

Ecological site R043BY014ID Wet Meadow (Muck) SALIX/CAREX

Last updated: 2/03/2020
Accessed: 05/11/2025

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.

MLRA notes

Major Land Resource Area (MLRA): 043B—Central Rocky Mountains

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43B – Central Rocky Mountains – This MLRA is extensive including Montana, Idaho, Wyoming and a small portion in Utah. MLRA 43B includes the Rocky Mountains. A revision of the MLRA's in 2006 lead to the inclusion of the foothills with the mountains for much of Wyoming. Cartographic standards limited the ability to capture the foothills as a separate MLRA .

Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

Classification relationships

Major Land Resource Area (MLRA): 043B—Central Rocky Mountains
Land Resource Unit: E (Rocky Mountain Range and Forested)

EPA EcoRegion: Level III (Middle Rockies)

Ecological site concept

Site receives additional water.

Soils are:

None to slightly saline or saline-sodic.

Deep to very deep, not skeletal within 20" of soil surface.

Season water table <12" with high amounts of organic matter

Not strongly or violently effervescent in surface mineral 10".

Slope is < 30%.

Clay content is = <35% in surface mineral 4".

Site does not have an argillic horizon with > 35% clay.

Associated sites

R010XY030ID	Marsh TYLA-SCAC3
R043BY007ID	Meadow DECA18-CANE2
R043BY008ID	Dry Meadow PONE3-PHAL2
R043BY011ID	Riparian SALIX/CAREX

Similar sites

R043BY007ID	Meadow DECA18-CANE2
R010XY030ID	Marsh TYLA-SCAC3

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site generally occurs on gently sloping to nearly level high mountain valley floors. Slopes are less than 3 percent and occur on all aspects. This site is frequently dissected by old stream courses, oxbows, and potholes. The surface is generally not flat, but slightly undulating with small depressions and high spots. Elevations range between 6000-7300 feet (1800-2250 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	6,000–7,300 ft
Aspect	Aspect is not a significant factor

Climatic features

The Central Rocky Mountains range in elevation from 6000 to 10000 feet above sea level with some peaks reaching over 12000 feet. The average annual precipitation, based on 10 long term climate stations located throughout the MLRA , is 21 inches. The annual average minimum is 18 and the annual average maximum recorded is 24 inches. The annual average temperature is 41.7 degrees Fahrenheit. The annual average low is 26.7 and the annual average high is 56.7 degrees F. The frost free period ranges from 58 to 80 days while the freeze free period ranges from 90 to 116 days.

Table 3. Representative climatic features

Frost-free period (average)	80 days
Freeze-free period (average)	116 days
Precipitation total (average)	24 in

