USDA Natural Resources
Conservation Service

Ecological site R009XY019ID
Dry Meadow

Last updated: 9/23/2020
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.

Classification relationships

No data.

Associated sites

R009XY003ID	**Loamy 16-22 PZ**
R009XY006ID	**Loamy 12-16 PZ**
R009XY016ID	**Loamy 22+ PZ FEID-PSSPS**
R009XY018ID	**Meadow**
R009XY031ID	**Stony Riparian POBAT-ALNUS/ELYMU**
R009XY032ID	**Riparian DECA5-CAREX**
R009XY033ID	**Stony Bottomland SYAL/PSSP6**

Similar sites

R009XY018ID	**Meadow**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on nearly level topography along small streams. The site is frequently dissected by old stream courses and oxbows. Slopes are nearly level to undulating and range from 0-4 percent. This site occurs on all aspects. Elevations range from 2500 to 6000 feet (750 to 1800 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Occasional to frequent
Ponding duration	Very long (more than 30 days)
Ponding frequency	Rare

Elevation	762–1,829 m
Slope	0–4%
Ponding depth	0–30 cm
Water table depth	0–91 cm

Climatic features

The elevation of MLRA 9 ranges from 2000 to 4000 feet with an average elevation of 3000 feet. Elevation along major streams averages only 650 feet above sea level. Average annual precipitation ranges from 20 to 25 inches with an average of 23 based on 9 long term climate stations located throughout the MLRA. Summers are relatively dry while precipitation is evenly distributed between fall, winter, and spring.
The maximum average annual temperature is 58 degrees Fahrenheit while the average minimum temperature is 35 degrees F. The average annual temperature is 46.8 degrees F. The frost free period ranges from 107 to 134 days and the freeze free period ranges from 143 to 173 days.

Table 3. Representative climatic features

Frost-free period (average)	134 days
Freeze-free period (average)	173 days
Precipitation total (average)	660 mm

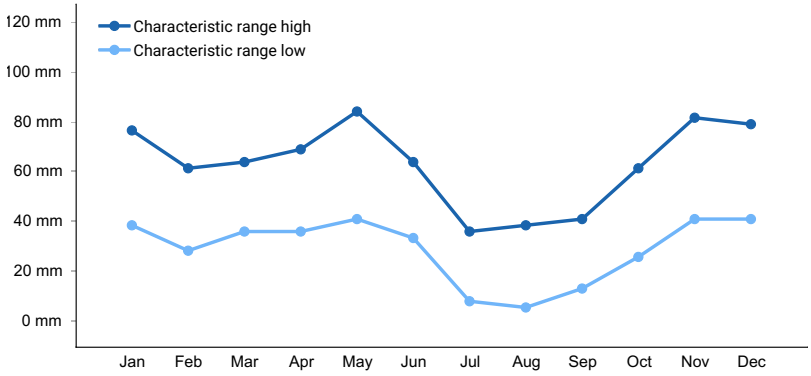


Figure 1. Monthly precipitation range

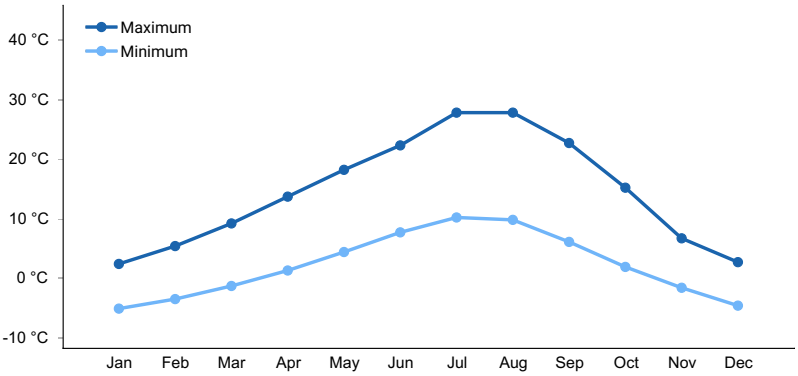


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

This site is influenced by adjacent wetlands, streams, or run on.

Soil features

The soils on this site are very deep, somewhat poorly to poorly drained Silt loam to Silty Clay loam. They have moderately to slow permeability and available water holding capacity is very low to high. Runoff is low to high with

occasional brief ponding or flooding in depressions and drains. The erosion hazard is slight to moderate by water, and slight to moderate by wind. The water table fluctuates from 20 to 40 inches during most of the growing season restricting most deep-rooted shrubs. Depressions usually accumulate local sediment instead of eroding. The surface texture is generally ashy loam to silt loam with few or no surface stones. The subsoil is usually moderately well to well developed with clay ranging from approximately 20 to 45 percent. These soils are characterized by a xeric or aquic soil moisture regime and the lack of shallow restrictive layers. Soil temperature regime is mesic to frigid. Severe removal of vegetation can allow accelerated channel cutting, which usually causes a lowering of the water table. These deep to very deep soils are formed from local alluvium. Reactions range from neutral to moderately alkaline. The AWC is supplemented by upward capillary movement of water from the water table. The surface is usually dark and high in organic matter.

Soil Series Correlated to this Ecological Site

Wilkins
Latahco
Crumarine
Burntcreek

Table 4. Representative soil features

Surface texture	(1) Ashy loam (2) Silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained
Permeability class	Moderate to moderately slow
Soil depth	152 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	6.86–17.53 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.4–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–70%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

The dominant visual aspect of this site is a plant community dominated by Nevada bluegrass, alpine timothy and meadow sedges. Shrubs are normally not present, however several willow species can be found in small amounts. The soil surface of the site is typically slightly undulating causing small depressions and high spots with variable soil moisture characteristics. This site is commonly found in association with the following sites:

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

2. Wet Meadow Site. Shallow to depression areas with the water table at or near the surface for the entire growing season. This site is dominated by Carex spp. and Junus spp.

3. Meadow site. Slightly higher areas that are drier during the growing season. This site is dominated by tufted hairgrass, Nebraska sedge, and alpine timothy.

Composition is approximately 75 to 85 percent grass and grass-like, 10 to 20 percent forbs, and 0 to 5 percent shrubs.

During the last few thousand years, this Dry Meadow site has evolved in a semi-arid climate characterized by dry summers and cold, wet winters. Flooding and high water table have also influenced the development of this site. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include white-tailed deer, mule deer, Rocky Mountain elk, sage grouse, lagomorphs, and small rodents.

Fire has historically occurred on the site at intervals of 20-40 years. Fire has had little influence on the development of the site. This site normally burns in conjunction with an adjacent upland site.

The conditions for the plant community of this site are highly variable due to a wide variation of soils, flooding frequency and duration, 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 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 following table shows the amplitude of wetland species that occur on the four sites:

• Ecological Amplitude of Meadow/Marsh Plants.

Grass and Grass-like Species
Scientific name Dry Meadow Meadow Wet Meadow Marsh

Leymus cinereus

Danthonia californica

Carex filifolia

Pascopyron smithii

Poa nevadensis

Juncus dudleyi

Muhlenbergia richardsonis

Hordeum brachyantherum

Phleum alpinum

Juncus balticus

Juncus torreyi

Alopecurus aequalis

Carex athrostachya

Calamagrostis canadensis

Deschampsia caespitosa

Carex nebrascensis

Glyceria striata

Carex lasiocarpa

Carex utriculata

Carex aquatilis

Eleocharis palustris

Carex rostrata

Carex hoodii

Carex exsiccata

Scirpus microcarpus

Juncus effusus

Beckmannia syzigachne

Typha latifolia

Schoenoplectus acutus

Schoenoplectus pungens

Sparganium erectum

Schoenoplectus tabernaemontani

Forb Species
Scientific name Dry Meadow Meadow Wet Meadow Marsh
Arnica fulgens

Pyrrocoma lanceolata

Arenaria congesta

Artemisia ludoviciana

Achillea millefolium

Wyethia amplexicaulis

Pyrrocoma uniflora

Ranunculus spp.

