USDA Natural Resources
Conservation Service

Ecological site R077CY056NM
Sandy Plains

Last updated: 9/11/2023
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

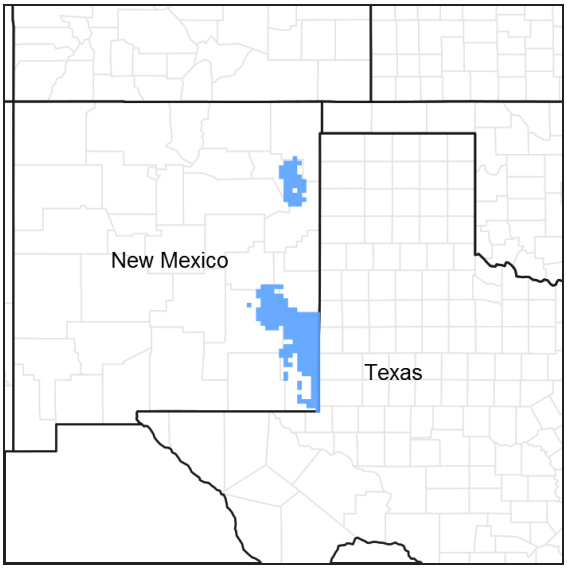


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 077C–Southern High Plains, Southern Part

MLRA 77C is characterized by nearly level plains with numerous playa depressions, moderately sloping breaks along drainageways, and a steep escarpment along the eastern margin. From southwest to northeast, soils grade from coarse-textured to finetextured. Soils are generally deep and occur in a thermic soil temperature regime and ustic soil moisture regime bordering on aridic.

Classification relationships

This ecological site is correlated to soil components at the Major Land Resource Area (MLRA) level which is further described in USDA Ag Handbook 296.

Ecological site concept

This site occurs on deep sandy soils on uplands. The reference vegetation includes midgrasses and shrubs with some tallgrasses and forbs. The dominant shrub is Sand Shinnery Oak. With abusive grazing practices, the plant community may shift away from the reference plant community. Without fire or other brush management, shrub canopy may increase across the site.

Associated sites

R077CY035TX	**Sandy 16-21" PZ** This site has very deep, nearly level to gently sloping, noncalcareous loamy fine sands on uplands and interdunes. These soils are well drained and permeability is moderately rapid to moderate. The reference vegetation includes tall and midgrasses with forbs and few shrubs.
R077CY028TX	**Limy Upland 16-21" PZ** These sites occur on calcareous, loamy soils on uplands. Plants adapted to high lime soil conditions dominate the site. The reference vegetation consists of midgrasses and shortgrasses with a few shrubs.
R077CY052NM	**Loamy Sand** Loamy Sand sites are similar to Sandy plains in topographic position and are often intermixed on the landscape. Sandy plains may have a root restrictive layer at 8 to 40 inches and Loamy sand is deep to very deep. Midgrasses, tallgrasses, and shrubs dominate these sites. Mean annual precipitation is lower (15 to 17 inches) and this site is less productive than the Sandy Plains site in MLRA 77C.

Similar sites

R077DY045TX	**Sand Hills 12-17" PZ** Sand Hills are on higher landscape positions and occur as rolling dunes or hills scattered throughout and adjacent to Sandy Plains sites. Midgrasses, tallgrasses, and shrubs dominate these sites.
R077CY034TX	**Sand Hills 16-21" PZ** These sites are on higher landscape positions and have very deep sandy soils on windblown sand dunes. Reference vegetation consists of tall and midgrasses, and shrubs. In the absence of periodic fire, shrub canopy may increase.
R077DY046TX	**Sandy 12-17" PZ** The Sandy occurs on very deep, loamy fine sand soils on gently rolling uplands. The reference vegetation includes tall and midgrasses with forbs and few shrubs. Mean annual precipitation is lower (15 to 17 inches) and this site is less productive than the Sandy Plains site in MLRA 77C.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Quercus havardii* (2) *Artemisia filifolia*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Andropogon hallii*

Physiographic features

This site occurs on nearly level to gently undulating landscapes on upland plains. Slopes range from 0 to 3 percent but are usually less than 3 percent. Steeper microslopes may occur where wind blowing of unprotected surface soils has formed low hummocks around shrubs.
Hummocks are less than two feet high. Direction of slope varies and is not significant. Elevation ranges from 2,700 to 4,400 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Plain
Runoff class	Negligible to medium
Flooding frequency	None
Ponding frequency	None
Elevation	1,021–1,311 m
Slope	0–5%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

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

The average annual precipitation ranges from 14 to 18 inches. Variations of 5 inches, more or less, are common. Approximately 85 percent of the precipitation falls from April through
October. Most of the summer precipitation falls in the form of high intensity-short duration thunderstorms, often accompanied by hailstorms.

Distinct seasonal changes and large annual and diurnal temperature changes characterize temperatures. The average annual temperature is 58 to 61 degrees F with extremes of 30 degrees F below zero in the winter to 110 degrees F in the summer.

The average frost-free season is 190 to 210 days. The last killing frost being in early to mid- April and the first killing frost being in late October to early November.

Temperature and rainfall both favor warm-season perennial plant growth. Occasionally an early spring or late fall storm will occur from a prolonged front. This, along with occasional spring and fall showers, allows the cool-season component to occupy an important part of this plant community. The vegetation on this site can take advantage of the moisture at the time it falls. Because of the soil profile, little moisture can be stored for any length of time. Strong winds blow from February through May from the south, which rapidly dries out the soil during a period critical to cool-season plant growth.

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

Table 3. Representative climatic features

Frost-free period (characteristic range)	152-189 days
Freeze-free period (characteristic range)	182-210 days
Precipitation total (characteristic range)	381-457 mm
Frost-free period (actual range)	146-194 days
Freeze-free period (actual range)	172-217 days
Precipitation total (actual range)	381-457 mm
Frost-free period (average)	169 days
Freeze-free period (average)	195 days
Precipitation total (average)	432 mm

Climate stations used

- (1) MELROSE [USC00295617], Melrose, NM
- (2) PORTALES [USC00297008], Portales, NM
- (3) CROSSROADS 2 [USC00292207], Crossroads, NM
- (4) TATUM [USC00298713], Tatum, NM
- (5) HOBBS [USC00294026], Hobbs, NM
- (6) SEMINOLE [USC00418201], Seminole, TX
- (7) ANDREWS [USC00410248], Andrews, TX

Influencing water features

Water features are not an influencing factor in this site.

Wetland description

N/A

Soil features

These are well drained, moderately deep to very deep soils overlying calcic and petrocalcic layers. The surface textures are typically loamy fine sand with some fine sand. The textures of the subsurface layers which occur at depths of less than 20 inches, are sandy clay loam, fine sandy loam and loam. The depth to the petrocalcic layer ranges from 25 to 40 inches and the depth to the calcic layer ranges from 33 to 60 inches. Permeability is moderate to moderately rapid above the calcic layers. The available water-holding capacity is moderate. The effective rooting depth is about 40 inches. Moisture falling on this site is readily absorbed and permeates to the subsurface layers. Non-growing season moisture can be stored in the subsoil for earlier green-up on the mid-grasses and deeper-rooted forbs. Without protection by plant cover and organic residue, the surface soils become windblown and low hummocks are formed.
Major Soil Taxonomic Units correlated to this site include: Amarillo loamy fine sand, Arvana loamy fine sand, Faskin fine sand and loamy fine sand, Gomez fine sand and loamy fine sand, Jalmar fine sand and loamy fine sand, Patricia fine sand and loamy fine sand, and Sharvana loamy fine sand.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–metamorphic and sedimentary rock
Surface texture	(1) Loamy fine sand (2) Fine sand
Family particle size	(1) Coarse-loamy (2) Loamy (3) Fine-loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	20–203 cm
Soil depth	20–203 cm
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.3–14.73 cm
Electrical conductivity (0-101.6cm)	0–3 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (0-101.6cm)	0–3%

Ecological dynamics

The Sandy Plains ecological site is found on nearly level to gently sloping soils. Surface soils are primarily loamy fine sands and fine sands. The moderately deep to deep course textured soils are well drained and have moderate to rapid permeability. A diagnostic high calcium accumulation layer exists at approximately 25 to 40 inches. This layer may also be represented as a calcium carbonate layer or grade in hardness to a petrocalcic layer or even harder as a true calcic layer. Often immediately below the petrocalcic or high alkaline layer is a true calcic layer at 33 to 60 inches. Violent effervescence with the standard acid test in these horizons also indicates highly alkaline soils. This alkaline zone has a limiting effect on plant uptake of soil supplied nutrients. These soil characteristics favor plants with root systems that can make due with a limited rooting depth and nutrient availability. Another characteristic of these soils is the ability to perch water received from limited rainfall events just above the calcic or

petrocalcic layer. This allows plants a few days longer availability of soil moisture after a rain event than is normally available in adjoining deeper soils that have no such restriction. Because of the rainfall pattern, most plant growth takes place from late spring to fall favoring vegetation consisting of tall and mid height warm-season bunchgrasses.

