USDA Natural Resources
Conservation Service

Ecological site R034BY006UT
Alkali Flat (Greasewood)

Last updated: 3/05/2022
Accessed: 05/19/2024

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.

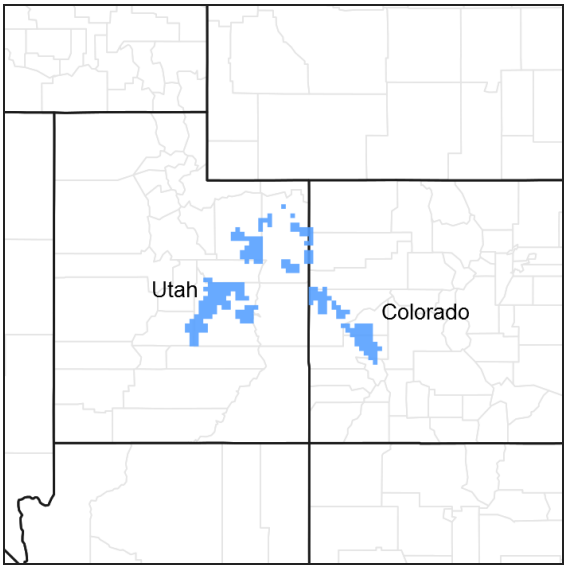

Figure 1. Mapped extent

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): 034B–Warm Central Desertic Basins and Plateaus

MLRA 34B occurs in is in Utah (70 percent) and Colorado (30 percent). It makes up about 12,850 square miles (33,290 square kilometers). A small part of the area is in the High Plateaus of Utah Section of the Colorado Plateaus Province of the Intermontane Plateaus. The northern part of the MLRA occurs in the Uinta Basin Section, which is bounded by the Uinta Mountains to the north, the Wasatch Range to the west, the Roan Plateau to the south, and the Rabbit Hills to the east. The southern part of the MLRA occurs in the northern third of the Canyon Lands Section. This section is bounded by the Roan Plateau to the north, the Wasatch Plateau to the west, the southern end of the San Rafael Swell to the south, and the western slope of the Rocky Mountains to the east. Elevation ranges from 4,100 feet (1,250 meters) near Green River, Utah, to 7,500 feet (2,285 meters) at the base of the Wasatch Range and the Roan Plateau.

Most of this area is covered by residual basin-floor materials and materials washed in from the surrounding mountains and plateaus. Shale and sandstone are the dominant rock types. The Tertiary-age Green River, Uinta, and Duchesne Formations dominate the northern part of the MLRA. The southern part is dominated by Cretaceous-age materials with lesser amounts of Jurassic and Triassic materials. The dominant Cretaceous formations are Mancos Shale, Dakota Sandstone, and the members of the Mesa Verde Group. The dominant Jurassic formations are the Morrison, Entrada, and Navajo. The dominant Triassic formations are the Chinle and Moenkopi. Quaternary alluvial, eolian, and glacial deposits occur in both parts of the MLRA.

The average annual precipitation in most of this area ranges from 6 to 10 inches (150 to 255 millimeters). A small part of this area receives as much as 24 inches of annual precipitation.
Much of the precipitation occurs as high-intensity, convective thunderstorms during the period July through September. May and June are usually the drier months. Precipitation is more evenly distributed throughout the year in the northern part of the MLRA than in the southern part, where there is a significant peak in late summer. The northern part of the MLRA receives more precipitation as snow during winter than the southern part. The average annual temperature ranges from 41 to 54 degrees F (5 to 12 degrees C). The freeze-free period averages 170 days and ranges from 110 to 235 days.

The dominant soil orders in this MLRA are Aridisols and Entisols. Mollisols occur at the higher elevations, particularly in the northern part of the MLRA. The dominant soil temperature regime is mesic, and the dominant soil moisture regime is aridic. The soils receiving less than 8 inches (205 millimeters) of precipitation annually have an aridic soil moisture regime. The soils receiving 8 to 12 inches (205 to 305 millimeters) have an aridic soil moisture regime that borders on ustic. The soils receiving 12 to 16 inches (305 to 405 millimeters) generally have an ustic soil moisture regime that borders on aridic. The dominant soil mineralogy is mixed and soils are formed in slope alluvium or residuum derived from shale or sandstone. Many of the soils are shallow or moderately deep to shale or sandstone bedrock. The soils at the lower elevations generally have significant amounts of calcium carbonate, salts, and gypsum.