Trifolium spp.

Scientific name Dry Meadow Meadow Wet Meadow Marsh
Potentilla gracilis

Senecio integerrimus

Aster spp.

Cirsium scariosum

Symphyotrichum ascendens

Iris missouriensis

Senecio serra

Helianthus nuttallii

Camassia quamash

Epilobium ciliatum

Montia chamissoi

Plantago major

Alisma triviale

Cicuta douglassii

Argentina anserina

Veronica anagallis-aquatica

Symphyotrichum frondosum

Polygonum bistortoides

Triglochin maritimum

Polygonum amphibium

Symphyotrichum foliaceum

Potamogeton natans

Lemna minor

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 Nevada bluegrass, alpine timothy, sedges, slender wheatgrass, and streambank wheatgrass. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 1300 pounds per acre (1444 kilograms per hectare) in a normal year. Production in a favorable year is 2000 pounds per acre (2222 kg/ha). Production in an unfavorable year is 850 pounds per acre (944 kg/ha). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by perennial forbs being more dominant than tall shrubs.

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, inherent fertility, high productivity, high percentage of rhizomatous plants, and the relatively flat slopes, the site is fairly resistant to disturbances that can potentially degrade it. Site degradation is usually the result of a lowering of the water table. This can occur with down cutting of adjacent stream channels or significant run-off following prolonged drought. It also 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:

When this site burns, it usually does not adversely affect the plant community. Most plants including shrubs sprout back after sufficient moisture and within the next growing season. Fires typically occur from mid-summer into fall.

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 potential down cutting of adjacent streams. 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 adversely influenced with prolonged drought. Overall plant composition is normally not affected when perennials have good vigor.

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

Influence of insects and disease:

Periodic disease and insect outbreaks can affect vegetation health. 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 understory.

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 rearing in the late spring, summer, and fall. Sage grouse, when present, use the site for brood rearing and forage. Total numbers of wildlife 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 more than 40 inches. This can occur with continued improper grazing management. It may also occur with proper grazing on the site, but channel erosion may continue if poor off-site conditions cause frequent and/or severe flooding events. This site has crossed the threshold. This state cannot be returned to State 1 without raising the

