USDA Natural Resources Conservation Service

Ecological site R010XA027ID
Meadow DECA18-CANE2

Last updated: 12/13/2023
Accessed: 05/12/2025

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): 010X–Central Rocky and Blue Mountain Foothills

This MLRA is characterized by gently rolling to steep hills, plateaus, and low mountains at the foothills of the Blue Mountains in Oregon and the Central Rocky Mountains in Idaho. The geology of this area is highly varied and ranges from Holocene volcanics to Cretaceous sedimentary rocks. Mollisols are the dominant soil order and the soil climate is typified by mesic or frigid soil temperature regimes, and xeric or aridic soil moisture regimes. Elevation ranges from 1,300 to 6,600 feet (395 to 2,010 meters), increasing from west to east. The climate is characterized by dry summers and snow dominated winters with precipitation averaging 8 to 16 inches (205 to 405 millimeters) and increasing from west to east. These factors support plant communities with shrub-grass associations with considerable acreage of sagebrush grassland. Big sagebrush, bluebunch wheatgrass, and Idaho fescue are the dominant species. Stiff sagebrush, low sagebrush, and Sandberg bluegrass are often dominant on sites with shallow restrictive layers. Western juniper is one of the few common tree species and since European settlement has greatly expanded its extent in Oregon. Nearly half of the MLRA is federally owned and managed by the Bureau of Land Management. Most of the area is used for livestock grazing with areas accessible by irrigation often used for irrigated agriculture.

For further information, see "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, 2006)" available online at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053624

Ecological site concept

• Site occurs on bottomlands
• Slopes less than 8%
• Water table present for most of the growing season
• Water at or near the surface at beginning of growing season and down to 20-40 inches at the end of the growing season

Associated sites

R010XA015ID	**South Slope Loamy 16-22 PZ** Adjacent south slopes
R010XA028ID	**Dry Meadow 8-15 PZ PONE3-PHAL2** Adjacent meadows at higher landscape positions relative to water sources
R010XA039ID	**Wet Meadow Carex/Juncus** Adjacent meadows at lower landscape positions relative to water sources

Similar sites

R010XA028ID	**Dry Meadow 8-15 PZ PONE3-PHAL2** Water at or near the surface at beginning of the growing season and greater than 40 inches at the end of the growing season
R010XA039ID	**Wet Meadow Carex/Juncus** Water at or near the surface at beginning of growing season and down to 10-20 inches at the end of the growing season
R010XA042ID	**Loamy Bottom 12-16 PZ LECI4** Water table usually not present

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Deschampsia cespitosa* (2) *Carex nebrascensis*

Physiographic features

This site generally occurs on nearly level to undulating slopes in stream valleys, high mountain valleys on flood plains. Slopes are 0 to 4 percent. It also occurs around localized seeps and springs. This site is frequently crossed by old stream courses, oxbows and potholes. The surface is generally not flat, but slightly undulating with small depressions and high spots. Elevation ranges between 3500 to 7500 feet (1065 to 2290 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountain valleys or canyons > Flood plain (2) Mountain valleys or canyons > Drainageway
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	3,500–7,500 ft
Slope	0–4%
Ponding depth	2–6 in
Water table depth	0–40 in
Aspect	Aspect is not a significant factor

Climatic features

The Big and Little Wood River Foot slopes and Plains, proposed as MLRA 10X, has a mean elevation of 5310 feet above sea level, and varies from 3600 to 9235 feet. In general, average annual precipitation is greatest on the western side, with the southeast area being the driest. The average annual precipitation, based on 7 long term climate stations located throughout the MLRA, is 15.39 inches, with a range of 12.5 to 18 inches. Monthly precipitation is generally greatest at the end of the year, diminishes steadily until a low in July and August, then increases rapidly in the autumn.

Monthly temperatures can vary considerably. Highs of up to 102° and lows down to -52° Fahrenheit have been recorded. The average annual temperature is 42.9°. The frost-free period ranges from 75 to 98 days. The freeze-free period is a bit longer: 106 to 133 days.

Both morning and afternoon average relative humidity values peak in the winter, and reach their low in July and august. The average number of sunny, cloud-free days is above average for the summer months, but below average for the period from November through February.

