

## Ecological site R012XY029ID Clayey South Slope 12-16 PZ ARAR8/PSSPS

Last updated: 9/22/2020  
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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): 012X—Lost River Valleys and Mountains

Land Resource Region: B (Northwestern Wheat and Range)  
MLRA: 12 (Lost River Valleys and Mountains)

EPA EcoRegion: Level III (Middle Rockies)

### LRU notes

012X-Lost River Valleys and Mountains

Precipitation or Climate Zone: 12-16" P.Z.  
<https://soils.usda.gov/survey/geography/mlra/index.html>

### Classification relationships

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

### Ecological site concept

Site does not receive additional water.

Soils are:

Not saline or saline-sodic.

Shallow to moderately deep to claypan or bedrock, with >35% (by volume) coarse fragments, skeletal within 20" of the soil surface.

Not strongly or violently effervescent in the to 20" of the soil profile.

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

Slope is > 30%.

Clay content is = >35% in surface mineral 4".

### Associated sites

R012XY006ID	<b>Windswept 8-16 PZ ARFR4/POSE</b>
R012XY008ID	<b>Gravelly 13-16 PZ ARTR4/PSSPS-FEID</b>
R012XY010ID	<b>North Slope Loamy 12-16 PZ ARTR4/FEID</b>
R012XY012ID	<b>Loamy 12-16 PZ ARTRV/FEID-PSSPS</b>
R012XY020ID	<b>Clayey 13-16 PZ ARAR8/FEID</b>

**Table 1. Dominant plant species**

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

## Physiographic features

This site occurs on south and west facing mountainsides over 30 percent. Elevation ranges from 5000 to 7500 feet (1524-2286 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	1,524–2,286 m
Slope	10–30%
Ponding depth	0 cm
Aspect	S, W

## Climatic features

MLRA 12 is dominated by dramatic changes in elevation which, in turn, influence local weather patterns. The intermontane valleys have elevations as low as 3800 feet, while the adjacent mountains may reach more than 12,600 feet. The average annual precipitation for the entire MLRA, based on 10 long term climate stations located throughout the MLRA, is approximately 9.38 inches. However, the dry valleys may have averages as low as 6 inches, while the upper peaks may have averages that exceed 46 inches per year.

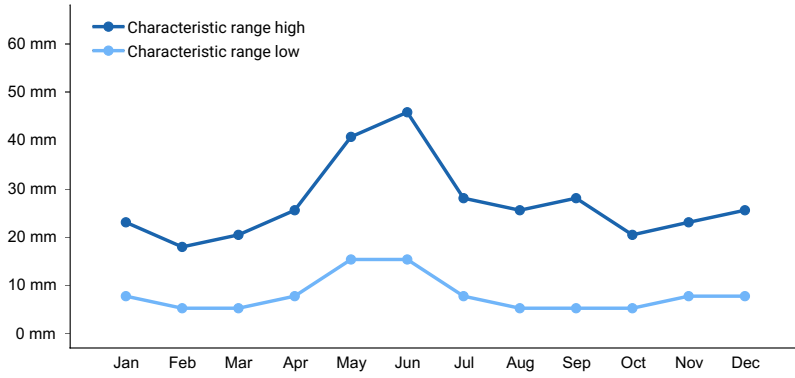
Temperatures vary considerably over the year. The average annual temperature is 42.25 degrees F. The average low is 27.4 degrees while the average high temperature is 57 degrees.

In the summer the sun shines 78% of the time, but drops to 40% in the winter. The prevailing wind is location-dependent, and generally flows parallel to the orientation of the dominant valleys. In the summer localized afternoon upslope winds and evening downslope winds are common. The average windspeed is greatest in the spring and early summer.

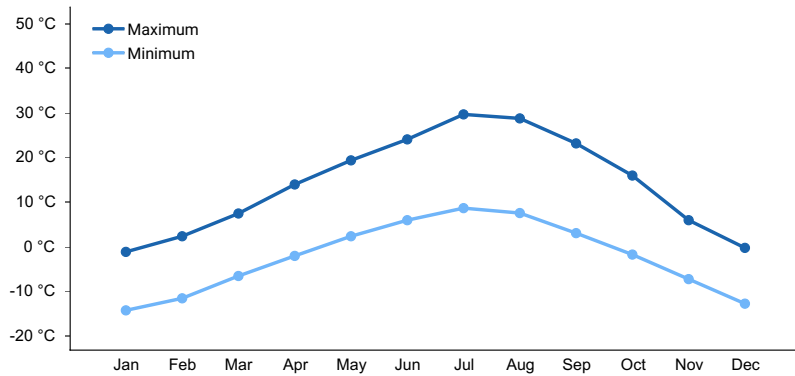
The frost free period ranges from 102 to 107 days while the freeze free period ranges from 134 to 139 days across the MLRA.