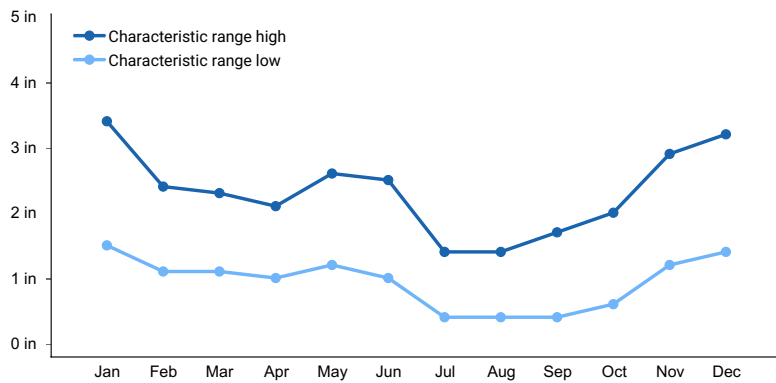


Figure 1. Monthly precipitation range

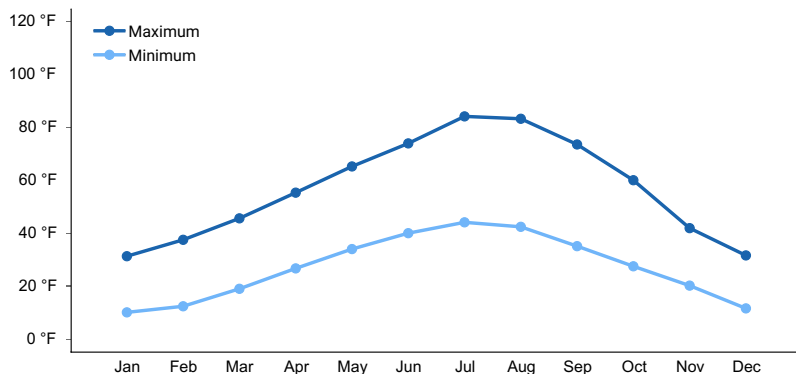


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is influenced by additional water from either adjacent streams through seasonal flooding, water table, seeps or springs or from run-on from adjacent sites.

Soil features

Soils on this site have thick to very thick (8-40 inches), dark, organic mats over sand and gravel. Texture of the surface layer is usually muck. These soils are very deep and very poorly drained. Permeability in the upper profile is moderate and very rapid in the underlying material. Runoff is slow. Depth to permanent year-round water table is from 6 inches above to 6 inches below the soil surface.

Erosion hazard is slight, however, the peaty and high organic soils tend to hummock severely as a result of hoof action. These soils are susceptible to gully formation which intercepts normal overflow patterns and results in site degradation. Flooding occurs occasionally during snowmelt and just after snowmelt. Ponding can occur in small depressional areas during this time period. The plant community is dependent on nearly saturated soils during a major portion of the growing season. The water table is influenced by seasonal flooding, stream flows, seeps, or springs or from run-on from adjacent sites. Soil characteristics, flooding, and water table can vary across the complex of meadow sites.

Ecological dynamics

The dominant visual aspect of this site is sedges and rushes with scattered forbs and shrubs. The dominant plant community is a variety of sedges. The site usually occurs within a complex of wetland sites. The soil surface of the site is typically slightly undulating causing small depressions and high spots with variable soil moisture characteristics. The plant communities found on these areas are sites within the complex. The dominant species in these included plant communities are as follows:

1. Marsh site. Deeper depressions with the water table at or near the surface or slightly above the surface for the entire growing season. This site is dominated by broadleaf cattail, hardstem bulrush, and common threesquare.
2. Wet Meadow site. Shallow to depression areas with the water table at or near the surface for the entire growing

season. This site is dominated by *Carex* spp. and *Junus* spp.

3. Meadow site. Slightly higher areas that are drier during the growing season. The water table is down to a depth of 20 to 40 inches by the end of the growing season. This site is dominated by tufted hairgrass and Nebraska sedge.

4. Dry Meadow site. Even higher areas that are even drier during the growing season and the water table is > 40 inches deep by the end of the growing season. The plant community is dominated by Nevada bluegrass and alpine timothy.

Composition by weight is 70 to 80 percent sedges, 10 to 25 percent forbs, and 5 to 15 percent shrubs.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by dry summers and cold, wet winters. The site has evolved on deep alluvial soils that are ponded in the beginning of the growing season to about 6 inches at the end of the growing season. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include pronghorn antelope, mule deer, moose, and Rocky Mountain elk.

Fire has had little or no influence on the development of the site. Wildfires are rare.

The soils within any complex of meadow sites are highly variable. Factors that affect the determination of the site include depth to water table at end of growing season, micro-topography, and drainage class. Depth to water table and micro-topography are measurable features. Determination of drainage class requires the use of soil interpretation tables. Other interpretive factors that may be used for site determination are depth, frequency, and duration of ponding and frequency and duration of flooding.

Micro-topography is a feature that has a dramatic effect on depth to water table and the resulting plant communities. A few inches of change in surface elevation changes species composition and/ or production. Slightly undulating topography is common in meadow complexes, therefore, more than one site should be expected.

An infinite number of combinations of factors that influence the ecology of potential plant communities exist. For practical purposes, four plant communities where the depth to the water table drives the vegetative composition have been described. They are:

- Dry meadow Water table at >40" at end of growing season
 - Meadow Water table at 20-40" at end of growing season
 - Wet meadow Water table at 10-20" at end of growing season
- Wet Meadow (Muck) Water table at 6 inches above the surface to 6 inches below the surface by the end of growing season.
- Marsh Water is at the surface or above the surface.

Most wetland species have a wide range of tolerance for variations in soil moisture. Most species occur in more than one site, although most are dominant on just one site.

The following table shows the amplitude of wetland species that occur on the four sites.

- Ecological Amplitude of Meadow/Marsh Plants.

Grass and Grass-like Species

Scientific name	Dry Meadow	Meadow	Wet Meadow	Marsh/Wet Meadow	Muck
<i>Leymus cinereus</i>					

Danthonia californica

Carex filifolia

Pascopyron smithii

Poa nevadensis

Juncus dudleyi

Muhlenbergia richardsonis

Hordeum brachyantherum

Phleum alpinum

Juncus balticus

Juncus torreyi

Alopecurus aequalis

Carex athrostachya

Calamagrostis canadensis

Deschampsia caespitosa

Carex nebrascensis

Glyceria striata

Carex lasiocarpa

Carex utriculata

Carex aquatilis

Eleocharis palustris

Carex rostrata

Carex hoodii

Carex exsiccata

Scirpus microcarpus

Juncus effusus

Beckmannia syzigachne

Typha latifolia

Schoenoplectus acutus

Schoenoplectus pungens

Sparganium erectum

Schoenoplectus tabernaemontani

Forb Species

Scientific name Dry Meadow Meadow Wet Meadow Marsh/Wet Meadow

Muck

Arnica fulgens

Pyrrocoma lanceolata

Arenaria congesta

Artemisia ludoviciana

Achillea millefolium

Wyethia amplexicaulis

Pyrrocoma uniflora

Ranunculus spp.

Trifolium spp.

Potentilla gracilis

Senecio integerrimus

Aster spp.

Cirsium scariosum

Symphyotrichum ascendens

Iris missouriensis

Senecio serra

Helianthus nuttallii

Camassia quamash

Epilobium ciliatum

Montia chamissoi

Plantago major

Alisma triviale

Cicuta douglassii

Argentina anserina

Veronica anagallis-aquatica

Symphyotrichum frondosum

Polygonum bistortoides

Triglochin maritimum

Polygonum amphibium

Symphyotrichum foliaceum

Potamogeton natans

Lemna minor

Carex pellita

The Historic Climax Plant Community (HCPC), the Reference State (State 1), moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The Reference Plant Community Phase is Phase A. This plant community is dominated by tufted hairgrass and Nebraska sedge. There are a wide variety of grasses and grass-like species and forbs that may occur in minor amounts. Some of these species may be dominant in small areas due to soil and water variations as stated above. Willows and shrubby cinquefoil can occur in small amounts. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

The total annual production is 3500 pounds per acre (3920 kilograms per hectare) in a normal year. Production in a favorable year is 4000 pounds per acre (4480 kilograms per hectare). Production in an unfavorable year is 3000 pounds per acre (3360 kilograms per hectare). Structurally, cool season deep-rooted perennial sedges are very dominant, followed by perennial forbs being more dominant than shrubs.

FUNCTION:

This site is suitable for big game and livestock grazing in the summer and fall. Wet soils can limit grazing opportunities, particularly early in the year.

Due to a permanently high water table, recreational opportunities are limited. Hunters and fisherman may cross the site. Motorized vehicles can be very detrimental to the site because soils are saturated to the surface.

Due to the deep soils, fertility, inherent high productivity, rhizomatous plants, and relatively flat slopes, the site is fairly resistant to disturbances that can potentially degrade it. Site degradation is usually the result of lowering of the water table. This can occur with down cutting of adjacent stream channels or significant run-off following prolonged drought. This can result from on-site improper grazing or off-site conditions in the upper watershed. Once adjacent streams down-cut, concentrated flows lower the water table.

Impacts on the Plant Community:

Influence of fire:

This site usually does not burn from wildfire. If a fire occurs, it usually does not adversely affect the plant community. Most plants including shrubs sprout back with sufficient soil moisture and/or during the next growing season.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be very detrimental to this site. The sedges in the plant community will decline in the stand and rushes and forbs will increase.

Continued improper grazing management will result in a stand of forbs and rushes. The reduced ability of the community to withstand seasonal flooding is reduced and down cutting of adjacent streams can result or initiation of headcuts can occur. This down cutting will lower the water table and thereby reduce the potential of the site. Livestock can cause soil damage due to trampling.

