

Ecological site R010XA030ID South Slope Channery 11-13 PZ ARTRX/PSSPS

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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): 010X–Central Rocky and Blue Mountain Foothills

This MLRA is characterized by gently rolling to steep hills, plateaus, and low mountains at the foothills of the Blue Mountains in Oregon and the Central Rocky Mountains in Idaho. The geology of this area is highly varied and ranges from Holocene volcanics to Cretaceous sedimentary rocks. Mollisols are the dominant soil order and the soil climate is typified by mesic or frigid soil temperature regimes, and xeric or aridic soil moisture regimes. Elevation ranges from 1,300 to 6,600 feet (395 to 2,010 meters), increasing from west to east. The climate is characterized by dry summers and snow dominated winters with precipitation averaging 8 to 16 inches (205 to 405 millimeters) and increasing from west to east. These factors support plant communities with shrub-grass associations with considerable acreage of sagebrush grassland. Big sagebrush, bluebunch wheatgrass, and Idaho fescue are the dominant species. Stiff sagebrush, low sagebrush, and Sandberg bluegrass are often dominant on sites with shallow restrictive layers. Western juniper is one of the few common tree species and since European settlement has greatly expanded its extent in Oregon. Nearly half of the MLRA is federally owned and managed by the Bureau of Land Management. Most of the area is used for livestock grazing with areas accessible by irrigation often used for irrigated agriculture.

For further information, see "Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (U.S. Department of Agriculture Handbook 296, 2006)" available online at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053624

Ecological site concept

- Site occurs on uplands
- Slopes greater than 30% on southerly aspects
- Occurs in 11-13 inch PZ
- Soils are not volcanic cinders
- Site occurs in association with rock outcrops and talus slopes

Associated sites

R010XA032ID	Bouldery 11-13 PZ ARTRX/PSSPS Adjacent low slope areas with bouldery soils
R010XA033ID	Loamy 11-13 PZ ARTRX/PSSPS Adjacent low slope areas with loamy soils
R010XA036ID	North Slope Stony 12-16 PZ ARTRX/PSSPS Adjacent north slopes

Similar sites

R010XA009ID	South Slope Gravelly 12-16 PZ Not occurring in association with rock outcrops and talus slopes
R010XA025ID	South Slope Loamy 11-13 PZ ARTRW8/PSSPS Not occurring in association with rock outcrops and talus slopes
R010XA021ID	South Slope Fractured 12-16 PZ Not occurring in association with rock outcrops and talus slopes, soils less than 20"

Table 1. Dominant plant species

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

Physiographic features

This site occurs on south and west facing undulating to very steep slopes with many rock outcrops and associated talus slopes. Slopes range from 2 to 60 percent. Elevations range from 4250 to 5100 ft. (1295 to 1550 meters).

Table 2. Representative physiographic features

Landforms	(1) Foothills > Hill (2) Foothills > Canyon
Flooding frequency	None
Ponding frequency	None
Elevation	4,250–5,100 ft
Slope	2–60%
Water table depth	60 in
Aspect	W, S, SW

Climatic features

The Big and Little Wood River Foot slopes and Plains, proposed as MLRA 10X, has a mean elevation of 5310 feet above sea level, and varies from 3600 to 9235 feet. In general, average annual precipitation is greatest on the western side, with the southeast area being the driest. The average annual precipitation, based on 7 long term climate stations located throughout the MLRA, is 15.39 inches, with a range of 12.5 to 18 inches. On fringes of the MLRA extent are drier with 8 to 11 inches of precipitation. Monthly precipitation is generally greatest at the end of the year, diminishes steadily until a low in July and August, then increases rapidly in the autumn.

Monthly temperatures can vary considerably. Highs of up to 102° and lows down to -52° Fahrenheit have been recorded. The average annual temperature is 42.9°. The frost-free period ranges from 75 to 98 days. The freeze-free period is a bit longer: 106 to 133 days.

Both morning and afternoon average relative humidity values peak in the winter, and reach their low in July and August. The average number of sunny, cloud-free days is above average for the summer months, but below average for the period from November through February.

