USDA Natural Resources Conservation Service

Ecological site R035XD416AZ
Silty Upland 7-11" p.z.

Accessed: 05/11/2025

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.

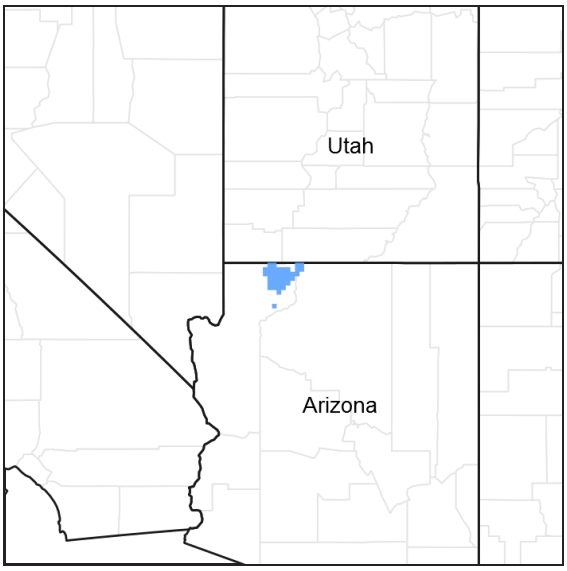

Figure 1. Mapped extent

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.

Associated sites

R035XD405AZ	**Gypsum Upland 7-11" p.z.**
R035XD409AZ	**Loamy Upland 7-11" p.z.**
R035XD410AZ	**Saline Upland 7-11" p.z. Loamy**
R035XD413AZ	**Sandy Loam Upland 7-11" p.z. Calcareous**
R035XD414AZ	**Sandy Loam Upland 7-11" p.z.**

R035XD418AZ	**Clay Loam Bottom 7-11" p.z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex confertifolia* (2) *Krascheninnikovia lanata*
Herbaceous	(1) *Pleuraphis jamesii* (2) *Achnatherum hymenoides*

Physiographic features

This site occurs in an upland position and does not benefit significantly from run-in moisture. It occurs as gently sloping valleys and plains, usually as old alluvium from gypsiferous shales and siltstones.

Table 2. Representative physiographic features

Landforms	(1) Valley side (2) Plain
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None to rare
Elevation	4,400–5,100 ft
Slope	1–4%
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)	11 in

Influencing water features

Soil features

The soils characterizing this site are typically deep to any root restricting layer. These soils are non saline to slightly salline in the first foot, with salinity increasing with depth. The subsoil contains harmful amounts of salt or exchangeable sodium.

Typical taxonomic units include:

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and shale
Surface texture	(1) Loam (2) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	60 in
Surface fragment cover >3"	0–1%
Available water capacity (0-40in)	6.6–9 in
Calcium carbonate equivalent (0-40in)	5–15%
Electrical conductivity (0-40in)	4–8 mmhos/cm
Sodium adsorption ratio (0-40in)	7–13
Soil reaction (1:1 water) (0-40in)	7.9–9