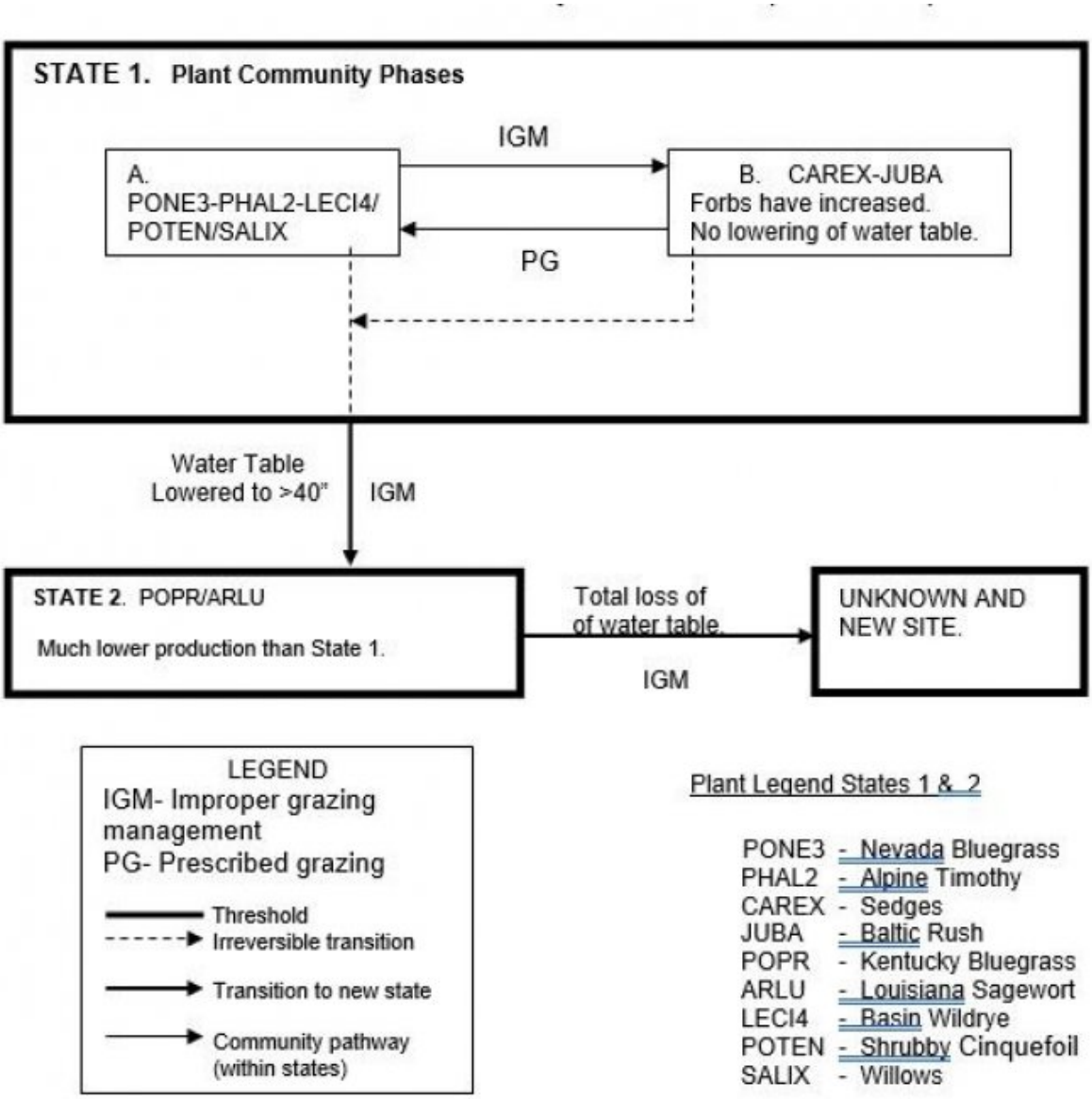
water table.

State 2 to unknown site. Results from continued lowering of the water table through down cutting of the stream channel. The site 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 has crossed the threshold. This state cannot be returned to State 1 without raising the water table.

Practice Limitations.

There are moderate seeding limitations on this site due to difficulty in preparing an adequate seedbed because of the water table. Elimination of existing vegetation prior to planting is difficult in wet seasons and high water table periods. There are moderate to severe limitations for brush management using chemicals due to the proximity to water bodies. 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 practice to consider.

State and transition model



State 1

State 1 Phase A

Community 1.1
State 1 Phase A

State 1, Phase A. Reference Plant Community Phase. This plant community has Nevada bluegrass, alpine timothy, basin wildrye, slender wheatgrass, streambank wheatgrass, and other Carex species in the herbaceous layer. There is a variety of perennial forbs but none comprise a high percentage of the plant community. Salix species and shrubby cinquefoil may be present but do not make up more than 5 percent of the community.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	785	1194	1849
Forb	146	224	336
Shrub/Vine	22	39	56
Total	**953**	**1457**	**2241**

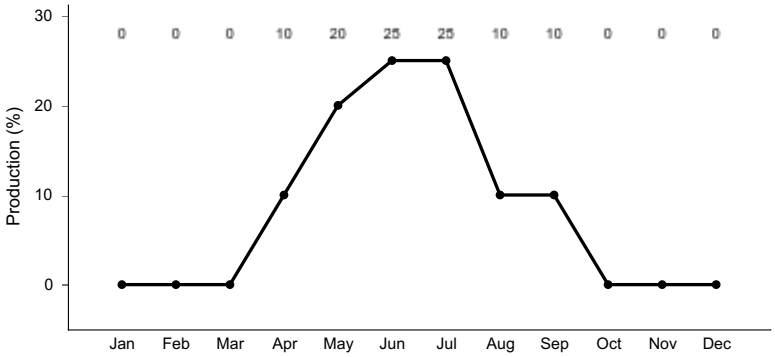


Figure 4. Plant community growth curve (percent production by month). ID0115, B9 DRY MEADOW. State 1.

