

UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION

**ECOLOGICAL SITE CHARACTERISTICS**

Site Type: Rangeland

Site ID: R042XC030NM

Site Name: Limy

Precipitation or Climate Zone: 10 to 13 inches

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

## PHYSIOGRAPHIC FEATURES

### Narrative:

This site occurs on plains, fans and terraces or adjacent to playa lake beds. Slopes are level to gently undulating, usually less than 5 percent. Direction of slope varies and is not significant. Elevations range from 2,842 to 4,500 feet.

### Land Form:

1. Plain

2. Fan

3. Terrace

### Aspect:

1. N/A

2.

3.

|                            |         |         |
|----------------------------|---------|---------|
|                            | Minimum | Maximum |
| Elevation (feet)           | 2,842   | 4,500   |
| Slope (percent)            | 0       | 5       |
| Water Table Depth (inches) | N/A     | N/A     |
|                            | Minimum | Maximum |
| Flooding:                  |         |         |
| Frequency                  | N/A     | N/A     |
| Duration                   |         |         |
|                            | Minimum | Maximum |
| Ponding:                   |         |         |
| Depth (inches)             | N/a     | N/a     |
| Frequency                  |         |         |
| Duration                   |         |         |

### Runoff Class:

## CLIMATIC FEATURES

### Narrative:

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity short duration thunderstorms.

Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer.

The average frost-free season is 207 to 220 days. The last killing frost is in late March or early April and the first killing frost in late October or early November.

Temperature and rainfall both favor warm season perennial plant growth. In years of abundant moisture, annual forbs and cool season grasses can make up an important component of the site. Strong winds blow from the west and southwest from January through June, which accelerate soil drying during a critical period for cool season plant growth.

|                                     | Minimum | Maximum |
|-------------------------------------|---------|---------|
| Frost-free period (days):           | 180     | 221     |
| Freeze-free period (days):          | 199     | 240     |
| Mean annual precipitation (inches): | 10.0    | 13.0    |

### Monthly moisture (inches) and temperature (<sup>0</sup>F) distribution:

|           | Precip. Min. | Precip. Max. | Temp. Min. | Temp. Max. |
|-----------|--------------|--------------|------------|------------|
| January   | 0.40         | 0.42         | 20.6       | 59.7       |
| February  | 0.40         | 0.41         | 25.2       | 65.6       |
| March     | 0.41         | 0.43         | 31.4       | 72.7       |
| April     | 0.58         | 0.63         | 40.4       | 81.5       |
| May       | 1.28         | 1.35         | 49.6       | 88.7       |
| June      | 1.40         | 1.46         | 59.1       | 95.4       |
| July      | 1.62         | 1.64         | 63.3       | 96.4       |
| August    | 1.79         | 1.84         | 61.6       | 94.8       |
| September | 1.81         | 2.20         | 54.1       | 88.5       |
| October   | 1.16         | 1.41         | 40.7       | 80.4       |
| November  | 0.43         | 0.47         | 28.4       | 68.7       |
| December  | 0.48         | 0.51         | 20.9       | 61.1       |

### Climate Stations:

- (1) NM0600, Artesia, NM - Period of record 1961 - 1990
- (2) NM0992, Bitter Lakes WL Refuge, NM - Period of record 1961 - 1990
- (3) NM1469, Carlsbad, NM - Period of record 1961 - 1990
- (4) NM293792, Hagerman, NM - Period of record 1961 - 1990
- (5) NM299563, Waste Isolation Plant, NM - Period of record 1961 - 1990
- (2) NM4346, Jal, NM - Period of record 1961 - 1990

## INFLUENCING WATER FEATURES

**Narrative:**

This site is not influenced by wetlands or streams.

**Wetland description:**

| System | Subsystem | Class |
|--------|-----------|-------|
|        |           |       |

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

N/A

## REPRESENTATIVE SOIL FEATURES

**Narrative:**

The soils of this site are deep and well drained with high lime horizons above 20 inches which may be weakly cemented. The surface layers are fine sandy loam, very fine sandy and loam. They are strongly calcareous. The underlying layers may be loam, clay loam or silt loam. Permeability is moderate and the available water holding capacity is moderate. Because of the high lime content and rather coarse textures, the soils are easily windblown if not protected by vegetation.

