

Ecological site R035XD413AZ

Sandy Loam Upland

7-11" p.z.

Calcareous

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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): 035X–Colorado Plateau

AZ CRA 35.4 – Colorado Plateau Cold Sagebrush – Grasslands Elevations range from 4200 to 5100 feet and precipitation averages 7 to 11 inches. Vegetation includes winterfat, fourwing saltbush, buckwheat species, needlegrass, bottlebrush squirreltail, Indian ricegrass, black grama, blue grama, sideoats grama, gyp dropseed, and galleta. The soil temperature regime is mesic and the soil moisture regime is typic aridic. This unit occurs within the Colorado Plateau Physiographic Province and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin.

Ecological site concept

This site occurs in an upland position on ridges, plateaus and mesas. It does not benefit greatly from run-in moisture. Elevation is 4,500 to 5,100 feet. Slope is 0 to 5 percent. Soils characterizing this site are very deep and well drained. They were formed in eolian sediments on ridges, fan terraces, plateaus and mesas. The sand content is greater than 35 percent. These soils may occur over calcareous sandstone or above gypsum accumulations at depths greater than 15 inches. The soil is calcareous at the surface. Reaction is moderately alkaline or strongly alkaline. The dominant aspect is desert grassland with scattered shrubs. In the original plant community, there is a mix of cool season and warm season grasses with shrubs and half shrubs. Common species are James' galleta, sand dropseed, fourwing saltbush, and broom snakeweed. Plant species most likely to invade or increase on this site when it deteriorates are broom snakeweed and annuals.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex canescens</i> (2) <i>Krascheninnikovia lanata</i>
Herbaceous	(1) <i>Pleuraphis jamesii</i> (2) <i>Sporobolus cryptandrus</i>

Physiographic features

This site occurs in an upland position on ridges, plateaus and mesas. It does not benefit greatly from run-in moisture. Wind erosion is a moderate hazard especially when the vegetative cover is removed.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Mesa (3) Structural bench
Flooding frequency	None to occasional
Ponding frequency	None to rare
Elevation	1,370 – 1,550 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Climatic features

Winter-Summer moisture ratios are typically 70:30 on the west side of this LRU and shift to 60:40 on the east side. Late spring is usually the driest period, and early fall moisture can be sporadic. Summer rains fall June-September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture October-May tends to be frontal; it originates in the Pacific and the Gulf of California and falls in widespread storms with longer duration and lower intensity. Precipitation generally comes as snow December-February. Accumulations above 10 inches are not common, but can occur. Snow usually lasts 3-4 days, but can persist much longer. Summer daytime temperatures are commonly 95-100 F and, on occasion, exceed 105F. Winter air temperatures can regularly go below 15 F and have been recorded below -15 F.

Table 3 Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	150 days
Precipitation total (average)	280 mm

Influencing water features

This site occurs in an upland position, not benefiting from excess run-in moisture.

Soil features

Soils characterizing this site are very deep and well drained. They were formed in eolian sediments on ridges, fan terraces, plateaus and mesas. The sand content is greater than 35 percent. These soils may occur over calcareous sandstone or above gypsum accumulations at depths greater than 15 inches. The soil is calcareous at the surface.

Typical taxonomic units include:

SSA625 Mohave County NE part MU 8 Brinkerhoff & Grieta, MU 42 Monue.

Table 4. Representative soil features

Parent material	(1) Eolian deposits – sandstone
Surface texture	(1) Sandy loam (2) Fine sandy loam (3) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	100 – 150 cm
Surface fragment cover <=3"	0 – 10 %
Available water capacity (0-101.6cm)	6.35 – 25.4 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 40 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 10
Subsurface fragment volume <=3" (Depth not specified)	10 – 30 %

Ecological dynamics

For state and transition model see ecological site DX035X02EESG07, Arizona Strip - Typic Aridic - Sandstone or Sandy Loam Upland.