**Table 3. Representative climatic features**

Frost-free period (average)	107 days
Freeze-free period (average)	139 days
Precipitation total (average)	279 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 have very cobbly clay loam or clay surfaces and clay subsoils or bedrock. Gravels, stones, and cobbles are usually present throughout the profile. Rooting depth and water penetration are limited by the clay subsoil or bedrock. Infiltration and water movement is slow. Depth to bedrock or Claypan is usually 16 to 30 inches.

**Table 4. Representative soil features**

Surface texture	(1) Very cobbly clay loam (2) Clay loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Slow to very slow
Soil depth	41–76 cm

## Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is low sagebrush with scattered grasses and forbs. Composition by weight is approximately 30 to 40 percent grass, 25 to 35 percent forbs and 30 to 40 percent shrubs.

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

bighorn sheep, Rocky Mountain elk, pronghorn antelope, lagomorphs, and small rodents.

Fire has historically occurred on the site at intervals of 60-80 years.

The Historic Climax Plant Community (HCPC) 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 HCPC is Phase A. This plant community is dominated by bluebunch wheatgrass in the understory and low sagebrush in the overstory. Subdominant species include Sandberg bluegrass, Hooker's balsamroot, longleaf phlox, and mulesear wyethia. There is a variety of other grasses, forbs and shrubs that can occur in minor amounts. The plant species composition of Phase A is listed later under "HCPC Plant Species Composition".

Total annual production is 500 pounds per acre (560 kilograms per hectare) in a normal year. Production in a favorable year is 750 pounds per acre (840 kilograms per hectare). Production in an unfavorable year is 300 pounds per acre (336 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are about equal to low to medium shrubs followed by perennial forbs, while shallow rooted perennial bunchgrasses are subdominant.

#### FUNCTION:

This site is suited for grazing by livestock in late spring (after the soil has dried out to some degree) and fall. It also provides habitat for mule deer, pronghorn antelope, big horn sheep, Rocky Mountain elk, small game, sage grouse, small birds, and rodents. The site provides limited recreational opportunities for hunting, hiking, horseback riding, off-road vehicle use, and early spring flower observation or photography.

This site can be degraded easily by improper grazing management since slopes are moderate to steep and relatively low in production. The site does, however, have some natural protection from overgrazing due to the steepness of the slopes and surface stones which can limit livestock access to some degree. Relatively low production on the site makes it susceptible to accelerated degradation from soil erosion. Infiltration and production can be maintained with a mixed stand of deep-rooted perennial bunchgrasses and shrubs. Runoff potential is high.

#### Impacts on the Plant Community.

##### Influence of fire:

This site historically had a very low fire frequency, approximately every 60 to 80 years. Most of the shrubs evolved in the absence of fire, therefore they can be severely damaged or killed when burned. The small amounts of Idaho fescue and antelope bitterbrush in the community can be lost with a fire. Rabbitbrush species can increase with fire. Cheatgrass and medusahead can be troublesome invaders on this site at lower elevations after fire. This can prevent perennial grass and shrub re-establishment and increases the fire frequency. Sandberg bluegrass, thickspike wheatgrass and forbs are usually maintained in the community. In the absence of fire Utah juniper can invade the site if a seed source is in the vicinity. See "Influence of juniper invasion" below.

##### Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be detrimental to this site. This type of management leads to reduced vigor of bluebunch wheatgrass and other deep-rooted perennial bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in low sagebrush and invasive plants.

Continued improper grazing management influences fire frequency with an increase in cheatgrass and/or medusahead, particularly at lower elevations. If a seed source is in the proximity, Utah juniper can invade the site.

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

##### Weather influence:

Above normal precipitation in April, May, and June can dramatically increase total annual production. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Extended drought reduces vigor of the perennial grasses and shrubs. Extreme drought may cause plant mortality.

#### Insects and disease:

Outbreaks can affect vegetation health. 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. If antelope bitterbrush is present, it is susceptible to western tent caterpillar (*Malacosoma fragilis*) infestations. 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 is available for this site.

