

Ecological site R035XC325AZ Cobbly Slopes 10-14" p.z. Saline

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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 is found in Common Resource Area 35.3 – the Colorado Plateau Sagebrush – Grasslands.

The Common Resource Area occurs within the Colorado Plateau Physiographic Province. It is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Elevations range from 4800 to 6700 feet and precipitation averages 10 to 14 inches. The elevation range is lower (about 4500 to 6000) on the western side of the Colorado Plateau along the Grand Canyon, and moves up about 500 to 800 feet higher on the eastern side in the areas of the Navajo and Hopi Indian Reservations due to rain shadow effects from the Kaibab Plateau and Mogollon Rim. Common vegetation in this region 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. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. The soil temperature regime is mesic and the soil moisture regime is ustic aridic.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex confertifolia</i>

Herbaceous	(1) <i>Pleuraphis jamesii</i> (2) <i>Sporobolus airoides</i>
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Physiographic features

This ecological site occurs on toeslopes between cuestas, and on footslopes and alluvial cones of escarpments. The soils formed in alluvium and residuum derived from Jurassic and Cretaceous sandstone and shale.

Table 2. Representative physiographic features

Landforms	(1) Structural bench (2) Cuesta (3) Alluvial fan
Flooding frequency	None
Ponding frequency	None
Elevation	1,463–2,042 m
Slope	15–45%
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

The soil moisture on this ecological site comes from precipitation. The site does not benefit significantly from run-on moisture. Because of the loamy surface texture and slopes, intense storms will produce runoff, reducing the amount of effective rainfall available on this site to produce vegetation.

Soil features

Soils are moderately deep to very deep with cobbly very fine sandy loam to sandy clay loam textures. Subsoils are very gravelly clay loam to clay. Available water capacity is high. Wind erosion hazard is slight; water erosion hazard is moderate. pH range is 7.9-9.0.

Soil survey map unit components that have been correlated to this ecological site include:

SSA 711 Navajo Mountain Area 13-Gish moderately deep.

SSA 717 Shiprock Area AZ/NM MU 307 Beclabito.

Table 4. Representative soil features

Parent material	(1) Residuum–mudstone
Surface texture	(1) Extremely cobbly very fine sandy loam (2) Extremely cobbly sandy clay loam (3) Extremely cobbly fine sandy loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Slow to very slow
Soil depth	102–203 cm
Surface fragment cover <=3"	10–35%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	6.35–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	5–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	5–10
Soil reaction (1:1 water) (0-101.6cm)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	9–35%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

An ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure. The historic climax plant community for this ecological site has been described by sampling relict or relatively undisturbed sites and/or reviewing historic records. The historic climax plant community is the plant community that evolved over time with the soil forming process and long term changes in climatic conditions of the area. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site.

Natural disturbances, such as drought, fire, grazing of native fauna, and insects, are inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the ecological site. Fluctuations in plant community structure and function caused by the effects of natural disturbances help establish the boundaries and characteristics of an ecological site. They are accounted for as part of the range of characteristics of the ecological site. Recognizable plant community phases are identified in the reference state of the ecological site. Some sites may have a small range of variation, while others have a large range. Some plant community phases may exist for long periods of time, while others may only occur for a couple of years after a disturbance.

Deterioration of the plant community, hydrology, or soil site stability on an ecological site can result in crossing a threshold or potentially irreversible boundary to another state, or equilibrium. This can occur as a result of the loss of soil surface through erosion, the loss of the stability of the site due to disturbances that cause active erosion on the site, increases in the amounts and/or patterns or runoff from rainstorms, changes in availability of surface and subsurface water, significant changes in plant structural and functional types, or the introduction of non-native species. When these thresholds are crossed, the potential of the ecological site to return to the historic climax plant community can be lost, or restoration will require significant inputs . There may be multiple states possible for an

ecological site, determined by the type and or severity of disturbance.

The known states and transition pathways for this ecological site are described in the state and transition model. Within each state, there may be one or more known plant community phases. These community phases describe the different plant community that can be recognized and mapped across this ecological site. The state and transition model is intended to help land users recognize the current plant community on the ecological site, and the management options for improving the plant community to the desired plant community.

Plant production information in this site description is standardized to the annual production on an air-dry weight basis in near normal rainfall years.