State 2
State 2 Phase B

Community 2.1
State 2 Phase B

State 1, Phase B. This plant community is dominated by a variety of sedges and Baltic rush. Forbs such as Rocky Mountain iris and Louisiana sagewort have increased in the community and Kentucky bluegrass may have invaded. Nevada bluegrass is present but in low vigor. A compaction layer has likely developed. This phase has developed due to improper grazing management. The water table has not been lowered from that of Phase A.

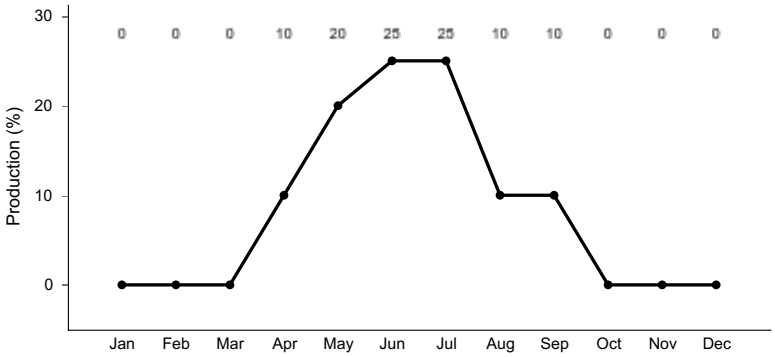


Figure 5. Plant community growth curve (percent production by month). ID0115, B9 DRY MEADOW. State 1.

State 3
State 2

Community 3.1
State 2

State 2. This plant community is dominated by Kentucky bluegrass and Louisiana sagewort 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. Cheatgrass and Sandberg bluegrass may have invaded or increased in the community. This state developed due to continued improper grazing management and a permanent lowering of the water table. The site has crossed the threshold. This state cannot be returned to State 1 without raising the water table. This might be done over time using structures or bio-engineering practices, but the plant community may take many years to approach the plant community in State 1.

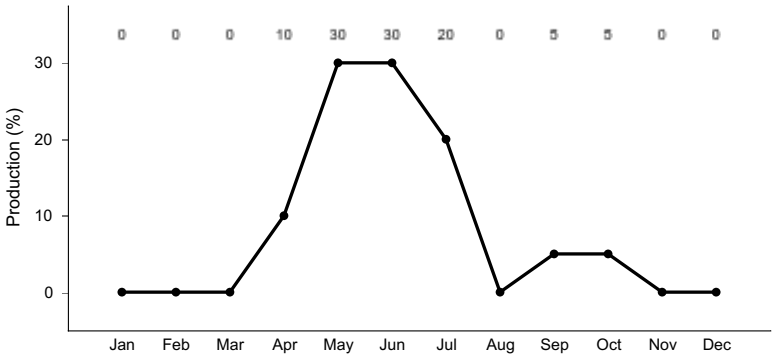


Figure 6. Plant community growth curve (percent production by month). ID0113, POPR/ARLU. State 2.

