Ecological site R030XC330AZ
Basalt Slopes 10-13" p.z.

Last updated: 2/25/2025
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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): 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 moderately deep to deep. Soil surface is armored with basalt cobble and stone.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Ephedra nevadensis*
Herbaceous	(1) *Muhlenbergia porteri* (2) *Pleuraphis rigida*

Physiographic features

This ecological site is found in an upland position on escarpments below basalt flows, often associated with basalt talus slopes and exposed mudstone.

Table 2. Representative physiographic features

Landforms	(1) Escarpment
Flooding frequency	None
Ponding frequency	None

Elevation	869–1,311 m
Slope	10–40%
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

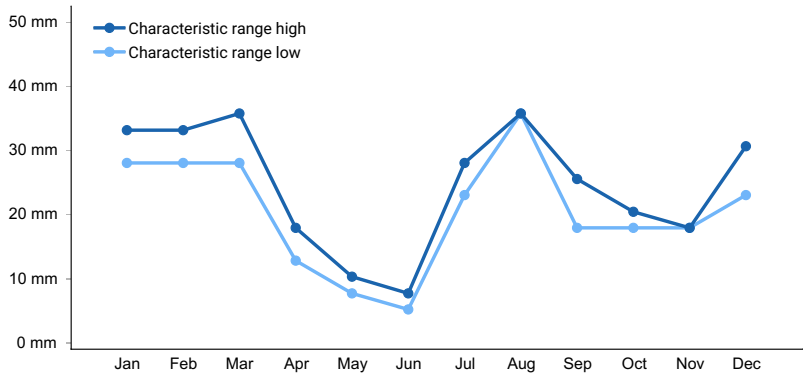


Figure 1. Monthly precipitation range

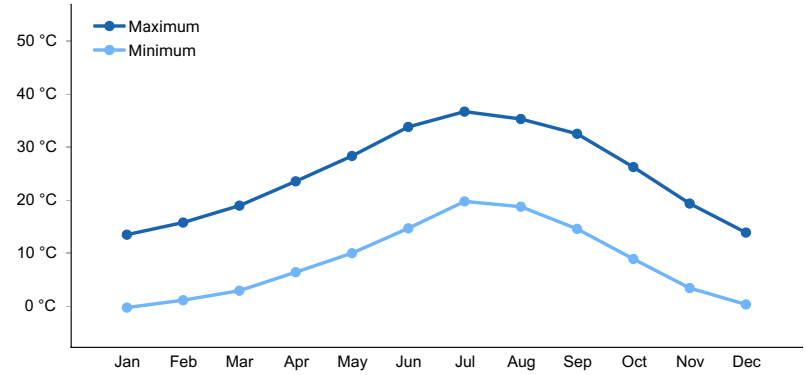


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

The soil of this ecological site is shallow to very deep with a surface texture of very cobbly fine sandy loam. Subsoil textures are very cobbly loam, cobbly fine sandy loam, gravelly loam, gravelly sandy loam, loam and loamy sand. The soil parent material is colluvium from sedimentary and igneous formations. The geologic formation on which it is found is basalt over Moenkopi. Soil available water capacity is very low to medium. The soil's erosion hazard by water is moderate to very severe and by wind is slight. The soil is non-saline, non-sodic with pH range of 7.6-9.0 (slightly to strongly alkaline). The soil moisture regime is typic aridic and temperature regime is thermic. The soil is

calcareous or gypsic throughout the profile.

A typical soil profile is:

A-0 to 2 inches; reddish brown (5YR 5/4) very cobbly fine sandy loam; 15 percent gravel, 25 percent cobbles, and 10 percent stones; slightly effervescent

Bw-2 to 12 inches; reddish brown (5YR 5/4) very cobbly loam; 15 percent gravel, 25 percent cobbles, and 10 percent stones; strongly effervescent

Bk1-12 to 26 inches; yellowish red (5YR 5/6) gravelly loam; 20 percent gravel and 5 percent cobbles; violently effervescent

Bk2-26 to 42 inches; yellowish red (5YR 5/6) gravelly6 sandy loam, 20 percent gravel and 5 percent cobbles; violently effervescent

2Cr-42 inches; mudstone and shale

The taxonomic classification is: coarse-loamy, mixed, thermic Typic Calciorthids

Table 4. Representative soil features

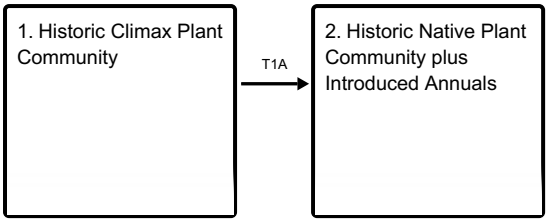
Surface texture	(1) Very cobbly loam (2) Cobbly fine sandy loam (3) Gravelly loamy sand
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	25–45%
Surface fragment cover >3"	20–50%
Available water capacity (0-101.6cm)	2.54–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	3–22%
Electrical conductivity (0-101.6cm)	2–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	25–45%
Subsurface fragment volume >3" (Depth not specified)	20–50%

Ecological dynamics

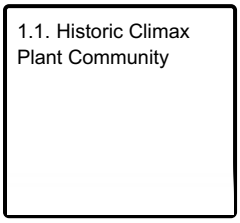
Basalt Slopes, 10"-13" p.z., is a shrub dominated ecological site. Sparse perennial grasses and forbs are occasionally encountered. Annual forbs and grasses flourish following rainfall. Natural disturbances are rare. After introduction of non-native annuals (forbs and/or grasses), they flourish following wet winters. Dominant shrubs are flattop buckwheat, creosote and white bursage. Assorted half-shrubs are widely scattered.