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

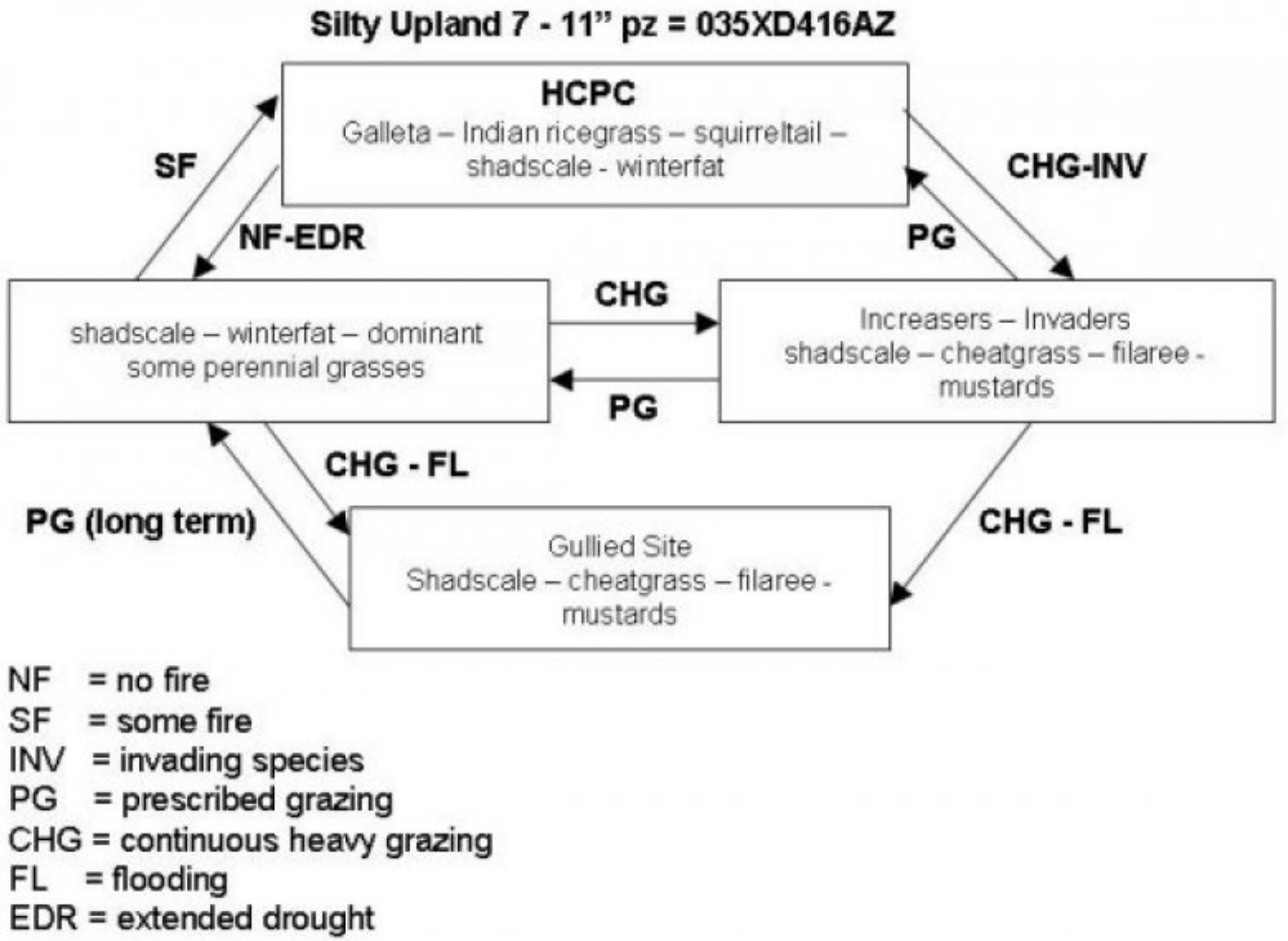

Figure 4. Silty Upland 7-11" p.z.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This site is characterized by a scattered mix of cold-desert shrubs, primarily shadscale and winterfat, with perennial grasses dominating the site. Galleta, Indian ricegrass, and bottlebrush squirreltail are the major species. This site also supports a lot of annual production if winter-spring moisture is good. Typical perennial plant spacing is .75 to 1.25 feet.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	250	288	325
Shrub/Vine	125	150	175
Forb	25	38	50
Total	**400**	**476**	**550**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-10%
Grass/grasslike foliar cover	0-4%

Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-25%
Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	65-85%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	0-1%
>0.5 <= 1	–	–	0-4%	–
>1 <= 2	–	0-10%	–	–
>2 <= 4.5	–	–	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

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). AZ3566, 35.4 7-11" p.z. winterfat. Growth occurs from spring through summer..

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

Figure 10. 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

State 2
Historic Climax Plant Community

Community 2.1
Historic Climax Plant Community

Because of its position on the landscape, this site will receive run-on moisture from the steeper slopes above - the silty textured soils are not cohesive and are easily eroded by overland flow, especially if the perennial grass component is reduced. This site holds a lot of plant-available moisture and can be very productive if the winter-spring moisture is favorable. This means it is also a favorable site for invading cool-season annuals such as cheatgrass brome and redstem filaree. Slow permeability and sodium content reduce the effectiveness of summer moisture. Soil salts increase on this site as the slopes get very flat and distance from the start of the drainage increases - the perennial grasses and the winterfat naturally decrease, while the shadscale increases somewhat. The role of fire on this site is limited; historic fire frequency was probably 30-50 years, and the chief effect was to periodically remove some of the shrubs. It should be noted that this site has a tendency to gully even in pristine conditions - overgrazing, livestock trailing, and vehicle traffic aggravate the situation.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
0				120–150	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	80–120	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	20–30	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	5–10	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	3–5	–
	rockjasmine buckwheat	ERAN5	*Eriogonum androsaceum*	3–5	–
	rubber rabbitbrush	ERNAG	*Ericameria nauseosa ssp. nauseosa var. glabrata*	3–5	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	3–5	–
3				5–25	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	5–25	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	0–15	–
	water jacket	LYAN	*Lycium andersonii*	0–10	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–5	–
Grass/Grasslike					
0				240–300	
	James' galleta	PLJA	*Pleuraphis jamesii*	100–150	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	50–100	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	10–25	–
	alkali sacaton	SPAI	*Sporobolus airoides*	10–25	–
	burrograss	SCBR2	*Scleropogon brevifolius*	5–15	–

