

Ecological site R030XC307AZ Limestone Hills 10-13" p.z.

Last updated: 10/21/2024

Accessed: 07/11/2025

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.

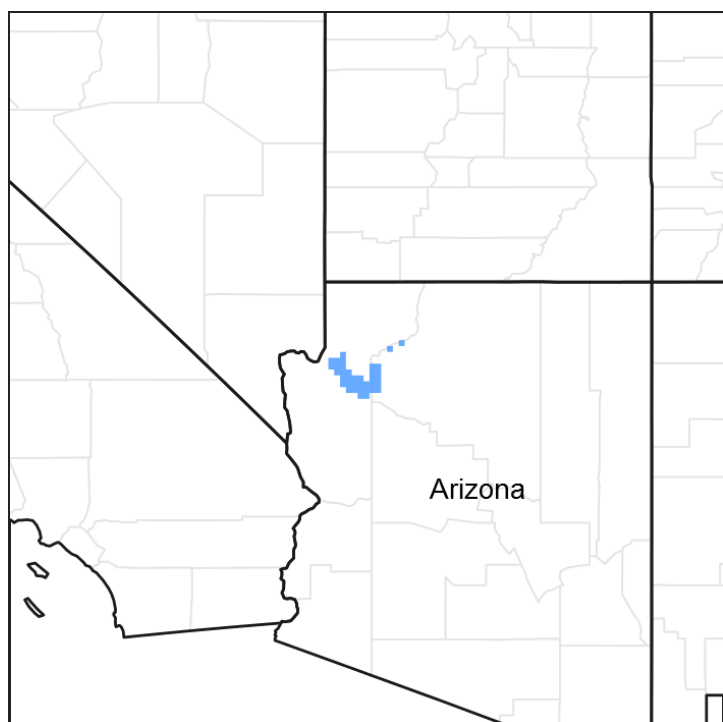


Figure 1. Mapped extent

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): 030X–Mojave Basin and Range

This unit occurs within the Basin and Range Province and is characterized by broad basins, valleys, and old lakebeds. Widely spaced mountains trending north to south occur

throughout the area. Isolated, short mountain ranges are separated by an aggraded desert plain. The mountains are fault blocks that have been tilted up. Long alluvial fans coalesce with dry lakebeds between some of the ranges.

LRU notes

AZ LRU 30-3 – Upper Mohave Desert

Elevations range from 2800 to 4500 feet and precipitation averages 9 to 12 inches per year. Vegetation includes Joshua tree, blackbrush, creosotebush, ratany, bush muhly, big galleta, black grama, desert needlegrass, and Indian ricegrass. The soil temperature regime is thermic and the soil moisture regime is typic aridic.

Ecological site concept

This ecological site is located on steeply sloping (15%-65%) uplands. Soils are very shallow to shallow over limestone bedrock.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Coleogyne ramosissima</i>
Herbaceous	Not specified

Physiographic features

This ecological site is located in an upland position on rims, ridges and footslopes of mesas and plateaus. It occurs on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Plateau
Flooding frequency	None
Ponding frequency	None
Elevation	4,000–4,800 ft
Slope	5–70%
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid and warm. Annual precipitation ranges from 10 to 13 inches. About 65 percent of the rainfall comes from October through May as gentle rain from Pacific storms

which may last for a couple of days. The rest of the rainfall comes during the summer monsoon season from July through September as spotty, brief, intense thunderstorms. Snow rarely falls, and only remains on the ground a few hours at most. Annual air temperature ranges from 46 to 76 degrees F. The average frost-free period ranges from 121 to 231 days.

Table 3. Representative climatic features

Frost-free period (average)	231 days
Freeze-free period (average)	269 days
Precipitation total (average)	13 in

Influencing water features

Soil features

The soil found on this ecological site is very shallow to shallow. Soil surface textures are extremely cobbly loam, extremely gravelly sandy loam, extremely gravelly sandy clay and very cobbly loam. Subsoil textures are extremely cobbly fine sandy loam, very gravelly clay loam, extremely gravelly loam, very gravelly loam and extremely cobbly loam. The soil parent material is residuum derived from limestone and calcareous sandstone. The soil's available water capacity is very low. The soil erosion hazard is slight to high for water and slight for wind. The soil is non-saline, non-sodic with a pH of 7.9-8.4. The soil moisture regime is typic aridic and temperature regime is thermic. Channers and gravel (40%); cobbles (40%) and stones (10%) are found on the soil surface. This ecological site is associated with rock outcrop.

A typical soil profile is:
A-0 to 3 inches; extremely cobbly loam
Bk-3 to 9 inches; very gravelly loam
R-9 inches; unweathered bedrock

The taxonomic classification of soils associated with this ecological site include Loamy-skeletal, mixed, superactive, calcareous, thermic Lithic Torriorthents.

Not mapped in any AZ SSA.
Previously, Map units that have been correlated to this ecological site include 697056 and 699018, Hindu soil; Mohave County, AZ, Central Part and Hualapai-Havasupai Area, AZ, Parts of Coconino, Mohave and Yavapai Counties.