#### Influence of noxious and invasive plants:

Annual and perennial invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory. Cheatgrass and medusahead can be very invasive on this site especially at lower elevations, after a fire. Once they become established the fire frequency increases. As a result, the shrub component can be lost.

#### Influence of wildlife:

Relatively low numbers of wildlife use this site and have little impact on it. Sage grouse use the site for strutting grounds and they also may use the site during the winter. Winter and spring use by mule deer occasionally occurs.

#### Watershed:

Decreased infiltration and increased runoff occur when low sagebrush is removed with frequent fires, particularly the year following the fire event. The increased runoff also increases sheet and rill erosion. The long-term effect is a transition to a different state. When hydrologic condition of the vegetative cover is good, natural erosion hazard is slight.

#### Influence of juniper invasion:

The following discussion deals with 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 hydrological 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 hydrological 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 near the site.

Phase A to C. Results from a fire.

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 & D to State 2. Develops through improper grazing management and frequent fire. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

State 1, Phase B to State 3. Develops with no fire and improper grazing management from a juniper invaded phase of State 1. The site has crossed the threshold to this state. It is not economical to return this site to State 1 with accelerating 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 not economical to return this site to State 1 with accelerating practices.

State 3 to State 2. Develops with fire or frequent fire.

State 3 to unknown site. Continued improper grazing management or lack of fire 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 not economical to return this site to State 1 with accelerating practices.

Practice Limitations:

Moderate limitations exist for implementing vegetative management practices due to slopes. Early spring grazing should be avoided due to prolonged wetness in the soil. Moderate limitations exist for implementing facilitating practices on this site. Shallow and stony soils and slopes greater than 30% present severe limitations for range seeding by ground moving equipment and is not generally economically feasible due to relatively low production potential. Brush control is generally not recommended on this site as severe limitations exist for brush management

on this site with ground moving equipment due to steep slopes.

#### Plant Community Narrative:

State 1. Plant Community A. Historic Climax Plant Community (HCPC). This plant community is dominated by bluebunch wheatgrass in the understory and low sagebrush in the overstory. Subdominant species include Sandberg bluegrass, Hooker's balsamroot, longleaf phlox, and mulesear wyethia. There is a variety of other grasses, forbs, and shrubs that can occur in minor amounts. The natural fire frequency is about 60 to 80 years.

State 1, Plant Community B. This plant community is dominated by low sagebrush with Sandberg bluegrass in the understory. Bluebunch wheatgrass and other deep-rooted perennial bunchgrasses are present but in reduced amounts and in low vigor. Bottlebrush squirreltail has increased. There is still a variety of forbs present in small amounts. If antelope bitterbrush is present, it is in low vigor and possibly hedged. This phase has developed due to improper grazing management and no fire.

State 1. Plant Community C. This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. The small amounts of Idaho fescue and antelope bitterbrush may have died out due to fire. Low sagebrush has been significantly reduced. Bottlebrush squirreltail and rabbitbrush have increased. Forbs are about in the same proportion as in the HCPC. This phase has developed due to fire.

State 1, Plant community D. This plant community is dominated by low sagebrush with reduced amounts of bluebunch wheatgrass and other deep-rooted perennial bunchgrasses. Sandberg bluegrass has increased in the understory. All deep-rooted bunchgrasses are typically in low vigor. Low sagebrush has increased as well as some other shrubs. This state has developed due to improper grazing management and lack of fire. There is no Utah juniper seed source in the vicinity. Some cheatgrass may have invaded the site at lower elevations.

State 2. This plant community is dominated by Sandberg bluegrass and annuals. Cheatgrass and medusahead have invaded the site at lower elevations. Some perennial forbs are present. The community has developed due to frequent fire and continued improper grazing management. Some soil loss has occurred. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

