

## Ecological site R012XY040ID Cold Gravelly 8-12 PZ ARNO4/HECOC8

Last updated: 9/22/2020  
Accessed: 05/03/2024

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### General information

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

### MLRA notes

Major Land Resource Area (MLRA): 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: 8-12" P.Z.  
<https://soils.usda.gov/survey/geography/mlra/index.html>

### Ecological site concept

Site does not receive additional water.

Soils are:

Not saline or saline-sodic.

Moderately deep to very deep, with >35% (by volume) coarse fragments, skeletal within 20" of the soil surface, coarse fragments increase with depth.

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

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

Slope is < 30%.

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

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

### Associated sites

R012XY036ID	Clayey 7-10 PZ ARTRW8-ATCO/PSSPS
R012XY041ID	Gravelly 7-10 PZ ATCO/SPCR

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia nova</i>
Herbaceous	(1) <i>Hesperostipa comata</i> ssp. <i>comata</i>

## Physiographic features

This site occurs on outwash fans and fan terraces on all aspects. Slopes generally range from 2 to 30 percent. Elevations range from 6000 to 8000 feet (1800-2450 meters).

**Table 2. Representative physiographic features**

Landforms	(1) Outwash fan
Elevation	1,829–2,438 m
Slope	2–30%

## 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.

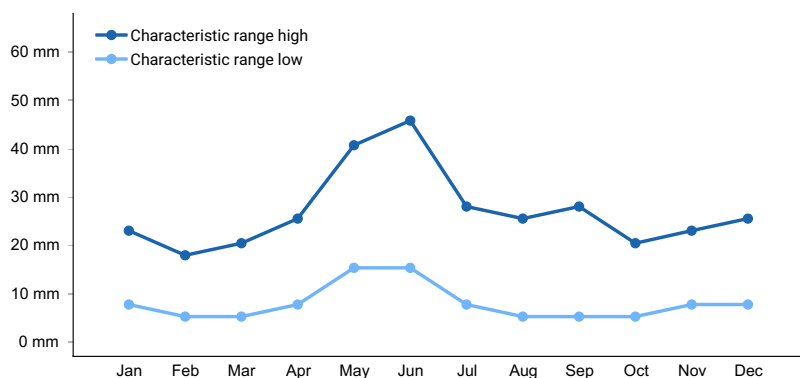
Temperatures vary considerably over the year. The average annual temperature is 42.25 degrees F. The average low is 27.4 degrees while the average high temperature is 57 degrees.

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**

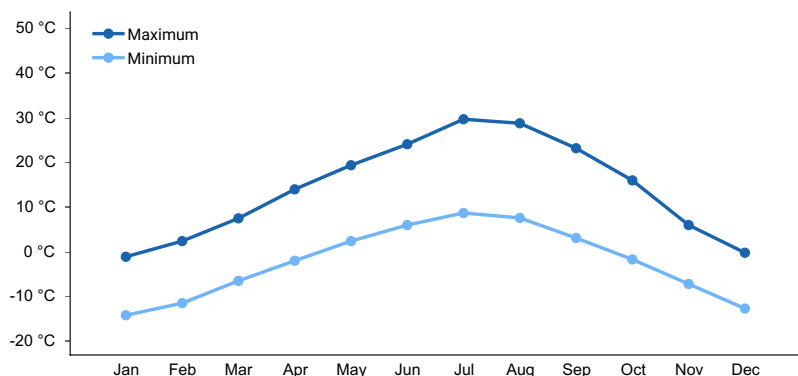


Figure 2. Monthly average minimum and maximum temperature

## Influencing water features

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

## Soil features

The soils in this site are gravelly and very gravelly loams to 20 inches and extremely gravelly below 20 inches. They are very deep, moderately permeable soils on outwash fans and fan terraces. They were formed in alluvium dominantly from limestone, carbonatic shale and mud stones. Gravels and coarse fragments can exceed 60 percent by volume in the soil profile below 20 inches in depth. Available water capacity is very low to low. The soils have an aridic soil moisture regime, or an aridic bordering on xeric. The soil temperature regime is frigid.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly
Permeability class	Moderate
Soil depth	152 cm
Surface fragment cover <=3"	20–45%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	6.1–9.91 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	50–70%
Subsurface fragment volume >3" (Depth not specified)	0–10%

## Ecological dynamics

The dominant visual aspect of this site is needle and thread and black sagebrush. Composition by weight is approximately 45 to 55 percent grass, 10 to 20 percent forbs and 30 to 40 percent shrubs.