Ecological site concept

This site occurs on alluvial flats and floodplains. Slopes are mostly 0 to 8 percent. Elevations range from 4,700 feet to 6,500 feet on all aspects. The characteristic soils in this site are very deep and moderately well drained. They formed in alluvium derived mainly from sedimenary parent materials. Permeability is moderately slow to moderately rapid. Runoff is low to medium. The water supplying capacity is 2 to 7 inches. Average annual soil loss in potential is less than 1 ton/acre. Soil temperature regime is mesic, and annual precipitation ranges from 5-12".

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus*
Herbaceous	(1) *Elymus elymoides*

Physiographic features

This site occurs on alluvial flats and floodplains. Slopes are mostly 0 to 8 percent. Elevations range from 4,700 feet to 6,500 feet on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Drainageway (3) Flood plain (4) Stream terrace
Runoff class	Low to medium
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to very rare
Elevation	1,219–1,981 m
Slope	0–8%
Ponding depth	Not specified
Water table depth	Not specified
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Average annual precipitation is 5 to 12 inches. Approximately 55 percent occurs as rain from March through May. On the average, June through September are the driest months and March through May are the wettest months. The mean annual air temperature is 7 Celsius and the soil temperatures are in the mesic regime. The average freeze-free period is 115 to 125 days. This site receives run-in moisture from surrounding areas which supplies much of the plant's water needs. In average years, plants begin growth around March 10 and end growth around October 15.

Table 3. Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	127-305 mm
Frost-free period (average)	
Freeze-free period (average)	125 days
Precipitation total (average)	229 mm

Influencing water features

Due to its landscape position, this site is not influenced by streams or wetlands. It does receive extra water from run-in from adjacent upland positions.

Soil features

The characteristic soils in this site are very deep and moderately well drained. They formed in alluvium derived mainly from sedimentary parent materials. Permeability is moderately slow to moderately rapid. Runoff is low to medium. The water supplying capacity is 2 to 7 inches. Average annual soil loss in potential is less than 1 ton/acre. Soil temperature regime is mesic, and annual precipitation ranges from 5-12".

Table 4. Representative soil features

Parent material	(1) Alluvium–sedimentary rock
Surface texture	(1) Sandy loam (2) Silt loam (3) Loam
Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Depth to restrictive layer	152 cm
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	5.08–17.78 cm
Calcium carbonate equivalent (Depth not specified)	1–25%
Electrical conductivity (Depth not specified)	0–8 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–20

Soil reaction (1:1 water) (Depth not specified)	7.9–9
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

State 1: Reference State
The reference state represents the plant communities and ecological dynamics of the alkali flat (greasewood) site. This state includes the biotic communities that become established on the ecological site if all successional sequences are completed under the natural disturbance regime. The reference state is generally dominated by greasewood. 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. Once invasive plants establish, return to the reference state may not be possible.

Reference State: Greasewood state with fluctuations form a greasewood shrubland to a grassland and a grassland/shrubland community.

Indicators: A community dominated by greasewood or perennial grasses.

Feedbacks: Continuous season long grazing of perennial grasses, frequent fire, or other disturbance that may allow for the establishment of invasive species.

At-risk Community Phase: This state is at risk when native plants are stressed and nutrients become available for invasive plants to establish.

Trigger: The establishment of invasive plant species.

Community Phase 1.1: Perennial Shrubland
This community is characterized by a greasewood shrub canopy, where some perennial grasses are present but contribute no more than 10 percent of total annual production. Commonly seen grasses include Indian ricegrass and galleta. As grass cover increases, shrub interspaces are filled. Other perennial grasses, shrubs, and forbs may or may not be present and cover is variable. Bare ground is variable (15-25%) depending on the amount of biological crusts (10 to 55).

Community Phase Pathway 1.1a
Fire, insect hervibory, and drought can reduce the greasewood dominance of this site and result in a grass dominated community.

Community Phase Pathway 1.1b
Less severe fire, insect herbivory, and drought can reduce the dominance of greasewood. This transition has occurred when greasewood production is reduced, but greasewood remains a dominant species.

Community Phase 1.2: Perennial Grassland
This community is characterized by a perennial grassland, where some minimal amounts of shrubs are present. Commonly seen grasses include Indian ricegrass and galleta. Other perennial grasses, shrubs, and forbs may or may not be present and cover is variable. Bare ground is variable (10-25%) depending on the amount of biological crusts (10 to 55).

Community Phase Pathway 1.2a
Time without disturbance and continuous season long grazing of perennial grasses results in a reduction of perennial grasses, and an increase in greasewood.

Community Phase 1.3: Perennial Grassland / Shrubland

This community is characterized by a perennial grassland and shrubland. In this phase, greasewood is co-dominant with perennial grasses. Commonly seen grasses include Indian ricegrass and galleta. Other perennial grasses, shrubs, and forbs may or may not be present and cover is variable. Bare ground is variable (10-30%) depending on the amount of biological crusts (10 to 55).

Community Phase Pathway 1.3a
Time without disturbance and continuous season long grazing of perennial grasses results in a reduction of perennial grasses, and an increase in greasewood.

Community Phase Pathway 1.3b
Fire that reduces only some of the greasewood.

T1a – This transition is from the native perennial warm and cool season grass understory in the reference state to a state that contains invasive species. Events include establishment of invasive plant species, intense continuous grazing of perennial grasses, prolonged drought, and surface disturbances, etc. However, invasive species such as cheatgrass have been known to invade intact perennial plant communities with little to no disturbance. Once invasive species are found in the plant community a threshold has been crossed.

State 2: Current Potential State

Community Phase 2.1: Perennial Shrubland
This community is characterized by a greasewood shrub canopy, where some perennial grasses are present but contribute no more than 10 percent of total annual production. Commonly seen grasses include Indian ricegrass and galleta. As grass cover increases, shrub interspaces are filled. Other perennial grasses, shrubs, and forbs may or may not be present. Invasive species are present. Bare ground is variable (15-25%) depending on the amount of biological crusts (10 to 55).

Community Phase Pathway 2.1a
Fire, insect hervibory, and drought can reduce the greasewood dominance of this site and result in a grass dominated community.

Community Phase Pathway 2.1b
Less severe fire, insect herbivory, and drought can reduce the dominance of greasewood. This transition has occurred when greasewood production is reduced, but greasewood remains a dominant species.

Community Phase 2.2: Perennial Grassland
This community phase is characterized by a perennial grassland where some minimal amounts of shrubs are present. Commonly seen grasses include Indian ricegrass and galleta. Other perennial grasses, shrubs, and forbs may or may not be present. Invasive species are present. Bare ground is variable (10-20%) depending on the amount of biological crusts (10 to 55).

Community Phase Pathway 2.2a
Time without disturbance and continuous season long grazing of perennial grasses results in a reduction of perennial grasses, and an increase in greasaewood.

Community Phase 2.3: Perennial Grassland / Shrubland
This community is characterized by a perennial grassland and shrubland. In this phase, greasewood is co-dominant with perennial grasses. Commonly seen grasses include Indian ricegrass and galleta. Other perennial grasses, shrubs, and forbs may or may not be present. Invasive species are present. Bare ground is variable (10-30%) depending on the amount of biological crusts (10 to 55).

Community Phase Pathway 2.3a
Time without disturbance and continuous season long grazing of perennial grasses results in a reduction of perennial grasses, and an increase in greasewood.

Community Phase Pathway 2.3b
Fire that reduces only some of the greasewood.

Transition T2A
This transition is from the current potential state into a state dominated by annual invasive plants. This transition occurs as events favor the increased establishment and dominance of annual invasive plants. Typically this occurs as a series of fires which lead to an increase in cheatgrass and a subsequent decrease in the fire return interval. Once invasive plant species drive the ecological dynamics of the site a threshold has been crossed.

State 3: Annual Grassland State
This community is characterized by the establishment and persistence of invasive annual grasses and forbs. The species of forbs and annual grasses present are a result of the area and seed sources. Due to the low number of sites currently in this state, the ability for this state to convert back to a shrubland is not well understood.