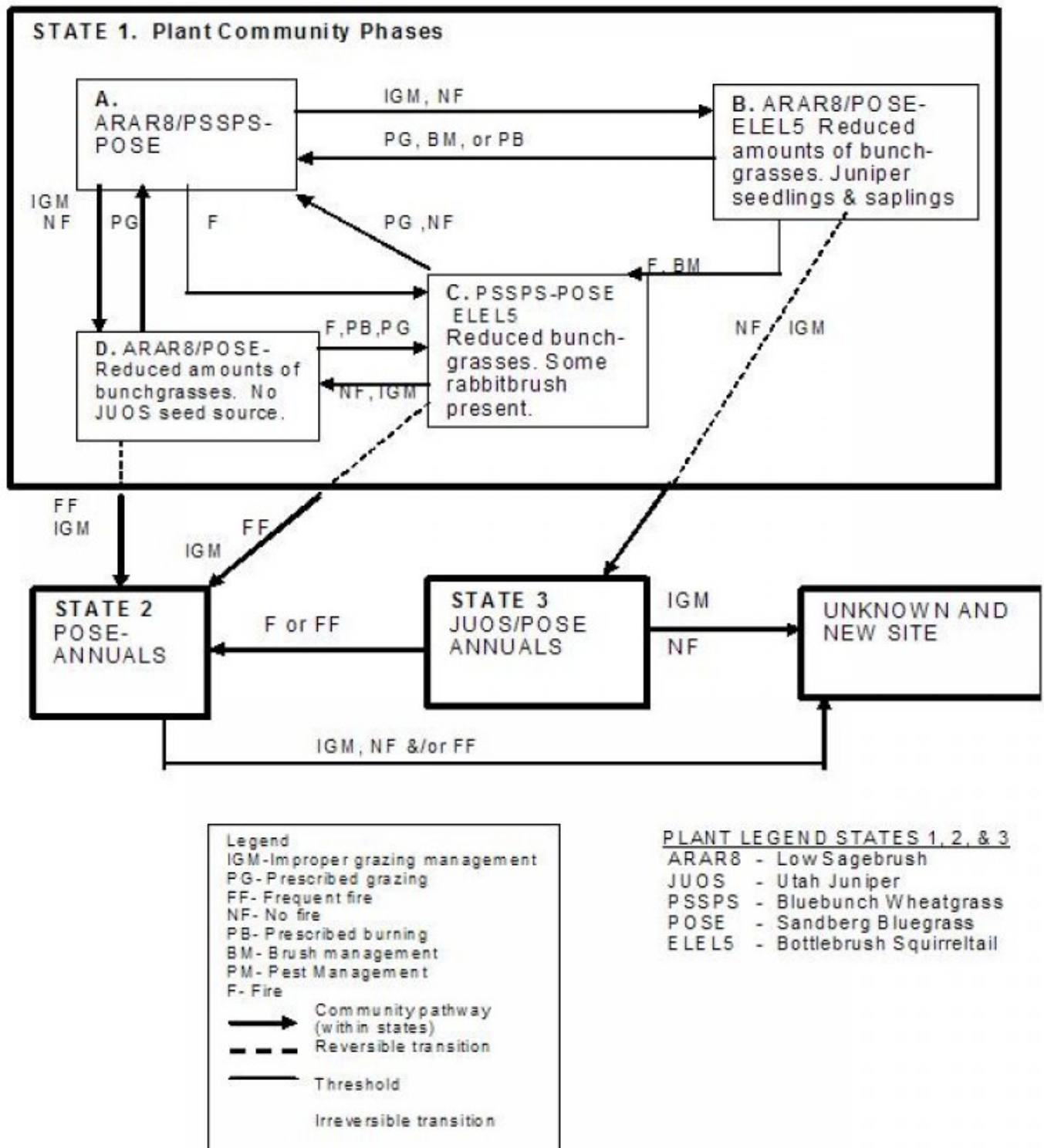
State 3. This plant community is dominated by Utah juniper. Remnants of bluebunch wheatgrass can be found in the understory. Shallow-rooted grasses, such as Sandberg bluegrass, and other annuals can be found in the interspaces. Few shrubs are present. This state has developed in the absence of fire and with continued improper grazing management. The heavy overstory of juniper intercepts snow in the branches and much of it is lost to sublimation. Infiltration is reduced in the interspaces and runoff is more rapid. Soil erosion is occurring, primarily in the interspaces. Generally, shrub cover is below 10-15%, bare ground is above 25-30%, and juniper cover is greater than 20%. See "Influence of juniper invasion" in Impacts on the Plant Community. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

Unknown Site. This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This community has developed due to continued improper grazing management and no fire and/or frequent fire from a Sandberg Bluegrass and annual dominated community from State 2. This unknown new site can also be reached from State 3 with further dominance of the site by juniper. It is not economical to return this site to State 1 with accelerating practices.

## **State and transition model**



The Reference State (state 1), the Historic Climax Plant Community (HCPC), moves through many phases depending on the natural and man-made forces that impact the community over time. The Reference Plant Community Phase is Phase A, State 1. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".



