Ecological site R040XC324AZ
Lithic 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.

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) *Eriogonum wrightii* (2) *Ephedra fasciculata*
Herbaceous	(1) *Pleuraphis rigida*

Physiographic features

This range site occurs as rolling to steep hills and low mountains. It is dissected by many steep-sided canyons and long drainageways.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Elevation	23–488 m
Slope	15–75%

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

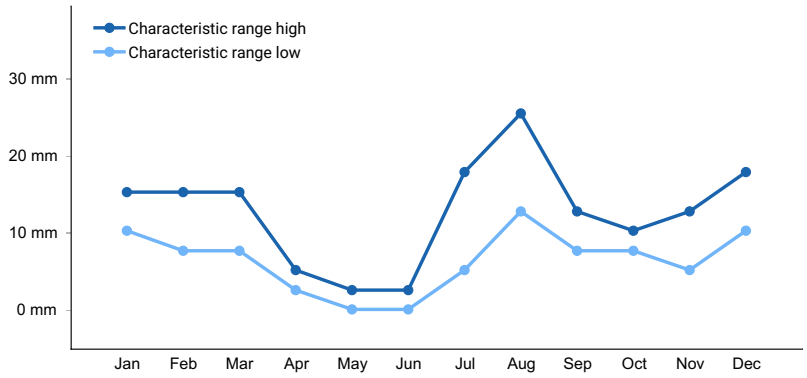

Figure 1. Monthly precipitation range

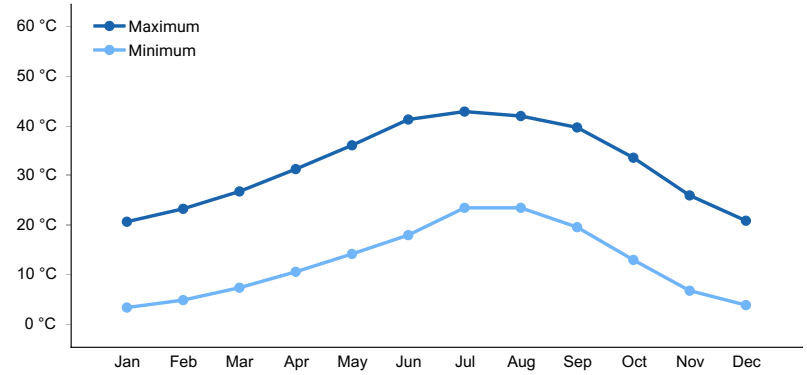

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

These soils are shallow to moderately deep. Parent material is slope alluvium and residuum. They are loamy, usually moderately calcareous, and have a very cobbly or stony surface. Soils are underlain by rhyolite, andesite, dacite and related volcanic rock. They take rainfall well. Plant-soil moisture relationships are fair. Bedrock is weathered or fractured enough to allow good opportunity for plant root penetration. Rock outcrop occupies 10-35% of the area.

Soils mapped on this site include: in SSA-627 Southern Mohave county MU Hyder-103.

Table 4. Representative soil features

Parent material	(1) Alluvium–volcanic breccia
Surface texture	(1) Gravelly loam (2) Very gravelly fine sandy loam (3) Cobbly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	25–102 cm
Surface fragment cover <=3"	25–55%
Surface fragment cover >3"	3–10%
Available water capacity (0-101.6cm)	0.81–5.59 cm
Calcium carbonate equivalent (0-101.6cm)	5–25%
Electrical conductivity (0-101.6cm)	0–1 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	15–45%
Subsurface fragment volume >3" (Depth not specified)	3–10%

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

This site has a plant community that is a mixture of desert trees and shrubs with an understory of perennial and annual grasses and forbs. As the better browse species and perennial grasses and forbs decline from overgrazing, species like cholla, brittlefush, and paloverde 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	177	216	256
Forb	78	99	118
Grass/Grasslike	19	39	59
Tree	11	13	17
Total	**285**	**367**	**450**

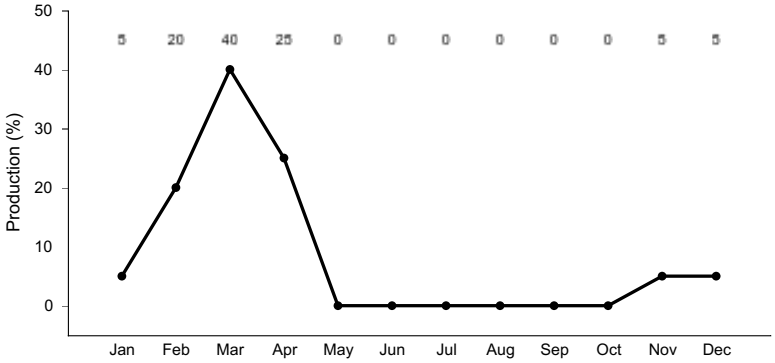

Figure 4. Plant community growth curve (percent production by month). AZ4041, 40.3 3-7" p.z. all sites. Most growth occurs in the winter to early spring, plants are dormant May through October..