Table 3. Representative climatic features

Frost-free period (characteristic range)	75-98 days
Freeze-free period (characteristic range)	106-133 days
Precipitation total (characteristic range)	11-13 in
Frost-free period (actual range)	
Freeze-free period (actual range)	

Precipitation total (actual range)	11-18 in
Frost-free period (average)	86 days
Freeze-free period (average)	120 days
Precipitation total (average)	16 in

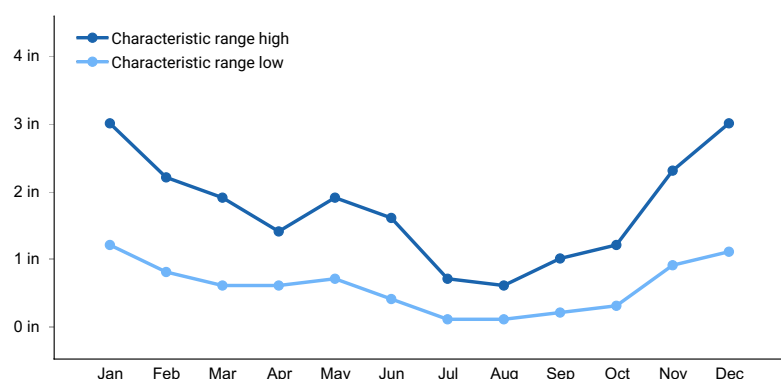


Figure 1. Monthly precipitation range

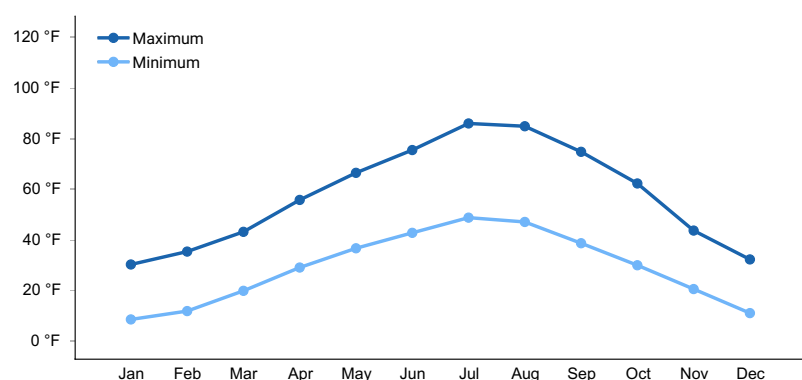


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Wetland description

This site is not influenced by adjacent wetlands.

Soil features

The soils on this site are characterized by Very Channery soils. By definition, these soils by volume, have more than 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. They are well drained, with moderate permeability and low available water holding capacity. Runoff is medium to high. The erosion hazard is severe or very severe by water. The surface texture is generally very channery loam. These soils are characterized by a xeric moisture regime. Soil temperature regime is mesic.

Soil Series Correlated to this Ecological Site

Burwill

Table 4. Representative soil features

Parent material	(1) Colluvium—volcanic rock
Surface texture	(1) Very channery loam

Family particle size	(1) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderate
Soil depth	40–60 in
Surface fragment cover <=3"	15–18%
Surface fragment cover >3"	15–24%
Available water capacity (0–40in)	3.8 in
Soil reaction (1:1 water) (0–40in)	6.1–7.3
Subsurface fragment volume <=3" (4–60in)	15–45%
Subsurface fragment volume >3" (4–60in)	15–45%

Ecological dynamics

This site is dominated by foothills big sagebrush in the overstory and bluebunch wheatgrass in the understory. The composition by weight is 25 to 45 percent grasses, 5 to 15 percent forbs, and 45 to 65 percent shrubs.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by dry summers and cold, wet winters. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, Rocky Mountain elk, and lagomorphs.

Fire has historically occurred on the site at intervals of 50 to 70 years.

The Reference State (State 1), previously referred to as 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.

FUNCTION:

This site is best suited for late spring and fall grazing by livestock. The site can be used by big game in the spring, summer, fall, and winter due to the amount of shrubs on the site for food and cover. It is also suited for recreation use in the summer and fall.

Due to the amount of surface stones and limited access on steeper slopes, most areas of this site are not easily degraded. Lower footslopes in proximity to bottoms or drainages are most likely to degrade due to access by animals from adjoining lands. Infiltration is good where the plant community has a good shrub component. Snow usually does not accumulate on the site due to southerly exposures and surface rocks. 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, foothills big sagebrush, antelope bitterbrush, and some other shrubs can gradually increase on the site. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, shrubs can displace most of the primary understory species.

When fires become more frequent than historic levels (50 to 70 years), foothills big sagebrush and bitterbrush are reduced significantly. Rabbitbrushes and other root sprouting shrubs can increase slightly. With continued short fire frequency, foothills big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass, Idaho fescue, and Thurber's needlegrass. These species may

be replaced by Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Cheatgrass and medusahead rye will invade the site. 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 a reduction in vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in tall shrubs and noxious and invasive plants.

Continued improper grazing management influences fire frequency by increasing fine fuels that carry fires. As cheatgrass and medusahead increase 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 foothills big sagebrush and tall shrubs. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn.

Due to the shrub species on this site, any brush management efforts should be carefully planned. Antelope bitterbrush is very important as a browse species for wildlife and needs to be protected with any brush control practices applied. A reduction in shrubs without a suitable understory of perennial grasses can lead to an increase in fine fuels which will lead to a more frequent fire regime. Loss of shrub species on this site can have very negative impacts on wildlife.

Weather influences:

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

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

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

Influence of Insects and disease:

Outbreaks can affect vegetation health. Bitterbrush can be severely affected by the western tent caterpillar (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. It seldom kills the entire stand. Mormon cricket and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and lead to increased fire frequency. Annual and perennial invasive species 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, summer, and fall and in moderate winters. Their numbers are seldom high enough to adversely affect the plant community. Herbivory can be detrimental to bitterbrush when livestock grazing and browsing by big game occurs at the same time and season. This will occur when both kinds of animal

are using the plant in the late summer or fall. The adverse impact is excessive use of the current year's leader growth. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

Watershed:

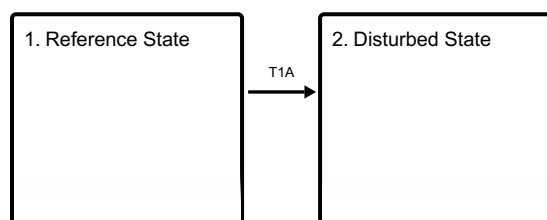
Decreased infiltration and increased runoff occur with an increase in foothills big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same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

Practice Limitations:

Moderate limitations exist on this site for implementing vegetative management practices. Usually this site will not be a key area for livestock management due to slope and stoniness. Moderate to severe limitations exist on this site for facilitating practices for livestock management. The steep slopes and stoniness make construction of fences, pipelines, troughs, and trails difficult. Stony soils and steep slopes present severe limitations for the use of ground equipment for seeding.

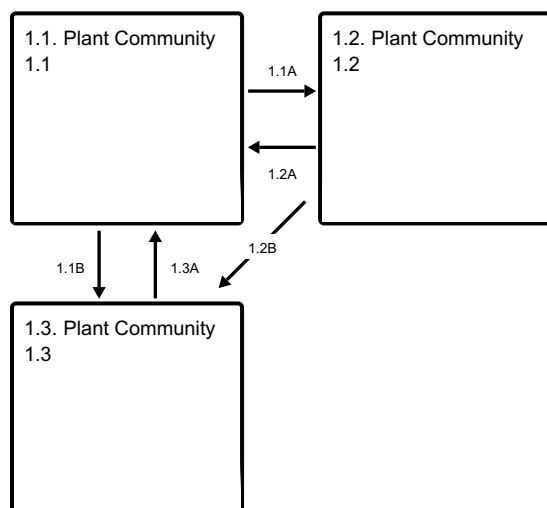
State and transition model

Ecosystem states



T1A - frequent fire, improper grazing management

State 1 submodel, plant communities



1.1A - improper grazing management, absence of fire

1.1B - fire

1.2A - prescribed grazing and no fire

1.2B - fire

1.3A - prescribed grazing and no fire

2.1. Plant Community

2.1

State 1

Reference State

Dominant plant species

- big sagebrush (*Artemisia tridentata ssp. xericensis*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata ssp. spicata*), grass

Community 1.1

Plant Community 1.1

This plant community has foothills big sagebrush in the overstory with bluebunch wheatgrass dominating the understory. Thurber’s needlegrass, Idaho fescue, Sandberg bluegrass, bottlebrush squirreltail, basin wildrye, antelope bitterbrush, and arrowleaf balsamroot are common. Other tall shrubs are common also. Natural fire frequency is 50 to 70 years.

