USDA Natural Resources
Conservation Service

Ecological site R040XC320AZ
Sandy Loam 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.

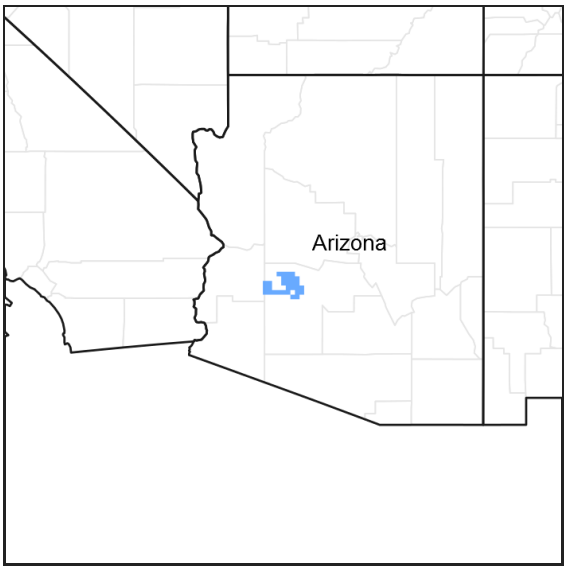

Figure 1. Mapped extent

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	Not specified
Shrub	(1) *Krameria grayi* (2) *Ambrosia dumosa*
Herbaceous	(1) *Pleuraphis rigida* (2) *Muhlenbergia porteri*

Physiographic features

This range site always occurs in an upland position on floodplains, low terraces and broad old alluvial plains. The Wellton and dateland soils do not benefit from moisture from adjacent areas, whereas the Antho soil does. Soils do not suffer from excessive loss from runoff.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Terrace (3) Alluvial flat
Elevation	75–1,200 ft
Slope	0–3%
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

Influencing water features

Soil features

Soils are deep to bedrock or other plant root restricting layers. Surface soils range in depth of 4-8 inches, with textures of sandy loam, fine sandy loam and loamy sand. The subsoil and underlying layers have a moderate to moderately rapid permeability, but can absorb and hold the moisture the climate supplies. Soluble salt accumulations ae low. the pH ranges from 7.9-8.4. With good vegetation cover, infiltration rates are high. Stability against erosion processes is good. Plant-Soil moisture relationships ae good. Percent coarse fragment ranges from 15-35% in Denure and Pahaka, and less than 15% in the Dateland soils.

Soils mapped on this site include: in SSA-627 Southern Mohave county MU's Coolidge-38 & Denure-38; SSA-645 Aguila-Carefree area MU's Antho-4, Carrizo-15 & 30, Denure-30, Maripo-4, Momoli-30; SSA-653 Gila Bend-Ajo area MU's Dateland-13 & Denure SL-16.

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Fine sandy loam (3) Loamy sand
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	60 in
Surface fragment cover <=3"	5–15%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	7.2–10.2 in
Calcium carbonate equivalent (0-40in)	1–25%
Electrical conductivity (0-40in)	0 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)	5–15%
Subsurface fragment volume >3" (Depth not specified)	0%

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 on this site is a mixture of desert shrubs and trees with an understory of perennial grasses. Winter and summer annual grasses and forbs are abundant in years with above average moisture in their respective seasons. Continued grazing use furing the various growing seaasons results in a decline in perennial grasses and an increase of woody species such as triangle bursage and creosotebush. The absence of natural fires may also be responsible for woody plant increases.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	130	185	240
Grass/Grasslike	100	160	220
Forb	40	50	60
Total	**270**	**395**	**520**