	sand dropseed	SPCR	*Sporobolus cryptandrus*	3–10	–
	gyp dropseed	SPNE	*Sporobolus nealleyi*	2–5	–
1				10–25	
	Grass, perennial	2GP	*Grass, perennial*	0–10	–
	sixweeks fescue	VUOC	*Vulpia octoflora*	0–5	–
	Grass, annual	2GA	*Grass, annual*	0–5	–
	threeawn	ARIST	*Aristida*	0–4	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–4	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	0–4	–
	saltgrass	DISP	*Distichlis spicata*	0–4	–
Forb					
0				15–30	
	globemallow	SPHAE	*Sphaeralcea*	10–25	–
	Forb, perennial	2FP	*Forb, perennial*	0–5	–
	pepperweed	LEPID	*Lepidium*	0–5	–
2				10–25	
	Forb, annual	2FA	*Forb, annual*	1–3	–
	borage	BORAG	*Borago*	1–3	–
	thistle	CIRSI	*Cirsium*	1–3	–
	western tansymustard	DEPI	*Descurainia pinnata*	1–3	–
	miniature woollystar	ERDI2	*Eriastrum diffusum*	1–3	–
	common sunflower	HEAN3	*Helianthus annuus*	1–3	–
	lettuce	LACTU	*Lactuca*	1–3	–
	blazingstar	MENTZ	*Mentzelia*	1–3	–

Animal community

The soils of this site are not suited for range seeding of most available species because of rainfall and the salt problem. This site is often close to developed livestock ponds and overgrazing and excessive trailing can aggravate gullying. Sound management using the principles of proper grazing is critical.

Plant cover production and diversity are poor. Identified pronghorn antelope fawning areas require good livestock management to provide adequate cover - proper use of larger shrubs is important. Permanent naturally occuring open waters are scarce, which makes the livestock ponds important as the fawning sites are often close by. Heights of the bottom wire on fences is an important consideration.
Species commonly found on this site are pronghorn antelope, great horned owl, red-tailed hawk, golden eagle, prairie falcon, western rattlesnake, lizards and small game.

Recreational uses

This site occurs as gently sloping valleys and plains. It has a relatively sparse mixture of shrubs and grasses.

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.

Inventory data references

Aspect does not play a significant role on this site. There is no thermic site counterpart in CRA D30-2. Near the

lower CRA boundary this site may more closely resemble D35-2 Silty Upland. There is also no site counterpart in CRA D35-3 because of the change in soil parent material - at the upper elevations the soil salt content is less and the site will change to D35-3 Clayloam upland.

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T39N R4W S2
General legal description	Mohave County; Pipe Spring 7.5 minute Quad; Section 2, T39N, R4W. Also one-quarter mile south of milepost 606 between Fredonia and Jacob Lake.

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. Mounding is found under long-lived shrubs. Turf building of 1/4 to 1/2 inch occurs on grasses.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** < or = 59%

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

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):** No appreciable movement of litter.

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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):** Soils associated with this site develop a surface crust resistant to erosion.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Surface o soils associated with this site is weak platy structure parting to weak fine granular, very friable. Color is brown (7.5YR 5/4) dry, dark brown (7.5YR 4/4) moist.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Randomly scattered plants consisting of about 65% grasses, 30% shrubs and 5% forbs promote infiltration and reduce runoff. The average distance to the nearest perennial plant (fetch) is about 2 inches, with the majority ranging from 0 to 4 inches, but occasionally 5 as far as 5 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):** No compaction layer. An accumulation of clay creating a relatively hard layer is encountered at about 13 inches.

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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 (50-65%) >> Shrubs (10-20%) > Forbs (5-10%

    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):** Plant mortality never exceeds 10% other than during periods of extended drought when mortality is often greater.

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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 400-600 lbs/ac in a year of average annual precipitation.

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), carelessweed (Amaranthus palmeri) 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.

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