USDA Natural Resources
Conservation Service

Ecological site R013XY031ID
Steep Stony North 16-22 PZ ARTRV/FEID

Last updated: 9/23/2020
Accessed: 05/19/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 013X–Eastern Idaho Plateaus

013X-Eastern Idaho Plateaus

Precipitation or Climate Zone: 16-22” P.Z.
https://soils.usda.gov/survey/geography/mlra/index.html

Classification relationships

Artemisia vaseyana 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”.

Land Resource Unit: B (Northwestern Wheat and Range)
MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

Ecological site concept

Site does not receive any additional water.
Soils are:
not saline or saline-sodic.
Shallow, moderately deep, with >35% stone (10-25”) and boulder (>25”) cover. skeletal within 20” of soil surface, fragment percentage increasing with depth
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.

Associated sites

R013XY005ID	**Loamy 16-22 PZ ARTRV/FEID-PSSPS**
R013XY015ID	**Steep Stony Mahogany 16-22 PZ CELE3-ARTRV/PSSPS**
R013XY016ID	**Moist Mountain Loam 20+ PZ POTR**
R013XY019ID	**Stony Loam 16-22 PZ ARTRV/PSSPS**

Similar sites

R013XY008ID	**Steep South Slopes 12-16 PZ ARTRV/PSSPS**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. vaseyana*
Herbaceous	(1) *Festuca idahoensis*

Physiographic features

This site occurs on the steep upper portion of mountain ridges. Slopes range from 20 to 60 percent. The site occurs on all aspects, but predominately on the north and east aspects. Elevations range from 6000 to 9000 feet (1829 to 2743 meters).

Table 2. Representative physiographic features

Landforms	(1) Ridge
Flooding frequency	None
Elevation	1,829–2,743 m
Slope	20–60%
Aspect	N, E

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

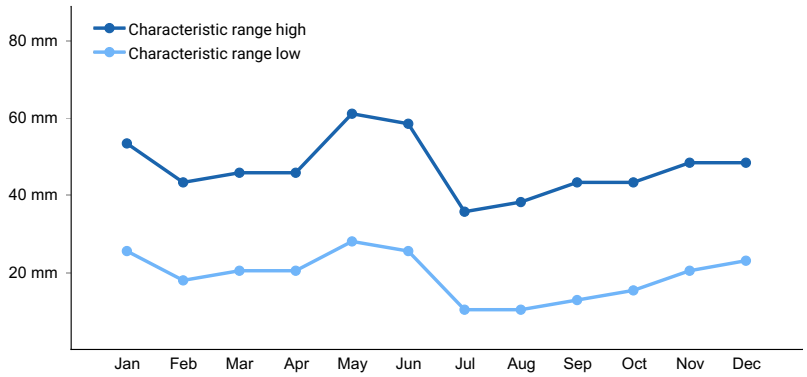


Figure 1. Monthly precipitation range

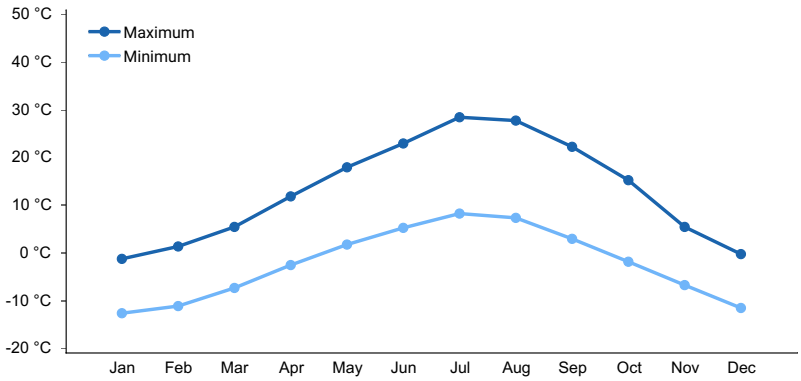


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils on this site are generally shallow, well drained, extremely stony loams formed in colluvium and material that weathered from limestone and has had additions of loess in the upper portion of the profile. These soils have moderate permeability with low available water holding capacity (AWC) and a high runoff hazard.

Soil Series Correlated to this Ecological Site

none

Table 4. Representative soil features

Surface texture	(1) Extremely stony loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	25–51 cm
Surface fragment cover <=3"	0–35%
Surface fragment cover >3"	0–45%
Subsurface fragment volume <=3" (Depth not specified)	15–45%
Subsurface fragment volume >3" (Depth not specified)	0–35%

Ecological dynamics

The dominant visual aspect of this site is mountain big sagebrush and Idaho fescue. Composition by weight is approximately 50-60 percent grass, 10-20 percent forbs, and 25-35 percent shrubs.

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, lagomorphs, and small rodents.

Fire has historically occurred on the site at intervals of 25-40 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 Idaho fescue and mountain big sagebrush. Subdominant species include bluebunch wheatgrass,

Columbia needlegrass, big bluegrass, arrowleaf balsamroot, tapertip hawksbeard, and mountain snowberry. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 1000 pounds per acre (1120 kilograms per hectare) in a normal year. Production in a favorable year is 1600 pounds per acre (1792 kilograms per hectare). Production in an unfavorable year is 700 pounds per acre (784 kilograms per hectare). 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 suited for grazing by domestic livestock in the summer and fall. This site is valuable for wildlife because of the variety and abundance of plant species and the interspersion of this site with other habitat types. The site provides habitat for quail, sage grouse, blue grouse, ruff grouse, sharp-tailed grouse, lagomorphs, squirrels, and songbirds as well as habitat for mule deer, Rocky Mountain elk, bear, cougar, and coyote. Due to surface stones, the site is fairly resistant to disturbances that can potentially degrade it as long as a good herbaceous cover is retained.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, shrubs can gradually increase. Grasses and forbs decrease as shrubs increase. Juniper can also increase if a seed source is in the proximity. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, juniper can displace most of the shrubs and other understory species. See “Influence of juniper invasion” below.

When fires become more frequent than historic levels (25-40 years), mountain big sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass, Idaho fescue, Columbia needlegrass, and big bluegrass. These species may be replaced by cheatgrass and Kentucky bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Mountain snowberry will re-sprout after fire.

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 and bitterbrush. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in mountain big sagebrush, snowberry, and noxious and invasive plant species. Continued improper grazing management influences fire frequency by increasing fine fuels.

Proper grazing management that addresses frequency, duration, and intensity of grazing can also keep fine fuels from developing, thereby reducing fire frequency. This can lead to gradual increases in mountain big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management should be carefully planned due to the surface stones, species of brush present, and the steepness of the slopes. The shrub species present are extremely important to wildlife and need to be protected if control measures are implemented. Any reduction in shrubs without a suitable understory of perennial grasses can lead to an increase in fine fuels which will lead to a more frequent fire regime. Loss of the shrub component on this site will have very negative impacts on wildlife.

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, particularly bitterbrush by the western tent caterpillar (Malacosoma fragilis). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available. 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.
Many of the perennial invasive species with deep root systems 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, summer, and fall. Their numbers are seldom high enough to adversely affect the plant community. Herbivory can be detrimental to bitterbrush when livestock grazing and browsing by big game occurs at the same time and season. This will occur when both kinds of animal are using the plant in the late summer or fall. The adverse impact is excessive use of the current years' leader growth.

The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

Watershed:

Decreased infiltration and increased runoff occur with an increase of mountain big sagebrush. This increase can be triggered by lack of fire, poor grazing management, and prolonged drought. The increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long-term effect is a transition to a different state.

Influence of juniper invasion:

In plant communities that are invaded by juniper, the species has a competitive advantage for the following reasons:
• Juniper is very drought tolerant.
• It has the ability to extract soil moisture from a wide range of soil depths.
• Juniper has high evapo-transpiration rates.
• The species intercepts rain and snow before it reaches the soil surface.
• It has the ability to grow as long as there is soil moisture and the temperature is above freezing.
• Juniper has a relatively rapid growth rate and is long-lived. It can readily over-top shade intolerant species which leads to mortality.
• Nutrient cycling is reduced.
• As the canopy closes, juniper gains control of energy capture

As juniper extracts water, other plants are unable to acquire sufficient water and nutrients to sustain growth and reproduction, thus reducing cover and biomass in the interspaces. After the canopy closes, there is sufficient soil moisture available for shallow-rooted, shade tolerant species to persist directly under the tree.

The following hydrologic impacts occur on sites invaded by juniper:
• Infiltration in the interspaces is reduced.
• Run-off increases resulting in increased sheet and rill erosion with elevated sediment loads.
• Soil temperatures increase in the interspaces which results in accelerated drying of the soil surface.
• Increased bare ground in the interspaces.
• Soil moisture storage is reduced.
As bare ground and interconnectiveness of bare ground increases, flow rates are accelerated (reduction of flow sinuosity) and run-off out of the area increases.

