

## Ecological site R013XY024ID Loamy 22+ PZ ARTRV/FEID-BRMA4

Last updated: 9/23/2020  
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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: 22+” P.Z.

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

### Classification relationships

*Artemisia vaseyana* / *Festuca idahoensis* 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)

### Ecological site concept

Site does not receive any additional water.

Soils are:

not saline or saline-sodic.

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.

### Associated sites

R013XY005ID	<b>Loamy 16-22 PZ ARTRV/FEID-PSSPS</b>
R013XY014ID	<b>Shallow Stony 12-20 PZ ARAR8/PSSPS</b>
R013XY016ID	<b>Moist Mountain Loam 20+ PZ POTR</b>
R013XY019ID	<b>Stony Loam 16-22 PZ ARTRV/PSSPS</b>
R013XY020ID	<b>Loamy Tall Brush 16-22 PZ ACGL/BRMA4</b>
R013XY022ID	<b>Subalpine Loamy 16-22 PZ ARTRS2/ELTR7-BRMA4</b>

## Similar sites

R013XY005ID	<b>Loamy 16-22 PZ ARTRV/FEID-PSSPS</b>
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**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. vaseyana</i>
Herbaceous	(1) <i>Festuca idahoensis</i> (2) <i>Bromus marginatus</i>

## Physiographic features

This site generally occurs on nearly level to moderately sloping mountain slopes, uplands, lava plains and fan remnants. Slopes range from 0 to 15 percent on all aspects. Elevations range from 6300 to 7400 feet (1925 to 2250 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Lava plain (2) Fan remnant (3) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	1,920–2,256 m
Slope	0–15%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

## Climatic features

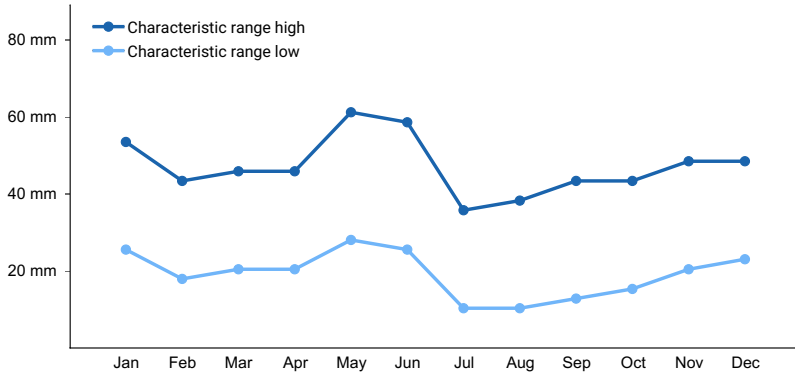
MLRA 13, the Eastern Idaho Plateaus, is part of the Northwestern Wheat and Range Region. Its elevation ranges from 4209 to 9331 feet above sea level, with an average elevation of 5787 feet. The average annual precipitation is 16.41 inches, with a range of 13.56 to 18.75 inches, based on ten long term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

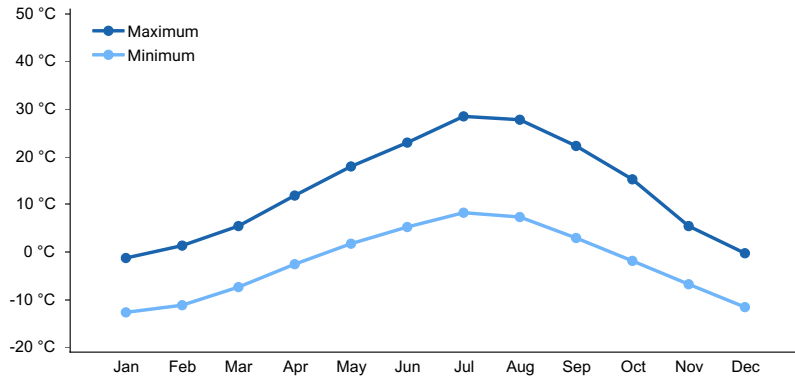
The frost-free period ranges from 64 to 90 days, while the freeze-free period can be 98 to 123 days.

