USDA Natural Resources
Conservation Service

Ecological site R013XY009ID
Ashy Loam 13-16 PZ ARTRV/PSSPS

Last updated: 2/13/2025
Accessed: 05/12/2025

General information

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

MLRA notes

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

013X-Eastern Idaho Plateaus

Precipitation or Climate Zone: 13-16” P.Z.
https://soils.usda.gov/survey/geography/mlra/index.html

Classification relationships

Artemisia vaseyana/Agropyron spicatum ht. Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number “35”.

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

EPA EcoRegion: Level III (Middle Rockies)

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

R013XY001ID	**Loamy 12-16 PZ**
R013XY002ID	**Stony Loam 13-16 PZ ARTRV/PSSPS**
R013XY004ID	**Shallow Gravelly 12-16 PZ ARTRV/PSSPS**
R013XY008ID	**Steep South Slopes 12-16 PZ ARTRV/PSSPS**
R013XY012ID	**Gravelly South Slope 12-16 PZ ARTRV/PSSPS**
R013XY013ID	**Stony 12-16 PZ ARTRV/FEID**

R013XY028ID	**Shallow Sand 12-16 PZ ARTRV/PSSPS**

Similar sites

R013XY027ID	**Sand 12-16 PZ PUTR2/HECOC8**
R013XY028ID	**Shallow Sand 12-16 PZ ARTRV/PSSPS**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on moderate to steep mountain slopes, on all aspects. Slopes range from 4 to 60 percent. Elevations range from 4800 to 6000 feet (1450-2000 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Hill (3) Mountain slope
Flooding frequency	None
Elevation	1,463–1,981 m
Slope	4–60%
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

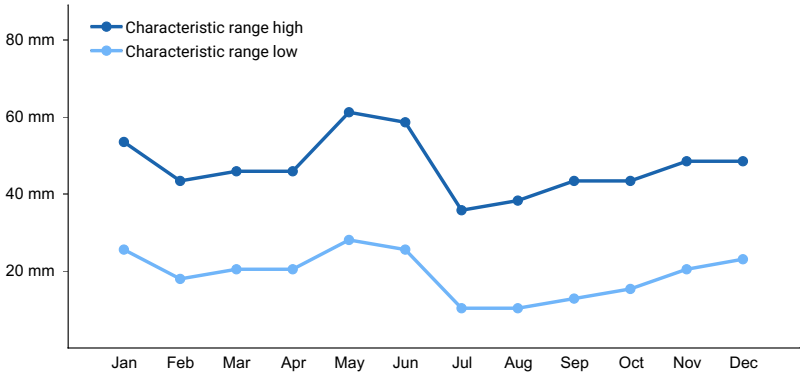


Figure 1. Monthly precipitation range

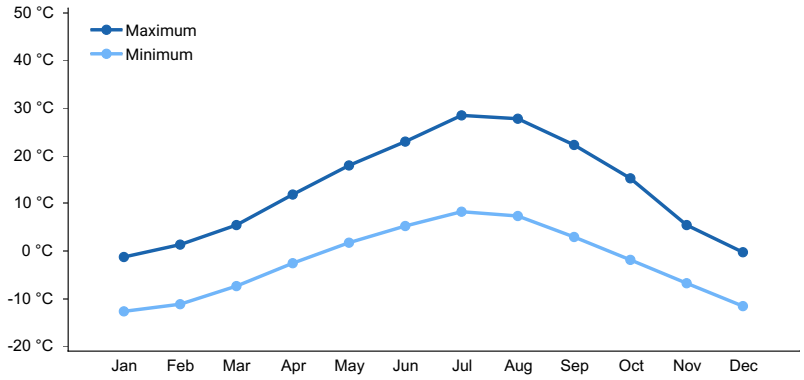


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils on this site are generally very fine sandy loams, loams or clay loams. They are moderately deep to deep over paralithic bedrock, well drained, and are formed in alluvium and residuum from consolidated volcanic ash and tuff. Available water holding capacity (AWC) is very low to low. The moisture supplying capacity of the soils is limited by the depth to paralithic bedrock. Water erosion can be high when the plant cover is reduced and slope increases. These soils are characterized by a xeric soil moisture regime and a frigid soil temperature regime.

