

## Ecological site R013XY041ID Shallow Loamy 12-16 PZ ARARL/PSSPS

Last updated: 9/23/2020  
Accessed: 05/14/2025

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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 Unit: 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

*Artemisia wyomingensis/ agropyron spicatum* HT in "Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number "35."

### Ecological site concept

Site does not receive any additional water.

Soils are:

not saline or saline-sodic.

Shallow, with >35% gravels (<10") and cobbles (10-25") cover. skeletal within 20" of soil surface, fragment percentage increasing with depth

strongly or violently effervescent in surface mineral 10".

textures usually range from sandy loam to 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

R013XY042ID	Loamy 12-16 PZ ARARL/PSSPS
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### Similar sites

R013XY043ID	Shallow Silt Stone 12-16 PZ STAC/ACHY
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R013XY011ID	Windswept Ridge 12-20 PZ ARNO4/PSSPS
R013XY014ID	Shallow Stony 12-20 PZ ARAR8/PSSPS

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia arbuscula ssp. longiloba</i>
Herbaceous	(1) <i>Pseudoroegneria spicata ssp. spicata</i>

## Physiographic features

This site occurs on upper convex ridges. Slopes generally range from 5 to 20 percent on south and west aspects. Elevations range from 6300 to 6800 feet (1900 to 2100 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Ridge
Flooding frequency	None
Elevation	1,920–2,073 m
Slope	5–20%
Aspect	S, W

## Climatic features

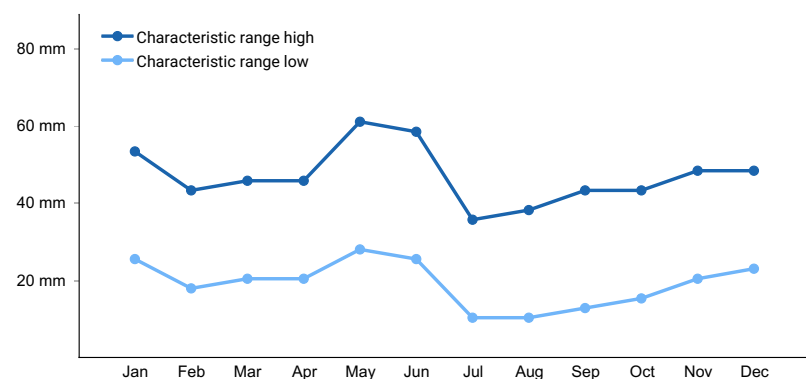
MLRA 13, the Eastern Idaho Plateaus, is part of the Northwestern Wheat and Range Region. Its elevation ranges from 4209 to 9331 feet above sea level, with an average elevation of 5787 feet. The average annual precipitation is 16.41 inches, with a range of 13.56 to 18.75 inches, based on ten long term 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**

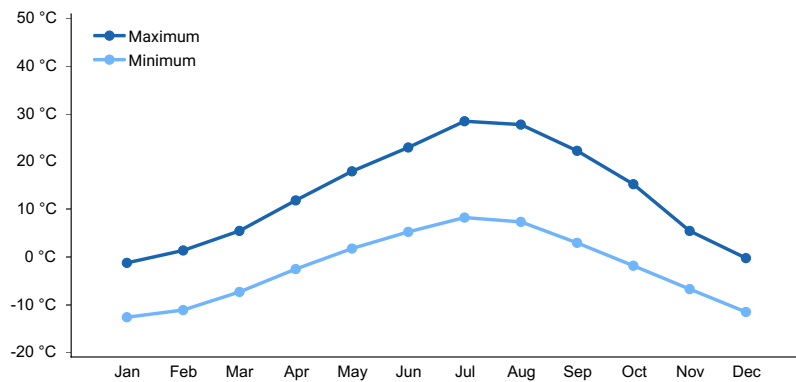


Figure 2. Monthly average minimum and maximum temperature

### Influencing water features

This site is not influenced by adjacent wetlands, streams, or run on.

### Soil features

The soils on this site are well drained and shallow to bedrock. They occur on limestone ridges and are formed in residuum. Textures are dominantly very gravelly loam, extremely gravelly loam and extremely gravelly sandy loam. The profile has greater than 60 percent coarse fragments and very high concentrations of lime below 6 inches. The available water holding capacity (AWC) is very low.

Soil Series Correlated to this Ecological Site

none

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Extremely gravelly sandy loam
Drainage class	Well drained
Soil depth	25–51 cm
Surface fragment cover <=3"	0–60%
Surface fragment cover >3"	0–10%
Subsurface fragment volume <=3" (Depth not specified)	15–60%
Subsurface fragment volume >3" (Depth not specified)	0–10%

### Ecological dynamics

The dominant visual aspect of this site is low shrubs and bluebunch wheatgrass. Composition by weight is approximately 35-50 percent grasses, 5-10 percent forbs, and 30-45 percent shrubs.

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

Fire has historically occurred on this site every 80-100 years. Fire occurs only in years with above normal precipitation.

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 bluebunch wheatgrass and alkali sagebrush. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 350 pounds per acre (392 Kg/ha) in a normal year. Production in a favorable year is 650 pounds per acre (728 Kg/ha). Production in an unfavorable year is 225 pounds per acre (250 Kg/ha). Structurally, cool season deep-rooted bunchgrasses are very dominant, followed by medium height shrubs with perennial forbs and shallow rooted perennial bunchgrasses being sub-dominant.

#### FUNCTION:

This site is best suited for livestock grazing in late spring, summer, and early fall. Natural water supplies are limited. This site provides fair to good habitat for various upland wildlife species. Mule deer, pronghorn, and sage grouse make use of the site throughout the year.

This site can be degraded easily by improper grazing management since slopes are moderate, allowing easy access. The numerous rock outcrops that typically surround this site provide a degree of protection from improper grazing management. Inherent low production on the site makes it susceptible to accelerated degradation.

The site offers minimal recreation or aesthetic values.

#### Impacts on the Plant Community.

##### Influence of fire:

This site historically had a very low fire frequency, approximately every 80-100 years. Most of the shrubs, especially antelope bitterbrush, evolved in the absence of fire, therefore they can be severely damaged or killed when burned. Rabbitbrush species can invade with fire and gray horsebrush will increase. Cheatgrass can be a troublesome invader on this site after fire, preventing perennial grass and shrub re-establishment and increasing the fire frequency. Sandberg bluegrass is usually maintained in the community.

##### Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be detrimental to this site. This type of management leads to reduced vigor of bluebunch wheatgrass and other deep-rooted perennial bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in alkali sagebrush, Sandberg bluegrass, and invasive plants. Once Sandberg bluegrass becomes strongly dominant, reestablishment of more productive grasses such as bluebunch wheatgrass may take a long period of time.

Continued improper grazing management influences fire frequency with an increase in cheatgrass and/or medusahead. Early spring grazing can cause severe damage to the understory if the animals are present when the soils are wet and trampling damage occurs.

Proper grazing management can maintain the integrity of the plant community.

##### Weather influences:

Above normal precipitation in April, May, and June can dramatically increase total annual production. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Extended periods of drought significantly impact this site due to the low water holding capacity and shallow soil. Extended drought reduces vigor of the perennial grasses and shrubs. Extreme drought may cause plant mortality.

##### Influence of insects and disease:

Outbreaks can affect vegetation health. An outbreak of a particular insect is usually influenced by weather but no

specific data is available for this site.

#### Influence of noxious and invasive plants:

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. Cheatgrass and bulbous bluegrass can be very invasive on this site, especially after fire. Once they become established the fire frequency increases. As a result, the shrub component can be lost.

#### Influence of wildlife:

Relatively low numbers of wildlife use this site and have little impact on it. Pronghorn antelope is the dominant large herbivore using the site. They use the site yearlong but prefer it in the spring, fall, and early winter. Sage grouse use the site for strutting grounds and they may also use the site during the winter. Winter and spring use by mule deer occasionally occurs.

#### Watershed:

The site experiences decreased infiltration and increased runoff on slopes greater than 10 percent occur when alkali sagebrush is removed with frequent fires, particularly the year following the fire event. The increased runoff also increases sheet and rill erosion. The long-term effect is a transition to a different state.

#### Plant Community and Sequence:

##### Transition pathways between common vegetation states and phases:

##### State 1.

Phase A to B. Develops with fire (approximately every 80-100 years). Fire only occurs in above normal precipitation (favorable) years.

Phase A to C. Develops under improper grazing management and no fire.

Phase B to A. Develops from prescribed grazing and no fire.

Phase C to A. Develops under a prescribed grazing management program and no fire.

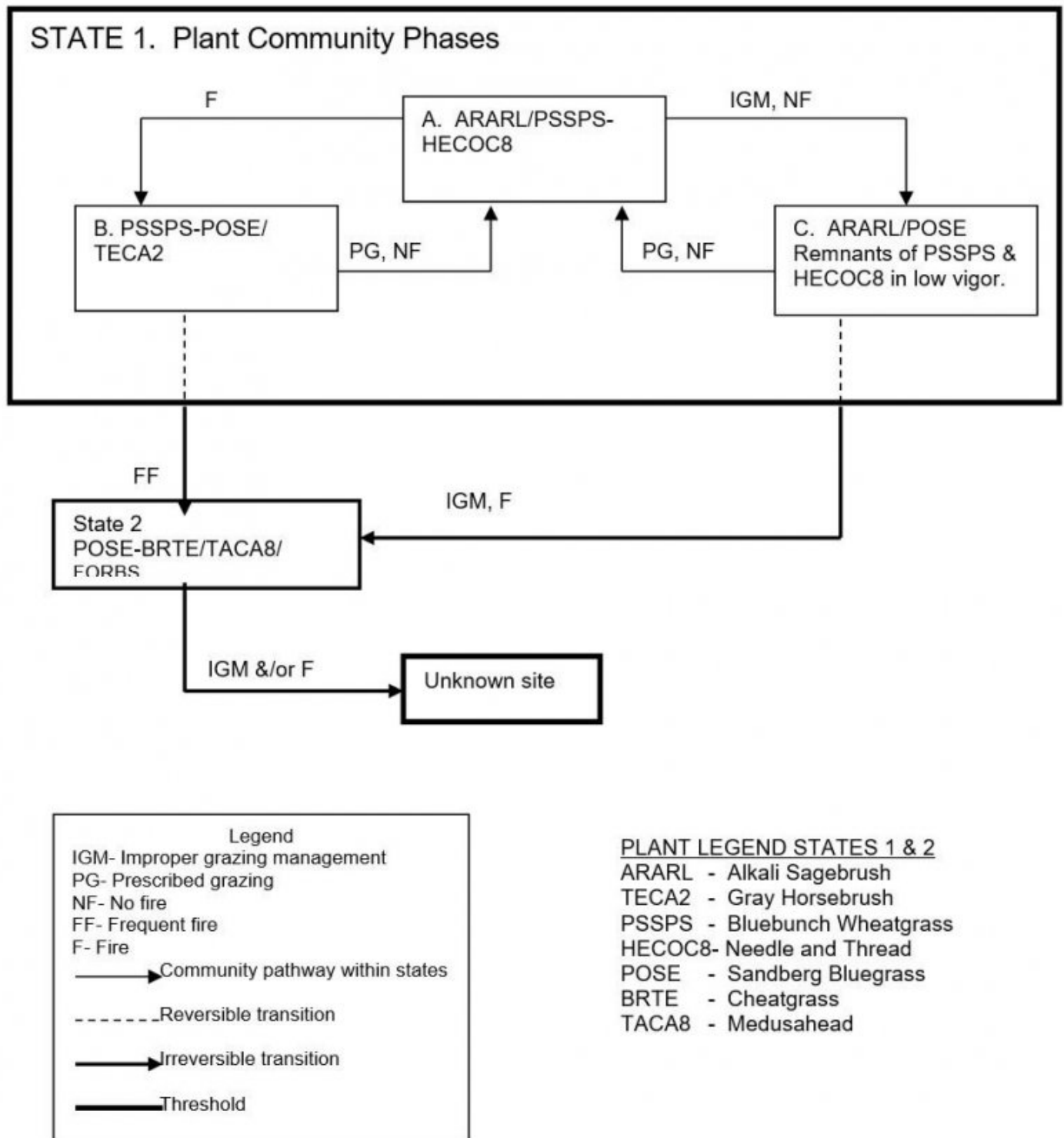
State 1 Phase B & C to State 2. Develops from Phase B with frequent fire or from Phase C with improper grazing management and fire. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

State 2 to Unknown new site. The site has deteriorated further and soil loss has occurred resulting in a loss of site potential. This has resulted from improper grazing management and/or fire. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

#### Practice Limitations

Due to the shallow soils, gravels and low available water holding capacity of the soils, moderate to severe limitations exist for range seeding on this site. The short growing season limits species selection. Low potential production must be considered if planning brush management.

### State and transition model



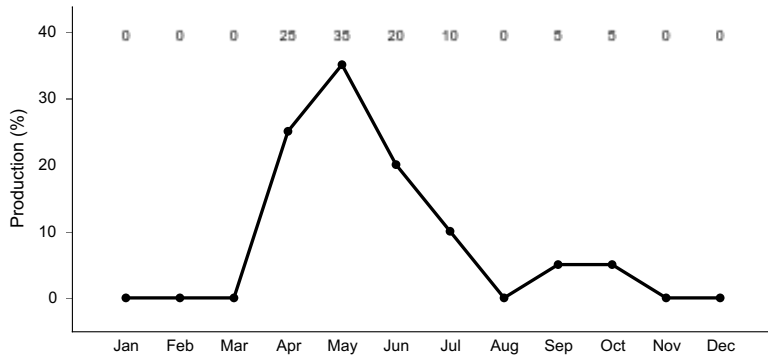
## State 1

### State 1 Phase A

#### Community 1.1

#### State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by bluebunch wheatgrass and alkali sagebrush. Needle and thread grass is sub-dominant. Small amounts of Indian ricegrass, Swallen's ricegrass, bottlebrush squirreltail, and Nevada bluegrass may be present. A large variety of forbs are present but each represents a small amount in the community. Other shrubs such as Wyeth eriogonum and antelope bitterbrush can be present in small amounts. The natural fire frequency is about 80-100 years.

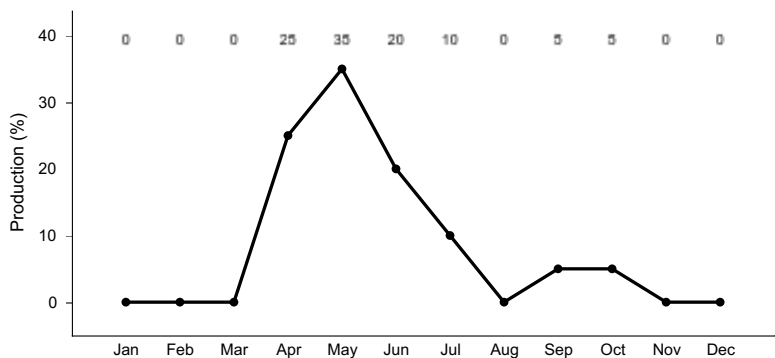


**Figure 3. Plant community growth curve (percent production by month). ID0810, ARNO4/PSSPS.**

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

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

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Small amounts of needle and thread grass, bottlebrush squirreltail, Nevada bluegrass, Swallen’s and Indian ricegrass, a variety of forbs, and gray horsebrush can be present. Some annual grasses have invaded. This phase has developed due to fire.

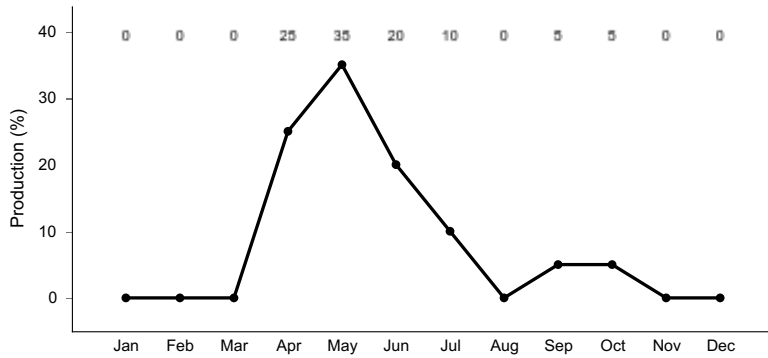


**Figure 4. Plant community growth curve (percent production by month). ID0810, ARNO4/PSSPS.**

**State 3**  
**State 1 Phase C**

**Community 3.1**  
**State 1 Phase C**

This plant community is dominated by alkali sagebrush with Sandberg bluegrass in the understory. Bluebunch wheatgrass and other deep-rooted perennial bunchgrasses are present but in reduced amounts and in low vigor. Some annual grasses have invaded. This phase has developed due to improper grazing management and no fire.

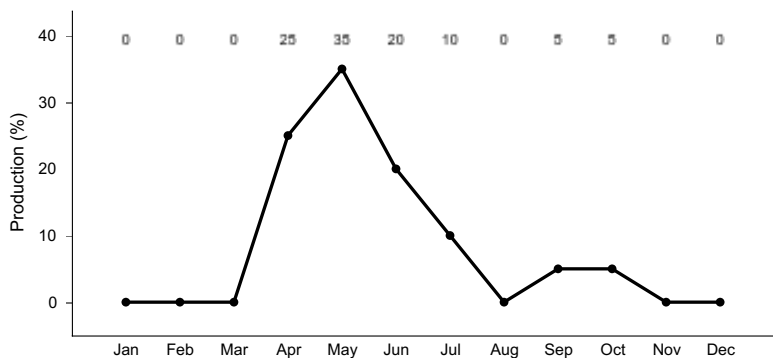


**Figure 5. Plant community growth curve (percent production by month).**  
ID0810, ARNO4/PSSPS.

**State 4**  
**State 2**

**Community 4.1**  
**State 2**

This plant community is dominated by Sandberg bluegrass, cheatgrass, and a variety of forbs. Some perennial forbs are present. The community has developed due to continued improper grazing management and fire from phase C, State 1 and with frequent fires from phase B, State 1. Some soil loss has occurred. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.



**Figure 6. Plant community growth curve (percent production by month).**  
ID0810, ARNO4/PSSPS.

**State 5**  
**State 3**

**Community 5.1**  
**State 3**

Unknown 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. This community has developed due to continued improper grazing management and/or fire. It is not economical to return this site to State 1 with accelerating practices.

**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 pronghorn antelope. Important seasonal habitat is provided 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. With reduced shrub cover, shrub obligate avian and mammal species become rare including sage-grouse, brewer's sparrow, and sage thrasher. Encroachment of noxious and invasive plants (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 limited, being provided only by seasonal runoff, artificial water catchments, and spring sites.

**State 1 Phase 1.1 – Alkali Sagebrush/ Bluebunch Wheatgrass/ Needle and Thread 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. Alkali sagebrush has an early bloom period which can be beneficial for native insect communities early in the season. The reptile and amphibian community is represented by sagebrush lizard, western rattlesnake, western toad, boreal chorus frog, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. The plant community supports a variety of migratory and resident bird species that utilize the grasses, forbs, and shrubs for food, brood-rearing, and nesting cover. Shrub-steppe obligate avian species include the Brewer's sparrow, sage thrasher, and sage-grouse. Alkali sagebrush provides winter cover and food for sage-grouse. The plant community supports the seasonal (winter and spring) needs of pronghorn and mule deer, providing food and cover. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots would utilize the habitat.

**State 1 Phase 1.2- Bluebunch Wheatgrass/ Sandberg Bluegrass/ Gray Horsebrush Plant Community:** This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure, limiting use by shrub-steppe obligate animals. Insect diversity would be reduced with the loss of the shrub component but a diverse native forb plant community would still support select pollinators. Reptile use including sagebrush lizard and western rattlesnakes, would be limited or excluded 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 thrasher, and sage-grouse. This plant community provides brood-rearing habitat for sage grouse when sagebrush habitat is nearby. The lack of sagebrush prevents the use of this plant community as wintering habitat and nesting cover for sage-grouse. The dominant herbaceous vegetation improves habitat for grassland bird species (horned lark and western meadowlark). Pronghorn and mule deer use would be seasonal (spring and fall), providing a variety of native herbaceous plants for food. Small mammal diversity and populations maybe reduced as predator hunting success may increase due to the lack of suitable shrub cover.

