

# **Ecological site R013XY045ID**

## **Loamy Bottom 12-16 PZ ARTRT/LECI4-ELLAL**

Last updated: 9/23/2020

Accessed: 05/21/2025

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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 Region: B (Northwestern Wheat and Range)

MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

### **LRU notes**

013X-Eastern Idaho Plateaus

Precipitation or Climate Zone: 12-16" P.Z.

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

### **Classification relationships**

none.

### **Ecological site concept**

Site receives additional water. (water table, if present, is >100 cm (40 in))

Soils are:

not saline or saline-sodic.

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

NOT strongly or violently effervescent in surface mineral 10".

textures usually range from loam to silty loam in surface mineral 4".

Slope is < 30%.

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

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

## Associated sites

R013XY001ID	<b>Loamy 12-16 PZ</b>
R013XY039ID	<b>Dry Meadow PONE-PHAL2</b>
R013XY050ID	<b>Riparian Wet Meadow SALIX/CAREX</b>
R013XY053ID	<b>Wet Meadow CAREX-JUNCUS</b>

## Similar sites

R013XY039ID	<b>Dry Meadow PONE-PHAL2</b>
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>tridentata</i>
Herbaceous	(1) <i>Leymus cinereus</i> (2) <i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>

## Physiographic features

This site occurs on nearly level to sloping stream terraces, fans, and hill and mountain sides. Slopes range from 0 to 12 percent. The site occurs on all aspects and elevation ranges from 4600 to 6800 feet (1400 to 2075 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Stream terrace (2) Fan remnant (3) Mountain
Flooding frequency	None
Elevation	1,402–2,073 m
Slope	0–12%
Water table depth	122–183 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

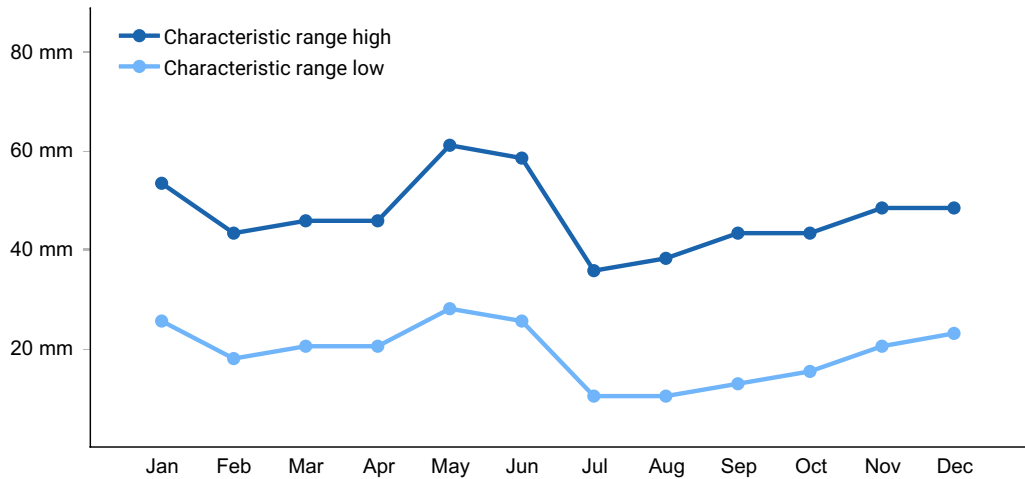


Figure 1. Monthly precipitation range

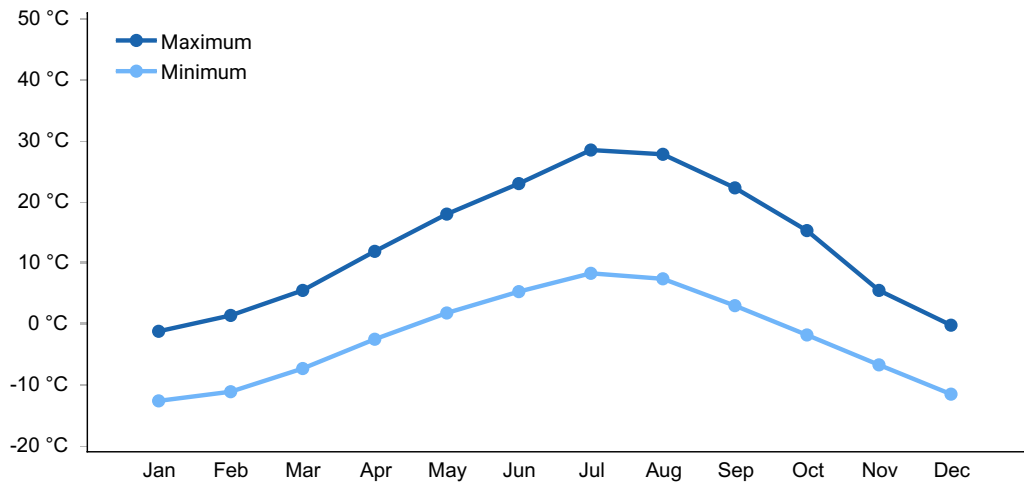


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Some run-in water from adjacent sites can occur on this site, especially in years with above normal snow depths or unusually heavy precipitation periods. Some overland flow can also occur during high runoff periods.

Soil features

The soils on this site are very deep to bedrock. The soils are moderately well to well drained, with slow to moderate permeability. Runoff is low. They occur on terraces, fans, mountains and valley bottoms. They are formed in alluvium and loess from sandstone, limestone, and quartzite. Textures are dominantly silt loam and loam. A high water table can occur at 48 inches between February and July. The available water holding capacity (AWC) is low to medium. These soils are characterized by a xeric soil moisture regime and a frigid soil temperature regime.

Soil Series Correlated to this Ecological Site

Jovine  
Merkley  
Pegram

Suryon

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Loam
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderate

Soil depth	152 cm
Surface fragment cover <=3"	0–15%
Available water capacity (0-101.6cm)	12.19–21.08 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–35%

## Ecological dynamics

### Ecological Dynamics of the Site:

The dominant visual aspect of this site is large bunchgrass and tall shrubs with an understory of sod-grasses. Composition by weight is approximately 60-70 percent grasses, 5-15 percent forbs, and 20-30 percent shrubs. Major species are basin wildrye, thickspike wheatgrass, and basin big sagebrush.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by dry summers and cold, wet winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, Rocky Mountain elk, and lagomorphs.

Fire has historically occurred on the site at intervals of 15-25 years.

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 basin wildrye and thickspike wheatgrass with an overstory of basin big sagebrush. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 6000 pounds per acre (6667 kilograms per hectare) in a normal year. Production in an unfavorable year is 4000 pounds per acre. Production in a favorable year is 8000 pounds per acre. Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

## FUNCTION:

This site is suitable for livestock grazing in the late spring and summer and for fall grazing at lower elevations. Water is often limited in the summer and fall unless it is adjacent to an intermittent or perennial stream. This site provides good cover for most wildlife species in all seasons.

This site has limited opportunities for recreation.

The site has moderately low runoff potential. Snow accumulates on the site due to the presence of tall shrubs and large bunchgrasses.

This site due to the relatively flat slopes, deep soils, and inherent productivity of the grass component, is fairly resistant to disturbances that can potentially degrade it. Site degradation is usually the result of downstream changes of grade and/ or loss of the understory component which leads to the development of gullies. Once gullies begin to develop, erosion is accelerated by the concentrated water flows within the gully itself.

Impacts on the Plant Community.

Influence of fire:

This site has a normal fire frequency of 15-25 years. Immediately after a fire, basin wildrye is stimulated. Gray and green rabbitbrush typically re-sprout and basin big sagebrush is eliminated. In the absence of normal fire frequency, bitterbrush and basin big sagebrush may increase. Grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (15-25 years), basin big sagebrush is reduced significantly. With continued short fire frequency, basin big sagebrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Nevada bluegrass. Rabbitbrush species can become the dominant overstory species. The understory species may be replaced by cheatgrass at lower elevations. Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive species generally increase.