Proper grazing management that addresses frequency, duration, and intensity of grazing can maintain the integrity of the plant community and the water table on which it is dependent.

Weather influences:

Because of the deep soils, the influence of the water table, seasonal flooding and run-on, the production of this site changes little during wet or dry precipitation years. The overall plant production can be adversely influenced with prolonged drought. Overall plant composition is normally not affected when perennials have good vigor.

Below normal temperatures in the spring can have an adverse impact on total production regardless of the precipitation. An early, hard freeze can occasionally kill some plants.

Influence of Insects and disease:

Periodic disease and insect outbreaks can affect vegetation health. Grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available.

Influence of noxious and invasive plants:

Annual and perennial invasive species can compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the plant community. The plants on this site are very competitive against potentially invasive plant species.

Influence of wildlife:

This site is important for many species of mammals for food and life cycles. The site is primarily used in the summer and fall by big game. Many birds use the site for food, nesting, or brood raising in the late spring, summer, and fall. Sage grouse use the site for brood rearing and forage. Total numbers are seldom high enough to adversely affect the plant community.

Watershed:

The largest threat to degradation of this site is the lowering of the water table. Off-site conditions can affect the gradient of adjacent stream channels that can affect the water table. If the perennial sedge cover is depleted, down cutting can be accelerated within the site. High run-off events from the adjacent uplands can severely damage or change the normal stream channel on the site. As the water table is lowered, productive potential is lost. Eventually the water table is below the root zone of the adapted perennial grasses, sedges, and rushes. These are ultimately replaced by perennial forbs and shallow rooted grasses. Extreme down cutting and lowering of the water table can move the site across the threshold to a new, less productive site. Severe down-cutting can result in a plant community that resembles an upland site.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with improper grazing management.

Phase B to A. Results from prescribed grazing.

