USDA Natural Resources
Conservation Service

Ecological site R034BY209UT
Semidesert Loam (Salina wildrye)

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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.

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

The soils of this site formed mostly in eolian deposits and/or slope alluvium over residuum weathered from limestone, sandstone, and shale. Surface soils are fine sandy loam in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up less than 35 percent of the soil volume. These soils are moderately deep, well-drained, and have moderate to moderately rapid permeability. pH is slightly to moderately alkaline. Available water-holding capacity ranges from 2 to 5 inches of water in the upper 40 inches of soil. The soil moisture regime is mostly ustic aridic and the soil temperature regime is mesic. Precipitation ranges from 8-12 inches annually.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Leymus salinus ssp. salinus*

Physiographic features

This site occurs on benches and cuestas.

Table 2. Representative physiographic features

Landforms	(1) Structural bench (2) Cuesta
Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None
Elevation	1,433–2,073 m
Slope	2–15%
Ponding depth	Not specified
Water table depth	Not specified
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Average annual precipitation is 8 to 12 inches.

Approximately 65% occurs as rain from March through September. On the average, November through February are the driest months and July through October are the wettest months. The mean annual air temperature is 10 degrees celsius and the soil temperatures are in the mesic regime. The average freeze-free period is 100 to 140 days. In average years, plants begin growth around March 30 and end growth around September 30.

Table 3. Representative climatic features

Frost-free period (characteristic range)	
Freeze-free period (characteristic range)	100-140 days
Precipitation total (characteristic range)	203-305 mm

Influencing water features

Due to its landscape position, this site is not influenced by streams or wetlands.

Soil features

The soils of this site formed mostly in eolian deposits and/or slope alluvium over residuum weathered from limestone, sandstone, and shale. Surface soils are fine sandy loam in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up less than 35 percent of the soil volume. These soils are moderately deep, well-drained, and have moderate to moderately rapid permeability. pH is slightly to moderately alkaline. Available water-holding capacity ranges from 2 to 5 inches of water in the upper 40 inches of soil. The soil moisture regime is mostly ustic aridic and the soil temperature regime is mesic. Precipitation ranges from 8-12 inches annually.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–sedimentary rock (2) Slope alluvium–sedimentary rock (3) Residuum–sedimentary rock
Surface texture	(1) Fine sandy loam
Family particle size	(1) Fine-loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	51–102 cm
Soil depth	51–102 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–1%
Available water capacity (Depth not specified)	5.08–12.7 cm
Calcium carbonate equivalent (Depth not specified)	1–30%
Electrical conductivity (Depth not specified)	0–8 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–5
Soil reaction (1:1 water) (Depth not specified)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–13%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

State 1: Reference State
The reference state was determined by documenting rangeland relic areas that have been protected from excessive disturbance, such as grazing and recreation. Historical accounts were also considered.

The reference state represents the natural range of variability in the plant community dynamics of this ecological site. This state includes the biotic community that can establish on the ecological site if all successional sequences were completed under the present environmental conditions, without interferences by man; natural disturbances are inherent in its development. This state is dominated by native perennial warm season and cool season grasses, shadscale, and native annual and perennial forbs. Perennial warm and cool season grass composition depends primarily on slope aspect or soil moisture content. If present, Utah juniper is sparse and most common under relatively moist soil conditions (usually north-facing slopes). Soil moisture is the most important driver of plant community change in this state. When natural disturbances occur, the rate of recovery is relatively rapid due to niches being filled with highly adapted native vegetation.

Community Phase 1.1: Moist phase
This plant community phase is characterized by perennial warm and cool season grasses and native shrubs. The dominant cool season grasses include Salina wildrye and Indian ricegrass and the dominant warm season grass is galleta. Dominant native shrubs include shadscale and Torrey jointfir, with some Utah juniper present at times. Forb composition is variable. Other shrubs, and grasses may be present and cover is variable.

Community Phase Pathway 1.1
This pathway occurs when soil moisture decreases, favoring plants species that can tolerate dryer conditions. Events leading to this pathway may include extended periods of drought and/or increased temperatures.

Community Phase 1.2: Dry phase
This plant community phase is characterized by perennial warm and cool season grasses and native shrubs. The dominant cool season grass is Indian ricegrass, and the dominant warm season grass is galleta. Dominant shrubs are shadscale and Torrey jointfir. Forb composition is variable. Other shrubs, forbs, and grasses may be present and cover is variable.

Community Phase Pathway 1.2
This pathway occurs when events favor plant species with higher cool-season moisture requirements such as Salina wildrye. Events may include extended periods of higher than normal precipitation and may be coupled with cooler temperatures.

Transition 1
This transition occurs when cheatgrass and/or other invasive plant species are dispersed to the site and allowed to germinate, establish and reproduce on site. Events triggering this transition may include improperly managed livestock grazing or recreational activities that disperse non-native seeds to safe microsites that are suitable for establishment of the invaders. Invasive species are also known to establish in undisturbed native plant communities due to their ability to adapt and compete with native vegetation. Eradication of these species once established is considered infeasible.

At-risk Community Phase – All communities are at risk of invasive plant establishment.

Trigger – Dispersal, germination and establishment of invasive species.

State 2: Current Potential State
This state is very similar to the reference state in nutrient cycling and disturbance regime; however it now includes invasive plant species, particularly cheatgrass. This state is dominated by native perennial warm and cool season grasses, shadscale, and native annual and perennial forbs. Invasive plants are present but not dominant. Perennial warm and cool season grass composition depends primarily on slope, aspect and soil moisture. If present, Utah juniper is sparse and most common under relatively moist soil conditions (usually north and east-facing slopes). Soil moisture is the most important driver of plant community change in this state. This state has lower resistance to disturbances and resilience after disturbance than the reference state. Invasive plants are beginning to fill the niches and establish on the site.

