Ecological site R040XC301AZ
Basalt 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) *Encelia farinosa* (2) *Ambrosia dumosa*
Herbaceous	(1) *Muhlenbergia porteri* (2) *Tridens muticus*

Physiographic features

This range site occurs in an upland position. It does not benefit significantly from run-in moisture from adjacent areas, but it does suffer from excessive loss from run-off. It occurs on low hills and steep mountains.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Elevation	122–488 m
Slope	25–70%

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 temperature 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 of 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

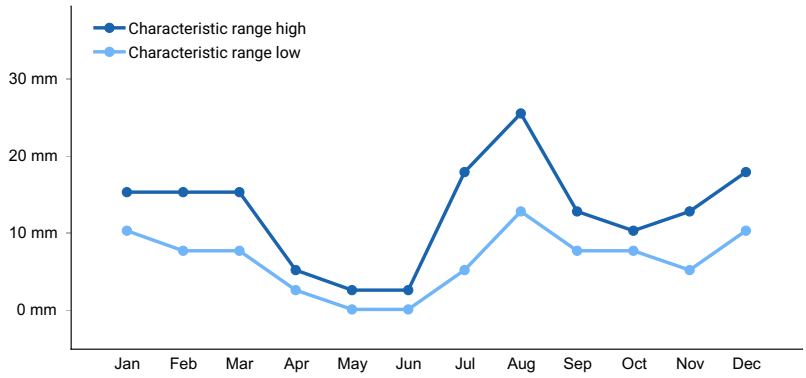

Figure 1. Monthly precipitation range

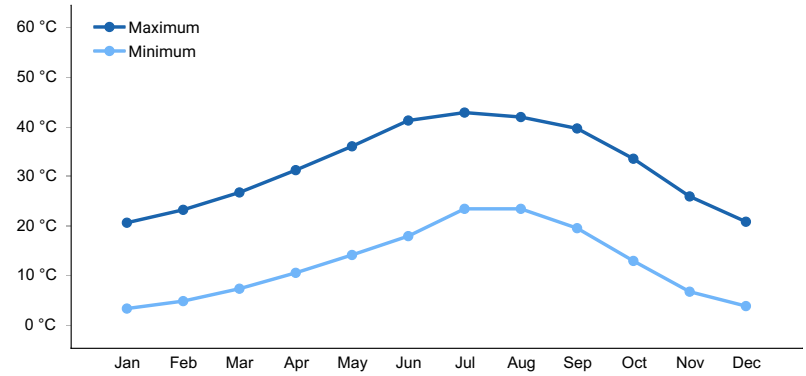

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

Soils are shallow to bedrock and plant rooting zone is restricted. Parent material is calcareous slope alluvium and residuum. The surface soil is 6-8 inches deep and ranges in texture from an extremely cobbly loam to very gravelly loam. Underlying layers and subsoil can absorb and hold most of the moisture the climate supplies. Soluble salt accumulations are low. pH ranges from 7.9-8.4. With good vegetation cover, infiltration rates are moderate. Stability against erosion processes is good. Plant-soil moisture relationships are good. Coarse fragments may be found throughout the soil and are more than 35% of the total soil volume.

Soils mapped on this site include: SSA-627 MU Hyder-63; SSA-649 MU's Cherioni-4 & Gachado-7; SSA-656 MU Cherioni-6.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly fine sandy loam (3) Very cobbly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	10–51 cm
Surface fragment cover <=3"	15–45%
Surface fragment cover >3"	10–25%
Available water capacity (0-101.6cm)	0.76–5.59 cm
Calcium carbonate equivalent (0-101.6cm)	5–25%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
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)	3–15%

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 grazing, fire, 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 shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If 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 is predominantly a shrub site. Perennial grasses make up a small percentage of the plant community. Annual grasses can make up a moderate percentage in years with good summer precipitation and forbs do the same in years with good winter precipitation. Perannial forbs and grasses, though classed as warm season growers, grow actively with winter moisture. Continued grazing use in winter and spring removes these plants. INcrease of brittlebush will occur when palatable species are removed.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	177	189	202
Grass/Grasslike	12	26	38
Forb	12	19	26
Tree	6	9	12
Total	**207**	**243**	**278**

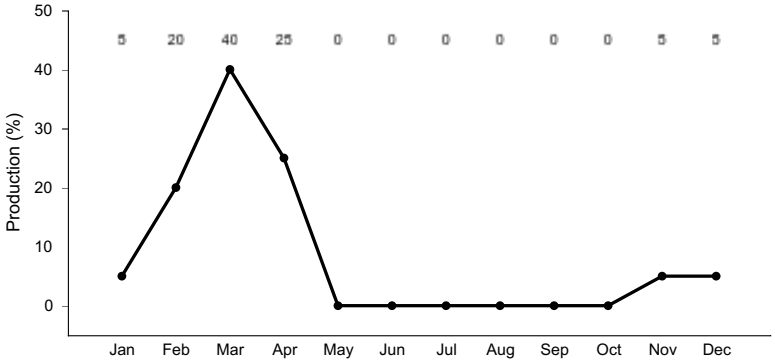

Figure 4. Plant community growth curve (percent production by month). AZ4041, 40.3 3-7" p.z. all sites. Most growth occurs in the winter to early spring, plants are dormant May through October..