Soil Series Correlated to this Ecological Site

Copenhagen
Lonigan
Sanyon
Trailcreek
Wormcreek

Table 4. Representative soil features

Surface texture	(1) Gravelly very fine sandy loam (2) Very gravelly loam (3) Clay loam
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	25–152 cm

Surface fragment cover <=3"	0–40%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	3.05–13.21 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–60%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is mountain big sagebrush and antelope bitterbrush overstory with bluebunch wheatgrass dominating the understory. Composition by weight is approximately 50-60 percent grasses, 10-20 percent forbs, and 20-30 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, 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 bluebunch wheatgrass and mountain big sagebrush. Subdominant species include Thurber’s needlegrass, needle and thread, Sandberg bluegrass, Indian ricegrass, arrowleaf balsamroot, and antelope bitterbrush. The plant species composition of Phase A is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 800 pounds per acre (896 kilograms per hectare) in a normal year. Production in a favorable year is 1300 pounds per acre (1456 kilograms per hectare). Production in an unfavorable year is 400 pounds per acre (448 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

This site is well suited for big game and livestock as late spring, early summer, and fall range. The steeper slopes in some areas will limit livestock movement. This site provides valuable wildlife food and cover for deer, elk, raptors, and other small wildlife species. The site can be winter range for big game in moderate winters. It is also well suited for recreation use in the summer and fall including hunting, hiking, and photography.

Due to the rainfall, elevation, and steep topography on this site, it is susceptible to degradation from erosion. Livestock trailing can cause soil movement. Due to the low production of the site, this site is easily degraded by improper grazing management or frequent fires.

Infiltration is good where the community is in mid to late seral status. The site has moderately low runoff potential. Runoff, when it does occur can be erosive on steeper slopes particularly 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, mountain big sagebrush can gradually increase on the site. Antelope bitterbrush may increase slightly and some Utah juniper can invade at the upper elevations of the site if a seed source is in the proximity. Grasses and forbs decrease as shrubs increase. At the upper elevations 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 antelope 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 Indian ricegrass, Thurber’s needlegrass and bluebunch wheatgrass. These species may be replaced by cheatgrass, Sandberg bluegrass, and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants.

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 at upper elevations, an increase in mountain big sagebrush and noxious and invasive plants. Continued improper grazing management influences fire frequency by increasing fine fuels.

Due to the soil surface texture, improper grazing management usually results in the development of terracettes. On steeper slopes massive soil erosion can occur during intense convection storms.

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 and/or Utah juniper. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Due to the steepness of the slopes and the brush species occupying the site, any brush management should be very carefully evaluated prior to practice application.

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, especially in shallow rooted species. Prolonged drought can lead to a reduction in fire frequency.

Influence of Insects and disease:

Outbreaks can affect vegetation health, particularly 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.

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 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 and fall and some winters. 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. Burrowing rodents can provide micro-sites for establishment of invasive species.

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 when mountain big sagebrush is removed following a fire or at higher elevations, the invasion of Utah juniper. Juniper invasion can be triggered by lack of fire, improper grazing management, and prolonged drought. The increased runoff also causes sheet and rill erosion. The long-term effect can be 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 with improper grazing management and in the absence of fire. There is a Utah juniper seed source present in the vicinity.
Phase A to C. Results from a wildfire, prescribed burning, or brush management.
Phase A to D. Results from improper grazing management and no fire. 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 or 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 State 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 this state to State 1 with accelerated practices.

