USDA Natural Resources
Conservation Service

Ecological site R030XA101AZ
Basalt Hills 3-6" p.z.

Last updated: 10/21/2024
Accessed: 12/17/2025

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

Basalt Hills. 3"-6" p.z., is found on steep slopes with very shallow to shallow soils over dark basalt bedrock.

Table 1. Dominant plant species

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

Physiographic features

This site occurs in an upland position. It does not benefit significantly from run-in moisture from adjacent areas. It suffers from excessive loss from runoff. This ecological site is found on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	800–1,700 ft
Slope	15–70%

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)	6 in

Influencing water features

There are no water features associated with this site.

Soil features

The soils characterizing this site are shallow to bedrock. The soil surface is often covered with basalt cobbles and gravels. The surface soil has a minimum depth of 2-4 inches and ranges in texture from very gravelly loam to very gravelly clay loam. The subsoil and underlying layers have permeabilities ranging from moderate to moderately slow. This site can not absorb and hold all the moisture that climate supplies. Soluble salt accumulatations are low and pH ranges from 7.9-8.4. The soil surface is only slightly effervescent, but becomes strongly to violently effervescent within a few inches of the soil surface. With good vegetative cover, infiltration rates are low. Stability against erosion processes is poor and plant-soil moisture relationships are less than average. Coarse fragments average 60-70% of the total soil volume.

A typical soil profile is:
A-0 to 2 inches; very gravelly loam; 80 percent basalt cobble and gravel; non to slightly effervescent
Bt1-2 to 4 inches; gravelly sandy clay loam; 20 percent basalt gravel; slightly to strongly effervescent
Bt2-4 to 8 inches clay loam; 10 percent basal gravel; slightly to violently effervescent
Bt3-8 to 13 inches; extremely gravelly sandy clay loam; 65 percent basalt gravel; strongly to violently effervescent
2R-13 inches; bedrock

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Clay loam
Family particle size	(1) Loamy
Soil depth	7–20 in
Surface fragment cover <=3"	40–80%
Surface fragment cover >3"	0–60%
Soil reaction (1:1 water) (0-40in)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	35–80%

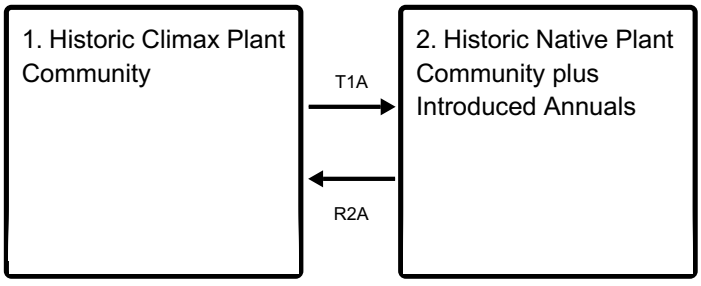
Ecological dynamics

This ecological site is located on low rolling hills and basalt mountains. It occurs on dark desert hills protruding abruptly from the desert floor. The potential plant community is shrub dominated. The dark colored bedrock and cobble cover creates a warm growing environment during late winter/early spring months but is extremely hot and droughty in the summer months. Annual forbs and grasses flourish on this site following rainfall. Non-native forbs and grasses are well-adapted to this site.

While early growth of annuals provides green forage during periods when other sites are dormant, livestock grazing impacts on this site are minimal due to the steep and rugged slopes.

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 plant community found on this ecologcal site is composed primarily of shrubs, and scattered perennial grasses and forbs. Native annuals become abundant, generally in late winter and spring in years of normal to above-normal precipitation.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	150	160	170
Forb	10	20	40
Grass/Grasslike	10	20	30
Total	**170**	**200**	**240**

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

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 Asian mustard (*Brassica tournefortii*), 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 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				10	
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–5	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	0–5	–
	tobosagrass	PLMU3	*Pleuraphis mutica*	0–5	–
	big galleta	PLRI3	*Pleuraphis rigida*	0–5	–
	slim tridens	TRMU	*Tridens muticus*	0–5	–
2				20	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	5–10	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	5–10	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	5–10	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	5–10	–
Forb					
3				10–40	
	Forb, annual	2FA	*Forb, annual*	5–20	–

	devil's spineflower	CHRI	*Chorizanthe rigida*	5–20	–
	spurge	EUPHO	*Euphorbia*	5–20	–
	pepperweed	LEPID	*Lepidium*	5–20	–
	plantain	PLANT	*Plantago*	5–20	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	5–20	–
Shrub/Vine					
4				50–80	
	brittlebush	ENFA	*Encelia farinosa*	50–80	–
5				40–70	
	burrobush	AMDU2	*Ambrosia dumosa*	40–70	–
6				30–60	
	button brittlebush	ENFR	*Encelia frutescens*	30–60	–
7				10–20	
	creosote bush	LATR2	*Larrea tridentata*	10–20	–
8				2–10	
	ratany	KRAME	*Krameria*	2–10	–
	desert-thorn	LYCIU	*Lycium*	2–10	–
9				2–10	
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	2–5	–

Contributors

AZ NRCS Staff
AZ NRCS Staff. Original Number And Name -- D30-2 Basalt Hills 4-8
Karlynn Huling
Larry D. Ellicott
Steve Barker

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	12/17/2025
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:**
