USDA Natural Resources
Conservation Service

Ecological site R010XA004ID
Loamy 12-16 PZ ARTRV/FEID-PSSPS

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. 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 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
• Slope 1-30%, occurring on all aspects
• Soils are greater than 20" deep. Moderately deep to deep.
• Site not associated with recent lava flows
• Soils are not sandy; textures are loams, silt loams and gravelly silt loams.
• Elevation is 4500-6500 ft.

Associated sites

R010XA009ID	**South Slope Gravelly 12-16 PZ** Adjacent gravelly south slopes

R010XA031ID	**Bouldery Loam 12-16 PZ ARTRV/FEID** Adjacent bouldery soils
R010XA037ID	**Shrubby Stony North 12-16 PZ ARTRV/FEID** Adjacent stony north aspects

Similar sites

R010XA023ID	**Loamy 12-16 PZ ARTR4/FEID** Site supports ARTR4 rather than ARTRV, no abiotic criteria identified
R010XA026ID	**Loamy 11-13 PZ ARTRW8/PSSPS** Site supports ARTRW8 rather than ARTRV no abiotic criteria identified
R010XA033ID	**Loamy 11-13 PZ ARTRX/PSSPS** Site supports ARTRX rather than ARTRV no abiotic criteria identified

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata var. vaseyana*
Herbaceous	(1) *Festuca idahoensis* (2) *Pseudoroegneria spicata*

Physiographic features

This site occurs on gently sloping to undulating foothills and alluvial fans. It occurs on all aspects. Slopes vary from 1 to 30 percent. Elevation ranges from 4500 to 6500 feet (1364 to 1970 meters).

Table 2. Representative physiographic features

Landforms	(1) Foothills > Alluvial fan (2) Foothills > Hill
Flooding frequency	None
Ponding frequency	None
Elevation	4,500–6,500 ft
Slope	1–30%
Water table depth	80 in
Aspect	W, NW, N, NE, E, SE, S, SW

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)	12-16 in
Frost-free period (actual range)	
Freeze-free period (actual range)	
Precipitation total (actual range)	12-18 in
Frost-free period (average)	86 days
Freeze-free period (average)	120 days
Precipitation total (average)	15 in

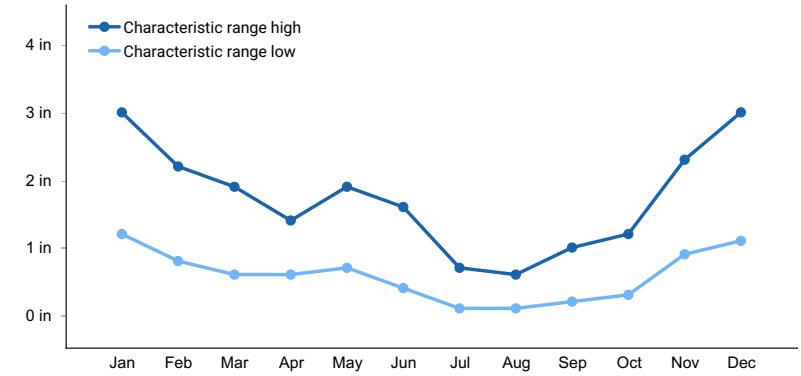


Figure 1. Monthly precipitation range

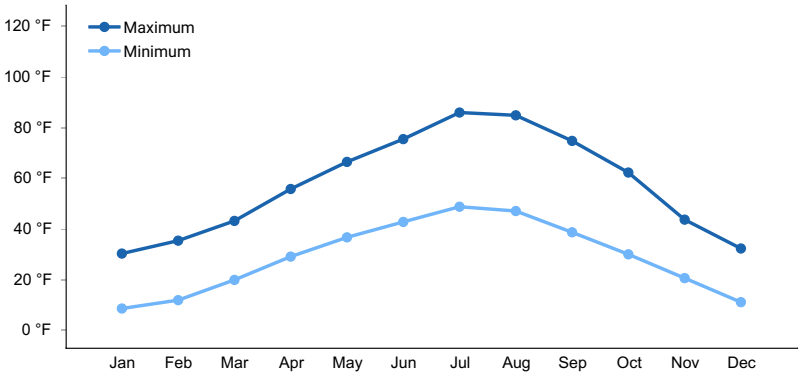


Figure 2. Monthly average minimum and maximum temperature

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

These soils are moderately deep to very deep to lithic or paralithic bedrock or duripan. Textures are loam, gravelly loams or silt loams with clay or clay loam subsoils. Gravels, cobbles, and stones are generally present in the profile. Infiltration and internal water movement is slow to moderate. The available water holding capacity (AWC) is moderate. Erosion by water is low to moderate when vegetation is gone or removed. These soils have a xeric soil moisture regime and a frigid or mesic soil temperature regime.

Table 4. Representative soil features

Parent material	(1) Alluvium–basalt (2) Colluvium–welded tuff (3) Residuum–rhyolite
Surface texture	(1) Stony loam (2) Gravelly silt loam (3) Sandy loam
Family particle size	(1) Fine-loamy (2) Loamy-skeletal
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	20–60 in
Surface fragment cover <=3"	0–35%
Surface fragment cover >3"	0–15%
Available water capacity (0-40in)	1.6–8.3 in
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.6–7.8
Subsurface fragment volume <=3" (4-60in)	0–30%
Subsurface fragment volume >3" (4-60in)	0–30%

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is mountain big sagebrush in the overstory with Idaho fescue and bluebunch wheatgrass in the understory. Composition by weight is approximately 40-50 percent grass, 20-30 percent forbs, and 25-30 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 20-50 years.

The Reference Plant Community 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 well suited for big game in the late spring, summer and fall. It is also well suited for livestock and recreation use in the late spring, summer and fall.

Due to the relatively high rainfall and elevation on this site, it is fairly resistant to disturbances that can potentially degrade the site.

Due to the gentle topography, infiltration is normally high and runoff low. Runoff, when it does occur is non-erosive except during high intensity convection storms. Snow accumulates on the site due to the high elevation and presence of tall shrubs.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, mountain big sagebrush and antelope bitterbrush increases. Grasses and forbs decrease as shrubs increase.

When fires become more frequent than historic levels (20-50 years), mountain big sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, big sagebrush and antelope bitterbrush can be completely eliminated along with many of the desirable understory species such as bluebunch wheatgrass and Idaho fescue. These species may be replaced by cheatgrass, medusahead, bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. These fine fuels will increase the fire frequency. Root sprouting shrubs such as rabbitbrush and mountain snowberry may increase.

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 and possibly bitterbrush. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in mountain big sagebrush and noxious and invasive plants

Continued improper grazing management influences fire frequency by increasing fine fuels. If cheatgrass and/or 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 mountain big sagebrush. A planned grazing system can be developed to intentionally accumulate fine fuels in preparation for a prescribed burn. Any brush management should be carefully planned as a reduction in shrubs without a suitable understory of perennial grasses can lead to an increase in cheatgrass and/or medusahead which will lead to more frequent fire intervals.

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, particularly bitterbrush from western tent caterpillars (Malacosoma fragilis). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available. 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.

Many of the annual and perennial invasive species with deep root systems 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 late 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 years' leader growth.

The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

Watershed:

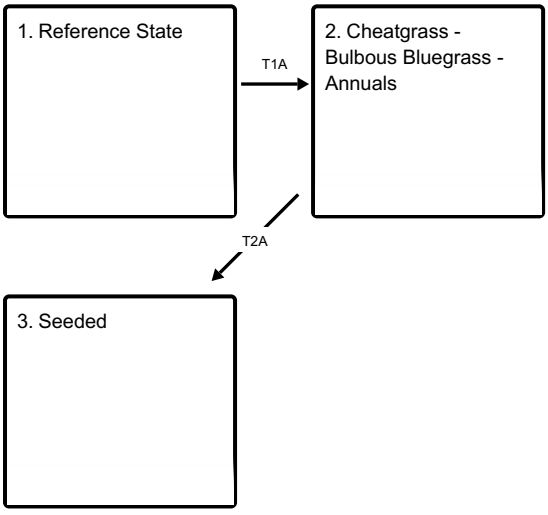
Decreased infiltration and increased runoff occur with the increase in mountain big sagebrush. Desired understory species can be reduced. The increased runoff also causes sheet and rill erosion. This composition change can affect nutrient and water cycles. Abnormally short fire frequency also gives the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

Practice Limitations:

Only slight limitations exist on this site for implementing vegetative management practices. Usually this site is a key area for livestock management due to flatter slopes and non-stony soils. This site is suited to seeding if needed. Mechanical, chemical, and fire are satisfactory methods of brush management on this site. Slight to moderate limitations exist on this site for implementing facilitating practices such as water developments, salting, and fencing.

