USDA Natural Resources
Conservation Service

Ecological site R012XY007ID
Shallow Gravelly Loam 8-12 PZ ARAR8/PSSPS-ACHY

Last updated: 9/21/2020
Accessed: 05/11/2024

General information

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

MLRA notes

Major Land Resource Area (MLRA): 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

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 with a duripan or hardpan. >35% (by volume) coarse fragments, skeletal within 20” of soil surface.
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

R012XY003ID	**Saline Flat <8 PZ ATGA/ACHY**
R012XY017ID	**Shallow Fractured South 8-12 PZ ARTRW8/PSSPS-LESAS2**
R012XY018ID	**Saline Loamy 8-11 PZ SAVE4/LECI4**
R012XY023ID	**Dry Meadow PONE3-PHAL2**

R012XY026ID	**Dry Loamy 7-10 PZ ATCO-ARFR4/PSSPS**
R012XY032ID	**Loamy 8-12 PZ ARTRW8/PSSPS**
R012XY036ID	**Clayey 7-10 PZ ARTRW8-ATCO/PSSPS**
R012XY040ID	**Cold Gravelly 8-12 PZ ARNO4/HECOC8**
R012XY041ID	**Gravelly 7-10 PZ ATCO/SPCR**

Similar sites

R012XY002ID	**Gravelly Loam 12-16 PZ ARAR8/PSSP6-FEID**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia arbuscula*
Herbaceous	(1) *Pseudoroegneria spicata ssp. spicata* (2) *Achnatherum hymenoides*

Physiographic features

This site occurs on fans, terraces and mountain foot slopes. Slopes range from 0 to 30 percent. It can occur on all aspects but generally has a southerly exposure. Elevations range from 5400 to 7200 feet (1650-2200 meters).

Table 2. Representative physiographic features

Landforms	(1) Fan (2) Terrace (3) Mountain slope
Elevation	1,646–2,195 m
Slope	0–30%

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

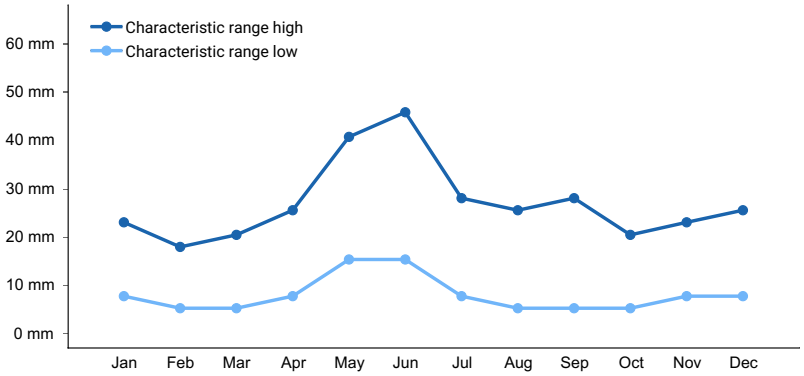


Figure 1. Monthly precipitation range

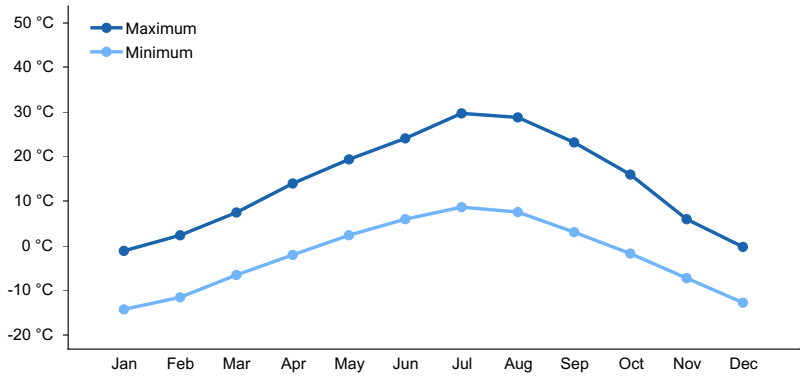


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils for this site are generally shallow to a duripan or hardpan. Surface textures usually are gravelly to very gravelly loams and silt loams. The subsoil is also gravelly to very gravelly. These soils are well to somewhat excessively drained shallow to very deep soils. The soils have a moderate to moderately rapid permeability and a very low to low available water capacity. Parent material can be mixed sedimentary and metamorphic alluvium influenced heavily by limestone. Water erosion can be high when the plant cover is reduced and slope increases. These soils are characterized by an aridic soil moisture regime or an aridic bordering on xeric. The soil temperature regime is either frigid or cryic.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Very gravelly silt loam
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	25–152 cm
Surface fragment cover <=3"	0–45%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	1.78–9.91 cm
Calcium carbonate equivalent (0-101.6cm)	0–75%

Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–65%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The dominant visual aspect of this site is low sagebrush with bluebunch wheatgrass and Indian ricegrass. Composition by weight is approximately 40 to 55 percent grasses, 5 to 10 percent forbs and 40 to 50 percent shrubs.

