

## 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.

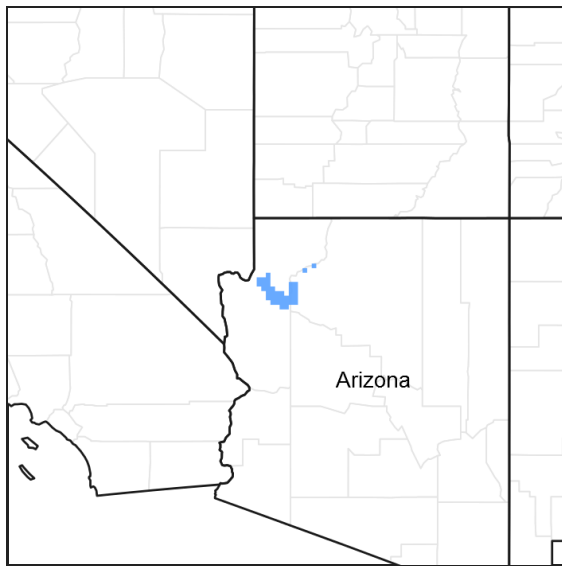


Figure 1. Mapped extent

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

AZ CRA 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. 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.

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	1,219–1,463 m
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)	330 mm

## 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	23 cm
Surface fragment cover <=3"	65–85%
Surface fragment cover >3"	50–75%
Available water capacity (0-101.6cm)	1.27–2.54 cm
Calcium carbonate equivalent (0-101.6cm)	10–35%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	45–65%
Subsurface fragment volume >3" (Depth not specified)	0–20%

## Ecological dynamics

The historic climax plant community (HCPC) for a site in North America is the plant community that existed at the time of European immigration and settlement. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site. The historic climax plant community was in dynamic equilibrium with its environment. It is the plant community that was able to avoid displacement by the suite of disturbances and disturbance patterns (magnitude and frequency) that naturally occurred within the area occupied by the site. Natural disturbances, such as drought, fire, grazing by native fauna, and insects, were inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the site that contribute to that dynamic equilibrium. Fluctuations in plant community structure and function caused by the effects of these natural disturbances establish the boundaries of dynamic equilibrium. They are accounted for as part of the range of characteristics for an ecological site. Some sites may have a small range of variation, while others have a large range.

The historic climax plant community of an ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure. The HCPC for this ecological site has been estimated by sampling relict or relatively undisturbed sites and/or reviewing historic records.

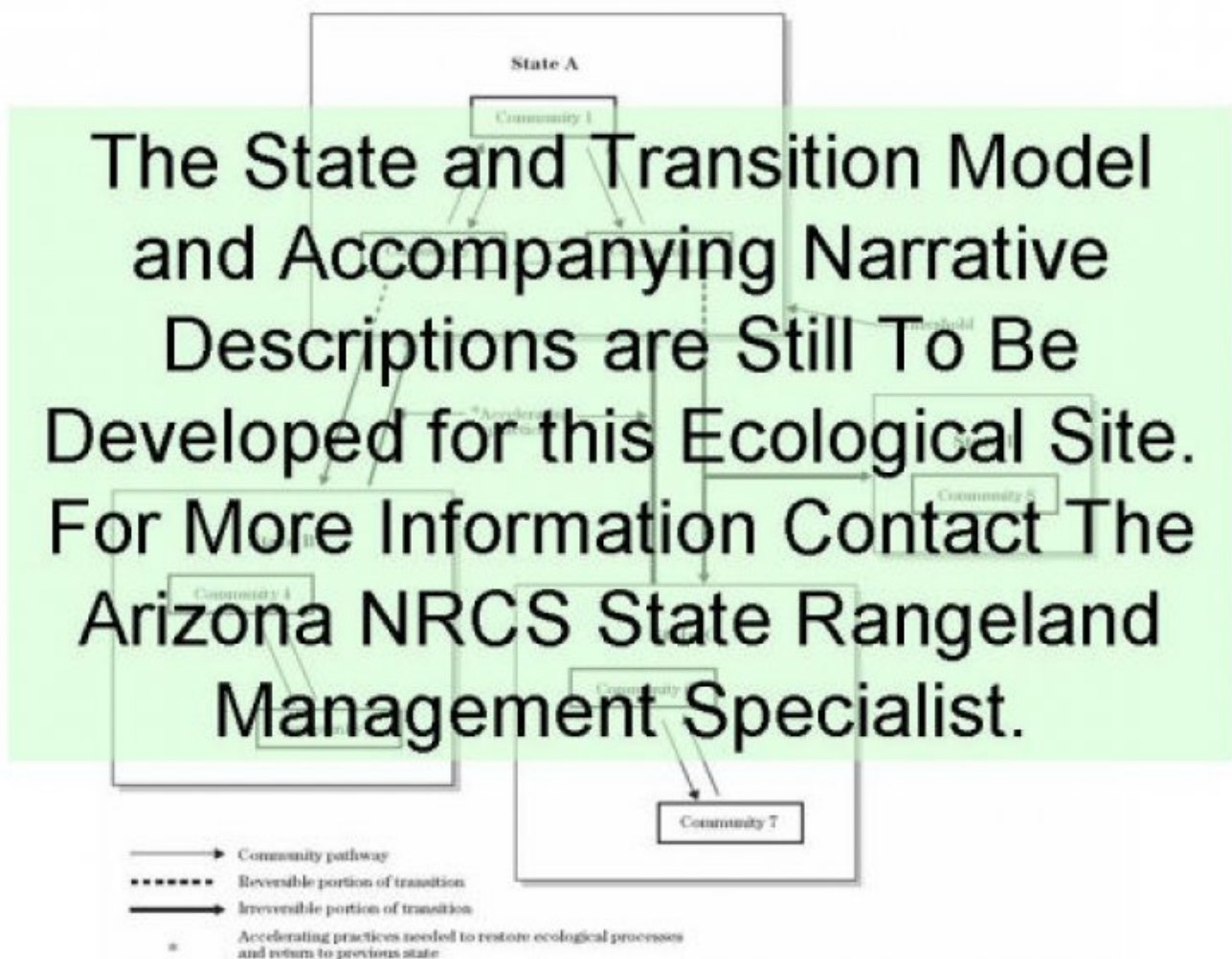
Plant communities that are subjected to abnormal disturbances and physical site deterioration or that are protected from natural influences, such as fire and grazing, for long periods seldom typify the historic climax plant community. The physical site deterioration caused by the abnormal disturbance results in the crossing of a threshold or irreversible boundary to another state, or equilibrium, for the ecological site. There may be multiple thresholds and states possible for an ecological site, determined by the type and or severity of abnormal disturbance. The known states and transition pathways for this ecological site are described in the accompanying state and transition model. The Plant Community Plant Species Composition table provides a list of species and each species or group of

