Ecological site R040XB217AZ
Sandy Upland 7"-10" p.z.

Accessed: 05/18/2024

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.

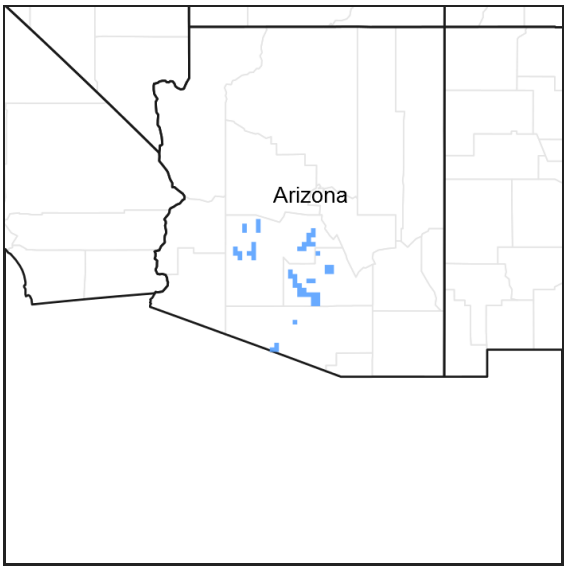

Figure 1. Mapped extent

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 40.2 – Middle Sonoran Desert

Elevations range from 1200 to 2000 feet and precipitation averages 7 to 10 inches per year. Vegetation includes saguaro, palo verde, creosotebush, triangle bursage, brittlebush, prickly pear, cholla, desert saltbush, wolfberry bush muhly, threeawns, 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) *Larrea tridentata var. tridentata* (2) *Ambrosia dumosa*
Herbaceous	(1) *Sporobolus contractus* (2) *Pleuraphis rigida*

Physiographic features

This site occurs as stream terraces, fan terraces and dunes. Slopes are generally 3-5 percent or less, however, short side slopes, in dune areas, may exceed 15 percent. Elevations are from 1000 to 2200 feet.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace (2) Fan (3) Dune
Elevation	305–671 m
Slope	3–15%

Climatic features

Precipitation in the sub-resource area ranges from 7 to 10 inches. Elevations range from 900 to 2050 feet. Winter-summer rainfall ratios range from 40% to 60% in the southern part along the international boundary, to 60% to 40% in the central and northern parts of the sub-resource area. 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 38% at Florence and 46% at Aguila. Summer rains fall July- September, originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. Summer precipitation is extremely erratic and undependable in this area. Cool season moisture tends to be frontal, originates in the Pacific and Gulf of California, and falls in widespread storms with long duration and low intensity. This is the dependable moisture supply for vegetation in the area. Snow is very rare and usually melts on contact. May-June is the driest time of the year. Humidity is very low.

Winter temperatures are very mild with very few days recording freezing for short periods of time. Summertime temperatures are hot to very hot with many days in June-July exceeding 105 degrees F. Frost-free days range from 280 at stations in major river valleys with cold air drainage to 320 to 350 days at upland stations.

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)	350 days
Freeze-free period (average)	0 days
Precipitation total (average)	254 mm

Influencing water features

Soil features

These soils are deep and sandy. Plant-soil moisture relationship is very good as these soils take all the moisture the climate supplies and makes it available to plants.

Soils mapped on this site include: SSA-645 Aguila-Carefree area MU Vint(fine sandy loam, loamy sand, and loamy fine sand) unflooded-125; SSA-651 Central Maricopa county MU Duneland-Dn; SSA-659 Western Pinal county MU Rositas-40; SSA-661 Eastern Pinal-Southern Gila counties MU Momoli-216; SSA-703 Tohono O'odham area MU Rositas(sand, fine sand, loamy sand, and loamy fine sand)-54.

Table 4. Representative soil features

Surface texture	(1) Sand (2) Loamy sand (3) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Very rapid
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	9.14–12.19 cm
Calcium carbonate equivalent (0-101.6cm)	0–3%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
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 the 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
Historical Climax Plant Community

Community 1.1
Historical Climax Plant Community

The plant community is a mixture of perennial and annual grasses, forbs and desert shrubs. When the plant cover has been depleted, these soils are very susceptible to wind blowing and water increase on the site with surface disturbance.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	510	–	667
Shrub/Vine	39	–	118
Forb	78	–	118
Total	**627**	**–**	**903**