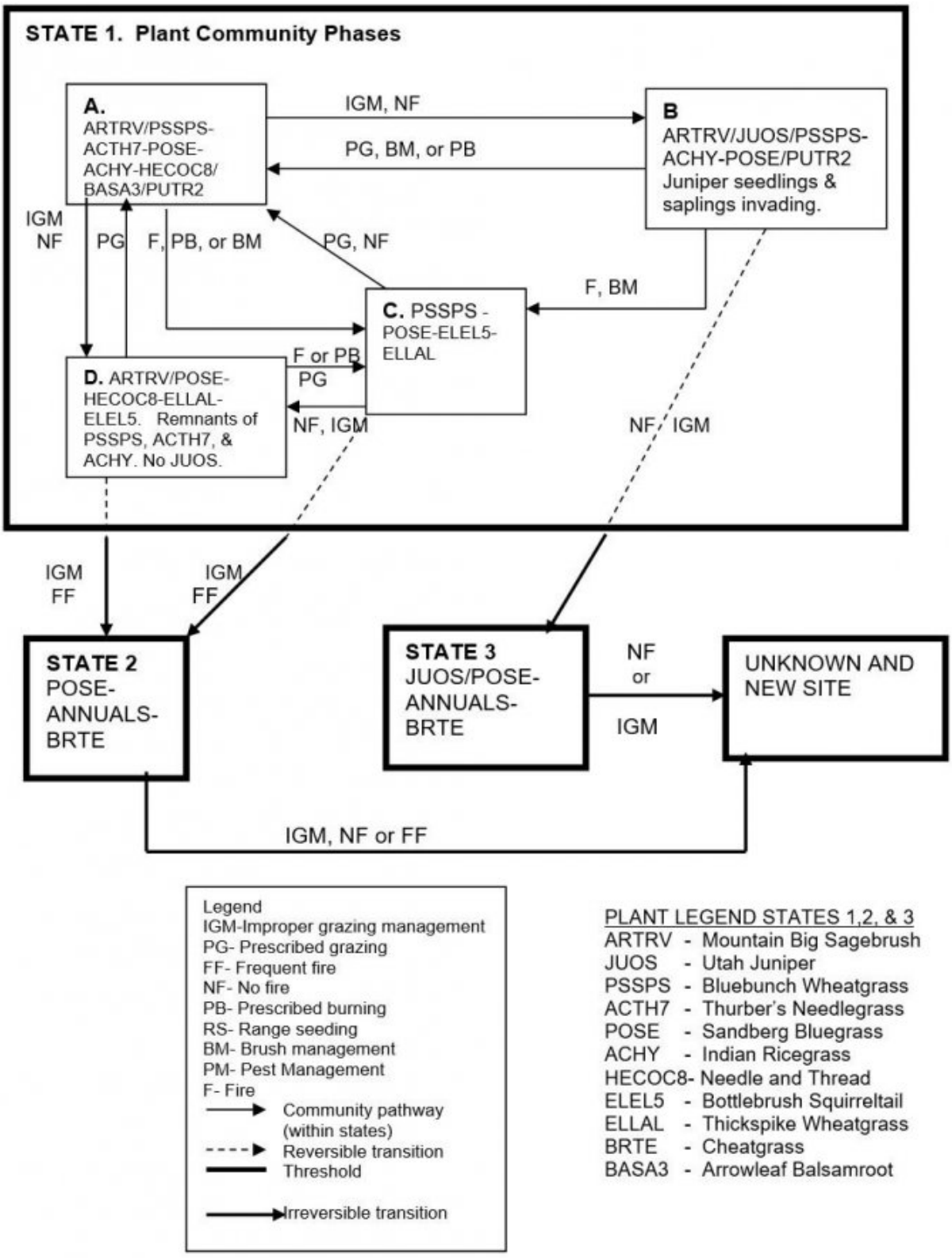
State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and no fire or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is economically impractical to return this state to State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

Practice Limitations:

Few limitations exist on much of this site for implementing vegetative management and facilitating practices. Areas with slopes less than 20 percent may be seeded with precautions to prevent soil erosion. Areas greater than 20 percent have severe limitations for seeding due to slope. Brush control projects need to be carefully evaluated due to the species present and the steepness of the slopes.

State and transition model



State 1
State 1 Phase A

Community 1.1
State 1 Phase A

Reference Plant Community Phase. This plant community has mountain big sagebrush in the overstory with bluebunch wheatgrass in the understory. Other significant species in the plant community are Thurber's needlegrass, Sandberg bluegrass, Indian ricegrass, needle and thread, arrowleaf balsamroot, and antelope bitterbrush. There is a wide variety of other grasses and forbs in small amounts. Natural fire frequency is 20-50

years.

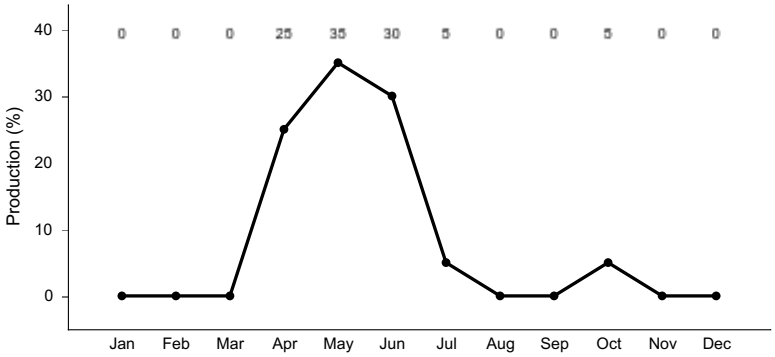


Figure 3. Plant community growth curve (percent production by month). ID0805, B13 ARTRV . State 1.

