

Ecological site R013XY038ID Meadow DECA18-CANE2

Last updated: 9/23/2020
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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): 013X–Eastern Idaho Plateaus

Land Resource Unit: B (Northwestern Wheat and Range)
MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

LRU notes

013X-Eastern Idaho Plateaus

Additional Moisture site.
<https://soils.usda.gov/survey/geography/mlra/index.html>

Classification relationships

no data.

Ecological site concept

Site receives additional moisture
not saline or sodic
deep to very deep, poorly drained
seasonal water table >30 cm (12 in)

Associated sites

R013XY039ID	Dry Meadow PONE-PHAL2
R013XY045ID	Loamy Bottom 12-16 PZ ARTRT/LECI4-ELLAL
R013XY050ID	Riparian Wet Meadow SALIX/CAREX
R013XY053ID	Wet Meadow CAREX-JUNCUS

Similar sites

R013XY039ID	Dry Meadow PONE-PHAL2
R013XY053ID	Wet Meadow CAREX-JUNCUS

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Deschampsia cespitosa</i> (2) <i>Carex nebrascensis</i>

Physiographic features

This site generally occurs on nearly level stream valleys, high mountain valleys on flood plains with slopes of 0 to 5 percent. It also occurs around localized seeps and springs. 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 4000 to 8000 feet (1200 to 2450 meters).

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream terrace (3) Alluvial fan
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	1,219–2,438 m
Slope	0–5%
Ponding depth	5–15 cm
Water table depth	0–102 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 13, the Eastern Idaho Plateaus, is part of the Northwestern Wheat and Range Region. Its elevation ranges from 4209 to 9331 feet above sea level, with an average elevation of 5787 feet. The average annual precipitation is 16.41 inches, with a range of 13.56 to 18.75 inches, based on ten long term climate stations located throughout the MLRA. A spike in precipitation amount often occurs in late spring, usually in May.

Temperatures vary widely in the MLRA throughout the year. A maximum temperature of 103° Fahrenheit occurred at the McCammon climate station (# 105716; elevation 4770 feet), while a minimum of -41° was recorded at the Kilgore station (#104908). At all stations temperatures throughout the year are usually below the national average. Kilgore also recorded the greatest annual snowfall amount of 217 inches. The average temperature is 41.4 degrees F. with an average high of 55.3 degrees and an average low of 27.5 degrees.

The frost-free period ranges from 64 to 90 days, while the freeze-free period can be 98 to 123 days.

Table 3. Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	123 days
Precipitation total (average)	483 mm