Community Phase 3.1: Cheatgrass Dominated
This community phase is characterized by the establishment and persistence of invasive annual grasses and forbs. The species of forbs and annual grasses present are a result of the area and seed sources.

State and transition model

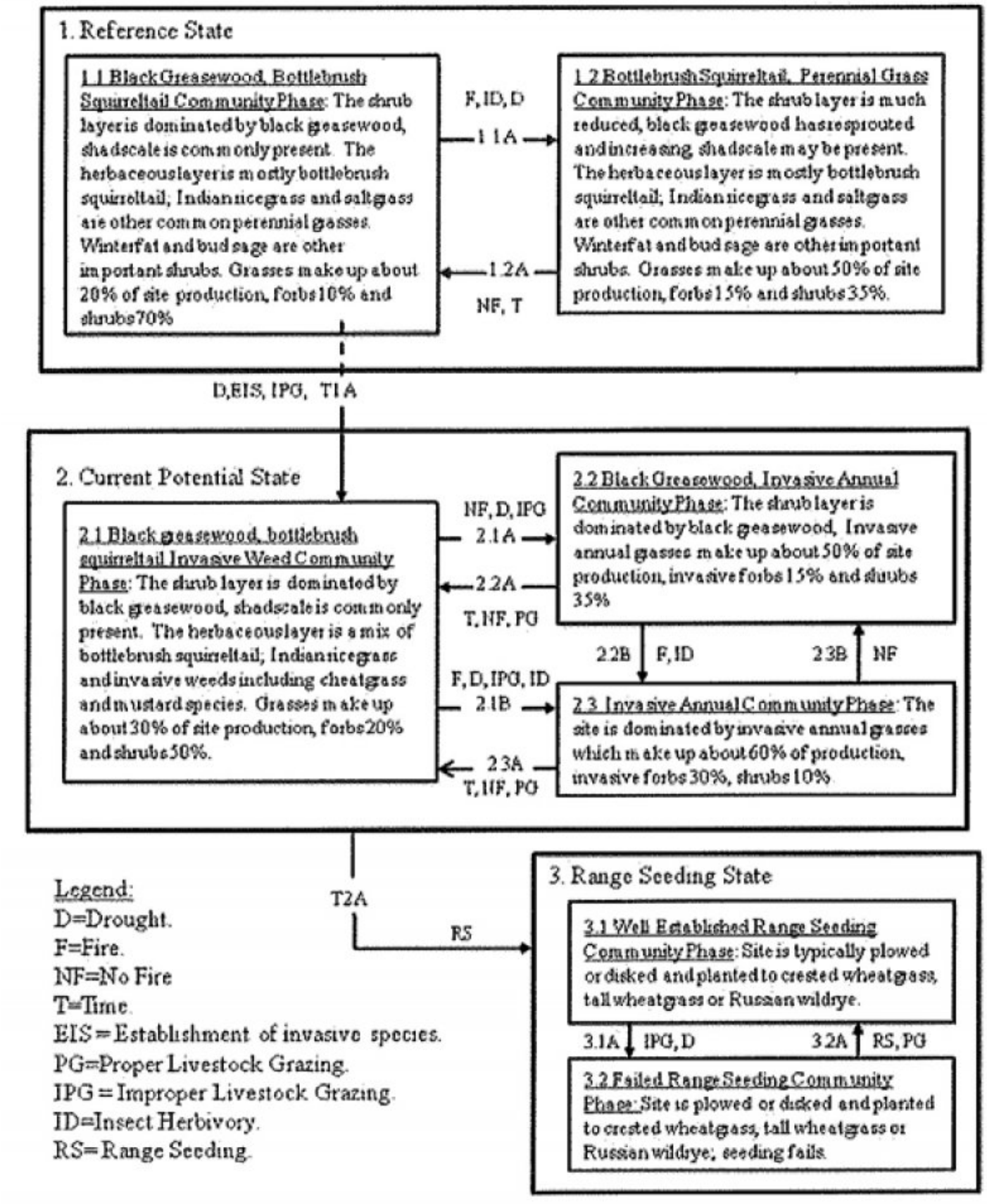

Figure 2. STM

State 1
Reference State

Community 1.1

Reference State

The dominant aspect of this plant community is greasewood. The composition by air-dry weight is approximately 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	280	364	532
Shrub/Vine	224	291	426
Forb	56	73	106
Total	**560**	**728**	**1064**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	39-41%
Grass/grasslike foliar cover	19-21%
Forb foliar cover	9-11%
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 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	9-11%
>0.3 <= 0.6	–	–	19-21%	–
>0.6 <= 1.4	–	39-41%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
0	**Dominant Shrub**			251–392	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	196–275	

