

Ecological site R035XB235AZ Sandy Loam Upland 6-10" p.z. Warm

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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.

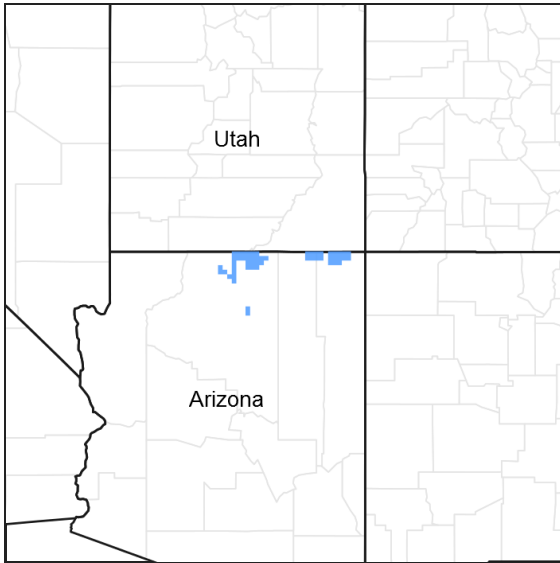


Figure 1. Mapped extent

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

This ecological site occurs in Common Resource Area 35.2 - the Colorado Plateau Shrub – Grasslands

Elevations range from 3800-5800 feet and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama, and black grama. 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>Coleogyne ramosissima</i> (2) <i>Atriplex canescens</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i> (2) <i>Sporobolus contractus</i>

Physiographic features

Site is deep soils that occurs on summits and risers of fan terraces and structural benches of plateaus. This site does not benefit from run-in moisture, nor does it suffer from excessive runoff. The slopes is generally 1 to 15%, but may be steeper in spots.

Table 2. Representative physiographic features

Landforms	(1) Structural bench (2) Plateau (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,158–1,768 m
Slope	1–15%
Aspect	Aspect is not a significant factor

Climatic features

Area has a very dry and windy climate that is hot in the summer and cold in the winter. Average annual precipitation is from 6 to 10 inches. Soil moisture regime is typic aridic and the soil temperature regime is mesic. A slight majority of the precipitation arrives during the late fall, winter, and early spring. this winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow falls from December through February, but rarely lasts more than a few days. The driest period is from late May to early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. Windy conditions are common year round with the strongest most frequently in the spring.

Table 3. Representative climatic features

Frost-free period (average)	181 days
Freeze-free period (average)	207 days
Precipitation total (average)	254 mm

Influencing water features

The soil moisture on this ecological site comes from precipitation. The site does not benefit significantly from run-on moisture. The sandy surface texture of the soil allows the site to capture the majority of both gentle winter storms and intense summer thunderstorms with little runoff.

Soil features

Soils on this site are deep and very deep. Surface textures are loamy sand to sandy loam. Subsurface textures are loamy fine sand to fine sandy loam. They are formed in alluvium and eolian from sandstone and siltstone from Navajo sandstone and Jurassic age formations. Moisture regime is Typic Aridic and temperature regime is Mesic.

Typical taxonomic units include:

SSA 629 Coconino County North part - MU's 32 & 33 Pagina;
SSA-707 Little Colorado Area MU's 5 Typic Calciargids, 34 Moffat;
SSA 711 Navajo Mountain Area MU's 1 Marcou & Typic Calcigypsids, 60 Typic torriorthents;
SSA 717 Shiprock Area (NM/AZ) - MU's 515 Bluechief, 517 Moffat, & 518 Tohatin and
SSA UT689 Glen Canyon Utah MU's 2 Bluechief & Pagina, 20 Pagina, 24 Redhouse family, 38 Sheppard family.

Table 4. Representative soil features

Parent material	(1) Alluvium–sandstone and siltstone
Surface texture	(1) Sandy loam (2) Loamy fine sand (3) Loamy sand
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	102–152 cm
Surface fragment cover <=3"	0%
Available water capacity (0-101.6cm)	6.35–25.4 cm
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)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	1–15%

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.