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 Perennial Grass**			20–39	
	big galleta	PLRI3	*Pleuraphis rigida*	20–39	–
1	**Misc. Perennial Grasses**			4–20	
	threeawn	ARIST	*Aristida*	0–8	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	2–7	–
	slim tridens	TRMU	*Tridens muticus*	2–6	–
2	**Annual Grasses**			17–39	
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–9	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	2–9	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	2–9	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	2–9	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	2–8	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	2–8	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	2–4	–
	needle grama	BOAR	*Bouteloua aristidoides*	2–4	–
Forb					
3	**Dominant Forbs**			39–56	
	goldenweed	PYRRO	*Pyrrocoma*	19–28	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	20–28	–
4	**Misc. Forbs**			39–59	
	milkvetch	ASTRA	*Astragalus*	1–2	–
	spiderling	BOERH2	*Boerhavia*	1–2	–
	cryptantha	CRYPT	*Cryptantha*	1–2	–
	fleabane	ERIGE2	*Erigeron*	1–2	–
	buckwheat	ERIOG	*Eriogonum*	1–2	–
	phacelia	PHACE	*Phacelia*	1–2	–
	pepperweed	LEPID	*Lepidium*	1–2	–
	cloak fern	NOTHO	*Notholaena*	1–2	–

	evening primrose	OENOT	*Oenothera*	1–2	–
	combseed	PECTO	*Pectocarya*	1–2	–
	spurge	EUPHO	*Euphorbia*	1–2	–
	gilia	GILIA	*Gilia*	1–2	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	0–1	–
	Emory's rockdaisy	PEEM	*Perityle emoryi*	0–1	–
	desert deervetch	LOMI	*Lotus micranthus*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	0–1	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–1	–
	Coues' cassia	SECO10	*Senna covesii*	0–1	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–1	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	0–1	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–1	–
	dainty desert hideseed	EUMI2	*Eucrypta micrantha*	0–1	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	0–1	–
	desert larkspur	DEPA	*Delphinium parishii*	0–1	–
	tall mountain larkspur	DESC	*Delphinium scaposum*	0–1	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–1	–
	desert marigold	BAMU	*Baileya multiradiata*	0–1	–
	pelotazo	ABIN	*Abutilon incanum*	0–1	–
	trailing windmills	ALIN	*Allionia incarnata*	0–1	–
	common fiddleneck	AMMEI2	*Amsinckia menziesii var. intermedia*	0–1	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–
Shrub/Vine					
5	**Dominant Shrubs**			118–157	
	Nevada jointfir	EPNE	*Ephedra nevadensis*	22–45	–
	sweetbush	BEJU	*Bebbia juncea*	11–28	–
	bastardsage	ERWR	*Eriogonum wrightii*	11–22	–
	desert lavender	HYEM	*Hyptis emoryi*	6–17	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	11–17	–
6	**Misc. Shrubs**			39–59	
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	2–11	–
	desert-thorn	LYCIU	*Lycium*	2–6	–
	littleleaf ratany	KRER	*Krameria erecta*	2–6	–
	white ratany	KRGR	*Krameria grayi*	2–6	–
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	2–6	–
	burrobush	AMDU2	*Ambrosia dumosa*	2–6	–
	brittlebush	ENFA	*Encelia farinosa*	2–6	–
	toothleaf goldeneye	VIDE3	*Viguiera dentata*	2–4	–

	desert ironwood	OLTE	*Olneya tesota*	1–3	–
	Schott's pygmycedar	PESC4	*Peucephyllum schottii*	1–3	–
	bush arrowleaf	PLPL	*Pleurocoronis pluriseta*	1–3	–
	American threefold	TRCA8	*Trixis californica*	1–3	–
	ocotillo	FOSP2	*Fouquieria splendens*	1–3	–
	slender janusia	JAGR	*Janusia gracilis*	1–3	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	1–3	–
	Indian mallow	ABUTI	*Abutilon*	1–3	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	1–3	–
7	**Succulents**			4–20	
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	1–2	–
	saguaro	CAGI10	*Carnegiea gigantea*	1–2	–
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	1–2	–
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	1–2	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	1–2	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	0–1	–
	California barrel cactus	FECYC	*Ferocactus cylindraceus var. cylindraceus*	0–1	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–1	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–1	–
Tree					
8	**Tree**			6–17	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	6–17	–

Animal community

Steep slopes, rock outcrop and cobbly surfaces somewhat limit use of this site. Fencing, to restrict animals to the site, and stockwater developments are very important to permit proper management of these areas.

Natural waters are virtually nonexistant in these areas except for scattered rock tanks (tinajas) which are only seasonal. Stockwater developments are very important to wildlife on this site. The site has a varied diversity of both forage species and cover for a variety of wildlife species. Forage seasons are extended due to greenup differences in the north and south slopes and canyon bottoms. This is a very important site for the desert bighorn in this LRA.

Recreational uses

This site is located on steep dissected hills and low mountains. It has an abundance of wildflowers following both winter and summer rains. The mixture of grasses, trees and shrubs enhances the aesthetics of these areas, as does the rugged terrain.

Very few days in the fall, winter or spring are too uncomfortable to enjoy outside activities. In Jun-Aug, however, after lunch heat restricts activity. Horseback riding, wildlife observation, hunting, hiking, photography, camping and picnicking are activities suitable to this site.

Type locality

Location 1: La Paz County, AZ	
Township/Range/Section	T4N R14W S23

General legal description	Crowder-Weisser Allotment, near Pyramid Park, 3 mi. S of Hope, AZ

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:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional 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):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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):**

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:**