USDA Natural Resources
Conservation Service

Ecological site R030XA118AZ
Volcanic Hills 3-6" 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 30-1 – Lower Mohave Desert

Elevations range from 400 to 2500 feet and precipitation averages 3 to 6 inches per year. Vegetation includes creosotebush, white bursage, Mormon tea, and brittlebush. The soil temperature regime is hyperthermic and the soil moisture regime is typic aridic.

Ecological site concept

This ecological site is located on steep slopes. Soils are non-calcareous, very shallow to shallow to andesite bedrock.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ambrosia dumosa* (2) *Larrea tridentata*
Herbaceous	Not specified

Physiographic features

This ecological site is found on backslopes, summits and shoulders of hills and mountains of volcanic origin. It is found on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	274–914 m
Slope	30–65%

Climatic features

The 30-1AZ Lower Mohave Desert Shrub land resource unit is characterized by a hot, dry climate. The average annual rainfall is 3 to 6 inches, but it can be extremely variable (e.g. from 0 to 11 inches). There can be long periods when little or no precipitation is received. Most of the precipitation for the year could arrive in just a couple of storms. The soil moisture regime is typic aridic and the soil temperature regime is hyperthermic. Winter precipitation from November through April occurs as gentle rains from storms coming out of the Pacific Ocean. Snow is very rare and only falls in the highest mountains. A seasonal drought occurs in May and June. Summer/fall precipitation from July through October comes from spotty, unreliable, and sometimes violent thunderstorms. The moisture originates in the Gulf of Mexico (and the Pacific Ocean in the fall) and flows into the state on the north end of the Mexican monsoon. Strong winds are common, especially during the spring.

Table 3. Representative climatic features

Frost-free period (average)	325 days
Freeze-free period (average)	365 days
Precipitation total (average)	152 mm

Influencing water features

Soil features

The soils of this ecological site are very shallow to shallow. Surface textures are extremely gravelly sandy loam to extremely stony fine sandy loam. Subsoil textures are extremely gravelly sandy loam to very gravelly sandy loam. Parent material is volcanic and conglomerate slope alluvium and colluvium. The geologic formation the ecological site is found on is andesite. Available water capacity is very low. Erosion hazard by water is severe; by wind is slight. Runoff is very rapid. Soils are non-saline, non-sodic with pH range of 7.6-7.8 (mildly alkaline). Soil moisture regime is typic aridic; temperature regime is hyperthermic. Depth to andesite bedrock is 9-13 inches. Rock outcrop is associated with this site.

A typical soil profile is:
A-0 to 2 inches; extremely gravelly fine sandy loam

Bw-2 to 5 inches; very gravelly sandy loam
2Cr-5 to 6 inches; weathered bedrock
2R-6 inches; unweathered bedrock

The ecological site has been correlated to map unit 627105, Sunrock series, Mohave County, AZ, Southern Part SSA.

Table 4. Representative soil features

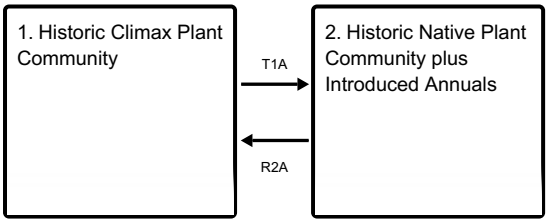
Surface texture	(1) Extremely gravelly sandy loam (2) Extremely stony very fine sandy loam
Drainage class	Somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	13–33 cm
Surface fragment cover <=3"	70–80%
Surface fragment cover >3"	0–15%
Available water capacity (0-101.6cm)	0.51–1.02 cm
Calcium carbonate equivalent (0-101.6cm)	5–15%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	45–70%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This ecological site potential is a shrub dominated plant community. Few natural disturbances affect this site. Steep slopes, rugged terrain, and limited available forage restrict livestock impacts on this site. Annual forbs flourish in springs, particularly following wet winters; the green forage produced is desired by livestock but is largely unused once matured. Non-native annuals are well adapted on this site.

