USDA Natural Resources Conservation Service

Ecological site R010XA008ID
North Slope Loamy 16-22 PZ

Last updated: 12/13/2023
Accessed: 07/27/2024

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): 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 with higher elevations reaching 9250 feet on the northern fringe of the MLRA. 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. Higher elevations on the northern fringe of this MLRA receive upwards of 41 inches in precipitation. These areas are the foothills and lower mountain side slopes as the MLRA transitions into MLRA 43C.
These factors support plant communities with trees and shrub-grass associations with considerable acreage of sagebrush grassland. 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.

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 vaseyana/ Festuca idahoensis ht. 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 greater than 30% on northerly aspects
- Site occurs in 16-22 PZ
- Soils are deep and loamy
- Site occurs at an elevation between 5000-8800 ft

Associated sites

R010XA011ID	**Clayey North 16-22 PZ** Adjacent north slopes with shallower soils
R010XA014ID	**Steep South Slope 16-22 PZ** Adjacent south aspects with 45% or greater slopes

R010XA015ID	**South Slope Loamy 16-22 PZ** Adjacent south aspects with under 45% slopes
R010XA016ID	**Quaking Aspen 20+ PZ POTR5** Adjacent moisture accumulating depressions supporting aspen communities

Similar sites

R010XA010ID	**North Slope Fractured 16-22 PZ** Soils are <20” to fractured bedrock or clay. Roots penetrate below 20”.
R010XA011ID	**Clayey North 16-22 PZ** Soils are <20” to unfractured bedrock. Roots do not penetrate below 20”.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. vaseyana*
Herbaceous	(1) *Festuca idahoensis*

Physiographic features

This site occurs on mountain sides on north, east and northwest facing exposures with slopes of 20 to 60 percent slopes. The elevation ranges from 5000 to 8800 feet (1515 to 2666 meters).

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–8,800 ft
Slope	20–60%
Water table depth	80 in
Aspect	NW, N, NE, E

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. However, the northern fringe receives upwards of 41 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 60 to 85 days. The freeze-free period is a bit longer: 80 to 105 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)	60-85 days
Freeze-free period (characteristic range)	80-105 days
Precipitation total (characteristic range)	16-22 in
Frost-free period (average)	70 days