Parent Material Kind: Marine Deposits

Parent Material Origin: Mixed-Calcareous

**Surface Texture:**

|                         |
|-------------------------|
| 1. Fine sandy loam      |
| 2. very fine sandy loam |
| 3. loam                 |

**Surface Texture Modifier:**

|        |
|--------|
| 1. N/A |
| 2.     |

Subsurface Texture Group: Fine sandy loam, Loam,

Surface Fragments <=3" (% Volume): 2 to 26

Surface Fragments >3" (% Volume): N/A

Subsurface Fragments <=3" (%Volume): N/A

Subsurface Fragments >=3" (%Volume): N/A

|  | Minimum<br>moderately well<br>drained | Maximum<br>well drained |
|--|---------------------------------------|-------------------------|
| Drainage Class:                          |                                       |                         |
| Permeability Class:                      | slow                                  | moderately slow         |
| Depth (inches):                          | 20                                    | >72                     |
| Electrical Conductivity (mmhos/cm):      | 0.0                                   | 4.0                     |
| Sodium Absorption Ratio:                 | N/A                                   | N/A                     |
| Soil Reaction (1:1 Water):               | 7.9                                   | 9.0                     |
| Soil Reaction (0.1M CaCl <sub>2</sub> ): | N/A                                   | N/A                     |
| Available Water Capacity (inches):       | 0                                     | 7                       |
| Calcium Carbonate Equivalent (percent):  | N/A                                   | N/A                     |