Degradation of these systems can result in the formation of a feedback cycle in which greater juniper cover and density results in greater plant and soil disturbance between the canopies.

In summary, a closed juniper community takes control of the following ecological processes: (1) hydrology, (2) energy capture, and (3) nutrient cycling. The changes are primarily driven by the hydrologic processes. The development of a closed juniper canopy always results in a transition across the threshold to a different state. Generally, when juniper canopy cover nears 20%, the plant community is approaching the threshold.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.
Phase A to B. Develops in the absence of fire. No juniper seed source in the proximity.
Phase A to C. Usually results from improper grazing management and absence of fire. A juniper seed source is present.
Phase A to D. Results from one or more fires.
Phase A to E. Develops in the absence of fire and improper grazing management. A juniper seed source is present.
Phase A to F. Results from improper grazing management and absence of fire. No juniper seed source is present.
Phase B to A. Results from prescribed grazing management.
Phase C to A. Develops with prescribed grazing management and prescribed burning or fire.
Phase D to A. Usually results from prescribed grazing management and no fire.
Phase E to A. Develops from prescribed grazing management and prescribed burning or brush management.
Phase F to A. Results from prescribed grazing management, no fire or brush management.
Phase B to D. This develops from prescribed burning or fire.
Phase C to D. This develops from prescribed burning or fire.
Phase E to D. Results from prescribed burning or fire.
Phase F to D. Results from prescribed burning or fire.

State 1 Phase D to State 2, Phase B. Develops through improper grazing management and frequent fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

State 1 Phase F to State 2 Phase A. Develops through improper grazing management with no fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

State 1 Phase C or E to State 3. Results from improper grazing management and lack of fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

State 2 Phase A to State 2 Phase B. Results from improper grazing management and fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

State 2 Phase B to State 2 Phase A. Results from no fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

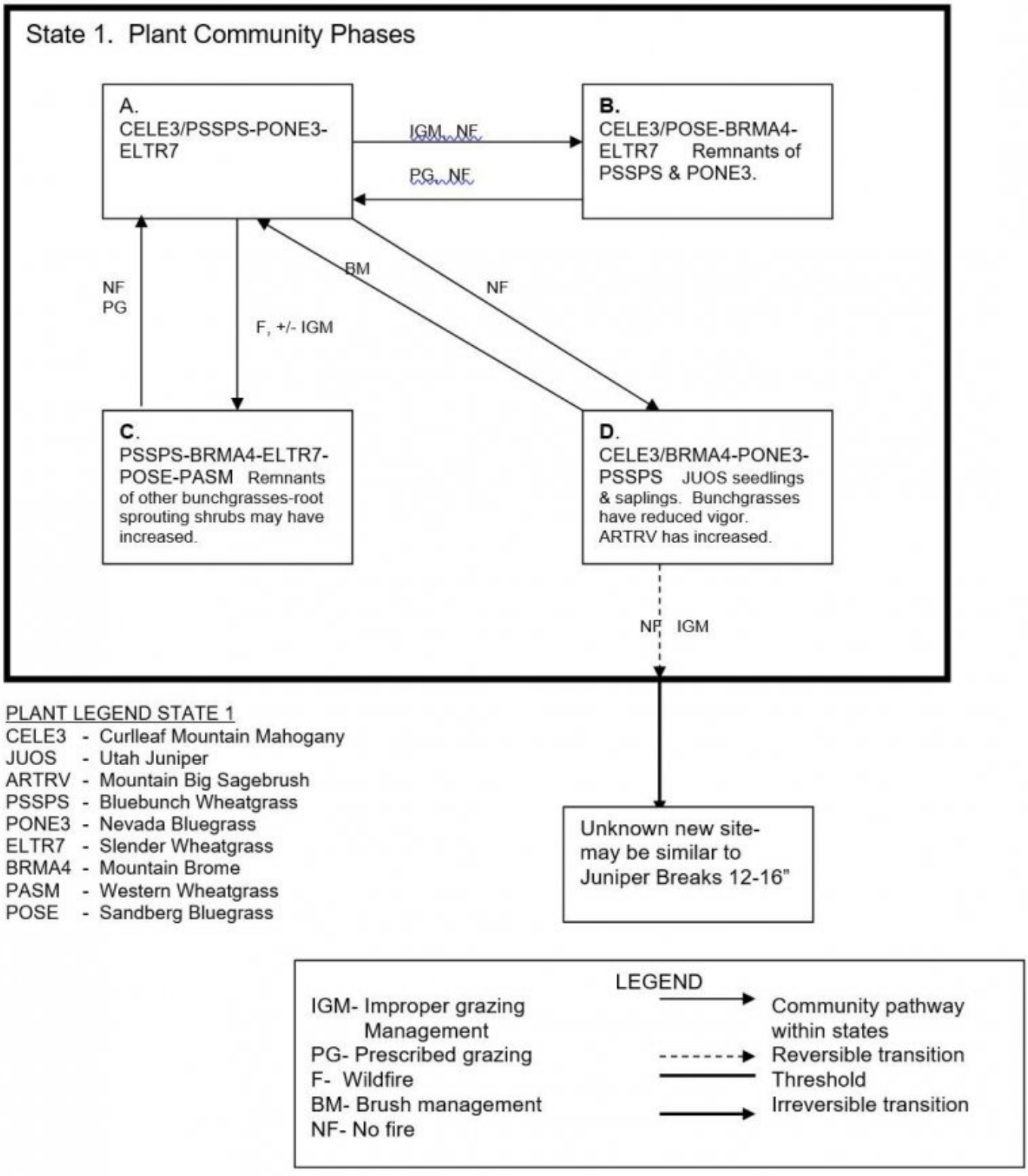
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and/or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is usually uneconomical to return this community to State 1 through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

