Ecological site R035XD414AZ
Sandy Loam Upland 7-11" p.z.

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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.

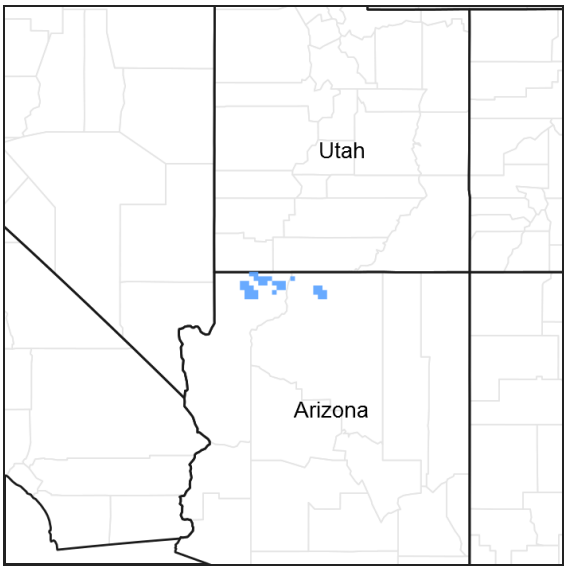

Figure 1. Mapped extent

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): 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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex canescens* (2) *Ephedra nevadensis*
Herbaceous	(1) *Bouteloua gracilis* (2) *Pleuraphis jamesii*

Physiographic features

This site occurs in an upland position. It does not benefit from run-in moisture and does not suffer from excessive runoff. It occurs on undulating plains and rolling hills, often near sandstone cliffs or mesas. It may occur as alluvial fans in deeply entrenched bottoms.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Alluvial fan (3) Plain
Flooding frequency	None to rare
Ponding frequency	None to rare
Elevation	1,372–1,615 m
Slope	1–15%
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)	279 mm

Influencing water features

Soil features

Soil moisture: Intermittently moist in some parts during July, October, and December to March. Driest during May and June. Typic aridic soil moisture regime.
Soil depth: These soils are typically deeper than 60 inches, but may have bedrock at depths of 40 to 60 inches.

Taxonomic units include;

SSA623 Shivwits Area MU 19 Dera, MU 82 Twist:
SSA625 Mohave County Area NE Part MU 13 Grieta:
SSA629 Coconino County North Kaibab - 28 Monue & 29 Monue and Seeg.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone
Surface texture	(1) Gravelly sandy loam (2) Fine sandy loam (3) Very fine sandy loam

Family particle size	(1) Loamy
Drainage class	Well drained to moderately well drained
Permeability class	Moderately slow to moderate
Soil depth	102–152 cm
Surface fragment cover <=3"	5–20%
Available water capacity (0-101.6cm)	12.7–25.4 cm
Calcium carbonate equivalent (0-101.6cm)	1–35%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.6
Subsurface fragment volume <=3" (Depth not specified)	5–35%
Subsurface fragment volume >3" (Depth not specified)	0–5%

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 with a relatively small percentage of forbs and shrubs. In the original plant community there is a predominance of warm season grasses with shrubs, half shrubs, and cool season grasses. Plant species most likely to invade or increase on this site when it deteriorates are broom snakeweed, rabbit brush, and annuals.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	346	387	426
Shrub/Vine	54	106	160
Forb	6	29	54
Total	**406**	**522**	**640**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-5%

Grass/grasslike foliar cover	5-15%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	5-15%	0-1%
>0.15 <= 0.3	–	–	–	–
>0.3 <= 0.6	–	0-5%	–	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 5. Plant community growth curve (percent production by month). AZ0002, 35.4 7-11" p.z. sand dropseed. Some growth in spring, most growth in summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	5	5	25	50	15	0	0	0

Figure 6. Plant community growth curve (percent production by month). AZ0004, 35.4 7-11" p.z. fourwing saltbush. Some growth in spring, most growth in summer to early fall rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	15	30	40	5	0	0	0

Figure 7. Plant community growth curve (percent production by month). AZ3541, 35.4 7-11" p.z. all sites. Most growth occurs in the spring and during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	9	20	15	5	16	25	6	2	1	0

Figure 8. Plant community growth curve (percent production by month). AZ3570, 35.4 7-11" p.z. Nevada Mormon tea. Growth occurs mostly in spring and early summer using stored winter moisture..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	25	25	20	15	10	0	0	0	0

Figure 9. Plant community growth curve (percent production by month).