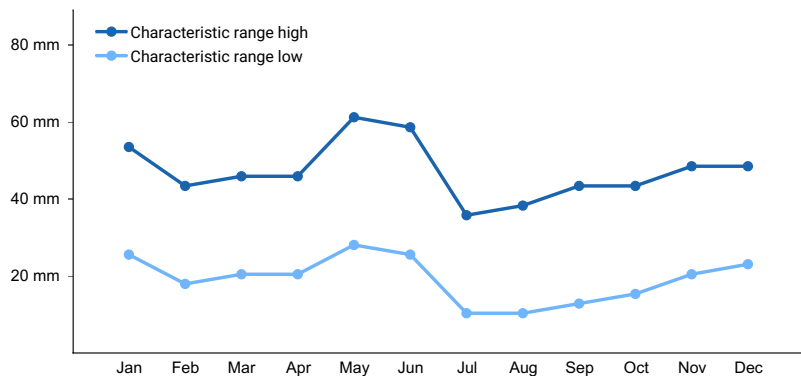


Figure 1. Monthly precipitation range

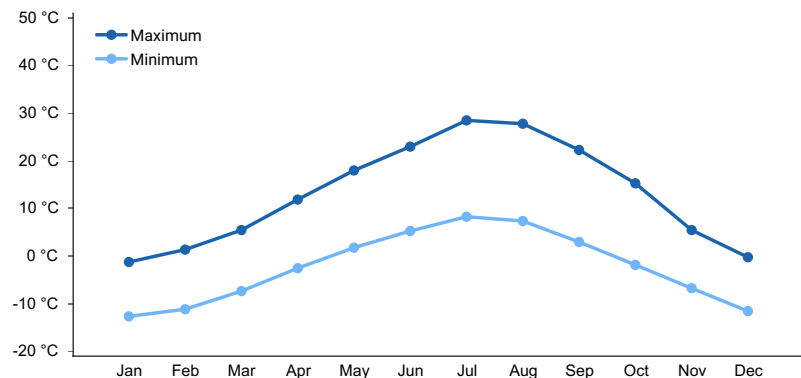


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Meadow 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. The site may include the following wetlands and stream types.

Soil features

Soils on this site are mainly silty clay loams, silt loams, clays, clay loams, or mucky peat over 20 inches (50 cm.) deep. The soils are moderately deep to very deep, alluvial in origin, and have a high organic content. The soils range from strongly alkaline to strongly acidic in pH. The available water holding capacity (AWC) is moderate to very high and is supplemented by upward capillary movement from the shallow water table. The effective rooting depth is limited by the water table. These soils have an aquic or xeric soil moisture regime and a frigid soil temperature regime.

Erosion hazard is slight, however, the peaty and high organic soils tend to hummock severely from trampling. These soils are susceptible to gully formation which intercepts normal overflow patterns and results in site degradation. The soils are poorly to very poorly drained and have a water table at or near the surface at the beginning of the growing season and down to 20-40 inches by the end of the growing season. Flooding occurs occasionally during snowmelt and just after snowmelt. Ponding can occur in small depression 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.

Soil Series Correlated to this Ecological Site -

Bear Lake
 Cedron
 Chesbrook
 Cookcan

Downata
 Fulmer
 LaJara
 Nythar
 Tendoy
 Tepete

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Silty clay loam
Drainage class	Poorly drained
Permeability class	Slow to moderately rapid
Soil depth	152 cm
Surface fragment cover <=3"	0–10%
Available water capacity (0-101.6cm)	10.92–40.39 cm
Calcium carbonate equivalent (0-101.6cm)	0–40%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–10
Soil reaction (1:1 water) (0-101.6cm)	4.5–9
Subsurface fragment volume <=3" (Depth not specified)	0–15%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is grass and sedges with scattered forbs and shrubs. The dominant plant community has tufted hairgrass, Nebraska sedge, and other *Carex* species as major components. The site usually occurs within a complex of wetland sites. The typical soil surface of the site is slightly undulating causing small depressions and high spots with variable soil moisture regimes. The complex of wetland sites that are commonly found in association with this site and the dominant species that occur in those sites are as follows:

1. Marsh site. Deeper depressions with water 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 sites. Shallow depressions 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. Dry Meadow site. Slightly higher areas that are 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 80-90 percent grasses and grass-like, 5-15 percent forbs, and 0-10 percent shrubs. The depression area plant communities are inclusions and may have sedge and rush species making up nearly 100 percent of the community.

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 saturated to the surface at the beginning of the growing season and move down to a depth of about 20 – 40 inches by 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 influence on the development of the site. Rare wildfires can occur following consecutive drought years.

The conditions of the plant community on this site are highly variable due to a wide variation of soils, frequency and duration of flooding, water table fluctuations, air and soil temperatures, and competition between mostly rhizomatous plants. These conditions can vary within the site at a given location. At any one point within the site, one species can occupy nearly 100 percent of a small area. Another point nearby may have another species fully occupying that area. Due to these situations, the plant community in this ESD is written broadly.

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 the frequency and duration of flooding and the depth, frequency, and duration of ponding.

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
- Marsh Water at surface to <10" at end of growing season

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 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 Communities Phase Plant Species Composition".