State 3 to unknown site. Continued lack of fire and improper grazing management cause this state to cross the threshold and retrogress to a new site with reduced potential due to significant soil loss and changes in hydrology. It is usually uneconomical to return this community to State 1 through accelerated practices.

Practice Limitations.

Severe limitations exist for seeding and brush control with conventional ground moving equipment due to extremely stony soils and steep slopes. Access for livestock may be difficult due to steep slopes and surface stones.

State and transition model



State 1
State 1

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This plant community is dominated by mountain big sagebrush in the overstory with Idaho fescue, bluebunch wheatgrass, Columbia needlegrass, big bluegrass, and arrowleaf balsamroot prominent in the understory. Tapertip hawksbeard, helianthella, and mountain snowberry are sub-dominant species. Other significant species in the plant community can include lupine, antelope bitterbrush, Saskatoon serviceberry, and rabbitbrush. Natural fire frequency is 25-40 years.

Table 5. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	30-40%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

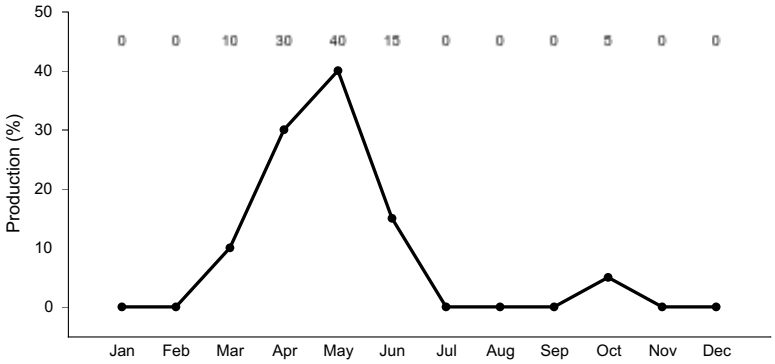


Figure 3. Plant community growth curve (percent production by month). ID0804, ARTRV, NORTH. STATE 1.

Community 1.2
State 1, Phase B

This plant community is dominated in the overstory by mountain big sagebrush and antelope bitterbrush. Shrubs are increasing and forbs are decreasing. Idaho fescue and bluebunch wheatgrass are still very prominent in the plant community. No juniper seed source is present. This plant community is the result of fire frequency being much longer than normal.

Community 1.3
State 1, Phase C

This plant community is dominated by mountain big sagebrush with reduced amounts of bluebunch wheatgrass and Idaho fescue. Small juniper trees, seedlings, and saplings are present since a juniper seed source is in the vicinity. Mountain brome, dryland sedges, and Sandberg bluegrass have increased in the understory. All deep-rooted perennial bunchgrasses are typically in low vigor. Mountain big sagebrush and mountain snowberry have increased and Kentucky bluegrass has invaded. Some cheatgrass may also have invaded the site. This state has developed due to improper grazing management and no fire.

Community 1.4
State 1, Phase D

This plant community is dominated by bluebunch wheatgrass and Idaho fescue. Sandberg bluegrass and other perennial grasses and forbs are subdominant. No shrubs are present due to fire.

Community 1.5
State 1, Phase E

This plant community is similar to the Reference Plant Community, Phase A except that juniper seedlings and saplings are invading the site due to a lack of fire. A juniper seed source is in the proximity. This state has developed due to the absence of fire and improper grazing management.

Community 1.6
State 1, Phase F

This plant community is dominated by mountain big sagebrush in the overstory. Sandberg bluegrass is the dominant grass in the understory. Bluebunch wheatgrass and Idaho fescue are present but in reduced amounts and typically in low vigor. This state has developed due to improper grazing management and a lack of fire. No juniper seed source is in the proximity.

Pathway A to B
Community 1.1 to 1.2

Develops in the absence of fire. No juniper seed source in the proximity.

Pathway A to C
Community 1.1 to 1.3

Usually results from improper grazing management and absence of fire. A juniper seed source is present.

Pathway A to D
Community 1.1 to 1.4

Results from one or more fires.

Pathway A to E
Community 1.1 to 1.5

Develops in the absence of fire and improper grazing management. A juniper seed source is present.

Pathway A to F
Community 1.1 to 1.6

Results from improper grazing management and absence of fire. No juniper seed source is present.

Pathway B to A
Community 1.2 to 1.1

Results from prescribed grazing management.

Pathway B to D
Community 1.2 to 1.4

This develops from prescribed burning or fire.

Pathway C to A
Community 1.3 to 1.1

Develops with prescribed grazing management and prescribed burning or fire.

Pathway C to D

Community 1.3 to 1.4

This develops from prescribed burning or fire.

Pathway D to A
Community 1.4 to 1.1

Usually results from prescribed grazing management and no fire.

Pathway E to A
Community 1.5 to 1.1

Develops from prescribed grazing management and prescribed burning or brush management.

Pathway E to D
Community 1.5 to 1.4

Results from prescribed burning or fire.

Pathway F to A
Community 1.6 to 1.1

Results from prescribed grazing management, no fire or brush management.

Pathway F to D
Community 1.6 to 1.4

Results from prescribed burning or fire.

State 2
State 2

Community 2.1
State 2, Phase A

This plant community is dominated by mountain big sagebrush with Sandberg bluegrass and annuals in the interspaces. This state has developed due to continued improper grazing management and the absence of fire from phase F, State1 or with no fire from phase B, State 2. This site has crossed the threshold. It is usually uneconomical to return this community to State1 through accelerated practices.

Community 2.2
State 2 Phase B

This plant community is dominated by Sandberg bluegrass and other annuals and forbs. Root sprouting shrubs such as rabbitbrush and snowberry are present. This state has developed due to improper grazing management and frequent fires form phase D, State 1 or with improper grazing management and fire from phase A, State 2. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	0%

Biological crusts	0%
Litter	30-40%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

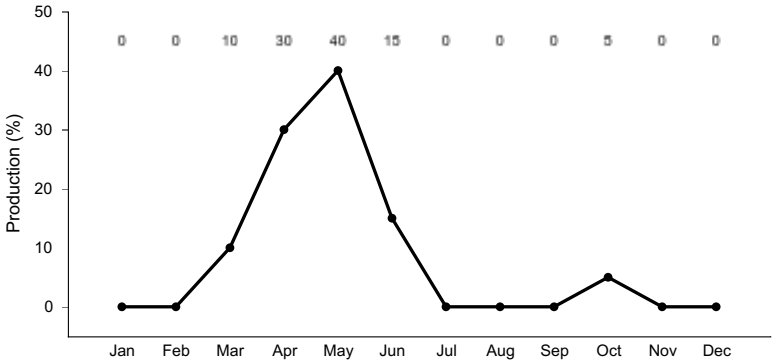


Figure 4. Plant community growth curve (percent production by month). ID0804, ARTRV, NORTH. STATE 1.

Pathway A to B
Community 2.1 to 2.2

Results from improper grazing management and fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

Pathway B to A
Community 2.2 to 2.1

Results from no fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

State 3
State 3

This plant community is dominated by juniper. Remnants of Bluebunch wheatgrass and Idaho fescue can be found in the understory, often under trees. Shallow-rooted grasses, such as Sandberg bluegrass, and other annuals can be found in the interspaces. Few shrubs are present. This state has developed with improper grazing management and in the absence of fire. When shrub cover is below 12-13%, bare ground is above 27-28%, and juniper cover is greater than 20%, the site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

State 4
State 4

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 from State 2 or the lack of fire and improper grazing management from the juniper dominated plant community of State 3. This site will not return to State 1 or 2 because of significant soil loss.

Transition T1A

State 1 to 2

State 1 Phase D to State 2, Phase B. Develops through improper grazing management and frequent fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices. State 1 Phase F to State 2 Phase A. Develops through improper grazing management with no fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

Transition T1B
State 1 to 3

State 1 Phase C or E to State 3. Results from improper grazing management and lack of fire. This site has crossed the threshold. It is usually uneconomical to return this community to State 1 through accelerated practices.

Transition T2A
State 2 to 4

Excessive soil loss and changes in the hydrologic cycle caused by 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 usually uneconomical to return this community to State 1 through accelerated practices.

Transition T3A
State 3 to 4

Continued lack of fire and improper grazing management cause this state to cross the threshold and retrogress to a new site with reduced potential due to significant soil loss and changes in hydrology. It is usually uneconomical to return this community to State 1 through accelerated practices.

Additional community tables

Animal community

Wildlife Interpretations.
Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. The plant community exhibits a diverse mixture of forbs throughout the growing season offering excellent habitat for invertebrates. Mule deer, elk, and sometimes pronghorn antelope utilize the site at different times of the year. The rangeland provides seasonal habitat for resident and migratory animals including western toad, shrews, bats, ground squirrels, mice, coyote, red fox, badger, Ferruginous hawk, and prairie falcon. Area sensitive bird species include Brewer’s sparrow, sage thrasher, sage sparrow, sharp-tailed grouse, and sage-grouse. Water features are sparse provided by seasonal runoff, artificial water catchments, and springs.

State 1 Phase 1.1 – Mountain Big Sagebrush/ Bluebunch Wheatgrass/ Idaho Fescue/ Columbia Needlegrass/ Big Bluegrass/ Antelope Bitterbrush Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs used by native insect communities that assist in pollination. An extensive array of forbs is represented throughout the growing season leading to a diverse insect community. Many avian and mammal species utilize this habitat based on the availability of invertebrate prey species. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, Great Basin spadefoot toad, western toad, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Development of spring sites that collect all available water would exclude amphibian use on these sites. Native shrub-steppe obligate avian species utilizing the habitat include the Brewer’s sparrow, sage sparrow, sage grouse, and sage thrasher. Sage-grouse habitat (leks, nesting, brood-rearing, and winter) is provided by this plant community. The plant community provides seasonal food and cover for large mammals including mule deer, pronghorn antelope, and elk. Antelope bitterbrush may be present in this plant community and along with bluebunch wheatgrass and Idaho fescue is an important forage species for these animals. Some areas of this site (south and west facing slopes) may provide winter food for mule deer and elk. A diverse small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin pocket mice may utilize this plant

community. Pika may be present at higher elevations when adjacent to talus slopes. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.2- Mountain Big Sagebrush/ Antelope Bitterbrush/ Bluebunch Wheatgrass/ Idaho Fescue Plant Community: This phase has developed due to fire return intervals being much longer than normal. An increase in canopy cover of sagebrush and antelope bitterbrush contributes to a declining herbaceous understory. The reptile and amphibian community will be similar to the State 1 Phase 1.1 community. Sagebrush provides brood-rearing, winter cover, and winter food habitat for sage-grouse but as understory vegetation declines the quality of this habitat is reduced. The plant community supports spring and fall food for mule deer, elk, and pronghorn. Quality of winter forage for mule deer, elk, and pronghorn is similar to that in State 1 Phase 1.1. A diverse small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin pocket mice may utilize this plant community.

State 1 Phase 1.3 – Mountain Big Sagebrush/ Utah Juniper/ Mountain Brome/ 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 juniper contributes to a sparse herbaceous understory. A reduced herbaceous understory results in lower diversity and numbers of insects. The reptile and amphibian community will be similar to the State 1 Phase 1.1 community, represented by common sagebrush lizard, western rattlesnake, Great Basin spadefoot toad, western toad, and northern leopard frog. The reduced diversity of insects and understory cover may reduce the quality of food and cover for reptile populations. As juniper increases, habitat for Brewer’s sparrow, sage thrasher, and sage sparrow may increase. Remaining sagebrush provides brood-rearing, winter cover, and winter food habitat for sage-grouse but as juniper encroaches the quality of this habitat is severely reduced or eliminated. The plant community provides limited spring and fall forage for mule deer, elk, and pronghorn antelope due to the loss of understory vegetation. Juniper can provide winter habitat (cover and food) for mule deer. As juniper encroaches, the site will provide additional thermal cover for large mammals. A diverse small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin pocket mice may utilize this plant community.

State 1 Phase 1.4 – Bluebunch Wheatgrass/ Idaho Fescue Plant Community: The plant community is a result of recent wildfire, prescribed burn, or brush management. The plant community, dominated by herbaceous vegetation with little to no sagebrush or antelope bitterbrush would provide less vertical structure for animals. Patches of root sprouting shrubs (snowberry and rabbitbrushes) may be present to provide limited vertical structure for wildlife over time. Insect diversity would be reduced but a native forb plant community similar to that in State 1 Phase 1.1 would still support select pollinators. The quality of food and cover habitat for reptiles would decline due to the loss of sagebrush and antelope bitterbrush. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collect all available water would exclude the use of amphibians on these sites. The dominance of herbaceous vegetation with little sagebrush or antelope bitterbrush canopy cover would limit use of these areas as nesting habitat by Brewer’s sparrow, sage sparrow, sage grouse, and sage thrasher. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark, savannah sparrow, vesper sparrow, and western meadowlark). Sharp-tailed grouse may prefer this plant community over sites with higher sagebrush canopy cover. Mule deer, pronghorn, and elk use would be seasonal (spring, summer, and fall) but the site would offer little thermal or young of year cover due to the loss of shrub cover. The populations of small mammals would be dominated by open grassland species. Large blocks of this plant community would fragment the reference plant community and reduce the quality of habitat for shrub-steppe obligate animal species.

State 1 Phase 1.5 – Mountain Big Sagebrush/ Bluebunch Wheatgrass/ Idaho Fescue/ Columbia Needlegrass/ Big Bluegrass 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. Grasses, forbs, and shrubs are used by native insects that assist in pollination. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, Great Basin spadefoot toad, western toad, and northern leopard frog. Shrub-steppe obligate avian species include Brewer’s sparrow, sage sparrow, sage thrasher, and sage-grouse. Quality of habitat (brood-rearing and nesting cover) for sage-grouse is reduced due to a less diverse herbaceous plant community and an increase in juniper. Winter habitat (cover and food) for sage-grouse is provided but the quality is reduced or eliminated when junipers become dominantly established. The reduced vigor of understory vegetation provides a shorter forage season for mule deer, elk, and pronghorn antelope. Young of year cover would be provided for deer and pronghorn antelope. As juniper is established, additional winter thermal cover is provided for mule deer and elk. Small mammal diversity and populations would be similar to those in State 1 Phase 1.1.

State 1 Phase 1.6 – Mountain Big Sagebrush/ Sandberg Bluegrass Plant Community: This phase has developed due to improper grazing management and a lack of fire. An increase in canopy cover of sagebrush and improper grazing management contributes to a reduction of Idaho fescue and bluebunch wheatgrass. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, Great Basin spadefoot toad, western toad, and northern leopard frog. Shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Quality of habitat (brood-rearing and nesting cover) for sage-grouse is reduced due to poor vigor and a less diverse herbaceous plant community. Winter habitat (cover and food) for sage-grouse is provided. Young of year cover would be provided for deer and pronghorn antelope. Small mammal diversity and populations would be similar to those in State 1 Phase 1.1.

State 2 Phase 2.1 – Mountain Big Sagebrush/ Sandberg Bluegrass/ Annuals/ 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 contributes to a reduction of Idaho fescue and bluebunch wheatgrass. The reduced diversity of native herbaceous understory plants and increase in invasive plants results in a lower diversity of insects. The reptile and amphibian community is similar to that in Phase 1.6, State 1. The reduced diversity of insects may reduce reptile diversity and populations. Reduced herbaceous understory will lower the quality of the habitat for bird species. Shrub-steppe obligate avian species include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Quality of habitat (brood-rearing and nesting cover) for sage-grouse is reduced due to poor vigor and less diversity in the native herbaceous plant community. Winter habitat (cover and food) for sage-grouse is provided. Young of year cover would be provided for deer and pronghorn antelope. Small mammal diversity and populations would be similar to those in Phase 1.1, State 1.

State 2 Phase 2.2 –Sandberg/ Annuals/ Forbs/ Green Rabbitbrush/ Mountain Snowberry Plant Community: This phase has developed due to improper grazing management and frequent fire from Phase 1.4, State 1 or with improper grazing management and fire from Phase 2.1, State 2. The reduced forb and shrub components in the plant community would support a very limited population of pollinators. Habitat for common sagebrush lizard, Great Basin spadefoot toad, and western toad would be limited due to the loss of sagebrush. The loss of sagebrush and antelope bitterbrush would severely reduce the quality of habitat for sage thrasher, Brewer's sparrow, sage-grouse, and sage sparrow. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Kentucky bluegrass may provide excellent forage for elk and deer. The populations of small mammals would be dominated by open grassland species. Predator hunting success would increase due to the reduced quality of cover for small mammals. Large blocks of this plant community would fragment the reference plant community and reduce the quality of habitat for shrub-steppe obligate animal species.

State 3 –Utah Juniper/ Sandberg Bluegrass/ Annuals Plant Community: This state has developed due to improper grazing management and no fire. The loss of native understory vegetation will reduce insect diversity on the site. The lack of flowering plants reduces use by pollinators like butterflies and moths. Habitat for common sagebrush lizard, Great Basin spadefoot toad, and western toad would be limited due to the loss of sagebrush. This plant community does not support the habitat requirements for sage-grouse. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird, chipping sparrow, waxwings, and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Hunting success by raptors may decrease due to a heavy overstory of juniper. As juniper encroaches the site, it will provide additional thermal cover for large mammals. The plant community provides winter food and cover for mule deer.

Grazing Interpretations.

This site is suited for grazing by domestic livestock in the 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 run-off potential. Due to surface stones, the site is fairly resistant to disturbances that can potentially degrade it as long as a good herbaceous cover is retained.

Recreational uses

This site provides recreation for hunters and for hikers in viewing summer blooming forbs.

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

Revision Notes: “Previously Approved” Provisional
This Provisional ecological site concept has passed Quality Control (QC) and Quality Assurance (QA) to ensure that the site meets the 2014 NESH standards for a Provisional ecological site description. This is an updated “Previously Approved” ESD that represents a first-generation tier of documentation that, prior to the release of the 2014 National Ecological Site Handbook (NESH), met all requirements as an “Approved” ESD as laid out in the 1997 (rev.1, 2003) National Range and Pasture Handbook (NRPH). The document fully described the Reference State and Community Phase in the State-and-Transition model. All other alternative states are at least described in narrative form. The “Previously Approved” ESD has been field-tested for a minimum of five years and is a proven functional document for conservation planning. The “Previously Approved” ESD does not contain all tabular and narrative entries as required in the current “Approved” level of documentation, but it is expected that the “Previously Approved” ESD will continue refinement toward an “Approved” status.

Site Development and Testing Plan:
Future work, as described in a Project Plan, is necessary to validate the information in this Provisional Ecological Site Description. This will include field activities to collect low-, medium-, and high-intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. The final field review, peer review, quality control, and quality assurance reviews of the ESD will be required to produce the final document.

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

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”.
Petersen, S.L., 2004. A Landscape-Scale Assessment of Plant Communities, Hydrologic Processes, and State-and-Transition Theory in a Western Juniper Dominated Ecosystem. PhD Dissertation. Oregon State University, Corvallis, Oregon.

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.
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	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 can occur on this site. If rills are present they are likely to occur immediately following wildfire. Rills are most likely to occur on soils with surface textures of silt loam and clay loam. Surface stones reduce rills.

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

3. **Number and height of erosional pedestals or terracettes:** both occur on this site but are not extensive. In areas where flow patterns and/or rills are present, a few pedestals may be expected. Terracettes also occur on the site uphill from surface stones, bases of tall shrubs, and large bunchgrasses.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** may range from 10-20 percent but additional data is needed.

5. **Number of gullies and erosion associated with gullies:** do not occur on this site.

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

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 3 feet following a significant run-off event. Coarse litter generally does not move.

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):** no data.

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 catch blowing snow in the interspaces.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** not present.

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

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** mountain big sagebrush and antelope bitterbrush will become decadent in the absence of normal fire frequency and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.

---

14. **Average percent litter cover (%) and depth (in):** additional litter cover data is needed but is expected to be 15-30 percent to a depth of 0.1 inches. Under mature shrubs 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 1000 pounds per acre (1120 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 50-60 percent of the total production, forbs 10-20 percent and shrubs 25-35 percent.

---

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, leafy spurge, and yellow salsify.

---

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