USDA Natural Resources Conservation Service

Ecological site R030XA107AZ
Limy Slopes 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 calcareous, moderately deep to deep. Textures are sandy loam to loam.

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 summits and backslopes of fan terraces. It occurs on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	457–914 m
Slope	15–35%
Aspect	Aspect is not a significant factor

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 soil of this ecological site is very deep. Parent material is of mixed igneous and metamorphic alluvium materials from various formations. Available water capacity is low. Permeability is moderately rapid. Water erosion hazard is severe; wind erosion hazard is slight. Runoff is rapid. Soils are non-saline, non-sodic with pH of 8.0-8.2 (moderately alkaline). Soil moisture regime is typic aridic; temperature regime is hyperthermic.

A typical soil profile is:
A-0 to 2 inches; very gravelly loam; strongly effervescent
Bw-2 to 9 inches; very gravelly sand loam; violently effervescent
Bkq- 9 to 27 inches; very gravelly sandy loam; violently effervescent
Bk 27 to 40 inches; extremely gravelly sandy loam; violently effervescent
2C-40 to 60 inches; very gravelly loamy sand; violently effervescent

Soil mapping units correlated to this ecological site include map unit 627060, Huevi Series, Mohave County, AZ, Southern Part SSA and map unit 701013, Snapcan Series, Grand Canyon Area, AZ, Parts of Coconino and Mohave Counties.

Table 4. Representative soil features

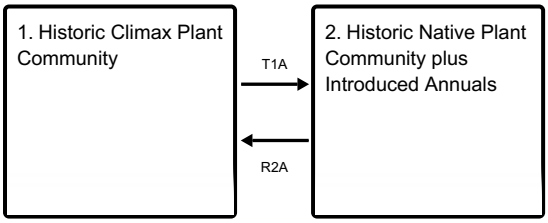
Surface texture	(1) Very gravelly sandy loam (2) Extremely gravelly
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	152 cm
Surface fragment cover <=3"	40–60%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	7.62–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	2–30%
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)	20–55%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

The dominant aspect of this ecological site is a sparse stand of desert shrubs such as creosotebush, white brittlebush and white ratany. Limited natural disturbance occurs on 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 the site is a desert shrub. Creosotebush, white bursage and white brittlebush are the major shrubs. Because of the low density of plants and the lack of desirable species for grazing, it is hard to measure degredation. A fire will not carry on this site and grazing is limited to annual grasses, forbs and low amounts of white bursage. Plant community changes are limited by low moisture and high temperatures.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	74	83	84
Forb	4	11	15
Grass/Grasslike	1	4	4
Total	**79**	**98**	**103**

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%	0-2%
>0.15 <= 0.3	–	–	–	–
>0.3 <= 0.6	–	4-8%	–	–
>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

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				0–2	
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–2	–
2				1–3	
	Grass, annual	2GA	*Grass, annual*	1–3	–
Forb					
3				0–3	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–3	–
4				4–10	
	desert Indianwheat	PLOV	*Plantago ovata*	4–10	–
5				0–3	
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–3	–
6				1–4	
	Forb, annual	2FA	*Forb, annual*	1–4	–
Shrub/Vine					
7				49–59	
	creosote bush	LATR2	*Larrea tridentata*	49–59	–
8				15–20	
	burrobush	AMDU2	*Ambrosia dumosa*	15–20	–
9				0–2	
	white ratany	KRGR	*Krameria grayi*	0–2	–
10				4–10	
	brittlebush	ENFA	*Encelia farinosa*	4–10	–
11				0–2	
	Shrub, other	2S	*Shrub, other*	0–2	–

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)	Cody Lunsford and Steve Cassady
Contact for lead author	Steve Cassady, State Rangeland Management Specialist
Date	04/04/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None. A cover of gravel and rock armor the soil surface against erosion.

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2. **Presence of water flow patterns:** A few possible, but spaced no closer than 20 to 30 feet apart. This ecological site usually occurs on the side slopes of fairly narrow ridge tops. The occasional water flow pattern may be observed just above the natural drainages into the washes dissecting the fan terrace the site occurs on. The cover of gravel and rock armors the soil surface against erosion preventing water flow patterns from developing in other locations on the ecological site.

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3. **Number and height of erosional pedestals or terracettes:** None. A cover of gravel and rock armors the soil surface against erosion and the creation of pedestals or terracettes.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground makes up 5 to 15 percent. Rock and gravel cover is 75 to 80 percent. Litter cover is 5 to 15 percent. Basal plant cover is generally less than 5 percent.

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5. **Number of gullies and erosion associated with gullies:** Numerous drainages running approximately vertical to the direction of the ridge tops may be observed. These are natural and no active erosion is seen associated with them.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None. A cover of gravel and rock armors the soil surface against wind erosion and the resulting scoured, blowout and/or depositional areas.

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter is naturally concentrated underneath the scattered shrubs found on this ecological site. The residue of annual forbs and grasses, although naturally scarce, generally stays in place for several months after these plants have senesced due to the soil surface cover of gravel and rock found on this ecological site.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** No slake test information is available. The soil surface is very resistant to both water and wind erosion due to the cover of rocks and gravels.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thick platy structure; color is 10YR4/3 moist. The thickness of the A horizon is about 2 inches.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This plant community is characterized by widely scattered shrubs with average spacing of 20 to 30 feet. Canopy cover of shrubs is 5 to 15 percent.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer exists on this ecological site. The soil surface cover of gravel and rock forms a somewhat impenetrable layer, but this is not due to compaction.

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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: Shrubs (75 to 85%) >>

    Sub-dominant: Forbs (5 to 15%) >, Grasses (1 to 5%)

    Other:

    Additional: During years of above average precipitation the ratio of shrubs to annual plants (dominantly annual forbs) will naturally change with the annually produced biomass produced and resulting percent composition of forbs increasing substantially while the biomass of the shrubs will increase only slightly.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** One to two percent of the perennial plants may be dead or dying due to drought or natural senescence at any given time. Dead branched in the creosote bush and occasionally white bursage are common and natural, increasing during drought periods.

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14. **Average percent litter cover (%) and depth (in):** Litter is naturally concentrated under shrubs. Litter from winter spring annual forb and grass production generally stays in place for several months due to the rock and gravel cover found in interspaces.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Average annual production on this site is expected to be 75 to 125 lbs/ac. in a year of average precipitation.

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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: Red brome (Bromus rubens, Mediterranean grass, Schismus barbatus, and filaree, Erodium cicutarium may be found on the site in very small amounts (< 1% or < 1 lb/ac.).

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17. **Perennial plant reproductive capability:** All plants native to this site are adapted to the climate and are capable of producing seeds, stolons, and/or rhizomes except during the most severe droughts.
