

Ecological site R010XA050ID Very Shallow Loam 12-16 PZ ARAR8/POSE

Last updated: 12/13/2023
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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

Classification relationships

Artemisia arbuscula/ Poa sandbergii 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 occurs on uplands
- Slopes generally less than 30%, occurring on all aspects
- Site associated with recent lava flows
- Soils less than 10" to basalt or lava bedrock

Associated sites

R010XA002ID	Clayey 12-16 PZ ARTR4/PSSPS Adjacent very shallow soils with stony surfaces
R010XA004ID	Loamy 12-16 PZ ARTRV/FEID-PSSPS Adjacent south slopes

R010XA009ID	South Slope Gravelly 12-16 PZ Adjacent south slopes with high coarse fragment content
R010XA020ID	Mixed Shrub 12-16 PZ Adjacent low slope areas with shallow soils
R010XA023ID	Loamy 12-16 PZ ARTR4/FEID Adjacent low slope areas with deeper soils
R010XA042ID	Loamy Bottom 12-16 PZ LECI4 Adjacent bottomlands with less than 8% slope

Similar sites

R010XA020ID	Mixed Shrub 12-16 PZ Shallow rather than very shallow soils
R010XA002ID	Clayey 12-16 PZ ARTR4/PSSPS Soils are stony
R010XA049ID	Gravelly Loam 12-16 PZ ARTRV-PUTR2/PSSPS Moderately deep soils

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia arbuscula</i>
Herbaceous	(1) <i>Poa secunda</i>

Physiographic features

This site occurs on undulating to hilly slopes. These sites are also associated with basalt and lava tablelands and benches. Slopes range from 3 to 25 percent and occur on all aspects. Elevation ranges from 5,000 to 7,000 feet (1500 to 2150 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Plateaus or tablelands > Plateau
Flooding frequency	None
Ponding frequency	None
Elevation	1,524–2,134 m
Slope	3–25%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Climatic features

The Big and Little Wood River Footslopes and Plains, proposed as MLRA 10A, 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. 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)	305-406 mm
Frost-free period (actual range)	
Freeze-free period (actual range)	
Precipitation total (actual range)	305-457 mm
Frost-free period (average)	86 days
Freeze-free period (average)	120 days
Precipitation total (average)	406 mm