Table 4. Representative soil features

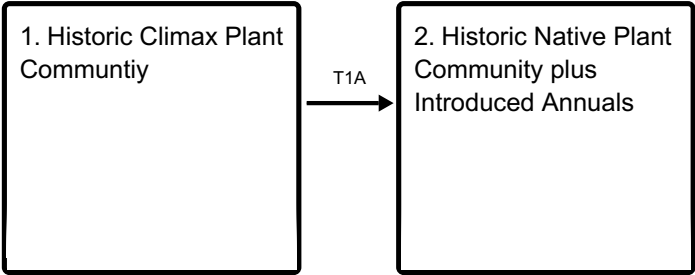
Surface texture	(1) Extremely cobbly sandy loam (2) Extremely gravelly sandy clay (3) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to moderate
Soil depth	9 in
Surface fragment cover <=3"	65–85%
Surface fragment cover >3"	50–75%
Available water capacity (0-40in)	0.5–1 in
Calcium carbonate equivalent (0-40in)	10–35%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–2
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	45–65%
Subsurface fragment volume >3" (Depth not specified)	0–20%

Ecological dynamics

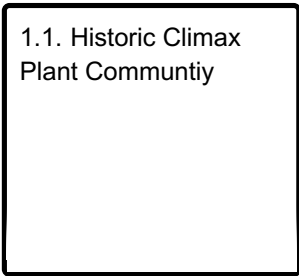
Limestone Hills, 10"-13" p.z., is a shrub dominated ecological site. Sparse perennial grasses and forbs are rarely present. Annual forbs and grasses flourish following rainfall. Natural disturbances are rare. After introduction of non-native annuals (forbs and/or grasses), they flourish following wet winters. Dominant shrubs are blackbrush and jointfir. Assorted half-shrubs are widely scattered.

State and transition model

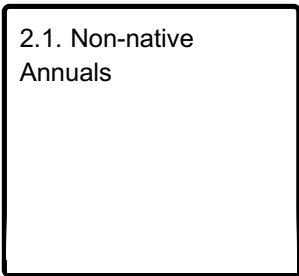
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

The dominant aspect of this plant community is a shrub-grassland. Major grasses are black grama and slim tridens. Major shrubs are blackbrush, Nevada Mormon tea, Utah agave and banana yucca. With severe disturbance, blackbrush and threadleaf snakeweed will increase; red brome and annual forbs will invade.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	185	290	467
Grass/Grasslike	62	115	200
Forb	3	20	33
Total	250	425	700

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	2-4%
Grass/grasslike foliar cover	0-2%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	0-2%
>0.5 <= 1	—	—	9-11%	—
>1 <= 2	—	23-27%	—	—
>2 <= 4.5	—	—	—	—
>4.5 <= 13	—	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

Figure 5. Plant community growth curve (percent production by month).
AZ3024, 30.3 10-13" p.z. upland sites. Growth begins in the spring and continues through the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	8	18	18	11	14	20	8	2	0	0

State 2

Historic Native Plant Community plus Introduced Annuals

Community 2.1

Non-native Annuals

This plant community resembles the historic native plant community, but exotic annuals have been introduced. Non-native species include wild oat, red brome, Mediterranean grass (*Schismus* spp.), and filaree. The flourish of non-native annuals that occurs following rainfalls may preclude native annuals.

Transition T1A

State 1 to 2

Introduction of non-native annual forb and grass seed.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				21–42	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	21–42	–
2				21–42	
	slim tridens	TRMU	<i>Tridens muticus</i>	21–42	–
3				4–21	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	4–21	–
4				0–4	
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0–4	–
5				0–21	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–21	–
6				0–4	
	muttongrass	POFE	<i>Poa fendleriana</i>	0–4	–
7				0–4	
	Parish's threeawn	ARPUP5	<i>Aristida purpurea</i> var. <i>parishii</i>	0–4	–
8				0–4	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–4	–
9				0–4	
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	0–4	–

10				4–21	
	Grass, perennial	2GP	<i>Grass, perennial</i>	4–21	–
Forb					
11				4–21	
	Forb, perennial	2FP	<i>Forb, perennial</i>	4–21	–
12				0–4	
	Forb, annual	2FA	<i>Forb, annual</i>	0–4	–
Shrub/Vine					
13				170–212	
	blackbrush	CORA	<i>Coleogyne ramosissima</i>	170–212	–
14				4–8	
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	4–8	–
15				4–21	
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	4–21	–
16				4–21	
	banana yucca	YUBA	<i>Yucca baccata</i>	4–21	–
17				0–8	
	mariola	PAIN2	<i>Parthenium incanum</i>	0–8	–
18				4–21	
	Utah agave	AGUT	<i>Agave utahensis</i>	4–21	–
19				0–4	
	buckhorn cholla	CYACM	<i>Cylindropuntia acanthocarpa var. major</i>	0–4	–
20				0–4	
	Stansbury cliffrose	PUST	<i>Purshia stansburiana</i>	0–4	–
21				0–4	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	0–4	–
22				4–21	
	Shrub, other	2S	<i>Shrub, other</i>	4–21	–

Contributors

Harmon Hodgkinson

Harmon S. Hodgkinson
Larry D. Ellicott
Stephen Cassady
Steve Barker

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	07/11/2025
Approved by	Kendra Moseley
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:**
