Ecological site R043BY023ID
Fen 22+ PZ Carex

Last updated: 2/03/2020
Accessed: 05/18/2024

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

Major Land Resource Area (MLRA):

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:
Not saline or saline-sodic.
Deep to very deep, not skeletal within 20” of soil surface.
Season water table <40” with dark, organic mats (peat) over sand and gravel
Poorly drained, standing water is common until late summer
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

R012XY047ID	**Marsh TYLA-SCAC3**

R043BY007ID	**Meadow DECA18-CANE2**
R043BY008ID	**Dry Meadow PONE3-PHAL2**
R043BY011ID	**Riparian SALIX/CAREX**
R043BY012ID	**Mountain Poorly Drained Bottom ARCAV3-DAFRF/FEID**

Similar sites

R012XY047ID	**Marsh TYLA-SCAC3**
R043BY007ID	**Meadow DECA18-CANE2**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site generally occurs on nearly level high mountain valley floors, closed basins, and discrete springs. The site can also occur on mountain sideslopes where groundwater discharges to the surface. This site is frequently dissected by old stream courses, oxbows, and potholes. Slopes are less than 2 percent and it occurs on all aspects. Elevations range between 6000-8500 feet (1825-2600 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	1,829–2,591 m
Slope	0–2%
Water table depth	0 cm
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)	610 mm

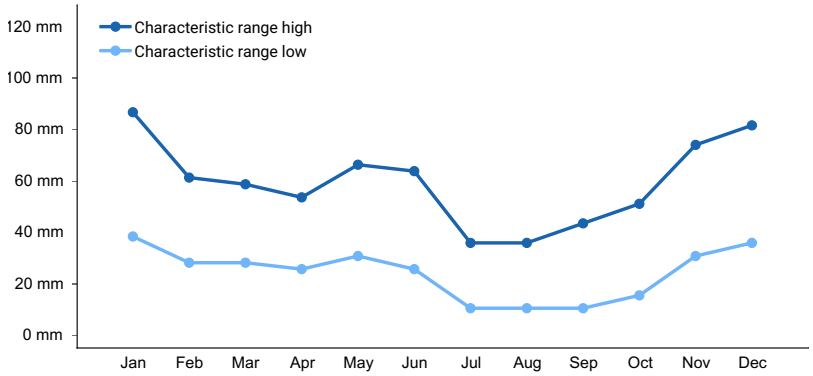


Figure 1. Monthly precipitation range

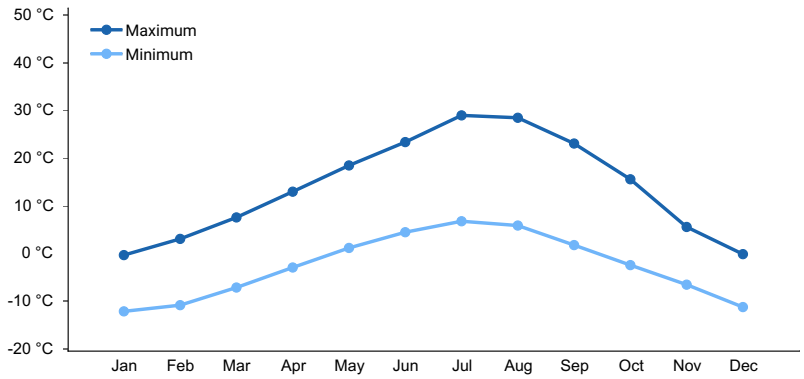


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is typified by water at the soil surface yearlong.

Soil features

Soils on this site have thick to very thick (10-40+ inches), dark, organic mats (peat) over sand and gravel. The typical site has a histic epipedon. Soil pH ranges from 4.0 to 7.0. These soils are moderately deep to very deep and very poorly drained. Permeability in the upper profile is slow to moderate. Runoff is slow. Soils are saturated to the surface yearlong. Maintenance of the organic layer (peat) is dependent on cold temperatures and anaerobic conditions throughout the profile.

Erosion hazard is slight, however, the peaty and high organic soils can hummock severely from trampling. 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 saturated soils throughout the year. The site is dependent upon flooding, stream flows, seeps or springs, or from run-on from adjacent sites. Soil characteristics, depth of organic layer, and flooding can vary across the site and associated meadow sites.