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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
0	**Dominant Perennial Grasses**			70–150	
	big galleta	PLRI3	*Pleuraphis rigida*	60–120	–
	bush muhly	MUPO2	*Muhlenbergia porteri*	10–30	–
1	**Misc. Perennial Grasses**			10–30	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	2–7	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	2–7	–
	California threeawn	ARCA9	*Aristida californica*	2–3	–
	Santa Rita threeawn	ARCAG	*Aristida californica var. glabrata*	2–3	–
	poverty threeawn	ARDI5	*Aristida divaricata*	2–3	–
	blue threeawn	ARPUN	*Aristida purpurea var. nealleyi*	2–3	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	2–3	–
	Wright's threeawn	ARPUW	*Aristida purpurea var. wrightii*	2–3	–
	spidergrass	ARTE3	*Aristida ternipes*	2–3	–
	spidergrass	ARTEG	*Aristida ternipes var. gentilis*	2–3	–
2	**Annual Grasses**			20–40	
	needle grama	BOAR	*Bouteloua aristidoides*	3–6	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	3–6	–
	Arizona brome	BRAR4	*Bromus arizonicus*	3–6	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	2–5	–
	littleseed muhly	MUMI	*Muhlenbergia microsperma*	2–5	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	2–5	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	2–5	–
Forb					
3	**Forbs**			40–60	
	glandular threadplant	NEGL	*Nemacladus glanduliferus*	5–8	–
	evening primrose	OENOT	*Oenothera*	5–8	–
	globemallow	SPHAE	*Sphaeralcea*	5–8	–
	milkweed	ASCLE	*Asclepias*	5–8	–
	milkvetch	ASTRA	*Astragalus*	5–8	–
	spiderling	BOERH2	*Boerhavia*	5–8	–
	cryptantha	CRYPT	*Cryptantha*	5–8	–
	erigenia	ERIGE	*Erigenia*	5–8	–
	buckwheat	ERIOG	*Eriogonum*	5–8	–
	cottongrass	ERIOP	*Eriophorum*	5–8	–
	spurge	EUPHO	*Euphorbia*	5–8	–
	gilia	GILIA	*Gilia*	5–8	–

	gilia	GILIA	*Gilia*	5–8	–
	pepperweed	LEPID	*Lepidium*	5–8	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	5–8	–
	pellitory	PARIE	*Parietaria*	1–5	–
	strigose bird's-foot trefoil	LOSTT	*Lotus strigosus var. tomentellus*	0–5	–
	orphniospora lichen	ORPHN	*Orphniospora*	0–3	–
	woollyhead neststraw	STMI2	*Stylocline micropoides*	1–3	–
	cutleaf thelypody	THLA	*Thelypodium laciniatum*	1–3	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	1–3	–
	combseed	PECTO	*Pectocarya*	0–3	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	1–3	–
	phacelia	PHACE	*Phacelia*	0–3	–
	desert Indianwheat	PLOV	*Plantago ovata*	1–3	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	1–3	–
	sleepy silene	SIAN2	*Silene antirrhina*	1–3	–
	London rocket	SIIR	*Sisymbrium irio*	0–3	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	1–3	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	1–3	–
	Emory's globemallow	SPEM	*Sphaeralcea emoryi*	0–3	–
	Lindley's silverpuffs	MILI5	*Microseris lindleyi*	1–3	–
	foothill deervetch	LOHU2	*Lotus humistratus*	1–3	–
	Gordon's bladderpod	LEGO	*Lesquerella gordonii*	1–3	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	1–3	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	1–3	–
	pygmy poppy	ESMI	*Eschscholzia minutiflora*	1–3	–
	desert trumpet	ERIN4	*Eriogonum inflatum*	1–3	–
	brownfoot	ACWR5	*Acourtia wrightii*	1–3	–
	common fiddleneck	AMMEI2	*Amsinckia menziesii var. intermedia*	1–3	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	1–3	–
	American wild carrot	DAPU3	*Daucus pusillus*	1–3	–
	western tansymustard	DEPI	*Descurainia pinnata*	1–3	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	1–3	–
	hoary bowlesia	BOIN3	*Bowlesia incana*	1–3	–
	exserted Indian paintbrush	CAEXE	*Castilleja exserta ssp. exserta*	1–3	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	1–3	–
	devil's spineflower	CHRI	*Chorizanthe rigida*	1–3	–
Shrub/Vine					
4	**Dominant Shrubs**			100–180	
	burrobush	AMDU2	*Ambrosia dumosa*	40–80	–
	white ratany	KRGR	*Krameria grayi*	60–80	–
	creosote bush	LATRT	*Larrea tridentata var. tridentata*	20–40	–
5	**Misc. Shrubs**			20–40	
	whitethorn acacia	ACCO2	*Acacia constricta*	5–8	–
	catclaw acacia	ACGR	*Acacia greggii*	5–8	–

