USDA Natural Resources
Conservation Service

Ecological site R040XC308AZ
Limy Hills 3"-7" p.z.

Accessed: 05/13/2025

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.

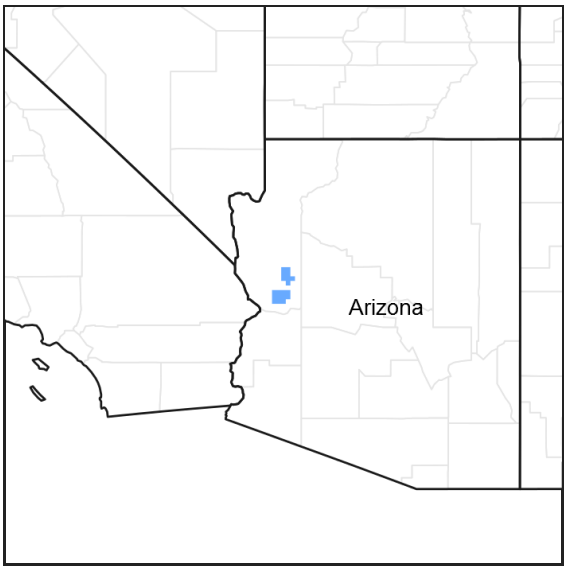

Figure 1. Mapped extent

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): 040X–Sonoran Basin and Range

AZ 40.3 – Colorado Sonoran Desert

Elevations range from 300 to 1200 feet and precipitation averages 3 to 7 inches per year. Vegetation includes creosotebush, white bursage, brittlebush, Mormon tea, teddybear cholla, elephant tree, smoke tree, ocotillo, and big galleta. The soil temperature regime is hyperthermic and the soil moisture regime is typic aridic. This unit occurs within the Basin and Range Physiographic Province and is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys and basins. Igneous and metamorphic rock classes dominate the mountain ranges and sediments filling the basins represent combinations of fluvial, lacustrine, colluvial and alluvial deposits.

Table 1. Dominant plant species

Tree	(1) *Parkinsonia microphylla*
Shrub	(1) *Ambrosia dumosa* (2) *Encelia farinosa*
Herbaceous	(1) *Pleuraphis rigida* (2) *Tridens muticus*

Physiographic features

This site occurs as gently sloping and rolling hills to very steep hill slopes. Inclusions of schist or other rock outcrop can make up 0-5% of the area.

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	23–305 m
Slope	1–70%

Climatic features

Precipitation in this common resource area ranges from 3-7 inches yearly. Despite historical averages in rainfall amounts, as one moves from east to west in this resource area rains become more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 44% at Gila Bend and 65% at Mohawk. Winter-Summer rainfall ratios are 40-60%. Summer rains fall July-September, originate in the Gulf of Mexico and are convective, usually brief intense thunderstorms. Summer thunderstorms usually form over the mountains in the afternoon and spread to the valleys and plains in the evening. The intensity of this precipitation is moderate to heavy, but rarely lasts more than half an hour. Many times these storms produce little more than gusty winds and light showers. Cool season moisture tends to be frontal, originate in the Pacific and Gulf of California and falls in widespread storms with long duration and low intensity. Snow is very rare and falls normally only in the higher mountains.

Mean temperatures for the hottest month (Jul) is 93 F; the coldest month (Jan) is 53 F. Extreme temperatures of 125 F and 10 F have been recorded. Long periods with little or no effective moisture occur frequently.

The winter-spring precipitation is the most dependable on the site. Perennial grasses, though classed as warm season growers, grow actively year-round when moisture is available. Shrubs and trees generally respond to seasonal moisture. The two rainy periods bring about their respective production of either winter or summer annual grasses and forbs.

Table 3. Representative climatic features

Frost-free period (average)	363 days
Freeze-free period (average)	0 days
Precipitation total (average)	178 mm

Influencing water features

Soil features

Soils are very shallow to moderately deep. They are gravelly to very gravelly loams, calcareous to the surface, and underlain by schist and metomorphic granitic type rock. The surface is gravel covered. Some soils have lime pans on top of the rock. Plant-soil moisture relationships are poor.

Soils mapped on this site include: in SSA-627 Southern Mohave county MU Gunsight-57 and SSA-656 Colorado River Indian Reservation MU Gunsight-16 & 17.