The Reference Community of the Sandy Plains Ecological Site in MLRA 77C is a Tall-Midgrass Grassland Community (1.1). It supports tall and midgrasses, widely scattered shrubs most of which are mottes of Sand Shinnery/Havard oak and a variety of forbs. Characteristic tall grasses included little and sand bluestems. Midgrasses such as sideoats grama, sand and mesa dropseeds, Plains Lovegrass, hairy grama, fall witchgrass, sand paspalum and three-awns provided most of the annual production. See the Plant Composition and Annual Production Table below for estimated composition and production of the species present in the reference/diagnostic community.

Pre-settlement disturbances included frequent re-occurring droughts and fires and grazing or browsing by endemic pronghorn antelope and enormous herds of migratory bison. It is anticipated that herbivory was heavy following fires but, because of fire induced migration, a recovery period followed. The seasonal availability of water would also influence the frequency and intensity of bison grazing. Wildfires re-occurred at frequent intervals (Frost 1998) suppressing woody species. European settlement beginning around 1820 followed by active fire suppression around communities and passive fire suppression caused by cattle, sheep and horse grazing removed fine fuels needed for fire spread. This chain of events reduced fire frequency and intensity to give the competitive advantage to woody plants; especially re-sprouters. The interaction of grazing and fire suppression changed the composition and structure of the reference/diagnostic community dramatically on most areas of this site. Most of the areas correlated to this ESD are currently shrub dominated unless reoccurring brush management practices have been applied.

Inappropriate livestock grazing causes a reduction of more palatable species, such as the native bluestems. The mechanism of decline for high palatable tall and mid grasses is through a combination of repeat defoliation in the growing season and the detrimental effect of that on individual plant longevity. The year after year removal of seed heads and the potential for regeneration by seed this represents has a negative impact on post disturbance site recovery. This reduction in herbaceous cover and litter leads directly to a decline in soil cover, organic matter, soil stability and reduced in fire frequency. Woody, and herbaceous increasers are generally endemic species released from competition from grasses and aided by a significantly altered fire regimen. Sand shinnery/Havard oak, honey mesquite, and sand sagebrush expand their influence to dominate the ecological processes on the site. Droughts, characteristic of the region, contribute to shifting from a Tall and midgrass dominated community (1.1) to a Midgrass/Shrubs Community (1.2). Perennial grasses still dominate annual herbage production in this community phase, but woody species increase proportionally to herbaceous plant decline. This is the at-risk phase of the reference state.

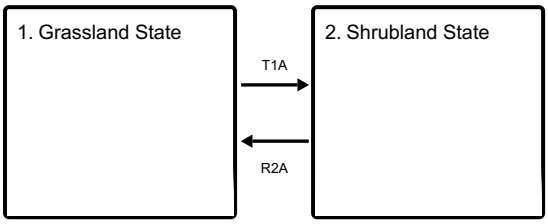
Over time with continued loss of foliar cover contributing to the reduction of fire frequency, shrubs increase. The Midgrass/Shrubs Community (1.2) transitions into woody plants; The Shrubland State. Severe droughts, which occur at approximately 10-year intervals in this region, amplify this situation. It is thought that shrubs better survive droughts because they have extensive root systems that occupy the majority of all levels of the soil. During the transition, grazing-resistant grasses such as perennial three-awns, sand dropseed and lovegrasses as well as less palatable forbs begin replacing the tall and midgrasses. As the grass cover declines litter, mulch, soil organic matter and soil stability declines. Bare ground, erosion and other desertification processes increase. This trend can be reversed, or at least slowed under the present climate, with proper grazing management and brush suppression practices, such as fire or individual plant treatments (IPT). Rest from grazing alone will not restore the Tall/Midgrass Community (1.1). A threshold is reached when the woody plant community exceeds 20 percent canopy, the plants reach fire resistant age and/or reproductive maturity.. The Midgrass/Shrubs Community (1.2) transitions into the Mixed Shortgrass-Shrub Community (2.1). Shrubs now dominate production and other ecological processes. Reversal of this transition is not possible without accelerating conservation and management practices that manage woody increaser and invader expansion. Once shrubs become dominant, prescribed burning is not an option because fine fuel quantity and continuity is limited.

