Ecological site R040XA130AZ
Loamy Upland, Limy 10"-13" p.z.

Accessed: 05/19/2024

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 40.1 – Upper Sonoran Desert

Elevations range from 2000 to 3200 feet and precipitation averages 10 to 13 inches per year. Vegetation includes saguaro, palo verde, mesquite, creosotebush, triangle bursage, prickly pear, cholla, limberbush, wolfberry, bush muhly, threeawns, ocotillo, and globe mallow. The soil temperature regime is thermic 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) *Krameria erecta*
Herbaceous	(1) *Bouteloua eriopoda* (2) *Muhlenbergia porteri*

Physiographic features

This site occurs in an upland position. It does not benefit significantly from run-in of moisture from adjacent areas, but it does suffer from some runoff. It can occur on all exposures. It usually occurs on broad old alluvial fans and terraces.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Terrace
Flooding frequency	None to rare
Ponding frequency	None
Elevation	853–1,280 m
Slope	2–15%
Aspect	Aspect is not a significant factor

Climatic features

Precipitation in the sub resource area ranges from 10 to 13 inches in the southern part, along the Mexican border

with elevations from about 1900 to 3200 feet. Precipitation in the northern part of the resource area ranges from 11 to 14 inches with elevations from about 1700 to 3500 feet. Winter-summer rainfall ratios range from 40%-60% in the southern portions of the land resource unit, to 50%-50% in the central portions, to 60%-40% in the northern part of the land resource unit. As one moves from east to west in this resource area rains become slightly more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 29% at Tucson and 36% at Carefree. Summer rains fall July through Sept., originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. Cool season moisture tends to be frontal, originating in the Pacific and Gulf of California. This winter precipitation falls in widespread storms with long duration and low intensity. Snow is rare and seldom lasts more than an hour or two. May and June are the driest months of the year. Humidity is generally very low.

Winter temperatures are mild, with very few days recording freezing temperatures in the morning. Summer temperatures are warm to hot, with several days in June and July exceeding 105 degrees F.

Both the spring and the summer growing seasons are equally important for perennial grass, forb and shrub growth. Cool and warm season annual forbs and grasses can be common in their respective seasons with above average rainfall. Perennial forage species can remain green throughout the year with available moisture.

Table 3. Representative climatic features

Frost-free period (average)	265 days
Freeze-free period (average)	0 days
Precipitation total (average)	330 mm

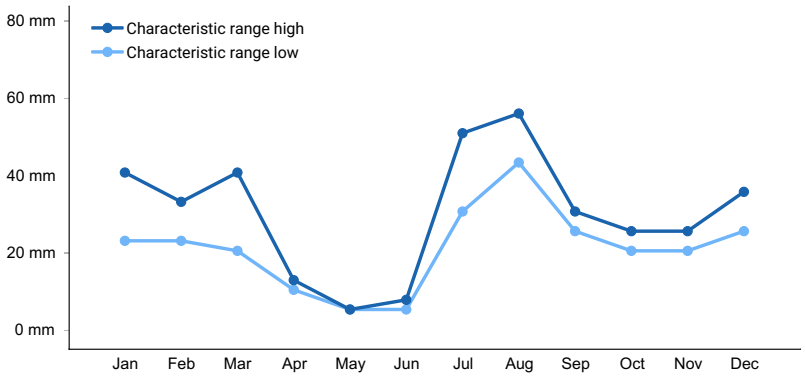

Figure 1. Monthly precipitation range

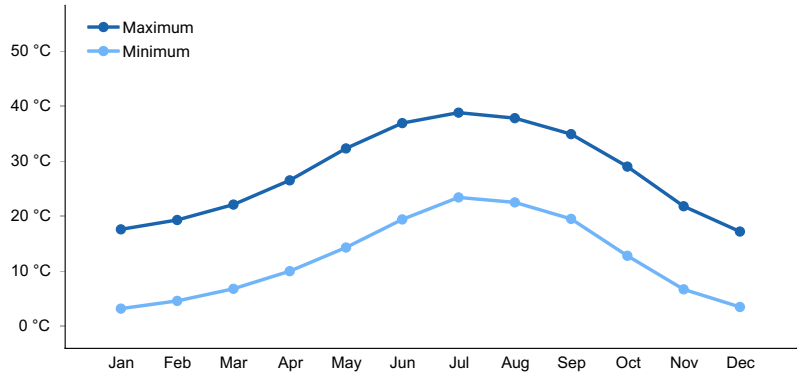

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

The soils characterizing this site are shallow to deep to bedrock or other plant root restricting layers. The surface soil depth ranges from 4 to 8 inches thick and ranges in texture from very gravelly loam, gravelly sandy loam to sandy loam. The subsoil and underlying layers have permeability ranging from moderate to moderately slow, but

can absorb and hold all the moisture the climate supplies. Soluble salt accumulations are low and pH ranges from 7.8 to 8.4. With good vegetative cover, infiltration rate is moderate. Stability against erosion is moderate. Plant soil moisture relationships are poor. Gravel may be found throughout the soil profile.
Soils mapped on this site include: in
SSA-627 Southern Mohave county MU's Tres Hermanos-34, Rillino-36, Stagecoach-112 & 114 and Topawa-114;
SSA-637 Western Yavapai county MU's Bridge-BrD, Tres Hermanos-TwC & Whitlock-TwC.