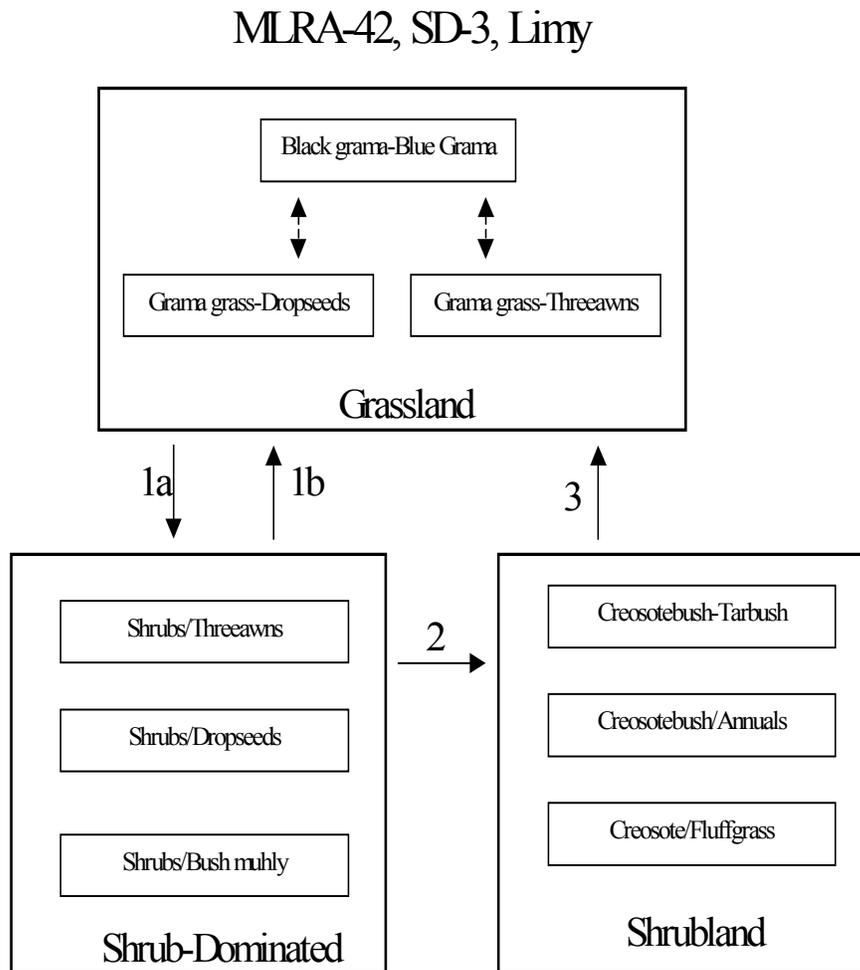
## **PLANT COMMUNITIES**

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

#### **Overview**

The Limy site occurs on nearly level or slightly concave upland plains, fans, and terraces, or adjacent to playa lakebeds. The Limy site can occur as a distinct unit adjacent to, or as part of, a mosaic with Loamy, Sandy, and Shallow Sandy sites. A soil layer high in lime, of soft or weakly cemented calcium carbonate, usually within two feet of the soil surface, distinguishes the Limy site. The historic plant community of the Limy site exhibits a grassland aspect, with shrubs and half shrubs noticeable and evenly scattered. Grasses account for approximately 65 to 80 percent of the total potential production. Black grama and blue grama are the dominant grass species. Yucca, winterfat, and ephedra are common shrubs. Overgrazing and/or extended drought can reduce grass cover, effect a change in grass species dominance, and may result in a shrub-dominated state. Decreased fire frequency may also play a key role in the transition to shrub dominance.<sup>1</sup> Resource competition by shrubs, continued loss of grass cover, and resulting erosion may initiate the transition to a shrubland state.

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



1a. Loss of grass cover due to overgrazing or drought, decreased fire frequency.

1b. Brush control, prescribed grazing.

2. Continued loss of grass cover, competition by shrubs, erosion.

3. Brush control, range seeding, prescribed grazing.

## Plant Communities Photo Display & Descriptive Diagnosis

MLRA 42; SD-3; Limy

### Shrubland State



- Creosote-Tarbush community
- Very little grass cover
- Large connected bare areas present
- Jal soil series, southern part of Lea Co., NM

Plant Community Name: Historic Climax Plant Community

Plant Community Sequence Number: 1 Narrative Label: HCPC

State Containing Historic Plant Community:

Grassland: The historic plant community is dominated by black, and blue grama. Black grama densities tend to be highest on soils with sandy loam surface textures, and blue grama on soils with loam surface textures. Bush muhly, hairy grama, plains bristlegrass, and sand dropseed also occur in significant amounts. Yucca, winterfat, and ephedra species are the dominant shrubs of the historic community. Fourwing saltbush, creosotebush, tarbush, and broom snakeweed typically occur as sub-dominants. Threadleaf groundsel, wooly groundsel, Leatherweed croton, and bladderpod are forbs commonly found across the site. Extended periods of drought, or drought in combination with heavy grazing can cause a decrease in plants such as black grama, blue grama, bush muhly, vine mesquite, Arizona cottontop, winterfat, and fourwing saltbush. Dropseeds and threeawns may increase in representation and become co-dominant to black or blue grama. Dropseeds and threeawns produce ample viable seed and are not as palatable as either black or blue grama, especially during the dormant season. Threeawns can take advantage of early spring, as well as summer moisture, enabling it to quickly establish following drought. Creosotebush, tarbush, broom snakeweed, fluffgrass and burrograss increase with further site degradation. This increase in shrubs and associated loss of grass cover, perhaps in conjunction with decreased fire frequency may result in a shrub-dominated state.

Diagnosis: Black grama and blue grama are the dominant grasses. Grass cover is uniformly distributed with few large bare areas. Yucca, winterfat, and ephedra species are the dominant shrubs. Fourwing saltbush is present.

**Ground Cover (Average Percent of Surface Area).**

|  |         |
|--|---------|
| Grasses & Forbs                        | 20 – 30 |
| Bare ground                            | 25 – 35 |
| Surface gravel                         |         |
| Surface cobble and stone               | 10 – 15 |
| Litter (percent)                       | 12 – 15 |
| Litter (average depth in cm.)          | 2       |
| Canopy Cover (shrubs, and half-shrubs) | 0 - 7   |

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

| Plant Type         | Annual Production (lbs/ac) |     |       |
|--------------------|----------------------------|-----|-------|
|                    | Low                        | RV  | High  |
| Grass/Grasslike    | 380                        | 703 | 1026  |
| Forb               | 60                         | 111 | 162   |
| Tree/Shrub/Vine    | 60                         | 111 | 162   |
| Lichen             |                            |     |       |
| Moss               |                            |     |       |
| Microbiotic Crusts |                            |     |       |
| Totals             | 500                        | 925 | 1,350 |