State and transition model

Ecosystem states



State 1 submodel, plant communities

1.1. Historic Climax Plant Community

State 2 submodel, plant communities

2.1. Non-Native Annuals

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

The dominant aspect of this site is a desert shrub. Some grasses and forbs are also present. Dominant shrub are creosotebush, white bursage, and white brittlebush. Besides annual grasses, desert needlegrass may be present. The soil-moisture plant relationship is fair-to-good on this site. The surface coarse fragments help slow down evaporation by providing shade, and the cracks in the bedrock provide repositories for water.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	168	179	191
Grass/Grasslike	22	28	34
Forb	11	17	22
Total	**201**	**224**	**247**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-2%
Grass/grasslike foliar cover	0%
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	–	–	0-2%	–
>0.3 <= 0.6	–	6-10%	–	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 4. Plant community growth curve (percent production by month). AZ3011, 30.1 3-6" p.z. all sites. Growth begins in late winter, most growth occurs in the spring..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	7	30	32	13	7	3	5	2	1	0	0

Figure 5. Plant community growth curve (percent production by month). AZ3082, 30.27 3-6" p.z. creosotebush. Growth occurs mostly in the spring using stored winter moisture. Flowers and sets seed by July..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	20	40	20	20	0	0	0	0	0	0

Figure 6. Plant community growth curve (percent production by month). AZ3083, 30.27 3-6" p.z. white bursage. Growth begins in early spring. Dormancy occurs during the hot summer months. With sufficient summer/fall precipitation, some plants may break dormancy and produce a flush of growth. Flowers and sets seed by July..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	40	20	15	0	0	0	0	0	0

Figure 7. Plant community growth curve (percent production by month). AZ3084, 30.27 3-6" p.z. white brittlebush. Growth begins in the late winter and continues through mid spring, goes dormant during the summer heat. Flowers and sets seed by July..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	30	45	20	0	0	0	0	0	0	0

Figure 8. Plant community growth curve (percent production by month). AZ3087, 30.27 3-6" p.z. desert needlegrass. Growth begins in late winter to early spring, most growth occurs before summer. Seed set occurs by late summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	25	20	15	15	5	0	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 (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				2–11	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	2–11	–
2				0–2	
	slim tridens	TRMU	*Tridens muticus*	0–2	–
3				2–4	
	needle grama	BOAR	*Bouteloua aristidoides*	2–4	–
4				2–4	
	sixweeks grama	BOBA2	*Bouteloua barbata*	2–4	–
5				2–4	
	sixweeks fescue	VUOC	*Vulpia octoflora*	2–4	–
6				2–4	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	2–4	–
7				2–4	
	threeawn	ARIST	*Aristida*	2–4	–
8				0–2	
	bush muhly	MUPO2	*Muhlenbergia porteri*	0–2	–
Forb					
9				2–4	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–4	–
10				2–4	
	desert Indianwheat	PLOV	*Plantago ovata*	2–4	–
11				2–4	
	desert pepperweed	LEFR2	*Lepidium fremontii*	2–4	–
12				2–4	
	Forb, annual	2FA	*Forb, annual*	2–4	–
13				2–4	
	Forb, perennial	2FP	*Forb, perennial*	2–4	–
Shrub/Vine					
14				34–45	

	brittlebush	ENFA	*Encelia farinosa*	34–45	–
15				45–56	
	creosote bush	LATR2	*Larrea tridentata*	45–56	–
16				45–67	
	burrobush	AMDU2	*Ambrosia dumosa*	45–67	–
17				2–11	
	white ratany	KRGR	*Krameria grayi*	2–11	–
18				0–4	
	Mojave yucca	YUSC2	*Yucca schidigera*	0–4	–
19				0–2	
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	0–2	–
20				0–4	
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	0–4	–
21				0–2	
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	0–2	–
22				0–4	
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	0–4	–
23				2–7	
	brittlebush	ENCEL	*Encelia*	2–7	–
24				2–4	
	Nevada jointfir	EPNE	*Ephedra nevadensis*	2–4	–
25				2–11	
	Shrub, other	2S	*Shrub, other*	2–11	–

Contributors

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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:

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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:**