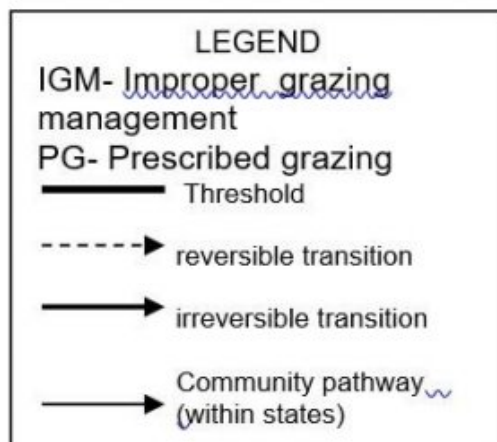
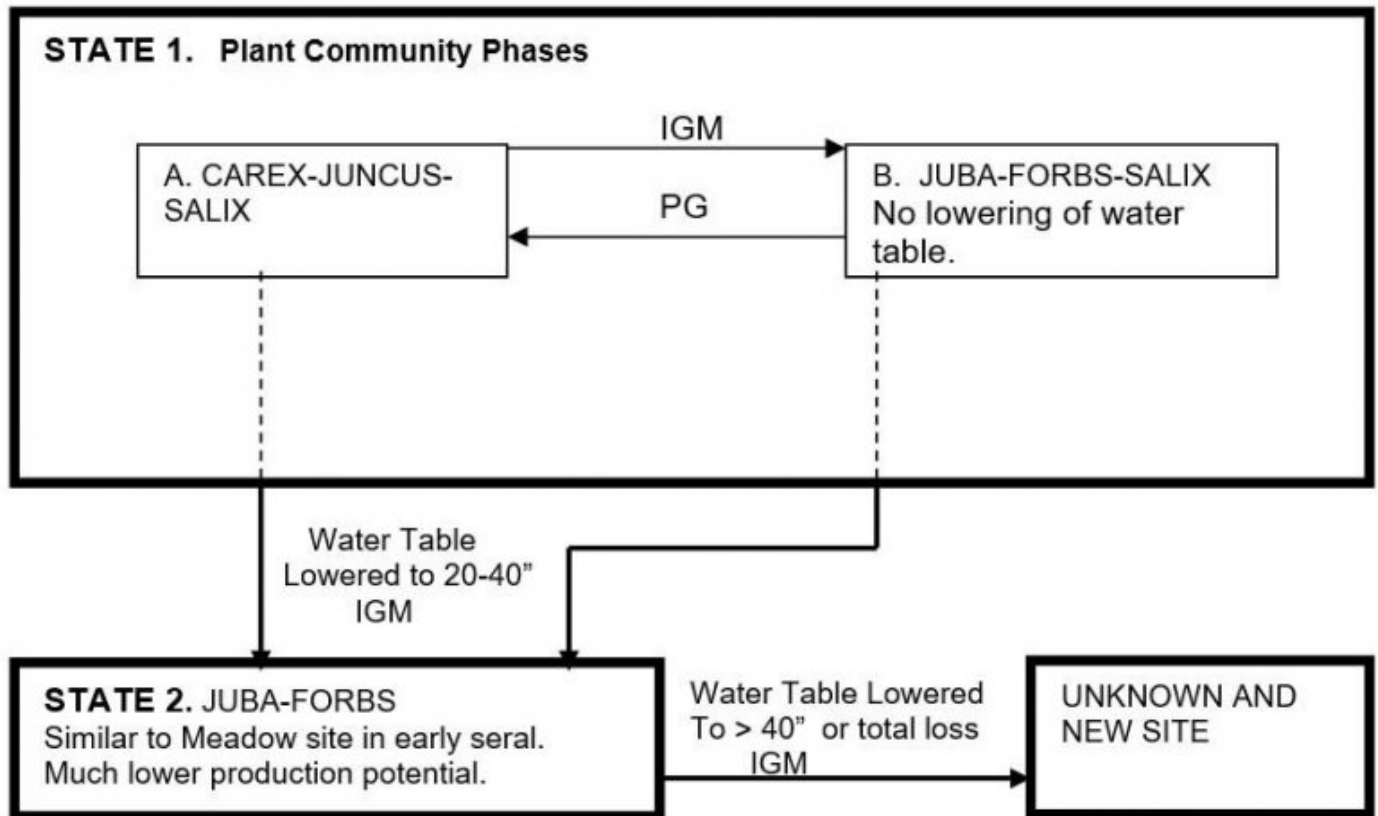
State 1 to State 2. Develops through permanently lowering the late growing season water table to 20 to 40 inches. This can occur with continued improper grazing management. It may also occur with proper grazing on the site, but channel erosion may continue if poor off-site conditions cause frequent and/or severe flooding. The site has crossed the threshold. This state cannot be returned to State 1 without raising the water table. This might be done over time using structures or bio-engineering practices, but the plant community may take many years to approach the plant community in State 1.

State 2 to unknown site. Results from permanently lowering the water table in the soil profile to below 40 inches through down cutting of the stream channel. The site crosses the threshold and retrogresses to a new site with reduced potential due to significant loss of available soil moisture from the lowered water table. It occurs with continued improper grazing management or repeated significant run-off events. This state cannot be returned to State 1 without raising the water table. This might be done over time using structures or bio-engineering practices, but the plant community may take many years to approach the plant community in State 1.

Practice Limitations:

There are severe seeding limitations on this site due to difficulty in preparing an adequate seedbed in saturated soils. Elimination of existing vegetation prior to planting is difficult in wet seasons and during high water table periods. Grade stabilization structures may be needed to prevent further down-cutting of the channel. Other options for rehabilitation may include application of fertilizer, prescribed grazing, and off-site livestock water development. Fencing of the site for better livestock control might also be a consideration.

State and transition model



PLANT LEGEND STATES 1 & 2

CAREX - Sedges
JUBA - Baltic rush
SALIX - Willows
JUNCUS- Rushes

State 1 State 1 Phase A

Community 1.1 State 1 Phase A

Reference Plant Community Phase. This plant community has a variety of sedges and rushes in the herbaceous layer including beaked sedge, water sedge, and Baltic rush. There are several willow species that occur on the site including wolf willow and Drummond willow. Some of these species may be dominant in small areas due to soil and water variations as stated above. Shrubby cinquefoil can occur in small amounts.