Influence of improper grazing management.

Season-long grazing and/or excessive utilization can be very detrimental to this site. The vigor of the perennial grasses can be reduced significantly by heavy early season grazing, especially basin wild rye. This type of management leads to reduced vigor of the other bunchgrasses also. With reduced vigor, recruitment of these species declines.

Continued improper grazing management influences fire frequency by increasing fine fuels. Once the understory is depleted of deep-rooted perennial grasses, basin big sagebrush will increase. Surface erosion increases and may lead to the development of rills and gullies.

Proper grazing management that addresses frequency, duration, and intensity of grazing can also keep fine fuels from developing, thereby reducing fire frequency. However, a planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management needs to be carefully planned as a reduction in shrubs without a suitable understory of perennial grasses can lead to an increase in fine fuels which will lead to more frequent fire intervals.

Weather influences:

Because of the deep soils and influence of run-on, the production of this site changes little during dry years. 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. Outbreaks of Black grass bugs commonly occur on basin wildrye and the wheatgrasses. They seldom kill the plants but do reduce vigor and affect the palatability for grazing animals.

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:

Many of these species add to the fine-fuel component and lead to increased fire frequency.

Many of the annual and perennial invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife.

Wildlife use this site in the spring, summer, and fall. Their numbers are seldom high enough to adversely affect the plant community.

Watershed:

The largest threat to degradation of this site is that of rill and gully development. Soils are usually very deep and have few coarse fragments in the profile to prevent erosion. If the perennial grass cover is depleted, rill and gully development can occur rapidly. High run-off events from the adjacent uplands can severely damage or change the normal stream channel on the site. Once gully development begins, the water table is lowered and run-on water no longer flows across the site. As the available soil moisture level is lowered, productive potential is lost. Eventually the watertable is below the root zone of the perennial grasses. These grasses are ultimately replaced by shrubs, annual grasses, and forbs. Extreme gully development can move the site across the threshold to a new, less productive site.

## Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

### State 1.

Phase A to B. Develops with either prescribed burning or wild fire.

Phase A to C. Usually results from improper grazing management and no fire.

Phase B to A. Develops in the absence of fire.

Phase C to A. Develops from prescribed grazing.

Phase C to B. Develops from prescribed grazing and fire.

State 1, Phase C to State 2. Develops through improper grazing management and fire. The site has crossed the threshold. It is generally not economically feasible to move this state back towards phase A.

State 2 to State 3. Pest management, brush management and range seeding are used to change this plant community. The site has crossed the threshold. It is generally not economically feasible to move this state back towards phase A.

State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by channel downcutting, improper grazing management, and/or fire causes this state to cross the threshold and retrogress to a new site with reduced potential. It is generally not economically feasible to move this state back towards phase A.

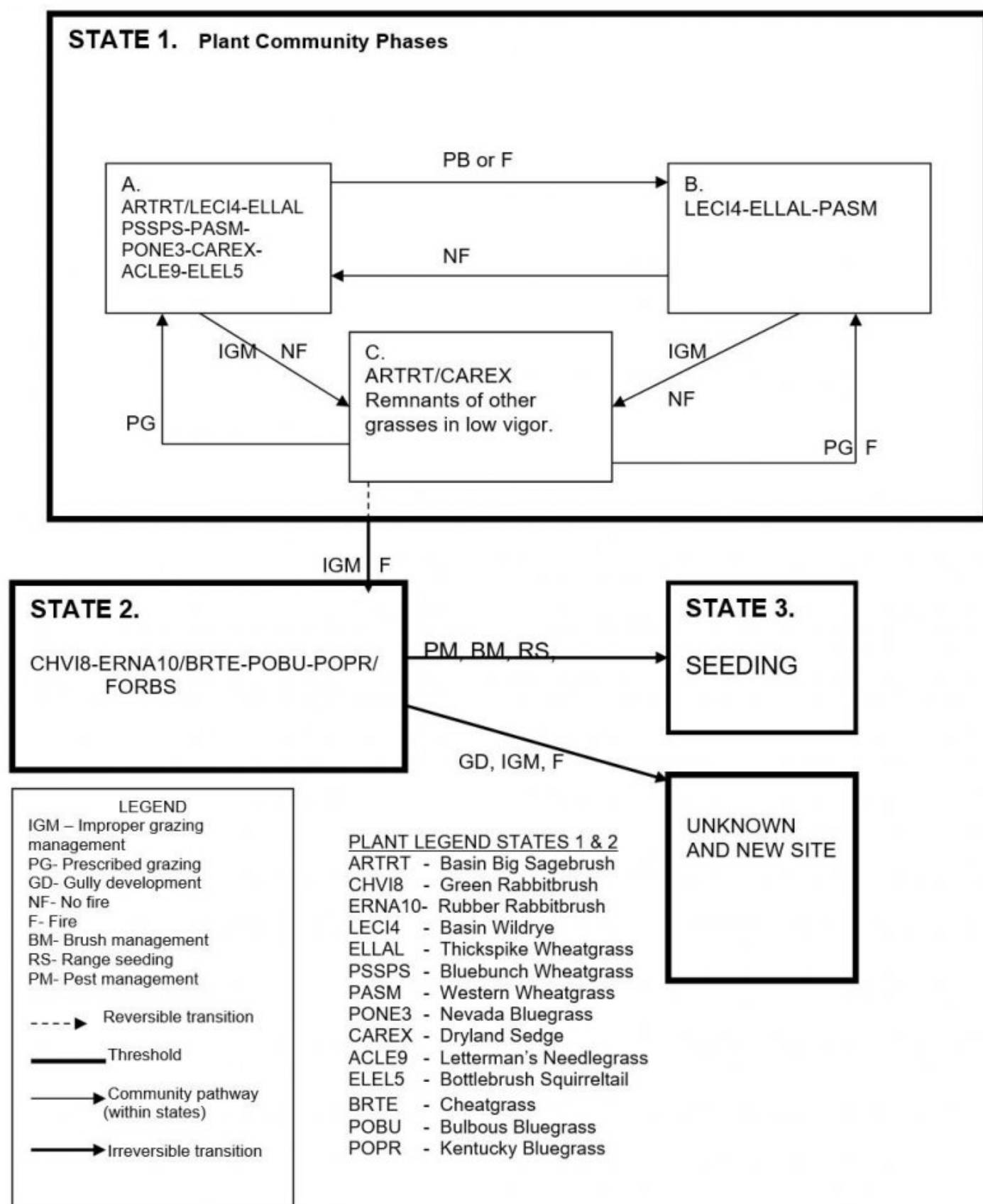
## Practice Limitations.

There are few restrictions to seeding on this site. Spring wetness may prevent early planting.

Brush management is feasible, however, the wildlife impacts should be carefully evaluated before undertaking any brush management program.



## State and transition model

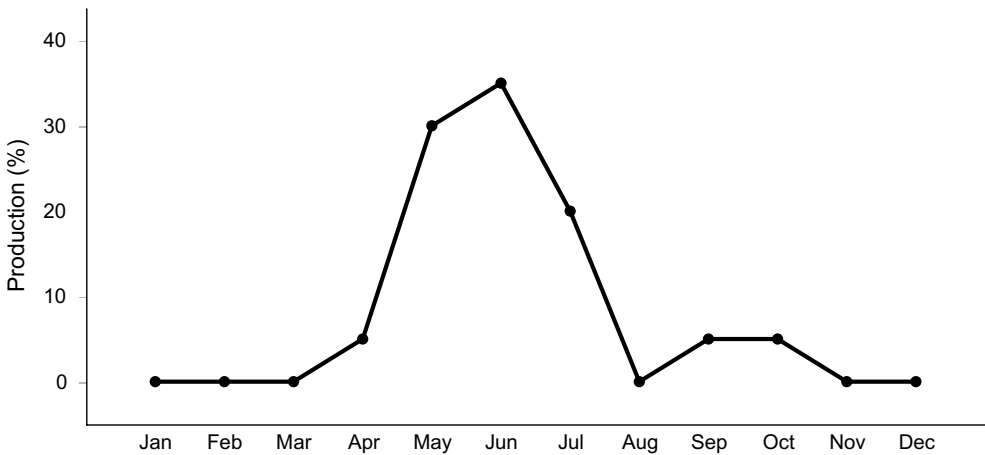


**State 1**

**State 1 Phase A**

**Community 1.1**  
**State 1 Phase A**

Reference Plant Community Phase. This plant community is dominated by basin wildrye and thickspike wheatgrass. Basin big sagebrush is present. Understory species include bluebunch wheatgrass, western wheatgrass, Nevada bluegrass, dryland sedge, Letterman’s needlegrass, and bottlebrush squirreltail. Natural fire frequency is 15 to 25 years.



**Figure 3. Plant community growth curve (percent production by month).**  
ID0813, POPR/ARLU.

**State 2**  
**State 1 Phase B**

**Community 2.1**  
**State 1 Phase B**

This plant community is dominated by basin wildrye and thickspike wheatgrass. Few shrubs are present, since fire has removed them. Understory species include Nevada bluegrass, dryland sedge, bottlebrush squirreltail, western wheatgrass, bluebunch wheatgrass, tapertip hawksbeard, arrowleaf balsamroot, and lupine. This phase has developed due to prescribed burning or fire.

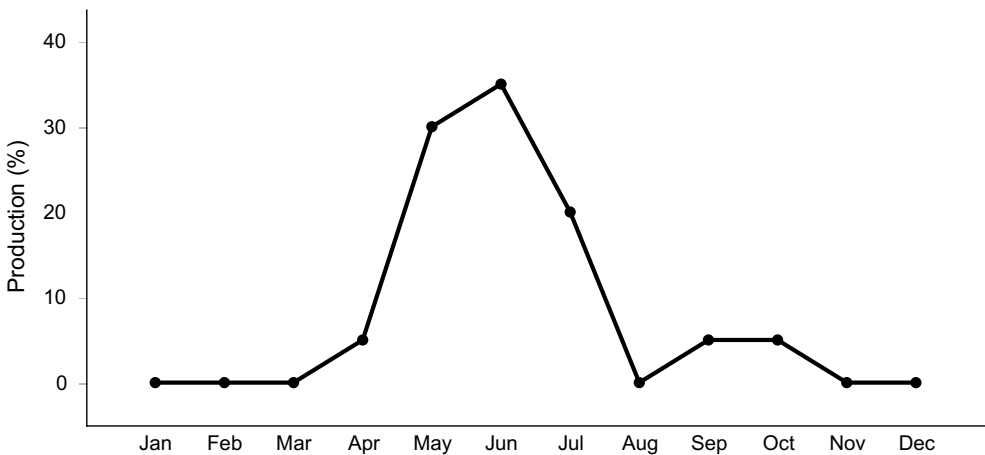


Figure 4. Plant community growth curve (percent production by month).  
ID0813, POPR/ARLU.

State 3  
State 1 Phase C

Community 3.1  
State 1 Phase C

This plant community is dominated by basin big sagebrush. Dryland sedge and remnants of basin wildrye, Nevada bluegrass, thickspike and western wheatgrasses are present but in extremely low vigor. Kentucky bluegrass may have invaded the site. The perennial grasses that remain are typically protected in and around the sagebrush plants. This phase has developed due to improper grazing management and lack of fire.

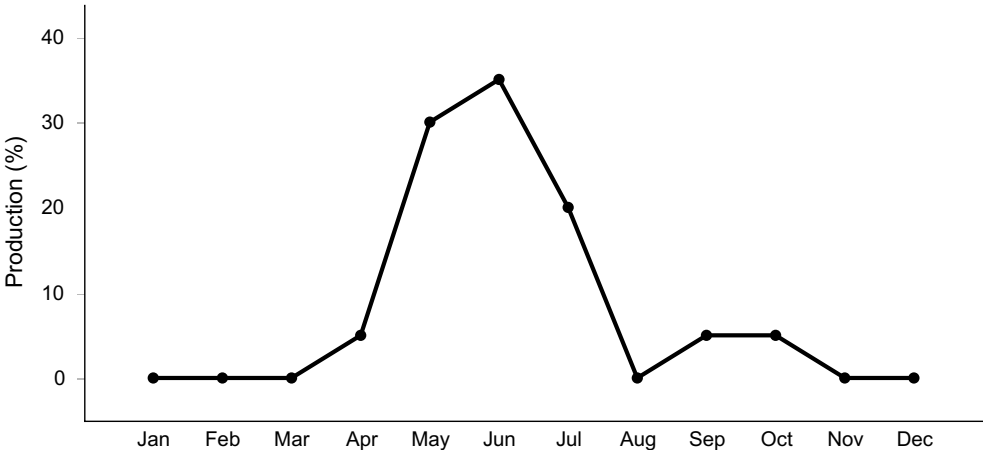
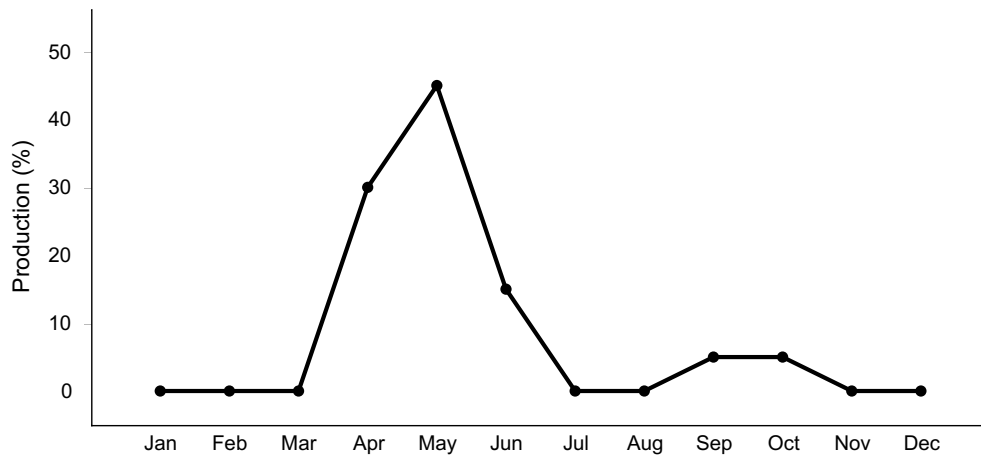


Figure 5. Plant community growth curve (percent production by month).  
ID0813, POPR/ARLU.

State 4  
State 2

Community 4.1  
State 2

This plant community is dominated by root-sprouting shrubs (rabbitbrushes), annual grasses and forbs. This state has developed due to improper grazing management and fire. The site has crossed the threshold. It is generally not economically feasible to move this state back towards phase A, State 1.



**Figure 6. Plant community growth curve (percent production by month). ID0809, ARTRT/ARTRW8/POSE/ANNUALS.**

## **State 5**

### **State 3**

## **Community 5.1**

### **State 3**

This plant community is made up of either introduced or native species that attempt to mimic the reference plant community, Phase A, State 1.

## **State 6**

### **State 4**

## **Community 6.1**

### **State 4**

Unknown new site. This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. Gully development has lowered the watertable so that it is below the rooting depth of the perennial grasses and forbs. This state has developed due to gully development, continued improper grazing management, and/or fires. It is generally not economically feasible to move this state back towards phase A, State 1.

## **State 7**

### **State 5**

## **Community 7.1**

### **State 5**

This plant community may resemble the early seral stages of the following sites: Loamy

## **Additional community tables**

### **Animal community**

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. Large herbivore use of this ecological site is dominated by mule deer and to a lesser degree pronghorn antelope. Important seasonal habitat is provided by the tall, dense vegetation for resident and migratory animals including western toad, sagebrush lizard, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Area sensitive species include pygmy rabbit, Great Basin ground squirrel, long-nosed snake, groundsnake, Great Basin collared lizard, and Townsend pocket gopher. Changes in the plant community composition can reduce the number and diversity of wildlife species in the area. With reduced shrub cover, shrub obligate avian and mammal species become rare including sage-grouse, brewer's sparrow, sage sparrow, and sage thrasher. Encroachment of noxious and invasive plant species (cheatgrass and bulbous bluegrass) can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water is provided by seasonal runoff, artificial water catchments, adjacent streams, and spring sites.

State 1 Phase 1.1 - Basin Big Sagebrush/ Basin Wildrye/ Thickspike Wheatgrass/ Bluebunch Wheatgrass/ Western Wheatgrass/ Nevada Bluegrass/ Dryland Sedge/ Letterman's Needlegrass/ Bottlebrush Squirreltail Reference Plant Community (RPC): The RPC provides a diversity of grasses, forbs, and shrubs used by native insect communities who assist in the pollination process for the plant community. The reptile and amphibian community is represented by sagebrush lizard, western rattlesnake, western toad, and northern leopard frog. Amphibians are associated with springs, streams, and isolated water bodies adjacent to this plant community. Spring developments that capture all available water would preclude the use of these sites by amphibians. The plant community supports a variety of migratory and resident avian species that utilize the grasses, forbs, shrubs, and water for food, brood-rearing, and nesting cover. When large streams are adjacent to this site, significant use of the tall and dense vegetation by waterfowl and shorebirds may occur. Shrub-steppe obligate avian species of concern include the Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Habitat (i.e. brood-rearing, winter cover and food) for sage-grouse is provided by this diverse plant community. The plant community supports seasonal (late spring, summer, and winter) habitat needs for mule deer providing food, thermal cover, and young of year cover. Antelope may utilize the site for thermal cover and young of year cover. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-

bellied marmots would utilize the site.

State 1 Phase 1.2 - Basin Wildrye/ Thickspike Wheatgrass/ Western Wheatgrass Plant Community: This phase has developed due to prescribed burning or fire. The plant community, dominated by herbaceous vegetation with little or no basin big sagebrush provides less vertical structure, limiting use by sagebrush obligate animals. Insect diversity may be reduced due to the loss of shrubs, but a native forb plant community similar to the one in State 1 Phase 1.1 would still support select pollinators. Quality of habitat for sagebrush lizard and western rattlesnakes, would be reduced due to the absence of sagebrush. The dominance of herbaceous vegetation with little sagebrush canopy cover would prevent use of these areas for nesting by Brewer's sparrow, sage sparrow, sage grouse, and sage thrasher. This plant community provides brood-rearing habitat for sage grouse when sagebrush cover is nearby. The dominance of herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Mule deer and antelope habitat would still be provided. A small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize the site.

State 1 Phase 1.3 - Basin Big Sagebrush/ Dryland Sedge Plant Community: This plant community is the result of improper grazing management and a lack of fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in a reduced diversity of insects. You can expect a decrease in population and diversity of reptiles due to the reduced diversity and canopy cover of herbaceous vegetation. Shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Winter cover and food for sage-grouse is available but the quality of brood rearing habitat may be reduced due to limited understory vegetation. The loss of basin wildrye reduces the available thermal cover and young of year cover for mule deer and antelope. The loss of native understory plants will result in a shorter forage season for large mammals. A small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots may utilize the site. Quality of habitat for pygmy rabbits may increase at this phase.

