

## Ecological site R035XD405AZ Gypsum 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.

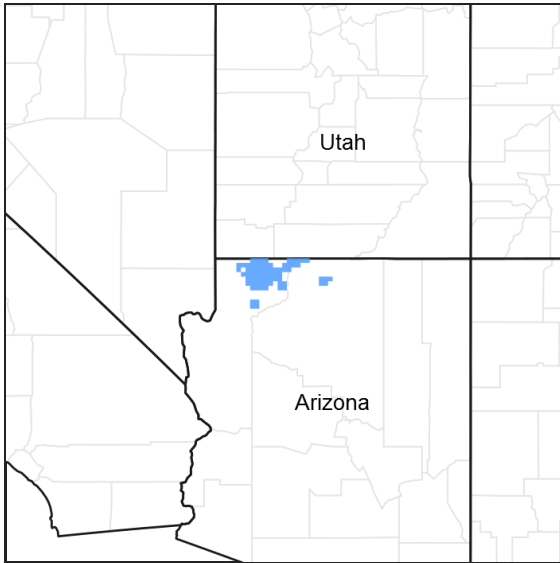


Figure 1. Mapped extent

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) <i>Atriplex cordifolia</i> (2) <i>Atriplex canescens</i>
Herbaceous	(1) <i>Pleuraphis jamesii</i> (2) <i>Sporobolus nealleyi</i>

## Physiographic features

This site occurs in an upland position on fan terraces, cuestras and undulating plains. It does not benefit from run-in moisture, nor suffers from excessive runoff.

**Table 2. Representative physiographic features**

Landforms	(1) Cuesta (2) Fan (3) Plain
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)
Ponding frequency	None 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

Soils characterizing this site are usually moderately deep or deep to any plant root restricting layer. Although the profiles are quite variable, gypsum is apparent somewhere in the upper two feet of the profile and acts as the common factor in determining the plant community. The gypsum may be visible in powdery or crystalline forms. The water erosion hazard is severe.

Taxonomic units include:

SSA623 - Shivwits Area MU22 Dutchman & McCullan, 24 Gyppocket, 32 Gypsiorthids, 58 Nutter & gyppocket;  
SSA625 - Mohave County NE part, MU10 & 19 Clayhole, 15 Gypsids, 54 Saido;  
SSA629 - Coconino County North Kaibab part, MU8 & 9 Clayhole.

**Table 4. Representative soil features**

Parent material	(1) Alluvium–rock gypsum
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Surface texture	(1) Fine sandy loam (2) Silty clay
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Slow to moderate
Soil depth	102–152 cm
Surface fragment cover <=3"	15–35%
Available water capacity (0-101.6cm)	0–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	5–30%
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)	7.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–15%

