USDA Natural Resources
Conservation Service

Ecological site R030XB202AZ
Basalt Hills 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 steeply sloping uplands (slopes 15%-65%). Soils are shallow to dark colored

basalt bedrock. Dark colored basalt cobbles and gravels armor the soil surface.

Associated sites

R030XB214AZ	**Limy Upland 6-9" p.z.**

Similar sites

R030XB201AZ	**Andesite Hills 6-9" p.z. Coarse** This ecological site occurs on andesite bedrock.
R030XA101AZ	**Basalt Hills 3-6" p.z.** This ecological site occurs at lower elevation, higher temperature and lower precipitation.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Larrea tridentata*
Herbaceous	Not specified

Physiographic features

This ecological site occurs in an upland position on basalt hills and mountains in associaton with basalt outcrop. It occurs on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	610–1,280 m
Slope	15–70%

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)	229 mm

Influencing water features

Soil features

The soil of this ecological site is shallow and is underlaid by basalt bedrock. The soil surface is often covered with

basalt stones, cobbles and gravels. The available water capacity of the soil is very low. The soil hazard to wind erosion is slight; water erosion is moderate to severe. Runoff from the site is slow. The soil is non-sodic, non-saline with a pH od 7.4 to 8.4. The moisture regime of the soil is typic aridic and temperature regime is thermic.

A typical soil profile is:
A-0 to 2 inches; extremely cobbly loam
Bk-2 to 15 inches; extremely gravely loam
2R-15 inches; unweathered bedrock

The taxonomic classification of the soil is Loamy-skeletal, mixed, superactive, calcareous, thermic Lithic Torriorthents.

Soils correlated to this ecological site include map units 627092, 627094, 627096, 627104 Razorback soil, Mohave County, AZ, Southern Part SSA.

Table 4. Representative soil features

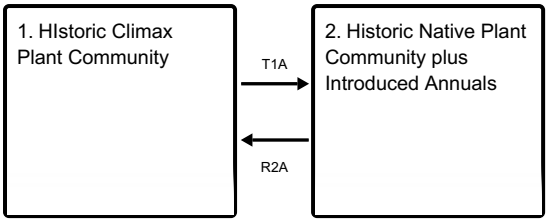
Surface texture	(1) Extremely gravelly loam (2) Extremely stony loam (3) Extremely cobbly loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained
Permeability class	Moderate
Soil depth	25–51 cm
Surface fragment cover <=3"	45–55%
Surface fragment cover >3"	65–75%
Available water capacity (0-101.6cm)	15.24–2.54 cm
Calcium carbonate equivalent (0-101.6cm)	2–10%
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)	70–80%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

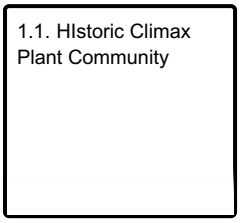
Basalt Hills, 6"-9" p.z., is a shrub dominated ecological site. Perennial grasses and forbs are occasionally encountered. Annual forbs and grasses flourish following rainfall. Natural disturbances are rare. After introduction of non-native annuals (forbs and/or grasses), the shift in total productivity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

State and transition model

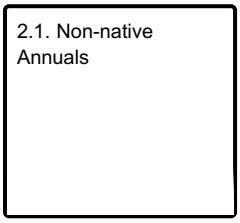
Ecosystem states



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 site is a desert shrub with grasses and forbs. Creosotebush is the major shrub. Other shrubs include white bursage, bush encelia, Nevada Mormon tea, range ratany and flattop buckwheat. Big galleta is present in minor amounts. Access by large animals to most of this site is difficult because of loose rock material on the surface and steep slopes. Grass and grasslike plants make up 10 to 15 percent of the plant community, forbs 10 to 20 percent and shrubs 65 to 75 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	64	163	382
Forb	10	34	102
Grass/Grasslike	10	28	76
Total	**84**	**225**	**560**

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	–	–	–	1-3%
>0.15 <= 0.3	–	–	1-3%	–
>0.3 <= 0.6	–	4-6%	–	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

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

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	
	big galleta	PLRI3	*Pleuraphis rigida*	2–11	–
2				2–11	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	2–11	–
3				11–22	
	Grass, annual	2GA	*Grass, annual*	11–22	–
4				0–7	
	Grass, perennial	2GP	*Grass, perennial*	0–7	–
Forb					
5				0–4	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–4	–
6				11–34	
	Forb, annual	2FA	*Forb, annual*	11–34	–
7				2–11	
	Forb, perennial	2FP	*Forb, perennial*	2–11	–
Shrub/Vine					
8				67–90	
	creosote bush	LATR2	*Larrea tridentata*	67–90	–
9				2–11	
	burrobush	AMDU2	*Ambrosia dumosa*	2–11	–
10				2–11	
	button brittlebush	ENFR	*Encelia frutescens*	2–11	–
11				0–11	
	brittlebush	ENFA	*Encelia farinosa*	55–91	–
12				2–11	
	Nevada jointfir	EPNE	*Ephedra nevadensis*	2–11	–
13				2–11	
	littleleaf ratany	KRER	*Krameria erecta*	2–11	–
14				0–11	
	blackbrush	CORA	*Coleogyne ramosissima*	0–11	–
15				2–11	
	Eastern Mojave buckwheat	ERFAP	*Eriogonum fasciculatum var. polifolium*	2–11	–
16				2–4	
	water jacket	LYAN	*Lycium andersonii*	2–4	–
17				0–2	
18				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	05/13/2025
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:**