**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

These soils are generally moderately deep to very deep loams and gravelly loams. A few stones may be present in the profile. The soils are well drained and have slow to moderate permeability. Runoff is low to medium. Available water capacity is very low to moderate. These soils are characterized by a xeric soil moisture regime and a cryic soil temperature regime.

Soil Series Correlated to this Ecological Site

Raynoldson  
Shotgun  
Stringam

**Table 4. Representative soil features**

Surface texture	(1) Gravelly loam
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–25%
Surface fragment cover >3"	0–5%

Available water capacity (0-101.6cm)	7.62–18.8 cm
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	10–50%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## Ecological dynamics

### Ecological Dynamics of the Site:

The dominant visual aspect is Idaho fescue and mountain brome with mountain big sagebrush. There are numerous late spring and summer blooming forbs. Composition by weight is approximately 70 to 80 percent grasses, 10 to 20 percent forbs, and 5 to 15 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, moose, and lagomorphs.

Fire has historically occurred on the site at intervals of 20-50 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 brome with mountain big sagebrush. Mountain snowberry is subdominant in the overstory. Antelope bitterbrush can be present in small amounts. Subdominant herbaceous species include arrowleaf balsamroot, tapertip hawksbeard, geranium and lupine. 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 2600 pounds per acre (2912 kilograms per hectare) in a normal year. Production in a favorable year is 3500 pounds per acre (3920 kilograms per hectare). Production in an unfavorable year is 1600 pounds per acre (1792 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by perennial forbs being more dominant than tall shrubs.

### FUNCTION:

This site is well suited for deer, elk, moose, raptors, and other wildlife in summer and early fall. It is also well suited for livestock use in the summer. The site has high value of hunting, hiking, horse back riding, ATV use, and other activities. The site has numerous showy flowers in spring and summer.

Due to the relatively high rainfall, elevation, and favorable cool growing season, it is fairly resistant to disturbances that can potentially degrade the site.

Due to the relatively high production and deep soils, infiltration is normally high and runoff moderately low. Runoff, when it does occur is non-erosive except during high intensity convection storms. Snow accumulates on the site due to high elevation and presence of tall shrubs.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, shrubs can gradually increase. Utah juniper can invade the site 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 (20-50 years), mountain big sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, mountain big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as Idaho fescue and mountain brome. These species may be replaced by cheatgrass (at lower elevations), slender wheatgrass, and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive species. Mountain snowberry and rabbitbrush may increase.

#### 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 possibly bitterbrush. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to Utah juniper invasion, an increase in mountain big sagebrush and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels. If cheatgrass increases due to improper grazing management and becomes co-dominant with Sandberg bluegrass and other annuals, fires become more frequent, particularly at lower elevations.

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. An increase in tall shrubs generally leads to an increase in juniper by providing bird perches and "nursery" sites for juniper establishment. 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 as a reduction in shrubs without a suitable understory of perennial grasses can lead to an increase in fine fuels which will lead to more frequent fire intervals.

With the potential for bitterbrush on this site, any prescribed burning needs to be very carefully evaluated because of its importance to 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 antelope bitterbrush from western tent caterpillars (*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. Snow mold can adversely affect the health of mountain big sagebrush.

#### Influence of noxious and invasive plants:

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

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

Influence of wildlife:

Big game animals use this site in the 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 the invasion of Utah juniper. Juniper invasion 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:

The following discussion deals with both western juniper and Utah juniper.

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 and improper grazing management. There is a Utah juniper seed source present in the vicinity near the site.

Phase A to C. Results from a fire or prescribed burn.

Phase A to D. Results from improper grazing management and no fire. There is no Utah juniper seed source present in the vicinity.

Phase B to C. Results from a wildfire or brush management.

Phase B to A. Occurs with prescribed grazing and brush management or prescribed burning.

Phase C to A. Results from prescribed grazing and no fire.

Phase D to A. Occurs with prescribed grazing.

Phase D to C. Occurs with fire or prescribed burning and prescribed grazing.

Phase C to D. Occurs with no fire and improper grazing management.

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

State 1, Phase B to 3. Develops with no fire and improper grazing management from a juniper invaded phase of State 1. This site has crossed the threshold. It is economically impractical to return State 3 to State 1 with accelerated practices.

State 2 or State 3 to State 4. Results from range seeding.

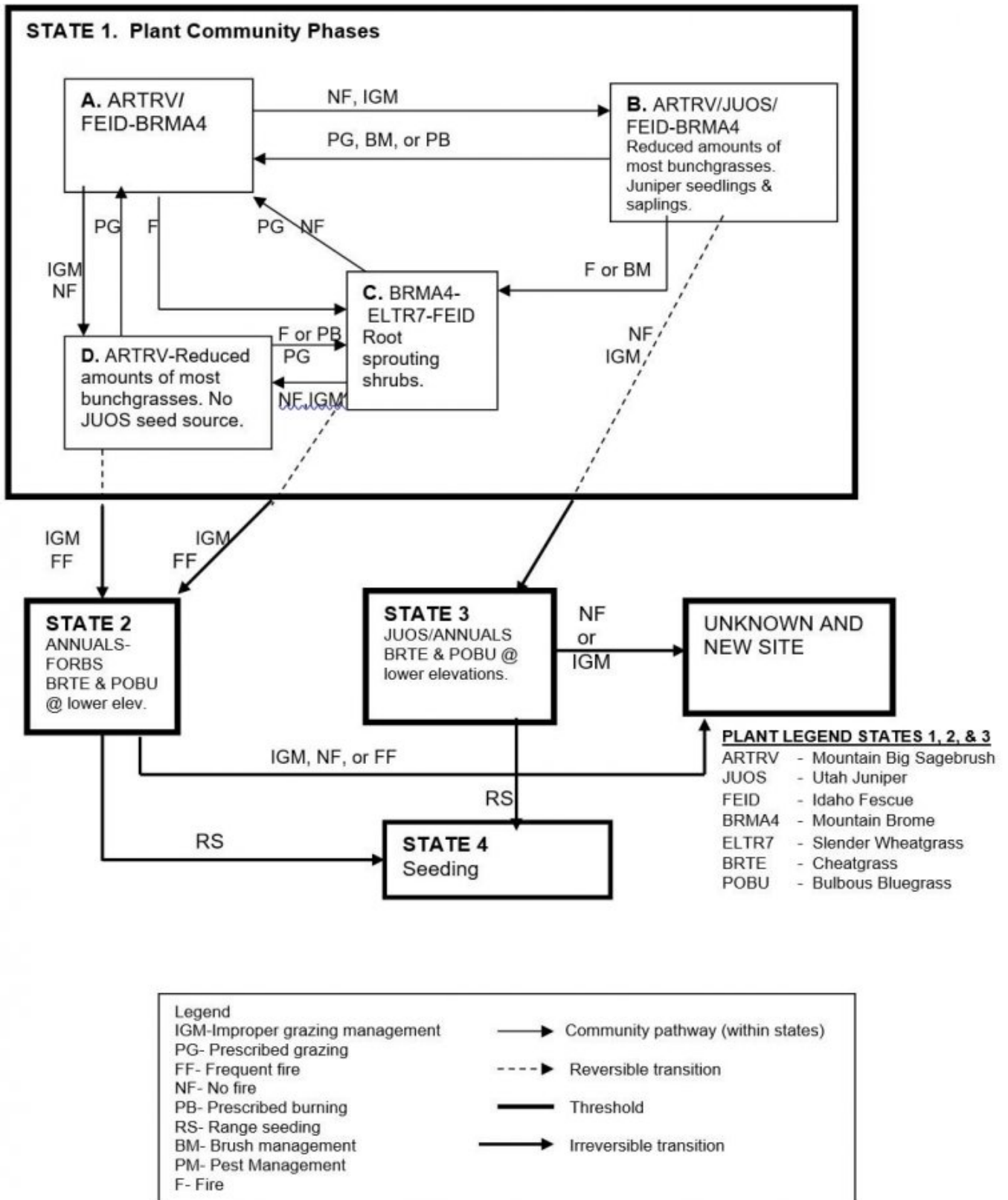
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and no fire or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this plant community to State 1 with accelerated practices.

State 3 to unknown site. Continued lack of fire or 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 economically impractical to return this plant community to State 1 with accelerated practices.

Practice Limitations:

Only slight limitations exist on this site for seeding and brush management and facilitating practices.

## **State and transition model**



**State 1**  
**State 1**

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

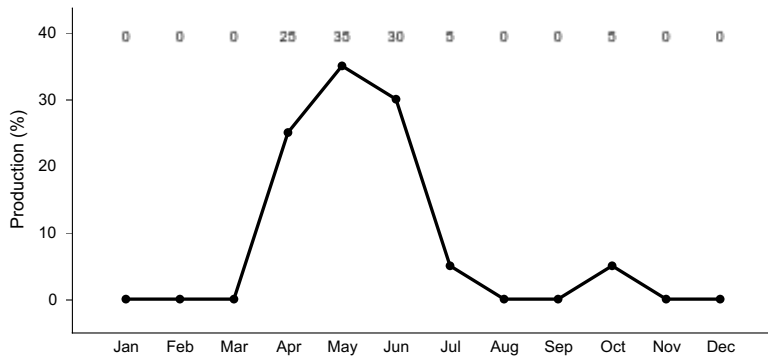
Reference Plant Community Phase. This plant community has mountain big sagebrush in the overstory with Idaho fescue and mountain brome in the understory. Mountain snowberry is subdominant in the overstory. Antelope bitterbrush may be present. The dominant forbs are arrowleaf balsamroot, tapertip hawksbeard, geranium and lupine. A wide variety of other grasses, forbs and shrubs can occur in the plant community in small amounts.



Natural fire frequency is 20-50 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	60-80%
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). ID0805, B13 ARTRV . State 1.**

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

This plant community is dominated in the overstory by mountain big sagebrush with some Utah juniper seedlings and saplings invading. Idaho fescue and mountain brome are still dominant in the understory but with reduced amounts and in low vigor. A wide variety of other grasses, forbs, and shrubs may occur but in small amounts and may be in low vigor. Slender wheatgrass may have increased. Antelope bitterbrush may have died out. A Utah juniper seed source is present in nearby sites. Some cheatgrass may be present at lower elevations. This state has developed due to fire frequency being much longer than normal and improper grazing management.

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

This plant community is dominated by mountain brome with slender wheatgrass. There is a wide variety of other grasses and forbs in small amounts. Idaho fescue and Letterman's and Columbia needlegrasses have decreased and may have died out due to fire. Most shrubs are absent from the site due to recent fire, except for some rabbitbrush, mountain snowberry, and other root sprouting shrubs that may be present. Some cheatgrass and bulbous bluegrass may have invaded the site, particularly at lower elevations. The community is a result of recent wildfire or prescribed burning.

### **Community 1.4 State 1, Phase D.**

This plant community is dominated by mountain big sagebrush in the overstory with significantly reduced amounts of Idaho fescue and mountain brome in the understory. Both are in reduced vigor. Slender wheatgrass has increased. Other bunchgrasses have been reduced and are also in low vigor. Antelope bitterbrush has been eliminated or is present in very reduced amounts with reduced vigor. There is no Utah juniper seed source in the proximity. Some cheatgrass may be present particularly at lower elevations. This plant community has developed due to improper grazing management and no fire.

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

Develops in the absence of fire and improper grazing management. There is a Utah juniper seed source present in the vicinity near the site.

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

Results from a fire or prescribed burn.

**Pathway A to D**  
**Community 1.1 to 1.4**

Results from improper grazing management and no fire. There is no Utah juniper seed source present in the vicinity.

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

Occurs with prescribed grazing and brush management or prescribed burning.

**Pathway B to C**  
**Community 1.2 to 1.3**

Results from a wildfire or brush management.

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

Results from prescribed grazing and no fire.