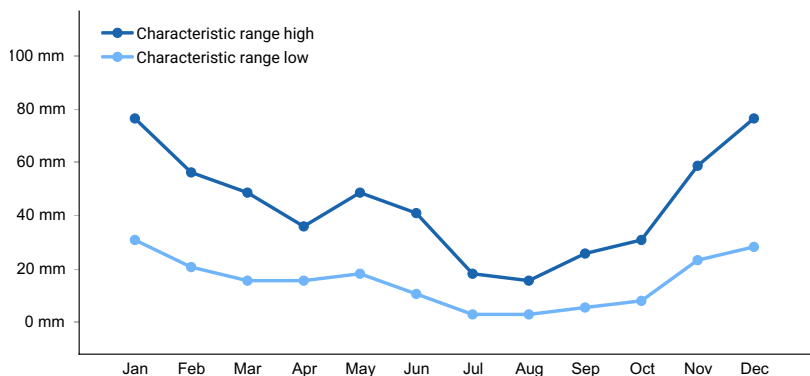


Figure 1. Monthly precipitation range

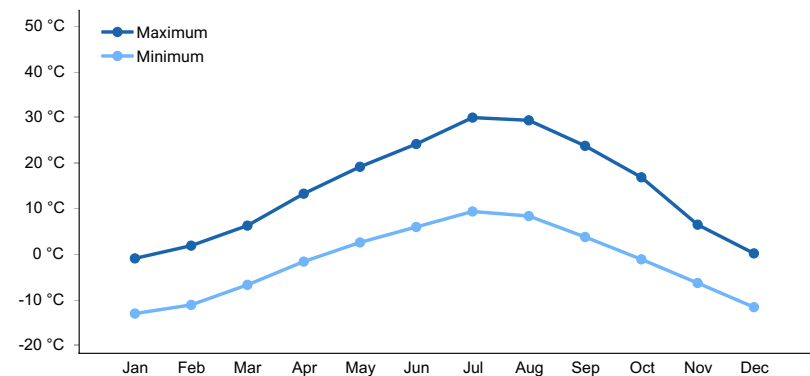


Figure 2. Monthly average minimum and maximum temperature

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 supporting this site are very shallow, well or somewhat excessively drained, with moderate to slow permeability above bedrock. Runoff is low to very high. The erosion hazard is slight by water and slight by wind. The available water holding capacity (AWC) is very low. These soils are usually less than 10 inches deep to

bedrock. The surface texture is generally loam or coarse sandy loam with significant surface stones.

Table 4. Representative soil features

Parent material	(1) Colluvium—volcanic rock (2) Residuum—volcanic rock
Surface texture	(1) Stony loam (2) Very stony sandy loam
Family particle size	(1) Ashy-skeletal
Drainage class	Well drained to somewhat excessively drained
Permeability class	Slow to moderate
Soil depth	0–25 cm
Surface fragment cover ≤3"	0–15%
Surface fragment cover >3"	15–60%
Available water capacity (0–101.6cm)	0–2.54 cm
Soil reaction (1:1 water) (0–101.6cm)	6.1–7.8
Subsurface fragment volume ≤3" (10.2–152.4cm)	0–15%
Subsurface fragment volume >3" (10.2–152.4cm)	15–60%

Ecological dynamics

The dominant visual aspect of this site is mixed grass and low sagebrush. Composition by weight is approximately 65 to 75 percent grasses, 10 to 15 percent forbs, and 15 to 20 percent shrubs.

During the last few thousand years, this site has evolved in a semi-arid climate characterized by warm, dry summers and cold, wet winters. Herbivory has historically occurred on the site at low levels of utilization. Herbivores include pronghorn antelope, mule deer, sage grouse, lagomorphs, and small rodents. Fire has historically occurred on this site every 100 to 125 years. Fire occurs only in years with above normal precipitation.

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 livestock grazing in late spring and early fall. This site provides fair to good habitat for various upland wildlife species. Mule deer, pronghorn, feral horses, Rocky Mountain elk, and sage grouse make use of the site throughout the year.

This site can be degraded easily by improper grazing management since slopes are moderate, allowing easy access. Inherent low production on the site makes it susceptible to accelerated degradation.

Trampling as a result from early spring grazing by uncontrolled feral horses or cattle can cause severe damage to the understory if the grazing occurs when the soils are wet.

Infiltration and production can be maintained with a mixed stand of bunchgrasses and shrubs. Runoff potential is rapid to very rapid and the erosion hazard is moderate to high.

Impacts on the Plant Community:

Influence of fire:

This site historically had a very low fire frequency, approximately every 100 to 125 years. Most of the shrubs evolved in the absence of fire, therefore they can be severely damaged or killed when burned. Rabbitbrush species can increase with fire. Cheatgrass and medusahead can be troublesome invaders on this site after fire, preventing perennial grass and shrub re-establishment and increasing the fire frequency. Sandberg bluegrass is usually maintained in the community.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be detrimental to this site. This type of management leads to reduced vigor of deep-rooted perennial bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in low sagebrush and Sandberg bluegrass. Once Sandberg bluegrass becomes strongly dominant, reestablishment of more productive grasses such as Thurber's needlegrass may take a long period of time and may even require thinning of low sagebrush with fire or chemicals.

Continued improper grazing management influences fire frequency by increasing 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 maintain the integrity of the plant community. It can also keep fine fuels from developing, thereby reducing fire frequency.

Early spring grazing by uncontrolled feral horses or cattle can cause severe trampling damage to the understory if these animals are present when the soils are wet.

Weather influences:

Above normal precipitation in March, April, and May 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 very shallow soil. Extended drought reduces vigor of the perennial grasses and shrubs. Extreme drought may cause plant mortality. Prolonged drought can lead to a reduction in fire frequency.