	greasewood	SAVE4	*Sarcobatus vermiculatus*	196–275	–
	mat saltbush	ATCO4	*Atriplex corrugata*	39–78	–
3	**Sub-Dominant Shrubs**			78–204	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	24–39	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	8–24	–
	basin saltbush	ATTR3	*Atriplex tridentata*	8–24	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	8–24	–
	spiny hopsage	GRSP	*Grayia spinosa*	8–24	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	8–24	–
	shortspine horsebrush	TESP2	*Tetradymia spinosa*	8–24	–
Grass/Grasslike					
0	**Dominant Grasses**			259–432	
	squirreltail	ELEL5	*Elymus elymoides*	78–118	–
	alkali sacaton	SPAI	*Sporobolus airoides*	78–118	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	39–78	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	24–39	–
1	**Sub-Dominant Grasses**			63–220	
	Grass, annual	2GA	*Grass, annual*	8–39	–
	Grass, perennial	2GP	*Grass, perennial*	8–39	–
	purple threeawn	ARPU9	*Aristida purpurea*	8–24	–
	blue grama	BOGR2	*Bouteloua gracilis*	8–24	–
	saltgrass	DISP	*Distichlis spicata*	8–24	–
	needle and thread	HECO26	*Hesperostipa comata*	8–24	–
	western wheatgrass	PASM	*Pascopyrum smithii*	8–24	–
Forb					
0	**Dominant Forbs**			31–78	
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	16–39	–
2	**Sub-Dominant Forb**			141–267	
	Forb, annual	2FA	*Forb, annual*	24–39	–
	Forb, perennial	2FP	*Forb, perennial*	24–39	–
	woolly locoweed	ASMO7	*Astragalus mollissimus*	8–16	–
	silverscale saltbush	ATAR2	*Atriplex argentea*	8–16	–
	ballhead ipomopsis	IPCOC3	*Ipomopsis congesta ssp. congesta*	8–16	–
	desert pepperweed	LEFR2	*Lepidium fremontii*	8–16	–
	mountain pepperweed	LEMO2	*Lepidium montanum*	8–16	–
	Gray's biscuitroot	LOGR	*Lomatium grayi*	8–16	–
	Torrey's desertdandelion	MATO2	*Malacothrix torreyi*	8–16	–
	whitestem blazingstar	MEAL6	*Mentzelia albicaulis*	8–16	–
	pale evening primrose	OEPA	*Oenothera pallida*	8–16	–

Animal community

This site provides proper grazing for cattle and sheep during winter and spring. This site provides food and cover for wildlife. Wildlife using this site include jackrabbit, coyote, kangaroo rat, snake, and hawk.

Hydrological functions

The soil is in hydrologic group B. The runoff curve numbers are 61 to 79 depending on the overall watershed condition.

Recreational uses

Recreation activities are hiking and hunting.

Other products

None

Contributors

Jim Brown

Approval

Kirt Walstad, 3/05/2022

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)	V. Keith Wadman, NRCS Retired.
Contact for lead author	shane.green@ut.usda.gov
Date	05/22/2012
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are normally not present. Some very minor rill development may occur in sparsely vegetated areas. Any rills present should be less than 1/2 inch deep, widely spaced (15 to 20 feet), and not connected. They should average < 15 feet in length. A slight increase in rill development may also be observed following large storm events or spring runoff periods, but should heal within the next year. Rill development may also increase where the site is adjacent to other sites that produce large amounts of runoff (i.e. steeper sites, slickrock, etc.)

---

2. **Presence of water flow patterns:** None to very few. Any flow patterns present should be sinuous and wind around perennial plant bases. They may be long (15 to 25 feet), < 1 foot wide, and spaced from 10 to 20 feet apart. They should be stable with only minor evidence of deposition. This site is periodically inundated with runoff water from adjacent sites. It also acts as a filter and trap sediment.