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					
1	**Perennial Grasses**			11–22	
	big galleta	PLRI3	*Pleuraphis rigida*	2–4	–
	slim tridens	TRMU	*Tridens muticus*	2–4	–
	threeawn	ARIST	*Aristida*	1–2	–
	needle grama	BOAR	*Bouteloua aristidoides*	1–2	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	1–2	–
	nineawn pappusgrass	ENDE	*Enneapogon desvauxii*	1–2	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	1–2	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	1–2	–
2	**Annual Grasses**			6–11	
	sixweeks grama	BOBA2	*Bouteloua barbata*	1–3	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	1–3	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	1–2	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	1–2	–
Forb					
3	**Perennial Forbs**			11–22	
	pelotazo	ABIN	*Abutilon incanum*	0–2	–
	trailing windmills	ALIN	*Allionia incarnata*	0–2	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–2	–
	desert marigold	BAMU	*Baileya multiradiata*	0–2	–
	fleabane	ERIGE2	*Erigeron*	0–2	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	0–2	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	0–2	–
	Coues' cassia	SECO10	*Senna covesii*	0–2	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–2	–
	globemallow	SPHAE	*Sphaeralcea*	0–2	–
	brownplume wirelettuce	STPA4	*Stephanomeria pauciflora*	0–2	–

4	**Annual Forbs**			2–11	
	common fiddleneck	AMMEI2	*Amsinckia menziesii var. intermedia*	0–1	–
	whitestem milkweed	ASAL	*Asclepias albicans*	0–1	–
	spiderling	BOERH2	*Boerhavia*	0–1	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	0–1	–
	devil's spineflower	CHRI	*Chorizanthe rigida*	0–1	–
	cryptantha	CRYPT	*Cryptantha*	0–1	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–1	–
	buckwheat	ERIOG	*Eriogonum*	0–1	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–1	–
	spurge	EUPHO	*Euphorbia*	0–1	–
	pepperweed	LEPID	*Lepidium*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	tansyaster	MACHA	*Machaeranthera*	0–1	–
	California evening primrose	OECA2	*Oenothera californica*	0–1	–
	evening primrose	OENOT	*Oenothera*	0–1	–
	combseed	PECTO	*Pectocarya*	0–1	–
	Emory's rockdaisy	PEEM	*Perityle emoryi*	0–1	–
	phacelia	PHACE	*Phacelia*	0–1	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–1	–
	sleepy silene	SIAN2	*Silene antirrhina*	0–1	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–1	–
Shrub/Vine					
5	**Dominant Shrubs**			101–163	
	brittlebush	ENFA	*Encelia farinosa*	90–126	–
	burrobush	AMDU2	*Ambrosia dumosa*	12–38	–
6	**Other Shrubs**			12–26	
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	2–4	–
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	1–3	–
	littleleaf ratany	KRER	*Krameria erecta*	1–3	–
	white ratany	KRGR	*Krameria grayi*	1–3	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	1–2	–
	desert lavender	HYEM	*Hyptis emoryi*	1–2	–
	desert-thorn	LYCIU	*Lycium*	1–2	–
	desert ironwood	OLTE	*Olneya tesota*	1–2	–
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	1–2	–
7	**Misc. Shrubs**			11–22	
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	1–2	–
	bush arrowleaf	PLPL	*Pleurocoronis pluriseta*	0–1	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	0–1	–
	American threefold	TRCA8	*Trixis californica*	0–1	–
	toothleaf goldeneye	VIDE3	*Viguiera dentata*	0–1	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	0–1	–

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	sweetbush	BEJU	*Bebbia juncea*	0–1	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	0–1	–
	starry bedstraw	GAST	*Galium stellatum*	0–1	–
	slender janusia	JAGR	*Janusia gracilis*	0–1	–
8	**Succulents**			22–34	
	desert agave	AGDE	*Agave deserti*	1–3	–
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	2–3	–
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	2–3	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	2–3	–
	ocotillo	FOSP2	*Fouquieria splendens*	2–3	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	2–3	–
	globe cactus	MAMMI	*Mammillaria*	1–2	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	1–2	–
	Emory's barrel cactus	FEEM	*Ferocactus emoryi*	1–2	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	1–2	–
Tree					
9	**Tree**			6–12	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	6–12	–

Animal community

The very cobbly surface and steep slopes limit use of this site. The site is more suited for use by stocker cattle in above average winters or summers than for yearlong use. Fencing, to restrict use of the site, and water development are important to improve livestock distribution. Stocker cattle work the rough slopes much better than cows with calves.

Natural water is limted to few, wet weather, potholes. Stock water developments are very important to wildlife on this site. The area is a feeding area for large desert mammale as the feed on it provides seasonal contrast to that of surrounding desert plains and bajadas. Cover, however, is usually poor. This, coupled with the lack of natural waters, limits the residency of large mammals.

Recreational uses

This site is located on steep, low hills and mountains. In years with above average winter moisture, brittlebush flower profusely and provide excellent contrast with the dark, basalt surface. Very few days in the fall, winter, or spring are too uncomfortable to enjoy outdoor activities. Jun-Aug afternoons, however, are warm enough to restrict activity. Horseback riding, wildlife observation, hunting, hiking and photography are the main activities suited to the site.

Other products

Masonary rock for fireplaces.

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:

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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):**

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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:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