Table 3. Representative climatic features

Frost-free period (characteristic range)	75-98 days
Freeze-free period (characteristic range)	106-133 days
Precipitation total (characteristic range)	12-18 in
Frost-free period (average)	86 days
Freeze-free period (average)	120 days
Precipitation total (average)	16 in

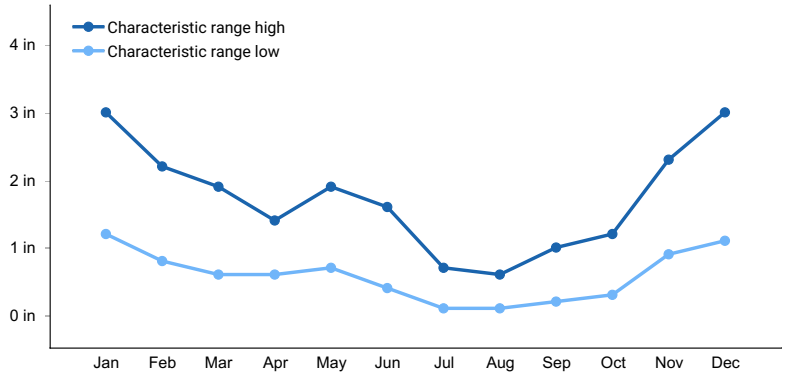

Figure 1. Monthly precipitation range

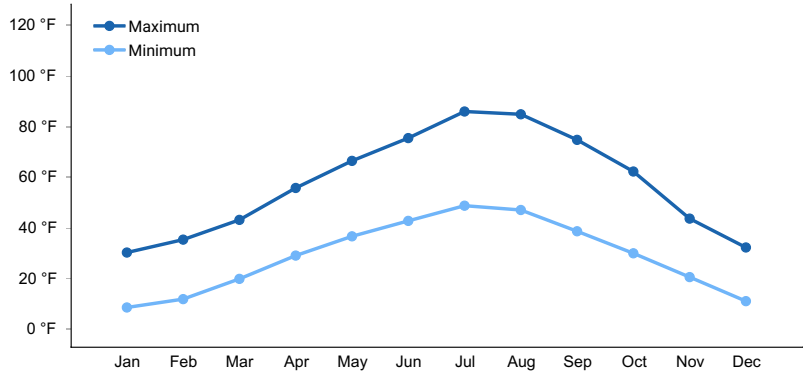

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

The 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 multiple stream types.

Wetland description

The site may include multiple wetland types.

Soil features

The soils on this site are very deep. The soils are poorly to very poorly drained with slow to moderate permeability. Runoff is low to very high depending on the season. Available water holding capacity (AWC) is low to moderate and is supplemented by upward capillary movement from the shallow water table. The effective rooting depth is limited by the water table

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The erosion hazard for water is slight to severe 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 soil textures are varied from fine sandy loams to clay loams and peats, and have a water table at or near the surface at the beginning of the growing season and down to 20 to 40 inches at 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 near 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. These soils are characterized by a xeric soil moisture regime. Soil characteristics, flooding, and water table can vary across the complex of meadow sites. Soil temperature regime is frigid.

Soil Series Correlated to this Ecological Site -

Bickett
Hapur
Houk
Marshdale

Table 4. Representative soil features

Parent material	(1) Alluvium–volcanic rock
Surface texture	(1) Loam (2) Sandy loam (3) Silty clay loam
Family particle size	(1) Fine-loamy
Drainage class	Poorly drained
Permeability class	Slow to moderate
Soil depth	60–80 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	3.6–8.4 in
Calcium carbonate equivalent (0-40in)	0–25%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.1–9
Subsurface fragment volume <=3" (4-60in)	1–15%
Subsurface fragment volume >3" (4-60in)	0–5%

Ecological dynamics

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. Typically, the 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 table at or near the surface or slightly above the surface for the entire growing season. The site is dominated by broadleaf cattail, hardstem bulrush, and common threesquare.

2. Wet Meadow sites. Shallow 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. Dry Meadow site. Slightly higher areas that are drier during the growing season and the water table is greater than 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 to 90 percent grasses and grass-like, 5 to 15 percent forbs and 0 to 10 percent shrubs. The depression area plant communities are inclusions and may have sedge and rush species making up nearly 100 percent of the plant 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 moves down to a depth of about 20 to 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 for the plant community of 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 (4) 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.

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

tat or near the surface.

Due to the deep soils, fertility, inherent high productivity of the site, high percentage of 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 are 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 moisture and during 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 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 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 can be influenced adversely 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. 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 competitive against potentially invasive plants.

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 and 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.