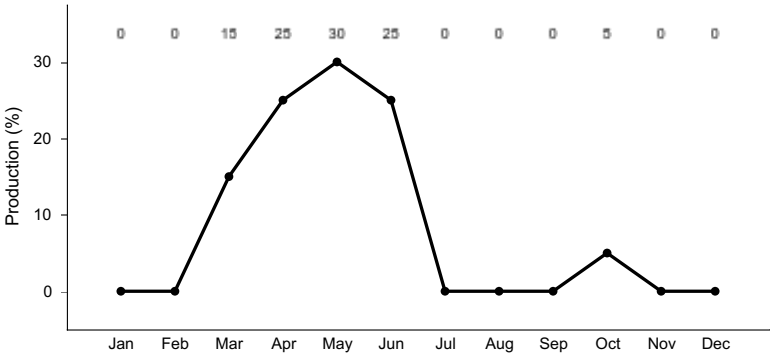


Figure 3. Plant community growth curve (percent production by month). ID0905, D25ARTRV South. State 1.

Community 1.2

Plant Community 1.2

This plant community is dominated by foothills big sagebrush with reduced amounts of bluebunch wheatgrass and other deep-rooted bunchgrasses. Sandberg bluegrass and bottlebrush squirreltail have increased in the understory. All deep-rooted bunchgrasses are typically in low vigor. Foothills big sagebrush has increased as well as some other tall shrubs. This state has developed due to improper grazing management and lack of fire. Some cheatgrass and medusahead may have invaded the site.

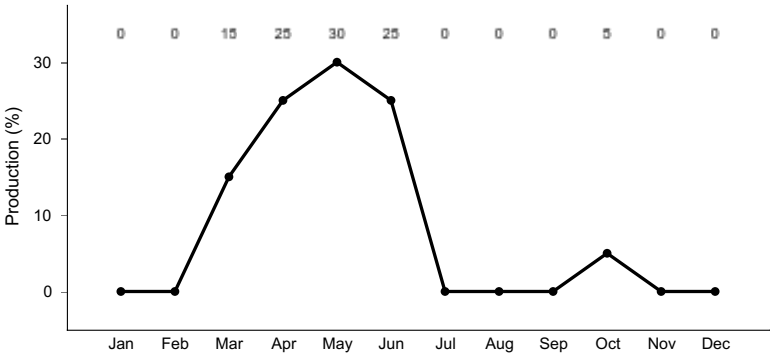


Figure 4. Plant community growth curve (percent production by month).

Community 1.3

Plant Community 1.3

This plant community is dominated by bluebunch wheatgrass, Sandberg bluegrass, and tall root-sprouting shrubs. Thurber's needlegrass and Idaho fescue can be lost due to fire. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Phase 1.1. Foothills big sagebrush and antelope bitterbrush have been reduced significantly due to wildfire. Some cheatgrass and medusahead may have invaded the site. This plant community is the result of wildfire.

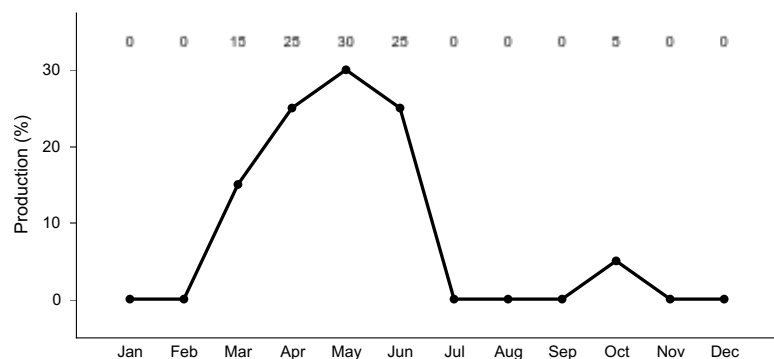


Figure 5. Plant community growth curve (percent production by month). ID0905, D25ARTRV South. State 1.

Pathway 1.1A

Community 1.1 to 1.2

Phase 1.1 to 1.2. Develops with improper grazing management and in the absence of fire.

Pathway 1.1B

Community 1.1 to 1.3

Phase 1.1 to 1.3. Develops with fire.

Pathway 1.2A

Community 1.2 to 1.1

Phase 1.2 to 1.1. Develops with prescribed grazing and no fire.

Pathway 1.2B

Community 1.2 to 1.3

Phase 1.2 to 1.3. Develops with fire.

Pathway 1.3A

Community 1.3 to 1.1

Phase 1.3 to 1.1. Develops with prescribed grazing and no fire.

State 2

Disturbed State

Resilience management. State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is economically impractical to return this plant community to State 1 with accelerating practices.

