

## Ecological site R013XY037ID Loamy 13-16 PZ ARTRW8/POA

Last updated: 9/23/2020  
Accessed: 05/06/2024

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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

013X-Eastern Idaho Plateaus

Precipitation or Climate Zone: 13-16" P.Z.

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

### LRU notes

Site does not receive any additional water.

Soils are:

Slight to moderate saline or saline-sodic, SAR 6 > 12, EC 4 > 8

moderately deep, deep, with < 3% stone (10-25") and boulder (>25") cover. not skeletal within 20" of soil surface.

not strongly or violently effervescent in surface mineral 10".

textures usually range from very fine sandy loam to clay loam in surface mineral 4".

Slope is < 30%.

Clay content is = <32% in surface mineral 4".

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

### Classification relationships

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

Land Resource Unit: B (Northwestern Wheat and Range)

MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

### Associated sites

R013XY001ID	<b>Loamy 12-16 PZ</b>
R013XY002ID	<b>Stony Loam 13-16 PZ ARTRV/PSSPS</b>
R013XY004ID	<b>Shallow Gravelly 12-16 PZ ARTRV/PSSPS</b>
R013XY008ID	<b>Steep South Slopes 12-16 PZ ARTRV/PSSPS</b>
R013XY013ID	<b>Stony 12-16 PZ ARTRV/FEID</b>
R013XY028ID	<b>Shallow Sand 12-16 PZ ARTRV/PSSPS</b>

R013XY036ID	Loamy 12-16 PZ ARTRW8/PSSPS
R013XY056ID	Juniper Breaks 12-16 PZ JUOS/PSSPS

## Similar sites

R013XY036ID	Loamy 12-16 PZ ARTRW8/PSSPS
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i>
Herbaceous	(1) <i>Poa</i>

## Physiographic features

This site occurs on nearly level to moderately sloping, convex lake terrace and hillside slopes. Slopes predominantly range from 2 to 30 percent and soils occur on all aspects. Elevation ranges from 4,600 to 5,100 feet (1400 to 1550 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Terrace (3) Mountain slope
Elevation	1,402–1,554 m
Slope	2–40%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

## Climatic features

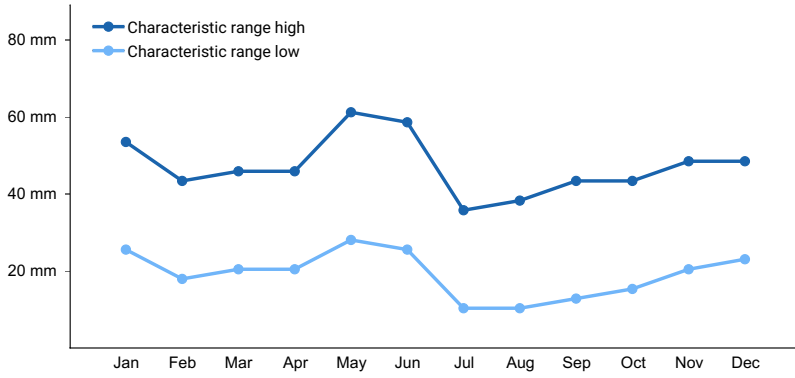
MLRA 13, the Eastern Idaho Plateaus, is part of the Northwestern Wheat and Range Region. Its elevation ranges from 4209 to 9331 feet above sea level, with an average elevation of 5787 feet. The average annual precipitation is 16.41 inches, with a range of 13.56 to 18.75 inches, based on ten long term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

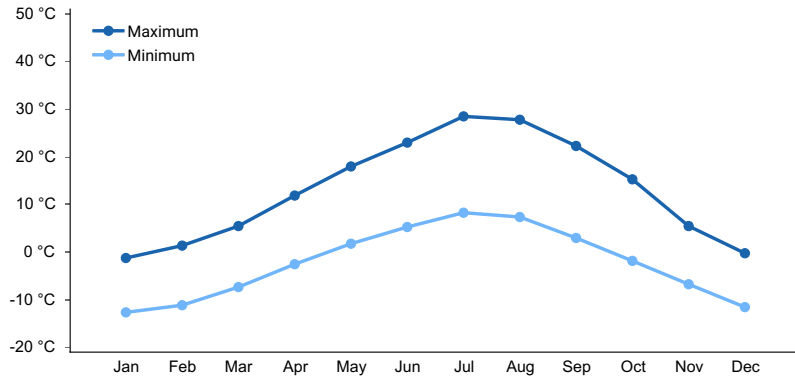
The frost-free period ranges from 64 to 90 days, while the freeze-free period can be 98 to 123 days.

**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

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

## Soil features

Soils are very deep, well drained silty sediments. Surface texture is calcareous silt loam over white, calcareous silt loam over very calcareous silt loam. Permeability is moderate and the available water holding capacity (AWC) is low. Runoff is rapid and hazard of erosion by water is very high. There is a high salt content in the soil profile.

Soil Series Correlated to this Ecological Site

Watercanyon variant

**Table 4. Representative soil features**

Surface texture	(1) Silt loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	152 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	6.1–11.68 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%

Electrical conductivity (0-101.6cm)	4–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	6–12
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## Ecological dynamics

The dominant visual aspect of this site is Wyoming big sagebrush, alkali bluegrass, and needle and thread. Composition by weight is approximately 40 to 50 percent grasses, 20 to 30 percent forbs, and 25 to 35 percent shrubs.

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

Fire has historically occurred on the site at intervals of 50-70 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 Wyoming big sagebrush, alkali bluegrass, and needle and thread. Subdominant species include Indian ricegrass, bluebunch wheatgrass, and bottlebrush squirreltail. A wide variety of other grasses, forbs, and shrubs occur in small amounts. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 700 pounds per acre (784 kilograms per hectare) in a normal year. Production in a favorable year is 1100 pounds per acre (1232 kilograms per hectare). Production in an unfavorable year is 400 pounds per acre (448 kilograms per hectare). Structurally, cool season deep-rooted perennial bunchgrasses are dominant, followed by shrubs that are more dominant than perennial forbs followed by shallow rooted perennial bunchgrasses.

## FUNCTION.

This site is suited for livestock in spring, early summer, and fall. It is used by big game in the spring, fall, and moderate winters. If water is available, the site is easily grazed by livestock due to gentle slopes.

This site has limited value for recreation.

Due to the low available water holding capacity (AWC), low production, and ease of access on relatively flat slopes, this site is easily degraded by improper grazing management or frequent fires.

Infiltration can be good with a mixed stand of shrubs and perennial grasses. Runoff is rapid and erosion hazard is very high. Snow is caught in the shrub interspaces and a mixed stand of shrubs and perennial grasses is necessary to reach the potential of the site.

Impacts on the Plant Community.

Influence of fire.

In the absence of normal fire frequency, Wyoming big sagebrush can gradually increase. Grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (50-70 years), Wyoming big sagebrush is reduced significantly. With continued short fire frequency, Wyoming big sagebrush can be completely eliminated along with many of the desirable understory species such as alkali bluegrass, bluebunch wheatgrass, bottlebrush squirreltail, Thurber's needlegrass, and Indian ricegrass. These species may be replaced by cheatgrass or a variety of other annual and perennial forbs.

Influence of improper grazing management.

Season-long grazing and/or excessive utilization can be very detrimental to this site. This type of management leads to reduced vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in Wyoming big sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency with an increase in cheatgrass that increases fire frequency.

Proper grazing management that addresses frequency, duration, and intensity of grazing can maintain the integrity of the plant community.

Weather influences:

Above normal precipitation in April, May, and June can dramatically increase total annual production of the plant community. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Likewise, below normal precipitation during these spring months can significantly reduce total annual production and be detrimental to viable seed production. 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.

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. Prolonged drought can lead to a reduction in fire frequency.

Influence of Insects and disease.

Outbreaks can affect vegetation health. An outbreak of a particular insect is usually influenced by weather. Two or more consecutive years may cause mortality of some species. The sagebrush defoliator moth (*Aroga websterii*) causes mortality in relatively small patches. It seldom kills the entire stand. Mormon cricket and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak.

Influence of noxious and invasive plants.

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

Big game animals use this site in the spring, fall, and moderate winters. Their numbers are seldom high enough to adversely affect the plant community. If the site is in a wintering area for big game, high numbers can adversely affect the plant community in the early spring.

Watershed.

Decreased infiltration and increased runoff on slopes greater than 15 percent occur when Wyoming big sagebrush is removed with frequent fires, particularly the year of the fire event. The increased runoff also causes 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 improper grazing management and in the absence of fire.

Phase A to C. Develops with fire.

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

Phase C to A. Develops with prescribed grazing and no fire.

State 1 to State 2. Develops through frequent fire and/or improper grazing management. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

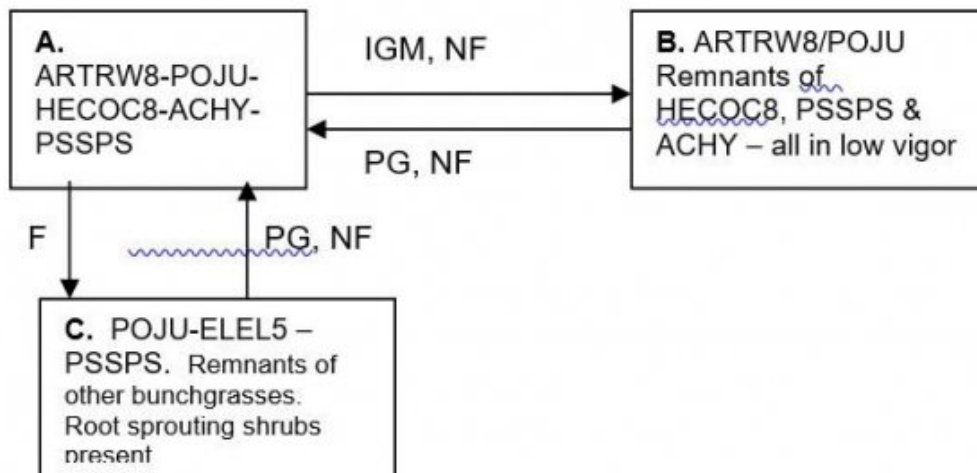
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this state to State 1 with accelerated practices.

Practice Limitations:

The soils of this site have moderate to severe limitations for range seeding due to salts in the soil profile. There are only slight limitations for brush management. Careful planning is needed to evaluate the desired vegetation that will respond to brush management because removal of Wyoming big sagebrush can lead to a significant increase in cheatgrass. The site offers slight limitations to vegetative management practices. Livestock water may be limiting on this site and associated sites.

## **State and transition model**

## STATE 1. Plant Community Phases



FF  
&/or  
IGM

## STATE 2. BRTE-ANNUALS

FF, IGM

UNKNOWN AND  
NEW SITE

### LEGEND

IGM- Improper grazing management  
 PG- Prescribed grazing  
 FF- Frequent fire  
 NF- No fire  
 F- Fire  
 RS- Range Seeding  
 —————> Community pathway (within states)  
 - - - - -> Reversible transition  
 ————— Threshold  
 —————> Irreversible transition

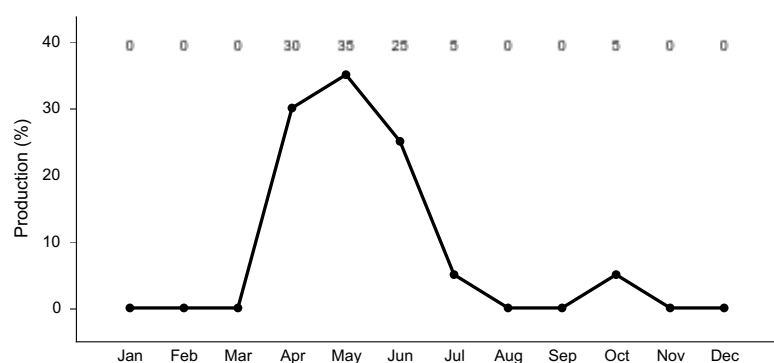
### PLANT LEGEND STATES 1 & 2

POJU - alkali bluegrass  
 ARTRW8- Wyoming big sagebrush  
 HECOC8- needle and thread  
 PSSPS - bluebunch wheatgrass  
 ELEL5 - bottlebrush squirreltail  
 BRTE - cheatgrass

State 1  
 State 1

Community 1.1  
 State 1 Phase A

This plant community is dominated by Wyoming big sagebrush, alkali bluegrass, and needle and thread. Subdominant species include Indian ricegrass, bluebunch wheatgrass, and bottlebrush squirreltail. A wide variety of other grasses, forbs and shrubs occur in small amounts. Natural fire frequency is 50-70 years.



**Figure 3. Plant community growth curve (percent production by month). ID0807, ARTRW8/PSSPS.**

### **Community 1.2 State 1, Phase B**

This plant community is dominated by Wyoming big sagebrush with alkali bluegrass in the understory. This state has developed due to improper grazing management and lack of fire. There is a reduced amount of needle and thread, bluebunch wheatgrass, and Indian ricegrass. These deep-rooted bunchgrasses are typically in low vigor. Tall shrubs have increased.

### **Community 1.3 State 1, Phase C**

This plant community is dominated by alkali bluegrass. Needle and thread is reduced in the stand and some may have died due to fire. Bluebunch wheatgrass is maintained in the stand and bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Phase A. Very small amounts of Wyoming sagebrush are present due to wildfire, but some rabbitbrush and greasewood is present due to sprouting and may have increased. This plant community is the result of wildfire.

### **Pathway A to B Community 1.1 to 1.2**

Develops with improper grazing management and in the absence of fire.

### **Pathway A to C Community 1.1 to 1.3**

Develops with fire.

### **Pathway B to A Community 1.2 to 1.1**

Develops with prescribed grazing and no fire.

### **Pathway C to A Community 1.3 to 1.1**

Develops with prescribed grazing and no fire.

### **State 2 State 2**



This plant community is dominated by cheatgrass and annuals. Root sprouting shrubs such as rabbitbrush and greasewood can be present, dependent upon, how frequent, fire has occurred. This state has developed due to frequent fires and/or improper grazing management. Some soil loss has occurred. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

### **State 3**

### **State 3**

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 state has developed due to continued improper grazing management and/or frequent fires.

### **Transition T1A**

### **State 1 to 2**

Develops through frequent fire and/or improper grazing management. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices.

### **Transition T2A**

### **State 2 to 3**

Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this state to State 1 with accelerated practices.

## **Additional community tables**

### **Animal community**

Wildlife Interpretations.

This site is fair to good habitat for big game. This site provides fair to good habitat for mule deer in moderate winters. It is also habitat for sagegrouse, cottontail rabbits, jackrabbits, coyotes, rattlesnakes, and various songbirds yearlong. It is hunted by raptors.

Grazing Interpretations.

This site is best suited for livestock grazing in the spring, early summer, and fall. If water is available, the site is easily grazed by livestock due to gentle slopes.

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**

No data.

## **Recreational uses**

This site has very little recreational value. It has some spring blooming flowers which offer slight aesthetic values. It has limited value for hunting coyotes, rabbits, and mule deer. The site has little value for picnicking or camping. It has very little aesthetic appeal or natural beauty.

## **Wood products**

None.

## **Other products**

None.

## **Other information**

Field Offices

American Falls, ID  
Blackfoot, ID  
Burley, ID  
Driggs, ID  
Ft. Hall, ID  
Idaho Falls, ID  
Malad City, 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

## **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/feis](http://www.fs.fed.us/database/feis)  
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**

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.

Author(s)/participant(s)	Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	06/24/2009
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** rills can occur on this site. If rills are present they are likely to occur on slopes over 15 percent and immediately following wildfire. They are most likely to occur on silt loam surface textures.  

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2. **Presence of water flow patterns:** water-flow patterns can occur on this site, particularly on slopes greater than 15 percent. If they occur, they are short and disrupted flows. They are disrupted by cool season grasses and tall shrubs and are not extensive.  

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3. **Number and height of erosional pedestals or terracettes:** both can occur on this site. Where flow patterns and/or rills are present, a few pedestals may be expected.  

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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 50-65 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. Where sagebrush has repopulated the site after a fire, remnants of past wind scour may be present.  

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7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 2 feet 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 3 to 5 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):** structure ranges from weak very fine granular to weak fine granular structure. Soil organic matter (SOM) generally ranges from 1 to 2 percent. The surface color ranges from dark brown to dark yellowish brown.
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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 shrubs can catch 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):** is not present.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: cool season deep -rooted perennial bunchgrasses
- Sub-dominant: tall shrubs
- Other: perennial forbs
- Additional: shallow rooted grasses
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Wyoming big sagebrush will become decadent in the absence of normal fire frequency. 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 5-20 percent to a depth of 0.1 inches. Under mature shrubs 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 700 pounds per acre (784 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 40-50 percent of the total production, forbs 20-30 percent, and shrubs 25-35 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* sp., annual mustards, bulbous bluegrass, and spotted and diffuse knapweeds.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years.

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