USDA Natural Resources Conservation Service

Ecological site R035XB237AZ
Clay Loam Terrace 6-10" p.z. Sodic

Accessed: 05/14/2025

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.

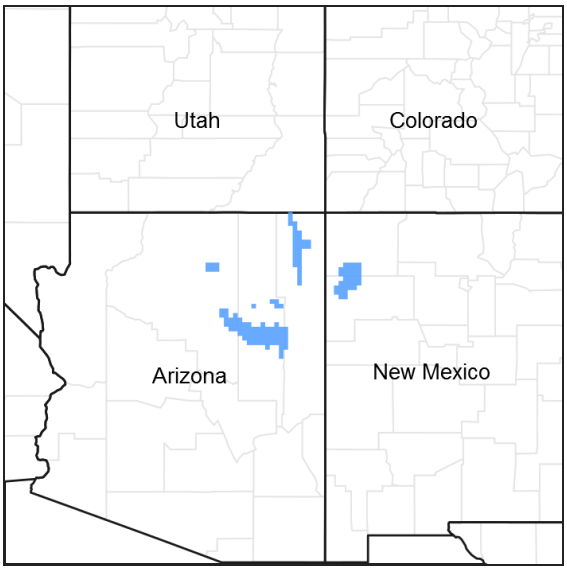


Figure 1. Mapped extent

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 35.2 - 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) *Atriplex obovata*
Herbaceous	(1) *Sporobolus airoides* (2) *Pleuraphis jamesii*

Physiographic features

This site occurs on fan remnants, low stream terraces, and swales of valley floors below mesas and cuestas.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Stream terrace (3) Valley floor
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	Rare to occasional
Elevation	1,158–1,768 m
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

The 35.2 Colorado Plateau Cold Desert Shrub - Grassland common resource area has a very dry and windy climate that is hot in the summer and cold in the winter. The annual precipitation averages between 6 and 10 inches. The 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 (average range of 1 to 17 inches) falls from December through February, but rarely lasts more than a few days. A seasonal drought occurs from late May through early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. The moisture originates from the Gulf of Mexico in the early summer and the Gulf of California in the late summer/early fall. Windy conditions are common year round, but the winds are strongest and most frequent during 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 and occasional run-on moisture following storm events. The sodic clay surface texture has very slow infiltration and permeability and does not allow the site to capture much of the moisture available.

Soil features

Soils on this site are very deep. The surface textures are clay loam to clay with sandy clay loam to clay subsurface textures.

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

SSA 633 Navajo County Central part - MU's 8 & 9 Burnswick;

SSA 707 Little Colorado River Valley Area - MU's 35 Navajo, 62 Fajada;

SSA 712 Canyon de Chelly National Monument MU 11 Navajo;

SSA 713 Chinle Area - MU's 19 Gotho, 22 & 35 Nazlini, 22, 24 & 60 Jocity, 24 Tezinie, 60 Ives;

SSA 715 Fort Defiance Area AZ/NM MU's 20 & 21 Burnswick, 71, 72 & 73 Notal, 72 Notal family, 95 Whitecone;

SSA 717 Shiprock NM - MU's 107 & 200 Tocito, 122, 177, 160, 170 Notal and 524 Uzaneva.

Table 4. Representative soil features

Parent material	(1) Alluvium–mudstone
Surface texture	(1) Clay loam (2) Sandy clay loam (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to slow
Soil depth	152–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	22.86–36.83 cm
Calcium carbonate equivalent (0-101.6cm)	1–5%
Electrical conductivity (0-101.6cm)	2–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	13–30
Soil reaction (1:1 water) (0-101.6cm)	7.9–9
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

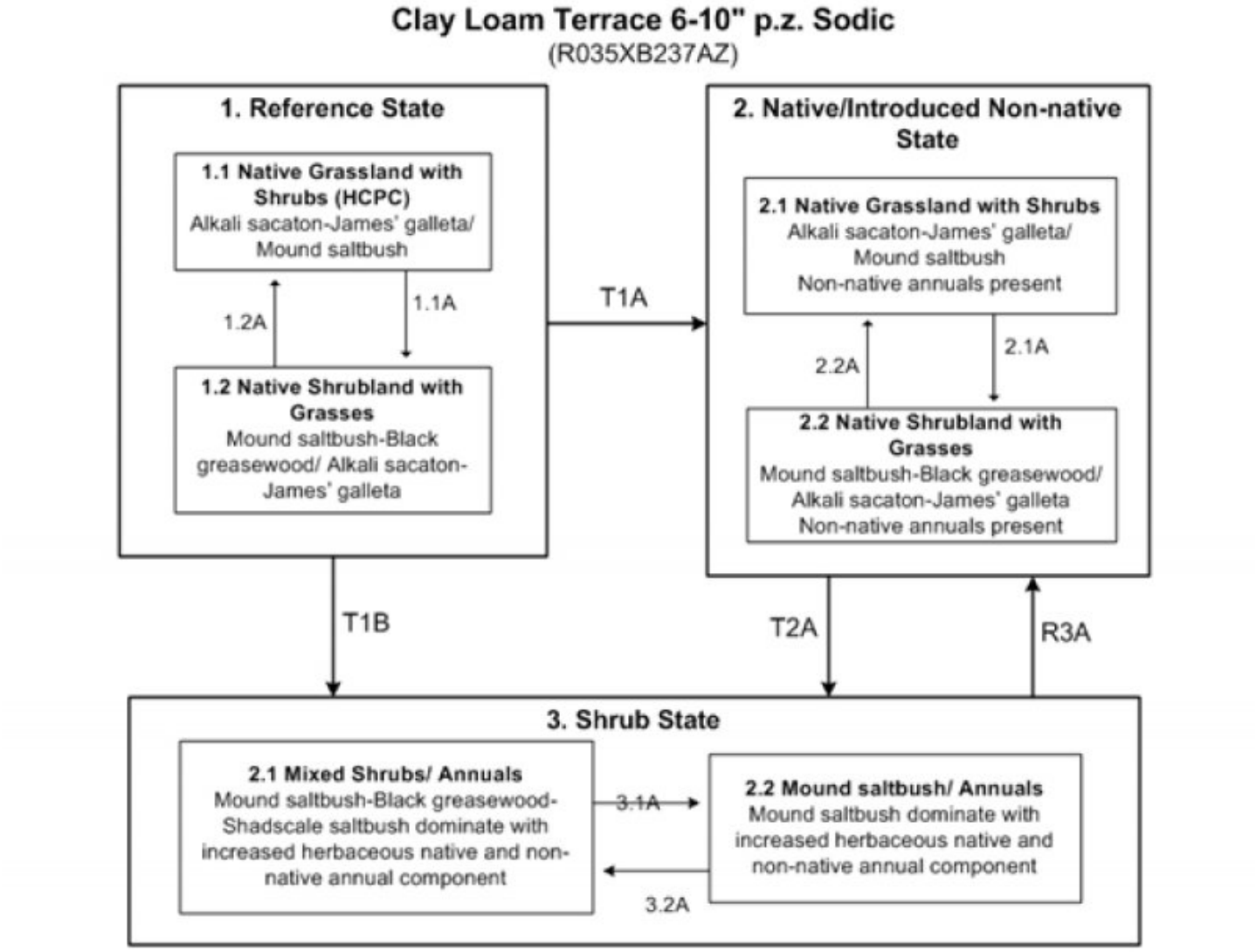


Figure 4. STM - R035XB237AZ

State 1
Reference Plant Community

The reference state represents the plant communities and ecological dynamics of the Clay Loam Terrace, Sodic site. The soil has a moderate amount of exchangeable sodium that heavily influences the kinds and amounts of

plant species that will grow on the site. The reference state is generally dominated by alkali sacaton, James' galleta and mound saltbush. In the original plant community there is a predominance of warm season grasses with a mixture of large shrubs and half shrubs. The reference state is self sustaining and resistant to change due to high resistance to natural disturbances and high resilience following natural disturbances. When natural disturbances occur, the rate of recovery is variable due to disturbance intensity. Plant species most likely to invade or increase on this site when it deteriorates are mound saltbush, black greasewood, and annuals. Once invasive plants establish, return to the reference state may not be possible.

Community 1.1
Native Grassland with Shrubs (HCPC)

Figure 5. Clay Loam Terrace, 6-10" p.z. Sodic

This plant community represents the historic climax plant community that is dominated by perennial warm season grasses with a mix of shrubs and a small component of forbs. Dominate grasses, such as alkali sacaton, James' gallata and squirreltail, make up about 55 percent of the total production. Common shrubs like mound saltbush and black greasewood generally make up less than 30 percent of the annual production.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	269	336	404
Shrub/Vine	157	196	235
Forb	11	22	34
Total	**437**	**554**	**673**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	10-20%
Grass/grasslike foliar cover	10-20%
Forb foliar cover	1-2%
Non-vascular plants	0-1%
Biological crusts	0-1%
Litter	15-30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%

Bare ground	35-55%

Table 7. Canopy structure (% cover)

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

Figure 7. 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 8. 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 9. Plant community growth curve (percent production by month). AZ5203, 35.2 6-10" p.z. alkali sacaton. Growth begins in the spring, most growth occurs in the summer, goes dormant in the fall..

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

Figure 10. Plant community growth curve (percent production by month). AZ5210, 35.2 6-10" p.z. mound saltbush. Growth begins in spring and continues through the summer. Seed stalk extension occurs in late summer with seed set in the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	20	25	15	15	10	5	5	0	0

Community 1.2
Native Shrubland with Grasses

This plant community is primarily comprised of shrubs, a mixture of mid and short grasses along with a small percentage of forbs. Shrubs, like mound saltbush, black greasewood, Torrey seepweed, shadscale saltbush produce about 60 percent of the total annual production.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	252	308	364
Grass/Grasslike	146	185	224
Forb	11	22	34
Total	**409**	**515**	**622**

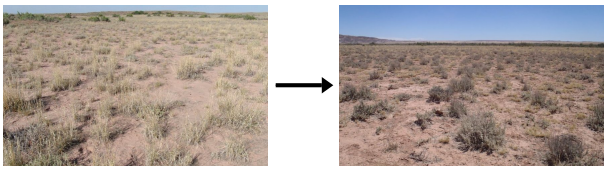
Table 9. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	10-25%
Grass/grasslike foliar cover	1-15%
Forb foliar cover	0-2%
Non-vascular plants	0%
Biological crusts	0%
Litter	15-30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	35-65%

Table 10. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	0-3%	0-1%
>0.15 <= 0.3	–	0-10%	5-10%	0-1%
>0.3 <= 0.6	–	10-20%	0-2%	–
>0.6 <= 1.4	–	0-1%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Pathway 1.1A
Community 1.1 to 1.2

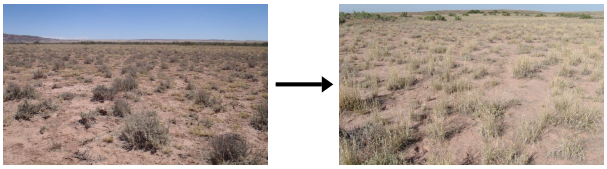


Native Grassland with Shrubs (HCPC)

Native Shrubland with Grasses

No Prescribed Grazing, Extensive Insect and/or Wildlife Herbivory, or Drought

Pathway 1.2A
Community 1.2 to 1.1



Native Shrubland with Grasses

Native Grassland with Shrubs (HCPC)

Prescribed grazing or Rest, Favorable/Normal precipitation.

State 2
Native/ Introduced Non-Native State

This state has plant communities that reflect a well-managed area after the introduction of livestock and non-native annual species. While not the HCPC, this state reflects the best current potential. Annuals, native and non-native, can make up to 20 percent of the total plant composition. Annuals are well established, but do not dominate the understory canopy.

Community 2.1
Native Grassland with Shrubs

This plant community represents the best current potential plant community that is dominated by perennial warm season grasses with a mix of shrubs and a small component of forbs. Dominate grasses, such as alkali sacaton, James' gallata and squirreltail, make up about 55 percent of the total production. Common shrubs like mound saltbush and black greasewood generally make up less than 30 percent of the annual production. Non-native annual forbs and grasses are present in small amounts.

Community 2.2

Native Shrubland with Grasses

This plant community is primarily comprised of shrubs, a mixture of mid and short grasses along with a small percentage of forbs. Shrubs, like mound saltbush, black greasewood, Torrey seepweed, shadscale saltbush produce about 60 percent of the total annual production. Non-native annual forbs and grasses are present in small amounts.

Pathway 2.1A
Community 2.1 to 2.2

No Prescribed Grazing, Extensive Insect and/or Wildlife Herbivory, or Drought

Pathway 2.2A
Community 2.2 to 2.1

Prescribed grazing or Rest, Favorable/Normal precipitation.

State 3
Shrub Dominated

This state is characterized by a dominance of shrub canopy with a small amount of herbaceous cover. Bare ground is typically over 75 percent, but ranges from 65 to 90 percent with basal cover averaging 1 to 5 percent for all vegetation. Perennial grasses may not be present or only present in ocassional scattered clumps.

Community 3.1
Mixed Shrubs/ Annuals

Figure 12. Mixed Shrub Dominated Plant Community

This plant community is dominated by a mixed shrub canopy, where some perennial grasses are present but contribute only a small amout of the total annual production. Common dominate shrubs include mound saltbush and black greasewood. Other shrubs include shadscale saltbush, Torrey seepweed, snakeweed and succulents. Non-native annual species are present.

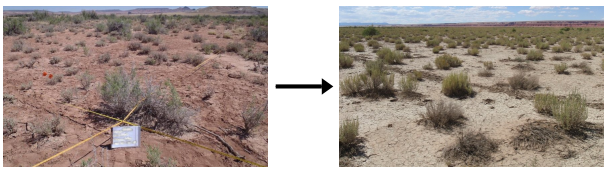
Community 3.2
Mound saltbush/ Annuals

Figure 13. Mound Saltbush Dominated Plant Community

Figure 14. Mound saltbush - Annuals, Heavily Grazed

This plant community is dominated by mound saltbush with a lesser amounts of black greasewood, shadscale, and Torrey seepweed. Annual forbs are present in small amounts and perennial grasses are sparse and widely scattered.

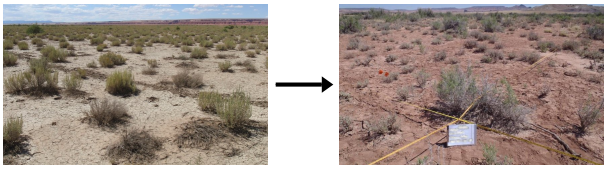
Pathway 3.1
Community 3.1 to 3.2



Mixed Shrubs/ Annuals **Mound saltbush/ Annuals**

Continous heavy grazing, Drought.

Pathway 3.2A
Community 3.2 to 3.1



Mound saltbush/ Annuals **Mixed Shrubs/ Annuals**

Rest or prescribed grazing, Normal preciptition.

Transition T1A
State 1 to 2

Introduction of non-native annuals.

Transition T1B
State 1 to 3

Drought, extended periods with winter dominated moisture patterns, loss of the natural fire frequency, and unmanaged grazing can reduce the perennial grasses on the site and allow woody species to increase.

Transition T2A
State 2 to 3

Continous heavy grazing.