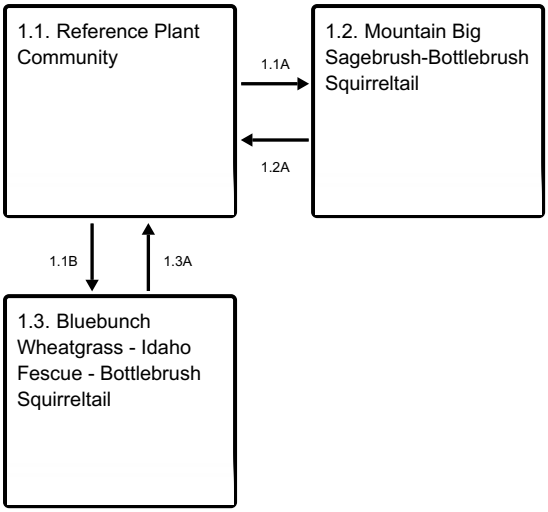
State and transition model

Ecosystem states



T2A - range seeding

State 1 submodel, plant communities



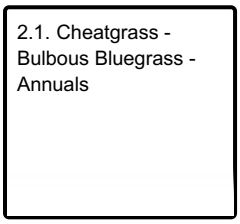
1.1A - improper grazing management, in the absence of fire

1.1B - fire

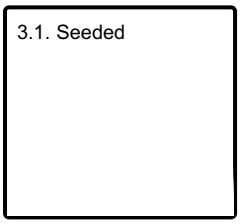
1.2A - prescribed grazing and brush management

1.3A - prescribed grazing and no fire

State 2 submodel, plant communities



State 3 submodel, plant communities



State 1
Reference State

Dominant plant species

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

Community 1.1
Reference Plant Community

The Reference Plant Community has mountain big sagebrush with Idaho fescue and bluebunch wheatgrass dominating the understory. Thurber’s needlegrass, arrowleaf balsamroot and lupine are subdominant in the understory. Tall green rabbitbrush and antelope bitterbrush occur in the overstory in small amounts. Natural fire frequency is 20 to 50 years.

Resilience management. The Reference Plant Community is community 1.1. This plant community is dominated by Idaho fescue and bluebunch wheatgrass and mountain big sagebrush. Antelope bitterbrush is usually present. Subdominant species include Thurber’s needlegrass, arrowleaf balsamroot and lupine. The plant species

composition of community 1.1. The species composition is listed later under “1.1 Reference Plant Community Plant Species Composition”. Total annual production is 800 pounds per acre (896 kilograms per hectare) in a normal year. Production in a favorable year is 1050 pounds per acre (1176 kilograms per hectare). Production in an unfavorable year is 600 pounds per acre (672 kilograms per hectare. Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by perennial forbs being about equal with tall shrubs while shallow rooted bunchgrasses are subdominant.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	280	370	500
Shrub/Vine	170	225	300
Forb	150	205	250
Total	**600**	**800**	**1050**

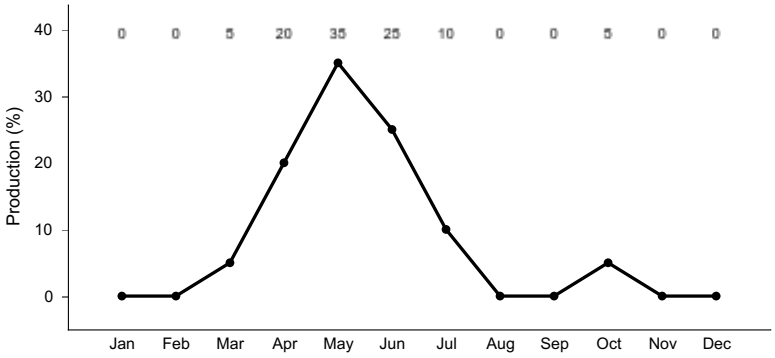


Figure 4. Plant community growth curve (percent production by month). ID0301, ARTRV HCPC. State 1.

Community 1.2
Mountain Big Sagebrush-Bottlebrush Squirreltail

This plant community is dominated by mountain big sagebrush with reduced amounts of Idaho fescue and bluebunch wheatgrass. Bottlebrush squirreltail has increased in the understory. All deep-rooted bunchgrasses are typically in low vigor. Mountain big sagebrush has increased as well as some other tall shrubs. Antelope bitterbrush may be present but in reduced vigor and 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.

