USDA Natural Resources
Conservation Service

Ecological site R035XY223UT
Semidesert Shallow Clay (Mat Saltbush)

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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.

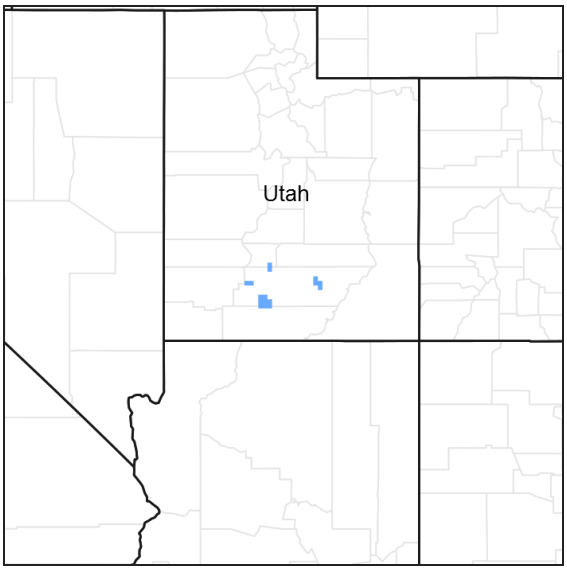

Figure 1. Mapped extent

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.

Classification relationships

Modal Soil: Ustic Torriorthents — clayey, montmorillonitic (calc), mesic, shallow Ustic Torriorthents

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex corrugata*
Herbaceous	(1) *Hilaria jamesii*

Physiographic features

This site occurs on rolling shale hills, benches, escarpments, and dissected pediment slopes. It is derived from the tropic shale formation.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope (3) Ridge

Flooding frequency	None
Ponding frequency	None
Elevation	1,829–2,591 m
Slope	20–50%

Climatic features

Average annual precipitation is 8 to 12 inches with approximately 60 to 70 percent coming in the plant growth period. The wettest months are July through October and the dryest months are November through February. The plant growth period is from March 15 to October 15.

Table 3. Representative climatic features

Frost-free period (average)	137 days
Freeze-free period (average)	162 days
Precipitation total (average)	330 mm

Influencing water features

Soil features

This soil is shallow over shale bed rock 2 to 10 inches deep and well drained. Soil textures are silty clay loam to silty clay. Permeability is slow to very slow and runoff is medium to rapid. Water supplying capacity is 1 to 3.5 inches. Average annual soil loss is approximately 3 tons/acre/year. The soil moisture regime is aridic and aridic-torric. The soil temperature regime is mesic.

Table 4. Representative soil features

Surface texture	(1) Very stony clay (2) Loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	18–51 cm
Surface fragment cover <=3"	4–14%
Surface fragment cover >3"	0–20%
Available water capacity (0-101.6cm)	3.05–7.87 cm
Calcium carbonate equivalent (0-101.6cm)	5–30%
Electrical conductivity (0-101.6cm)	4–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	0–4%

Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

As ecological condition deteriorates due to overgrazing, galleta, Indian ricegrass, and bottlebrush squirreltail decrease while annuals and bare ground will increase. Fire is not an important factor on this site. Halogeton and Russian thistle are most likely to invade this site. Of note, this site has sparse vegetation dominated by mat saltbush and galleta. This site occurs on tropic shale and is in the early seral stages of soil formation.

State and transition model

Ecosystem states

1. Reference State

State 1 submodel, plant communities

1.1. Reference State

State 1
Reference State

Community 1.1
Reference State

The dominant aspect of the plant community is mat saltbush. The composition by air-dry weight is approximately 15 percent perennial grasses, 10 percent forbs and 75 percent shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	63	231	315
Grass/Grasslike	12	46	63
Forb	9	31	43
Total	**84**	**308**	**421**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
0	**Dominant Shrubs**			185–235	
	mat saltbush	ATCO4	*Atriplex corrugata*	168–202	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	10–17	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	7–17	–
3	**Sub-Dominant Shrubs**			37–74	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	17–34	–
	black sagebrush	ARNO4	*Artemisia nova*	3–7	–
	valley saltbush	ATCU	*Atriplex cuneata*	3–7	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	3–7	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	3–7	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	3–7	–
	shortspine horsebrush	TESP2	*Tetradymia spinosa*	3–7	–
Grass/Grasslike					
0	**Dominant Grasses**			30–61	
	squirreltail	ELEL5	*Elymus elymoides*	10–17	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	3–10	–
1	**Sub-Dominant grasses**			0–20	
	Grass, annual	2GA	*Grass, annual*	0–10	–
	Grass, perennial	2GP	*Grass, perennial*	0–10	–
Forb					
0	**Dominant Forbs**			7–17	
	desert trumpet	ERIN4	*Eriogonum inflatum*	7–17	–
2	**Sub-Dominant Forbs**			74–188	
	Forb, annual	2FA	*Forb, annual*	17–34	–
	Forb, perennial	2FP	*Forb, perennial*	17–34	–
	woolly locoweed	ASMO7	*Astragalus mollissimus*	3–10	–
	sego lily	CANU3	*Calochortus nuttallii*	3–10	–
	cushion buckwheat	EROV	*Eriogonum ovalifolium*	3–10	–
	shaggy fleabane	ERPU2	*Erigeron pumilus*	3–10	–
	common sunflower	HEAN3	*Helianthus annuus*	3–10	–
	prairie sunflower	HEPE	*Helianthus petiolaris*	3–10	–
	manybranched ipomopsis	IPPO2	*Ipomopsis polycladon*	3–10	–
	Utah desertparsley	LOPA	*Lomatium parryi*	3–10	–
	pale evening primrose	OEPA	*Oenothera pallida*	3–10	–
	woolly plantain	PLPA2	*Plantago patagonica*	3–10	–
	gooseberryleaf globemallow	SPGR2	*Sphaeralcea grossulariifolia*	3–10	–
	Pacific aster	SYCHC	*Symphyotrichum chilense var. chilense*	3–10	–