During the last few thousand years, this site has evolved in an arid climate characterized by warm, dry summers

and cold winters. Herbivory has historically occurred on the site at low levels of utilization. Herbivores include pronghorn antelope, mule deer, Rocky Mountain elk, lagomorphs and small rodents.

Fire has historically occurred on this site every 80 to 100 years. Fire occurs only in years with above normal precipitation.

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 needle and thread and black sagebrush. Subdominant species include Sandberg bluegrass, Hoods phlox, plains pricklypear and spiny hopsage. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 450 pounds per acre (504 Kg/ha) in a normal year. Production in a favorable year is 700 pounds per acre (784 Kg/ha). Production in an unfavorable year is 200 pounds per acre (224 Kg/ha).

Structurally, cool season deep rooted perennial bunchgrasses are dominant, followed by medium height shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

#### FUNCTION:

This site provides yearlong range for pronghorn antelope. Mule deer make slight use in mild winters and moderate to heavy use in severe winters. Only in severe winters do Rocky Mountain elk use this site on the lower alluvial fans. Raptors hunt the site.

It is suited for livestock use in the spring, early summer and fall and recreation use in the summer and fall.

This site is easily degraded by improper grazing management due to ease of access with gentle slopes and low production. Runoff is moderately low and gravels on the surface provide a stabilizing affect on the surface erosion conditions.

Impacts on the Plant Community.

#### Influence of fire:

This site historically had a very low fire frequency, approximately every 80-100 years. Most of the shrubs evolved in the absence of fire; therefore, they can be severely damaged or killed when burned. Needle and thread grass and Indian ricegrass can be severely damaged or killed with fire. Cheatgrass can be a troublesome invader at lower elevations on this site after fire, preventing perennial grass and shrub re-establishment and increasing the fire frequency. 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:

Black sagebrush, spiny hopsage and winterfat can all be impacted by improper grazing management. Relatively low levels of utilization by cattle and sheep are needed to maintain the shrub component. Utah juniper can invade the site if a seed source is in the vicinity. Proper grazing management can help maintain the integrity of the plant community.

#### Weather influences:

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 periods of drought significantly impact this site due to the low available water holding capacity (AWC) and shallow soil. Extended drought reduces vigor of the perennial grasses and palatable shrubs. Extreme drought may cause plant mortality. An early, hard freeze can occasionally kill some plants.

#### Influence of Insects and disease:

Outbreaks can affect vegetation health. An outbreak of a particular insect is usually influenced by weather but no specific data is available for this site. 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:

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 can be very invasive on this site, especially after fire and at lower elevations. Once it becomes 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 very little impact on it. Pronghorn antelope is the dominant large herbivore that uses the site. They use the site yearlong but prefer it in the spring, fall, and early winter. Sage grouse use the site for strutting grounds. Winter and spring use by mule deer occasionally occurs.

#### Watershed:

Decreased infiltration and increased runoff occurs when black 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. This site has a low erosion hazard but a high run-off potential.

#### Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

##### State 1.

Phase A to B. Develops under improper grazing management and no fire. A Utah juniper seed source is in the vicinity.

Phase A to C. Develops with fire (approximately every 80-100 years). Fire only occurs in above normal precipitation (favorable) years.

Phase A to D. Develops with improper grazing management and from fire. No juniper seed source nearby.

Phase B to A. Develops from prescribed grazing and prescribed burning or brush management.

Phase C to A. Develops under prescribed grazing management and no fire.

Phase D to A. Develops from prescribed grazing.

State 1, Phase C or D to State 2. Develops with frequent fire and improper grazing management. Excessive soil loss has not occurred at this point but the site has crossed a vegetative threshold. It is not economical to return this plant community to State 1 with accelerating practices.

State 1, Phase B to State 3. Develops with no fire and improper grazing management. Utah juniper has taken control of the site hydrology. The site has crossed a threshold. It is not economical to return this plant community to State 1 with accelerating practices.