Sand Shinnery/Havard oak and honey mesquite dominate the Mixed Shortgrass-Shrub Community (2.1). Sand Shinnery/Havard oak dominates in the slightly deeper fine sand soils, while honey mesquite usually becomes dominant in the more loamy fine sand components. The grass component is a mixture of low palatability grasses, low quality forbs and annuals. With continued loss of foliar cover of grasses, the more palatable tall and midgrasses continue to decrease and are replaced by shortgrasses, such as hooded windmillgrass, sand dropseed and threeawns. In early stages (20-30% shrub cover) the increase of shrub species can be reversed with relatively

inexpensive brush control practices such as chemical aerial applications and/or individual plant treatments along with grazing management that emphasizes accumulation of plant litter, soil organic matter and soil stability. Generally, prescribed burning is not an option once this site has reached phase 2.1. The lack of fine fuel and poor continuity limits prescribed burning effectiveness. The high possibility of wind erosion generally excludes mechanical brush control treatments, but herbicide treatments can be effective. If these practices are not applied, the woody species will continue to increase in dominance. Once the brush canopy exceeds 50 percent, annual production for the herbaceous species is limited to low quality shortgrasses and annual grasses and forbs within shrub interspaces. This plant community, the Shrubs/Shortgrass/Annuals Community (2.2), becomes a stable shrubland, dominated by either Sand Shinnery/Havard oak or honey mesquite; or both. Reversal of this plant type requires extensive reclamation practices. Under continued inappropriate grazing and extended drought conditions dunes can form. In extreme cases they can form and move off-site, altering surrounding sites.

State and transition model

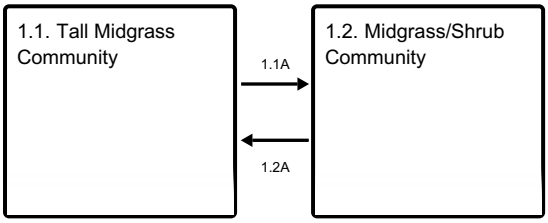
Ecosystem states



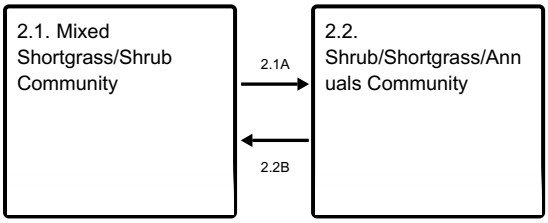
T1A - Absence of disturbance and natural regeneration over time, may be coupled with excessive grazing pressure

R2A - Adequate rest from defoliation and removal of woody canopy, followed by reintroduction of historic disturbance regimes

State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Grassland State

The Tall/Midgrass Community (1.1) is the interpretive/diagnostic/reference plant community for the Sandy Plains Ecological Site. Sand Shinnery/Havard oak mottes were widely scattered in microsites protected from frequent fire and made up less than ten percent of the plant canopy. Sand sagebrush, broom snakeweed and yucca were also present, but infrequent. Little and sand bluestem along with mesa and giant dropseeds are the dominant or co-dominant grasses throughout the site depending on variations in soils and water relations. Also occurring on the site, but in smaller amounts, were midgrasses such as sideoats grama, Plains Lovegrass, Hairy grama, Fall witchgrass, Sand Paspalum and three-awns provided most of the annual production. Common forbs found on the site include prairie clover, dotted gayfeather, wild alfalfa, catclaw sensitivebriar and bundleflower. The Tall-Midgrass Grassland community produced from 1,600 to 3,500 pounds of biomass annually. The Midgrass/Shrubs Community (1.2) is the result of the interaction of the reduction in frequency of fires and exacerbated by severe droughts. The reduction in vegetative structure and ground cover resulting from reduced fire frequency allows the shrubs a competitive advantage of a vast and persistent root system and to begin to hoard more site nutrients, processes and space to themselves. Sand Shinnery/Havard oak, honey mesquite, broom snakeweed and sand

sagebrush increase in density and cover, varying from 10 to 20 percent canopy cover. Sand dropseed, hooded windmillgrass and perennial three-awns begin replacing the more palatable tall and midgrasses found in the reference community. Most forbs such as gaura, groundsels, palofoxia and wild buckwheat persist in the Midgrass/Shrubs Community. Annual yield ranges from 1,000 to 2,300 pounds.