The total annual production is 3600 pounds per acre (4032 kilograms per hectare) in a normal year. Production in a favorable year is 4500 pounds per acre (5040 kilograms per hectare). Production in an unfavorable year is 2500 pounds per acre (2800 kilograms per hectare). Structurally, cool season deep-rooted perennial grasses and 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 late spring, summer, and fall. Wet soils can limit grazing opportunities, particularly early in the year.

This site can be used for hiking, access to fishing, hunting, viewing wildlife and plants, and horseback riding. The wet soils can limit access. Motorized vehicles can be very detrimental to the site especially when soils are saturated to the surface.

Due to the deep soils, fertility, inherent high productivity, high percentage of plants with rhizomes, 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. With sufficient moisture, most plants, including shrubs, sprout back 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 grasses in the plant community will decline in the stand and sedges, rushes, and forbs will increase. Continued improper grazing management will result in a stand of forbs and Kentucky bluegrass with sedges and rushes. The reduced ability of the community to withstand seasonal flooding results from continued improper grazing management and/or the potential down cutting of adjacent streams. If downcutting or the initiation of headcuts occurs, both will lower the water table level and thus reduce the potential of the site.

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, however, can be adversely influenced with prolonged drought. Plant composition, though, 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.

Insects and disease outbreaks:

Periodic disease and insect outbreaks can affect vegetation health. Mormon cricket and 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 good competitors to potential invaders.

Influence of wildlife:

This site is important for many species of mammals for food and life cycles. The site is primarily used in the late spring, 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 grass and 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 and grass-like 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.

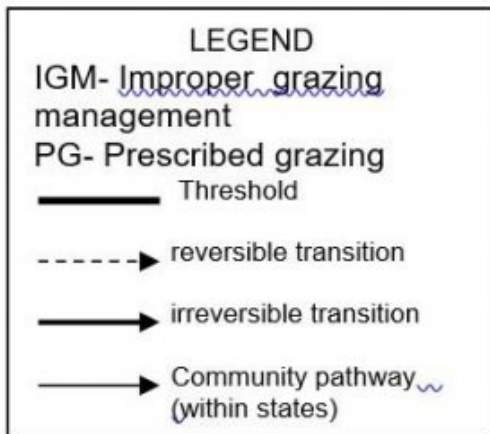
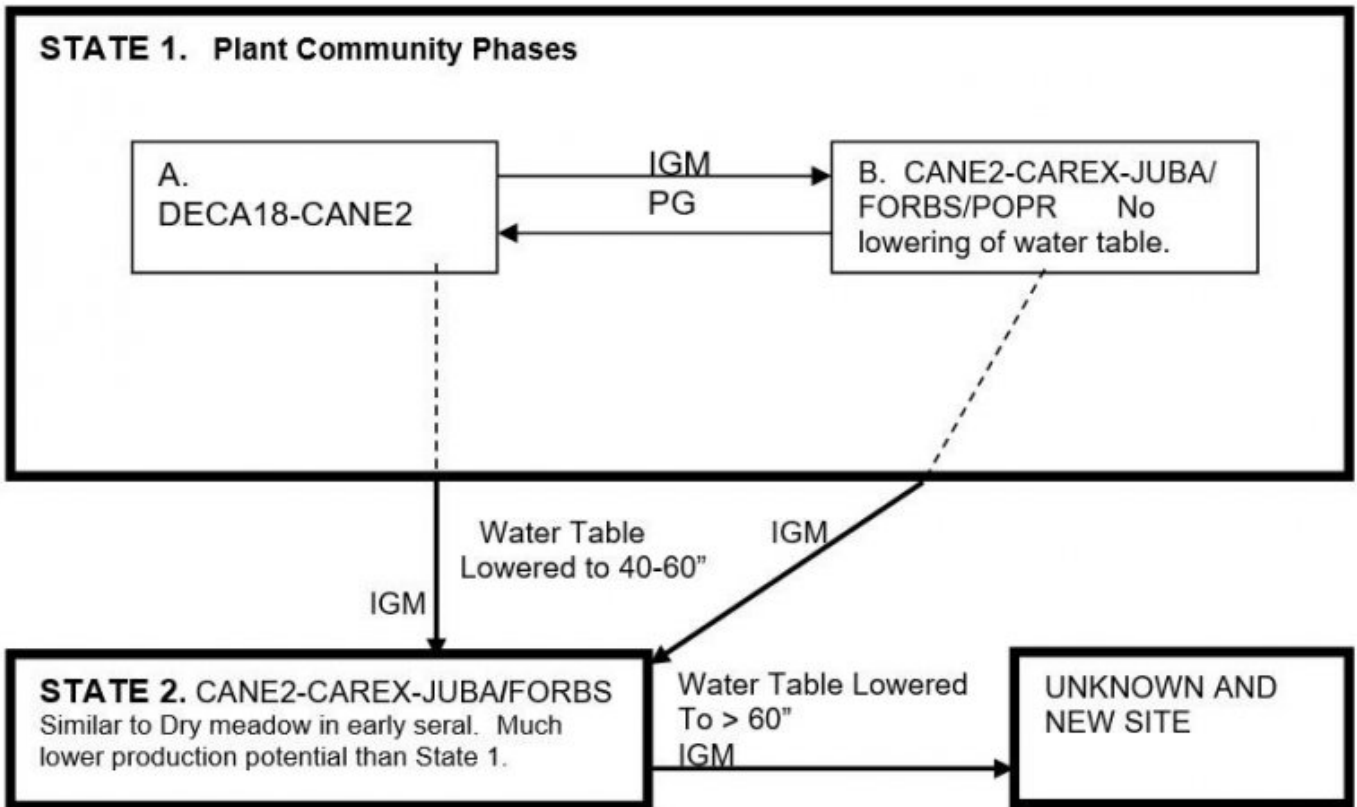
State 1 Phase A or B to State 2. Develops through permanently lowering the late growing season water table to 40 to 60 inches. This can occur with continued improper grazing management. It may also occur with proper grazing on the site, but channel erosion may continue if poor off-site conditions cause frequent and/or severe flooding. This site has crossed the threshold. It cannot be returned to State 1 without raising the water table.

