USDA Natural Resources
Conservation Service

Ecological site R035XD409AZ
Loamy 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.

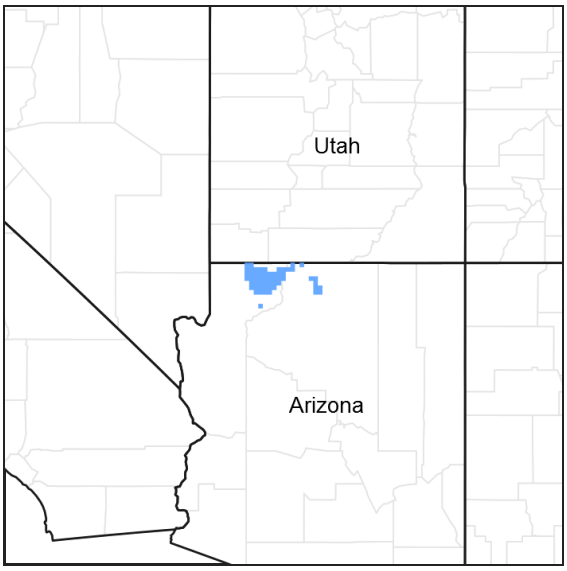

Figure 1. Mapped extent

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 cordifolia* (2) *Atriplex canescens*
Herbaceous	(1) *Elymus elymoides ssp. elymoides* (2) *Achnatherum hymenoides*

Physiographic features

This site occurs in an upland position and does not significantly benefit from run-in moisture. It exists on undulating plains or valleys. Some entrenched bottoms are included in this site.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Mesa (3) Fan
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	Rare to occasional
Elevation	1,158–1,615 m
Slope	0–15%
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

These soils are moderately deep to deep and formed over dry alluvium from limestone, sandstone and gypsiferous shale. The surface textures are loamy to silty and subsurface textures range from clay loams to loams. Coarse fragments may range from 5% to more than 35% in the substrata. These soils are highly subject to water erosion unless a good grass cover is maintained.

Typical taxonomic units on this site include:

SSA 625 Mohave County NE part MU's 14 Grieta, 16, 22 & 24 Kinan, 23 Grieta & Kinan, 46 Bacobi and 54 Brinkerhoff;
SSA 629 Coconino County North Kaibab part MU's 7 Bison and 15 Doak.

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone and sandstone

Surface texture	(1) Loam (2) Silt
Family particle size	(1) Loamy
Drainage class	Moderately well drained to somewhat excessively drained
Permeability class	Slow to rapid
Soil depth	102–152 cm
Surface fragment cover <=3"	0–5%
Calcium carbonate equivalent (0-101.6cm)	5–35%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	1–10
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.6
Subsurface fragment volume <=3" (Depth not specified)	5–35%

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 is a grassland community of mid and short grasses with both cool and warm season species present. Shrubs are sparse. Ground cover is good. The plant species most likely to increase on this site when it is disturbed are; wolfberry, sand dropseed, burrograss, and threeawn. Russian thistle and cheatgrass are invaders on this site.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	715	757	799
Shrub/Vine	9	46	84
Forb	9	26	43
Total	**733**	**829**	**926**

Figure 5. 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 6. Plant community growth curve (percent production by month). AZ0005, 35.4 7-11" p.z. Indian ricegrass. Most growth occurs in the spring, some growth occurs in the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	40	40	0	0	0	5	5	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). AZ3562, 35.4 7-11" p.z. bottlebrush squirreltail. Most growth occurs in the spring, plants may remain green during the winter..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	30	35	15	5	0	0	0	5	5	0

Figure 9. Plant community growth curve (percent production by month). AZ5215, 35.4 7-11" p.z. black grama. Growth occurs mostly during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	5	5	30	50	10	0	0	0

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				43–84	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	43–84	–
1				295–379	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	99–127	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	99–127	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	99–127	–
2				252–379	
	sideoats grama	BOCU	*Bouteloua curtipendula*	87–126	–
	black grama	BOER4	*Bouteloua eriopoda*	87–126	–
	blue grama	BOGR2	*Bouteloua gracilis*	87–126	–
3				43–84	
	James' galleta	PLJA	*Pleuraphis jamesii*	15–28	–
	spike dropseed	SPCO4	*Sporobolus contractus*	13–28	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	15–28	–
4				9–43	
	threeawn	ARIST	*Aristida*	4–21	–
	burrograss	SCBR2	*Scleropogon brevifolius*	4–21	–
Forb					
5				9–43	
	Forb, annual	2FA	*Forb, annual*	4–21	–
	Forb, perennial	2FP	*Forb, perennial*	4–21	–
Shrub/Vine					
6				9–84	
	fourwing saltbush	ATCA2	*Atriplex canescens*	2–17	–
	jointfir	EPHED	*Ephedra*	2–17	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	1–13	–
	water jacket	LYAN	*Lycium andersonii*	1–13	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	1–6	–

Animal community

This site adapts well to planned grazing systems and is usable yearlong by all classes of livestock.

The diversity on this site is poor but ground cover is good. Permanent open waters are lacking. The potential plant community produced by this site provides food for those species of wildlife that utilize grass as a major portion of their diet. When vegetative retrogression occurs, unpalatable shrubby species increase.

Recreational uses

This site occurs on undulating plains and valleys with an aspect of open grassland and a small percentage of shrubs.

Winters are usually cold and summers warm. Spring and fall are usually cool, windy and they are the dry seasons.

Hunting is the occasional recreation activity of this site.

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	T37N R6W S10
General legal description	Heaton Knolles quad map west of Sunshine Ridge and Trumbull Road.

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	04/29/2008
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:** No pedestalling, but mounding of about 2 to 4 inches, from leaf fall, rodent activity and soil deposition, occurs under long-lived shrubs. Turf building occurs in blue grama of about ½ to 1 inch.

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.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** A cover of small gravel (typically 15 to 20 percent) combined with the natural crusting of the soils associated with this site protects the soil surface from erosion.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface of soils associated with this site are weak thick platy structure; soft, very friable. Color is brown (7.5YR 5/4) dry, reddish brown (7.5YR 4/4) 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 90 percent grasses, 5 percent shrubs and 5 percent forbs promote infiltration and reduce runoff. The average distance to the nearest perennial plant (fetch) is 4 to 7 inches, with the majority ranging from 2 to 10 inches, but occasionally as far as 20 inches.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer is found in the soils associated with this site, but calcic horizon is found at about 14 inches below the soil surface.

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 (85 to 95%) >> Shrubs (1 to 10%) > Forbs (1 to 5%).

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Occasionally dead branches occur in four-wing saltbush, but little decadence or mortality is observed, even after prolonged drought periods.

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): Average annual production on this site is expected to be 700 to 800 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:** Russian thistle (Salsola kali) and cheatgrass (Bromus tectorum) 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 one or all of these 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.