---

3. **Number and height of erosional pedestals or terracettes:** Plants may show very minor pedestalling where they are adjacent to water flow patterns, but there should be no exposed roots. A few terracettes may be present. Where they are present, they should be stable and occur behind litter blocking water flow patterns.

---

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 25 to 30% bare ground. Bare ground openings should not be greater that 1 foot in size and normally should not be connected. Poorly developed biological crusting that functions the same as bare ground, should be recorded as bare ground.

---

5. **Number of gullies and erosion associated with gullies:** None at site level. Widely scattered landscape level gully channels, however, are a normal component of desert environments. Where landscape gullies are present, they should be stable, partially vegetated on their sides and bottoms, with little evidence of head-cutting. Some slight increase in disturbance may be evident following significant weather events or when gullies convey considerable runoff from higher elevation rocky or naturally eroding areas.

---

6. **Extent of wind scoured, blowouts and/or depositional areas:** No evidence of wind generated soil movement. Wind scoured (blowouts) and depositional areas are not present. One to two inches of depositional mounding around black greasewood and perennial grass clumps is normal for this site and is not caused by wind erosion.

---

7. **Amount of litter movement (describe size and distance expected to travel):** The majority of litter accumulates in place at the base of plant canopies. Slight movement of the finest material (< 1/8 inch) may move 1 to 2 feet in the direction of prevailing winds or downslope if being transported by water. Little accumulation is observed behind obstructions.

---

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 to 5 under plant canopies and a rating of 3 to 4 in the interspaces. The average should be 4. Surface textures typically vary from loams silty clay loams.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** (Jenrod) Soil surface is typically 0 to 2 inches deep. Surface texture is a sandy loam and structure is moderate medium platy. The A-horizon color is light yellowish brown (10YR 6/4). Soils have an Ochric epipedon that extends 2 inches into the soil profile. The A horizon is normally deeper and better developed under plant canopies. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial vegetation breaks raindrop impact and reduces splash erosion. Good spatial distribution of plants slows runoff by obstructing surface flows, allowing time for increased infiltration. With the physiographic location of this site being in low lying areas, it often acts as a terminal accumulation site for runoff. The amount of sodium in the soil can reduce the infiltration and facilitate puddling on the surface.

---

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 will normally have textural changes within its' profile. These should not be mistaken for compaction layers.

---

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: Sprouting Shrubs (black reasewood, four-wing saltbush) > Perennial Grasses (Alkali sacaton, bottlebrush squirreltail) > Perennial Forbs (scarlet globemallow).

    Sub-dominant: Non-sprouting Shrubs (shadscale, bud sage > Rhizomatous Grasses (James galleta, saltgrass) >> Perennial Forbs (slender seepweed).

    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. Biological soil crust is variable in its' expression where present on this site and is measured as a component of ground cover. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

    Additional: Disturbance regimes include insects, infrequent fire, and flooding. Temporal variability can be caused by fires, droughts, insects, etc. Spatial variability can be caused by runoff, soil pH, and topography. Following a recent disturbance such as fire, drought, or insect damage that remove woody vegetation, forbs and perennial grasses may dominate the community for a time. If a disturbance has not occurred for an extended period of time, woody species may continue to increase on the site, reducing herbaceous species. These conditions may reflect community phases within the reference state.

---

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 no mortality or decadence in either shrubs or grasses. During severe (multi-year) droughts that affect groundwater levels, up to 10% of the greasewood plants may die. Minor mortality of bunchgrass and other shrubs may also occur during these drought periods. There may be partial mortality of individual bunchgrasses and other shrubs during less severe droughts.

---

14. **Average percent litter cover (%) and depth (in):** Litter cover ranges from 20to 25%. Depth should be a 1 to 2 leaf thickness in the interspaces and from 3/4 to 1 1/4 inches under perennial plant canopies.

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production in air-dry herbage should be approximately 650 to 700 pounds per acre on an average year. Production could vary from 500 to 1000 pounds per acre during drought or above-average years.

---

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, mustard species, filarie, other non-native annual forbs and cheatgrass.

---

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