Freeze-free period (average)	98 days
Precipitation total (average)	18 in

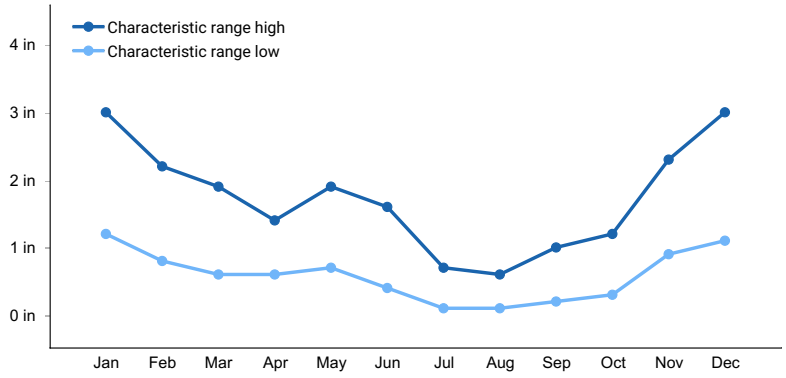


Figure 1. Monthly precipitation range

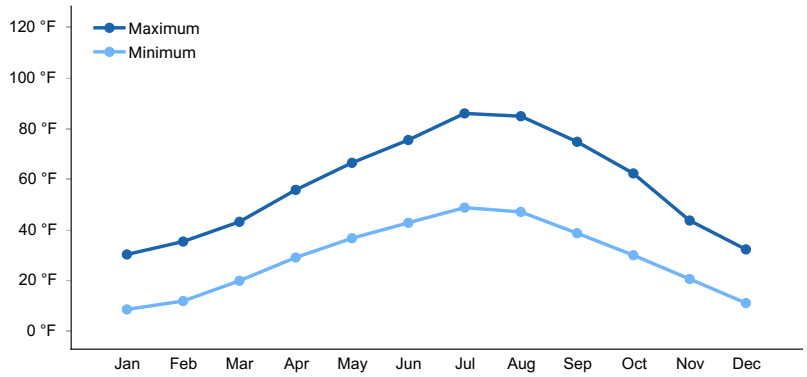


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils are dark colored, gravelly loams, gravelly silt loams, and clay loams and are over 40 inches deep. The subsoils are loams or clay loams which have varying amounts of coarse fragments. The soils are derived from volcanic, metasedimentary, or granitic materials. Infiltration and internal water movement is good. The available water holding capacity (AWC) is moderate. Erosion hazard is low to moderate when the vegetation is scarce or removed.

Table 4. Representative soil features

Parent material	(1) Colluvium–welded tuff (2) Alluvium–quartzite (3) Volcanic ash–volcanic breccia
Surface texture	(1) Gravelly loam (2) Very gravelly coarse sandy loam (3) Cobbly sandy loam
Family particle size	(1) Loamy-skeletal (2) Fine-loamy (3) Coarse-loamy
Drainage class	Well drained
Permeability class	Slow to moderately rapid

Soil depth	20–60 in
Surface fragment cover <=3"	0–30%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	2.4–7.3 in
Soil reaction (1:1 water) (0-40in)	5.6–7.8
Subsurface fragment volume <=3" (4-60in)	0–40%
Subsurface fragment volume >3" (4-60in)	0–25%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is mountain big sagebrush with Idaho fescue in the understory. Composition by weight is approximately 45 to 55 percent grasses, 20 to 30 percent forbs, and 20 to 25 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, Rocky Mountain elk, and lagomorphs.

Fire has historically occurred on the site at intervals of 20 to 50 years.

The Reference State, historically 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, summer, and fall grazing by livestock. The site can be used by big game in the spring, summer, and fall for food and cover. It is also suited for recreation use in the spring, summer, and fall.

Due to the limited access on steeper slopes and relatively high production, 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 these adjoining lands. Infiltration is good where the plant community has a good shrub component. 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, mountain 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 (20-50 years), mountain big sagebrush and bitterbrush are reduced significantly. Rabbitbrush and other root sprouting shrubs can increase slightly. With continued short fire frequency, mountain big sagebrush and bitterbrush can be completely eliminated along with many of the desirable understory species such as Idaho fescue, bluebunch wheatgrass 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 species. Cheatgrass and bulbous bluegrass will invade the site. These fine fuels will increase the fire frequency. Threetip sagebrush may increase if present in the community.

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 reducing vigor of the bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to increase in tall shrubs and noxious and invasive plants. Threetip sagebrush may increase if present in the community.

Continued improper grazing management influences fire frequency by increasing fine fuels. If cheatgrass and/or medusahead increase due to improper grazing management and they become co-dominant with Sandberg bluegrass and other annuals, fires become 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 mountain big sagebrush and tall shrubs. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Prescribed burning should be carefully planned as threetip sagebrush and cheatgrass can increase significantly. If this were to occur, fire frequency would increase.

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 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. Snow mold can reduce vigor of mountain big sagebrush in some years.

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, summer, and fall. 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:

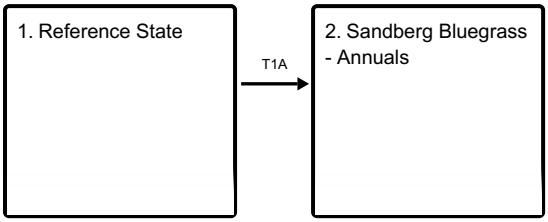
Decreased infiltration and increased runoff occur with an increase in mountain big sagebrush. Desired understory species can be reduced. This composition change can affect nutrient and water cycles. Increased runoff also causes sheet and rill erosion. Abnormally short fire frequency also gives the same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

Practice Limitations:

Severe limitations exist for brush control and seeding on this site with ground moving equipment due to steep slopes. Slight to moderate limitations exist for implementing vegetation management and facilitating practices.

