

Ecological site R042AD744TX

Limestone Hill, Dry Mixed Prairie

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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.

Associated sites

R042AC244TX	Gravelly, Desert Grassland Gravelly, Desert Grassland, is often associated in a lower position.
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Similar sites

R042AC249TX	Limestone Hill and Mountain, Desert Grassland The Limestone Hill & Mountain, Desert Grassland, is in a drier vegetation zone with less grass production potential. Additionally, curlyleaf muhly, blue grama, wolftail, hairy grama, banana yucca, and New Mexico agave, among others, typically not found in the site.
R042AE277TX	Igneous Hill and Mountain, Mixed Prairie The Limestone Hill & Mountain, Mixed Prairie, site has similiar grass species composition but slightly higher production potential and shrubs and trees such as redberry juniper, mountain mahogany, and oak are typically present.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

The site occurs on limestone hills with slopes ranging from 3 to 20 percent. Runoff is low on slopes less than 5 percent and medium on slopes of 5 to 20 percent.

Table 2. Representative physiographic features

Landforms	(1) Hill
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Flooding frequency	None
Ponding frequency	None
Elevation	1,370 – 1,680 m
Slope	10 – 20 %
Aspect	N, S

Climatic features

Average precipitation for this site is approximately 12 to 14 inches. Variations of 5 inches are not uncommon. Approximately 75 percent of the precipitation occurs from May through October. Most of the summer precipitation comes in the form of high intensity short duration thunderstorms. Although little precipitation does occur during the winter months, rain and snow of low intensity usually characterise the precipitation that does occur. Temperatures are mild. Freezing temperatures are common at night from December through April, however, temperatures during the day are frequently above 50 degrees F. Occasionally in December to February brief periods of 0 degree F. temperatures may be expected. During June to August some days may exceed 100 degrees F.

The mean annual precipitation figures are derived from rain gauge data collected by the BLM (1971 to 1990), and NOAA weather maps utilizing prism model estimation techniques. There are no permanent Climate stations within the boundaries of the Land Resource Unit.

Table 3 Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	190 days
Precipitation total (average)	360 mm

Influencing water features

Soil features

The site consists of very shallow to shallow gravelly and loamy soils weathered from limestone bedrock. The limestone formation can exhibit varying degrees of weathering potential resulting in “stair-step” topography. The harder, less fractured, and more weather resistant limestone layers form the “treads” and the more easily weathered and fractured layers form the steeper “risers”. Water infiltration, plant production and diversity are greater within the risers than the treads. The Bissett moist soil component is correlated to this site in the following map unit:

Bissett-Rock outcrop complex, moist, 3 to 20 percent slopes

Table 4. Representative soil features

Parent material	(1) Residuum – limestone
Surface texture	(1) Very gravelly loam

Drainage class	Well drained
Permeability class	Very slow
Soil depth	10 – 40 cm
Surface fragment cover <=3"	10 – 40 %
Surface fragment cover >3"	10 – 20 %
Available water capacity (0-101.6cm)	0 – 5.08 cm
Calcium carbonate equivalent (0-101.6cm)	40 – 80 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	30 – 40 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

The reference or current potential plant community for the Limestone Hill, Dry Mixed Prairie ecological site is a mid and shortgrass perennial warm-season grama grassland interspersed with mixed shrubs and banded rock outcrops. Grass, shrub and forb canopy cover ranges from 65-75, 5-20, and 1-5 percent, respectively. Surface fragment cover can range up to 75 percent. The scale of the plant community for measurement is the associated soil component within the soil map units.

Fluctuations in yearly weather conditions is probably the most influential factor that helps shape the plant communities. Prolonged droughts will dramatically reduce herbaceous cover and production while wet summers will favor black grama dominance and wet winters

will favor more mesic and cool-season grasses (Ludwig et al. 2000). Aspect, soil variability, and percentage of rock outcrop also play a role in shape the inherent plant community. Lightning induced fires do occur in the area but the exact frequency is unknown.