species' annual production in pounds per acre (air-dry weight) expected in a normal rainfall year. Low and high production yields represent the modal range of variability for that species or group of species across the extent of the ecological site.

The Annual Production by Plant Type table provides the median air-dry production and the fluctuations to be expected during favorable, normal, and unfavorable years.

The present plant community on an ecological site can be compared to the various common vegetation states that can exist on the site. The degree of similarity is expressed through a similarity index. To determine the similarity index, compare the production of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum shown for the group. Divide the resulting total by the total representative value shown in the Annual Production by Plant Type table for the reference plant community. Variations in production due to above or below normal rainfall, incomplete growing season or utilization must be corrected before comparing it to the site description. The Worksheet for Determining Similarity Index is useful in making these corrections. The accompanying growth curve can be used as a guide for estimating percent of growth completed.

## State and transition model



### 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	207	325	523
Grass/Grasslike	69	129	224
Forb	3	22	37
<b>Total</b>	<b>279</b>	<b>476</b>	<b>784</b>

**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 (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	-	-	-	0-2%
>0.15 <= 0.3	-	-	9-11%	-
>0.3 <= 0.6	-	23-27%	-	-
>0.6 <= 1.4	-	-	-	-
>1.4 <= 4	-	-	-	-
>4 <= 12	-	-	-	-
>12 <= 24	-	-	-	-
>24 <= 37	-	-	-	-
>37	-	-	-	-

**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

### Additional community tables

**Table 8. Community 1.1 plant community composition**

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)

**Grass/Grasslike**

1				24-47	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	24-47	-
2				24-47	
	slim tridens	TRMU	<i>Tridens muticus</i>	24-47	-
3				4-24	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	4-24	-
4				0-4	
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0-4	-
5				0-24	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0-24	-
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				4-24	
	Grass, perennial	2GP	<i>Grass, perennial</i>	4-24	-
<b>Forb</b>					
11				4-24	
	Forb, perennial	2FP	<i>Forb, perennial</i>	4-24	-
12				0-4	
	Forb, annual	2FA	<i>Forb, annual</i>	0-4	-
<b>Shrub/Vine</b>					
13				191-238	
	blackbrush	CORA	<i>Coleogyne ramosissima</i>	191-238	-
14				4-9	
	threadleaf snakeweed	GUMI	<i>Gutierrezia microcephala</i>	4-9	-
15				4-24	
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	4-24	-
16				4-24	
	banana yucca	YUBA	<i>Yucca baccata</i>	4-24	-
17				0-9	
	mariola	PAIN2	<i>Parthenium incanum</i>	0-9	-
18				4-24	
	Utah agave	AGUT	<i>Agave utahensis</i>	4-24	-
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				4-24	
	Shrub, other	2S	<i>Shrub, other</i>	4-24	-

## Animal community

Wildlife found on this ecological site includes mule deer, snakes, cottontail rabbit, coyote, desert bighorn sheep, lizards and blacktail jackrabbit.

## Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T27N R12W S9
General legal description	Hindu Canyon Quad. about 5-6 miles north of Plain Tank, North of Hindu Canyon on the Hualapai Indian Reservation.

## Contributors

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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.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

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

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

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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):

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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:**
- 

17. **Perennial plant reproductive capability:**
-