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.

Influence of noxious and invasive plants:

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

Influence of wildlife:

Relatively low numbers of wildlife use this site with little adverse impact. Pronghorn antelope is the dominant large herbivore using 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. Sage grouse, mule deer, and Rocky Mountain elk may also use the site during the winter.

Watershed:

Decreased infiltration and increased runoff on slopes greater than 10 percent occur when low sagebrush is removed with frequent fires, particularly the year following the fire event. The increased runoff also increases sheet and rill

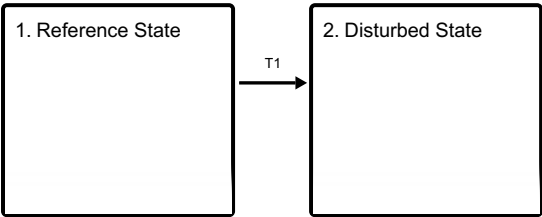
erosion. The long-term effect is a transition to a different state.

Practice Limitations.

Moderate limitations exist for implementing vegetative management practices. Early spring grazing should be avoided due to prolonged wetness in the soil. The stones on the surface and any associated outcrops inhibit animal movement. Moderate to severe limitations exist for implementing facilitating practices on this site. Shallow and stony soils and slopes greater than 20% present severe limitations for range seeding by ground moving equipment and is not generally economically feasible due to low production potential of the site.

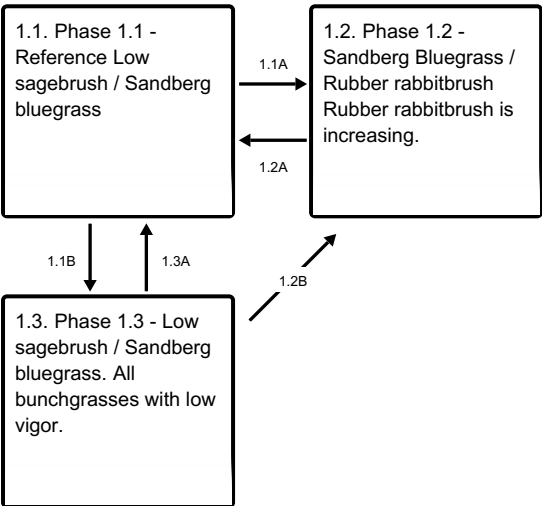
State and transition model

Ecosystem states



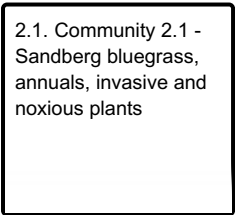
T1 - improper grazing management and fire

State 1 submodel, plant communities



- 1.1A - fire
- 1.1B - improper grazing management and no fire.
- 1.2A - prescribed grazing management and no fire.
- 1.3A - prescribed grazing management and no fire
- 1.2B - fire

State 2 submodel, plant communities



State 1
Reference State

Dominant plant species

- little sagebrush (*Artemisia arbuscula*), shrub
- Sandberg bluegrass (*Poa secunda*), grass

Community 1.1

Phase 1.1 - Reference Low sagebrush / Sandberg bluegrass

The Reference Plant Community Phase is Phase 1.1. This plant community is dominated by low sagebrush and Sandberg bluegrass. Subdominant species include bluebunch wheatgrass, Thurber's needlegrass, bottlebrush squirreltail, snow buckwheat, and prickly phlox. A large variety of forbs are present but each represents a small amount in the community. Other shrubs such as rubber rabbitbrush and antelope bitterbrush can be present in small amounts. The plant species composition of Phase 1.1 is listed later under "Reference Plant Community Phase Plant Species Composition". The natural fire frequency is about 100 to 125 years.

