

Ecological site R030XB214AZ Limy Upland 6-9" 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 30-2 – Middle Mohave Desert

Elevations range from 1500 to 3200 feet and precipitation averages 6 to 9 inches per year. Vegetation includes creosotebush, white bursage, yucca, prickly pear and cholla species, Mormon tea, flattop buckwheat, ratany, winterfat, bush muhly, threeawns, and big galleta. The soil temperature regime is thermic and the soil moisture regime is typic aridic.

Ecological site concept

This ecological site is located on gently sloping uplands. The calcareous soil is shallow to a petrocalcic layer. Soil texture is sandy loam. Soil is usually skeletal.

Associated sites

R030XB203AZ	Basalt Slopes 6-9" p.z.
R030XB205AZ	Sandy Loam Upland 6-10" p.z. Limy Subsurface, Gravelly
R030XB208AZ	Gypsum Hills 6-9" p.z.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Ambrosia dumosa</i> (2) <i>Larrea tridentata</i>
Herbaceous	Not specified

Physiographic features

This site occurs in an upland position on ridges, summits and shoulders of plateaus, mesas and fans. The soils associated with this site are generally shallow to a lime cemented root restricting layer. Occasionally the soil associated with the site is moderately deep or deep, but in these instances there is a weakly lime cemented layer at a shallow depth. The soil is calcareous throughout the profile. Slopes range from 1 to 25 percent.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Mesa (3) Fan
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Flooding frequency	None
Ponding frequency	None
Elevation	1,500–3,200 ft
Slope	1–25%
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid and warm. Annual precipitation ranges from 6 to 9 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 59 to 70 degrees F. The average frost-free period ranges from 156 to 259 days.

Table 3. Representative climatic features

Frost-free period (average)	259 days
Freeze-free period (average)	290 days
Precipitation total (average)	9 in

Influencing water features

Soil features

The soil of this site ranges from shallow to deep, but is generally shallow to a plant root restricting lime cemented layer. Those that are deeper have are weekly lime cemented at a shallow depth. The soil surface is gravelly or cobbly and has a texture ranging from sandy loam to loam. The subsoil is generally very gravelly to very cobbly. Subsoil textures range sandy loam to clay. The soil is calcareous throughout the profile.

A typical soil profile is:

A1--0 to 1 inch; reddish brown (5YR 5/4) very gravelly fine sandy loam, reddish brown (5YR 4/4) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common fine roots; few fine and medium tubular pores; disseminated calcium carbonate; 40 percent pebbles and cobbles; strongly effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary.

A2--1 to 6 inches; reddish brown (5YR 5/4) very gravelly fine sandy loam, reddish brown

(5YR 4/4) moist; weak medium platy structure parting to fine granular; slightly hard, very friable, nonsticky and nonplastic; common fine roots; common very fine, fine and medium tubular pores; disseminated calcium carbonate; 40 percent pebbles; strongly effervescent; strongly alkaline (pH 8.8); clear smooth boundary. (Combined thickness of the A horizons is 5 to 10 inches.)

Bk1--6 to 12 inches; light reddish brown (5YR 6/4) very gravelly fine sandy loam, reddish brown (5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine roots; common fine and medium tubular pores; disseminated calcium carbonate; 40 percent pebbles and cobbles; strongly effervescent; strongly alkaline (pH 8.8); clear wavy boundary.

Bk2--12 to 16 inches; light reddish brown (5YR 6/4) very cobbly fine sandy loam, reddish brown (5YR 4/4) moist; massive, soft, very friable, nonsticky and nonplastic; common fine roots; few fine and medium tubular pores; disseminated calcium carbonate; 60 percent pebble and cobble size pan fragments; strongly effervescent; strongly alkaline (pH 8.8); abrupt wavy boundary. (Combined thickness of the Bk horizons is 6 to 12 inches.)

Bkm--16 to 20 inches; indurated petrocalcic horizon..

Table 4. Representative soil features

Parent material	(1) Colluvium–conglomerate (2) Residuum–limestone
Surface texture	(1) Very cobbly sandy loam (2) Gravelly very fine sandy loam (3) Extremely gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	11–20 in
Surface fragment cover ≤3"	5–50%
Surface fragment cover >3"	0–30%
Available water capacity (0–40in)	1.3–1.7 in
Calcium carbonate equivalent (0–40in)	15–25%
Electrical conductivity (0–40in)	0–2 mmhos/cm
Soil reaction (1:1 water) (0–40in)	7.9–9

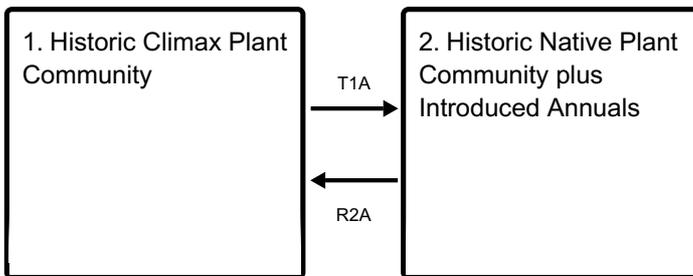
Subsurface fragment volume $\leq 3"$ (Depth not specified)	5–60%
Subsurface fragment volume $> 3"$ (Depth not specified)	0–25%

Ecological dynamics

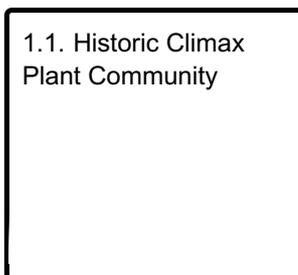
Limy Upland, 6"-9" p.z., is a shrub dominated ecological site. Sparse perennial grasses and forbs are occasionally encountered. Annual forbs and grasses flourish following rainfall. Natural disturbances are rare. After introduction of non-native annuals (forbs and/or grasses), the shift in total productivity is shift increased seasonal herbaceous production following periods of rain. Dominant shrubs are creosote and white bursage. Assorted half-shrubs are widely scattered.