State 2 – Green Rabbitbrush/ Rubber Rabbitbrush/ Cheatgrass/ Bulbous Bluegrass/ Kentucky Bluegrass/ Forbs Plant Community: This state has developed due to fire and improper grazing management. This plant community would not support as diverse an insect community as in State 1 Phase 1.1. The rabbitbrushes would provide late summer and fall pollinator habitat. The reduced forb component in the plant community would support a very limited population of pollinators. Food and cover for reptile species would be reduced due to the loss of understory vegetation. The plant community would not support the habitat requirements for sage-grouse, sage thrasher, Brewer's sparrow, or sage sparrow. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Mule deer may utilize the invasive herbaceous vegetation in the early part of the year and rabbitbrush in the winter when the plants would be more palatable. The rabbitbrush may provide thermal cover and young of year cover for mule

deer and antelope. Pygmy rabbits would not utilize this site due to the loss of sagebrush.

**State 3 - Range Seeding Plant Community:** The proposed seeding mixture (native or non-native) would determine the animal species that would utilize the area. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 phase 1.2. A diverse seed mixture of grasses, forbs, and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.3. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, birds, or mammals. Sagebrush obligate animal species would not be supported either. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, mule deer, and antelope would utilize this site for nesting and/or seasonal foraging. Birds of prey including hawks and falcons may range throughout these areas looking for prey species.

### **Grazing Interpretations.**

This site is best adapted for livestock grazing in the summer and fall grazing season. 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 group B. They have moderately low run-off potential.

## **Recreational uses**

This site provides open space in the valley bottoms with tall shrubs and grass understory. Intermittent or perennial streams are often associated with or may traverse the site.

## **Wood products**

none.

## **Other products**

none.

## **Other information**

Field Offices

American Falls, ID  
Blackfoot, ID  
Burley, ID  
Driggs, ID  
Fort 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

Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho

Kristen May, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

## Type locality

Location 1: Oneida County, ID	
General legal description	East of Twin Springs

## Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho. Moscow, Idaho. Bulletin Number 35.

USDA Forest Service, Rocky Mountain Research Station. 2004. Restoring Western Ranges and Wildlands. General Technical Report RMRS-GTR-136-vols. 1-3.

USDA, NRCS.2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>).

National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, Forest Service, Fire Effects Information Database. 2004. [www.fs.fed.us/database](http://www.fs.fed.us/database).

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

## Approval



## Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Date	05/06/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of 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:** are common on this site. When they occur they are long, often running the length of the site and disrupted by cool season grasses and tall shrubs. Water flow patterns are also common from run-in 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):** ranges from 20-30 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:** usually not present. Immediately following wildfire some soil movement may occur on lighter textured soils.

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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 following a significant run-off event. Coarse litter generally does not move.

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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):** soil structure ranges from moderate fine and medium granular to weak and moderate fine and medium subangular blocky. Soil organic matter (SOM) ranges from 2 to 5 percent. Surface color is generally very dark grayish brown. Depth of the A or A1 horizon is 2 to 10 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:** bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Tall grasses and shrubs accumulate snow in the interspaces.

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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.

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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: cool season deep rooted perennial bunchgrasses

Sub-dominant: tall shrubs

Other: perennial forbs

Additional: shallow rooted bunchgrasses

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** basin wildrye and basin big sagebrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.
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14. **Average percent litter cover (%) and depth ( in):** additional litter cover data is needed but is expected to be 20-25 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.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 6000 pounds per acre (6667 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 60-70 percent of the total production, forbs 5-15 percent and shrubs 20-30 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, Kentucky bluegrass, bulbous bluegrass, leafy spurge, whitetop, annual kochia, annual mustards, Russian thistle, 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.
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