During the last few thousand years, this site has evolved in an 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, bighorn sheep, lagomorphs and small rodents. Fire has historically occurred on the site at intervals of 80 to 100 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 and Indian ricegrass in the understory and low sagebrush in the overstory. Subdominant species include Sandberg bluegrass, bottlebrush squirreltail and Hoods phlox. 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 340 pounds per acre (381 kilograms per hectare) in a normal year. Production in a favorable year is 525 pounds per acre (588 kilograms per hectare). Production in an unfavorable year is 185 pounds per acre (207 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses and shrubs are about equal followed by perennial forbs while shallow rooted bunchgrasses are subdominant.

FUNCTION
This site is suited for livestock grazing in the spring, fall and early winter. There are few limitations to grazing. Natural water supplies may be insufficient or absent. The site provides fair to good habitat for various upland wildlife. The site can be valuable winter habitat for mule deer and pronghorn antelope. This site is easily degraded with improper management due to ease of access by livestock and low production. The site offers minimal recreational value except limited hunting opportunities. A mixed stand of shrubs and perennial grasses is necessary to reach the potential of the site.

Impacts on the Plant Community

Influence of fire:
In the absence of normal fire frequency, low sagebrush can gradually increase on the site. Utah juniper can invade if a seed source is in the vicinity. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, low sagebrush or Utah juniper can displace most of the primary understory species. See “Influence of juniper invasion” below.

When fires become more frequent than historic levels(80-100 years), low sagebrush is reduced significantly. Rabbitbrush can increase slightly. With continued short fire frequency, low sagebrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Indian ricegrass. These species may be replaced by Sandberg bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass and medusahead will invade the site at lower elevations. These fine fuels will increase the fire frequency.

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. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to increase in low sagebrush and noxious and invasive plants (e.g. an invasion of Utah juniper if a seed source is in the proximity).

Continued improper grazing management and excessive utilization influences fire frequency by increasing these fine fuels. If cheatgrass and/or medusahead increase due to improper grazing management and become co-dominant with Sandberg bluegrass and other annuals, fires become more frequent.

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 low sagebrush and/or Utah juniper. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. On sites with such low production and marginal soils, any brush management program needs to be very carefully planned and evaluated before implementation.

Weather influences
Above normal precipitation in April, May and June can dramatically increase total annual production of the plant community. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Likewise, below normal precipitation during these spring months can significantly reduce total annual production and be detrimental to viable seed production. Overall plant composition is normally not affected when perennials have good vigor.

Below normal temperatures in the spring can have an adverse impact on total production regardless of the precipitation. An early, hard freeze can occasionally kill some plants.

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment and production are usually reduced. Mortality can occur. Prolonged drought can lead to reductions in fire frequency.

Influence of 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.

Influence of noxious and invasive plants
Many of these species add to the fine-fuel component and lead to increased fire frequency. Perennial and annual invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife
Big game animals use this site in the spring, fall and moderate winters. Their numbers are seldom high enough to adversely affect the plant community.

Watershed
Decreased infiltration and increased runoff occur with an increase in low sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree. The long -term effect is a transition to a different state.

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

• Nutrient cycling is reduced.
• As the canopy closes, juniper gains control of energy capture.

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

The following 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 fire. Fire only occurs in above normal precipitation about every 80-100 years.
Phase A to C. Develops under improper grazing management and no fire.
Phase A to D. Develops with no fire and improper grazing management.
Phase B to A. Develops under prescribed grazing management program and no fire.
Phase C to A. Develops from prescribed grazing management and no fire.
Phase C to B. Develops with fire.
Phase D to A. Develops from prescribed grazing management and no fire.