Dominant plant species

- little bluestem (*Schizachyrium scoparium*), grass
- sand bluestem (*Andropogon hallii*), grass

Community 1.1
Tall Midgrass Community

Figure 8. Tall/Midgrass Community

The Tall/Midgrass Community (1.1) is the interpretive/diagnostic/reference plant community for the Sandy Plains Ecological Site. Sand Shinnery/Havard oak mottes were widely scattered in microsites protected from frequent fire and made up less than ten percent of the plant canopy. Sand sagebrush, broom snakeweed and yucca were also present, but infrequent. Little and sand bluestem along with mesa and giant dropseeds are the dominant or co-dominant grasses throughout the site depending on variations in soils and water relations. Also occurring on the site, but in smaller amounts, were midgrasses such as sideoats grama, , Plains Lovegrass, Hairy grama, Fall witchgrass, Sand Paspalum and three-awns provided most of the annual production. Common forbs found on the site include prairie clover, dotted gayfeather, wild alfalfa, catclaw sensitivebriar and bundleflower. The Tall-Midgrass Grassland community produced from 1,600 to 3,500 pounds of biomass annually. The Midgrass/Shrubs Community (1.2) is the result of the interaction of the reduction in frequency of fires and exacerbated by severe droughts. The reduction in vegetative structure and ground cover resulting from reduced fire frequency allows the shrubs a competitive advantage of a vast and persistent root system and to begin to hoard more site nutrients, processes and space to themselves. Sand Shinnery/Havard oak, honey mesquite, broom snakeweed and sand sagebrush increase in density and cover, varying from 10 to 20 percent canopy cover. Sand dropseed, hooded windmillgrass and perennial three-awns begin replacing the more palatable tall and midgrasses found in the reference community. Most forbs such as gaura, groundsels, palofoxia and wild buckwheat persist in the Midgrass/Shrubs Community. Annual yield ranges from 1,000 to 2,300 pounds.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1009	1556	2102
Forb	175	270	364
Shrub/Vine	175	270	364
Total	**1359**	**2096**	**2830**

Table 6. Ground cover

Tree foliar cover	0%

Shrub/vine/liana foliar cover	2-5%
Grass/grasslike foliar cover	40-50%
Forb foliar cover	2-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-45%
Surface fragments >0.25" and <=3"	0-3%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	5-15%

Figure 10. Plant community growth curve (percent production by month). NM4856, R077CY056NM Sandy Plains Reference State. R077CY056NM Sandy Plains Reference State.

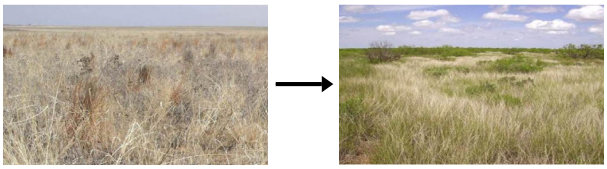
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	3	3	5	5	25	30	15	8	4	0

Community 1.2
Midgrass/Shrub Community

Figure 11. Midgrass/Shrub Community

The Midgrass/Shrubs Community (1.2) is the result of the interaction of longer fire return intervals and severe reoccurring droughts. The change in vegetative structure and reduced overall ground cover reduces the competitive advantage of grasses as well as seed production and dispersal. This contributes directly to the lack of accumulation of fine fuels needed for low intensity fire and reduced soil organic matter cycling which reduces soil stability while allowing increases in indigenous shrubs and invasion of shrubs from adjacent sites. The composition of the Midgrass/Shrubs Community (1.2) varies with time and intensity of grazing. Most reference community species are present, but the more palatable species decrease while less palatable species increase. This change is a function of a lack of periodic fire and reoccurring drought that favors shrubs and inhibits grass competition. Sand Shinnery/Havard oak, honey mesquite, broom snakeweed and sand sagebrush increase in density and cover, varying from 10 to 20 percent canopy cover. Litter and soil organic matter and soil stability are lower than in the reference community. Sand dropseed, hooded windmillgrass and perennial three awns begin replacing the more palatable tall and midgrasses found in the reference community. Most reference community forbs such as gaura, groundsels, palofoxia and wild buckwheat persist in this community. Annual yields range from 800 to 2,300 pounds. Total herbage production is only slightly reduced, due primarily to loss of vigor, but production by woody species and unpalatable forbs increases as more palatable species percent composition decreases.

Pathway 1.1A
Community 1.1 to 1.2



Tall Midgrass Community | Midgrass/Shrub Community

With , No Fire, and Brush expansion occurring, the Tall/Midgrass Community will convert into the Midgrass/Shrubs Community. This is a pathway within the reference state natural range of variability. When fire return intervals become longer and this enables shrubs to expand and colonize more areas on the site a gradual change toward a more shrubby appearing landscape characterizes this pathway.