**Pathway C to D**  
**Community 1.3 to 1.4**

Occurs with no fire and improper grazing management.

**Pathway D to A**  
**Community 1.4 to 1.1**

Occurs with prescribed grazing.

**Pathway D to C**  
**Community 1.4 to 1.3**

Occurs with fire or prescribed burning and prescribed grazing.

**State 2**  
**State 2**

This plant community is dominated by annuals and some perennial forbs. Cheatgrass or bulbous bluegrass is dominant in the community, particularly at lower elevations. There may be a variety of invasive forbs and noxious species that have invaded the site. Some soil loss has occurred. The community has developed due to continued improper grazing management and frequent fire. 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 is dominated by Utah juniper with annuals in the understory. There is a Utah juniper seed source in the proximity. Cheatgrass and bulbous bluegrass are dominant at lower elevations. There are few shrubs present due to competition from junipers. Some deep-rooted perennials may be present under the junipers. When shrub cover is below 12-13%, bare ground is above 27-28%, juniper cover is greater than 20%, and infiltration less than 6 cm/hr, the plant community has crossed the threshold. Some soil loss has occurred. This plant community has developed due to the continued lack of fire and improper grazing management. It is economically impractical to return this community to State 1 with accelerated practices.

### **State 4** **State 4**

This plant community is dominated by seeded species. The seeding may be introduced species or natives to mimic the Reference Plant Community Phase, Phase A.

### **State 5** **State 5**

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 no fire or frequent fires from State 2 or the continued absence of fire and improper grazing management from State 3 where the site is dominated by juniper. It is economically impractical to return this community to State 1 with accelerated practices.

### **Transition T1A** **State 1 to 2**

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

### **Transition T1B** **State 1 to 3**

State 1, Phase B to 3. Develops with no fire and improper grazing management from a juniper invaded phase of State 1. This site has crossed the threshold. It is economically impractical to return State 3 to State 1 with accelerated practices.

### **Transition T2A** **State 2 to 4**

Results from range seeding.

### **Transition T2B** **State 2 to 5**

Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and no fire 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 plant community to State 1 with accelerated practices.

## **Transition T3A**

### **State 3 to 4**

Results from range seeding.

## **Transition T3B**

### **State 3 to 5**

Continued lack of fire or 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 economically impractical to return this plant community to State 1 with 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, moose, and elk may 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, and sage-grouse. Water features are sparse provided by seasonal runoff, artificial water catchments, and springs.

State 1 Phase 1.1 – Mountain Big Sagebrush/ Idaho Fescue/ Mountain Brome 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 bird 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, moose, 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 (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. 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/ Utah Juniper/ Idaho Fescue/ Mountain Brome Plant Community: This phase has developed due to fire return intervals being much longer than normal and/or improper grazing management. An increase in canopy cover of sagebrush and juniper contributes to a reduced herbaceous understory. The reptile community will be similar to the State 1 Phase 1.1 community represented by common sagebrush lizard and western rattlesnake. Sagebrush provides brood-rearing, nesting, winter cover, and winter food habitat for sage-grouse but as understory vegetation declines and juniper increases the quality of this habitat is reduced. The plant community provides spring through fall forage for mule deer, elk, and moose. Quality of winter food habitat for mule deer and elk 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 Brome/ Slender Wheatgrass/ Idaho Fescue Plant Community: This plant community is a result of recent wildfire, prescribed burning, 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 rabbitbrush) may be present to provide limited vertical structure for wildlife. Insect diversity would be reduced but a native forb plant community similar to that of State 1 Phase 1.1 would still support select pollinators. Habitat for reptiles identified in State 1 Phase 1.1 would be reduced due to the loss of sagebrush. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collected 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 would prefer this plant community over sites with dense sagebrush. Mule deer 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. Pronghorn antelope may utilize this open grassy site. 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 the habitat for shrub-steppe obligate animal species.