State and transition model

35.3 Cobbly Slopes 10-14" p.z. Saline (R035XC325AZ)

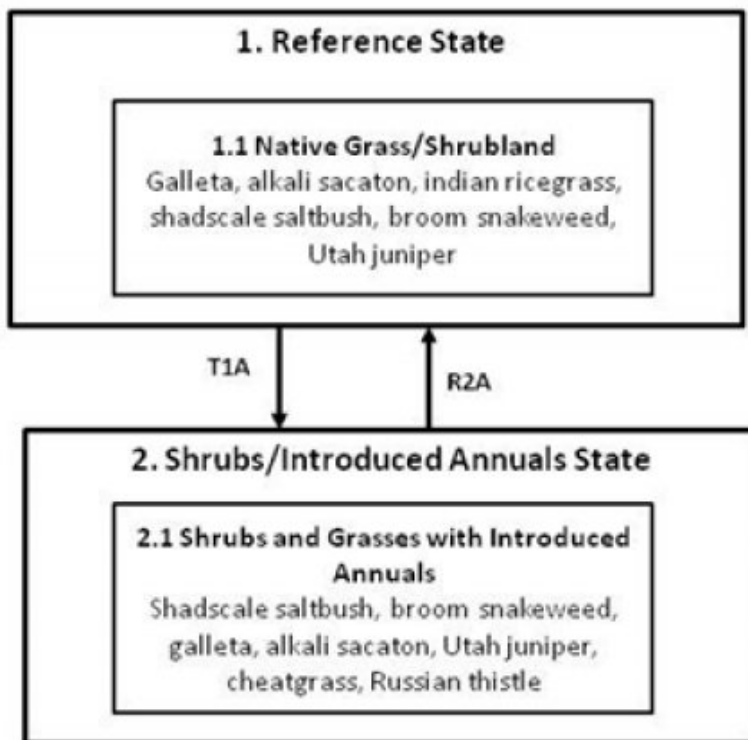


Figure 4. 35.3 Cobbly Slopes saline

State 1 Reference State

This plant community is a grassland aspect with scattered shrubs and the occasional juniper.

Community 1.1 Native Grass/Shrubland



Figure 5. Cobbly Slopes 10-14" p.z. Saline

This plant community is a grassland with mid and short grasses with low growing shrubs and a relatively small percentage of forbs. Major grasses include galleta, alkali sacaton, indian ricegrass and New Mexico feathergrass. Shadscale is the major shrub. Utah juniper can occur on the site. Plant species most likely to invade or increase on this site when it deteriorates are broom snakeweed, mormon tea, sagebrush, and annuals.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	291	314	336
Shrub/Vine	67	90	112
Forb	6	17	22
Tree	–	–	11
Total	364	421	481

Table 6. Ground cover

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	0-2%
Grass/grasslike foliar cover	5-10%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-20%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	15-20%

Table 7. Canopy structure (% cover)

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

Figure 7. 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 8. 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 9. Plant community growth curve (percent production by month). AZ3507, 35.3 10-14" p.z. alkali sacaton. Growth begins in late spring, most growth occurs in summer and early fall..

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

Figure 10. Plant community growth curve (percent production by month). AZ3509, 35.3 10-14" p.z. shadscale saltbush. Growth begins in spring and extends through the summer. Seed set occurs in summer to early fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	25	25	15	15	10	5	0	0	0

Figure 11. 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

State 2 Shrubs / Introduced Annuals State

The plant community in this state is a shrubland with some perennial grasses and non native plant species.

Community 2.1 Shrubs and Grasses with Introduced Annuals

This plant community is shrub dominated by species such as broom snakeweed and shadscale saltbush. Perennial grasses, such as galleta and alkali sacaton are still present but at reduced amounts. Introduced annual grasses and forbs, including red brome, cheatgrass, and Russian thistle are common. Juniper can also increase on this site. These species can affect biotic integrity, fire frequency/intensity, or hydrologic function on the site.

Transition T1A

State 1 to 2

Unmanaged grazing, fire exclusion, drought, introduction of non-native annuals.

Restoration pathway R2A

State 2 to 1

Managed grazing, favorable precipitation, prescribed or natural fire.

