USDA Natural Resources Conservation Service

Ecological site R035XF607AZ
Sandy Upland 13-17" p.z.

Accessed: 05/13/2025

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.

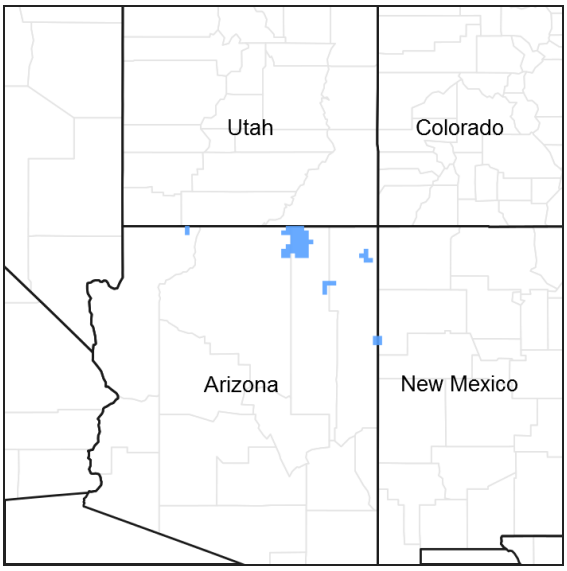

Figure 1. Mapped extent

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

This ecological site occurs in Common Resource Area 35.6 - the Colorado Plateau Pinyon-Juniper-Sagebrush

The Common Resource Area occurs within the Colorado Plateau Physiographic Province. Elevations range from 5800 to 7300 feet and precipitation averages 13 to 17 inches per year. Vegetation includes pinyon, juniper, big sagebrush, cliffrose, Mormon tea, muttongrass, prairie junegrass, squirreltail, western wheatgrass, and blue grama. The soil temperature regime is mesic and the soil moisture regime is aridic ustic. 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

F035XF627AZ	**Sandstone Upland (JUOS, PIED) 13-17" p.z. (Provisional)** Sandstone Upland 13-17" p.z. (JUOS, PIED)

Table 1. Dominant plant species

Tree	Not specified

Shrub	(1) *Artemisia tridentata ssp. wyomingensis* (2) *Purshia tridentata*
Herbaceous	(1) *Achnatherum hymenoides* (2) *Bouteloua gracilis*

Physiographic features

This site occurs on mostly level stabilized sand sheets and dunes that have formed on plateaus and mesas of sandstone geologic formations. The soils are deep with sandy textures througout the soil profile. Slopes range from 0 to 15 percent. The site is often intermingled with sandstone outcrops.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Mesa
Flooding frequency	None
Ponding frequency	None
Elevation	1,768–2,225 m
Slope	0–15%
Ponding depth	0 cm
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this land resource unit is semiarid with warm summers and cool winters. The mean annual precipitation ranges from 13 – 17 inches, but it is very erratic, often varying substantially from year to year. The majority of the precipitation comes from October through April. This precipitation comes as gentle rain or snow from frontal storms coming out of the Pacific Ocean. Snow is common from November through February. Generally no more than a few inches of snow accumulates, melting within a few days, but may last a week or more. The remaining precipitation comes from July through September as spotty, unreliable and sometimes violent thunderstorms. The moisture for this precipitation originates in the Gulf of Mexico (and the Pacific Ocean in the fall) and flows into the area on the north end of the Mexican monsoon. Late May through late June is generally a dry period. The mean annual air temperature ranges from 47 to 49 degrees Fahrenheit (F). The frost-free period (air temperature > 32 degrees F) ranges from 113 to 144 days (@ 50 percent probability). Strong winds are common, especially in the spring.

Table 3. Representative climatic features

Frost-free period (average)	144 days
Freeze-free period (average)	160 days
Precipitation total (average)	432 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

The soils characterizing this site are moderately deep to deep and are well drained. Soil textures range from fine

sand to coarse sand throughout the profile. Available water holding capacity is low to very low. Site occurs as sandsheets on structural benches. It is eolian sand..

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

SSA-625 Mohave County NE part MU 52 Royosa; SSA-711 Navajo Mountain Area MU 4 Aridic Ustorthent & Royosa; MU 36 & 37 Pinepoint;

SSA-713 Chinle Area MU 40 Royosa;

SSA-715 Fort Defiance Area NM/AZ MU 103 Royosa.

Table 4. Representative soil features

Parent material	(1) Eolian sands–sandstone
Surface texture	(1) Fine sand (2) Sand (3) Coarse sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Rapid to very rapid
Soil depth	51–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.54–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

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

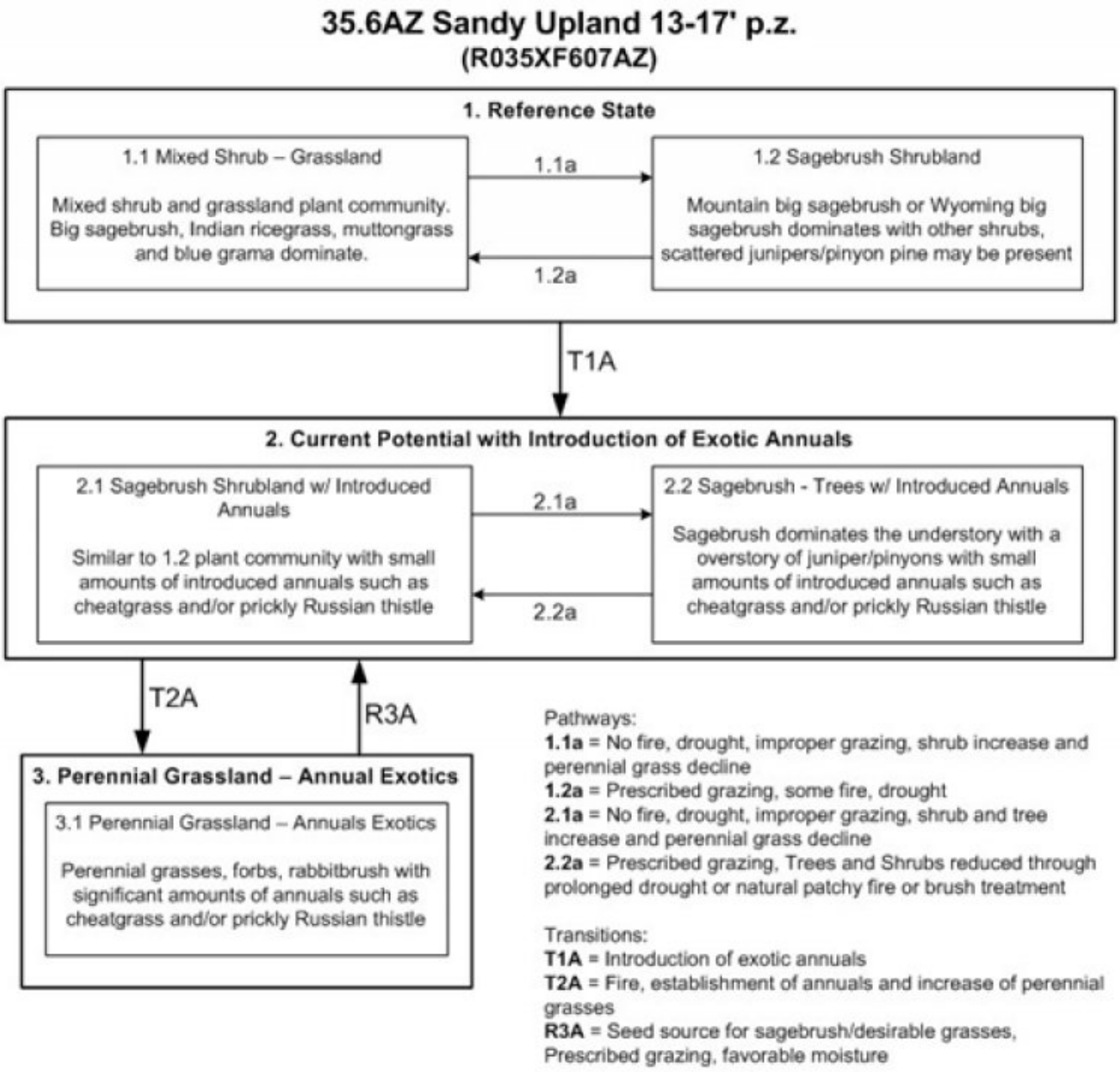

Figure 4. State and Transition Model - R035XF607AZ

State 1
Reference State

Community 1.1
Mixed Shrub - Grassland (HCPC)

Figure 5. Sandy Upland 13-17" p.z.

The dominant aspect of this site is a mixed shrub-grassland. The major grasses are Indian ricegrass and muttongrass. The domimant shrubs are big sagebrush, antelope bitterbrush with occasional widely scattered trees,

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	454	532	605
Grass/Grasslike	168	286	404
Forb	11	56	101
Tree	6	22	34
Total	**639**	**896**	**1144**

Table 6. Ground cover

Tree foliar cover	0-5%
Shrub/vine/liana foliar cover	20-40%
Grass/grasslike foliar cover	0-10%
Forb foliar cover	0-5%
Non-vascular plants	0%
Biological crusts	0-15%
Litter	10-20%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	20-40%

Table 7. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	3-8%
Grass/grasslike basal cover	0-3%
Forb basal cover	0-1%
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 8. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	0-1%
>0.15 <= 0.3	–	–	4-6%	0-1%
>0.3 <= 0.6	–	1-10%	0-4%	–
>0.6 <= 1.4	–	15-25%	–	–
>1.4 <= 4	0-5%	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 7. Plant community growth curve (percent production by month). AZ3506, 35.6 13-17" p.z. blue grama. Growth occurs mostly in summer and early fall during the rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	15	25	30	15	0	0	0

Figure 8. Plant community growth curve (percent production by month). AZ3561, 35.6 13-17" p.z. all sites. Growth begins in the spring and continues into the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	5	16	17	15	15	15	11	5	0	0

Figure 9. Plant community growth curve (percent production by month). AZ3565, 35.6 13-17" p.z. needle and thread. Growth occurs mostly in the spring..

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

Figure 10. Plant community growth curve (percent production by month). AZ3568, Indian Ricegrass, 35-6, 13"-17" p.z.. Most Growth in Spring, Some Growth in Fall.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	50	30	0	0	0	5	5	0	0

Figure 11. Plant community growth curve (percent production by month). AZ3571, Bottlebrush Squirreltail, 35-6, 13"-17" p.z.. Begins growth in late winter, stays green most winters..

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

Figure 12. Plant community growth curve (percent production by month). AZ3572, Mormon Tea, 35-6, 13"17" p.z.. 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 13. Plant community growth curve (percent production by month). AZ3601, 35.6 13-17" p.z. western wheatgrass. Growth begins in the spring and continues into fall during the rainy season..

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

Figure 14. Plant community growth curve (percent production by month). AZ3602, 35.6 13-17" p.z. muttongrass. Most growth occurs in early to mid spring, plants may be green in the fall. Seed set occurs by summer..

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

Community 1.2
Sagebrush Shrubland

This site is cahracterized by a dominance of sagebrush along with other scattered shrubs, shrubs as mormom tea, snakeweed and rabbitbrush. Grasses are scattered with blue grama and squirreltail dominate.

Pathway 1.1a
Community 1.1 to 1.2

No fire, drought, improper grazing leads to a increase of woody species and a decline in perennial grasses

Pathway 1.2a
Community 1.2 to 1.1

Prescribed grazing, severe drought reduces shrub/tree canopy or natural patchy fire

State 2
Natives / Introduced Annuals State

Community 2.1
Mixed Shrub - Grassland w/ Introduced Annuals

Introduced exotic annual grasses and forbs are present in minor amounts in the plant community, but the amount and proportions of native plants is similar to that found in plant community 1.2, Sagebrush Shrubland.

Community 2.2
Sagebrush - Trees w/ Introduced Annuals

Sagebrush dominates the understory with a overstory of juniper and pinyons. The lack of natural fire along with periods of favorable precipitation promote tree regeneration/increase.

Pathway 2.1a
Community 2.1 to 2.2

No fire, drought, improper grazing, shrub and tree increase and perennial grass decline

Pathway 2.2a
Community 2.2 to 2.1

Prescribed grazing, Trees and Shrubs reduced through prolonged drought or natural patchy fire or brush treatment

State 3
Perennial Grassland - Introduced Annuals State

In this plant community widespread fire has removed the shrub canopy. This site is characterized by a dominance of perennial grasses with a mix of introduced annuals grasses and forbs.

Transition T1A
State 1 to 2

Introduction of non-native annuals species creates an irreversible change in the plant community

Transition T2A
State 2 to 3

Fire, Establishment of annuals and increase of perennial grasses due to reduced competition from shrubs.

Transition R3A
State 3 to 2

Seed source for sagebrush/desirable grasses species, possible seeding of grasses, prescribed grasses, favorable moisture.

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Common Native Perennial Spring Grasses**			50–101	
	muttongrass	POFE	*Poa fendleriana*	50–101	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	50–101	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	20–50	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	10–20	–
2	**Common Native Perennial Summer Grasses**			71–151	
	blue grama	BOGR2	*Bouteloua gracilis*	50–101	–
	sandhill muhly	MUPU2	*Muhlenbergia pungens*	20–50	–
3	**Occasional Native Perennial Grasses**			50–101	
	Grass, perennial	2GP	*Grass, perennial*	0–30	–
	threeawn	ARIST	*Aristida*	10–30	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	10–30	–
	western wheatgrass	PASM	*Pascopyrum smithii*	10–30	–
	James' galleta	PLJA	*Pleuraphis jamesii*	10–30	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	10–30	–
Forb					

4	**Occasional Native Perennial Forbs**			11–50	
	Forb, perennial	2FP	*Forb, perennial*	6–17	–
	milkvetch	ASTRA	*Astragalus*	0–4	–
	bastard toadflax	COUM	*Comandra umbellata*	0–4	–
	cryptantha	CRYPT	*Cryptantha*	0–4	–
	larkspur	DELPH	*Delphinium*	0–4	–
	sulphur-flower buckwheat	ERUM	*Eriogonum umbellatum*	0–4	–
	wallflower	ERYSI	*Erysimum*	0–4	–
	fineleaf hymenopappus	HYFI	*Hymenopappus filifolius*	0–4	–
	evening primrose	OENOT	*Oenothera*	0–4	–
	beardtongue	PENST	*Penstemon*	0–4	–
	phacelia	PHACE	*Phacelia*	0–4	–
	ragwort	SENEC	*Senecio*	0–4	–
	globemallow	SPHAE	*Sphaeralcea*	0–4	–
	spiderwort	TRADE	*Tradescantia*	0–4	–
	vervain	VERBE	*Verbena*	0–4	–
5	**Occasional Native Annual Forbs**			0–50	
	Forb, annual	2FA	*Forb, annual*	0–28	–
	Wright's bird's beak	COWR2	*Cordylanthus wrightii*	0–11	–
	touristplant	DIWI2	*Dimorphocarpa wislizeni*	0–6	–
	shortstem lupine	LUBR2	*Lupinus brevicaulis*	0–6	–
	small wirelettuce	STEX	*Stephanomeria exigua*	0–6	–
Shrub/Vine					
6	**Common Native Shrubs**			353–504	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	202–252	–
	mormon tea	EPVI	*Ephedra viridis*	50–101	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	50–101	–
	Utah serviceberry	AMUT	*Amelanchier utahensis*	20–50	–
	narrowleaf yucca	YUAN2	*Yucca angustissima*	10–30	–
	rubber rabbitbrush	ERNAG	*Ericameria nauseosa ssp. nauseosa var. glabrata*	10–30	–
	beavertail pricklypear	OPBA2	*Opuntia basilaris*	10–30	–
7	**Occasional Native Shrubs**			90–135	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	10–30	–
	Sonoran scrub oak	QUTU2	*Quercus turbinella*	10–30	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	10–30	–
	greenleaf manzanita	ARPA6	*Arctostaphylos patula*	10–30	–
	hedgehog cactus	ECHIN3	*Echinocereus*	10–20	–
	banana yucca	YUBA	*Yucca baccata*	10–20	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–20	–
Tree					
8	**Occasional Native Trees**			6–34	
	Gambel oak	QUGA	*Quercus gambelii*	6–50	

	Gambel oak	QUGA	*Quercus gambelii*	0–30	–
	Utah juniper	JUOS	*Juniperus osteosperma*	0–20	–
	twoneedle pinyon	PIED	*Pinus edulis*	0–20	–
	ponderosa pine	PIPO	*Pinus ponderosa*	0–20	–

Animal community

The site is suitable for livestock grazing throughout the year, although during severe winters snow depth may limit the site's suitability for grazing.

The sandy nature of the soil of the site inhibits livestock travel. Improved livestock water distribution and animal performance can be obtained by spacing livestock waters at intervals no greater than one mile.

Water is generally lacking for wildlife also. Fair to good wildlife cover is provided.

Recreational uses

Recreational activities include deer hunting.

Wood products

No wood products are produced from this site.

Other information

Management Considerations:
Left undisturbed by fire or grazing the site will become increasingly dominated by shrubs at the expense of grasses and forbs. Fire, in the form of either natural or prescribed fire, can be used to reduce the shrub dominance, although this should be considered with caution due to the severe wind erosion potential of the site. An additional concern is the probability that shrub control through either fire or herbicidal treatment will also reduce the amount of desirabel shrub species, suc as antelope bitterbrush.

Type locality

Location 1: Mohave County, AZ	
Township/Range/Section	T41 N. R5 W. S23
General legal description	Arizona, Mohave County, Moccasin 7 1/2 min. quad., Sec. 23, T. 41 N., R. 5 W., Moccasin Mountain, Kaibab-Paiute Indian Reservation.

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)	Dean Schlichting, Dan Carroll and Ken Gishi
Contact for lead author	State Rangeland Management Specialist, NRCS-Arizona State Office
Date	10/28/2010
Approved by	Steve Barker
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None on shallow slopes. A few minor rills may be be present on steeper slopes and likely to form below exposed bedrock. Rills will be short and 4-8' long in length. On this site there can be a increase of rills following instense storm events, but do not persist due to coarse textures, wind action and raindrop splash impact.

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2. **Presence of water flow patterns:** A few water flow patterns may form due to the moderate hazard of water erosion for this site. These would be expected to be short and discontinuous due to the high potential for vegetative ground cover. These soils are well drained and have good permeability

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and terracettes may be seen on rare occasions near water flow patterns. Sites with well developed biological soil crust may resemble pedastals, but are normal surface roughness. These crusts will have a rolling or pinnacled appearance (.5 to 2" height) with a darken soil surface.

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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 is generally 20-40%. Biological soil crusts that is intact and functional shouldn't be counted as bare ground.

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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:** Some depositional areas may occur around long lived grasses, shrubs and trees but are stable due to canopy, biological soil crust and litter cover. An occasional blowout may occur around large junipers, especially during and after severe droughts.

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous and fine woody litter (<1/4' diameter) will be transported by wind in open areas a considerable distance (3-6'). The distance of movement in the water flow pathways will be a less (2-3')because of the high permeability and excessively drained soil. Coarse woody litter (>1/4" dia.) will remain under shrub and tree canopies.

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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): Soil surface textures are fine sand to loamy sand. Soil stability values are 1-2 with no canopy cover and 2-3 under canopy. There is little water erosion and light to moderate wind erosion with the reference plant community in place.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is typically single grain; loose (weak structure) and 3-8" deep. Surface horizons will typically have better developed horizons under plant canopies then the adjacent interspaces. Colors generally range from brown (7.5YR 5/4) to pale brown (10YR 6/3).

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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's plant community composition is dominated by shrubs (50-60%), grasses (25-35%), forbs (10-15%) and trees (0-2%). The average distance to the nearest perennial plant (fetch) is 3-4" and the range is from 1" to 10". Shrub canopies, scattered grasses and the present of a biological soil crust will limit splash impact and reduce runoff. This type of plant community will capture and hold all available moisture the climate can provide.

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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: Evergreen shrubs > cool season grasses

    Sub-dominant: Warm season grasses > decidious shrubs > perennial forbs

    Other: Trees > annual forbs = cacti

    Additional:

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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. During normal precipitation years, mortality will be very low in grasses and shrubs. Severe winter droughts affect trees and shrubs the most. Severe summer drought affects grasses the most.

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14. **Average percent litter cover (%) and depth (in):** Of the total litter amount (depth range .1 - 2"), it would be expected that approximately 60-80% would be herbaceous fine litter (<1/4" diameter) and approximately 20-40% would be woody litter (>1/4" - 2" diameter). Litter amounts increase during the first few years of drought and decrease in later years.

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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 750 to 850 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:** Broom snakeeed, prickly pear, locoweed, Wright's bird's beak and six weeks fescue are native species that have the potential to increase and dominate the site after disturbance. Cheatgrass and Russian thistle are exotic annuals that is becoming endemic to the site regardless of management or fire frequency.

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