USDA Natural Resources
Conservation Service

Ecological site R035XD404AZ
Gypsum Hills 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.

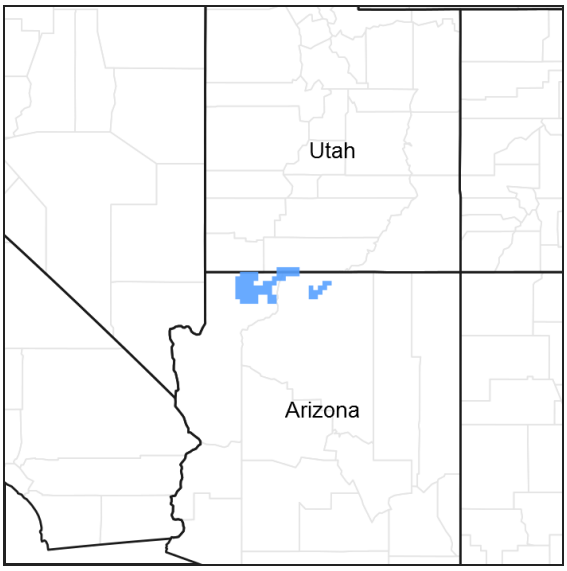

Figure 1. Mapped extent

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) *Eriogonum wrightii* (2) *Amelanchier utahensis*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Hesperostipa comata ssp. comata*

Physiographic features

This site occurs in an upland position. It does not benefit from run-in moisture, and runoff is medium to rapid. This site occurs as hummocky and dissected hills or plains of complex gypsiferous shale and sandstone outcrops.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Plain
Flooding duration	Extremely brief (0.1 to 4 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	None to rare
Elevation	1,158–1,615 m
Slope	0–30%
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 very shallow to deep to any plant root restricting layer. Rock outcrop is common. The soil profile is extremely variable on the site. Various amounts of gypsum are always present. The gypsum may be visible in powdery or crystalline forms. The pH may exceed 9.0 and is usually above 7.8.

Taxonomic units include:

SSA623 - Shivwits Area - MU's 23 & 24 Goblin, 32 Gypsiorthids shallow, 54 Goblin;
SSA625 - Mohave County Area NE Part - MU 15 Gypsids shallow;
SSA629 - Coconino County North Kaibab Part MU's 9 & 47 Torriorthents.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and shale
Surface texture	(1) Sandy loam (2) Clay loam

Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to slow
Soil depth	13–152 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–25%
Available water capacity (0-101.6cm)	0–25.4 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
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)	7.8–9
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 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 mixture of shrubs, forbs and grasses. In the original plant community there is a mixture of both cool and warm season plants. Lichens are a major ground cover on this site. Plant species most likely to increase or invade on this site are thallophytes. This is a harsh site and retrogression usually leave bare ground. Unpalatable shrubs do well.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	177	206	235
Grass/Grasslike	118	147	177
Forb	59	78	99
Tree	–	3	6
Total	**354**	**434**	**517**

Figure 5. 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 6. 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 7. 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 8. Plant community growth curve (percent production by month). AZ0001, 35.4 7-11. 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 (%)
Tree					
0				0–6	
	Utah juniper	JUOS	*Juniperus osteosperma*	0–6	–
Shrub/Vine					
0				45–157	
	bastardsage	ERWR	*Eriogonum wrightii*	22–62	–
	buckwheat	ERIOG	*Eriogonum*	11–39	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	11–22	–
	Mexican cliffrose	PUME	*Purshia mexicana*	0–22	–
	skunkbush sumac	RHTR	*Rhus trilobata*	6–17	–
2				50–168	
	Utah serviceberry	AMUT	*Amelanchier utahensis*	22–62	–
	jointfir	EPHED	*Ephedra*	11–39	–
	slender goldenweed	MAGR10	*Machaeranthera gracilis*	0–22	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	2–17	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	6–17	–
	Bigelow sage	ARBI3	*Artemisia bigelovii*	2–11	–
	yucca	YUCCA	*Yucca*	1–6	–
Grass/Grasslike					
0				62–123	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	22–50	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	17–39	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	17–28	–
	spike dropseed	SPCO4	*Sporobolus contractus*	0–17	–
1				22–101	
	James' galleta	PLJA	*Pleuraphis jamesii*	22–56	–
	gyp dropseed	SPNE	*Sporobolus nealleyi*	0–39	–
	black grama	BOER4	*Bouteloua eriopoda*	0–39	–
Forb					
0				59–99	
	Forb, perennial	2FP	*Forb, perennial*	9–39	–
	globemallow	SPHAE	*Sphaeralcea*	4–20	–
	princesplume	STANL	*Stanleya*	4–20	–
	Forb, annual	2FA	*Forb, annual*	8–20	–

Animal community

This site is fragile and adapts well only to light stocking rates. The topography is often steep and prevents good livestock distribution. When disturbed by overgrazing, stock trailing, or vehicular traffic serious erosion occurs and recovery is very difficult.

Site is characterized by low productivity, poor cover and fair diversity. Soil conditions and rough topography make this site unsuitable for habitat manipulation. Free water only occurs in widely scattered stock ponds on adjacent sites.

Recreational uses

The site consists of dissected hills and hummocky plains. These areas are usually quite barren with scattered shrubs and patches of grass.

Winters are cold and the summers are warm. Spring and fall are usually cool and windy.

Recreation use is low due to 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 R11W S6
General legal description	About 7 miles south of the Utah-Arizona state line south of St. George, Utah. Mohave County Section 6, T40N, R11W.

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
Contact for lead author	Steve Cassady
Date	09/15/2008
Approved by	Steve 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 ranges from 51 to 59 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 moves very little.

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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):** SSI = 5.5 with cover, 2.6 without cover. A lichen crust covers 10 to 13 percent of the soil surface.

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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 is weak fine granular structure, soft, non-sticky and non-plastic. Color is reddish brown (2.5YR 4/4) dry, dark reddish brown (2.5YR 3/4) moist.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Basal gaps are generally greater than 6 feet. About 15 percent of the area is covered by canopy. Canopy gaps of less than 6 feet make up about 23 percent and canopy gaps greater than 6 feet 62 percent.

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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:

    Sub-dominant:

    Other:

    Additional: Shrubs > Grasses > Forbs

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead shrubs are observable, but make up less than 5 percent of the total shrub component. Dead grasses are rarer, rarely making up more than 2 percent of the grass component. Percentages may increase during prolonged and/or severe drought.

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14. **Average percent litter cover (%) and depth (in):** Average percent litter cover (16% to 18%) and depth (1/8” to 1/2”).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 350 lbs/ac

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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:** Occasionally cheatgrass, Bromus tectorum, is found on this site, but never makes up more than 1 or 2 percent of the plant community.

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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.