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			291–359	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	56–112	–
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	22–67	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	22–45	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	11–22	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	11–22	–
	squirreltail	ELELE	<i>Elymus elymoides</i> ssp. <i>elymoides</i>	11–22	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	11–22	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	11–22	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	11–22	–
	Fendler's threeawn	ARPUF	<i>Aristida purpurea</i> var. <i>fendleriana</i>	0–11	–
	Grass, annual	2GA	<i>Grass, annual</i>	0–11	–
Forb					
2	Forbs			6–22	
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	16–47	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	6–17	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–11	–
Shrub/Vine					
3	Shrubs			67–123	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	45–67	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	16–31	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–22	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	4–22	–
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	0–11	–
	Torrey's jointfir	EPTO	<i>Ephedra torreyana</i>	0–6	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–6	–
Tree					
4	Trees			0–11	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	0–16	–
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	0–16	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–16	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	0–11	–

Animal community

This site is suitable for grazing by horses, stocker cattle and sheep during spring, summer and fall with a good variety of plants.

The potential plant community provides a variety of food and cover plants for wildlife. Water can be scarce in natural springs or pockets. The topography provides escape habitat but can cause distribution to be uneven.

Wildlife species found on site are mule deer, cottontail rabbit, lizards, coyote, pronghorn antelope, blacktail jackrabbits and snakes.

Recreational uses

Site is located on moderately steep to steep sloping cinder cones and footslopes of mesas which lend themselves to activities such as horseback riding, hiking, photography, wildlife observation and hunting.

This site has a variety of spring and summer flowers which are particularly noticeable after good moisture periods. It has good aesthetic appeal when not severely disturbed.

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

Type locality

Location 1: Apache County, AZ	
Township/Range/Section	T41N R30E S24
General legal description	Teec Nos Pos quad - SW 1/4 of section 24, T41N, R30E; 1.2 mi N of Teec Nos Pos, Navajo Indian Reservation, 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 Barker
Contact for lead author	NRCS State Rangeland Management Specialist, Phoenix AZ
Date	09/21/2012
Approved by	Steve Barker
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills may be common on steepest slopes due to high amount of rock directing runoff onto soils and low potential to support vegetative growth on shallow and very shallow soils.

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2. **Presence of water flow patterns:** Water flow patterns may be common on the steepest slopes due to high amount of rock directing runoff onto the soils and low potential for supporting vegetative growth. These patterns are short and discontinuous across larger soil areas, but may be longer and more continuous where soils lie adjacent to bedrock

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and terracettes may be common due to the slopes and moderate potential for water erosion.
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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 15 to 25 percent.
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5. **Number of gullies and erosion associated with gullies:** None expected.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind scour and blowouts are not expected on this site. There may be some deposition around large shrubs and trees.
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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous and fine woody litter will be transported in water flow pathways and by wind. Coarse woody litter will remain under shrub and tree canopies. Litter movement may be greatest in areas of steep slopes or areas adjacent to rock outcrop.
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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 expected average soil stability is 2. Surface fragments, litter, and vegetation cover aid in reducing erosion. This site has moderate resistance to wind erosion and low resistance to water erosion.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structures are weak platy (thin, fine to moderate) parting to medium granular structure. Surface thickness of the A-horizon is 1-3 inches. Color of the A-horizon does not differ significantly from the subsurface soil horizons.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by a relatively even distribution of perennial grasses with scattered half-shrubs, large shrubs, forbs and scattered trees. The vegetation when well distributed along with rock fragments across the site leads to slowing runoff and allowing for some infiltration. Steep slopes leads to high runoff on this site.
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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. This site has cobble cover.
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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: warm season grasses > cool season grasses > Shrubs (large and low shrubs) >
- Sub-dominant: Trees >

Other: Forbs > cacti & succulents

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All plant functional groups are adapted to survival in all but the most severe droughts. Severe winter droughts affect the shrubs the most. Severe summer droughts affect grasses the most.
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14. **Average percent litter cover (%) and depth (in):** Litter size and depth on this site will vary greatly beneath tree canopies and the plant interspaces. Litter size will range from 1 leaf thickness to woody litter 3 inches in diameter. Litter will be the highest under tree canopies with a mix of herbaceous, duff and woody litter.
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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 375 lbs/ac. in a year of average annual 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:** Juniper, broom snakeweed and rabbitbrush are all native to the site, but may have the potential to increase with continued disturbance. Cheatgrass and Russian thistle are non-native annuals that have the potential to invade the site with or without disturbance
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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 during the most severe droughts.
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