	catclaw acacia	ACGR	*Acacia greggii*	5–8	–
	cattle saltbush	ATPO	*Atriplex polycarpa*	5–8	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	4–8	–
	lotebush	ZIOBO	*Ziziphus obtusifolia var. obtusifolia*	3–7	–
6	**Succulents**			4–20	
	crucifixion thorn	CAEM4	*Castela emoryi*	1–2	–
	saguaro	CAGI10	*Carnegiea gigantea*	1–2	–
	buckhorn cholla	CYACA2	*Cylindropuntia acanthocarpa var. acanthocarpa*	1–2	–
	Wiggins' cholla	CYEC3	*Cylindropuntia echinocarpa*	1–2	–
	Christmas cactus	CYLE8	*Cylindropuntia leptocaulis*	1–2	–
	branched pencil cholla	CYRA9	*Cylindropuntia ramosissima*	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	–
	crown of thorns	KOSP	*Koeberlinia spinosa*	1–2	–
	globe cactus	MAMMI	*Mammillaria*	1–2	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	1–2	–

Animal community

This site produces year-round forage in good or better condition and is suited to year-long use. It is easily traversed by cows, calves, or stocker cattle. This site will be one of the first upland sites to respond to grazing management. Fencing and water developments (well & pipeline) are important on these areas to permit grazing management.

This site doesn't provide all the elements for good wildlife habitat; however, the site is usually near bottom sites or cultivated areas that provide feed, cover and water.

Recreational uses

This site is located on large, relatively flat, plains and alluvial fans. It has an abundance of wild flowers following both good winter and summer rainy seasons. The mixture of grasses, trees and shrubs enhances the aesthetics of the area. Very few days in the fall, winter or spring are too uncomfortable to enjoy outdoor activities; however, Jun-Aug after lunch heat restricts activity. The site is suited to horseback riding, wildlife observation, hunting, hiking, photography, camping and picnicking.

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)	Dave Womack, Dan Robinett, Emilio Carrillo.

Contact for lead author	NRCS Tucson Area Office
Date	03/07/2005
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are common, widely spaced, and coninuous in absence of high gravel cover.

2. **Presence of water flow patterns:** Water flow patterns are common, continuous and occupy 15-20% of area.

3. **Number and height of erosional pedestals or terracettes:** Shrubs have symmetrical mounds caused by actions of splash, erosion, and rodent activity. There are no pedestals on rock or gravel fragments and no terracettes.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 10-60%. Expect low values in dry years.

5. **Number of gullies and erosion associated with gullies:** None.

6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence.

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter can move by wind and water. Woody litter remains under shrub canopies.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil surface resistance to erosion is good under shrub canopies to moderate in interspaces due to crusts formed by raindrop impact.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thir platy to granular; 7.5-10YR5/3 dry; 7.5-10YR4/3 moist, to 6 inches.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 10-15%. Herbaceous litter is present in some years and absent in others. Large shrubs with large coppice mounds with high infiltration rates. Subshrubs with small mounds with high infiltration rates. Mounds occupy 10-15% of the surface and are evenly spaced over the area.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.

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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: Large shrubs > subshrubs > perennial grasses > winter annuals > summer annuals > succulents (note: in El Nino years, annual forbs and grasses are #1 in above ground weight.)

    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):** 30-70% canopy mortality on trees and shrubs; 90-100% mortality on perennial grasses.

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14. **Average percent litter cover (%) and depth (in):** Herbaceous litter is not persistent on the site, but may be in El Nino years.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 270 lbs/ac unfavorable precipitation; 395 lbs/ac normal precipitation; 520 lbs/ac favorable precipitatio.

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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:** Sahara mustard (potential), schismus

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17. **Perennial plant reproductive capability:** Not impaired for shrubs; drought impaired for perennial grasses and forbs.