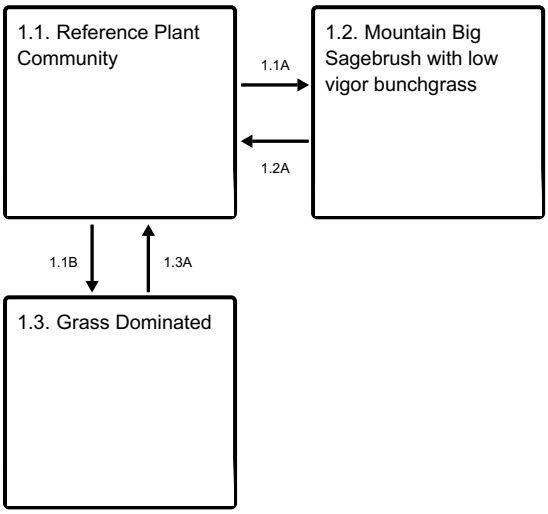
State and transition model

Ecosystem states



T1A - frequent fire, improper grazing management

State 1 submodel, plant communities



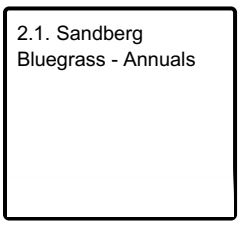
1.1A - improper grazing management, in the absence of fire

1.1B - fire

1.2A - prescribed grazing and brush management

1.3A - prescribed grazing and no fire

State 2 submodel, plant communities



State 1
Reference State

Dominant plant species

- mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), shrub
- Idaho fescue (*Festuca idahoensis*), grass

Community 1.1
Reference Plant Community

This plant community is dominated by mountain big sagebrush and Idaho fescue. Bluebunch wheatgrass is the subdominant grass. Major forbs include arrowleaf balsamroot, lupine, tapertip hawksbeard, and geranium. Antelope bitterbrush is present in the plant community. A wide variety of other grasses, forbs and shrubs can occur in minor amounts. Natural fire frequency is 20 to 50 years.

Resilience management. The Reference State is Phase 1.1. This plant community is dominated by mountain big sagebrush and Idaho fescue. Bluebunch wheatgrass is the subdominant grass. Major forbs include arrowleaf balsamroot, lupine, tapertip hawksbeard, and geranium. Antelope bitterbrush is present in the plant community. A wide variety of other grasses, forbs and shrubs can occur in minor amounts. The plant species composition of Phase 1.1 is listed later under “Reference Plant Species Composition”. Total annual production is 1300 pounds per acre (1456 kilograms per hectare) in a normal year. Production in a favorable year is 1625 pounds per acre (1820 kilograms per hectare). Production in an unfavorable year is 1000 pounds per acre (1120 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are dominant, followed by perennial forbs being slightly more dominant than tall shrubs while shallow rooted perennial bunchgrasses are subdominant.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	500	650	825
Forb	275	350	425
Shrub/Vine	225	300	375
Total	**1000**	**1300**	**1625**

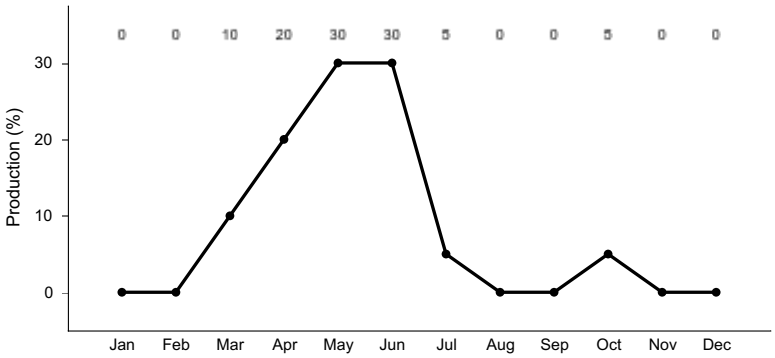


Figure 4. Plant community growth curve (percent production by month). ID0904, ARTRW8/PSSPS/ACTH7 HIGH PRECIP.