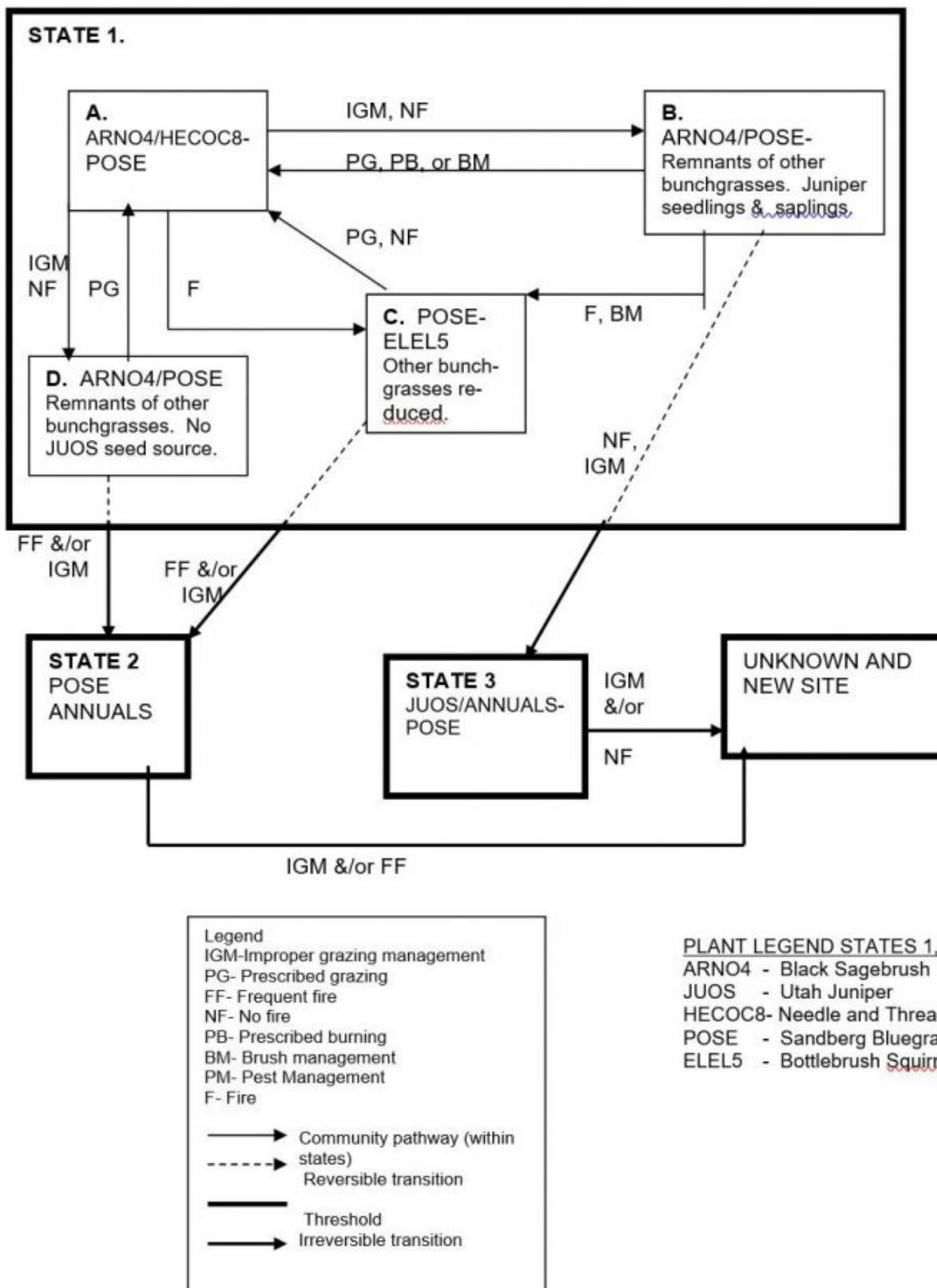
State 2 to Unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and/or frequent fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is not economical to return this plant community to State 1 with accelerating practices.

State 3 to Unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and/or no fire cause this state to cross the threshold and retrogress to a new site with reduced potential. It is not economical to return this plant community to State 1 with accelerating practices.