Community Phase 2.1: Moist Phase with Invasives
This plant community phase is characterized by perennial warm and cool season grasses and native shrubs. The dominant cool season grasses are Salina wildrye and Indian ricegrass, and the dominant warm season grass is galleta. Dominant native shrubs include shadscale and Torrey jointfir, with some Utah juniper present at times. Forb composition is variable. Cheatgrass or other non-native species are present but not dominant. Other shrubs, and grasses may be present and cover is variable.

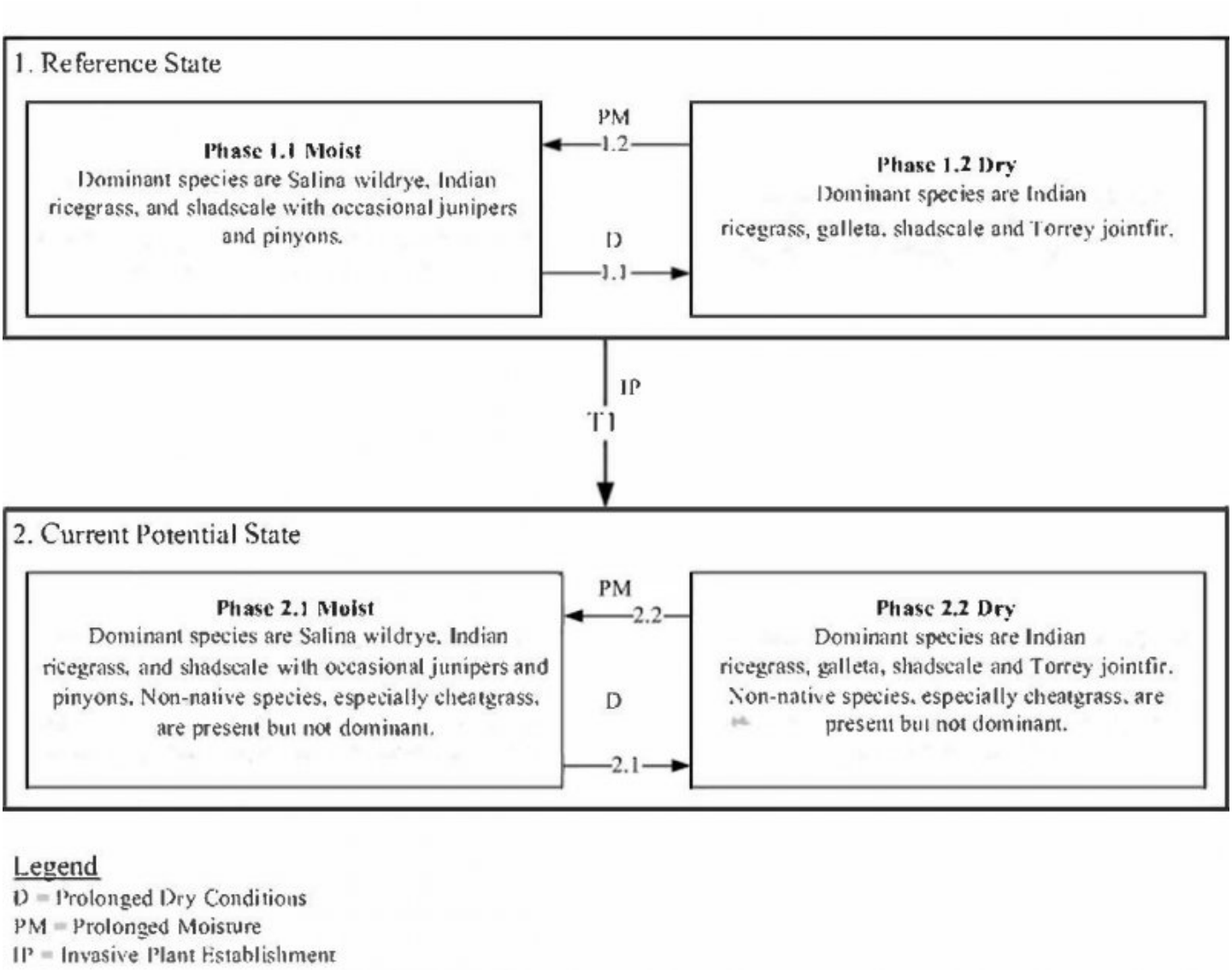
Community Phase Pathway 2.1
This pathway occurs when soil moisture decreases, favoring plants species that can tolerate dryer conditions. Events leading to this pathway may include extended periods of drought and/or increased temperatures.

Community Phase 2.2: Dry Phase with Invasives
This plant community phase is characterized by perennial warm and cool season grasses and native shrubs. The dominant cool season grass is Indian ricegrass, and the dominant warm season grass is galleta. Dominant shrubs

are shadscale and Torrey jointfir. Forb composition is variable. Cheatgrass or other non-native species are present but not dominant. Other shrubs, forbs, and grasses may be present and cover is variable.

Community Phase Pathway 2.2
This pathway occurs when events favor plant species with higher cool-season moisture requirements such as Salina wildrye. Events may include extended periods of higher than normal precipitation and may be coupled with cooler temperatures.

State and transition model



Legend
D = Prolonged Dry Conditions
PM = Prolonged Moisture
IP = Invasive Plant Establishment

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)	

Contact for lead author	
Date	05/16/2024
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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:

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