**State 1**

**State 1. Plant Community A. Historic Climax Plant Community (HCPC).**

**Community 1.1**

**State 1. Plant Community A. Historic Climax Plant Community (HCPC).**

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	118	196	297
Shrub/Vine	118	196	291
Forb	101	168	252
<b>Total</b>	<b>337</b>	<b>560</b>	<b>840</b>

Table 6. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	–
>0.3 <= 0.6	–	2-2%	1-2%	–
>0.6 <= 1.4	–	2-3%	2-3%	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

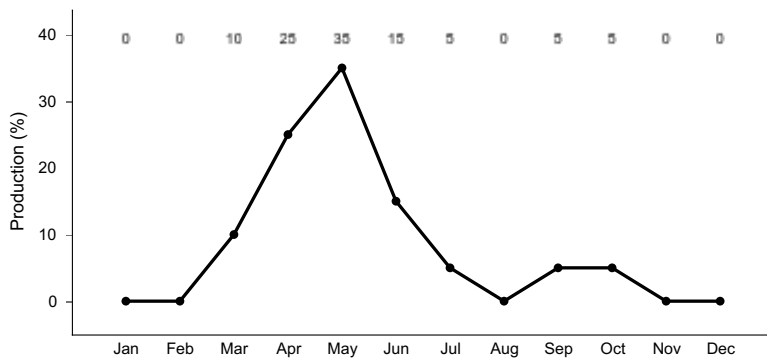


Figure 4. Plant community growth curve (percent production by month). ID0710, ARAR8/PSSPS. State 1.

## State 2

### State 1, Plant Community B

#### Community 2.1

##### State 1, Plant Community B

This plant community is dominated by low sagebrush with Sandberg bluegrass in the understory. Bluebunch wheatgrass and other deep-rooted perennial bunchgrasses are present but in reduced amounts and in low vigor. Bottlebrush squirreltail has increased. There is still a variety of forbs present in small amounts. If antelope bitterbrush is present, it is in low vigor and possibly hedged. This phase has developed due to improper grazing management and no fire.

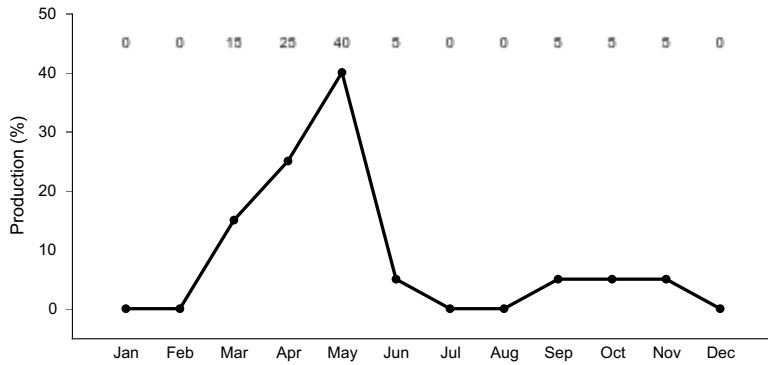


Figure 5. Plant community growth curve (percent production by month). ID0711, POSE/BRTE-ANNUALS. State 2 and 3.

**State 3**  
**State 1. Plant Community C**

**Community 3.1**  
**State 1. Plant Community C**

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. The small amounts of Idaho fescue and antelope bitterbrush may have died out due to fire. Low sagebrush has been significantly reduced. Bottlebrush squirreltail and rabbitbrush have increased. Forbs are about in the same proportion as in the HCPC. This phase has developed due to fire.

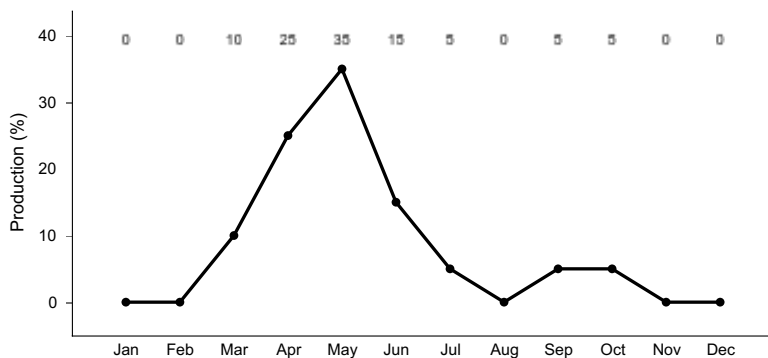
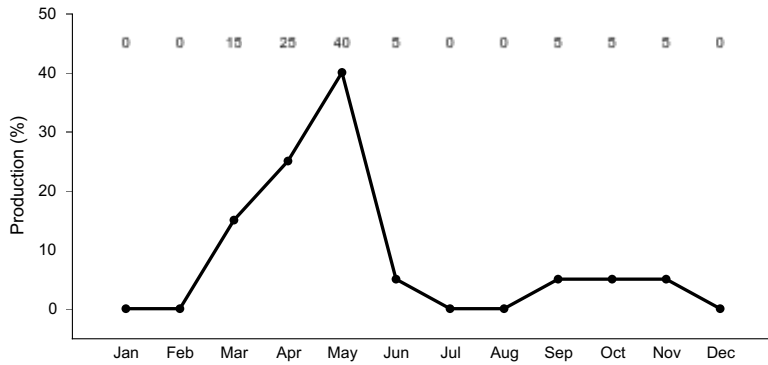


Figure 6. Plant community growth curve (percent production by month). ID0710, ARAR8/PSSPS. State 1.

**State 4**  
**State 1, Plant community D**

**Community 4.1**  
**State 1, Plant community D**

This plant community is dominated by low sagebrush with reduced amounts of bluebunch wheatgrass and other deep-rooted perennial bunchgrasses. Sandberg bluegrass has increased in the understory. All deep-rooted bunchgrasses are typically in low vigor. Low sagebrush has increased as well as some other shrubs. This state has developed due to improper grazing management and lack of fire. There is no Utah juniper seed source in the vicinity. Some cheatgrass may have invaded the site at lower elevations.

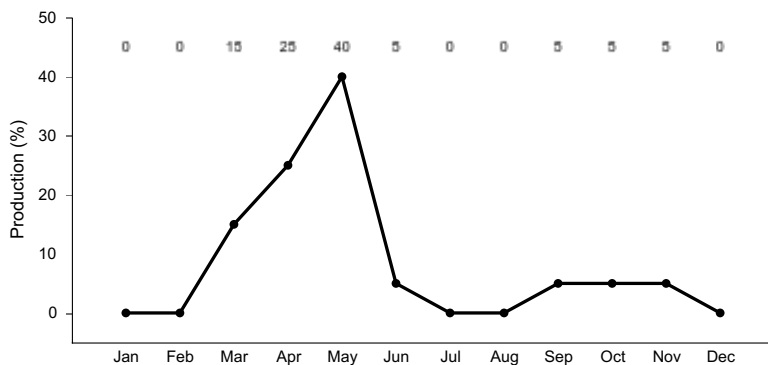


**Figure 7. Plant community growth curve (percent production by month). ID0711, POSE/BRTE-ANNUALS. State 2 and 3.**

**State 5  
State 2.**

**Community 5.1  
State 2.**

This plant community is dominated by Sandberg bluegrass and annuals. Cheatgrass and medusahead have invaded the site at lower elevations. Some perennial forbs are present. The community has developed due to frequent fire and continued improper grazing management. Some soil loss has occurred. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

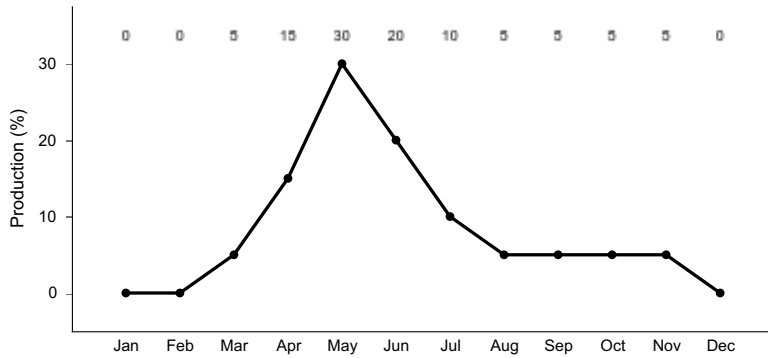


**Figure 8. Plant community growth curve (percent production by month). ID0711, POSE/BRTE-ANNUALS. State 2 and 3.**

**State 6  
State 3.**

**Community 6.1  
State 3.**

This plant community is dominated by Utah juniper. Remnants of bluebunch wheatgrass can be found in the understory. Shallow-rooted grasses, such as Sandberg bluegrass, and other annuals can be found in the interspaces. Few shrubs are present. This state has developed in the absence of fire and with continued improper grazing management. The heavy overstory of juniper intercepts snow in the branches and much of it is lost to sublimation. Infiltration is reduced in the interspaces and runoff is more rapid. Soil erosion is occurring, primarily in the interspaces. Generally, shrub cover is below 10-15%, bare ground is above 25-30%, and juniper cover is greater than 20%. See "Influence of juniper invasion" in Impacts on the Plant Community. The site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.