**State 1 Phase 1.4 – Mountain Big Sagebrush Plant Community:** This plant community is the result of improper grazing management and no fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. A reduced herbaceous understory results in lower diversity and numbers of insects. The reptile community will be similar to the State 1 Phase 1.1 community. The reduced diversity of insects and understory cover may reduce the quality of food and cover for reptile populations. Native shrub-steppe obligate bird species utilizing the habitat include the Brewer's sparrow, sage sparrow, sage grouse, and sage thrasher. Sagebrush provides brood-rearing, nesting, 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 limited spring and fall forage for mule deer, elk, and moose due to the loss of understory vegetation. A diverse small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice, and Great Basin pocket mice may utilize this plant community.

**State 2 – Annuals/ Forbs/ Cheatgrass/ Bulbous Bluegrass Plant Community:** This state has developed due to improper grazing management and frequent fire. 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 reduced or eliminated due to the loss of sagebrush. The loss of sagebrush and antelope bitterbrush would eliminate 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. Large mammals may utilize the herbaceous vegetation in the early part of the year when the vegetation is more palatable. The populations of small mammals would be dominated by open grassland species. Predator hunting success would increase due to the reduced amount 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 – Rocky Mountain Juniper/ Annuals/ Cheatgrass/ Bulbous Bluegrass Plant Community:** This state has developed due to improper grazing management and lack of 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 reduced due to the loss of sagebrush and native understory vegetation. 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, 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 will provide additional thermal cover for large mammals. The plant community provides food and cover for mule deer.

**State 4 – Rangeland Seeding Plant Community:** The seeding mixture (native or non-native) determines the animal species that utilize this site. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 phase 1.3. A diverse seed mixture of grasses, forbs and shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, avians, mammals, or shrub-steppe obligate animal species. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, mule deer, and elk would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout this community looking for prey species. Large areas of State 4 with no shrubs in the plant community would fragment the reference plant community and would severely reduce the quality of the habitat for shrub-steppe obligate animal species.

Grazing Interpretations.

This site is best suited for grazing by livestock in the summer.

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**

The soils in this site are in hydrologic group B. When the hydrologic condition of the vegetation is good, natural erosion hazard is slight.

## **Recreational uses**

This site is used for hunting, hiking, horseback riding, and viewing and photography of blooming forbs. The site is also used by ATV's and snowmobiles.

## **Wood products**

Mature juniper that has invaded and increased on the site can be cut for posts, poles, firewood, and lumber.

## **Other products**

none.

## **Other information**

Field Offices

American Falls, ID

Blackfoot, ID

Burley, ID

Driggs, ID

Ft. 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

### Type locality

Location 1: Clark County, ID
Location 2: Fremont County, ID

### Other references

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.

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	05/02/2008
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. If rills are present they are most likely to occur immediately following wildfire. Rills are most likely to occur on soils with surface textures of silt loam.

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

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3. **Number and height of erosional pedestals or terracettes:** both are rare on this site. In areas 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 not available. On sites in mid-seral status, bare ground may range from 20-40 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 does not occur.

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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. Terracettes and bunchgrass can trap fine litter. Coarse litter generally does not move.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 4 to 6 but needs to be tested.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure ranges from weak fine granular to weak and moderate fine subangular blocky. Soil organic matter (SOM) generally ranges from 2 to 5 percent, but in some cases have a range of 60 to 95 percent. Surface color is generally very dark



brown to very dark grayish brown. The A or A1 horizon is typically 4 to 12 inches thick.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Shrubs accumulate snow in the interspaces.
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** not present.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: cool season deep rooted perennial bunchgrasses
- Sub-dominant: perennial forbs
- Other: tall shrubs
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** mountain big sagebrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.
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14. **Average percent litter cover (%) and depth ( in):** annual litter cover in the interspaces will be 5-10 percent to a depth of <0.2. Under the mature shrubs litter is greater than 0.5 inches. Fine litter can accumulate on the terracettes.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 2600 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 70-80 percent of the total, forbs 10-20 percent, and shrubs 5-15 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 at lower elevations. Medusahead, bulbous bluegrass, rush skeletonweed, scotch thistle, spotted and diffuse knapweed, and leafy spurge. Other thistles.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years.

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