Restoration pathway R3A
State 3 to 2

Brush management with range planting, Deferred/Prescribed grazing, Favorable climate.

Additional community tables

Table 11. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Common Grasses**			280–364	
	alkali sacaton	SPAI	*Sporobolus airoides*	196–252	–
	James' galleta	PLJA	*Pleuraphis jamesii*	56–112	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	6–28	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	6–28	–
2	**Other Grasses**			11–45	
	western wheatgrass	PASM	*Pascopyrum smithii*	0–17	–
	Grass, annual	2GA	*Grass, annual*	0–11	–
	Grass, perennial	2GP	*Grass, perennial*	0–11	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–11	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–11	–
Forb					
3	**Annual Forbs**			6–17	
	Forb, annual	2FA	*Forb, annual*	0–11	–
	sack saltbush	ATSA	*Atriplex saccaria*	0–11	–
	mealy goosefoot	CHIN2	*Chenopodium incanum*	0–6	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–6	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–6	–
	plantain	PLANT	*Plantago*	0–6	–
4	**Perennial Forbs**			6–17	
	sandmat	CHAMA15	*Chamaesyce*	0–11	–
	greenleaf five eyes	CHCO2	*Chamaesaracha coronopus*	0–11	–
	little hogweed	POOL	*Portulaca oleracea*	0–11	–
	globemallow	SPHAE	*Sphaeralcea*	0–11	–
	Forb, perennial	2FP	*Forb, perennial*	0–6	–
Shrub/Vine					
5	**Common Shrubs**			140–196	
	mound saltbush	ATOB	*Atriplex obovata*	112–168	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	11–34	–
	Mojave seablite	SUMO	*Suaeda moquinii*	6–22	–
6	**Other Shrubs**			17–39	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–17	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	0–17	–
	Greene's rabbitbrush	CHGR6	*Chrysothamnus greenei*	0–11	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–11	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–11	–

Table 12. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Common Grasses**			140–196	
	alkali sacaton	SPAI	*Sporobolus airoides*	84–140	–
	James' galleta	PLJA	*Pleuraphis jamesii*	28–56	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	6–22	–
2	**Other Grasses**			6–28	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–22	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–11	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–11	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–11	–
Forb					
3	**Annual Forbs**			6–17	
	Forb, annual	2FA	*Forb, annual*	0–11	–
	sack saltbush	ATSA	*Atriplex saccaria*	0–11	–
	mealy goosefoot	CHIN2	*Chenopodium incanum*	0–6	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–6	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	0–6	–
	plantain	PLANT	*Plantago*	0–6	–
4	**Perennial Forbs**			6–17	
	sandmat	CHAMA15	*Chamaesyce*	0–11	–
	greenleaf five eyes	CHCO2	*Chamaesaracha coronopus*	0–11	–
	little hogweed	POOL	*Portulaca oleracea*	0–11	–
	globemallow	SPHAE	*Sphaeralcea*	0–11	–
	Forb, perennial	2FP	*Forb, perennial*	0–6	–
Shrub/Vine					
5	**Common Shrubs**			252–331	
	mound saltbush	ATOB	*Atriplex obovata*	224–280	–
	greasewood	SAVE4	*Sarcobatus vermiculatus*	6–28	–
	Mojave seablite	SUMO	*Suaeda moquinii*	0–22	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	0–22	–
6	**Other Shrubs**			0–34	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–17	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	0–11	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–11	–

Animal community

This site is suitable for grazing during any period of the year by cows and calves, stocker cattle, sheep and horses. Prescribed grazing systems can benefit this site by allowing rest periods for the cool season species.

The potential plant community provides a variety of food and cover plants for small wildlife. When the vegetation complex retrogresses then unpalatable shrub species increase and the site becomes less usable as a foraging area for some species. Grazing practices that encourage cool season grass species are beneficial to antelope,

cottontails and rodents. Shrubs that provide both food and cover should be maintained.