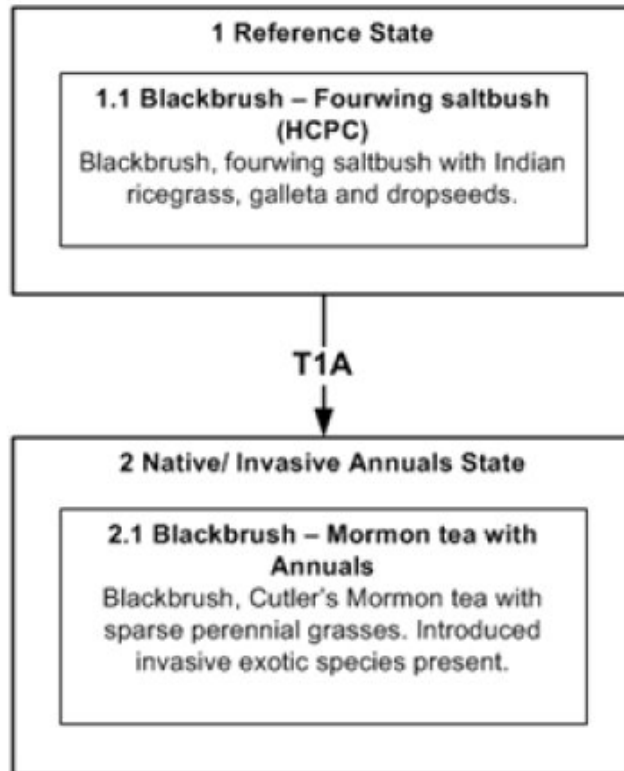
Production data provided in this site description is standardized to air-dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

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.

The State and Transition model shows the most common occurring plant communities likely to be encountered on this ecological site. This model may not show every possible plant community, but only those that are most prevalent and observed through field inventory. As more data is collected these plant communities may be revised, removed, and some added to reflect the ecological dynamics of this site.

State and transition model

**35.2AZ Sandy Loam Upland 6-10" p.z. Warm
(R035XB235AZ)**



Transition:

T1A = Drought, Continuous heavy grazing, Establishment of invasive species

Figure 4. STM - R035XB235AZ

**State 1
Reference State**

**Community 1.1
Blackbrush - Fourwing saltbush**



Figure 5. Sandy Loam Upland, Calcareous



Figure 6. Blackbrush - Fourwing Saltbush

The dominant aspect of this site is a low shrub (blackbrush and fourwing saltbush), mixed with grasses (Indian ricegrass, galleta and sand dropseed).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	168	269	336
Shrub/Vine	112	168	224
Forb	6	11	22
Total	286	448	582

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	5-18%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0-20%
Litter	10-25%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	45-65%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	0-3%	0-1%
>0.15 <= 0.3	–	0-2%	5-15%	0-1%
>0.3 <= 0.6	–	5-10%	0-2%	–
>0.6 <= 1.4	–	0-2%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 8. Plant community growth curve (percent production by month). AZ3521, 35.2 6-10" p.z. all sites. Growth begins in the spring and continues through the summer. Most growth in this CRA occurs in the spring using stored winter moisture..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	9	20	27	14	10	11	5	3	0	0

Figure 9. Plant community growth curve (percent production by month). AZ5104, 35.3 10-14" p.z. sand dropseed. Growth begins in spring and extends into the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	5	30	35	15	0	0	0

Figure 10. Plant community growth curve (percent production by month). AZ5201, 35.2 6-10" p.z. galleta. Growth begins in spring, most growth occurs during summer rains..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	10	15	35	5	0	0	0

Figure 11. Plant community growth curve (percent production by month). AZ5202, Indian ricegrass, 35.2 6-10" p.z.. Growth begins in spring, most growth occurs in May, goes dormant during summer heat..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	15	40	20	0	0	10	5	0	0

Figure 12. Plant community growth curve (percent production by month). AZ5206, 35.2 6-10" p.z. blackbrush. Most growth occurs in the spring, goes dormant during the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	20	50	20	0	0	0	0	0	0

State 2 Native/ Invasive Annuals State

Community 2.1 Blackbrush - Mormon tea with Annuals

This plant community is dominated by blackbrush, mormon tea with rabbitbrush and/or snakeweed. Perennial grasses are sparse and only present in small amounts. Common grasses found are galleta, sand dropseed and Indian ricegrass. Annuals grasses and forbs, both native and non-native, are present in small to moderate amounts.

There are moderate amounts of bare ground (60-85%) due to reduce perennial herbaceous cover. Annuals can make up to 25% of the the total plant communities composition.