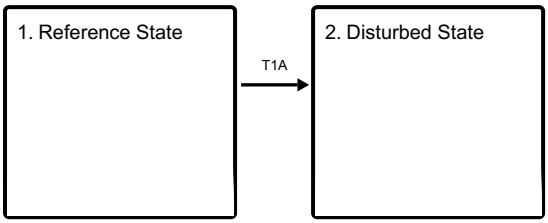
Watershed:

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.

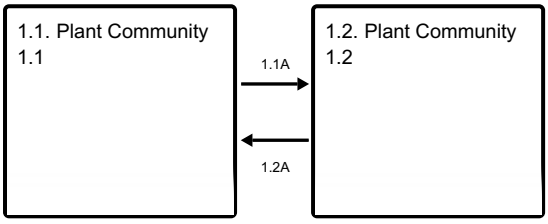
State and transition model

Ecosystem states



T1A - permanently lowering the late growing season water table

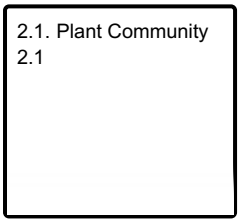
State 1 submodel, plant communities



1.1A - improper grazing management

1.2A - prescribed grazing

State 2 submodel, plant communities



State 1
Reference State

Resilience management. 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 runoff events. It is not feasible to return this site to State 1 or State 2 without raising the water table.

Dominant plant species

- tufted hairgrass (*Deschampsia cespitosa*), grass
- Nebraska sedge (*Carex nebrascensis*), grass

Community 1.1
Plant Community 1.1

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.

Resilience management. The Reference Plant Community Phase is Phase 1.1. 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 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.

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%

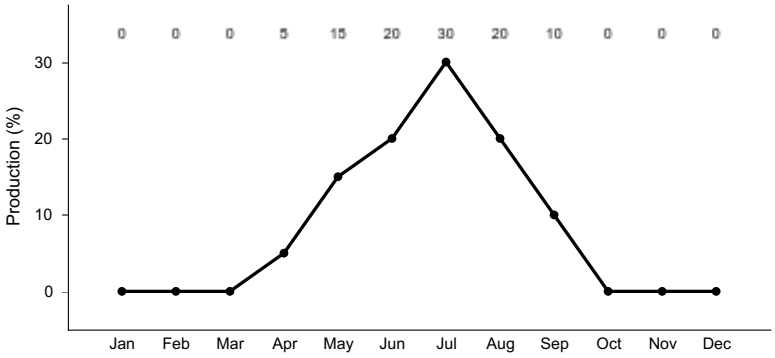


Figure 3. Plant community growth curve (percent production by month). ID0314, Wet Meadow. State 1, Reference Plant Community Phase.

Community 1.2
Plant Community 1.2

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 Plant Community 1.1.

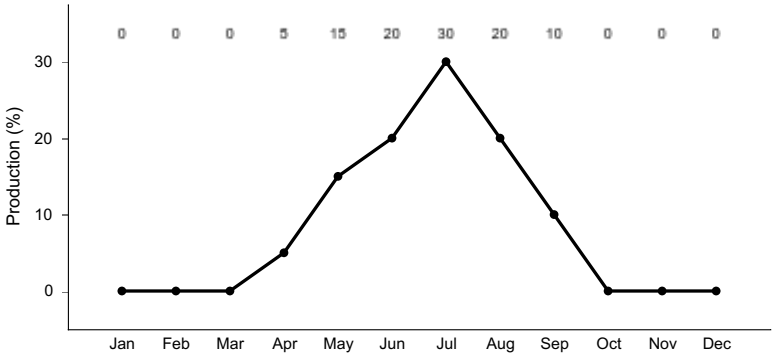


Figure 4. Plant community growth curve (percent production by month). ID0314, Wet Meadow. State 1, Reference Plant Community Phase.

Pathway 1.1A
Community 1.1 to 1.2

Phase 1.1 to 1.2. Develops with improper grazing management.

Pathway 1.2A
Community 1.2 to 1.1

Phase 1.2 to 1.1. Results from prescribed grazing.