Recreational uses

Site is typically fans and low stream terraces which lend themselves to activities such as horseback riding, wildlife observation and hunting.

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	T37N R25E S26
General legal description	Little Round Rock Quad; Section 26, T37N, R25E; ten and one half miles south south west of Rock Point Trading Post on west side of Chinle Wash; Navajo Indian Reservation, AZ.
Location 2: Navajo County, AZ	
Township/Range/Section	T20N R20E S7
General legal description	North of Marcou Mesa area, about 2 miles NE of Flying Butte, along the northside of Cottonwood Wash
Location 3: Apache County, AZ	
Latitude	109° 43′ 2″
Longitude	36° 15′ 50″
General legal description	About 7 miles east of Chinle Wash, South of Carson Mesa, near Coyote Springs, on the northside of the Black Mountain Wash.

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

Ken Gishi
Kenneth L. Gishi
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)	Ken Gishi, Kevin Williams
Contact for lead author	State Rangeland Management Specialist, NRCS-Arizona State Office, Phoenix,AZ
Date	06/07/2007
Approved by	
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills may occur occasionally due to clay loam and clay textures, slow permeability, moderate to high shrink/swell (cracking) characteristic of may soils, and rare flooding. The number and length of rills will be limited by the generally low slopes on the site. Rills should be uncommon due to moderate plant cover potential of the site.

2. **Presence of water flow patterns:** Water flow patterns may be due to the slow permeability of the soil, high shrink/swell characteristic of the soils and rare flooding. Patterns should be short (less than 8') and discontinuous due to moderate plant cover potential of the site.

3. **Number and height of erosional pedestals or terracettes:** none

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges 35-55% and has the potential to produce a heavy amount of plant cover and litter due to an average available water capacity of 10.7 inches. Drought may cause increase in 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):** Herbaceous and woody litter will be transported throughout the site by water during rare flood events. Herbceous litter will also be redistributed by wind.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soils have moderate shrink/swell properties and cracking may be common on the surface. If cracks do occur on the surface, this process will reduce aggregate stability. When well vegetated and not subjected to severe flood events, these soils have a low to moderate resistance to water erosion and a moderate resistance to wind erosion. Average Site Soil Stability are 1.5 (range 1-4), averages with canopy are 3 to 4, averages with no canopy are 1 to 2.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is mostly moderate thick platy structure parting to strong very fine granular. The A-horizon thickness is 2-6 inches. The A-horizon color did not differ significantly from the subsurface soil horizons.

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 grasses with scattered shrubs. There may be small patches or a light overstory of large shrubs. Vegetative canopy cover ranges from

15-35% (grasses > shrubs > forbs). Basal cover ranges 5-12% (predominantly grasses) for vascular plants and 0-1% for biological crust (moss > lichen > cyanobacteria). Both canopy and basal cover values decrease during a prolonged drought. This type of plant community is moderately effective at capturing and storing precipitation.

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Naturally there would not be a compaction layer, but these soils are easily compacted when wet and disturbed. Most of the soils may be easily compacted when wet due to clay loam and clay textures, lack of rock fragments, and occasional moisture from flooding. Most soils have a naturally granular surface structure.

---

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: perennial bunch grasses > perennial sod-forming grasses > shrubs >>

    Other: annual grasses = annual forbs > perennial forbs

    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.

---

14. **Average percent litter cover (%) and depth (in):** Litter amounts increase during the first few years of drought, then decrease in later years.

---

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 to 500 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:** Broom snakeweed, mound saltbush, and greasewood are native to the site but may have the potential to increase and dominate after heavy grazing. Saltcedar, Russian knapweed, and camelthorn are non-natives that have the potential to invade the site with or without disturbance. Cheatgrass is an non-native annual grass that has the potential to invade and dominate with or without disturbance. Annual wheatgrass and Russian thistle are introduced annuals that have the potential to invade after heavy continous grazing or disturbance, especially if the site is near farm fields or disturbed lands.

---

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.