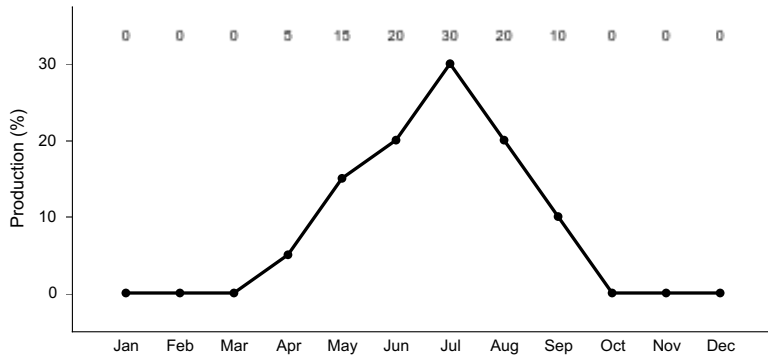


Figure 3. Plant community growth curve (percent production by month). ID1214, MEADOW. State 1.

State 2 State 1 Phase B

Community 2.1 State 1 Phase B

This plant community is dominated by rushes including Baltic rush, forbs, and willows. Forbs and willows have increased in the community. This phase has developed due to improper grazing management. The water table has not been lowered from that of Phase A.

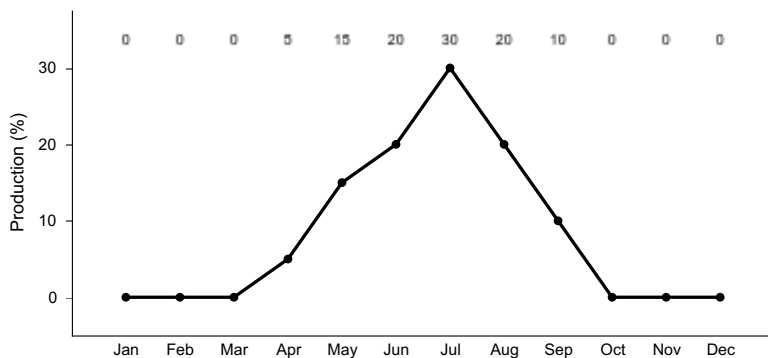


Figure 4. Plant community growth curve (percent production by month). ID1214, MEADOW. State 1.

State 3 State 2

Community 3.1 State 2

This plant community is dominated by Baltic rush and forbs and the overall production potential of the site is much lower than State 1. There is an increase or invasion in forbs and grasses that require less soil moisture. Kentucky bluegrass, redtop bentgrass, and meadow foxtail may have invaded the community. This state developed due to continued improper grazing management and a permanent lowering of the water table to 20-40 inches below the surface. This state can be similar to a Meadow site in early seral state. The site has crossed the threshold. This state cannot be returned to State 1 without raising the water table. This might be done over time using structures or bio-engineering practices, but the plant community may take many years to approach the plant community in State 1.

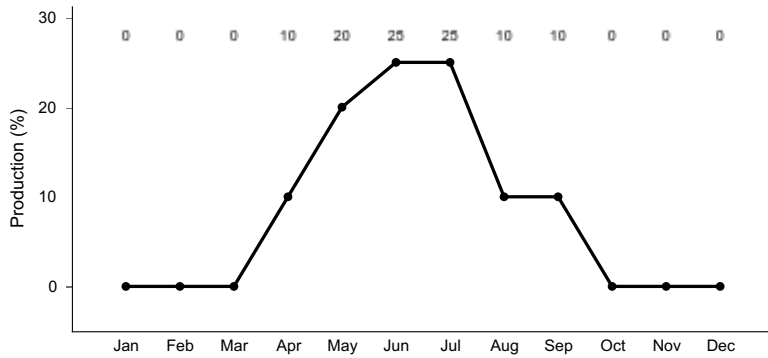


Figure 5. Plant community growth curve (percent production by month).
ID1215, DRY MEADOW early to mid seral. State 2.

State 4 Unknown New Site

Community 4.1 Unknown New Site

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant loss of available soil moisture has occurred due to the lowering of a water table below 40 inches. Some soil loss from the surface may have occurred. This state has developed due to continued improper grazing management and lowering or loss of the water table. The new site may be similar to Dry Meadow or upland sites such as Loamy Bottom or other loamy sites in an early seral state. This state cannot be returned to State 1 without raising the water table. This might be done over time using structures or bio-engineering practices, but the plant community may take many years to approach the plant community in State 1.