**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         | 93                        | 139                     |
| 2            | MUPO2                   | bush muhly          | 46                        | 93                      |
| 3            | BOGR2                   | blue grama          | 93                        | 185                     |
|              | BOHI2                   | hairy grama         |                           |                         |
| 4            | SEVU2                   | plains bristlegrass | 93                        | 139                     |
|              | SPCR                    | sand dropseed       |                           |                         |
| 5            | DAPU7                   | fluffgrass          | 28                        | 46                      |
|              | MUTO2                   | ring muhly          |                           |                         |
| 6            | ARIST                   | threeawns           | 28                        | 46                      |
| 7            | SCBR2                   | burrograss          | 28                        | 46                      |
| 8            | PAOB                    | vine-mesquite       | 28                        | 46                      |
|              | DICA8                   | Arizona cottontop   |                           |                         |
| 9            | 2GP                     | Other grasses       | 28                        | 46                      |

Plant Type - Tree/Shrub/Vine

| Group Number | Scientific Plant Symbol | Common Name       | Species Annual Production | Group Annual Production |
|--------------|-------------------------|-------------------|---------------------------|-------------------------|
| 10           | YUCCA                   | Yucca             | 46                        | 93                      |
| 11           | KRLA2                   | winterfat         | 46                        | 93                      |
|              | EPHED                   | ephedra spp.      |                           |                         |
| 12           | ATCA2                   | fourwing saltbush | 19                        | 46                      |
| 13           | LATR2                   | creosote bush     | 28                        | 46                      |
|              | FLCE                    | American tarbush  |                           |                         |
|              | GUSA2                   | broom shakeweed   |                           |                         |
| 14           | 2SHRUB                  | other shrubs      | 19                        | 46                      |

Plant Type – Forb

| Group Number | Scientific Plant Symbol | Common Name          | Species Annual Production | Group Annual Production |
|--------------|-------------------------|----------------------|---------------------------|-------------------------|
| 15           | SEFLF                   | threadleaf groundsel | 28                        | 46                      |
|              | PACAL5                  | wooly groundsel      |                           |                         |
| 16           | CRPOP                   | leatherweed croton   | 19                        | 46                      |
| 17           | LESQU                   | bladderpod           | 19                        | 46                      |
| 18           | 2FORB                   | other forbs          | 19                        | 46                      |

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 which could appear on this site include: ear muhly, mat muhly, sideoats grama, mesa dropseed, alkali sacaton, Hall’s panicum and cane bluestem.

Other woody plants include: javalinabush, mesquite and cholla.

Other forbs include: wooly paperflower, hoffmanseggia, globemallow, filaree, cutleaf haplopappus, desertholly, Indianwheat and deerstongue.

#### Plant Growth Curves

Growth Curve ID 2830

Growth Curve Name: Historic Climax Plant Community

Growth Curve Description: SD-3 Mixed grass-shrub plant community.

| Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|------|------|-------|-------|-----|------|------|------|-------|------|------|------|
| 0    | 0    | 4     | 5     | 8   | 10   | 25   | 30   | 15    | 5    | 0    | 0    |

#### Additional States:

**Shrub-Dominated:** This state is characterized by an increase in shrubs and a decrease in grass cover. Creosotebush, tarbush, and broom snakeweed are the dominant shrubs. Dropseeds, threeawns or bush muhly are the dominant grasses. Retrogression within this state is characterized by a continued reduction in grass cover and an increase in the size and frequency of bare patches. Under heavy grazing pressure grass cover is higher in shrub interspaces when dropseeds or threeawns are the dominant grass, as opposed to bush muhly, whose cover tends to be higher under shrub canopies. This may be due to the forage value of bush muhly, low resistance to grazing, and its ability to successfully establish under creosotebush and tarbush.<sup>4</sup>

**Diagnosis:** Shrubs are found at increased densities relative to the grassland state, especially creosotebush, tarbush, and broom snakeweed. Grass cover is patchy with large (>2m) connected bare areas present. Black grama may or may not be present. Wind erosion is common and evidenced by pedestaling of plants and rocks in shrub interspaces.