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam (2) Extremely gravelly loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained to excessively drained

Permeability class	Moderate to moderately rapid
Soil depth	25–102 cm
Surface fragment cover <=3"	35–80%
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–15 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	7.8–8.4
Subsurface fragment volume <=3" (Depth not specified)	35–80%

Ecological dynamics

The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The Historical Climax Plant Community represents the natural potential plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as fire, grazing, or drought.

Production data provided in this site description is standardized to air dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine Similarity index, compare the production (air dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum amount shown for each group. Divide the resulting total by the total normal year production shown in the plant community description. If the rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

State and transition model

The State and Transition Model and Accompanying Narrative Descriptions are Still To Be Developed for this Ecological Site. For More Information Contact The Arizona NRCS State Rangeland Management Specialist.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

The native plant community on this site is a mixture of desert trees, shrubs and cacti. The understory is a scattering of perennial and annual grasses and forbs. As palatable species decline from lack of management, less palatable species like bristlebush and cholla increase to dominate the site.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	168	196	224
Tree	168	196	224
Forb	28	43	56
Grass/Grasslike	28	43	56
Total	**392**	**478**	**560**

Figure 5. Plant community growth curve (percent production by month). AZ4041, 40.3 3-7" p.z. all sites. Most growth occurs in the winter to early spring, plants are dormant May through October..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	20	40	25	0	0	0	0	0	0	5	5

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
0	**Dominant Grass**			9–15	
	big galleta	PLRI3	*Pleuraphis rigida*	9–15	–
1	**Other Grasses**			6–15	
	slim tridens	TRMU	*Tridens muticus*	3–9	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	2–6	–
	threeawn	ARIST	*Aristida*	1–3	–
2	**Annual Grasses**			15–28	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	2–4	–
	needle grama	BOAR	*Bouteloua aristidoides*	2–4	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	2–4	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	2–4	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	2–4	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	2–4	–
	Texas fluffgrass	TRTE2	*Tridens texanus*	2–4	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	2–4	–
Forb					
3				9–28	
	trailing windmills	ALIN	*Allionia incarnata*	2–4	–
	cryptantha	CRYPT	*Cryptantha*	2–4	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	2–4	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	2–4	–
	desert Indianwheat	PLOV	*Plantago ovata*	2–4	–
	Coues' cassia	SECO10	*Senna covesii*	2–4	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–4	–
4				9–28	
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	2–4	–
	milkvetch	ASTRA	*Astragalus*	2–4	–
	desert marigold	BAMU	*Baileya multiradiata*	2–4	–
	spiderling	BOERH2	*Boerhavia*	2–4	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	2–4	–
	California suncup	CACA32	*Camissonia californica*	2–4	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	2–4	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	2–4	–
	devil's spineflower	CHRI	*Chorizanthe rigida*	2–4	–

	hairy prairie clover	DAMO	*Dalea mollis*	2–4	–
	larkspur	DELPH	*Delphinium*	2–4	–
	western tansymustard	DEPI	*Descurainia pinnata*	2–4	–
	bluedicks	DICA14	*Dichelostemma capitatum*	2–4	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	2–4	–
	woolly sunflower	ERIOP2	*Eriophyllum*	2–4	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	2–4	–
	spurge	EUPHO	*Euphorbia*	2–4	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	2–4	–
	pepperweed	LEPID	*Lepidium*	2–4	–
	foothill deervetch	LOHU2	*Lotus humistratus*	2–4	–
	strigose bird's-foot trefoil	LOSTT	*Lotus strigosus var. tomentellus*	2–4	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	2–4	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	2–4	–
	blazingstar	MENTZ	*Mentzelia*	2–4	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	2–4	–
	glandular threadplant	NEGL	*Nemacladus glanduliferus*	2–4	–
	evening primrose	OENOT	*Oenothera*	2–4	–
	combseed	PECTO	*Pectocarya*	2–4	–
	Emory's rockdaisy	PEEM	*Perityle emoryi*	2–4	–
	phacelia	PHACE	*Phacelia*	2–4	–
	sleepy silene	SIAN2	*Silene antirrhina*	2–4	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	2–4	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	2–4	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	2–4	–
	trailing windmills	ALIN	*Allionia incarnata*	2–4	–
	cryptantha	CRYPT	*Cryptantha*	2–4	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	2–4	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	2–4	–
	desert Indianwheat	PLOV	*Plantago ovata*	2–4	–
	Coues' cassia	SECO10	*Senna covesii*	2–4	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–4	–
Shrub/Vine					
5	**Dominant Shrubs**			62–155	
	burrobush	AMDU2	*Ambrosia dumosa*	43–56	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	3–15	–
	brittlebush	ENFA	*Encelia farinosa*	0–15	–
	white ratany	KRGR	*Krameria grayi*	0–15	–
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	0–15	–
	desert ironwood	OLTE	*Olneya tesota*	3–9	–
6	**Misc Shrubs**			15–28	
	catclaw acacia	ACGR	*Acacia greggii*	10–20	–