State 2 to unknown site. Results from permanently losing the water table in the soil profile 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. It cannot be returned to State 1 without raising the water table.

Practice Limitations:

There are moderate to severe seeding limitations on this site due to difficulty in preparing an adequate seedbed. Elimination of existing vegetation prior to planting is difficult in wet seasons and 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
 DECA18- Tufted Hairgrass
 CANE2 - Nebraska Sedge
 CAREX - Sedges
 JUBA - Baltic Rush
 POPR - Kentucky Bluegrass

State 1
State 1 Phase A

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This plant community has tufted hairgrass and Nebraska sedge as co-dominant in the herbaceous layer. 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.

Table 5. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%

Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	90-95%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

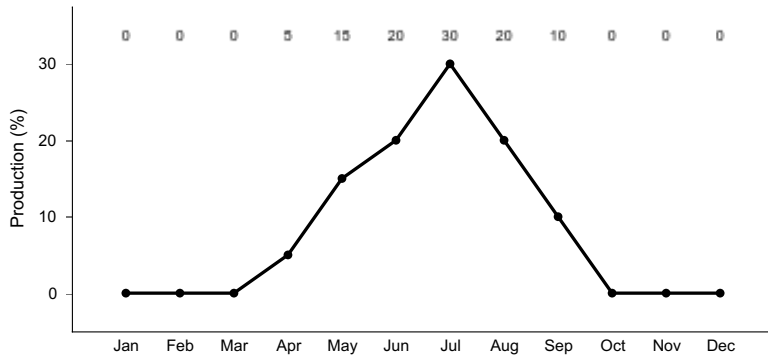


Figure 3. Plant community growth curve (percent production by month). ID0814, MEADOW.

State 2 State 1 Phase B

Community 2.1 State 1 Phase B

This plant community is dominated by Nebraska sedge and other sedges and Baltic rush. Forbs have increased in the community and Kentucky bluegrass may have invaded. This phase has developed due to improper grazing management. The water table has not been lowered from that of Phase A.