Historically, bison may have been in the area as Mescalero Apache sources suggest that their hunters headed to the Otero Mesa to hunt buffalo (McNamee 2008). The Limestone Hill ecological site occurs predominantly on the Otero Mesa in both Texas and New Mexico. In addition, desert bighorn sheep were documented to occur in the area and probably utilized the site. Both animals probably help influence the communities historically. Desert bighorn sheep are currently being reintroduced into the area. Other native fauna such as insects, rodents, mule deer, and pronghorn antelope are still helping influence the current plant communities.

Since 1885, the Otero Mesa and surrounding areas have been grazed by cattle, sheep, goats, horses, and mules. Parts of the mesa may have been ungrazed or lightly grazed because of the remoteness and ruggedness (Ludwig et al. 2000). The site is suited for prescribed grazing practices. Heavy continuous grazing, especially during dry years, over long periods will cause decreases in plants such as blue grama, black grama and increases in less palatable grasses such as sideoats grama (bunchgrass growth form), hairy grama, tridens, fluffgrass, and Neally grama. In addition, woody plants may increase in areas where the seed source is available. Ecological processes such as water and nutrient cycles may also be affected by improper grazing management.

The following diagram suggests general pathways that the vegetation on this site might follow. There are other plant communities and states not shown on the diagram. This information is intended to show what might happen in a given set of circumstances; it does not mean that this would happen the same way in every instance. Local professional guidance should always be sought before pursuing a treatment scenario.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	Warm season stoloniferous grass			224-336	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	224-336	–
2	Dominant warm season bunchgrasses			280-448	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	112-224	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	56-168	–
	curlyleaf muhly	MUSE	<i>Muhlenbergia setifolia</i>	67-168	–
3	Subdominant warm season bunchgrasses			84-112	
	oneflower grama	BOUN	<i>Bouteloua uniflora</i>	11-56	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	17-34	–
	common wolfstail	LYPH	<i>Lycurus phleoides</i>	17-34	–
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	17-34	–
	hairy woollygrass	ERPI5	<i>Erioneuron pilosum</i>	11-28	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	11-28	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	11-28	–
	slim tridens	TRMU	<i>Tridens muticus</i>	11-28	–
	plains lovegrass	ERIN	<i>Eragrostis intermedia</i>	6-17	–
	streambed bristlegrass	SELE6	<i>Setaria leucopila</i>	6-17	–
4	Cool season bunchgrass			17-50	
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	17-50	–
5	Warm season narrow leaf shortgrass			1-6	
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	1-6	–
Shrub/Vine					
6	Shrubs			34-67	
	desert myrtlecroton	BEOB	<i>Bernardia obovata</i>	6-22	–

	javelina bush	COER5	<i>Condalia ericoides</i>	6-22	–
	rough jointfir	EPAS	<i>Ephedra aspera</i>	6-22	–
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	6-22	–
	creosote bush	LATR2	<i>Larrea tridentata</i>	6-22	–
	Big Bend barometerbush	LEMI4	<i>Leucophyllum minus</i>	6-22	–
	algerita	MATR3	<i>Mahonia trifoliolata</i>	6-22	–
	mariola	PAIN2	<i>Parthenium incanum</i>	6-22	–
	resinbush	VIST	<i>Viguiera stenoloba</i>	6-22	–
	lotebush	ZIOB	<i>Ziziphus obtusifolia</i>	6-22	–
7	Sub-shrubs			6-11	
	featherplume	DAFO	<i>Dalea formosa</i>	2-6	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	2-6	–
	woody crinklemat	TICAC	<i>Tiquilia canescens var. canescens</i>	2-6	–
8	Fibrous and succulents			17-34	
	Havard's century plant	AGHA	<i>Agave havardiana</i>	6-17	–
	lechuguilla	AGLE	<i>Agave lechuguilla</i>	6-17	–
	tree cholla	CYIMI	<i>Cylindropuntia imbricata var. imbricata</i>	6-17	–
	green sotol	DALE2	<i>Dasylirion leiophyllum</i>	6-17	–
	Texas sacahuista	NOTE	<i>Nolina texana</i>	6-17	–
	pricklypear	OPUNT	<i>Opuntia</i>	6-17	–
	banana yucca	YUBA	<i>Yucca baccata</i>	6-17	–
	soaptree yucca	YUEL	<i>Yucca elata</i>	6-17	–
Forb					
9	Perennial			28-90	
	buckwheat	ERIOG	<i>Eriogonum</i>	1-11	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	1-11	–
	menodora	MENOD	<i>Menodora</i>	1-11	–
	beardtongue	PENST	<i>Penstemon</i>	1-6	–
	polygala	POLYG	<i>Polygala</i>	1-6	–
	needleleaf bluet	HOAC	<i>Houstonia acerosa</i>	1-6	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