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

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Shrub/Vine					
0				73-168	
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	26-50	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	26-50	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	16-26	–
	Greene's rabbitbrush	CHGR6	<i>Chrysothamnus greenei</i>	6-10	–
	jointfir	EPHED	<i>Ephedra</i>	0-10	–
	rubber rabbitbrush	ERNAG	<i>Ericameria nauseosa ssp. nauseosa var. glabrata</i>	6-10	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	4-9	–
2				6-10	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	6-10	–
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	0-6	–
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	0-6	–
	pale desert-thorn	LYPA	<i>Lycium pallidum</i>	0-6	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	1-6	–
	banana yucca	YUBA	<i>Yucca baccata</i>	1-6	–
Grass/Grasslike					
0				303-429	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	101-151	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	26-76	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	26-54	–
	Grass, annual	2GA	<i>Grass, annual</i>	26-50	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	26-50	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0-26	–
	threeawn	ARIST	<i>Aristida</i>	6-26	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	16-26	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	0-6	–
Forb					
0				6-16	

	Forb, perennial	2FP	<i>Forb, perennial</i>	6-16	-
	milkvetch	ASTRA	<i>Astragalus</i>	0-6	-
	mariposa lily	CALOC	<i>Calochortus</i>	0-6	-
	larkspur	DELPH	<i>Delphinium</i>	0-6	-
	pepperweed	LEPID	<i>Lepidium</i>	0-6	-
	phlox	PHLOX	<i>Phlox</i>	0-6	-
	ragwort	SENEC	<i>Senecio</i>	0-6	-
	globemallow	SPHAE	<i>Sphaeralcea</i>	0-6	-
	vetch	VICIA	<i>Vicia</i>	0-6	-
1				6-16	
	Forb, annual	2FA	<i>Forb, annual</i>	6-16	-
	aster	ASTER	<i>Aster</i>	0-6	-
	mustard	BRASS2	<i>Brassica</i>	0-6	-
	lambsquarters	CHAL7	<i>Chenopodium album</i>	0-6	-
	crossflower	CHTE2	<i>Chorispora tenella</i>	0-6	-
	flatcrown buckwheat	ERDE6	<i>Eriogonum deflexum</i>	0-6	-
	fleabane	ERIGE2	<i>Erigeron</i>	0-6	-
	stork's bill	ERODI	<i>Erodium</i>	0-6	-
	spurge	EUPHO	<i>Euphorbia</i>	0-6	-
	sunflower	HELIA3	<i>Helianthus</i>	0-6	-
	lupine	LUPIN	<i>Lupinus</i>	0-6	-
	blazingstar	MENTZ	<i>Mentzelia</i>	0-6	-
	popcornflower	PLAGI	<i>Plagiobothrys</i>	0-6	-
	plantain	PLANT	<i>Plantago</i>	0-6	-

Animal community

This site responds relatively quickly to good management. It adapts well to grazing systems which provide for an occasional rest. Proper stocking rates are important. This site is very susceptible to erosion, particularly overgrazed areas, old roads, cattle trails, and concentration areas. This site provides a good ground cover and fair diversity for wildlife species. It lacks open permanent waters. Species seen here include; pronghorns, black-tailed jackrabbits, coyotes, badgers, kangaroo rats, deer mice, and a variety of snakes and lizards.

Recreational uses

This site occurs on rolling hills or alluvial fans with grasslands interspersed with shrubs. Winters are cold and summers are quite warm. Spring and fall are the dry seasons and are typically cool and windy. Recreational activities most likely to occur are hunting, cross-country riding, photography and wildlife observation.

Other information

Threatened and Endangered Species: Golden eagles and Prairie falcons occasionally use the site for feeding areas.

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T40N R5W S22

General legal description	Pipe Valley Quad; about four miles west of Pipe Springs, AZ; Section 22, T40N, R5W, Mohave County.
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Contributors

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Approval

Kendra Moseley, 5/19/2025

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	05/05/2026
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:
