USDA Natural Resources
Conservation Service

Ecological site R035XC340AZ
Basalt Slopes 10-14" p.z. Calcareous

Accessed: 05/03/2024

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.

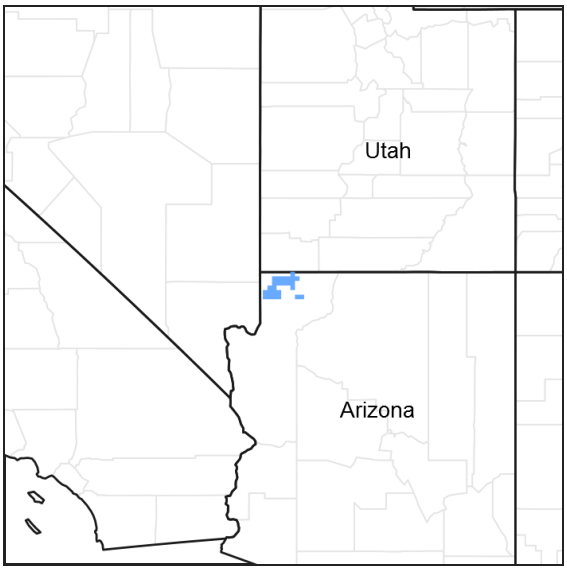

Figure 1. Mapped extent

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 35.3 – Colorado Plateau Sagebrush – Grasslands

Elevations range from 4500 to 6000 feet and precipitation averages 10 to 14 inches. Vegetation includes Wyoming big sagebrush, Utah juniper, Colorado pinyon - cliffrose, Mormon tea, fourwing saltbush, blackbrush Indian ricegrass, needle and thread, western wheatgrass Galleta, black grama, blue grama, and sand dropseed. The soil temperature regime is mesic and the soil moisture regime is ustic 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

R035XC301AZ	**Basalt Upland 10-14" p.z.**
R035XC307AZ	**Clay Loam Upland 10-14" p.z.**
R035XC313AZ	**Loamy Upland 10-14" p.z.**
R035XC331AZ	**Shallow Upland 10-14" p.z. Warm**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Coleogyne ramosissima* (2) *Ephedra nevadensis*
Herbaceous	(1) *Pleuraphis jamesii*

Physiographic features

This blackbrush-desert shrub site occurs in an upland position. It does not benefit from run-on moisture, but excessive runoff can occur because of steep slopes. Landform and position are colluvial backslopes and footslopes below basalt mesas.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Knoll (3) Mesa
Flooding frequency	None
Ponding frequency	None
Elevation	1,311–1,829 m
Slope	10–40%
Aspect	Aspect is not a significant factor

Climatic features

Winter summer moisture ratios range from 70:30 to 60:40. Late spring is usually the driest period, and early fall moisture can be sporadic. Summer rains fall from June through September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture from October through 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 from December through February. Accumulations above 12 inches are not common but can occur. Snow usually lasts for 3-4 days, but can persist much longer. Summer daytime temperatures are commonly 95 - 100 F and on occasion exceed 105 F. Winter air temperatures can regularly go below 10 F and have been recorded below - 20 F.

Table 3. Representative climatic features

Frost-free period (average)	168 days
Freeze-free period (average)	193 days
Precipitation total (average)	356 mm

Influencing water features

Soil features

Moisture regime is ustic aridic. Temperature regime is mesic. Parent material is derived from mixed alluvium and colluvium derived from sandstone, shale and conglomerate. Other geologic influences include gypsum content of lower horizons that can be quite high; lithic contact is gypsite or gypsiferous mudstone. Soils are non-sodic and slightly to strongly alkaline. pH range is 7.8-8.6. Water erosion hazard is slight to moderate. Wind erosion is slight. Plant-soil moisture relationship is low at shallow depths on much of the site due to gypsum and/or lime content.
Major soils are:
SSA 623 Shivwits Area MU 74 Tanbark family & Strych family.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and shale (2) Colluvium–conglomerate
Surface texture	(1) Very cobbly fine sandy loam (2) Very stony fine sandy loam (3) Very gravelly clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	25–102 cm
Surface fragment cover <=3"	15–35%
Surface fragment cover >3"	25–60%
Available water capacity (0-101.6cm)	2.03–8.13 cm
Calcium carbonate equivalent (0-101.6cm)	10–35%
Electrical conductivity (0-101.6cm)	2–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.8–8.6
Subsurface fragment volume <=3" (Depth not specified)	10–35%
Subsurface fragment volume >3" (Depth not specified)	15–40%

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 fire, grazing, 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 amount shown for each group. Divide the resulting total by the total normal year production shown in the plant community description. If the rainfall has ben 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

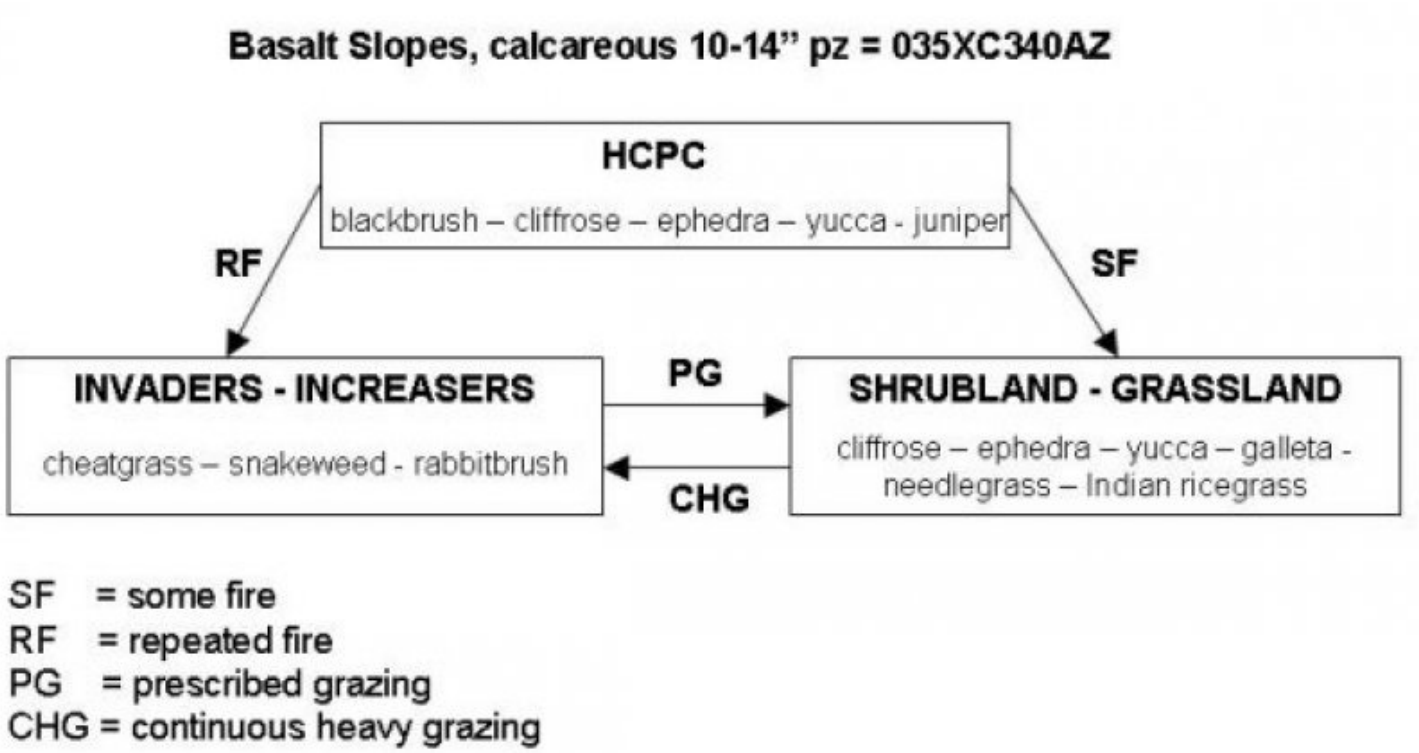

Figure 4. Basalt Slopes, calcareous 10-14" pz = 035XC340AZ

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This site has an aspect of fairly dense desert shrubs with scattered trees, Blackbrush dominates the site with minor amounts of ephedra, cliffrose and banana yucca interspersed. Trees are generally present and increase with elevation and cool aspect. Perennial grasses are a minor component, but are usually present in small amounts - galleta is most common. Forbs are also infrequent. Typical perennial plant spacing is 1.0-1.25 feet. Because of the scattered canopy cover and sparse understory, this site does not have a history of regular fire disturbance. Blackbrush plant communities are often quite old and tend to be stable. If it is severely disturbed this site will revert to an early seral stage of mostly annuals, including a large increase of cheatgrass brome, broom snakeweed, and rabbitbrush. A more advanced plant community will contain scattered desert shrubs and a small increase in perennial grasses, with little regeneration of blackbrush. It is speculated that blackbrush communities evolved under a different climatic regime, and once removed will not readily return to a site. Because of the scattered canopy and sparse understory, this site does not have a history of regular fire disturbance. Blackbrush communities are often quite old and tend to be stable. If removed, blackbrush will not readily return to the site - there will be an increase in the other major shrubs of the site, and a significant increase in the grass and forb component. On hotter south and west slopes near the lower elevation limit this site will more closely resemble the thermic site D30-2 Basalt Slopes 9-12" pz. Creosotebush, bush encelia, Fremont dalea and other low-desert shrubs may be present, along with big galleta and bush muhly. At the upper elevation limit this site may more closely resemble d39-3 Basalt Slopes 13-17" pz. Big sagebrush will increase and turbinella oak may be present; trees will increase and canopy cover may approach 25% on cool aspects and in drainages. The blackbrush component will be much less. There may be transition areas with chaparrel species such as manzanita and desert ceanthus. This site is usually located immediately below the basalt cap rock and above flatter sites. It is generally interspersed with basalt talus slopes.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	391	521	651
Grass/Grasslike	50	67	84
Forb	28	37	46
Tree	28	37	46
Total	**497**	**662**	**827**

Table 6. Ground cover

Tree foliar cover	0-3%
Shrub/vine/liana foliar cover	5-30%
Grass/grasslike foliar cover	0-3%
Forb foliar cover	0%
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	–	–	0-1%	–
>0.15 <= 0.3	–	–	0-3%	–
>0.3 <= 0.6	–	2-10%	–	–
>0.6 <= 1.4	–	5-30%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	0-3%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 6. Plant community growth curve (percent production by month). AZ3503, 35.3 10-14" p.z. galleta. Growth begins in spring, most growth occurs during summer and early fall rainy season. Plants will green up again in the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	5	20	15	20	30	10	0	0

Figure 7. Plant community growth curve (percent production by month). AZ3505, 35.3 10-14" p.z. Indian ricegrass. Growth begins in spring, with semi-dormancy occurring during July through August. Plants will green up again in the fall..

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

Figure 8. Plant community growth curve (percent production by month). AZ3513, 35.3 10-14" p.z. green Mormon tea. Growth occurs mainly in the spring and early summer..

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). AZ3531, 35.3 10-14" p.z. all sites. Growth begins in the spring and continues through the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	17	18	10	19	20	10	1	1	0

Figure 10. Plant community growth curve (percent production by month). AZ3532, Desert needlegrass. Makes most growth from April to May.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	50	30	0	0	0	0	0	0	0

Figure 11. Plant community growth curve (percent production by month). AZ3533, Nevada mormon tea. Grows mainly in spring and early summer..

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 12. Plant community growth curve (percent production by month). AZ5105, Blackbrush. Cool season grower, shuts down quickly when it gets hot..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	20	50	20	5	0	0	0	0	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 (%)
Tree					
0				7–67	
	Utah juniper	JUOS	*Juniperus osteosperma*	7–67	–
	twoneedle pinyon	PIED	*Pinus edulis*	3–45	–
	singleleaf pinyon	PIMO	*Pinus monophylla*	3–45	–
Shrub/Vine					
0				370–538	
	blackbrush	CORA	*Coleogyne ramosissima*	370–538	–
5				20–47	
	Nevada jointfir	EPNE	*Ephedra nevadensis*	10–24	–
	mormon tea	EPVI	*Ephedra viridis*	10–24	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–20	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	0–17	–
	Apache plume	FAPA	*Fallugia paradoxa*	0–17	

