Ecological site R034BY016UT
Semiwet Fresh Meadow

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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 alluvium from mixed sources. Surface soils are silt loam to 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 deep to very deep, poorly drained, and have moderately slow to moderately rapid permeability. pH is moderately to strongly alkaline. Available water-holding capacity ranges from 5 to 8 inches of water in the upper 60 inches of soil. The soil moisture regime is mostly typic aridic to 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	Not specified

Physiographic features

This site occurs on alluvial fans and flood plains.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Alluvial fan (2) Flood plain
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	None to occasional
Elevation	1,800 – 1,980 m
Slope	0 %
Ponding depth	Not specified
Water table depth	0 – 90 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

The average annual precipitation is 8 to 12 inches. Approximately 65 percent 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 75 degrees F(10 degrees c) and the soil temperatures are in the mesic regime. Much of the moisture that falls on this site runs off. 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)	110-140 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	200-310 mm

Influencing water features

This site has a water table that is generally within 0 to 35 inches of the surface.

Soil features

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Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale
Surface texture	(1) Loam (2) Silt loam
Family particle size	(1) Fine-loamy (2) Fine-silty
Drainage class	Poorly drained to very poorly drained
Permeability class	Moderately slow to moderately rapid
Depth to restrictive layer	150 cm
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	12.7 – 20.32 cm
Calcium carbonate equivalent (Depth not specified)	10 – 30 %
Electrical conductivity (Depth not specified)	Not specified

Sodium adsorption ratio (Depth not specified)	0 – 10
Soil reaction (1:1 water) (Depth not specified)	7.9 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 – 40 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

State 1 Reference State
The reference state represents the plant communities and ecological dynamics of the wet saline meadow 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 saltgrass and mountain rush(Arctic or Baltic rush). 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: Saltgrass/arctic rush state with natural fluctuations that form either a mixed grass meadow or a saltgrass dominated meadow depending on the sites natural disturbance history.

Indicators: A community dominated by saltgrass and arctic rush.

Feedbacks: Improper livestock grazing of perennial grasses and/or other disturbances that may allow for the establishment of invasive species.

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

Trigger: The establishment of invasive plant species.

Community 1.1 Saltgrass meadow with other Grasses & Grass-likes.
This community is characterized by an open grassland aspect with saltgrass, arctic rush, and foxtail barley dominating the herbaceous layer. Other commonly occurring grasses and grass-likes include native Kentucky bluegrass, alkali bluegrass (Sandberg bluegrass), spikerush, and tufted hairgrass. Other perennial grasses, shrubs, and forbs are also present. A stable water table is present at 35 inches or less, providing season long moisture for plant growth.

State 2
Current Potential Community
The current potential state is similar to the reference state, however invasive grasses and/ or forbs are now present in all community phases. This state still has the visual aspect of a saltgrass meadow. Foxtail barley, arctic rush and alkali bluegrass are other primary perennial grass or grass like species present. Fivehorn bassia, povertyweed and other less palatable species now make up a large portion of the herbaceous layer.

Primary disturbance mechanisms include native herbivore and domestic livestock grazing. Timing of these disturbances dictates the ecological dynamics that occur. The current potential state is still self sustaining; but is losing resistance to change due to lower resilience following disturbances. When disturbances occur, the rate of recovery is variable depending on severity.

Current Potential State: Saltgrass meadow state with various other native and non-native grasses and forbs present.

Indicators: A community dominated by saltgrass and arctic rush where other native perennial grasses and forbs are also present. Invasive grasses and/or forbs are present.

Feedbacks: Frequent disturbances that may allow annual invasive species such as fivehook bassia to dominate.

At-risk Community Phase: As increased disturbance frequency allows for the increase and/or dominance of annual grasses and forbs, this community is at greater risk.

Trigger: Reoccurring disturbance that results in a dominance of annual grasses and/or forbs in the herbaceous layer.