	angel's trumpets	ACLO2	*Acleisanthes longiflora*	10–20	–
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	10–20	–
	Coulter's brickellbush	BRCO	*Brickellia coulteri*	10–20	–
	button brittlebush	ENFR	*Encelia frutescens*	10–20	–
	starry bedstraw	GASTE2	*Galium stellatum ssp. eremicum*	10–20	–
	pink velvetmallow	HOAL	*Horsfordia alata*	10–20	–
	Newberry's velvetmallow	HONE	*Horsfordia newberryi*	10–20	–
	American threefold	TRCA8	*Trixis californica*	10–20	–
	Berlandier's wolfberry	LYBE	*Lycium berlandieri*	10–20	–
	desert-thorn	LYCIU	*Lycium*	10–20	–
	Fremont's desert-thorn	LYFR	*Lycium fremontii*	10–20	–
	slender poreleaf	POGR5	*Porophyllum gracile*	10–20	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	10–20	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	10–20	–
	Hall's shrubby-spurge	TEHA	*Tetracoccus hallii*	10–20	–
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	1–6	–
	southern goldenbush	ISPL	*Isocoma pluriflora*	1–6	–
7	**Other Shrubs**			0–28	
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–20	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0–20	–
	California fagonbush	FALA	*Fagonia laevis*	0–20	–
	slender janusia	JAGR	*Janusia gracilis*	0–20	–
	littleleaf ratany	KRER	*Krameria erecta*	0–20	–
	toothleaf goldeneye	VIDE3	*Viguiera dentata*	0–6	–
8	**Succulents**			0–15	
	saguaro	CAGI10	*Carnegiea gigantea*	0–10	–
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	0–10	–
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	0–10	–
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	0–10	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	0–10	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–10	–
	Johnson's fishhook cactus	ECJO3	*Echinomastus johnsonii*	0–10	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–10	–
	ocotillo	FOSP2	*Fouquieria splendens*	0–10	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–10	–
	common fishhook cactus	MATE4	*Mammillaria tetrancistra*	0–10	–
	desert ironwood	OLTE	*Olneya tesota*	2–10	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	0–10	–
Tree					
9	**Tree**			9–28	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	9–28	–

	yellow paloverde	PAMI3	*Parkinsonia microphylla*	5–20	–
	brittlebush	ENFA	*Encelia farinosa*	0–10	–
	creosote bush	LATR2	*Larrea tridentata*	0–10	–

Animal community

These hills are easily traversed by all classes of livestock. Water developments may be needed to permit use of the areas and to control grazing.

A lack of natural water and cover limit the vlaue of this site for wildlife habitat. The area is mainly a forage site for species living in the canyon bottoms associated with it.

Recreational uses

This site is located on rolling hills to steep slopes. The rugged terrain, along with the mixture of grasses, trees and shrubs, enhances the aesthetics of the site. Very few days in the fall, winter or spring are too uncomfortable to enjoy outdoor activities. Jun, Jul and Aug afternoon heat restricts activity. Activities suited to the site include horseback riding, wildlife observation, hunting, hiking, photography, camping and picnicking.

Type locality

Location 1: Yuma County, AZ	
Township/Range/Section	T9N R15W S2
General legal description	Muse Ranch, E. end Buckskin Mountains
Location 2: Maricopa County, AZ	
Township/Range/Section	T2S R9W S20
General legal description	Gable Ranch, E end of Gila Bend Mountains

Contributors

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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	
Approved by	
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:**