

Ecological site R041XC331AZ

Limy Upland

12-16" p.z.

Deep

Last updated: 4/12/2021

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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.

MLRA notes

Major Land Resource Area (MLRA): 041X–Madrean Archipelago

AZ 41.3 – Chihuahuan – Sonoran Semidesert Grasslands Elevations range from 3200 to 5000 feet and precipitation ranges from 12 to 16 inches per year. Vegetation includes mesquite, catclaw acacia, netleaf hackberry, palo verde, false mesquite, range ratany, fourwing saltbush, tarbush, littleleaf sumac, sideoats grama, black grama, plains lovegrass, cane beardgrass, tobosa, vine mesquite, threeawns, Arizona cottontop and bush muhly. The soil temperature regime is thermic and the soil moisture regime is ustic aridic. This unit occurs within the Basin and Range Physiographic Province and is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys and basins. Igneous and metamorphic rock classes dominate the mountain ranges and sediments filling the basins represent combinations of fluvial, lacustrine, colluvial and alluvial deposits.

Ecological site concept

Limy Upland, Deep, ecological site is found on generally on shoulders and side slopes. Slopes range from 5-15%. Calcareous soils are deep, well-drained, have good surface gravel cover (55-65%) with gravels (30-35%) throughout profile.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Acacia constricta</i> (2) <i>Mimosa biuncifera</i>
Herbaceous	(1) <i>Muhlenbergia porteri</i> (2) <i>Aristida</i>

Physiographic features

Stronghold soils are mapped generally on shoulders and side slopes. It is deep and well drained and is in runoff class high.

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Terrace
Elevation	1,190 – 1,400 m

Slope	10 – 30 %
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Climatic features

Precipitation in this common resource area ranges from 12-16 inches yearly in the eastern part with elevations from 3600-5000 feet, and 13-17 inches in the western part where elevations are 3300-4500 feet. Winter-Summer rainfall ratios are 40-60% in the west and 30-70% in the east. Summer rains fall July-September, originate in the Gulf of Mexico and are convective, usually brief, intense thunderstorms. Cool season moisture tends to be frontal, originates in the Pacific and Gulf of California, and falls in widespread storms with long duration and low intensity. Snow rarely lasts more than one day. May and June are the driest months of the year. Humidity is generally very low.

Temperatures are mild. Freezing temperatures are common at night from December-April; however temperatures during the day are frequently above 50 F. Occasionally in December-February, brief 0 F temperatures may be experienced some nights. During June, July and August, some days may exceed 100 F.

Cool season plants start growth in early spring and mature in early summer. Warm season plants take advantage of summer rains and are growing and nutritious July-September. Warm season grasses may remain green throughout the year.

Table 3 Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	
Precipitation total (average)	410 mm

Influencing water features

Soil features

Soils mapped on this unit are deep, well drained and have a high runoff class and no flooding hazard.

Soils on this unit are mapped in SSA-666 Cochise county NW part MU's 62 Stronghold and 83 Tombstone & Stronghold.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Soil depth	100 – 150 cm
Surface fragment cover <=3"	0 – 20 %

Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 8.4

Ecological dynamics

Shrubland State: Reference plant community is very diverse, dominated by shrubs (white-thorn acacia, wait-a-bit) with lesser amounts of creosote and ocotillo. Dominant perennial grasses (bush muhly, black grama, three-awns, AZ cottontop, side-oats grama) are widely scattered throughout site. Several miscellaneous perennial grass species are also present (ie, fluffgrass, slim tridens). Diverse succulents and subshrubs include banana yucca, twin-berry, ratany, desert zinnia. Several perennial forb species are well-represented, including white-stem paperflower and bahia. Fire does not play a major role in site dynamics. Episodic drought causes herbaceous understory mortality and is responsible for the two community phases within State 1: Shrubland State. Unmanaged grazing and/or drought will reduce perennial grass and forb presence. Site diversity will return with managed grazing and rainfall.

Shrubland, non-natives State: The shrub-grassland community phase is very similar to the reference state with Lehmann lovegrass present. The shrub and succulent component is strikingly similar to State 1. Lehmann lovegrass will come in on this site but will remain scattered unless the site is disturbed (heavy grazing or machinery). Over time with unmanaged heavy grazing, native perennial grasses will be selectively grazed out. Brush management projects allow Lehmann lovegrass to flourish on this ecological site; treated/managed grassland community phase must be maintained with repeated brush management (chemical spot treatment or prescribed fire). The Shrubland, Lehmann lovegrass State will be extremely productive. Lehmann lovegrass presents other management constraints.

Eroded State: The Limy Upland, Deep, 12-16" pz, ecological site is very well-protected against erosion with surface gravels. Once site is heavily disturbed, however, it is vulnerable to rill and gully erosion. Roads and other mechanical disturbance (dozing fenceline or grubbing shrubs) can create nick-points for accelerated run-off. Perennial grass diversity is dramatically reduced; the occasional bush muhly is only found in protection of shrubs. Species diversity and site productivity are dramatically reduced.

State and transition model

Additional community tables

Contributors

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Approval

Curtis Talbot, 4/12/2021

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	09/14/2026
Approved by	
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:

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

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

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

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:

17. Perennial plant reproductive capability:
