\_\_

### **Inventory Data References:**

Data Source	# of Records	Sample Period	State	County

### **Type Locality:**

State: New Mexico

County: Chavez, Eddy, Lincoln, Otero

Latitude: \_\_\_\_\_

Longitude: \_\_\_\_\_

Township: \_\_\_\_\_

Range: \_\_\_\_\_

Section: \_\_\_\_\_

Is the type locality sensitive?    Yes             No

General Legal Description: \_\_\_\_\_

### **Relationship to Other Established Classifications:**

### **Other References:**

Data collection for this site was done in conjunction with the progressive soil surveys within the Pecos-Canadian Plains and Valleys 70 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: Otero, Eddy, Chaves, Lincoln

### **References**

1. Brown, J. R. and S. Archer. 1999. Shrub invasion of grassland: recruitment is continuous and not regulated by herbaceous biomass or density. *Ecology* 80:2385-2396.
2. Johnsen, T. N., Jr. 1962. One-seeded juniper invasion of northern Arizona grasslands. *Ecological Monographs*. 32:187-207.
3. Wright, H.A., and A.W. Bailey. 1982. *Fire ecology: United States and southern Canada*. New York: John Wiley and Sons. 501p.

<b>Characteristic Soils Are:</b>	
Pena	Tencee
<b>Other Soils included are:</b>	

**Site Description Approval:**

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Don Sylvester	02/02/82	Donald H. Fulton	03/03/82

**Site Description Revision:**

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Elizabeth Wright	07/12/02	George Chavez	12/17/02
David Trujillo	10/29/03		10/29/03