#### Practice Limitations:

Slight limitations exist on this site for implementing vegetative management practices. Careful planning is needed to avoid heavy use of this site because of the low production and ease of accessibility by livestock. Slight to moderate limitations exist on this site for implementing facilitating practices such as water developments and fencing. Post holes may be difficult to dig in some gravelly areas. There are moderate to severe limitations for range seeding and brush management on this site due to gravelly soils. Also low precipitation can make it extremely hard to establish a successful seeding.

### **State and transition model**



**State 1**  
**State 1, Phase A, Reference Plant Community Phase.**

**Community 1.1**  
**State 1, Phase A, Reference Plant Community Phase.**

This plant community is dominated by needle and thread and black sagebrush. Subdominant species include Sandberg bluegrass, Hoods phlox, Indian ricegrass, plains pricklypear and spiny hopsage. There are other grasses, forbs, and shrubs that occur in minor amounts. Natural fire frequency is approximately 80 to 100 years. Fire only

occurs in favorable years.

**State 2**  
**State 1, Phase B**

**Community 2.1**  
**State 1, Phase B**

Due to improper grazing management, needle and thread, Indian ricegrass and bluebunch wheatgrass have been significantly reduced in amounts and are in low vigor. Sandberg bluegrass and bottlebrush squirreltail have increased as well as some shrubs. Black sagebrush has probably increased. Utah juniper has invaded the site in the form of seedlings and saplings. Under severe sheep or wildlife use in the fall or winter, black sagebrush can decrease. Palatable shrubs such as spiny hopsage have low vigor and are usually heavily hedged while rabbitbrush has increased.

**State 3**  
**State 1, Phase C**

**Community 3.1**  
**State 1, Phase C**

This plant community has developed after a fairly recent fire. The fire intolerant shrubs such as black sagebrush have been significantly reduced or eliminated. Spiny hopsage and rabbitbrush may have re-sprouted. Some needle and thread and Indian ricegrass have been reduced or killed. Sandberg bluegrass and bottlebrush squirreltail have increased and bluebunch wheatgrass has been maintained in the community. Some cheatgrass may have invaded at lower elevations.

**State 4**  
**State 1, Phase D**

**Community 4.1**  
**State 1, Phase D**

This plant community has developed from improper grazing management and no recent fire. Black sagebrush is the dominant overstory species with Sandberg bluegrass. Needle and thread grass has been reduced and is in low vigor. Bottlebrush squirreltail has increased. No Utah juniper has invaded. Palatable shrubs have been hedged and may be in low vigor. Some cheatgrass may have invaded the plant community at lower elevations.

**State 5**  
**State 2**

**Community 5.1**  
**State 2**

The site has degraded into a plant community dominated by Sandberg bluegrass and annual grasses and forbs. Fine fuels are adequate to carry a fire in favorable years. Frequent fires and/or improper grazing management have caused the degradation. Excessive soil loss has not occurred at this point but the site has crossed a vegetative threshold. It is not economical to return this plant community to State 1 with accelerating practices.

**State 6**  
**State 3**

**Community 6.1**  
**State 3**

The site has degraded into a plant community dominated by Utah juniper with annuals in the understory. Continued

lack of fire and improper grazing management has caused changes in the site hydrology with excessive soil loss. The site has crossed a threshold. It is not economical to return this plant community to State 1 with accelerating practices.

## **State 7**

### **Unknown new site**

#### **Community 7.1**

##### **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 community has developed due to continued improper grazing management and/or frequent fire from State 2 and from improper grazing management and/or no fire from State 3. It is not economical to return this plant community 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 these large mammals. The site provides important seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, western rattlesnake, 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 and tumbled mustard) 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 – Black Sagebrush/ Needle and Thread/ 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, western rattlesnake, 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. Brood-rearing habitat, winter cover, and winter food habitat for sage grouse is provided by this diverse plant community. Sage-grouse, mule deer, and pronghorn use black sagebrush for winter food. The plant community provides spring, fall, and winter forage needs for large mammals including mule deer and pronghorn. A diverse small mammal population may include golden-mantled ground squirrels, chipmunks, and pikas (when adjacent to talus slopes at high elevations).