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. Bluebunch wheatgrass, Indian ricegrass, and Sandberg bluegrass are present in the understory but have reduced vigor. Other bunchgrasses are reduced in amounts and vigor. Some forbs have increased. Antelope bitterbrush is still present but in reduced amounts and may be hedged. A Utah juniper seed source is present in nearby sites. Some cheatgrass may be present. This state has developed due to fire frequency being much longer than normal or improper grazing management with no fire.

Community 1.3
State 1, Phase C

This plant community is dominated by bluebunch wheatgrass. Sandberg bluegrass, bottlebrush squirreltail, thickspike wheatgrass and other perennial grasses and forbs are subdominant. Thurber’s needlegrass and needle and thread 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 may be present. Some cheatgrass may also be present. The community is a result of recent wildfire, prescribed burning, or brush management.

Community 1.4
State 1, Phase D

This plant community is dominated by mountain big sagebrush in the overstory with reduced amounts of bluebunch wheatgrass, Thurber’s needlegrass, and Indian ricegrass. Sandberg bluegrass, needle and thread, thickspike wheatgrass, and bottlebrush squirreltail have increased. Antelope bitterbrush has reduced vigor and maybe hedged in shape. There is no Utah juniper seed source in the proximity. Some cheatgrass may be present. This plant community has developed due to improper grazing management and no fire.

Pathway 1.1A
Community 1.1 to 1.2

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

Pathway 1.1B
Community 1.1 to 1.3

Results from a wildfire, prescribed burning, or brush management.

Pathway 1.1C
Community 1.1 to 1.4

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

Pathway 1.2A
Community 1.2 to 1.1

Occurs with prescribed grazing and brush management or prescribed burning.

Pathway 1.2B
Community 1.2 to 1.3

Results from a wildfire or brush management

Pathway 1.3A
Community 1.3 to 1.1

Results from prescribed grazing and no fire.

Pathway 1.3B
Community 1.3 to 1.4

Occurs with no fire and improper grazing management

Pathway 1.4A
Community 1.4 to 1.1

Occurs with prescribed grazing

Pathway 1.4B
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 Sandberg bluegrass and annuals in the understory. Cheatgrass is a dominant annual in the community. There may be a variety of invasive forbs and some noxious plant species may 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.

Community 2.1
State 1 Phase B

This plant community is dominated in the overstory by mountain big sagebrush with some Utah juniper seedlings and saplings invading. Bluebunch wheatgrass, Indian ricegrass, and Sandberg bluegrass are present in the understory but have reduced vigor. Other bunchgrasses are reduced in amounts and vigor. Some forbs have increased. Antelope bitterbrush is still present but in reduced amounts and may be hedged. A Utah juniper seed source is present in nearby sites. Some cheatgrass may be present. This state has developed due to fire frequency being much longer than normal or improper grazing management with no fire.

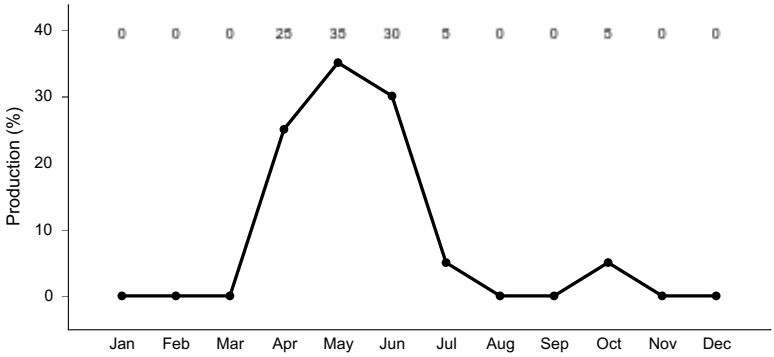


Figure 4. Plant community growth curve (percent production by month). ID0805, B13 ARTRV . State 1.

State 3
State 3

This plant community is dominated by Utah juniper with Sandberg bluegrass and annuals in the understory. Cheatgrass is a dominant annual. There are few shrubs present due to competition from junipers. Some deep-rooted perennials may be present under the junipers. Generally, 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. Some soil loss has occurred. This plant community has developed due to continued improper grazing management and lack of fire. This site has crossed the threshold. It is economically impractical to return this community to State 1 with accelerated practices.