**Figure 9. Plant community growth curve (percent production by month). ID0703, B12 Early Seral, JUOS. State 3.**

## State 7 Unknown Site

### Community 7.1 Unknown Site

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This community has developed due to continued improper grazing management and no fire and/or frequent fire from a Sandberg Bluegrass and annual dominated community from State 2. This unknown new site can also be reached from State 3 with further dominance of the site by juniper. It is not economical to return this site to State 1 with accelerating practices.

## Additional community tables

### Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides habitat for select native wildlife species that can tolerate cold sites, high in elevation, with a sparse plant community. Large herbivore use of the reference plant community is dominated by mule deer, elk, and pronghorn antelope. The site can provide critical winter habitat for mule deer and antelope. The site provides important seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. Sage-grouse and Idaho pocket gopher are area sensitive species that may be present on this site. In isolated areas encroachment of noxious and invasive plant species (cheatgrass, medusahead, and rush skeletonweed) can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water is limited, being provided only by seasonal runoff, artificial water catchments, and spring sites.

State 1 Phase 1.1 – Low Sagebrush/ Bluebunch Wheatgrass/ Sandberg Bluegrass Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs used by native insect communities that assist in pollination. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, and western toad. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Spring developments that capture all available water would preclude the use of these sites by amphibians. Birds that may be resident or migratory include mountain bluebird, lazuli bunting, vesper sparrow, grasshopper sparrow, and lesser goldfinch. Nesting, brood-rearing, winter cover, and winter food for sage grouse are all provided by this diverse plant community. Low sagebrush is a preferred winter forage for sage-grouse. The plant community provides spring, fall, and winter forage needs for large mammals including mule deer, elk, and antelope. Mule deer and antelope have a high preference for low sagebrush. A diverse small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

State 1 Phase 1.2- Low Sagebrush/ Sandberg Bluegrass Plant Community: This plant community is the result of

improper grazing management and no fire. An increase in canopy cover of sagebrush and juniper contributes to a sparse herbaceous understory. A reduced herbaceous understory results in less diversity and numbers of insects. The reptile community will be similar to State 1 Phase 1.1 community represented by leopard lizard, short horned lizard, sagebrush lizard, and western skink. The reduced diversity of insects and understory cover may reduce the quality of food and cover for reptile populations. As juniper increases, habitat cover for Brewer's sparrow, sage thrasher, and sage sparrow may increase. Remaining low sagebrush provides brood-rearing, winter cover, and winter food for sage-grouse but as juniper encroaches the quality of this habitat is severely reduced or eliminated. The plant community supports limited seasonal habitat for mule deer, elk, and antelope. As juniper encroaches the site will provide additional thermal cover for large mammals. A diverse small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

**State 1 Phase 1.3 – Bluebunch Wheatgrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community:** This phase has developed due to fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure for animals. Insect diversity would be reduced with the loss of sagebrush but a native forb plant community similar to State 1 Phase 1.1 would still support select pollinators. Encroachment of rabbitbrush would add fall pollinator habitat to the site over time. As rabbitbrush matures it would help replace the loss of sagebrush cover. Until rabbitbrush is established, diversity and populations of reptiles would be limited or excluded. The dominance of herbaceous vegetation with no sagebrush canopy cover would eliminate use of this area for nesting, winter cover, and winter food for sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse if the site is adjacent to sagebrush cover. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark, western meadowlark, vesper sparrow, and grasshopper sparrow). Winter habitat for antelope and mule deer would be reduced or eliminated with the loss of low sagebrush. Small mammal diversity and populations would be reduced due to the loss of cover and increase in success of hunting by predators.