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam (2) Gravelly sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderate
Soil depth	25–152 cm
Surface fragment cover <=3"	10–35%
Available water capacity (0-101.6cm)	6.35–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–30%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	2–4
Soil reaction (1:1 water) (0-101.6cm)	7.8–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–25%

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 has a plant community made up primarily of mid and short grasses, and a small percentage of shrubs. In the original plant community warm season grasses dominate cool season grasses. Plant species most likely to invade or increase on this site when it begins to deteriorate are broom snakeweed, cholla cacti and filaree.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	269	303	336
Shrub/Vine	90	112	135
Forb	22	34	45
Tree	6	9	11
Total	**387**	**458**	**527**

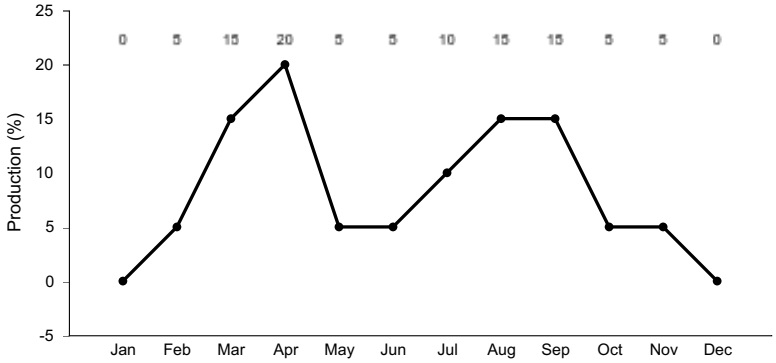

Figure 4. Plant community growth curve (percent production by month). AZ4011, 40.1 10-13" p.z. hill sites. Growth begins in the late winter, goes semi-dormant in the drought period of late May through early July, growth continues in the summer through early fall..

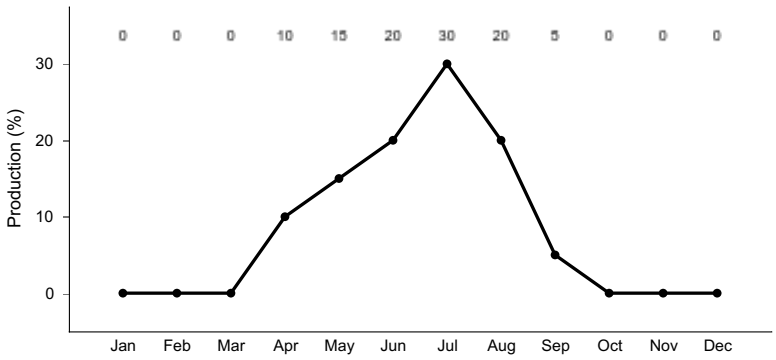

Figure 5. Plant community growth curve (percent production by month). AZ4032, 40-3AZ 10-12" p.z. all sites. Growth begins in the spring, most growth occurs during the summer rainy season..

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 Grasses**			202–269	
	black grama	BOER4	*Bouteloua eriopoda*	112–135	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	67–90	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	22–45	–
1	**Other Perennial Grasses**			45–67	
	desert needlegrass	ACSP12	*Achnatherum speciosum*	11–17	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	11–17	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	11–17	–
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	11–17	–
2	**Misc. Perennial Grasses**			28–67	
	sideoats grama	BOCU	*Bouteloua curtipendula*	11–22	–
	big galleta	PLRI3	*Pleuraphis rigida*	11–22	–
	burrograss	SCBR2	*Scleropogon brevifolius*	1–6	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	1–6	–
	slim tridens	TRMU	*Tridens muticus*	1–6	–
	threeawn	ARIST	*Aristida*	1–6	–