AZ0001, 35.4 7-11" p.z. galleta. Growth begins in the spring, most growth occurs during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	3	15	5	25	40	10	2	0	0

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
0				54–160	
	Nevada jointfir	EPNE	*Ephedra nevadensis*	27–78	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	16–43	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	6–27	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	6–11	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	6–11	–
	water jacket	LYAN	*Lycium andersonii*	0–7	–
	pale desert-thorn	LYPA	*Lycium pallidum*	0–7	–
3				0–11	
	purple coneflower	ECHIN	*Echinacea*	0–6	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–6	–
Grass/Grasslike					
0				336–415	
	James' galleta	PLJA	*Pleuraphis jamesii*	106–186	–
	blue grama	BOGR2	*Bouteloua gracilis*	54–133	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	27–80	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	6–27	–
	purple threeawn	ARPU9	*Aristida purpurea*	6–16	–
	black grama	BOER4	*Bouteloua eriopoda*	0–16	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–11	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	0–11	–
1				0–11	
	Grass, annual	2GA	*Grass, annual*	0–4	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–4	–
Forb					
0				6–34	
	globemallow	SPHAE	*Sphaeralcea*	6–16	–
	phlox	PHLOX	*Phlox*	0–11	–
	Forb, perennial	2FP	*Forb, perennial*	0–11	–
	winding mariposa lily	CAFL	*Calochortus flexuosus*	6–11	–
	larkspur	DELPH	*Delphinium*	0–4	–
	bladderpod	LESQU	*Lesquerella*	0–4	–
	trailing windmills	ALIN	*Allionia incarnata*	0–4	–
2				0–16	
	Forb, annual	2FA	*Forb, annual*	0–16	–

	aster	ASTER	*Aster*	0–2	–
	borage	BORAG	*Borago*	0–2	–
	goosefoot	CHENO	*Chenopodium*	0–2	–
	yellow spiderflower	CLLU2	*Cleome lutea*	0–2	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–2	–
	redstem stork's bill	ERCI6	*Erodium cicutarium*	0–2	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	0–2	–
	fleabane	ERIGE2	*Erigeron*	0–2	–
	gilia	GILIA	*Gilia*	0–2	–
	lettuce	LACTU	*Lactuca*	0–2	–
	pepperweed	LEPID	*Lepidium*	0–2	–
	blazingstar	MENTZ	*Mentzelia*	0–2	–
	desert Indianwheat	PLOV	*Plantago ovata*	0–2	–

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 R6W S29
General legal description	Mohave County, AZ; Maroney Well Quad; About 6 miles southeast of Colorado City; Section 29, T40N, R6W.

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)	Steve Cassady, Kyle Spencer, Tobiah Salvail
Contact for lead author	Steve Cassady
Date	04/30/2008
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

2. **Presence of water flow patterns:** None

3. **Number and height of erosional pedestals or terracettes:** None

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is < or = 50 percent.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** No appreciable movement of litter.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** The soil surface is protected somewhat by surface gravels (5 percent). This combined with the soils ability to cap or crust over provides protection against erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface 0 to 1 inches of soils associated with this site are single grained; loose. Color is yellowish red (5YR 5/6) dry, yellowish red (5YR 4/6) moist

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Randomly scattered plants consisting of about 75 percent grasses, 20 percent shrubs and 5 percent forbs promote infiltration and reduce runoff. The average distance to the nearest perennial plant (fetch) is 9 inches, with the majority ranging from 6 to 12 inches, but occasionally as far as 18 inches.

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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):** 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: Grasses (65 to 80%) >> Shrubs (10 to 30%) > Forbs (1 to 10%)

    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):** During periods of below average summer precipitation sand dropseed (Sporabolus cryptandrus) will die. During periods of below average winter precipitation winterfat (Krascheninnikovia lanata) will die back as will Indian ricegrass (Achnatherum hymenoides).

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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):** Average annual production on this site is expected to be 350 to 600 lbs/ac. in a year of average annual precipitation.

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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:** Cheatgrass (Bromus tectorum) and Russian thistle (Salsola kali) are commonly found in small amounts on the site (< 2 percent). During years of above average winter and spring moisture the composition of these may increase slightly. Severe disturbance may cause an increase in this or other invasive plants creating a potential for a shortened fire frequency on the site which could result in crossing a threshold to a state with increased introduced annual plants and fewer native shrubs.

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17. **Perennial plant reproductive capability:** All plants native to this site are adapted to the climate and are capable of producing seeds, stolons, and/or rhizomes except during the most severe droughts.