Dominant plant species

- big sagebrush (*Artemisia tridentata* ssp. *xericensis*), shrub
- Sandberg bluegrass (*Poa secunda*), grass
- cheatgrass (*Bromus tectorum*), grass

Community 2.1

Plant Community 2.1

This plant community is dominated by tall shrubs and Sandberg bluegrass, cheatgrass and other annuals. Root sprouting shrubs such as rabbitbrush and horsebrush can be present, dependent upon, how frequent, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires and improper grazing management from Phase 1.2, State 1 or with frequent fires and/or improper grazing management from Phase 1.3, State 1. This site has crossed the threshold. It is economically impractical to return this plant community to State 1 with accelerating practices.

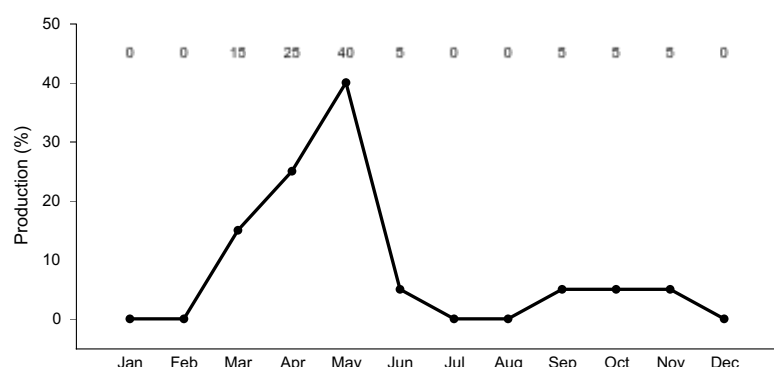


Figure 6. Plant community growth curve (percent production by month). ID0911, D25 POSE/B RTE/ANNUALS.

Transition T1A

State 1 to 2

State 1 Phase 1.2 to State 2. Develops through frequent fire and improper grazing management. State 1 Phase 1.3 to State 2. Develops with frequent fire and/or improper grazing management. The site has crossed the threshold. It is economically impractical 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 diverse habitat for many native wildlife species. The steep, rocky outcrop and talus slopes provide limited 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. Due to the difficult terrain use of these sites is typically limited to insects, reptiles, small mammals and birds. Mule deer and elk use of this ecological site is limited due to the rough terrain. The south facing slopes can provide winter foraging habitat for these ungulates. The diverse shrub cover provides suitable habitat for brewer's sparrow and sage thrasher. In some areas encroachment of noxious and invasive plant species (cheatgrass, Medusahead) can replace native plant species which provided 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. This rangeland ecological site may be associated with pre-historic lava flows which provide unique cave habitats for several sensitive animal species, including the Blind Cave Leiodid Beetle, Cave Obligate Mite, Bats and Cave Obligate Harvestman.

State 1 Phase 1.1 - Foothills Big Sagebrush/ Antelope Bitterbrush/ Bluebunch Wheatgrass/ Thurber's Needlegrass/Sandberg Bluegrass Reference 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, western toad, boreal chorus frog and northern leopard frog. 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. The plant community provides habitat for prey species and cover for these resident reptiles and amphibians. Shrub-steppe obligate avian species include the Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Critical habitat (lek sites, nesting areas, winter cover and food) for sage-grouse may be limited by the rocky outcrops and talus slopes dominant throughout this ecological site. The plant community supports the needs of large mammals (mule deer and elk) providing food and cover on a limited seasonal basis. Antelope bitterbrush is preferred browse for wild ungulates, available during all seasons on these sites. A diverse small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots utilize this plant community. The deer mouse is the primary vector for planting bitterbrush seed.

State 1 Phase 1.2 – Foothills Big Sagebrush/Sandberg Bluegrass/ Plant Community: This plant community is the result of improper grazing management and lack of fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. Grasses, forbs and shrubs, are used by native insects that assist in pollination but the reduced herbaceous understory results in decreased diversity and numbers of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink and western rattlesnake. Diversity and populations of the reptile community would decline with a reduced understory and associated loss of invertebrate habitat. Spring developments that capture all available water would preclude the use of these sites by amphibians. Key shrub-steppe avian obligates include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Critical habitat (lek sites, nesting areas, winter cover and food) for sage grouse is limited due to a less diverse herbaceous plant community and rocky terrain. The plant community supports limited needs of large mammals (mule deer and elk) providing winter food and cover. The increase in big sagebrush reduces the density of antelope bitterbrush and the value of winter forage habitat. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, deer mouse and yellow-bellied marmots would utilize the habitat. The deer mouse is the primary vector for planting bitterbrush seed.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Sandberg Bluegrass/ Bottlebrush Squirreltail Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure for wildlife. Insect diversity would be reduced. A diverse native forb plant community would still support select pollinators. Reptile use including short horned lizard, sagebrush lizard and western rattlesnakes, would be limited or excluded due to the absence of sagebrush. The dominance of herbaceous vegetation with reduced sagebrush canopy would eliminate use of these areas for nesting by Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse when sagebrush cover is adjacent to the site. Sage-grouse would not use the area for winter habitat. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer and elk) forage use would be seasonal but the site would offer little thermal cover and young of year cover. The diversity and populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