State 4
State 3

Community 4.1
State 3

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass and Grasslike**			–	
	alpine timothy	PHAL2	*Phleum alpinum*	269–673	–
	sedge	CAREX	*Carex*	45–112	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	45–112	–
	basin wildrye	LECI4	*Leymus cinereus*	45–112	–
	meadow barley	HOBR2	*Hordeum brachyantherum*	34–78	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	17–45	–
	slender wheatgrass	ELTRT	*Elymus trachycaulus ssp. trachycaulus*	17–45	–
	mountain rush	JUARL	*Juncus arcticus ssp. littoralis*	17–45	–
	beardless wildrye	LETR5	*Leymus triticoides*	17–45	–
2	**Nevada Bluegrass**			–	
	Sandberg bluegrass	POSE	*Poa secunda*	448–1121	–
Forb					
3	**Forbs**			–	
	clover	TRIFO	*Trifolium*	34–78	–
	cinquefoil	POTEN	*Potentilla*	34–78	–
	aster	ASTER	*Aster*	34–78	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	34–78	–
	common yarrow	ACMI2	*Achillea millefolium*	34–78	–
	mule-ears	WYAM	*Wyethia amplexicaulis*	0–56	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–56	–
Shrub/Vine					
4	**Shrubs**			–	
	willow	SALIX	*Salix*	17–45	–
	Woods' rose	ROWO	*Rosa woodsii*	17–45	–
	silver sagebrush	ARCA13	*Artemisia cana*	17–45	–

Animal community

Wildlife Interpretations.

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 rearing in the late spring, summer, and fall.

Grazing Interpretations.

This site is suitable for grazing in late spring after soils have dried sufficiently to prevent trampling an also in the summer and fall. Natural water supplies are likely to be limited or absent on the site in the late summer and fall.

Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use, and

seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

Soils on this site are in hydrologic groups B, C, and D.

Recreational uses

This site has some value for aesthetics and natural beauty due to several spring and early summer blooming forbs and shrubs. Some hunting for sage grouse, rabbits, elk and deer occurs. Hikers and fishermen may traverse the edge of the site where it is adjacent to streams.

Wood products

None.

Other products

None.

Other information

Field Offices

Grangeville, ID
Lewiston, ID
Craigmont, ID
Orofino, ID
St. Maries, ID
Moscow, 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
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Bruce Knapp, Resource Soil Scientist, NRCS, Idaho
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Other references

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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

JC

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	04/16/2009
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are not common on this site. If the site is degrading due to gully down-cutting, rills may occur on the side slopes of the gully.

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2. **Presence of water flow patterns:** Water-flow patterns are common on this site. When they occur they are long, often running the length of the site and disrupted by cool season grasses. Water-flow patterns are also common from run-on from the adjacent uplands.

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3. **Number and height of erosional pedestals or terracettes:** Both are rare 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 20-30 percent but more data is needed.

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5. **Number of gullies and erosion associated with gullies:** Does not occur in the Reference State on this site.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move more than 6 feet or even off the site following a significant flooding or run-off event.

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 4-9 inches thick. Structure ranges from moderate medium sub angular blocky to moderate fine granular. Soil organic matter (SOM) ranges from 1 to 7 percent. Moist and dry surface colors are black and dark grayish brown respectively.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep-rooted perennial grasses and grass-like plants slow run-off and increase infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Normally not present. A compaction layer can develop if grazing occurs when the soils are wet.

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: cool season deep-rooted perennial grasses and grass-like plants

    Sub-dominant: perennial forbs

    Other: shallow rooted bunchgrasses

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Most of the grasses and grass-like plants on this site will become decadent in the absence of fire and ungulate grazing. Decadence or low vigor is a result of litter buildup in the crowns of the plants.

14. **Average percent litter cover (%) and depth (in):** Additional litter cover data is needed but is expected to be 35 to 50 percent to a depth of 0.2 inches. Under mature shrubs and basin wildrye, litter is >0.5 inches deep and is 90-100 percent ground cover.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Is 1300 pounds per acre (1444 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 75-85 percent of the total production, forbs 10-20 percent, and shrubs 0-5 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 cheatgrass, leafy spurge, whitetop, perennial pepperweed, rush skeletonweed, Canada, musk and scotch thistle, and diffuse and spotted knapweed.

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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in most years.