The reference plant community is suited for conservative livestock grazing by cattle, horses, burros, and sheep and goats. Livestock should be stocked in proportion to the grazeable grass, forbs, and browse. Improper grazing management, especially during droughts, causes a gradual decline in range health, reducing livestock nutrition and habitat quality for some wildlife. The flower buds, blooms, and fruit of sacahuista can be toxic livestock, especially sheep and goats. A minimum toxic dose for sheep is about 1 percent of the animal's weight in buds or blooms (Hart et al. 2003). Wildlife that use this site for at least a portion of their overall habitat needs include mule deer, pronghorn antelope, desert bighorn sheep, coyotes, black-tailed jackrabbits, cottontails, mice, and ground squirrels. Birds that use this site as for at least a portion of their habitat needs include scaled quail, dove, raptors, and numerous song birds. Insects and reptiles such as rattlesnakes and lizards also frequent the area. Some free ranging introduced exotic ungulates that also utilize the site include oryx

antelope and aoudad sheep.

Hydrological functions

The site is located in both a surface water run-in and runoff position. Surface rock fragments and a high grass cover help reduce runoff potential especially on hill slopes. Plant community 1.1 and 2.1 provide the optimum hydrologic function for the site. A reduction in grass and ground cover, as in plant communities 1.2 and 2.2, will impair the hydrologic function of the site by increasing surface runoff and decreasing water infiltration.

Recreational uses

The site can be used for hiking and hunting among other recreational uses.

Wood products

N/A

Other references

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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.

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Date	06/19/2012
Approved by	
Approval date	

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

1. Number and extent of rills: None

2. Presence of water flow patterns: None, except following high intensity storms, when short (less than 1 m) and discontinuous flow patterns may appear. Flow patterns in drainages are linear and continuous.

3. Number and height of erosional pedestals or terracettes: None.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 1-5 % bare ground. Surface rock cover can range up to 75 percent.

5. Number of gullies and erosion associated with gullies: None.

6. Extent of wind scoured, blowouts and/or depositional areas: None.

7. Amount of litter movement (describe size and distance expected to travel): In drainages, there can be significant amounts of litter moved long distances. On most of the site, minimal and short distance (<5ft) of litter movement associated with high intense rainfall.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Stability class ranging from 4-5 at the surface.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Soil surface about 2 inches thick, very dark grayish brown (10YR 5/2) with a weak medium granular structure.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: A high canopy cover of midgrass bunch and stoloniferous grasses will help minimize runoff and maximize infiltration. Grasses should comprise approximately 50-65% canopy cover. Shrubs will comprise about 5-20% canopy cover.

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

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: Stoloniferous grasses = dominant bunchgrasses > subdominant bunchgrasses=cool season bunchgrasses > shrubs > fibrous/succulents > subshrubs > forbs = fluffgrass

13. **Amount of plant mortality and decadence** (include which functional groups are expected to show mortality or decadence):
All grasses will show some mortality and decadence in addition to annual forbs. Mid/tall perennial shrubs will show some mortality or decadence only after prolonged and severe droughts. Subshrubs will be less resistant to severe droughts than mid/tall perennial shrubs
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14. **Average percent litter cover (%) and depth (in):** Extended droughts and high levels of herbivory will decrease litter cover.
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15. **Expected annual annual-production** (this is TOTAL above-ground annual-production, not just forage annual-production):
675-1000 lbs/ac depending on annual rainfall
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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: Extended droughts and high levels of herbivory will decrease litter cover.
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17. **Perennial plant reproductive capability:** All species should be capable of reproducing.
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