Soil Series Correlated to this Ecological Site -

No data

Ecological dynamics

This site ranges from poor to rich fens. Poor fens are characterized by a pH of 4.0 to 5.5. Bryophytes (Sphagnum) are dominant followed by vascular species (sedges and ericads). Rich fens are slightly acid to 7.0. They are dominated by sedges, other graminoids, and true mosses.

Composition by weight is 80-90 percent grass and grass-likes, 10-20 percent mosses and forbs, and 0-2 percent shrubs.

This site has evolved in a montane climate characterized by cool summers and cold, wet winters. A fen is formed by a stable discharge of groundwater. It requires wet, anaerobic soils, carbon accumulation from vigorous plant growth, low soil temperatures, and thousands of years to form the characteristic organic soil.

Fens form at low points in the landscape or near slopes where ground water intercepts the soil surface. Ground water inflows maintain a fairly constant water level year-round, with water at or near the soil surface. Constant high water levels lead to accumulation of organic material. In addition to peat accumulation and perennially saturated soils, some fens have distinct soil and water chemistry properties with high levels of one or more minerals. The surrounding landscape may be ringed with other wetland sites (see Wet meadow, Meadow, and Dry Meadow ESD's) or a variety of upland sites from grasslands to forest.

Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, white-tail deer, bighorn sheep, Shira's moose, and Rocky Mountain elk.

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

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 a mosaic of grass/ grass-like species. Forbs and shrubs are minor components of the plant community. Some of these species may be dominant in small areas due to soil and water variations as stated above. Small areas within the fen site may be dominated by either *Carex aquatilis*, *Carex atherodes*, *Carex rostrata*, *Carex vesicaria*, *Eleocharis quinqueflora*, *Eleocharis palustris*, *Calamagrostis canadensis* or any of the grass/grass-like species listed in the Reference Plant Community Phase Plant Species Composition table. Sphagnum species may occur in most of these plant communities. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

The total annual production is 1500 pounds per acre (1666 kilograms per hectare) in a normal year. Production in a favorable year is 2000 pounds per acre (2222 kilograms per hectare). Production in an unfavorable year is 1000 pounds per acre (1111 kilograms per hectare). Structurally, cool season deep-rooted perennial sedges and grasses are very dominant, followed by perennial forbs being more dominant than shrubs.

FUNCTION:

Due to the rarity of this site and fragile nature of the peat layer, grazing by large herbivores should be discouraged. Wet soils can limit grazing opportunities, particularly early in the year.

Due to the permanent saturation at the soil surface, recreational opportunities are limited. Hunters and fisherman may cross the site. Motorized vehicles can be very detrimental to the site because of the saturated surface soils.

Site degradation is usually the result of the stable discharge of water being changed. 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 change the hydrology of the site.

Other threats to the site may include inundation, peat mining, livestock grazing, and invasive species.

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 the next growing season.

Influence of improper grazing management:

Livestock grazing should be avoided on this site due to the potential of de-stabilizing the normal groundwater discharge. Livestock can cause soil damage due to trampling.

Weather influences:

Because of the deep soils, the influence of groundwater discharge at the surface, seasonal flooding and run-on, the production of this site changes little during wet or dry precipitation years. Below normal temperatures in the spring have little impact on total production.

Influence of Insects and disease:

Periodic disease and insect outbreaks can affect vegetation health. 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 that grow on this site are very competitive potentially invasive species. The growing season and associated environment limit the potential for the introduction of undesirable plants.

Influence of wildlife:

Large and small mammals are occasional users of the site. Waterfowl and shore birds use the site for food, nesting, or brood raising in the late spring, summer, and fall. Total numbers are seldom high enough to adversely affect the plant community.

Watershed:

The largest threat to degradation of this site is the de-stabilization of the ground water discharge to the soil surface. Off-site conditions can affect the gradient of adjacent stream channels that can affect the hydrologic function. If the perennial 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. These events may be triggered by massive wildfires or poor forest/ rangeland health. As the hydrologic function is changed, site 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 and grass-likes. Extreme down cutting and lowering of the water table can move the site across a 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:

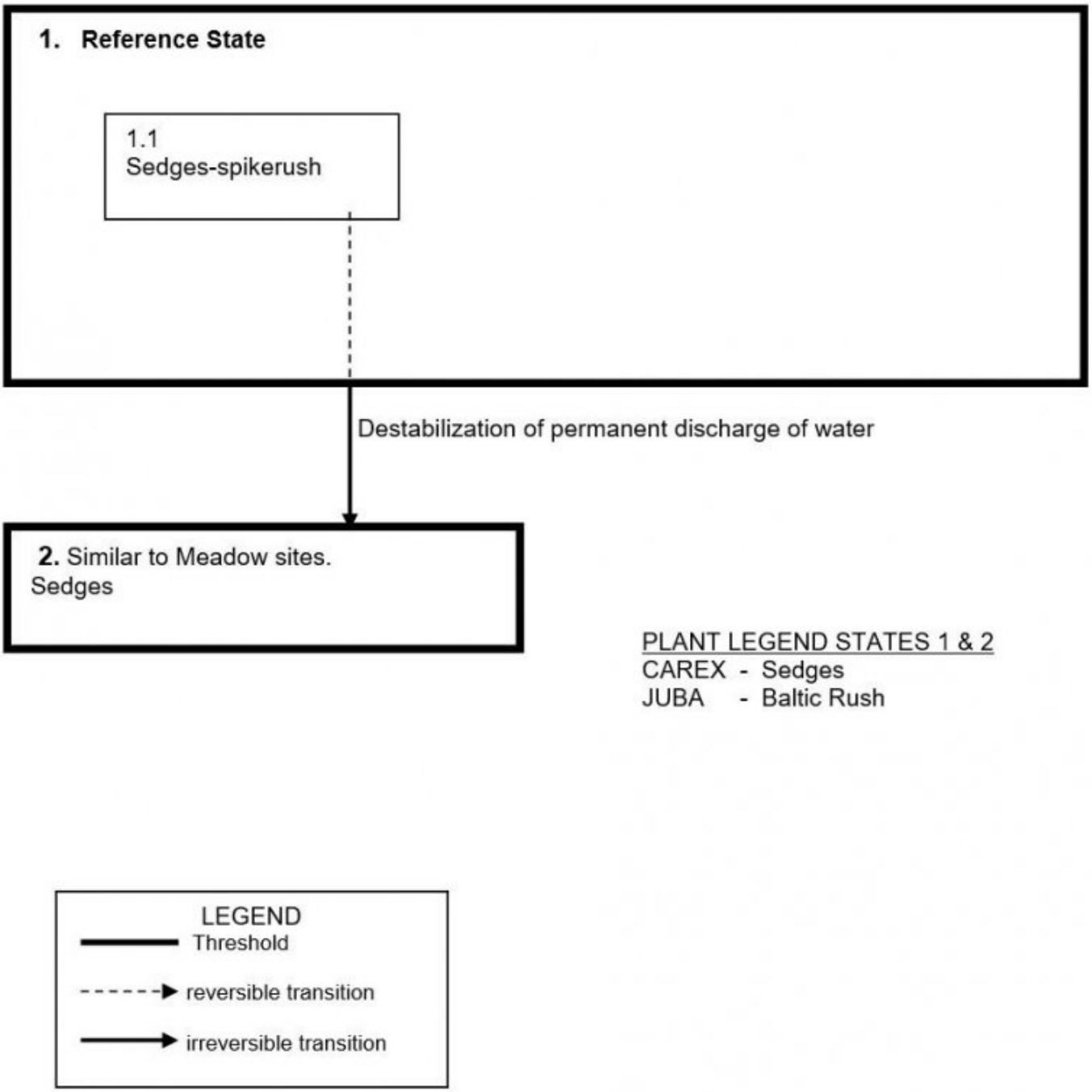
State 1 to State 2. Develops through permanently modifying the discharge of ground water to the surface. This can occur with grazing, down-cutting of the adjacent stream channel, or changes in the hydrologic function of the upper watershed.

Practice Limitations:

There are severe seeding limitations on this site due to difficulty in preparing an adequate seedbed in saturated soils. Restoration of fens is thought to be difficult or impossible due to their reliance on groundwater and snowmelt hydrology. Fens are delicate systems that form in situ over thousands of years, requiring highly stable conditions. Once damaged, recovery is slow and the resulting hydrologic alterations may result in permanent degradation. Elimination of existing vegetation prior to planting should not be attempted. Grade stabilization structures or other bioengineering practices may be needed to prevent further down-cutting of the channel. Fencing of the site for

livestock exclusion might also be a consideration.