Pathway 1.2A
Community 1.2 to 1.1

Midgrass/Shrub Community | Tall Midgrass Community

With the implementation of various conservation practices such as Prescribed Grazing that fosters litter production and accumulation of fine fuels sufficient in quantity and continuity to carry a fire and/or Brush Management, and Prescribed Burning, the Midgrass/Shrubs Community can be reverted back to the Tall/Midgrass Community. This is a pathway within the reference state natural range of variability. The growth and accumulation of fine fuels and appropriate fire frequency are the principal governors of this pathway.

State 2
Shrubland State

The Mixed Shortgrass/Shrub Community (2.1) supports a 20 to 45 percent woody composition as measured by canopy cover. Honey mesquite, Sand Shinnery/Havard oak, sand sagebrush, broom snakeweed and yucca being the most common shrubs. This plant type is the result of selective grazing by livestock and the differential response of plants to defoliation over a long period of time. There is a continued decline in diversity of the grassland component and an increase in woody species and unpalatable forbs. The Shrub/Shortgrass/Annuals Community (2.2) is the result of many years of inappropriate grazing, lack of periodic fires and little brush management. Sand Shinnery/Havard oak and honey mesquite dominate the Shrub/Shortgrass/Annuals Community, which is essentially a shrubland. Under extreme conditions of grazing and drought, the site deteriorates to active dunes and blowouts. Common understory shrubs are broom snakeweed, yucca and sand sagebrush. With continued inappropriate grazing and no brush control, the shrubs can approach 70 percent or more of the composition of the site as measured by canopy. Short-grasses and low quality annual and perennial forbs occupy woody plant interspaces.

Dominant plant species

- honey mesquite (*Prosopis glandulosa*), shrub
- Havard oak (*Quercus havardii*), shrub
- sand sagebrush (*Artemisia filifolia*), shrub

Community 2.1
Mixed Shortgrass/Shrub Community

Figure 12. Mixed Shortgrass/Shrub Community

The Mixed Shortgrass/Shrub Community (2.1) supports a 20 to 45 percent woody plant composition as measured by canopy with honey mesquite, Sand Shinnery/Havard oak, sand sagebrush, broom snakeweed and yucca as the most common shrubs. There is a continued decline in diversity of the grassland component and an increase in woody species and unpalatable forbs. Annual herbage production is reduced due to decline in soil fertility, structure and organic matter, and plant composition has shifted strongly toward the non-grass component. Honey mesquite is a strong increaser throughout the site although it usually does not reach as high a density on this site as on more loamy soils of the MLRA. Remnants of reference community grasses and forbs and unpalatable increasers and invaders occupy the interspaces between shrubs. Cool-season grasses that are adapted to occupy sites exhibiting rapid soil redistribution, such as New Mexico feathergrass, plus other grazing resistant species, can be found under and around woody plants. Because of lowered fertility and competition for nutrients and water from the woody plants the grassland component shows general lack of plant vigor and productivity. Common herbaceous species include three-awns, sand dropseed, broom snakeweed, western ragweed, groundsel and grey goldaster. Total plant production declines at approximately 600 to 750 pounds per acre, depending on precipitation. Annual production is balanced between herbaceous plants and woody plants. Browsing animals such as goats and deer can find fair food value. Forage quantity and quality for cattle is low and oak bud poisoning can be a livestock problem when access to other forages is limited in the spring. Without aggressive management intervention, the transition toward the Shrub/Shortgrass/Annuals Community (2.2) will continue. The trend cannot be reversed with proper grazing management alone. Accelerated brush management practices along with range planting and grazing management designed to improve plant vigor, litter production and accumulation and improve soil stability and organic matter is required to return this plant community to the grassland state.

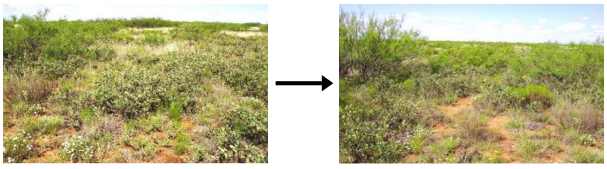
Community 2.2
Shrub/Shortgrass/Annuals Community