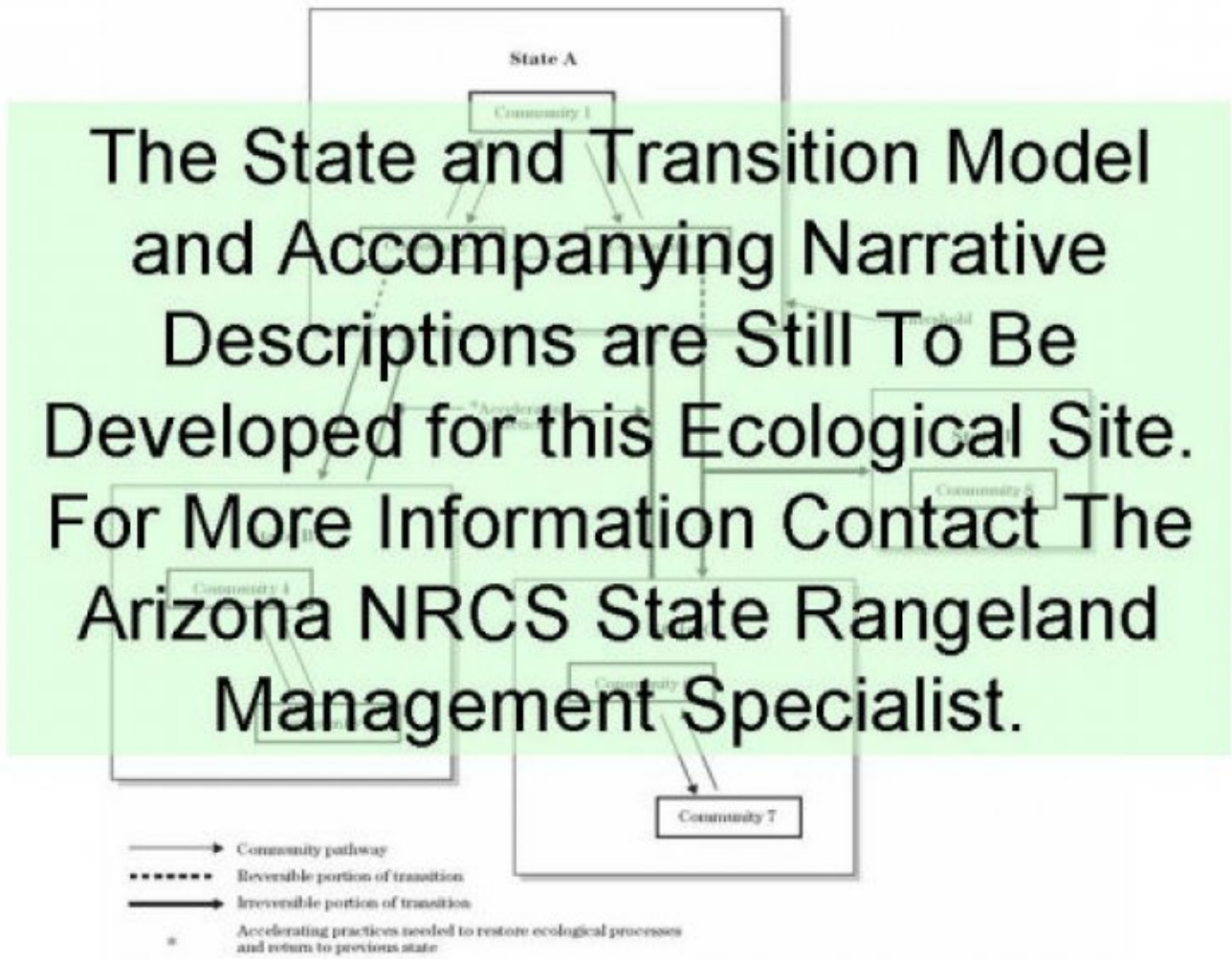
## Ecological dynamics

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



**State 1  
Historic Climax Plant Community**

**Community 1.1  
Historic Climax Plant Community**

This site is made up of short and mid grasses and shrubs. In the original plant community there is a mixture of both cool and warm season plants. Lichens are common on some areas. When disturbed, plant species most likely to invade this site are annuals. This site readily deteriorates to bare ground and lichens.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	370	401	432
Shrub/Vine	123	169	216
Forb	31	46	62
<b>Total</b>	<b>524</b>	<b>616</b>	<b>710</b>

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). 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 10. 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 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Shrub/Vine</b>					
0				45–123	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	22–78	–
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	11–31	–
	slender goldenweed	MAGR10	<i>Machaeranthera gracilis</i>	11–31	–
4				62–123	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	62–123	–
	jointfir	EPHED	<i>Ephedra</i>	62–123	–
<b>Grass/Grasslike</b>					
0				129–392	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	62–155	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	31–93	–
	gyp dropseed	SPNE	<i>Sporobolus nealleyi</i>	7–62	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	31–62	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–31	–
1				90–151	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	90–151	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	90–151	–
2				7–31	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	7–31	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	7–31	–
<b>Forb</b>					
0				12–44	
	Forb, annual	2FA	<i>Forb, annual</i>	12–44	–
3				12–44	
	Forb, perennial	2FP	<i>Forb, perennial</i>	12–44	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	12–44	–

## Animal community

This site is difficult to restore once the plant has been altered. Infiltration is usually slow because of the resulting surface structure. Stocking rates should carefully controlled to avoid overgrazing.

The site is moderately productive for a few wildlife species. Plant diversity is poor to fair. Water is present only in widely sattered stock ponds. Cover is poor.

## Recreational uses

This site is located on undulating plains, mesas and fans with an open grassland and a few interspersed shrubs. Vegetation is patchy with bare ground exposed.

Winters are cold and summers are very warm. Spring and fall are usually cool, windy and dry.

Recreation is limited due to the above factors but includes cross country riding, hunting and rock collecting.

## 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 R10W S36
General legal description	About 12 miles south of Utah-Arizona state line and west of Hurricane Cliffs, Section 36, T40N, R10W; Mohave County.

## Contributors

Larry D. Ellicott  
Steve Barker

## 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)	Kyle Spencer, Steve Cassady
Contact for lead author	Steve Cassady
Date	04/28/2008
Approved by	S. Cassady
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

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

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2. **Presence of water flow patterns:** In areas of  $<$  or  $=$  5 percent slope no water flow patterns occur. In areas of  $>$  5 percent slope water flow patterns are common, but they show no signs of erosion and little litter movement.

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3. **Number and height of erosional pedestals or terracettes:** Long lived perennial grasses and shrubs show signs of turf building. No pedestalling is seen on galleta, but some is seen on bunch grasses such as alkali sacaton.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 65 to 70 percent.

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter naturally accumulates under shrubs. Little movement occurs due to wind or water transport.
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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** The soil has a natural crust which is very resistant to wind and water erosion.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Thin platy structure; slightly hard, friable, sticky and plastic. Color is yellowish red (5YR 5/6) dry; reddish brown (5YR 4/4) wet.
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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 65 percent grasses, 25 percent shrubs and 10 percent forbs promote infiltration and reduce runoff. The average distance to the nearest perennial plant (fetch) is 9 inches, with the majority ranging from 2 to 14 inches, but occasionally as far as 24 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):** The soils associated with this ecological site have a high percentage of clay and silt making the soil "hard", but this is natural and is not a compaction layer.
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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 (60 to 70%) >> Shrubs (20 to 35%) > Forbs (5 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):** Shadscale (*Atriplex confertifolia*) will naturally die back (dead branches as well as dead plants) during periods of drought. Galleta (*Pleuraphis jamesii*) will also show a substantial number of dead plants. During "normal" precipitation years the overall number of dead plants on the site should not be more than 10 percent.
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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 is expected to be 500 to 600 lbs/ac. in a year of average 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: Blue mustard (*Chorispora tenella*), 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 drought

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