Community 3.1
State 1 Phase C

This plant community is dominated by bluebunch wheatgrass. Sandberg bluegrass, bottlebrush squirreltail, thickspike wheatgrass and other perennial grasses and forbs are subdominant. Thurber’s needlegrass and needle and thread 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 may be present. Some cheatgrass may also be present. The community is a result of recent wildfire, prescribed burning, or brush management.

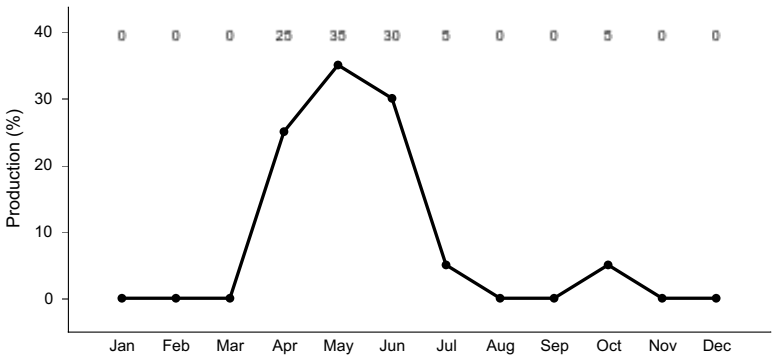


Figure 5. Plant community growth curve (percent production by month). ID0805, B13 ARTRV . State 1.

State 4
State 4

Unknown new site. This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. 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 the juniper dominated plant community of State 3. It is economically impractical to return this community to State 1 with accelerated practices.

Community 4.1
State 1 Phase D

This plant community is dominated by mountain big sagebrush in the overstory with reduced amounts of bluebunch wheatgrass, Thurber's needlegrass, and Indian ricegrass. Sandberg bluegrass, needle and thread, thickspike wheatgrass, and bottlebrush squirreltail have increased. Antelope bitterbrush has reduced vigor and maybe hedged in shape. There is no Utah juniper seed source in the proximity. Some cheatgrass may be present. This plant community has developed due to improper grazing management and no fire.

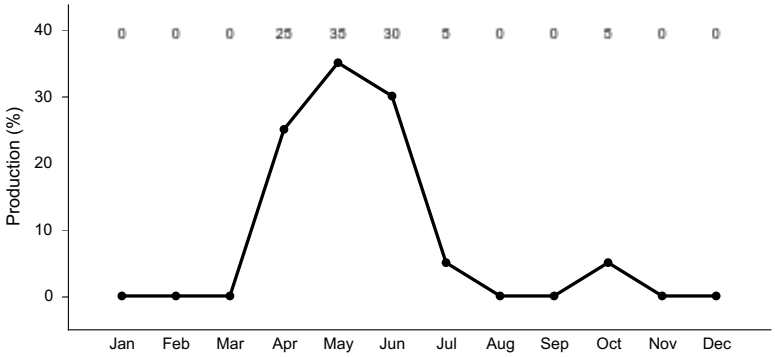


Figure 6. Plant community growth curve (percent production by month). ID0805, B13 ARTRV . State 1.

Transition T1A
State 1 to 2

State 1 Phase C or 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 State 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 this state to State 1 with accelerated practices.

Transition T2A
State 2 to 4

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 state to State 1 with accelerated practices.

Transition T3A
State 3 to 4

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 state 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, pronghorn antelope, 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/ Bluebunch Wheatgrass/ Thurber's Needlegrass/ Sandberg Bluegrass/ Indian Ricegrass/ Needle and Thread/ Arrowleaf Balsamroot/ 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 and elk. Antelope bitterbrush along with bluebunch wheatgrass is an important forage species for these animals. Some areas (south 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/ Bluebunch Wheatgrass/ Indian Ricegrass/ Sandberg Bluegrass/ Antelope Bitterbrush Plant Community: This phase has developed due to fire frequency being much longer than normal or improper grazing management with no fire. An increase in canopy cover of sagebrush and junipers 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 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 supports limited spring and fall forage for mule deer and elk due to the loss of understory vegetation. Juniper can provide winter habitat (cover and food) for mule deer. As juniper increases 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 would utilize this plant community.

