Ecological site R040XC322AZ
Shallow Upland 3"-7" p.z.

Accessed: 05/11/2025

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) *Ambrosia dumosa* (2) *Olneya tesota*
Herbaceous	(1) *Muhlenbergia porteri* (2) *Pleuraphis rigida*

Physiographic features

This site occurs as gently sloping to undulating uplands and pediments in and around the low desert mountains.

Table 2. Representative physiographic features

Landforms	(1) Pediment
Elevation	75–1,600 ft
Slope	1–15%
Aspect	Aspect is not a significant factor

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)	7 in

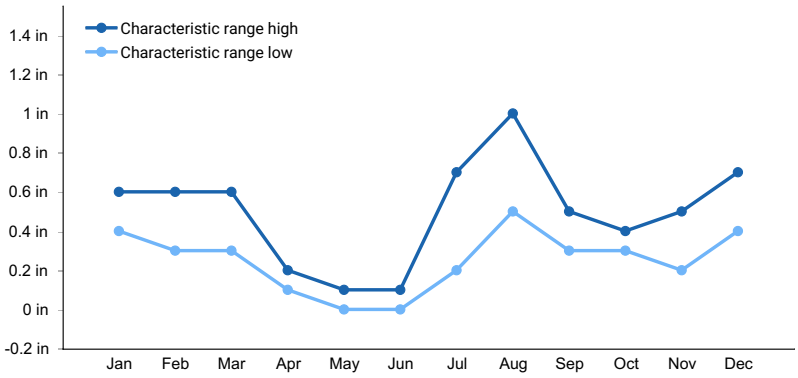

Figure 1. Monthly precipitation range

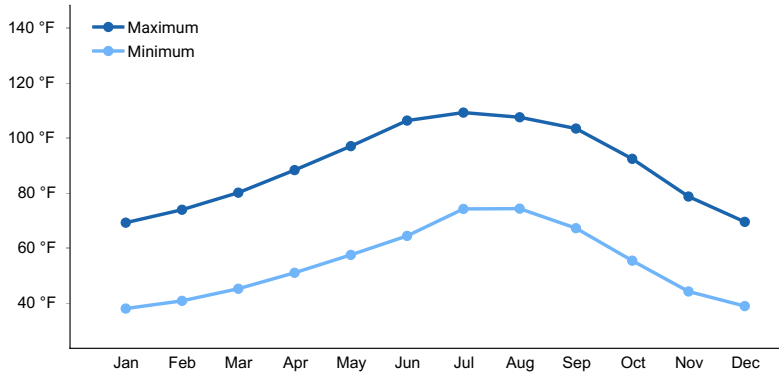

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

These soils are very shallow and shallow, loamy and slightly calcareous. Soils formed from both slope alluvium and resiuduum. They are underlain by highly weathered granitic and adesitic bedrock. Plant-soil moisture relationships are fair due to limited available water capacity and shallow depth.

Soil mapped on this site include: in SSA-653 Gila Bend-Ajo area MU's Quilotosa GrSL-61 & Vaiva GrXSL-61.

Table 4. Representative soil features

Parent material	(1) Slope alluvium–granite (2) Residuum–gneiss
Surface texture	(1) Gravelly loam (2) Very gravelly fine sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to rapid
Soil depth	4–20 in
Surface fragment cover <=3"	15–45%
Surface fragment cover >3"	3–10%
Available water capacity (0-40in)	0.32–2.2 in
Calcium carbonate equivalent (0-40in)	1–10%
Electrical conductivity (0-40in)	0–1 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	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

The plant community is a mixture of desert shrubs and trees with a sparse understory of perennial grasses and perennial forbs. As the site deteriorates from lack of management, the palatable shrubs decline and are replaced by creosotebush, cacti and other unpalatable invader shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	140	160	180
Tree	30	40	50
Forb	20	25	30
Grass/Grasslike	10	20	30
Total	**200**	**245**	**290**

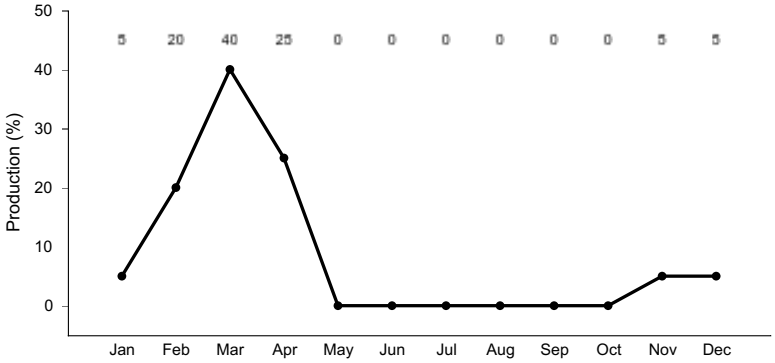

Figure 4. Plant community growth curve (percent production by month). AZ4041, 40.3 3-7" p.z. all sites. Most growth occurs in the winter to early spring, plants are dormant May through October..