State and transition model

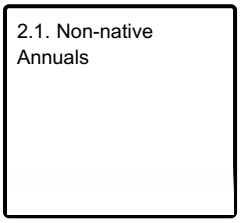
Ecosystem states



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 plant community is a desert shrub-perennial grass. Major grasses are bush muhly and big galleta. Major shrubs are blackbrush, Nevada mormon tea and creosotebush.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	185	275	358
Grass/Grasslike	122	196	269
Forb	20	39	61
Tree	9	22	41
Total	**336**	**532**	**729**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	1-3%
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	–	–	–	–
>0.15 <= 0.3	–	–	1-3%	–
>0.3 <= 0.6	–	–	–	–
>0.6 <= 1.4	–	5-7%	–	–
>1.4 <= 4	0-2%	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

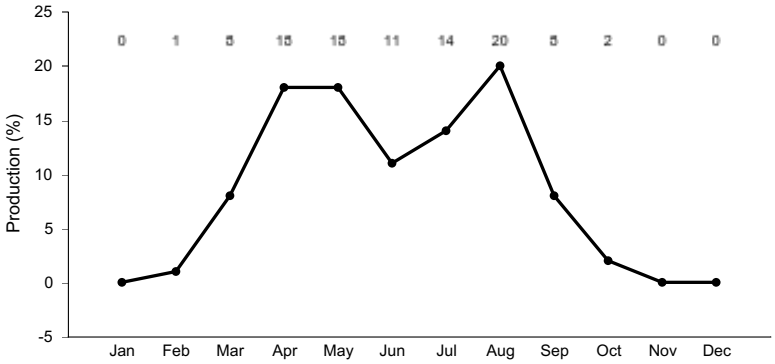


Figure 4. Plant community growth curve (percent production by month). AZ3024, 30.3 10-13" p.z. upland sites. Growth begins in the spring and continues through the summer..

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 (Kg/Hectare)	Foliar Cover (%)

Grass/Grasslike					
1				27–80	
	bush muhly	MUPO2	*Muhlenbergia porteri*	27–80	–
2				27–54	
	big galleta	PLRI3	*Pleuraphis rigida*	27–54	–
3				11–54	
	threeawn	ARIST	*Aristida*	11–54	–
4				11–21	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	11–21	–
5				7–16	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–16	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	0–16	–
6				0–11	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–11	–
7				0–11	
	slim tridens	TRMU	*Tridens muticus*	0–11	–
8				0–11	
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–11	–
9				6–16	
	Grass, annual	2GA	*Grass, annual*	0–16	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–16	–
Forb					
10				6–27	
	desert trumpet	ERIN4	*Eriogonum inflatum*	6–27	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	6–27	–
11				6–27	
	Forb, perennial	2FP	*Forb, perennial*	0–16	–
	winding mariposa lily	CAFL	*Calochortus flexuosus*	0–16	–
	bluedicks	DICA14	*Dichelostemma capitatum*	0–16	–
	princesplume	STANL	*Stanleya*	0–16	–
12				6–16	
	Forb, annual	2FA	*Forb, annual*	0–16	–
Shrub/Vine					
13				27–80	
	blackbrush	CORA	*Coleogyne ramosissima*	27–80	–
14				16–54	
	Nevada jointfir	EPNE	*Ephedra nevadensis*	16–54	–
15				6–27	
	creosote bush	LATR2	*Larrea tridentata*	6–27	–
16				6–27	
	button brittlebush	ENFR	*Encelia frutescens*	6–27	–
17				6–16	
	rayless goldenhead	ACSP	*Acamptopappus sphaerocephalus*	6–16	–

18				6–16	
	water jacket	LYAN	*Lycium andersonii*	6–16	–
19				0–27	
	littleleaf ratany	KRER	*Krameria erecta*	0–27	–
	white ratany	KRGR	*Krameria grayi*	0–27	–
20				64–133	
	Shrub, other	2S	*Shrub, other*	0–45	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–45	–
	burrobrush	HYSA	*Hymenoclea salsola*	0–45	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–45	–
	Fremont's dalea	PSFR	*Psorothamnus fremontii*	0–45	–
	banana yucca	YUBA	*Yucca baccata*	0–45	–
Tree					
21				11–37	
	Joshua tree	YUBR	*Yucca brevifolia*	11–37	–

Animal community

Wildlife found on this ecological site include jackrabbit, coyote, desert cottontail, pocket gopher, antelope squirrel, kangaroo rat, gambel quail, raven, gopher snake, Mohave rattlesnake, western rattlesnake and pocket mouse.

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T35N R16W S1
General legal description	Pakoon Springs Quad. about 3 miles north of Pakoon Springs Ranch.

Contributors

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Approval

Sarah Quistberg, 2/25/2025

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	05/13/2025
Approved by	Sarah Quistberg

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:

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

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

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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:**

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17. **Perennial plant reproductive capability:**