Resilience management. The Reference Plant Community of this site is dominated by Sandberg bluegrass and low sagebrush. Subdominant species include bluebunch wheatgrass, Thurber's needlegrass, bottlebrush squirreltail, snow buckwheat, and prickly phlox. Total annual production is 200 pounds per acre (224 Kg/ha) in a normal year. Production in a favorable year is 300 pounds per acre (336 Kg/ha). Production in an unfavorable year is 125 pounds per acre (140 Kg/ha). Structurally, cool season shallow rooted perennial bunchgrasses are very dominant, followed by medium height shrubs while perennial forbs and deep rooted bunchgrasses are co-dominant.

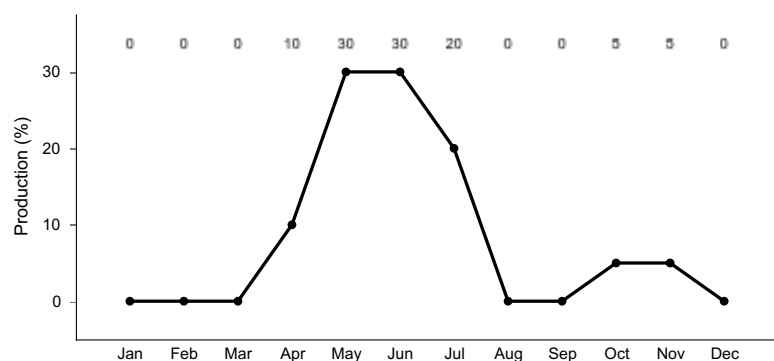


Figure 3. Plant community growth curve (percent production by month). ID0313, POPR/ARLU. State 2.

Community 1.2

Phase 1.2 - Sandberg Bluegrass / Rubber rabbitbrush Rubber rabbitbrush is increasing.

This plant community is dominated by Sandberg bluegrass. Small amounts of bottlebrush squirreltail, a variety of forbs, and rubber rabbitbrush can be present. This phase has developed due to fire (1.1A).

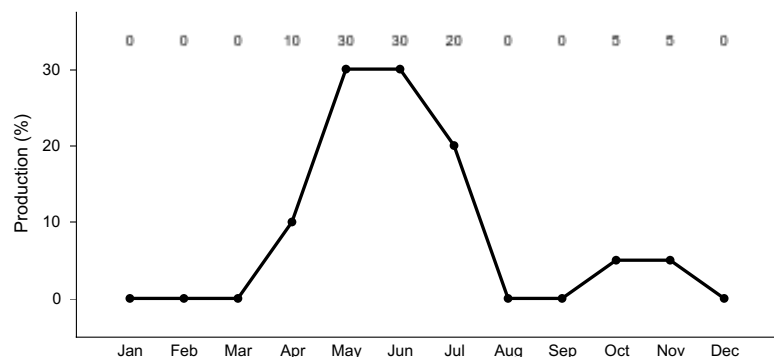


Figure 4. Plant community growth curve (percent production by month). ID0313, POPR/ARLU. State 2.

Community 1.3

Phase 1.3 - Low sagebrush / Sandberg bluegrass. All bunchgrasses with low vigor.

This plant community is dominated by low sagebrush with Sandberg bluegrass in the understory. Thurber's needlegrass and other deep-rooted perennial bunchgrasses are present but in reduced amounts and in low vigor.

This phase has developed due to improper grazing management and no fire (1.1B).

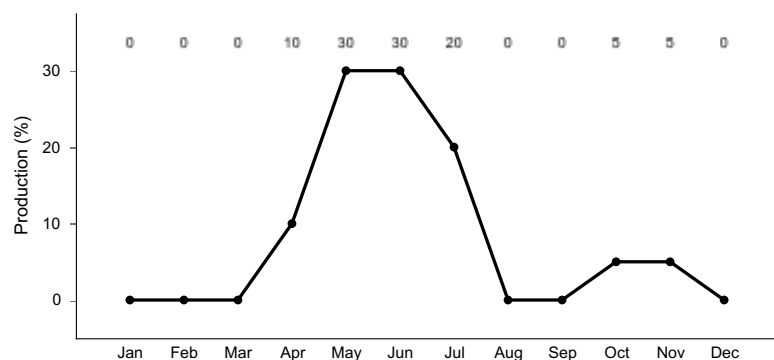


Figure 5. Plant community growth curve (percent production by month).
ID0313, POPR/ARLU. State 2.