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant Perennial Grasses**			10–20	
	bush muhly	MUPO2	*Muhlenbergia porteri*	5–10	–
	big galleta	PLRI3	*Pleuraphis rigida*	5–10	–
	threeawn	ARIST	*Aristida*	3–5	–
2	**Annual Grasses**			2–10	
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–5	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–4	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–2	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–2	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–2	–
Forb					
3	**Perennial Forbs**			10–20	
	cottongrass	ERIOP	*Eriophorum*	2–5	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	2–5	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–5	–
	spurge	EUPHO	*Euphorbia*	1–3	–
	trailing windmills	ALIN	*Allionia incarnata*	1–3	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	1–3	–
4	**Annual Forbs**			2–10	
	desert Indianwheat	PLOV	*Plantago ovata*	0–5	–
	velvet turtleback	PSRA	*Psathyrotes ramosissima*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	–
	devil's spineflower	CHRI	*Chorizanthe rigida*	0–1	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–1	–
	cryptantha	CRYPT	*Cryptantha*	0–1	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–1	–
	American wild carrot	DAPU3	*Daucus pusillus*	0–1	–

	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–1	–
	pepperweed	LEPID	*Lepidium*	0–1	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–1	–
	strigose bird's-foot trefoil	LOSTT	*Lotus strigosus var. tomentellus*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	phacelia	PHACE	*Phacelia*	0–1	–
Shrub/Vine					
5	**Dominant Shrubs**			70–90	
	burrobush	AMDU2	*Ambrosia dumosa*	40–60	–
	desert ironwood	OLTE	*Olneya tesota*	20–30	–
6	**Misc. Shrubs**			35–60	
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	2–5	–
	triangle bur ragweed	AMDE4	*Ambrosia deltoidea*	3–5	–
	narrowleaf silverbush	ARLA12	*Argythamnia lanceolata*	3–5	–
	brittlebush	ENFA	*Encelia farinosa*	3–5	–
	jointfir	EPHED	*Ephedra*	3–5	–
	California fagonbush	FALA	*Fagonia laevis*	3–5	–
	slender janusia	JAGR	*Janusia gracilis*	3–5	–
	littleleaf ratany	KRER	*Krameria erecta*	3–5	–
	white ratany	KRGR	*Krameria grayi*	3–5	–
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	3–5	–
	desert-thorn	LYCIU	*Lycium*	2–5	–
	slender poreleaf	POGR5	*Porophyllum gracile*	3–5	–
	American threefold	TRCA8	*Trixis californica*	2–4	–
	sweetbush	BEJU	*Bebbia juncea*	2–4	–
7	**Succulents**			2–10	
	saguaro	CAGI10	*Carnegiea gigantea*	1–2	–
	Engelmann's hedgehog cactus	ECEN	*Echinocereus engelmannii*	1–2	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	0–1	–
	ocotillo	FOSP2	*Fouquieria splendens*	0–1	–
	Graham's nipple cactus	MAGR9	*Mammillaria grahamii*	0–1	–
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	0–1	–
	teddybear cholla	CYBI9	*Cylindropuntia bigelovii*	0–1	–
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	0–1	–
	branched pencil cholla	CYRA9	*Cylindropuntia ramosissima*	0–1	–
Tree					
8	**Tree**			30–50	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	30–50	–

Animal community

Being nearly level and associated with steep, rough desert hills, this site if often overused. Adequate water development and fencing, together with the hills, will permit use of greater numbers of animals for shorter periods of

time. This will help eliminate overuse of the site and force livestock to use steeper slopes.

Lack of natural water and scanty cover limit the value of the site for wildlife habitat. Forage diversity is good, however, and the site is associated with small canyons that provide needed cover. Water developments are very important to wildlife species in these areas.

Recreational uses

This site is located on gently sloping to rolling uplands and pediments in and around the desert mountains. A mixture of an understory of desert shrubs and grass and a good overstory of desert trees enhances the aesthetics of this site. Very few days in the fall, winter or spring are too uncomfortable to enjoy outdoor activities, however, Jun-Aug after lunch heat restricts activity. Horseback riding, wildlife observation, hunting, hiking, photography, camping and picnicking are activities suited to this site.

Type locality

Location 1: Maricopa County, AZ	
General legal description	Arnold Ranch - North end of Buckeye Hills.

Contributors

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Steve Barker

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:**