

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

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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.

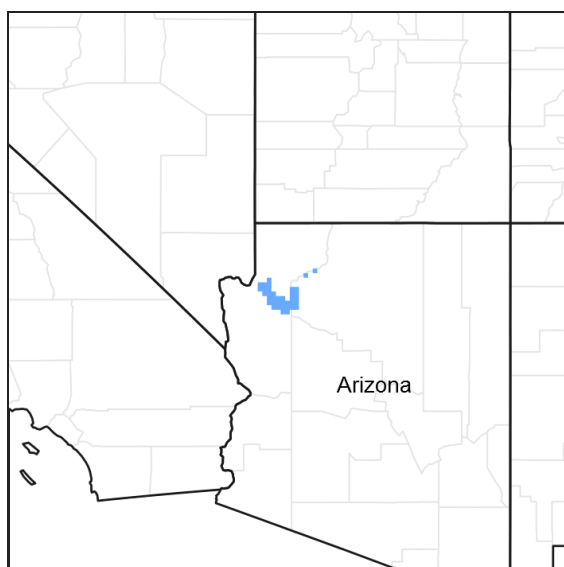


Figure 1. Mapped extent

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): 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

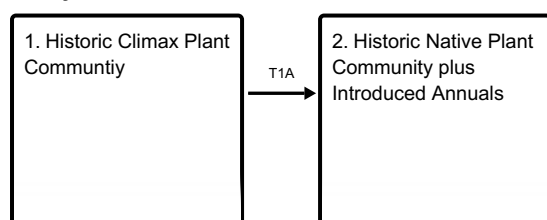
| | |
|--|--|
| Surface texture | (1) Extremely cobbly sandy loam (2) Extremely gravelly sandy clay (3) Very gravelly loam |
| Family particle size | (1) Loamy |
| Drainage class | Well drained |
| Permeability class | Moderately rapid to moderate |
| Soil depth | 9 in |
| Surface fragment cover <=3" | 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

1.1. Historic Climax
Plant Communtiy

State 2 submodel, plant communities

2.1. Non-native
Annuals

State 1
Historic Climax Plant Communtiy

Community 1.1
Historic Climax Plant Communtiy

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 | |

| | | | | | |
|-------------------|-------------------------|--------|--|---------|---|
| 6 | 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</i> var. <i>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 | – |

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Approval

Kendra Moseley, 10/21/2024

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 | 05/12/2025 |
| 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:**