Figure 13. Shrub/Shortgrass/Annuals Community

The Shrub/Shortgrass/Annuals Community (2.2) is the result of many years of inappropriate grazing, lack of periodic fires and little or no brush management, and drought. Soil moisture is lost through evaporation on bare ground. Sand Shinnery/Havard oak and honey mesquite dominate the Shrub/Shortgrass/Annuals Community,

which is essentially a shrubland. Under extreme conditions of inappropriate grazing and drought, the site deteriorates to active dunes and blowouts. Common understory shrubs are broom snakeweed, yucca and sand sagebrush. With continued heavy grazing and no brush management, the shrubs can approach 70 percent or more aerial cover. Short-grasses and low quality annual and perennial forbs occupy the woody plant interspaces. Characteristic grasses are bristlegrass, hairy grama, hooded windmillgrass, sand dropseed and three-awns. Grasses and forbs make up 25 percent or less of the annual herbage production. Forbs commonly found in this community include western ragweed, gray goldaster, silverleaf nightshade, catclaw and annuals. The Shrub/Shortgrass/Annuals Community provides cover for wildlife. Only limited preferred forage or browse is available for livestock or wildlife. High cost and high energy accelerating practices are required to restore the Shrub/Shortgrass/Annuals Community (2.2) back to the Reference state if the reference plant community is the management goal. Accelerating practices would include brush management such as aerial herbicide application, range planting, grazing deferment, prescribed grazing and prescribed burning to return the shrubland state to the grassland state.

Pathway 2.1A
Community 2.1 to 2.2



Mixed Shortgrass/Shrub Community

Shrub/Shortgrass/Annuals Community

With Heavy Continuous Grazing pressure, No Fires, and No Brush Management implemented, the Mixed Shortgrass/Shrub Community will transition into the Shrub/Shortgrass/Annuals Community from the Mixed Shortgrass/Shrub Community. The driver is believed to be lack of herbaceous plant production and vigor, lack of litter and fine fuels production and lack of adequate soil organic matter inputs from herbaceous plant roots and tops. This favors increaser shrubs that have mechanisms of resource use and accumulation that are adapted to these conditions. An example of this is honey mesquite. It has deep tap roots and extensive shallow roots that monopolize deep and shallow soil moisture and nutrients. Add to this the ability to self-fertilize thru nitrogen in the leaf litter fall and a clear competitive advantage is apparent.

Pathway 2.2B
Community 2.2 to 2.1

Shrub/Shortgrass/Annuals Community

Mixed Shortgrass/Shrub Community

With Prescribed Grazing and Brush Management conservation practices, the Shrub/Shortgrass/Annuals Community can be shifted to the Mixed Shortgrass/Shrub Community

Transition T1A
State 1 to 2

Transition R2A
State 2 to 1

The trend cannot be reversed from the Shrubland State (Mixed Shortgrass/Shrub) to the Grassland State with grazing management alone. Accelerated brush management practices along with range planting and prescribed grazing is required to return this plant type to grassland (Midgrass/Shrubs Community).

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Little Bluestem**			519–622	
	little bluestem	SCSC	*Schizachyrium scoparium*	519–622	–
2	**Sand Bluestem**			104–207	
	sand bluestem	ANHA	*Andropogon hallii*	104–207	–
3	**Sideoats Grama**			207–312	
	sideoats grama	BOCU	*Bouteloua curtipendula*	207–312	–
4	**Plains Lovegrass**			63–104	
	plains lovegrass	ERIN	*Eragrostis intermedia*	63–104	–
5	**Hairy Grama**			35–104	
	hairy grama	BOHI2	*Bouteloua hirsuta*	35–104	–
6	**Sand Paspalum**			41–104	
	thin paspalum	PASE5	*Paspalum setaceum*	41–104	–
7	**Fall Witchgrass**			41–104	
8	**Threeawn spp.**			63–104	
	threeawn	ARIST	*Aristida*	63–104	–
9	**Sand Dropseed, Mesa Dropseed**			63–104	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	63–104	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	63–104	–
10	**Other Grasses**			21–104	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	21–104	–
21	**Blue Grama**			35–104	
	blue grama	BOGR2	*Bouteloua gracilis*	35–104	–
Forb					
11	**Glopemallow spp, Penstemon, spp., Lemon Scurfpea**			63–206	
	beardtongue	PENST	*Penstemon*	63–206	–
	lemon scurfpea	PSLA3	*Psoralidium lanceolatum*	63–206	–
	globemallow	SPHAE	*Sphaeralcea*	63–206	–
12	**Mustard spp., Paperflower**			41–104	
	mustard	BRASS2	*Brassica*	41–104	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	41–104	–
13	**Queensdelight, Western Ragweed, Woolly Beeblossom**			21–63	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	21–63	–
	queen's-delight	STSY	*Stillingia sylvatica*	21–63	–
14	**Annual Sunflower, Annual Wildbuckwheat**			21–104	
	annual buckwheat	ERAN4	*Eriogonum annuum*	21–104	–
	common sunflower	HEAN3	*Helianthus annuus*	21–104	–
15	**Other Forbs**			21–104	
	soapweed yucca	YUGL	*Yucca glauca*	25–121	–
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	21–104	–