Animal community

This site has good potential for recreation in hiking and sightseeing. There is good aesthetic value with the natural landscape.
This site provides proper grazing for cattle and sheep during fall, winter, and spring.
This site provides food and limited cover for wildlife. Wildlife using this site include jackrabbits, mice, kangaroo rats, coyotes, bobcats, hawks, and snakes.

Recreational uses

This site has good potential for recreation in hiking and sightseeing. There is good aesthetic value with the natural landscape.

Wood products

None

Contributors

Tom Jarman

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)	Shane A. Green (NRCS), Robert D. Stager (BLM), Dana Truman (NRCS), Paul Curtis (BLM) and Randy Beckstrand (BLM)
Contact for lead author	shane.green@ut.usda.gov
Date	09/11/2008
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Very common. Rills present typically run for most of the slope length. They should be 2-3 inches deep.

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2. **Presence of water flow patterns:** Very common throughout the site. They are expected to be long and connected into drainage networks. Evidence of flow will increase with slope. Flow patterns are sometimes difficult to see due to the rough/cracked surface texture.

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3. **Number and height of erosional pedestals or terracettes:** Plants may show some pedestalling (up to .5 inch), a few exposed roots may be apparrent. Terracettes should be rare and stable, occurring in water flow patterns behind rare debris dams.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 40 – 60%. Ground cover is based on the first raindrop impact, and bare ground is the inverse of ground cover. Ground cover + bare ground = 100%. Poorly developed biological soil crusts that are interpreted as functioning as bare ground (therefore they would be susceptible to raindrop splash erosion) should be recorded as bare ground.

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5. **Number of gullies and erosion associated with gullies:** Present. May be found where adjacent sites or watersheds provide concentrated flows into the site. Gullies may show signs of active erosion. Gullies may show more indication of erosion as slope steepens, or as the site occurs adjacent to sites where runoff accumulation occurs.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of wind generated soil movement. Wind caused blowouts and deposition are not expected to be present.

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7. **Amount of litter movement (describe size and distance expected to travel):** Some down slope redistribution of fine litter caused by water. Herbaceous litter typically becomes lodged in cracks in the soil surface. Some fine litter removal by wind, and some fine litter removal may occur in flow patterns and rills with deposition occurring at points of obstruction, especially following large storm events. Litter movement will increase with slope.

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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):** This site should have a soil stability rating of 3 under plant canopies and a rating of 2 to 3 in the interspaces using the soil stability kit test. The average should be a 3. Surface texture is silty clay loam. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface is typically up to 7 inches deep. Structure is typically weak very fine platy. Color is typically light olive gray (5Y6/2). The A horizon does not differ between plant canopies and interspaces. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Natural erosion would be expected in most storms and spring runoff, with little influence from the scant vegetation cover.

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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. The higher clay content and platy structure on this site should not be confused with compaction layers.

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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: Non-sprouting shrubs (Mat Saltbush, Bud sagebrush, Shadscale)

    Sub-dominant: Warm season perennial grasses (Galleta) > Cool season grasses (Indian ricegrass, Squirreltail) >

perennial and annual native forbs (Indian pipeweed) > Biological soil crusts

Other: Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state (e.g. Siberian Wheatgrass, Forage kochia etc.) Biological soil crust is variable in its expression where present on this site and is measured as a component of ground cover. Forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

Additional: Factors that contribute to temporal variability include erosion events, insects, and drought. Factors that contribute to spatial variability include slope, aspect, etc.
Following a recent disturbance such as drought or insects that removes the woody vegetation, native annuals (herbaceous species) may dominate the community. These conditions reflect a community phase within the reference state.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with average to above average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. During severe (multi-year) drought, up to 20% of the plants may die. There may be partial mortality of individual bunchgrasses and other shrubs during less severe drought.

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14. **Average percent litter cover (%) and depth (in):** Litter cover (including under plants) nearly all of which should be fine litter. Depth should be 1 leaf thickness in the interspaces and under canopies.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 250-300 #/acre on an average 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:** Russian thistle, halogeton

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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually in most years, except in drought years.