State 2 – Tall Shrubs/ Sandberg Bluegrass/ Cheatgrass/ Annual Plant Community: This plant community is the result of continued improper grazing management and/or frequent fire. Vertical structure is provided by rabbitbrushes and horsebrush. Insect diversity and populations would be reduced with the loss of forbs and change in dominance of shrub species. The plant community would support a very limited population of pollinators. Limited habitat is provided for native reptile species. Vertical structure is present but the reduced insect community will reduce quality of reptile habitat. This plant community does not support the habitat requirements for sage-grouse, sage thrasher, Brewer's sparrow or sage sparrow. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Large mammals may utilize the herbaceous vegetation in the early part of the year when the 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. The reduction of insect populations and diversity would reduce suitability of site for bats. Small mammal populations and diversity would be reduced due to less favorable understory vegetation and insect populations.

State 3 - Range Seeding Plant Community: The seeding mixture (native or non-native) determines the animal species that will utilize this site. A diverse seed mixture of grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 phase 1.3. A diverse seed mixture of grasses, forbs and

shrubs would provide similar habitat conditions as described in State 1 phase 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, avian, mammals or sagebrush obligate species. Grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat and elk would utilize this site for nesting and/or foraging. Birds of prey including hawks and falcons may range throughout this community looking for prey species.

Grazing Interpretations.

This site is best suited for livestock grazing in the late spring 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

None listed

Recreational uses

This site provides opportunities for hunting of big game and upland birds. The site also provides opportunities for hiking, photography and nature study.

Wood products

None

Other products

None

Other information

Field Offices

Mountain Home, ID

Gooding, ID

Shoshone, ID

Rupert, ID

Arco, ID

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

Leah Juarros, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Gooding County, ID	
Township/Range/Section	T3S R14E S22

References

. 2004. Restoring Western Ranges and Wildlands. General Technical Report RMRS-GTR-136 Vols 1-3. USDA Forest Service, Rocky Mountain Research Station.

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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.

Contributors

Dave Franzen and Jacy Gibbs

Approval

Kirt Walstad, 12/13/2023

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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Date	03/28/2008
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills can occur on this site due to steep slopes in small areas that have few surface stones. The presence of flat stones on the surface reduces erosion.

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2. **Presence of water flow patterns:** surface stones usually do not allow water flow patterns to develop but if present they are short and not extensive.

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3. **Number and height of erosional pedestals or terracettes:** both are rare on this site. Some terracettes can occasionally develop uphill from the large bunchgrasses and shrubs.
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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** no data available, but expected to range from 5-10 percent.
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5. **Number of gullies and erosion associated with gullies:** none.
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6. **Extent of wind scoured, blowouts and/or depositional areas:** usually does not occur.
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7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 5 feet or further following a significant run-off event. Rocks can trap fine litter. Coarse litter generally does not move.
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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 4 to 6 but needs to be tested.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure ranges from weak fine granular to weak fine subangular blocky. Soil organic matter (SOM) needs to be determined. The A or A1 horizon is typically 3 inches thick. Surface soil color is very dark grayish brown moist.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Tall shrubs accumulate snow in the interspaces. Surface stones slow water movement and rain-drop impact 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):** 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: tall shrubs
- Sub-dominant: cool season deep-rooted perennial bunchgrasses
- Other: perennial forbs

Additional: shallow rooted grasses

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** foothills big sagebrush and antelope bitterbrush 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 20-30 percent to a depth of <0.1 inch. Under the mature shrubs litter is greater than 0.5 inches deep. Fine litter can accumulate on the terracettes and behind surface stones.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 1050 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 25-45 percent of the total, forbs 5-15 percent, and shrubs 45-65 percent.
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** includes cheatgrass, medusahead, bulbous bluegrass, rush skeletonweed, scotch thistle, and spotted and diffuse knapweed.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years.
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