	Apache plume	FAPA	*Fallugia paradoxa*	0–17	–
	rubber rabbitbrush	ERNAG	*Ericameria nauseosa ssp. nauseosa var. glabrata*	0–10	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–10	–
6				0–7	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–20	–
	rockjasmine buckwheat	ERAN5	*Eriogonum androsaceum*	0–20	–
	echinocactus	ECHIN2	*Echinocactus*	0–2	–
	kingcup cactus	ECTR	*Echinocereus triglochidiatus*	0–2	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–2	–
	banana yucca	YUBA	*Yucca baccata*	0–2	–
7				0–20	
	Apache plume	FAPA	*Fallugia paradoxa*	0–34	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	0–34	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–20	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	0–20	–
	spiny hopsage	GRSP	*Grayia spinosa*	0–20	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–20	–
	water jacket	LYAN	*Lycium andersonii*	0–20	–
	Fremont's mahonia	MAFR3	*Mahonia fremontii*	0–20	–
Grass/Grasslike					
0				34–101	
	James' galleta	PLJA	*Pleuraphis jamesii*	7–67	–
	threeawn	ARIST	*Aristida*	0–20	–
	black grama	BOER4	*Bouteloua eriopoda*	0–20	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0–20	–
	muttongrass	POFE	*Poa fendleriana*	0–20	–
	burrograss	SCBR2	*Scleropogon brevifolius*	0–20	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–20	–
	gyp dropseed	SPNE	*Sporobolus nealleyi*	0–20	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–7	–
	desert needlegrass	ACSP12	*Achnatherum speciosum*	2–7	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	2–7	–
1				0–34	
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	0–20	–
	Grass, perennial	2GP	*Grass, perennial*	0–13	–
	threeawn	ARIST	*Aristida*	0–2	–
	black grama	BOER4	*Bouteloua eriopoda*	0–2	–
	muttongrass	POFE	*Poa fendleriana*	0–2	–
	burrograss	SCBR2	*Scleropogon brevifolius*	0–2	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–2	–
	gyp dropseed	SPNE	*Sporobolus nealleyi*	0–2	–
2				0–28	

	Grass, annual	2GA	*Grass, annual*	0–34	–
Forb					
3				0–34	
	Forb, perennial	2FP	*Forb, perennial*	0–34	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–34	–
	winding mariposa lily	CAFL	*Calochortus flexuosus*	0–34	–
	Colorado four o'clock	MIMU	*Mirabilis multiflora*	0–34	–
	spiny phlox	PHHO	*Phlox hoodii*	0–34	–
	globemallow	SPHAE	*Sphaeralcea*	0–34	–
4				7–47	
	borage	BORAG	*Borago*	7–47	–
	woollystar	ERIAS	*Eriastrum*	7–47	–
	common sunflower	HEAN3	*Helianthus annuus*	7–47	–
	phacelia	PHACE	*Phacelia*	7–47	–
	Forb, annual	2FA	*Forb, annual*	0–16	–

Animal community

Steep slopes, cobbly surface and lack of water limit livestock use of this site. Witner use can be greater bacause of the palatable shrub component.

This is mostly a winter range for mule deer, and not extensively used. Prescribed burning can improve shrub variety and quantity, but is difficult to accomplish. Management should be concentrated on prescribed grazing and development of wildlife water.

Potential species include: great horned owl, common raven, western rattlesnake, fringed myotis, mule deer, white-throated antelope squirrel, red-tailed hawk, rock wren, collared lizard, deer mouse, badger, Cassin's kingbird, gopher snake, leopard lizard, coyote and black-tailed jackrabbit.

Recreational uses

Recreational activities include hiking, hunting, wildlife observation and photography.

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T40N R12W S25
General legal description	Wolf Hole Mountain East 7.5 minute quad; about 2 miles NW of Seegmiller Mountain.

Other references

Sampling Technique EC GC FC PC

NRCS Range 417 1
NRCS AZ Range-1 2 1
NRCS Dry-Weight Rank 3 2

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)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial**

distribution on infiltration and runoff:

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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):**

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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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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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):**

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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:**

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17. **Perennial plant reproductive capability:**