Additional community tables

Animal community

Wildlife Interpretations.

The site is primarily used in the summer and fall by big game. Many birds use the site for food, nesting, or brood raising in the late spring, summer, and fall. It is good habitat for waterfowl, shorebirds, muskrat, and beaver whenever it is adjacent to stream and ponds.

Grazing Interpretations.

This site is best suited for livestock grazing in the late spring, summer, and fall. Wet soils can limit grazing opportunities, particularly in the late spring.

Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory, past use history and type, condition of vegetation, production, season of use, and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

Soils in this site are generally grouped in hydrologic group D. The runoff potential is high.

Recreational uses

Due to a permanently high water table, recreational opportunities are limited. Hunters and fisherman may cross the site. Motorized vehicles can be very detrimental to the site because soils are saturated to the surface.

Wood products

None.

Other products

None.

Other information

Field Offices

Grangeville, ID
Nezperce, ID
Cascade, ID
Weiser, ID
Emmett, ID
Mtn. Home, ID
Salmon, ID
Challis, ID
Shoshone, ID
Arco, ID
St. Anthony, ID
Lewiston, ID
Orofino, ID

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. Those involved in developing this site description include:

Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC

Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC

Jim Cornwell, Range Management Specialist, IASCD

Dan Ogle, Plant Materials Specialist, NRCS, Idaho

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Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho

Bruce Knapp, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Blaine County, ID	
Township/Range/Section	T8N R14E S29
General legal description	SE 1/4

Other references

USDA, NRCS.2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>.) National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA NRCS. 1992. Major Land Resource Area, Owyhee High Plateau, Range Site Descriptions. Reno, Nevada.

USDA NRCS. Major Land Resource Area, Owyhee High Plateau, Range Site Descriptions. Portland, Oregon.

USDA, Forest Service. 2004. (www.fs.fed.us/database/feis/plants.).

USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Approval

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.

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Date	06/12/2009
Approved by	Scott Woodall
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills do not occur on this site.

2. **Presence of water flow patterns:** water flows over and through the plant community. Rarely are flows detrimental to the plants. The plants have adapted or evolved with this occurrence.

3. **Number and height of erosional pedestals or terracettes:** neither occurs on this site. Some plants may be hummocked due to trampling damage.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data is not available. On sites in mid-seral status bare ground may range from 2-10 percent.

5. **Number of gullies and erosion associated with gullies:** none.

6. **Extent of wind scoured, blowouts and/or depositional areas:** does not occur.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move 6 feet or more due to seasonal flooding. Litter accumulates on the surface. There is little or no coarse litter developed on the site, and it will be removed from the site following seasonal flooding.

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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):** values should range from 4 to 6 but needs to be tested.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** no data.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** deep rooted perennial grasses and sedges slow run-off and increase infiltration. The total vegetation cover should be >60 percent to optimize infiltration. The plant community does not depend on water infiltration alone, but on the water table. The water table controls rooting depth.
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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):** is not present. Compaction layers can develop under stock trails made by livestock going to and from water or from long-term repetitive heavy grazing.
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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: deep rooted perennial grasses and sedges
- Sub-dominant: perennial forbs
- Other: shrubs
- Additional:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** normal mortality of grass and grass-like is slow and occurs as aging plants. This will go unnoticed due to regeneration from roots, seeds, or other new plants filling the spaces.
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14. **Average percent litter cover (%) and depth (in):** additional litter cover data is needed but is expected to be 45-60 percent to a depth of 0.5-1.5 inches. Litter accumulates on the soil surface.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 3600 pounds per acre (4032 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses and sedges produce 80-90 percent of the total production, forbs 5-15 percent, and shrubs 0-10 percent.
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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: includes whitetop, Leafy spurge, Dock, Canadian thistle, reed canarygrass, foxtail barley, perennial pepperweed, and teasel. Other invasive species may include meadow foxtail, redtop, and Kentucky bluegrass.

17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years. Many of the plants reproduce vegetatively.
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