State 1, Phase B to State 2. Results from continued improper grazing management and/or 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 C to State 2. Develops through fire and improper grazing management. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

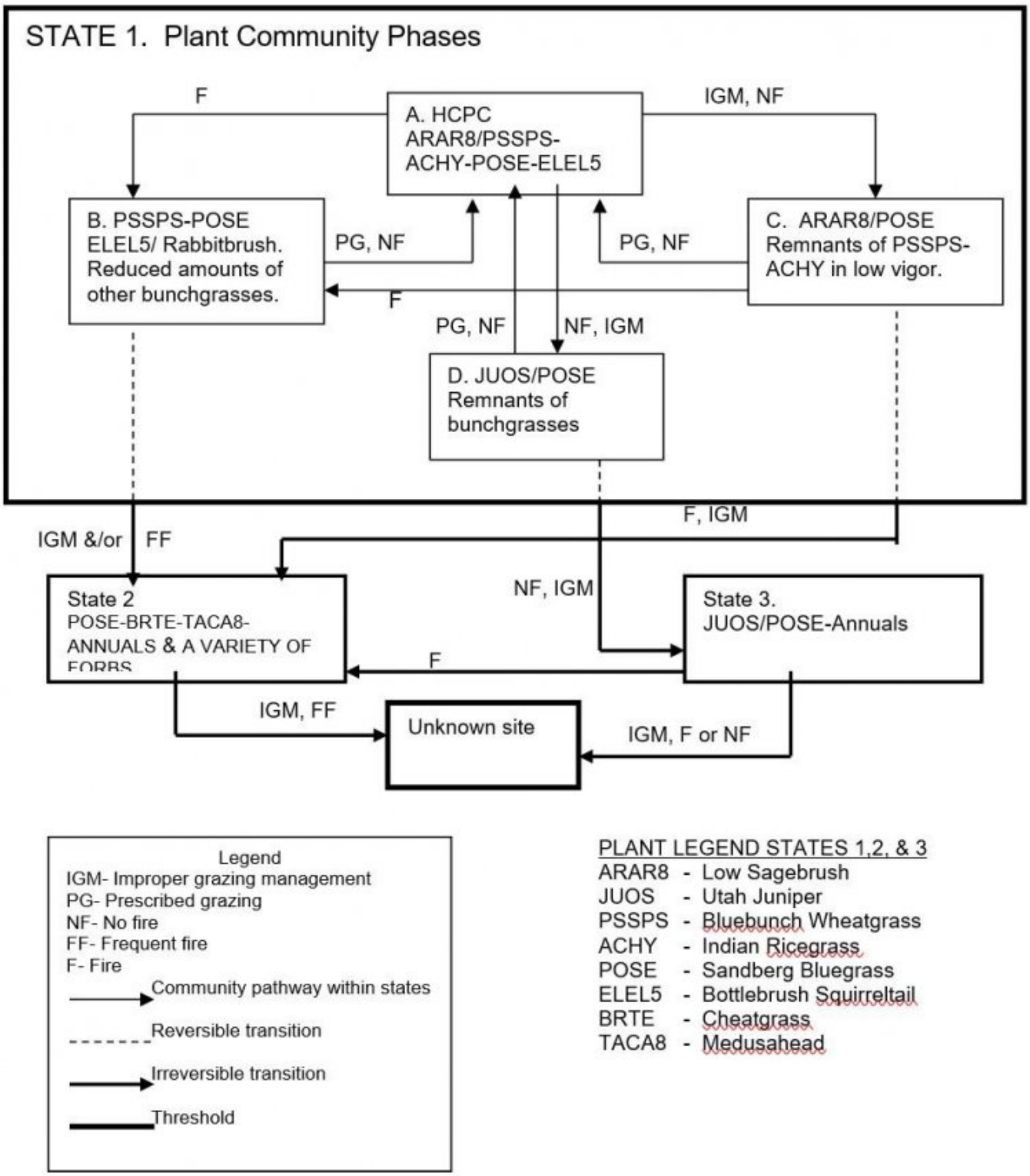
State 1 Phase D to State 3. Results from no fire and continued improper grazing management from a juniper invaded phase of State 1. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

State 2 to Unknown Site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and frequent fire causes this state to cross a 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 Unknown Site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and fire or no fire causes this state to cross a threshold and retrogress to a new site with reduced potential. It is not economical to return this site to State 1 with accelerating practices.

Practice Limitations
Severe limitations exist on this site for rangeland seeding due to low precipitation, shallow and gravelly soils and low available water holding capacity. Brush management is not normally desired or needed on this site.

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 low sagebrush in the overstory and bluebunch wheatgrass and Indian ricegrass in the understory. Subdominant species include Sandberg bluegrass, bottlebrush squirreltail and Hoods

phlox. There is a variety of other grasses, forbs and shrubs that can occur in minor amounts. Natural fire frequency is 80-100 years.

State 2
State 1. Phase B

Community 2.1
State 1. Phase B

This plant community is dominated by bluebunch wheatgrass and Sandberg bluegrass. Rabbitbrush is present due to sprouting. Bottlebrush squirreltail has increased. Indian ricegrass and other bunchgrasses may have died due to fire. Most forbs are maintained in the plant community. Cheatgrass may have invaded the site at lower elevations. This phase has developed due to fire.

