USDA Natural Resources
Conservation Service

Ecological site R030XB220AZ
Andesite Hills 6-9" p.z.

Last updated: 10/21/2024
Accessed: 05/20/2025

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 30-2 – 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 very steep uplands (slopes >65%). Soils are very shallow to andesite bedrock.

Similar sites

R030XB201AZ	**Andesite Hills 6-9" p.z. Coarse**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Ambrosia dumosa* (2) *Eriogonum fasciculatum*
Herbaceous	(1) *Achnatherum speciosum*

Physiographic features

This ecological site is found in an upland positon on shoulders, sideslopes and summits of hills and mountains of andesite geologic parent material. It is found on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	762–1,067 m
Slope	20–70%

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)	229 mm

Influencing water features

Soil features

The soil of this ecological site is very shallow to shallow. The soil's patent material is andesite alluvium and colluvium. The soil surface texture is extremely gravelly sandy loam and the subsoil textures is very gravelly sandy loam. The soil's available water capacity is very low. The soil wind erosion hazard is slight and water erosion hazard is severe. The soil pH range is 7.9-8.4. The soil moisture regime is typic aridic and soil temperature regime is thermic. Andesite bedrock is encountered at a depth of 4-5 inches. Rock outcrop is associated and intermixed with this ecological site.

A typical soil profile is:
A-0 to 2 inches; extremely gravelly loam
C-2 to 5 inches; very gravelly loam
2R-5 inches; unweathered bedrock

The soil taxinomic classification is Loamy-skeletal, mixed, superactive, calcareous, thermic Lithic Torriorthents.

Soils correlated to this ecological site include map unit 627118, Razorback soil, Mohave County, AZ, Southern Part SSA.

Table 4. Representative soil features

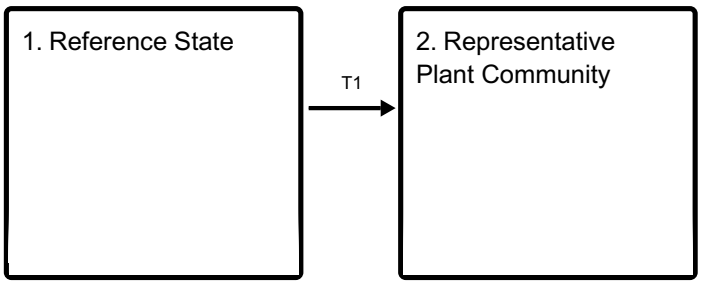
Parent material	(1) Alluvium–andesite
Surface texture	(1) Extremely gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained
Permeability class	Moderately rapid
Soil depth	10–18 cm
Surface fragment cover <=3"	65–80%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	0.25–1.02 cm
Calcium carbonate equivalent (0-101.6cm)	5–10%
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)	65–80%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

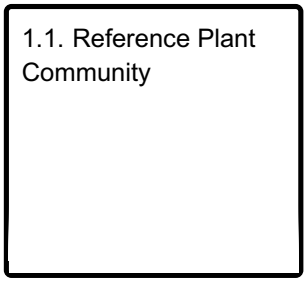
Andesite Hills, 6"-9" p.z., is a mixed shrubland. Sparse perennial grasses and forbs are occasionally encountered. Annual forbs and grasses flourish following rainfall. Natural disturbances are extremely rare. The very steep slopes reserve browsing to desert bighorn and burros. After introduction of non-native annuals (forbs and/or grasses), they will grow after wet winters.

State and transition model

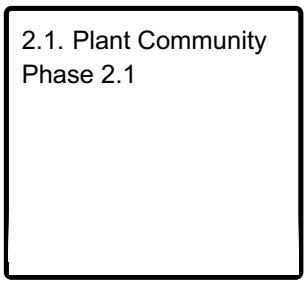
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference State

The reference state is representative of the natural range of variability under pristine conditions. Fire is rare in this system. This ecological site experiences seasonal flooding and is important for redistributing moisture and nutrients throughout the landscape. Timing of disturbances combined with weather events determines plant community dynamics.

Community 1.1
Reference Plant Community

The dominant aspect of this plant community is a desert shrub. It consists of a mix of four shrubs: creosotebush, white bursage, Nevada Mormon tea and flattop buckwheat. Desert needlegrass is usually present on this site and is sometimes abundant. The stocking rate will have to be determined each year based on growth from winter and spring moisture and steep slopes. The climax plant community is best used to support desert bighorn sheep which are well suited to the site.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	112	280	448
Grass/Grasslike	13	45	78
Forb	1	11	19
Total	**126**	**336**	**545**

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	–	8-12%	–	–
>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

State 2
Representative Plant Community

The Representative Plant Community is characterized by the presence of non-native species in the understory. A biotic threshold is crossed with the introduction of non-natives that are difficult to remove from the system and have they potential to significantly alter disturbance regimes from their historic range of variation. Non-native annuals will persist once introduced into the plant community, due to their annual growth form, abundant seed production and long term seed viability. Non-native annuals such as red brome and cheatgrass are potential invaders on this ecological site. These non-native annuals are highly flammable and promote wildfires where fires historically have been infrequent.

Community 2.1
Plant Community Phase 2.1

Species composition is similar to the reference plant community. Ecological processes have not been compromised at this time, however, ecological resilience is reduced by the presence of non-natives. This plant community phase will respond differently following disturbance, when compared to the reference plant community. Management focused on decreasing the amount of anthropogenic disturbance is important for maintaining the health of perennial native species that protect the site against erosion.

Transition T1
State 1 to 2

Introduction of non-native species.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
1	**Shrubs**			147–260	
	burrobush	AMDU2	*Ambrosia dumosa*	56–84	–
	creosote bush	LATR2	*Larrea tridentata*	28–43	–
	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	28–43	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	28–43	–
	Shrub, other	2S	*Shrub, other*	2–13	–
	littleleaf ratany	KRER	*Krameria erecta*	0–9	–
	catclaw acacia	SEGR4	*Senegalia greggii*	0–9	–
	Mojave sage	SAMO3	*Salvia mohavensis*	0–9	–
	pricklypear	OPUNT	*Opuntia*	2–9	–
	water jacket	LYAN	*Lycium andersonii*	2–6	–
	Mojave woodyaster	XYTOT	*Xylorhiza tortifolia var. tortifolia*	0–2	–
Grass/Grasslike					
2	**Grasses**			28–43	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	28–31	–
	slim tridens	TRMU	*Tridens muticus*	0–6	–
	threeawn	ARIST	*Aristida*	0–6	–
Forb					
3	**Forbs**			2–13	
	Forb, annual	2FA	*Forb, annual*	2–11	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–2	–

Contributors

Harmon Hodgkinson
Harmon S. Hodgkinson
Larry D. Ellicott
Stephen Cassady

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	05/20/2025
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:**