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	90-95%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

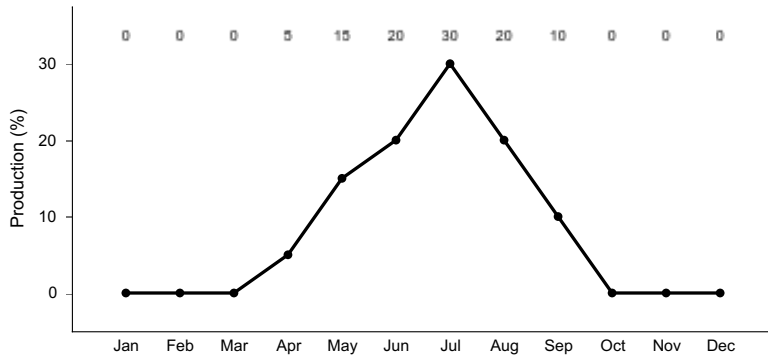


Figure 4. Plant community growth curve (percent production by month). ID0814, MEADOW.

State 3
State 2

Community 3.1
State 2

This plant community is dominated by Nebraska sedge and other sedges and Baltic rush but the overall production potential of the site is much lower than State 1. There is an increase 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 from 20-40 inches down to 40-60 inches below the surface. This state can be similar to Dry Meadow 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.

Table 7. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	90-95%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

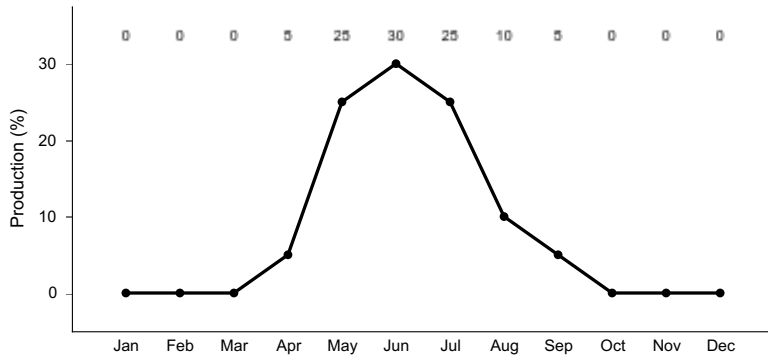


Figure 5. Plant community growth curve (percent production by month). ID0815, B13 DRY MEADOW.

State 4

State 3

Community 4.1

State 3

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 loss of a water table. Some soil loss from the surface has 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 upland sites such as Loamy Bottom other loamy sites in 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 will take many years to approach the plant community in State 1.

Table 8. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	90-95%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This meadow ecological site provides diverse habitat for wetland and upland wildlife species. The seasonal hydrology results in abundant forage attracting invertebrate and vertebrate animals to this ecological site. Important seasonal habitat is provided for over 80% of the adjacent rangeland resident and migratory animals including western toad, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-

grouse, sharp-tailed grouse, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Large herbivore use of this ecological site is dominated by mule deer, moose, and elk. Native reptiles and amphibians are reliant on these meadow sites throughout the year. Open water is seasonal, only being provided by seasonal runoff, ponding, seasonal high water table, and natural springs.

State 1 Phase 1.1 –Tufted Hairgrass/ Nebraska Sedge Reference Plant Community (RPC): The RPC provides a diversity of grasses and forbs used by native insect communities who assist in pollination of the plant community. The insects are food for the many predator species utilizing the site. The reptile and amphibian community is represented by rubber boa, western rattlesnake, western toad, boreal chorus frog, and northern leopard frog. A diverse amphibian population is a key indicator of good ecological health on this site. Loss of hydrology will limit or exclude amphibians from this ecological site. Water loving birds including ducks, geese, cranes, and shorebirds may utilize the habitat for nesting and feeding. Sage-grouse utilize the meadows as summer and fall brood-rearing habitat. Isolated patches of woody vegetation add horizontal and vertical structure for nesting and roosting sites. Bird species can include black-capped chickadee, MacGillivray's warbler, fox sparrow, song sparrow, and long-billed curlew. The plant community supports the seasonal (spring, summer and fall) forage needs of pronghorn antelope, mule deer, and elk. The dominant plant community is preferred forage for the ungulates utilizing the site. Limited thermal cover for ungulates is provided by isolated patches of woody vegetation within the plant community. A small mammal population including deer mouse, montane vole, meadow vole, and western jumping mouse may utilize the habitat on a seasonal basis.