State 3
State 1, Phase C

Community 3.1
State 1, Phase C

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. Cheatgrass may have invaded the site at lower elevations. This phase has developed due to improper grazing management and no fire.

State 4
State 1, Phase D

Community 4.1
State 1, Phase D

This plant community is dominated by Utah juniper and Sandberg bluegrass with remnants of bluebunch wheatgrass and Indian ricegrass. This phase has developed with a continued lack of fire and improper grazing management. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

State 5
State 2

Community 5.1
State 2

This plant community is dominated by Sandberg bluegrass, cheatgrass, medusahead and a variety of forbs. Some perennial forbs are present. The community has developed due to continued improper grazing management and fire. 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 6
State 3

Community 6.1
State 3

This plant community is dominated by Utah juniper, Sandberg bluegrass and a variety of annuals. Some perennial forbs are present. This community has developed with a continued lack of fire and improper grazing management. This site has crossed the threshold. It is not economical to return this site to State 1 with accelerating practices.

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/ or fire.

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 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/ Indian Ricegrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community (HCPC): 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 sites, brood-rearing habitat, winter cover, and winter food for sage grouse are provided by this diverse plant community. Low sagebrush is a preferred winter food 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. The south facing slopes provide winter habitat for mule deer and antelope. A diverse small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

State 1 Phase 1.2 – 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. 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 by sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse if 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 hunting success by predators.

State 1 Phase 1.3- 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 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 amounts of 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 1 Phase 1.4- Utah Juniper/ Sandberg Bluegrass Plant Community: This site has developed due to improper grazing management and no fire. The loss of native forbs and understory vegetation will reduce insect diversity on the site. Reptile species will be similar to the State 1 Phase 1.1 community, but the quality of the habitat is reduced resulting in lower populations. The site will not provide suitable habitat 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, elk, and antelope in spring and fall. As juniper encroaches the site will provide additional thermal cover for large mammals.

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. Hunting success by raptors may increase. 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 food and cover, and an increase in hunting success 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 forbs and understory vegetation will reduce insect diversity on the site. The lack of flowering plants will reduce 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 of 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, elk, and antelope in spring and fall. As juniper encroaches, the site will provide additional thermal cover for large mammals.

Grazing Interpretations
This site is best adapted to lilvestock grazing in the spring, fall, and winter. 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 and sagegrouse hunting are the major recreation uses of this site.

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, U.S. 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, 9/21/2020

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	02/04/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are rare on this site. They are most likely to occur immediately following a wildfire and on slopes greater than 15 percent. Surface gravels reduce rill formation.

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2. **Presence of water flow patterns:** Water-flow patterns are rare on this site. They are most likely to occur with high intensity convection storms and when slopes are greater than 15 percent. When they do occur, they are short, disrupted by cool season perennial grasses and tall shrubs and are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** Erosional pedestals or terracettes are rare on this site. A few pedestals and terracettes can occur on this site on slopes greater than 15 percent and where rills and water flow patterns are present, but they are not extensive. Surface gravels reduce the formation of pedestals.

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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 30-40 percent but data is needed to verify.

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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:** Wind scoured, blowouts and/or depositional areas are rare.

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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move up to 2-3 feet or further following a significant run-off event and on slopes greater than 15 percent. Coarse litter generally does not move.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values should range from 3-5 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):** The A or A1 horizon is typically 2 to 7 inches thick. Structure ranges from weak very fine and fine granular to weak thin, medium,

thick platy to weak very fine, fine and medium subangular blocky. Soil organic matter (SOM) ranges from 0.5 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 species, slow run-off and increase infiltration. Shrubs catch snow in the interspaces. Terracettes provide a favorable micro-site for vegetation establishment, which further increases infiltration. Surface gravels help slow surface water movement and increase infiltration.

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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 = tall shrubs>

    Sub-dominant: Perennial forbs> shallow rooted grasses.

    Other:

    Additional:

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

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14. **Average percent litter cover (%) and depth (in):** Annual litter cover in the interspaces will be 5-10 percent to a depth of <0.1. Under the mature shrubs, litter is greater than 0.5 inches. Fine litter can accumulate on the terracettes.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production is 340 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 40-55 percent of the total, forbs 5-10 percent and shrubs 40-50 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, rush skeletonweed, scotch thistle, spotted and diffuse knapweed, Russian thistle, mustard. clasping pepperweed, beggar ticks, tansymustard, Jim Hill tumblemustard, yellow salsify, burr buttercup, medusahead and halogeton.

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