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				392–549	
	spike dropseed	SPCO4	*Sporobolus contractus*	336–448	–
	big galleta	PLRI3	*Pleuraphis rigida*	56–101	–
2				39–78	
	Santa Rita threeawn	ARCAG	*Aristida californica var. glabrata*	0–17	–
	Parish's threeawn	ARPUP5	*Aristida purpurea var. parishii*	0–17	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–11	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	0–11	–
	purple threeawn	ARPU9	*Aristida purpurea*	0–11	–
	California threeawn	ARCA9	*Aristida californica*	0–11	–
3				39–78	
	witchgrass	PACA6	*Panicum capillare*	0–11	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–11	–
	sixweeks threeawn	ARAD	*Aristida adscensionis*	0–11	–
	prairie threeawn	AROL	*Aristida oligantha*	0–11	–
	needle grama	BOAR	*Bouteloua aristidoides*	0–11	–
	sixweeks grama	BOBA2	*Bouteloua barbata*	0–11	–
	Rothrock's grama	BORO2	*Bouteloua rothrockii*	0–6	–
	Arizona brome	BRAR4	*Bromus arizonicus*	0–1	–
	feather fingergrass	CHVI4	*Chloris virgata*	0–1	–
	canyon cupgrass	ERLE7	*Eriochloa lemmonii*	0–1	–
	tufted lovegrass	ERPEP2	*Eragrostis pectinacea var. pectinacea*	0–1	–
	Mexican sprangletop	LEFUU	*Leptochloa fusca ssp. uninervia*	0–1	–
	mucronate sprangletop	LEPA6	*Leptochloa panicea*	0–1	–
	Bigelow's bluegrass	POBI	*Poa bigelovii*	0–1	–
	Arizona signalgrass	URAR	*Urochloa arizonica*	0–1	–
Forb					
4				8–39	
	desert lily	HEUN2	*Hesperocallis undulata*	0–8	–
	birdcage evening primrose	OEDE2	*Oenothera deltoides*	0–8	–
	whitemargin sandmat	CHAL11	*Chamaesyce albomarginata*	1–4	–
	desert sand verbena	ABVI	*Abronia villosa*	0–3	–
	desert marigold	BAMU	*Baileya multiradiata*	0–3	–
	lacy tansyaster	MAPIP4	*Machaeranthera pinnatifida ssp. pinnatifida var. pinnatifida*	0–1	–
	canaigre dock	RUHY	*Rumex hymenosepalus*	0–1	–
	smooth threadleaf ragwort	SEFLM	*Senecio flaccidus var. monoensis*	0–1	–
5				39–78	
	desert Indianwheat	PLOV	*Plantago ovata*	0–11	–
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	0–6	–
	Coulter's globemallow	SPCO2	*Sphaeralcea coulteri*	0–6	–

	globemallow				
	common fiddleneck	AMMEI2	*Amsinckia menziesii var. intermedia*	0–6	–
	bristly fiddleneck	AMTE3	*Amsinckia tessellata*	0–6	–
	Booth's evening primrose	CABOI	*Camissonia boothii ssp. intermedia*	0–3	–
	chuckwalla combseed	PEHE	*Pectocarya heterocarpa*	0–3	–
	broadfruit combseed	PEPL	*Pectocarya platycarpa*	0–2	–
	wingnut cryptantha	CRPT	*Cryptantha pterocarya*	0–2	–
	hairy prairie clover	DAMO	*Dalea mollis*	0–1	–
	soft prairie clover	DAMO2	*Dalea mollissima*	0–1	–
	California shieldpod	DICA7	*Dithyrea californica*	0–1	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–1	–
	woolly sunflower	ERIOP2	*Eriophyllum*	0–1	–
	kidneyleaf buckwheat	ERRE3	*Eriogonum reniforme*	0–1	–
	Thomas' buckwheat	ERTH	*Eriogonum thomasii*	0–1	–
	little deserttrumpet	ERTR8	*Eriogonum trichopes*	0–1	–
	California poppy	ESCAM	*Eschscholzia californica ssp. mexicana*	0–1	–
	spurge	EUPHO	*Euphorbia*	0–1	–
	Arizona poppy	KAGR	*Kallstroemia grandiflora*	0–1	–
	Great Basin langloisia	LASE3	*Langloisia setosissima*	0–1	–
	shaggyfruit pepperweed	LELA	*Lepidium lasiocarpum*	0–1	–
	Bigelow's linanthus	LIBI2	*Linanthus bigelovii*	0–1	–
	foothill deervetch	LOHU2	*Lotus humistratus*	0–1	–
	desert deervetch	LOMI	*Lotus micranthus*	0–1	–
	bajada lupine	LUCO	*Lupinus concinnus*	0–1	–
	Coulter's lupine	LUSP2	*Lupinus sparsiflorus*	0–1	–
	California desertdandelion	MACA6	*Malacothrix californica*	0–1	–
	yellowcomet	MEAF2	*Mentzelia affinis*	0–1	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–1	–
	cottonheads	NEDE	*Nemacaulis denudata*	0–1	–
	glandular threadplant	NEGL	*Nemacladus glanduliferus*	0–1	–
	desert evening primrose	OEPR	*Oenothera primiveris*	0–1	–
	giant Spanish needle	PAARG	*Palafoxia arida var. gigantea*	0–1	–
	brittle spineflower	CHBR	*Chorizanthe brevicornu*	0–1	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–1	–
	Panamint cryptantha	CRAN4	*Cryptantha angustifolia*	0–1	–
	redroot cryptantha	CRMI	*Cryptantha micrantha*	0–1	–
	New Mexico silverbush	ARNE2	*Argythamnia neomexicana*	0–1	–