**State 1 Phase 1.4 - Low Sagebrush/ Sandberg Bluegrass Plant Community:** This plant community is the result of improper grazing management and no fire. An increase in canopy cover of sagebrush 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 State 1 Phase 1.1 community represented by leopard lizard, short horned lizard, sagebrush lizard, and western skink. The reduced diversity of insects and understory cover may reduce the quality of food and cover for reptile populations. As sagebrush increases, habitat cover for Brewer's sparrow, sage thrasher, and sage sparrow may increase. Quality of nesting and brood-rearing for sage-grouse would decline with the loss of vigor and amount of forbs and deep-rooted perennial bunch grasses. Winter cover and winter food for sage-grouse would still be provided. The plant community provides important winter habitat for mule deer and antelope. A diverse small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

**State 2 - Sandberg Bluegrass/ Cheatgrass / Medusahead/ Annuals Plant Community:**

This plant community is the result of continued improper grazing management and fire. The reduced forb and shrub components in the plant community would support a very limited population of pollinators. Most reptilian species identified in State 1 Phase 1.1 are not supported with food, water, or cover. This plant community does not support the habitat requirements for sage-grouse. 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. Mule deer and antelope may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) are more palatable. At other times of the year large mammals would not regularly utilize these areas due to poor food and cover conditions. Winter habitat for mule deer and antelope would not be available. Small mammal populations and diversity would be reduced due to poor quality cover and food and an increase in success of hunting by predators.

**State 3 – Utah Juniper/ Sandberg Bluegrass/ Annuals:** This site has developed due to improper grazing management and no fire. The loss of native understory vegetation will reduce insect diversity on the site. The lack of flowering plants reduces use by pollinators like butterflies and moths. Most reptilian species identified in State 1 Phase 1.1 are not supported with food, water, or cover. 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. The plant community supports limited seasonal habitat for mule deer and elk in spring and fall. As juniper encroaches, the site will provide additional thermal cover for large mammals.

## Grazing Interpretations.

This site is suited for grazing by livestock in late spring (after the soils have dried out to some degree) and fall. Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use, and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

## Hydrological functions

The soils in this site are in hydrologic group D. They have high runoff potential.

## Recreational uses

The site provides limited recreational opportunities for hunting, hiking, horseback riding, off-road vehicle use, and early spring flower observation or photography.

## Wood products

None

## Other products

None

## Other references

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## Contributors

DLF

## Approval

Kendra Moseley, 9/22/2020

## Rangeland health reference sheet

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

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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Rills: can occur on this site. If rills are present they are likely to occur immediately following a wildfire or high intensity storm. Rills are most likely to occur on soils with silt loam or clay loam surface texture. Surface stones reduce rill development.  

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2. **Presence of water flow patterns:** Water-Flow Patterns: can occur on this site. When they do occur they are short and disrupted by cool season grasses, shrubs and surface stones. They are not extensive. Terracettes can occur above bunchgrasses and shrubs.  

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or Terracettes: are common on the site where flow patterns are present and the surface soils have a high clay content. Do not mistake frost heaving for pedestalling.  

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground: data is not available, but it is expected to range from 30-40 percent.  

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind-Scoured, Blowouts, and/or Deposition Areas: are usually not present.  

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

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Surface Resistance to Erosion: values should range from 3 to 5 but needs to be tested.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil Surface Loss or Degradation: The A or A1 horizon is typically 4 to 7 inches thick. Structure ranges from weak or moderate fine granular to weak medium subangular blocky. Soil organic matter (SOM) ranges from 1 to 3 percent.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant Community Composition and Distribution Relative to Infiltration: bunchgrasses, especially deep rooted perennials, slow runoff and increase infiltration. Medium height shrubs accumulate some 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):** Compaction Layer: not present. The site can develop a compaction layer due to the clay in the subsoil from severe livestock use when the soils are wet.
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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: Functional/ Structural Groups: cool season deep-rooted perennial bunchgrasses = medium shrubs>perennial forbs>shallow rooted bunchgrasses.
- Sub-dominant:
- Other:
- Additional:
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant Mortality/ Decadence: very little mortality or decadence is expected on this site. Mortality of shallow rooted grasses may occur due to extended periods of drought.
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14. **Average percent litter cover (%) and depth ( in):** Litter Amount: additional data is needed but is expected to be low and at a shallow depth.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production: is 500 pounds per acre (560 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 30-40 percent of the total production, forbs 25-30 percent, and shrubs 30-40 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:** Invasive Plants: includes cheatgrass, medusahead rye, Vulpia species, bulbous bluegrass, annual mustards, and rush skeletonweed.

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17. **Perennial plant reproductive capability:** Reproductive Capability of Perennial Plants: all functional groups have the potential to reproduce in favorable years.
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