Community 1.2
Mountain Big Sagebrush with low vigor bunchgrass

This plant community is dominated by mountain big sagebrush with reduced amounts of Idaho fescue, bluebunch wheatgrass and other deep-rooted perennial bunchgrasses. Sandberg bluegrass and bottlebrush squirreltail have increased in the understory. All deep-rooted perennial bunchgrasses are typically in low vigor. Mountain big sagebrush has increased as well as some other tall shrubs. Antelope bitterbrush is present but in reduced vigor and may be hedged. This state has developed due to improper grazing management and lack of fire. Some cheatgrass, bulbous bluegrass and/or medusahead may have invaded the site.

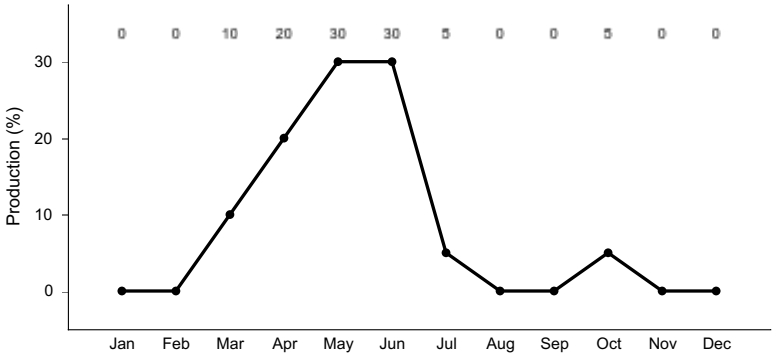


Figure 5. Plant community growth curve (percent production by month). ID0904, ARTRW8/PSSPS/ACTH7 HIGH PRECIP.

Community 1.3
Grass Dominated

This plant community is dominated by bluebunch wheatgrass with some basin wildrye and tall root-sprouting shrubs. Idaho fescue can be lost due to fire. Bottlebrush squirreltail has increased. Forbs remain about in the same proportion as Plant Community 1.1. Mountain big sagebrush and antelope bitterbrush have been reduced significantly due to wildfire. Some cheatgrass, bulbous bluegrass and/or medusahead may have invaded the site. This plant community is the result of wildfire.

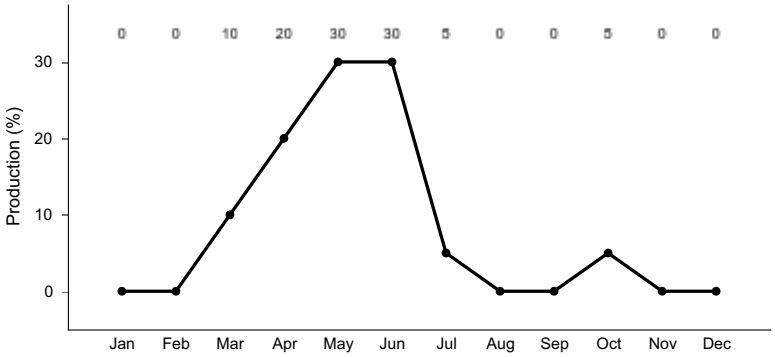


Figure 6. Plant community growth curve (percent production by month). ID0904, ARTRW8/PSSPS/ACTH7 HIGH PRECIP.

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 brush management.

Pathway 1.3A
Community 1.3 to 1.1

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

State 2

Sandberg Bluegrass - Annuals

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 not economically practical to return this plant community to State 1 with accelerating practices.

Dominant plant species

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

Community 2.1
Sandberg Bluegrass - Annuals

This plant community is dominated by Sandberg bluegrass, cheatgrass, bulbous bluegrass and /or other annuals. Root sprouting shrubs such as rabbitbrushes and mountain snowberry can be present, dependent upon, how frequent, fire has occurred. Some soil loss has occurred. This state has developed due to frequent fires and/or improper grazing management. This site has crossed the threshold. It is not economically practical to return this plant community to State 1 with accelerating practices.

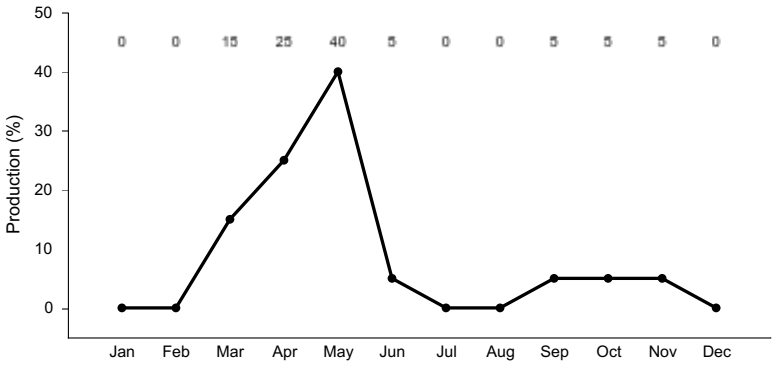


Figure 7. Plant community growth curve (percent production by month). ID0911, D25 POSE/BRTE/ANNUALS.

Transition T1A
State 1 to 2

State 1, Phase 1.2 to State 2. Develops through frequent fire and/or improper grazing management. State 1, Phase 1.3 to State 2. Develops through frequent fire and/or improper grazing management. This site has crossed the threshold. It is not economically practical to return this plant community to State 1 with accelerating practices.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				500–825	
	Idaho fescue	FEID	*Festuca idahoensis*	300–500	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	125–200	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	25–50	–
	wood bluegrass	PONE	*Poa nemoralis*	1–30	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–10	–
	basin wildrye	LECI4	*Leymus cinereus*	0–10	–
	oniongrass	MEBU	*Melica bulbosa*	0–10	–

	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	0–10	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	0–10	–
	mountain brome	BRMA4	*Bromus marginatus*	0–10	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–10	–
	squirreltail	ELEL5	*Elymus elymoides*	0–10	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–10	–
Forb					
2				275–425	
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	75–125	–
	lupine	LUPIN	*Lupinus*	50–100	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	30–60	–
	geranium	GERAN	*Geranium*	25–50	–
	beardtongue	PENST	*Penstemon*	1–15	–
	buckwheat	ERIOG	*Eriogonum*	1–15	–
	Indian paintbrush	CASTI2	*Castilleja*	1–15	–
	pale agoseris	AGGL	*Agoseris glauca*	0–15	–
	nettleleaf giant hyssop	AGUR	*Agastache urticifolia*	0–10	–
	onion	ALLIU	*Allium*	0–10	–
	aster	ASTER	*Aster*	0–10	–
	milkvetch	ASTRA	*Astragalus*	0–10	–
	longleaf phlox	PHLO2	*Phlox longifolia*	0–10	–
	cinquefoil	POTEN	*Potentilla*	0–10	–
	Idaho blue-eyed grass	SIID	*Sisyrinchium idahoense*	0–10	–
	alumroot	HEUCH	*Heuchera*	0–10	–
	oneflower helianthella	HEUN	*Helianthella uniflora*	0–10	–
	hawkweed	HIERA	*Hieracium*	0–10	–
	western stoneseed	LIRU4	*Lithospermum ruderale*	0–10	–
	nineleaf biscuitroot	LOTR2	*Lomatium triternatum*	0–10	–
	oblongleaf bluebells	MEOB	*Mertensia oblongifolia*	0–10	–
	common yarrow	ACMI2	*Achillea millefolium*	0–10	–
Shrub/Vine					
3	**Shrubs**			225–375	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	100–150	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	0–50	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	1–50	–
	longrunner	ROSA	*Rorippa sarmentosa*	0–25	–
	currant	RIBES	*Ribes*	0–10	–
	Saskatoon serviceberry	AMAL2	*Amelanchier alnifolia*	0–10	–
	threetip sagebrush	ARTR4	*Artemisia tripartita*	0–10	–
	snowbrush ceanothus	CEVE	*Ceanothus velutinus*	0–10	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–10	–
	Lewis' mock orange	PHLE4	*Philadelphus lewisii*	0–10	–
	chokecherry	PRVI	*Prunus virginiana*	0–10	–