Pathway 1.1A **Community 1.1 to 1.2**

Plant Community Phase 1.1 to 1.2 (1.1A). Develops with fire. Fire only occurs with above normal precipitation about every 100-125 years.

Pathway 1.1B **Community 1.1 to 1.3**

Plant Community Phase 1.1 to 1.3 (1.1B). Develops under improper grazing management and no fire.

Pathway 1.2A **Community 1.2 to 1.1**

Plant Community Phase 1.2 to 1.1 (1.2A). Develops under prescribed grazing management program and no fire.

Pathway 1.3A **Community 1.3 to 1.1**

Plant Community Phase 1.3 to 1.1 (1.3A). Develops from prescribed grazing management and no fire.

Pathway 1.2B **Community 1.3 to 1.2**

Plant Community Phase 1.3 to 1.2 (1.3B). Develops with fire.

State 2 **Disturbed State**

Dominant plant species

- Sandberg bluegrass (*Poa secunda*), grass
- cheatgrass (*Bromus tectorum*), grass
- medusahead (*Taeniatherum caput-medusae*), grass

Community 2.1 **Community 2.1 - Sandberg bluegrass, annuals, invasive and noxious plants**

Sandberg bluegrass, annuals, invasive and noxious plants 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/or frequent fire (T1B) from Phase 1.2, State 1 or with improper grazing management and frequent fire (T1A) from Phase 1.3, State 1. Some soil loss has occurred.

Resilience management. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and fire causes 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.

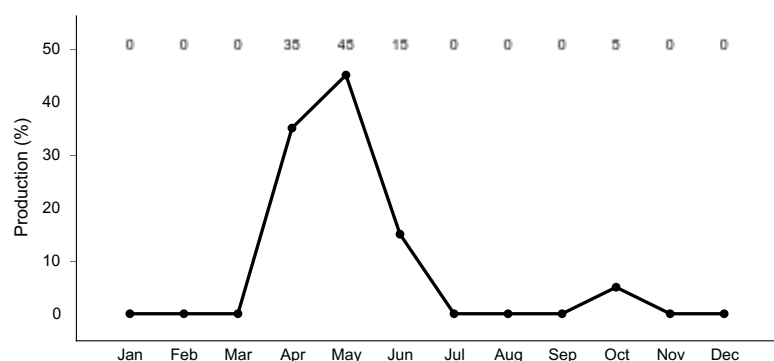


Figure 6. Plant community growth curve (percent production by month).
ID0309, POSE/ANNUALS. State 2.

Transition T1 State 1 to 2

State 1, Phase 1.3 to State 2 (T1A). Results from continued improper grazing management and frequent fire. State 1, Phase 1.2 to State 2 (T1B). Results from continued improper grazing management and/or frequent fire. 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. Large herbivore use is dominated by mule deer, pronghorn antelope, and elk. Low sagebrush and antelope bitterbrush provide important winter forage for the large herbivores. The site provides important seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, western rattlesnake, shrews, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. Sage-grouse utilize the site on a seasonal basis. In isolated areas encroachment of noxious and invasive plant species (cheatgrass and medusahead) can replace native plant species which provide critical feed, brood-rearing and nesting cover for a variety of native wildlife. Water features are sparse provided by seasonal streams, artificial water catchments and springs.

State 1 Phase 1.1 – Low Sagebrush/ 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, 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. Critical habitat (leks, winter cover and winter food) for sage grouse is provided by this diverse plant community. Low sagebrush is a preferred winter food for sage-grouse. The plant community provides seasonal (spring, fall and winter) forage needs for large mammals including mule deer, antelope, and elk. A diverse small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots utilize this ecological site.