	cane bluestem	BOBA3	*Bothriochloa barbinodis*	1–6	–
3	**Annual Grasses**			6–22	
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–3	–
	needle grama	BOAR	*Bouteloua aristidoides*	1–3	–
	Arizona brome	BRAR4	*Bromus arizonicus*	1–3	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–3	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	1–3	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–3	–
	Eastwood fescue	VUMIC	*Vulpia microstachys var. ciliata*	0–2	–
Forb					
4	**Perennial Forbs**			4–22	
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	1–3	–
	desert marigold	BAMU	*Baileya multiradiata*	1–3	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	1–3	–
	wishbone-bush	MILAV	*Mirabilis laevis var. villosa*	1–3	–
	globemallow	SPHAE	*Sphaeralcea*	1–3	–
	evening primrose	OENOT	*Oenothera*	0–2	–
	Parry's false prairie-clover	MAPA7	*Marina parryi*	1–2	–
5	**Annual Forbs**			0–22	
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–2	–
	strigose bird's-foot trefoil	LOSTT	*Lotus strigosus var. tomentellus*	0–2	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–2	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–2	–
	flatcrown buckwheat	ERDE6	*Eriogonum deflexum*	0–1	–
	buckwheat	ERIOG	*Eriogonum*	0–1	–
	combseed	PECTO	*Pectocarya*	0–1	–
	phacelia	PHACE	*Phacelia*	0–1	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–1	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–1	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–1	–
	spurge	EUPHO	*Euphorbia*	0–1	–
	pepperweed	LEPID	*Lepidium*	0–1	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–1	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	–
	cryptantha	CRYPT	*Cryptantha*	0–1	–
Shrub/Vine					
6	**Major Shrubs**			67–90	
	littleleaf ratany	KRER	*Krameria erecta*	8–10	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	8–10	–
	jointfir	EPHED	*Ephedra*	8–10	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	8–10	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	8–10	–
	Eastern Mojave	ERFA2	*Eriogonum fasciculatum*	7–9	–

	Eastern Mojave buckwheat	ERFA2	*Eriogonum fasciculatum*	7–9	
	bastardsage	ERWR	*Eriogonum wrightii*	7–9	–
	slender janusia	JAGR	*Janusia gracilis*	7–9	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	7–9	–
7	**Misc. Shrubs**			22–45	
	catclaw acacia	ACGR	*Acacia greggii*	2–6	–
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	3–6	–
	whitethorn acacia	ACCO2	*Acacia constricta*	2–4	–
	snakewood	CONDA	*Condalia*	1–3	–
	narrowleaf goldenbush	ERLI6	*Ericameria linearifolia*	1–3	–
	snakeweed	GUTIE	*Gutierrezia*	1–3	–
	rayless goldenhead	ACSP	*Acamptopappus sphaerocephalus*	1–3	–
	desert-thorn	LYCIU	*Lycium*	1–3	–
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	1–3	–
	toothleaf goldeneye	VIDE3	*Viguiera dentata*	1–2	–
	desert zinnia	ZIAC	*Zinnia acerosa*	1–2	–
	plains blackfoot	MELE2	*Melampodium leucanthum*	1–2	–
	mariola	PAIN2	*Parthenium incanum*	1–2	–
	turpentinebroom	THMO	*Thamnosma montana*	1–2	–
	San Felipe dogweed	ADPO	*Adenophyllum porophylloides*	1–2	–
	crucifixion thorn	CAHO3	*Canotia holacantha*	1–2	–
8	**Succulents**			6–11	
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	1–2	–
	candy barrelcactus	FEWI	*Ferocactus wislizeni*	1–2	–
	ocotillo	FOSP2	*Fouquieria splendens*	1–2	–
	banana yucca	YUBA	*Yucca baccata*	1–2	–
	Joshua tree	YUBR	*Yucca brevifolia*	1–2	–
Tree					
9	**Tree**			6–11	
	yellow paloverde	PAMI5	*Parkinsonia microphylla*	6–11	–

Animal community

This site is suited for yearlong grazing by stocker cattle or cow-calf operations. Any grazing system will need to have a large amount of flexibility built into it due to the lack of dependable precipitation and variability of forage production. The site will respond favorably to summer deferment. Some years will produce moderate amounts of cool season annuals but the forage quality is generally highest during the July through September period.
For wildlife this site has excellent diversity in the potential plant community. As the site deteriorates, shrubs tnd to dominate the area and habitat diversity is decreased. Maintaining diversity in the plant community will maximize wildlife values. Water developments are infrequent on the site. Water developments adjacent to tree and shrub-lined drainageways which provid effective cover along escape corridors further enhance habitat elements.

Recreational uses

This site is located on broad alluvial fans and terraces and is generally monotonous in appearance unless it is in complex with more scenic areas.
Very few days in the fall, winter and spring are too uncomfortable to enjoy out-of-door activities. In June, July and

August the afternoon heat restricts activity. The major activities are rockhounding, hunting, horseback riding, driving and photography.

Type locality

Location 1: Mohave County, AZ
Location 2: Yavapai County, AZ

Contributors

Larry D. Ellicott
Unknown

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):**

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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):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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:**