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. The plant community exhibits a diverse mixture of forbs throughout the growing season offering excellent habitat for invertebrates. Wildlife use these areas on a short seasonal basis due to the high elevation, short growing season and temperature regimes. Mule deer and elk are the large herbivores using the site. The rangeland habitat provides seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, shrews, bats, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. Sagebrush obligate avian and mammal species including sage-grouse, Brewer's sparrow, sage thrasher and pika utilize these sites on a limited basis, due to the high elevation and associated cold temperatures throughout much of the year. Sage-grouse, an area sensitive species, may utilize the sagebrush plant community as winter and brood-rearing habitat. A change in the quality of the historic plant community over time can reduce the numbers and diversity of native wildlife species in the area. Encroachment of noxious and invasive plant species (i.e. cheatgrass and medusahead) in isolated areas have replaced native plant species which provide critical feed, brood-rearing and nesting cover for a variety of native wildlife. The loss of herbaceous understory vegetation has had a negative impact on ground nesting birds, while the loss of shrub cover has negatively affected both ground and shrub nesting avians. Water features are sparse provided by seasonal streams, artificial water catchments and springs.

State 1 Phase 1.1 – Mountain Big Sagebrush/ Idaho Fescue/ Bluebunch Wheatgrass/ Antelope Bitterbrush Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs and shrubs, used by native insect communities that assist in pollination. An extensive array of forbs is represented throughout the growing season leading to a diverse insect community. Many avian and mammal species utilize this habitat based on the availability of invertebrate prey species. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, 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 hydrology would preclude the use of these sites by amphibians. Native shrub-steppe obligate avian species utilizing the habitat include the Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Sage-grouse may utilize this plant community on a limited basis for winter and brood-rearing habitat due to the sites high elevation. The plant community provides seasonal forage needs for large mammals including mule deer and elk. A diverse small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots utilize this community. Pikas may utilize the site if adjacent to rocky open areas. Habitat for the pygmy rabbit would be marginal due to gravelly soils, steepness and high elevation. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.2- Mountain Big Sagebrush/ Bottlebrush Squirreltail/ Sandberg Bluegrass/ Antelope Bitterbrush Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy of sagebrush and antelope bitterbrush contributes to a sparse herbaceous understory. Native insects assist in pollination but the reduced herbaceous understory results in reduced diversity and numbers of insects. The reptile community represented by leopard lizard, short horned lizard, sagebrush lizard and western skink would decline in diversity and population due to the reduction of available prey species and cover. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collected all available water would exclude the use of amphibians on these sites. This plant community supports a less diverse variety of migratory and resident avian species with the reduced understory vegetation. Few prey species and less understory cover results in poor food, brood rearing and nesting habitat. Key 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 plant community supports limited seasonal habitat for large mammals including mule deer, and elk. A small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots utilize these areas. Pikas may be present in areas with adjacent open rocky habitat. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.3 – Bluebunch Wheatgrass/ Bottlebrush Squirreltail Plant Community Plant Community: This plant community is the result of fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush or antelope bitterbrush would provide less vertical structure for animals. Insect diversity would be reduced but a diverse native forb plant community would still support select pollinators. The reptiles including short

horned lizard and sagebrush lizard would be limited or excluded due to the loss of sagebrush. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collected all available water would exclude the use of amphibians on these sites. The dominance of herbaceous vegetation with little sagebrush canopy would prevent use of these areas as nesting habitat by Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. This plant community provides limited brood-rearing habitat for sage-grouse when adjacent sagebrush cover is provided. Use as winter cover and winter food by sage- grouse is eliminated. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer, and elk) use for forage would be seasonal and 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 – Sandberg Bluegrass/ Cheatgrass/ Bulbous Bluegrass/ Annuals Plant Community:
This plant community is the result of continued improper grazing management and/or frequent fire. Invasive herbaceous plants and patches of root sprouting shrubs like rabbitbrushes and mountain snowberry can be present. 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. Most reptilian species are not supported with food, water or cover. This 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 available food. 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 diversity and populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

Grazing Interpretations.

The site is best used by livestock in the late spring, summer, and fall. The steep slopes can limit some access by livestock.
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.