State 2
Disturbed State

Dominant plant species

- Nebraska sedge (*Carex nebrascensis*), grass
- mountain rush (*Juncus arcticus ssp. littoralis*), grass
- Forb (herbaceous, not grass nor grass-like) (*Forb (herbaceous, not grass nor grass-like)*), other herbaceous

Community 2.1
Plant Community 2.1

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 to 40 inches to 40 to 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 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%

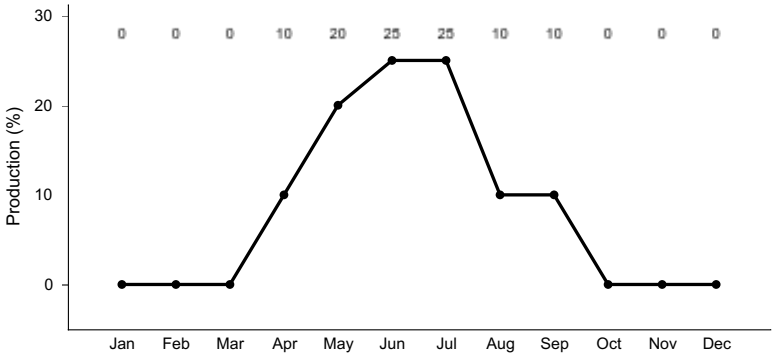


Figure 5. Plant community growth curve (percent production by month). ID0315, DRY MEADOW. State 1.

Transition T1A
State 1 to 2

State 1 Phase 1.1 or 1.2 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 is not feasible to return this site to State 1 without raising the water table.

Additional community tables

Animal community

Wildlife Interpretations.
Animal Community – Wildlife Interpretations

This meadow ecological site provides diverse habitat value for both wetland and upland wildlife species. The seasonal hydrology results in abundant forage and seasonal water attracting invertebrate and vertebrate animals to this ecological site. Important seasonal habitat is provided for over 80% of adjacent rangeland resident and migratory animals including western toad, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. Large herbivore use of this ecological site includes mule deer, pronghorn antelope and elk. Native reptiles and amphibians are reliant on these meadow sites throughout the year. Loss of site hydrology significantly reduces habitat value of the adjacent ecological sites. 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 provide feed for the many predator species utilizing the site. The reptile and amphibian community is represented by leopard lizard, western skink, 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. Sage-grouse utilize this site as summer and fall brood-rearing habitat. Isolated patches of woody vegetation add horizontal and vertical structure for nesting and roosting sites for resident and migratory avian species. Bird species can include warbling vireo, black-capped chickadee, MacGillivray's warbler, fox sparrow, song sparrow and long-billed curlew. The plant community supports seasonal forage needs of large mammals (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 with isolated patches of woody vegetation within the plant community. A diverse small mammal population including deer mouse, montane vole and western jumping mouse would utilize the habitat on a seasonal basis.

State 1 Phase 1.2- Nebraska Sedge/ Sedges/ Baltic Rush/ Forbs/ Kentucky Bluegrass Plant Community: The plant community is the result of improper grazing management. Under proper grazing management insect diversity and populations would be similar to the reference plant community. With the hydrologic conditions similar to State 1 Phase 1.1, amphibian use would still occur and prey species would be abundant. Improper grazing management would reduce the habitat cover value for reptiles and amphibians. The plant community provides summer and fall brood-rearing habitat for sage-grouse when sagebrush cover is nearby. Large mammal (antelope, mule deer and elk) use would be seasonal. The dominant plant community provides reduced quality forage for ungulates. Small mammal populations and diversity would be reduced under an improper grazing management scenario reducing vertical structure and increasing vulnerability to predators.

State 2 – Nebraska Sedge/ Sedges/ Baltic Rush/Forbs/Grasses Plant Community: The plant community is the result of improper grazing management. Loss of historic hydrology has reduced the habitat value for many animals present in State 1. The vigor and diversity of forbs would support a very limited diversity and population of pollinators. The loss of historic hydrology will limit or exclude use of the site by amphibians and many reptiles. Suitable habitat cover 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 all species of birds. The site would be more suitable for killdeers, western meadowlark and horned larks. Birds of prey (northern harrier and Cooper's hawk) may range throughout these areas looking for prey species. With improper grazing management forage for ungulates would be available for a shorter duration in the summer and fall. Bat populations and diversity may be reduced by the change in plant community and reduced population and diversity of insects. Small mammal populations and diversity would be reduced under an improper grazing management scenario reducing vertical structure and increasing 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

Mountain Home, ID
Gooding, ID
Shoshone, ID
Rupert, ID
Arco, 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
Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho
Leah Juarros, Resource Soil Scientist, NRCS, Idaho
Lee Brooks, Range Management Specialist, IASCD

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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.

Contributors

Dave Franzen and Jacy Gibbs

Approval

Kirt Walstad, 12/13/2023

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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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:** none. 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.

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.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The A or A1 horizon is typically 5 inches thick, sometimes with a thick organic horizon over the A. Structure ranges from weak fine granular to strong medium subangular blocky. Soil organic matter (SOM) needs to be determined.

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 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.

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