State 1 Phase 1.3 – Bluebunch Wheatgrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail/ Thickspike Wheatgrass 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 (rabbitbrushes) may be present to provide limited vertical structure for wildlife. Insect diversity would be reduced but a native forb plant community similar to State 1 Phase 1.1 would still support select pollinators. Habitat for reptiles including common sagebrush lizard and western rattlesnake would be limited or excluded 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. Sharp-tailed grouse may find this site to be suitable habitat. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark, savannah sparrow, vesper sparrow, and western meadowlark). Mule deer and elk use would be seasonal but the site would offer little thermal cover and young of year cover due to the loss of shrub cover. The diversity and 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 1.4 – Mountain Big Sagebrush / Sandberg Bluegrass/ Needle and Thread/ Bottlebrush Squirreltail/ Thickspike Wheatgrass 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. Grasses, forbs, and shrubs are used by native insects that assist in pollination but the reduced herbaceous understory results in lower diversity of insects. The reptile and amphibian community is represented by common sagebrush lizard,

western rattlesnake, Great Basin spadefoot toad, western toad, and northern leopard frog. The reduced diversity of insects may reduce reptile diversity and populations. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Key avian shrub-steppe obligates 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. Winter habitat (cover and food) for sage-grouse is provided. The reduced vigor of understory vegetation provides a shorter forage season for mule deer and elk. Young of year cover would be provided for deer. Small mammal diversity and populations would be similar to those in State 1 Phase 1.1.

State 2 – Sandberg/ Annuals/ Cheatgrass Plant Community:
This state has developed due to continued improper grazing management and frequent fire. The plant community does not support a diverse insect community. The reduced forb and shrub components in the plant community would support a very limited population of pollinators. Habitat for sagebrush lizard, Great Basin spadefoot toad, and western toad would be limited due to the loss of sagebrush. This plant community does not provide quality habitat for sage thrasher, Brewer's sparrow, sage-grouse, or sage sparrow. Diversity of grassland avian species is reduced due to poor cover and available food. 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 decreased cover for small mammals. 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 3 - Utah Juniper/ Sandberg Bluegrass/ Annuals/ Cheatgrass 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 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, 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 cover and forage value for mule deer in winter.

Grazing Interpretations.
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. They have moderately low runoff potential.

Recreational uses

This site offers little recreation or aesthetic value. Some small game, upland game birds, and big game hunting opportunities exist. Viewing of spring blooming flowers may occur. The site offers limited opportunities for hiking and horseback riding. Some ATV use may occur on lesser slopes.

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
Blackfoot
Burley
Driggs
Idaho Falls
Malad
Pocatello
Rexburg
Soda Springs
St. Anthony

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

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
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

Kirt Walstad, 2/13/2025

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)	Author’s Participants Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Contact for Lead Author Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	04/25/2008
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** can occur on this site. If rills are present they are likely to occur immediately following wildfire. Rills, when present, are weakly defined due to sandy surface textures.

---

2. **Presence of water flow patterns:** can occur on this site. When they occur they are short and disrupted by cool season grasses and tall shrubs and are not extensive. Permeability is rapid once the surface is moist thus reducing runoff.

---

3. **Number and height of erosional pedestals or terracettes:** pedestals rarely occur on this site. Terracettes are common and are a natural occurrence on the site. Accumulation of sandy surface material develops on the uphill side of larger perennial grasses and shrubs. This accumulation is from concentrated flow or following intense rainfall events.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** data is not available. On sites in mid-seral status, bare ground may range from 40-60%.

5. **Number of gullies and erosion associated with gullies:** none.

6. **Extent of wind scoured, blowouts and/or depositional areas:** can be found due to the sandy surface textures. Blowouts usually occur following a wildfire and will be noticeable by deposition around perennial bunchgrasses.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 5 feet following a significant run-off event. It generally moves onto terracettes. Coarse litter generally does not move except on the steeper slopes.

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 1-2 but needs to be tested. Organic carbon content ranges from _____. NO DATA

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Structure is weak very fine and fine granular to weak fine and medium subangular blocky. Soil organic matter (SOM) ranges from 1 to 4 percent. The surface horizon color varies from dark brown to very dark grayish brown. The A or A1 horizon is typically 3 to 7 inches thick.

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 accumulate 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 bitterbrush will become decadent in the absence of fire 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 5-10 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 800 pounds per acre (896 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 20-30 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, leafy spurge, dalmatian toadflax, bulbous bluegrass, Russian thistle, mustard, rush skeletonweed, musk and scotch thistle, and diffuse, Russian, and spotted knapweed.

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