Hydrological functions

The hydrologic condition of rangelands is the result of complex interrelationships of soil, vegetation, topography and climate. The hydrology of this site is characterized by low intensity frontal storms from October through April, and occasional high intensity thunderstorms during summer and early fall. About 60 to 70 percent of the precipitation falls as snow, and the site has snow cover during most of the winter. Productive mountain big sagebrush sites at elevations ranging from 5,000 to 8,800 feet generate most runoff from snowmelt. The site is typically protected by vegetation when snowmelt and runoff occur, from late spring through summer. Shallow subsurface flow to drainages, especially on steeper slopes, is common. Runoff averages about 10-15% of the annual water budget, but this is quite variable from year to year. Ponding and flooding generally do not occur on this site. Run-on from adjacent sites normally does not occur.

State 1, Phase 1.1.
In Reference, the majority of rainfall and snowmelt infiltrates into the soil profile and the erosion potential is very low. Shrub canopy zones (coppices) generally have higher rates of infiltration than shrub interspaces because of differences in soil morphology, organic matter and surface litter cover. Moss and lichens dominate most coppices as ground cover. Interspaces between shrubs have sufficient aerial and ground cover in HCPC to protect the site from runoff and erosion. Moss in the sagebrush understory is a good indicator of proper hydrologic function. Dominance of bunchgrasses (especially Idaho fescue) in the stand is also an indicator of good hydrologic condition. When soil surface condition is dry, and undecomposed litter biomass is great, water repellency can develop on lighter textured soils. The bulk of runoff occurs in late spring and early summer and is associated with snowmelt. Event-based runoff increases the potential for soil loss, and modeling indicates that the largest erosion losses will typically occur in early fall. Higher runoff volumes are positively correlated with increasing bare ground and steepness of slope, but

some studies have also shown reduced runoff on steeper slopes due to increased component of subsurface flow. Differences in runoff potential will be dependent on the interaction of site characteristics (soils, slopes, vegetation, and microtopography). Some sediment may be transported off-site with higher runoff volumes. Rill erosion is the dominant process on steeper slopes where erosion is more likely, but sediment is usually deposited on lower slopes and does not reach area streams. Deep percolation (5% of water budget) does not generally occur on these deep soils unless there is greater than average winter snow cover. Good grazing management that addresses frequency, duration, and intensity of grazing can keep fine fuels from developing on these northern slopes, maintain normal levels of litter, and promote the production and vigor of existing native bunchgrasses. Trampling and overgrazing can result in rapid and possibly permanent loss of the cryptogam cover, which can increase the potential for wind erosion, and open crusts are a microenvironment for the establishment of winter annual aliens.

State 1, Phase 1.2.
Increasing sagebrush density and cover, due to the lack of fire or improper grazing management, can be associated with deteriorating hydrologic condition. Increasing water repellency and subsequently higher runoff rates are associated with litter buildup in decadent bitterbrush and Mountain big sagebrush coppice microsites. Repellency typically increases during dry conditions, so that runoff and erosion are more likely to occur from smaller and/or less intense storm events. Studies show increasing cover of sagebrush is typically correlated with greater sediment/runoff ratios when runoff does occur. The loss of vigorous deep-rooted bunchgrasses in conjunction with invading annual grasses will typically increase the seasonal variability of infiltration and runoff as compared to reference. Increasing shrub cover, including taller shrubs, may impact snow hydrology. Greater shrub cover increases the chance of interception loss, but may also increase potential snow accumulation and reduce snowmelt rate. The preponderance of small, low intensity events coupled with greater shrub cover reduces the effective precipitation during the growing season, since the interception loss can be a significant proportion (> 25%) of seasonal precipitation. Brush management (chemical or prescribed burn) should have minimal impact on sagebrush hydrology if other factors remain undisturbed (coppice characteristics remain intact, with little impact on litter cover), and will invigorate native bunchgrasses if managed properly.