**Transition to Shrub-Dominated (1a)** Overgrazing and/or extended periods of drought, and suppression of natural fire regimes are thought to cause this transition. Decreases in grass cover give a competitive advantage to shrubs and shrub seedling establishment. Shrubs are better equipped to withstand prolonged periods of drought due to the ability of their root systems to extract water from a larger area than grasses. If periodic fire played a role in naturally suppressing shrubs (especially creosotebush and tarbush), then decreased fire frequency may facilitate this transition.

Key indicators of approach to transition:

- Increase in amount of dropseeds or threeawns
- Decrease or loss of winterfat and fourwing saltbush.
- Increase in size and frequency of bare patches.

**Transition back to Grassland (1b)** Brush control is necessary to re-establish grass dominance. Prescribed grazing will help to ensure proper forage utilization following brush control and sustain grass cover. Periodic use of prescribed fire may help in maintaining the grassland state.

***Shrubland State:*** This state is characterized by very little grass cover, extensive dominance of shrubs, and accelerated erosion. Creosotebush is typically the dominant shrub, and tarbush often occurs as a sub-dominant. Herbaceous cover is very limited, often restricted to a sparse cover of fluffgrass or annual forbs and grasses scattered across the shrub interspaces, or scattered bush muhly in shrub bases.

***Diagnosis:*** Grass cover very sparse or absent in shrub interspaces. Fluffgrass or annuals may be the dominant herbaceous species. Erosion is evident by soil sealing, water flow patterns, pedestals or terracettes. Sub-surface soil horizons may be exposed.

**Transition to Shrubland State (2)** Persistent loss of grass cover, associated erosion, and increased competition for resources by shrubs may cause a transition to a shrubland state. As grass cover diminishes, perhaps due to excessive grazing followed by drought, erosion rates increase. Erosion removes or re-distributes organic matter and available nutrients. As organic matter is lost, soil surfaces seal, reducing infiltration and available water. The relocation of resources from interspaces to shrub bases further increases shrubs competitive advantage.

Key indicators of approach to transition:

- Increase in size and frequency of bare patches.
- Loss of grass cover in shrub interspaces.
- Increased signs of erosion—evidenced by pedestalling of plants, soil deposition on leeward side of plants, exposure of subsoil.<sup>2</sup>

**Transition back to Grassland (3)** Brush control will be necessary to overcome competition between shrubs and grass seedlings. Seeding may expedite recovery or may be necessary if an adequate seed source is no longer remaining. Prescribed grazing will help ensure adequate deferment and proper forage utilization following grass establishment. The degree to which this site is capable of recovery and benefits derived depends on the cost of restoration, extent of degradation to soil resources, and adequate rainfall necessary to establish grasses.<sup>3</sup> Depending on the extend of soil degradation, the length of time involved for a transition back to the Grassland state may take longer than the typical management timeframe.

## ECOLOGICAL SITE INTERPRETATIONS

### Animal Community:

This site provides habitat which supports a resident animal community that is characterized by black-tailed jackrabbit, spotted ground squirrel, black-tailed prairie dog, yellow-faced pocket gopher, Merriam's kangaroo rat, hispid cotton rat, swift fox, burrowing owl, horned lark, meadowlark, lark bunting, scaled quail, greater earless lizard, leopard lizard, Texas horned lizard, Western spadefoot toad, prairie rattlesnake and Western coachwhip.

The marsh hawk hunts over the site in winter, and long-billed curlew, and sandhill crane utilize playas associated with the site during migrations.

### Hydrology Functions:

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

| Hydrologic Interpretations |                  |
|----------------------------|------------------|
| Soil Series                | Hydrologic Group |
| Jal                        | B                |
| Armesa                     | B                |
| Karro                      | B                |
|                            |                  |

### Recreational Uses:

This site offers recreation potential for hiking, horseback riding, nature observation and photography, relict hunting, and quail, dove, antelope and predator hunting.

### Wood Products:

This site produces no significant wood products.