State 1 Phase 1.2 - Sandberg Bluegrass/ Rubber Rabbitbrush Plant Community: This plant community 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 similar to Phase 1.1. An increase in rabbitbrush would enhance fall seasonal pollinator habitat. Diversity and populations of reptiles would be limited or excluded due to the loss of shrub cover. The dominance of herbaceous vegetation with little sagebrush canopy cover would

prevent the 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 adjacent to suitable sagebrush cover. Winter cover and winter food for sage-grouse is eliminated. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer, antelope, and elk) use would be seasonal but the site offers little thermal cover and young of year cover. Small mammal diversity would be reduced and be dominated by species reliant on grass cover.

State 1 Phase 1.3 – Low Sagebrush/ Sandberg Bluegrass Plant Community:

This phase has developed due to improper grazing management and no fire. An increase in canopy cover of sagebrush contributes to a sparse herbaceous understory. Grasses, forbs and shrubs, are used by native insects that assist in pollination but the reduced herbaceous understory results in reduced diversity and numbers of insects. The reptile community is represented by leopard lizard, short horned lizard, sagebrush lizard, western rattlesnake and western skink. The reduced diversity of insects will reduce reptile diversity. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Shrub-steppe avian obligates include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Critical habitat (winter cover and winter food) for sage-grouse is available. The reduced vigor of herbaceous understory shortens seasonal forage habitat for mule deer, antelope, and elk. The small mammal population would be similar to Phase 1.1 including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots.

State 2 - Sandberg Bluegrass/ Cheatgrass/ Medusahead/ Forbs Plant Community:

This plant community has developed due to improper grazing management and/or frequent fire. The plant community does not support a diverse insect community. The reduced forb and shrub component in the plant community would support a very limited population of pollinators supported by the availability of invasive and noxious forbs. Diversity and populations of reptiles would be limited or excluded due to the loss of shrub cover. The plant community does not support the habitat requirements for sage-grouse, sage thrasher, Brewer's sparrow or sage sparrow. Diversity of grassland avian species is reduced due to poor cover and reduced prey species. 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 populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

Grazing Interpretations.

This site is most suitable for livestock grazing in late spring and early fall.

Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use, and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

The soils on this site are in hydrologic group D. They have high run-off potential.

Recreational uses

This site is used for hunting, horseback riding, and hiking. The site provides some diversity to the landscape. Colorful flowers blooming in the late spring and early summer provide excellent opportunities for photography and nature study.

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

Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho

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Leah Juarros, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Butte County, ID

References

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

Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number "35".

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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	06/24/2009
Approved by	Kirt Walstad
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 gravelly and stony surface. If they do occur it will normally be on slopes greater than 10%.

2. **Presence of water flow patterns:** water-flow patterns are normally not present on this site. When they do occur they are short and disrupted by cool season grasses, shrubs, and surface stones. They are not extensive.

3. **Number and height of erosional pedestals or terracettes:** pedestals can occur on the site. They are most likely to occur where water-flow patterns are present and surface stones are absent. Terracettes are rare.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** ranges from 20-30 percent but more data is needed.

5. **Number of gullies and erosion associated with gullies:** does not occur.

6. **Extent of wind scoured, blowouts and/or depositional areas:** blowouts and depositional areas are usually not present. Immediately following wildfire some soil movement may occur on lighter textured soils.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter moves by wind or water. Fine litter can move up to 2 feet after a strong summertime convection storm. Due to the relatively flat slopes, large litter does not move.

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.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** structure ranges from weak, moderate and strong fine granular. Soil organic matter (SOM) ranges from 1 to 4 percent. The A or A1 horizon is typically 3 to 5 inches thick.
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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 runoff and increase infiltration. Shrubs accumulate little snow in the interspaces since the site occurs on or near ridgetops.
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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: cool season shallow-rooted perennial bunchgrasses
- Sub-dominant: medium shrubs
- Other: perennial forbs deep rooted bunchgrasses
- 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):** is 200 pounds per acre (336 Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 65-75 percent of the total production, forbs 10-15 percent and shrubs 15-20 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, *Vulpia* species, bulbous bluegrass, and annual mustards.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in favorable years.