	Cedros milkvetch	ASIN6	*Astragalus insularis*	0–1	–
	spiderling	BOERH2	*Boerhavia*	0–1	–
	onyxflower	ACCO3	*Achyronychia cooperi*	0–1	–
	manybristle chinchweed	PEPA2	*Pectis papposa*	0–1	–
	small wirelettuce	STEX	*Stephanomeria exigua*	0–1	–
	longbeak streptanthella	STLO4	*Streptanthella longirostris*	0–1	–
	woolly tidestromia	TILA2	*Tidestromia lanuginosa*	0–1	–
	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	0–1	–
	New Mexico plumeseed	RANE	*Rafinesquia neomexicana*	0–1	–
Shrub/Vine					
6				39–78	
	creosote bush	LATR2	*Larrea tridentata*	6–22	–
	burrobush	AMDU2	*Ambrosia dumosa*	2–11	–
	Nevada jointfir	EPNE	*Ephedra nevadensis*	2–11	–
	longleaf jointfir	EPTR	*Ephedra trifurca*	2–11	–
	white ratany	KRGR	*Krameria grayi*	2–11	–
7				8–39	
	lotebush	ZIOB	*Ziziphus obtusifolia*	0–11	–
	singlewhorl burrobrush	HYMO	*Hymenoclea monogyra*	0–11	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–6	–
	honey mesquite	PRGLG	*Prosopis glandulosa var. glandulosa*	0–3	–

Animal community

This site produces year round forage and is easily traversed by all classes of cattle except in the summer season when lack of shade and loose sandy soils greatly hinder livestock use. As these soils are very susceptible to wind and water erosion, management which maintains the plant cover is most important. Fencing and water development may be important in achieving grazing control.

Due to the sandy soils and good diversity in feed plants, this site is host to a variety of burrowing, desert mammals. It is mainly a feeding ground for the larger desert mammals, the predatory mammals, reptiles and birds of the desert.

Other information

T&E: Antilocapra Americana sonoriensis
(Sonoran pronghorn)

Type locality

Location 1: Pinal County, AZ	
Township/Range/Section	T7S R4E S10
General legal description	Casa Grande FO - 3.4 miles west of where old Greens Wash crosses I-8
Location 2: Pinal County, AZ	
Township/Range/Section	T2S R4E S30

General legal description	Casa Grande FO
Location 3: Pima County, AZ	
Township/Range/Section	T8S R5E S5
General legal description	Sells FO - West of Chiuchu
Location 4: Maricopa County, AZ	
Township/Range/Section	T3N R1E S18
General legal description	Phoenix FO - Along Agua Fria Wash at Sun City
Location 5: Maricopa County, AZ	
Township/Range/Section	T2S R1E S18
General legal description	Buckeye FO - Beloat Ranch

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, Emilio Carrillo, Dan Robinett
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:** None due to high infiltration rates.

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2. **Presence of water flow patterns:** Water flow patterns are uncommon due to high infiltration rates.

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3. **Number and height of erosional pedestals or terracettes:** All shrubs have symmerical mounds 2-5 inches tall formed by combined action of splash, erosion and rodents. There are no pedestals on rock or gravel fragments and no terracettes are present.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 60-70%

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** Minor evidence of soil movement by wind.

7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter can move by wind. 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 raindop impact.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thir plat to granula; color 7.5-10YR6/4 dry, 7.5-10YR4/5 moist; to 2inces thick

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Canopy 15-20%. Herbaceous litter is present in some years and absent in others. Large shubs with large coppice mounds with high infiltration rates. Subshrubs with smal mounds with high infiltration rates.

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

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: perennial grass > shrubs > winter annuals > trees > summer annuals > succulents = perennial forbs > cryptogams

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** 0-50% canopy mortality; 90-100 mortality on perennial grasses.

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):** 400 lbs/ac unfavorable precipitation, 700 lbs/ac normal precipitation, 1000 lbs/ac favorabl precipitation

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), mesquite, creosote

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