**State 1 Phase 1.3 – Alkali Sagebrush/ Sandberg Bluegrass Plant Community:**

This plant community is the result of improper grazing management and no fire. An increase in canopy cover of sagebrush and improper grazing management contribute to a sparse herbaceous understory and can lead to an increase in noxious weeds. The quality of habitat for native insects that assist in pollination is reduced due to the lack of forbs, resulting in lower diversity and numbers of insects. The reptile community is similar to that in the State 1 Phase 1.1 plant community. You can expect a decrease in population of reptiles due to the reduced plant diversity and canopy cover of herbaceous vegetation. Reduced herbaceous understory is a key factor in limiting the use of this plant community by native bird species. Shrub-steppe obligate avian species include Brewer's sparrow, sage thrasher, and sage-grouse. Habitat (nesting and brood rearing) for sage grouse is limited due to the reduced canopy cover of herbaceous vegetation. The plant community provides spring, fall, and winter habitat (food) for mule deer and antelope. Alkali sagebrush is preferred browse for antelope. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, and yellow-bellied marmots may utilize this plant community.

**State 2 – Sandberg Bluegrass/ Cheatgrass/ Gray Horsebrush/ Forbs Plant Community:** This plant community is the result of improper grazing management and fire. This plant community would not support a diverse insect community. The reduced forb component would support a very limited population of pollinators. Reptiles utilizing the site would be similar to the State 1 Phase 1.3 species. The plant community would not support sage-grouse, sage thrasher, or Brewer's sparrow due to the loss of sagebrush. The dominant herbaceous vegetation improves habitat for grassland bird species (horned lark and western meadowlark). Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Large mammals may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) would be more palatable. At other times of the

year large mammals would not regularly utilize these areas due to poor food and cover conditions. The populations of small mammals would be dominated by open grassland species.

Grazing Interpretations.

This site is best used for domestic livestock in late spring, 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 group D. They have high runoff potential.

## Recreational uses

This site provides open space on gently sloping terrain with low growing vegetation and offers little recreational opportunity.

## 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

Lee Brooks, Range Management Specialist, IASCD

Kristen May, Resource Soil Scientist, NRCS, Idaho

## Type locality

Location 1: Bear Lake County, ID
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## 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.

## Contributors

DF

## Approval

Kendra Moseley, 9/23/2020

## Rangeland health reference sheet

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

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Date	05/15/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** rills rarely occur on this site due to the gravelly surface. If they do occur it will normally be on slopes greater than 10%.

2. **Presence of water flow patterns:** water-flow patterns are normally not present on this site. When they do occur they are short and disrupted by cool season grasses, shrubs, and surface gravel. They are not extensive.

3. **Number and height of erosional pedestals or terracettes:** pedestals can occur on the site. They are most likely to occur where water flow patterns are present and surface gravels are absent. Terracettes are rare.
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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 25-35 percent but more data is needed.
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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:** does not occur.
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7. **Amount of litter movement (describe size and distance expected to travel):** fine litter moves by wind or water. Fine litter can move up to 2 feet after a strong summertime convection storm. Due to the flat slopes, large litter 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):** 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:** bunchgrasses, especially deep rooted perennials, slow runoff and increase infiltration.
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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: medium shrubs-perennial forbs
- Other: shallow-rooted perennial bunchgrasses
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or**

**decadence**): very little mortality or decadence is expected on this site. Mortality of shallow rooted grasses may occur due to extended periods of drought.

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14. **Average percent litter cover (%) and depth ( in):** additional data is needed but is expected to be low and at a shallow depth.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 350 pounds per acre (392 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 35-50 percent of the total production, forbs 5-10 percent and shrubs 30-45 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, Vulpia species, bulbous bluegrass, and annual mustards.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in favorable years.
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