State 1 Phase 1.2 - Black Sagebrush/ Sandberg Bluegrass/ Utah Juniper Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy cover of sagebrush and juniper contributes to a sparse herbaceous understory. A reduced herbaceous understory results in lower diversity and numbers of insects. The reptile community will be similar to the 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 for Brewer's sparrow, sage thrasher, and sage sparrow may increase. Remaining black sagebrush will provide brood-rearing, winter cover, and winter forage habitat for sage-grouse but as juniper encroaches the quality of this habitat is severely reduced or eliminated. Reduction of Indian rice-grass lowers the quality of forage habitat for song birds. The plant community supports limited seasonal habitat for mule deer, elk, and pronghorn due to reduced stands of Indian ricegrass and bluebunch wheatgrass. As juniper encroaches, the site will provide additional thermal cover for



large mammals. A small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots, and pikas (when adjacent to talus slopes at high elevations) may utilize this site.

**State 1 Phase 1.3 –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. 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 eliminated. 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 and western meadowlark). Winter habitat for large mammals would be reduced or eliminated with the loss of black sagebrush. Small mammal diversity and populations would be reduced due to a loss of cover and increase in success of hunting by predators.

**State 1 Phase 1.4- Black Sagebrush/ Sandberg Bluegrass Plant Community:** This phase has developed due to improper grazing management and no fire. The animal community would be similar to State 1 Phase 1.1. The reduced vigor and canopy cover of forbs would lower the quality of habitat for pollinators. The reptile community includes 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. The site would provide winter cover and winter food for sage-grouse. The quality of brood-rearing and nesting cover for sage-grouse would be lowered as herbaceous understory is depleted. Mule deer, elk, and pronghorn would utilize the site for winter habitat. A small mammal population including golden-mantled ground squirrels, chipmunks, yellow-bellied marmots, and pikas (when adjacent to talus slopes at high elevations) may utilize this site.

**State 2 - Sandberg Bluegrass/ 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. Hunting success by raptors may increase. Large mammals 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. Small mammal populations and diversity would be reduced due to poor quality cover, food, and an increase in hunting success by predators.

**State 3 – Utah Juniper/ Annuals/ Sandberg Bluegrass:** 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 provides limited forage for mule deer, elk, and pronghorn in the spring and fall. Mule deer will use this site for winter cover and food. As juniper encroaches, the site will provide additional thermal cover for large mammals.

**Grazing Interpretations.**

This site is best adapted for livestock grazing in the spring, summer and fall. Natural water supplies are short or absent and livestock water may have to be piped, hauled or otherwise made available. 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**

Antelope hunting is the major recreational use of this site. There are limited opportunities for hiking, horseback riding, off-road vehicle use and photography.

## **Wood products**

None.

## **Other products**

None.

## **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**

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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, 9/22/2020

## **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.

Author(s)/participant(s)	
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Date	01/16/2008
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 due to the very gravelly to extremely gravelly surface soils and gentle slopes.  

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2. **Presence of water flow patterns:** Water-flow patterns rarely 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.  

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3. **Number and height of erosional pedestals or terracettes:** Erosional pedestals or terracettes are rare on the site. Where flow patterns do occur, 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):** Bare ground ranges from 8 to 15 percent.  

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

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces typically moves less than one foot due to relatively flat slopes, gravelly surface and low rainfall. Coarse litter generally does not move. Wind may move fine litter 1 to 3 feet.  

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values should range from 3 to 5 but need 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 medium subangular blocky to strong medium angular blocky. The A or A1 horizon is typically 2 to 7 inches thick. Soil organic matter (SOM) ranges from 1 to 2 percent.
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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, slow runoff and increase infiltration. Gravels on surface slow surface runoff and increase infiltration. Medium height shrubs catch 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 is not present.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Cool season deep-rooted perennial bunchgrasses> medium shrubs>
- Sub-dominant: Perennial forbs>shallow rooted bunchgrasses
- Other:
- Additional:
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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or 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):** 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 400 pounds per acre (448 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 45-55 percent of the total production, forbs 10-20 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 species include cheatgrass at lower elevations, clasping pepperweed, beggar ticks, tansymustard, Jim Hill tumbledustard, yellow salsify and halogeton.
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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in normal and favorable years.
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