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Grasses			168–336	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	90–112	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	34–56	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	22–45	–
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	11–34	–
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	4–22	–
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	0–22	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	4–22	–
	Fendler's threeawn	ARPUF	<i>Aristida purpurea</i> var. <i>fendleriana</i>	0–11	–
	sandhill muhly	MUPU2	<i>Muhlenbergia pungens</i>	0–11	–
Forb					
2	Forbs			6–22	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–13	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–9	–
	flatspine bur ragweed	AMAC2	<i>Ambrosia acanthicarpa</i>	0–2	–
	thicksepal cryptantha	CRCR3	<i>Cryptantha crassisepala</i>	0–2	–
	bulbous springparsley	CYBU	<i>Cymopterus bulbosus</i>	0–2	–
	shortstem lupine	LUBR2	<i>Lupinus brevicaulis</i>	0–2	–
	Arizona skeletonplant	LYAR2	<i>Lygodesmia arizonica</i>	0–2	–
	Ives' phacelia	PHIV	<i>Phacelia ivesiana</i>	0–2	–
	Fendler's globemallow	SPFE	<i>Sphaeralcea fendleri</i>	0–2	–
	heartleaf twistflower	STCO6	<i>Streptanthus cordatus</i>	0–2	–
	longbeak streptanthella	STLO4	<i>Streptanthella longirostris</i>	0–2	–
Shrub/Vine					
3	Shrubs			112–224	
	blackbrush	CORA	<i>Coleogyne ramosissima</i>	112–135	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	22–67	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	4–22	–
	Cutler's jointfir	EPCU	<i>Ephedra cutleri</i>	4–22	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–6	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–6	–
	narrowleaf yucca	YUAN2	<i>Yucca angustissima</i>	0–6	–
	Greene's rabbitbrush	CHGR6	<i>Chrysothamnus greenei</i>	0–6	–

Animal community

This site is suitable for yearlong grazing by either cows and calves or stocker cattle and is easily traversed by all classes of livestock. Prescribed Grazing systems adapt very well to use on this site. Soils on this site have a severe wind erosion hazard, particularly on overgrazed areas, roads, cattle trails and concentration areas.

This site offers a fair diversity in the vegetative complex for wildlife. In higher condition classes the site is most suitable to grassland wildlife species. As retrogression occurs the woody species increase and wildlife species utilizing the site may change.

Recreational uses

Site is typically plateaus and fans. It produces high desert grasslands which can be very picturesque.

Winters are cold, however, relatively mild spring, fall and summer months are attractive to recreationists.

Activities include hunting, cross-country riding, photography, hiking, rock collecting, and wildlife observation.

Type locality

Location 1: Apache County, AZ	
Township/Range/Section	T41N R26E S4
General legal description	Walker Creek Reservoir Quad; Nokalito Bench area, four miles northeast of Walker Creek Reservoir; Section 4, T41N, R26E, Navajo Indian Reservation, AZ.

Other references

Updates and revisions for this ESD were conducted as part of a 2007-2012 Interagency Technical Assistance Agreement between the Bureau of Indian Affairs–Navajo Region and the NRCS-Arizona.

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 and Ken Gishi
Contact for lead author	State Rangeland Management Specialist, NRCS-Arizona State Office, Phoenix, AZ
Date	05/01/2008
Approved by	
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 the site has a hummocky appearance due to deposition around and under shrubs like blackbrush and mormon tea.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 45 to 65 percent. This site can have up to 20 percent of functioning biological surface crust, this is not bare ground.

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 of most litter. Woody litter stays in place under canopies, very fine litter will move by wind for short distances.

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 thin crust (physical or biological crust) resistant to erosion. The expected soil site stability is 3-4.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface thickness is generally 1-4 inches thick and structure associated with this site are single grained; loose. Color is yellowish red (5YR 5/8) dry, yellowish red (5YR 4/6) 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 60 percent grasses, 35 percent shrubs and 5 percent forbs promote infiltration and reduce runoff. The average distance to the nearest perennial plant (fetch) is 5 inches, with the majority ranging from 1 to 7 inches, but occasionally as far as 15 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. A very hard calcic horizon is encountered at about 16 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 (55-65%) > shrubs (30-40%) > forbs (1-5%)

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Mortality is rare in blackbrush and < 1% in grasses. During times of drought, blackbrush will drop its leaves.
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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 350-450 lbs/ac in an average annual precipitation year.
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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:** False buffalograss, Russian thistle, cheatgrass or red brome
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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.
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