State and transition model

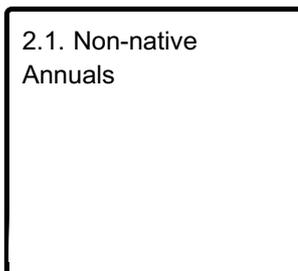
Ecosystem states



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 ecological site is mixed desert shrub. The dominant shrubs are white bursage, creosotebush, Nevada Mormon tea and white ratany. Very little perennial grass occurs on this site. During years of average or below average production the majority of the annual herbage production is from shrubs. In wetter than average years production is from shrubs. Many species are only seen in above annual precipitation years.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	184	309	433
Forb	7	15	23
Grass/Grasslike	2	12	22
Tree	7	14	22
Total	200	350	500

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-2%
Grass/grasslike foliar cover	0-1%
Forb foliar cover	0-1%
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	–	–	0-2%	–
>1 <= 2	–	–	–	–
>2 <= 4.5	–	8-12%	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 5. Plant community growth curve (percent production by month). AZ3022, 30.2 6-9" p.z. upland sites. Growth begins in the late winter, most growth occurs in the spring..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	2	19	33	18	7	7	11	3	0	0	0

Figure 6. Plant community growth curve (percent production by month). AZ3074, 30.23, 6-9 p.z., Nevada Mormon Tea. Growth primarily in spring and early summer months..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	15	25	20	15	15	10	0	0	0	0

Figure 7. Plant community growth curve (percent production by month). AZ3075, 30.23 6-9" p.z. white ratany. Most growth occurs in the spring, some growth occurs in the summer. Flowers in the spring..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	20	35	5	10	15	10	0	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 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.

Restoration pathway R2A

State 2 to 1

None known.

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				0–9	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–9	–
2				0–4	
3				0–4	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–4	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	0–4	–
	threeawn	ARIST	<i>Aristida</i>	0–4	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	0–4	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	0–4	–
	slim tridens	TRMU	<i>Tridens muticus</i>	0–4	–
4				4–13	
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	4–14	–
Forb					
4				4–14	
	globemallow	SPHAE	<i>Sphaeralcea</i>	4–14	–
5				0–9	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–9	–
	desert marigold	BAMU	<i>Baileya multiradiata</i>	0–9	–
	winding mariposa	CAFL	<i>Calochortus flexuosus</i>	0–9	–

	lily				
	desert trumpet	ERIN4	<i>Eriogonum inflatum</i>	0-9	-
6				4-14	
	Forb, annual	2FA	<i>Forb, annual</i>	0-4	-
	trailing windmills	ALIN	<i>Allionia incarnata</i>	0-4	-
	devil's spineflower	CHRI	<i>Chorizanthe rigida</i>	0-4	-
	dyssodia	DYSSO	<i>Dyssodia</i>	0-4	-
	buckwheat	ERIOG	<i>Eriogonum</i>	0-4	-
	spurge	EUPHO	<i>Euphorbia</i>	0-4	-
	New Mexico plumeseed	RANE	<i>Rafinesquia neomexicana</i>	0-4	-
Shrub/Vine					
8				112-158	
	burrobush	AMDU2	<i>Ambrosia dumosa</i>	112-158	-
9				68-112	
	creosote bush	LATR2	<i>Larrea tridentata</i>	68-112	-
10				4-22	
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	4-22	-
11				4-22	
	white ratany	KRGR	<i>Krameria grayi</i>	4-22	-
12				0-22	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0-22	-
13				9-27	
	pricklypear	OPUNT	<i>Opuntia</i>	9-27	-
14				9-22	
	turpentinebroom	THMO	<i>Thamnosma montana</i>	9-22	-
15				4-14	
	water jacket	LYAN	<i>Lycium andersonii</i>	4-14	-
16				0-14	
	echinocactus	ECHIN2	<i>Echinocactus</i>	0-14	-
	barrel cactus	FEROC	<i>Ferocactus</i>	0-14	-
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	0-14	-
17				22-45	
	rayless goldenhead	ACSP	<i>Acamptopappus</i>	4-22	-

	goldenmead		<i>sphaerocephalus</i>		
	button brittlebush	ENFR	<i>Encelia frutescens</i>	4–22	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	4–22	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	4–22	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	4–22	–
	whitestem paperflower	PSCO2	<i>Psilostrophe cooperi</i>	4–22	–
	Mojave yucca	YUSC2	<i>Yucca schidigera</i>	4–22	–
Tree					
18				14–22	
	Joshua tree	YUBR	<i>Yucca brevifolia</i>	14–22	–

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	07/16/2025
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:**
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- 17. Perennial plant reproductive capability:**
-