### Other Products:

This site is suitable for grazing during all seasons of the year by all kinds and classes of livestock. As this site deteriorates there will be a decrease in plants such as black grama, bush muhly, blue grama, vine-mesquite, Arizona cottontop, winterfat and fourwing saltbush. This will cause an increase in fluffgrass, burrograss, yucca, creosotebush, tarbush and broom snakeweed. There will also be an increase in bare ground. As vegetative cover is reduced the soil is very open to wind erosion. This site responds best to a system of management that rotates the season of use.

**Other Information:**

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

| Similarity Index | Ac/AUM    |
|------------------|-----------|
| 100 - 76         | 3.0 – 3.5 |
| 75 – 51          | 3.4 – 4.8 |
| 50 – 26          | 4.7 – 7.0 |
| 25 – 0           | 7.1 +     |

**Plant Preference by Animal Kind:**

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

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 |
| black grama            | <i>Bouteloua eriopoda</i>   | EP         | P                  | P | P | D | D | D | D | D | D | D | P | P |
| bush muhly             | <i>Muhlenbergia porteri</i> | EP         | P                  | P | P | P | P | P | P | P | P | P | P | P |
| blue grama             | <i>Boutaloua gracilis</i>   | EP         | D                  | D | D | D | P | P | P | P | P | D | D | D |
| hairy grama            | <i>Bouteloua hirsuta</i>    | EP         | D                  | D | D | D | D | D | P | P | P | D | D | D |
| plains<br>bristlegrass | <i>Setaria vulpiseta</i>    | EP         | D                  | D | D | D | D | P | P | P | P | D | D | D |
| fourwing<br>saltbush   | <i>Atriplex canescens</i>   | EP         | P                  | P | P | P | P | D | D | D | D | D | P | P |

**Supporting Information**

{PRIVATE}Associated Sites:

| <u>{PRIVATE}Site Name</u> | <u>Site ID</u> | <u>Site Narrative</u> |
|---------------------------|----------------|-----------------------|
| Loamy                     | R042XC007NM    |                       |
| Sandy                     | R042XC004NM    |                       |

Similiar Sites:

| <u>{PRIVATE}Site Name</u> | <u>Site ID</u> | <u>Site Narrative</u> |
|---------------------------|----------------|-----------------------|
|                           |                |                       |

State Correlation:

This site has been correlated with the following states: Texas

Inventory Data References:

| <u>{PRIVATE}Data Source</u> | <u>Number of Records</u> | <u>Sample Period</u> | <u>State</u> | <u>County</u> |
|-----------------------------|--------------------------|----------------------|--------------|---------------|
|                             |                          |                      |              |               |

Type Locality:

Relationship to Other Established Classifications:

Other References:

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains (42) Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: South Chaves, Eddy, Lea and Otero.

| <u>Characteristic Soils Are:</u> |            |
|----------------------------------|------------|
| Jal fine sandy loam              | Karro loam |
| Armesa very fine sandy loam      |            |
| <u>Other Soils included are:</u> |            |
|                                  |            |
|                                  |            |
|                                  |            |

## References

1. Humphrey, R.R. 1974. Fire in the deserts and desert grassland of North America. In: Kozlowski, T. T.; Ahlgren, C. E., eds. Fire and ecosystems. New York: Academic Press: 365-400.
2. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet. Rangeland Soil Quality—Wind Erosion. Rangeland Sheet 10. [Online]. Available: <http://www.statlab.iastate.edu/survey/SQI/range.html>
3. Vallentine, J.F. and J.J. Norris. 1964. A comparative study of soils of selected creosotebush sites in southern New Mexico. J. Range. Manage. 17: 23-32.
4. Welsh, R.G. and R.F. Beck. 1976. Some ecological relationships between creosotebush and bush muhly. Journal of Range Management **29**:472-475.

### Site Description Approval:

| <u>{PRIVATE}Author</u> | <u>Date</u> | <u>Approval</u> | <u>Date</u> |
|------------------------|-------------|-----------------|-------------|
| Don Sylvester          | 06/05/80    | Don Sylvester   | 06/05/80    |

### Site Description Revision:

| <u>{PRIVATE}Author</u> | <u>Date</u> | <u>Approval</u> | <u>Date</u> |
|------------------------|-------------|-----------------|-------------|
| George Chavez          | 02/13/03    | George Chavez   | 05/20/03    |
| David Trujillo         | 05/19/03    |                 |             |