Community 2.1 Saltgrass meadow with Invasive Species.
This community is characterized by an open grassland aspect with saltgrass, arctic rush, and foxtail still dominating the herbaceous layer. Other commonly occurring grasses and grass-likes include native Kentucky bluegrass, alkali bluegrass, spikerush, and tufted hairgrass. Non-native species including fivehorn bassia, poverty weed,and/or salt cedar are also present. A stable water table is present at 20 inches or less, providing season long moisture for plant growth. Species composition by air-dry weight is approximately 85 percent perennial grasses, 10 percent forbs, and 5 percent shrubs. Bare ground is variable (20-50%) depending on the amount of biological crust (0 to 10), and plant cover.

Community 2.2 Deteriated Saltgrass meadow with Invasive Species.
This community is characterized by an open grassland aspect with saltgrass, arctic rush, and foxtail still dominating the herbaceous layer. Palatable grasses and grass-likes including native Kentucky bluegrass, alkali bluegrass, spikerush, and tufted hairgrass are much reduced. Non-native species including fivehorn bassia, poverty weed,and/or salt cedar are also present and may dominate the site. Water table may be unstable and when deeper than 30 inches may allow annuals to out compete perennials.

Pathway 2.1A
Community 2.1 to 2.2
This pathway occurs when events favor a decrease in palatable perennial grasses and grass-likes and an increase in less palatable species such as saltgrass and arctic rush. Non-native annuals including mustards and fivehorn smotherweed may eventually dominate the community. Events may include, improper livestock grazing, and a declining water table that may favor annuals and decrease desirable perennials.

Pathway 2.2A Community 2.2 to 2.1
This pathway occurs when events favor a increase in palatable perennial grasses and grass-likes and a decrease in less palatable species such as saltgrass and arctic rush. Non-native annuals including mustards and fivehorn smotherweed may eventually be reduced in the community. Events may include, carefully managed livestock grazing over long periods, and a stable water table that is within 20 inches of the soil surface. These conditions generally favor desirable perennials and decrease annual weeds.

State 3 Disturbed State.
This state occurs when the site is burned or chemically treated to reduce saltgrass and other unwanted herbaceous species. The resulting plant communities can be highly variable ranging from the recovery of desired native species to the dominance of of invasive weeds such as salt cedar, fivehorn bassia, poverty weed and various mustard species.

Invasive Forb State: Burned or chemically treated community phases influenced by livestock grazing practices and fluctuating water tables.

Indicators: Perennial, annual, invasive grasses, grass-likes and forbs present in various amounts.

Feedbacks: Livestock grazing practices and fluctuating water tables that maintain or degrade or desirable species and increase non-native, weedy species present in the community.

Trigger: The further establishment of salt cedar, fivehorned bassia and/or other weedy species decrease perennial production and increase bare ground.

Community 3.1 Altered Community.
This community phase occurs when the site is chemically treated and/or furned to remove unwanted species. Results can be highly variable ranging from a mixture of native, non-native and invasive species being present. Non-palatable species such as arctic rush, salt cedar, fivehorn bassia & poverty weed may dominate. Kentucky bluegrass may occasionally be present. Water table may be unstable and when deeper than 30 inches may allow annuals to out compete perennials.

Transition T1A State 1 to 2
This transition is from the native perennial grass and grass-like community in the reference state to a state that contains non-native, invasive species. Events typically include the establishment of invasive grasses and forbs, and an increase in saltgrass,arctic rush and other less palatable species. Factors that drive such events may include any combination of improper livestock grazing, a fluctuating water table, and the presence of a seed source for invasive species. Invasive species such as fivehorn bassia however 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.

Transition T2A State 2 to 3
This transition is from the current potential state to an altered state created by chemical treatment or fire. Results can vary widely from little site production to a healthy mixed perennial grass and grass-like community.Non-native, invasive species may also dominate the site. Factors that drive such events include, improper livestock grazing of palatable perennial grasses, fluctuating water tables and the availability of invasive weeds.

State and transition model

Additional community tables

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	06/21/2026
Approved by	
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):**

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

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

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

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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):**

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

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

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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):**

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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:

    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:**