State and transition model



State 1
State 1

Community 1.1
State 1

This plant community is dominated by a mosaic of grass/ grass-like species. Forbs and shrubs are minor components of the plant community. Some of these species may be dominant in small areas due to soil and water variations as stated above. Small areas within the fen site may be dominated by either *Carex aquatilis*, *Carex atherodes*, *Carex rostrata*, *Carex vesicaria*, *Eleocharis quinqueflora*, *Eleocharis palustris*, *Calamagrostis canadensis*, or any of the grass/grass-like species listed in the Reference Plant Community Phase Plant Species Composition table. Sphagnum species may occur in most of these plant communities.

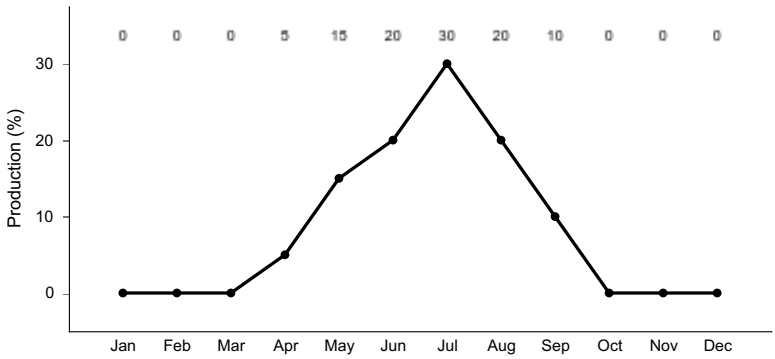


Figure 3. Plant community growth curve (percent production by month). ID1214, MEADOW. State 1.

State 2
State 2

Community 2.1
State 2

This plant community may resemble any of the meadow sites. The site has crossed the threshold. This state cannot be returned to State 1 without re-establishing the water discharge to the surface. This might be done over time using structures or bioengineering practices, but the plant community may take many years to approach the plant community in State 1.

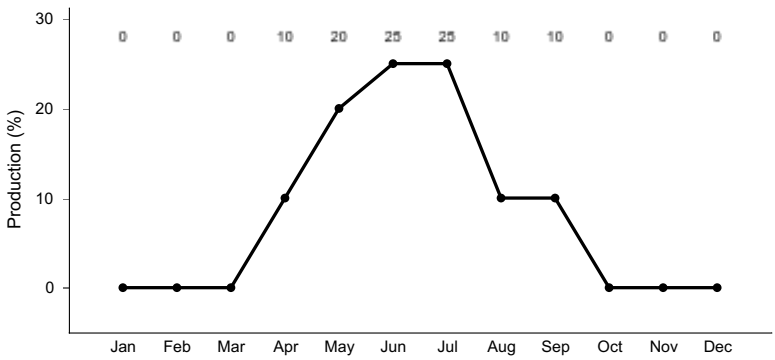


Figure 4. Plant community growth curve (percent production by month). ID1215, DRY MEADOW early to mid seral. State 2.

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. This site is not recommended for inundation to create waterfowl and/or fisheries habitat due to the unique organic soils that occur.

Grazing Interpretations.

Due to the rarity of this site and fragile nature of the peat layer, grazing by large herbivores should be discouraged.

Hydrological functions

No data.

Recreational uses

Due to the permanent saturation of the soil surface level, recreational opportunities are limited. Hunters and fisherman may cross the site. Motorized vehicles and trails 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
Dan Ogle, Plant Materials Specialist, NRCS, Idaho
Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho
Chris Hoag, Wetland Plant Ecologist, NRCS, Idaho
Jim Cornwell, Range Management Specialist, IASCD
Lee Brooks, Range Management Specialist, IASCD
Bruce Knapp, Resource Soil Scientist, NRCS, Idaho

Type locality

Location 1: Valley County, ID

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

Scott Woodall, 2/03/2020

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.

Author(s)/participant(s)	Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	06/15/2009
Approved by	Scott Woodall
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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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.

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3. **Number and height of erosional pedestals or terracettes:** Do not occur on this site.

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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.

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

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

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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 >80 percent to optimize infiltration. The plant community does not depend on water infiltration alone, but on the discharge of water to the surface.

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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.

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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 low 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 1500 pounds per acre (1666 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses and sedges produce 80-90 percent of the total production, forbs 10-20 percent and shrubs 0-2 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: No data.

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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.