Shrub/Vine					
16	**Small Soapweed Yucca**			104–146	
	soapweed yucca	YUGL	*Yucca glauca*	104–146	–
17	**Southwest Rabbitbrush**			21–41	
	southwestern rabbitbrush	CHPU4	*Chrysothamnus pulchellus*	21–41	–
18	**Sand Sagebrush, Shinnery Oak**			0–104	
	sand sagebrush	ARFI2	*Artemisia filifolia*	0–104	–
	Havard oak	QUHA3	*Quercus havardii*	0–104	–
19	**Broom Snakeweed**			21–63	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	21–63	–
20	**Other Shrubs**			21–63	
	Shrub, deciduous	2SD	*Shrub, deciduous*	21–63	–

Animal community

Habitat for Wildlife:

This site provides habitats which, support a resident animal community that is characterized by pronghorn antelope, badger, swift fox, desert cottontail, spotted ground squirrel, plains pocket gopher, hispid pocket mouse, Ord's kangaroo rat, northern grasshopper mouse, southern plains woodrat, ferruginous hawk, roadrunner, lesser prairie chicken, scaled quail, meadowlark, plains spadefoot toad, western box turtle, lesser earless lizard, southern prairie lizard, round-tailed horned lizard, bullsnake, plains black-headed snake and western diamondback rattlesnake.

Hydrological functions

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

Hydrologic Interpretations
Soil Series----------Hydrologic Group
Amarillo----------B
Arvana----------C
Clovis----------B
Douro----------B
Faskin----------B
Gomez----------B
Jalmar----------A
Spantara----------B
Springer----------B

Recreational uses

This site offers recreation potential for horseback riding, nature observation, photography, quail and dove hunting, antelope hunting and predator hunting. During years with abundant spring moisture and continuing moisture throughout the growing season, this site displays a colorful array of wildflowers from May through September.

Wood products

The natural plant community of this site affords little or no wood products.

Other products

Grazing:

This site is suitable for grazing during all seasons of the year. The site in itself lacks protective cover for livestock from winter storms. Because of the high component percentage of grasses the site is best suited to animals such as cattle which utilize grasses for a large percent of their diets. It could be suitable for minority proportions of sheep and goats. Grazing or browsing by goats might also be of value from a brush control standpoint where woody plants have increased considerably or invaded. In general, cattle grazing will result in a decrease in grasses and palatable forbs and an increase in woody plants. Sheep grazing will result in a decrease in perennial forbs and an increase in unpalatable grasses and woody plants. Grazing or browsing by goats results in a decrease in shrubs and half-shrubs and an increase in grasses. Grazing with cows in late May or early June during the flowering stage can control the spread of small soapweed. Continuous yearlong grazing, or grazing continually during the potential growing season will result in a decrease in the vigor and abundance of little bluestem, sideoats grama, sand bluestem and Indiangrass. A corresponding increase will occur in threeawn spp., dropseed spp., shinnery oak, sagebrush spp., and small soapweed, which will eventually dominate the site. This condition, coupled with an increase of exposed bare soil, severely impairs the grazing value of the site. Well planned systems of deferred grazing by domestic livestock, which vary the seasons of grazing and rest in pastures during successive years, will result in a balanced plant community, providing higher-quality forage and browse during all seasons of the year.

Inventory data references

NRCS FOTG – Section II of the FOTG Range Site Descriptions and numerous historical accounts of vegetative conditions at the time of
early settlement in the area were used in the development of this site description. Vegetative inventories were made at several site locations
for support documentation.
Inventory Data References (documents):
NRCS FOTG – Section II - Range Site Descriptions

Type locality

Location 1: Chaves County, NM
Location 2: Curry County, NM
Location 3: De Baca County, NM
Location 4: Lea County, NM
Location 5: Roosevelt County, NM

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12. Quantification of state-and-transition model components utilizing long-term ecological response data following one-seed juniper treatment on a deep sand savannah ecological site. Authors: Shaver, Patrick L. Advisors: Stringmham, Tamzen Krueger, William Committee Members: Herrick, Jeffery Miller, Richard Males, James Citation URL: http://hdl.handle.net/1957/14658
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Approval

Bryan Christensen, 9/11/2023

Acknowledgments

Site Development and Testing Plan

Future work, as described in a Project Plan, to validate the information in this Provisional Ecological Site Description is needed. This will include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.

Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/03/2024
Approved by	Bryan Christensen

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