State 1 Phase 1.2- Nebraska Sedge/ Sedges/ Baltic Rush/ Forbs/ Kentucky Bluegrass Plant Community: This plant community is the result of improper grazing management. The new plant community would have similar insect diversity and populations to the reference plant community or possibly increased populations due to the increase in forbs. With the hydrologic conditions similar to Phase 1.1, similar amphibian habitat would be available. Continued improper grazing management would reduce the value of the habitat for reptiles and amphibians. The plant community provides summer and fall brood-rearing habitat for sage-grouse when sagebrush cover is nearby. Large mammal (moose, mule deer, and elk) use would be seasonal (spring through fall). The dominant plant community provides reduced amounts of quality forage for ungulates due to improper grazing. Small mammal populations and diversity would be reduced due to the loss of vertical structure and increasing vulnerability to predators.

State 2 – Nebraska Sedge/ Sedges/ Baltic Rush/Forbs/Grasses Plant Community: This state developed due to continued improper grazing management and a permanent lowering of the water table. Loss of historic hydrology has reduced the habitat value for many animals present in State 1. Pollinators would be supported by forbs that require less moisture than the plants in State 1. The loss of historic hydrology will limit or exclude use of the site by amphibians and many reptiles. Suitable habitat for the northern leopard frog, a species of concern, would not be provided. With improper grazing management, the loss of vertical and horizontal structure would reduce diversity and populations of many species of birds. The site would be more suitable for killdeer, western meadowlark, and horned lark. Birds of prey (northern harrier and ferruginous hawk) may range throughout these areas looking for prey species. With continued improper grazing management forage for deer and elk would be available for a shorter duration in the summer and fall. Small mammal populations and diversity would be reduced under an improper grazing management scenario that reduces vertical structure and increases their vulnerability to predators.

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. When hydrologic condition of the vegetative cover is good, natural erosion hazard is slight.

Recreational uses

This site presents an aesthetically pleasing view of lush vegetation consisting primarily of grasses and grass-like plants. When livestock or big game are grazing or browsing on the site it presents a pleasant pastoral panorama. Hikers and fisherman often traverse the edges of this site. Picnickers and campers frequent the site in late summer and early fall as sometime adjacent shaded wooded areas become less pleasant on cool days. Vehicular use can be very detrimental to this site, especially during wet weather and high water table conditions.

Wood products

none.

Other products

none.

Other information

Field Offices

American Falls, ID
Blackfoot, ID
Burley, ID
Driggs, ID
Ft. Hall, ID
Idaho Falls, ID
Malad, ID
Pocatello, ID
Rexburg, ID
Soda Springs, ID
St. Anthony, 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
Chris Hoag, Wetland Plant Ecologist, NRCS, Idaho
Joe May, State Rangeland Management Specialist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD
Kristen May, Resource Soil Scientist, NRCS, Idaho

Other references

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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

Kendra Moseley, 9/23/2020

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	05/05/2008
Approved by	Kendra Moseley
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:** does not occur 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):** structure ranges weak and moderate very fine, fine and medium granular to weak very thin and thin platy to weak fine, medium and coarse and moderate medium subangular blocky. Soil organic matter (SOM) ranges from 2 to 95 percent. Surface color ranges from grayish brown to very dark grayish brown to very dark gray. The A or A1 horizon is typically 2 to 11 inches thick.
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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):** 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:
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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 in 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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