State 1, Phase 1.3.
Fire can reduce infiltration, subsurface water recharge and increase runoff and erosion causing reduced site productivity and contributing to water quality impacts in the short term. Runoff can be generated more quickly and in greater volume after fire, leading to erosion and flooding concerns. Fire reduces random roughness and significantly reduces plant cover, litter biomass, and organic matter in the soil surface. The effects of fire on the risk of runoff and erosion will be significant on steeper sites until ground and canopy cover recover. Amount of runoff and erosion will depend on the weather pattern during the recovery period. After fire, water repellency often occurs on the soil surface, with burned coppices being most impacted. Mosaic burn patterns on a pre-fire reference site will somewhat mitigate erosion and runoff effects. Repellency is typically gone after two seasons following fire, and hydrologic function improves as vegetation cover increases. Runoff and erosion on severely burned steep sagebrush landscapes may require more than 3 years to return to background levels. Recovered sites with bluebunch wheatgrass dominating the understory have good hydrologic function. Gradual increases in sagebrush and bitterbrush, along with fine fuels management, will reduce fire frequency over time.

State 2
Litter cover can be reduced by 50% or more, and bare ground can increase significantly immediately following fire. Repeated fires significantly reduce site productivity. Dominance of annual grass and forbs is typical, and is associated with unstable hydrologic conditions. Due to diffuse basal characteristics, annual grasses do not have the capacity to catch and hold sediment like bunchgrass clumps. Heavy stands of annual grasses may contribute to increased infiltration in spring and early summer, but will not have sufficient cover during other times to protect the site. These sites may demonstrate significant variability in infiltration and runoff due to seasonal changes in cover. Snow accumulation may be reduced since there are insufficient shrubs to prevent drifting, and earlier melt-off is probable without shrub cover. Likewise, there is no shrub cover to mitigate the impact of rainfall on soil, which leads to increased soil detachment and availability for transport during high intensity events. Fire risk can be high, especially when conditions are dry. More frequent fires result in increased bare ground conditions which are highly susceptible to water and wind erosion. Repeated cycles of annual grass regeneration and repeated fire can result in severe depletion of the surface soil horizon and organic matter. Reductions in organic matter lead to reduced aggregate stability, reducing infiltration and plant available water, and increasing the risks of runoff and soil loss. Reduced cover and reduced random roughness due to repeated burns provide interconnected flow paths for runoff and associated erosion. Sediment yields increase as rill erosion processes become dominant, even on lower slopes. With improper grazing management, trail areas become compacted, leading to further rilling and gully

creation.

Recreational uses

This site has value for hunting, hiking and horseback riding. There is many opportunities for photography of blooming flowers in the spring and early summer.

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
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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

USDA, NRCS.2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov.). National Plant Data Center, Baton Rouge, LA 70874-4490 USA
USDA, Forest Service, Fire Effects Information Database. 2004. www.fs.fed.us/database/feis

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

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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	03/28/2007
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. If rills are present they are likely to occur immediately following wildfire. Rills are most likely to occur on soils with surface textures of silt loam and clay loam.

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2. **Presence of water flow patterns:** Water Flow Patterns: occur on the site. They occur as short and disrupted flows. They are disrupted by cool season grasses and tall shrubs and are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or Terracettes: are rare on this site. Where flow patterns and/or rills are present, a few pedestals may be expected. Terracettes can occur as deposits behind large bunchgrasses and shrubs. They are not extensive.

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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: On sites in mid-seral status bare ground may range from 20-30 percent.

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

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

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

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil Surface Resistance to Erosion: values should range from 3 to 5 .

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil Surface Loss or Degradation: the A or A1 horizon is typically 5 to 37 inches thick. Structure ranges from weak and moderate fine granular to weak thin platy. Soil organic matter (SOM) ranges from 1 to 6 percent.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant Community Composition and Distribution Relative to Infiltration: bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Tall shrubs accumulate snow in the interspaces.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compaction Layer: not present.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Functional/ Structural Groups: cool season deep-rooted perennial bunchgrasses > perennial forbs >tall shrubs > shallow rooted bunchgrasses.

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Plant Mortality/ Decadence: mountain 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):** Litter Amount: additional litter cover data is needed but is expected to be 20-30 percent to a depth of 0.1 inches. Under mature shrubs litter is >0.5 inches deep and is 90-100 percent ground cover.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production: is 1300 pounds per acre (1456 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 45-55 percent of the total production, forbs 20-30 percent and shrubs 20-25 percent.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not**

invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: Invasive Plants: include cheatgrass, bulbous bluegrass, whitetop, rush skeletonweed, musk and scotch thistle, and diffuse and spotted knapweed.

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