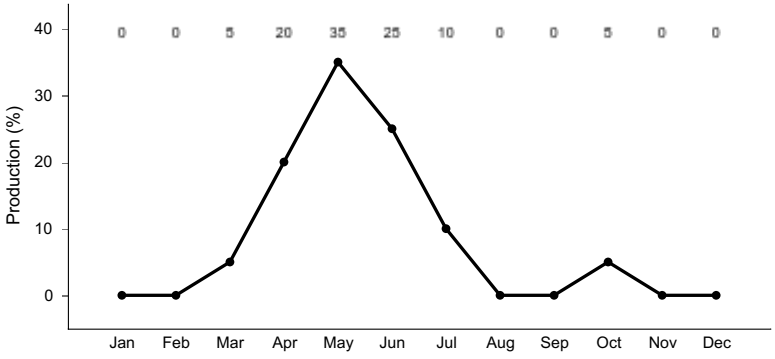


Figure 5. Plant community growth curve (percent production by month). ID0301, ARTRV HCPC. State 1.

Community 1.3
Bluebunch Wheatgrass - Idaho Fescue - Bottlebrush Squirreltail

This plant community is dominated by bluebunch wheatgrass with some rabbitbrush and mountain snowberry. Thurber’s needlegrass and 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.

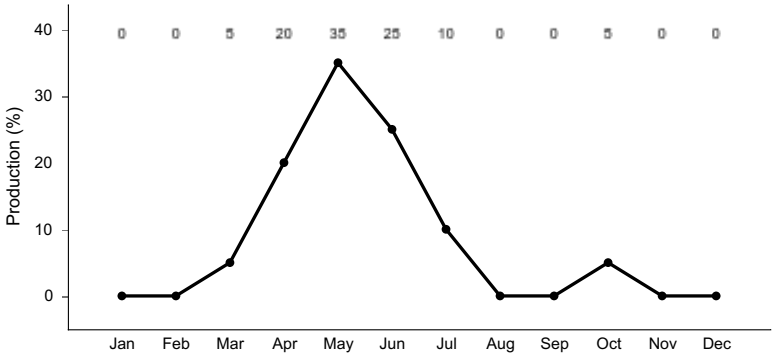


Figure 6. Plant community growth curve (percent production by month). ID0301, ARTRV HCPC. State 1.

Pathway 1.1A
Community 1.1 to 1.2

1.1A. Develops with improper grazing management and in the absence of fire.

Pathway 1.1B
Community 1.1 to 1.3

1.1B. Develops with fire.

Pathway 1.2A
Community 1.2 to 1.1

1.2A. Develops with prescribed grazing and brush management.

Pathway 1.3A
Community 1.3 to 1.1

1.3A. Develops with prescribed grazing and no fire.

State 2
Cheatgrass - Bulbous Bluegrass - Annuals

Resilience management. 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 toa new site with reduced potential. It is not economically practical to return this plant community to State 1 with accelerating practices.

Dominant plant species

- cheatgrass (*Bromus tectorum*), grass
- bulbous bluegrass (*Poa bulbosa*), grass

Community 2.1
Cheatgrass - Bulbous Bluegrass - Annuals

This plant community is dominated by cheatgrass, bulbous bluegrass and /or other annuals. Medusahead may also be present. Root sprouting shrubs such as rabbitbrush 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 or improper grazing management. The site has crossed the threshold. It is not economically practical to return this

plant community to State 1 with accelerating practices.

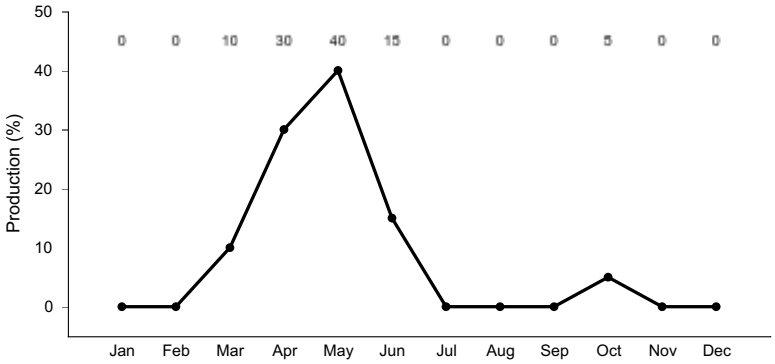


Figure 7. Plant community growth curve (percent production by month). ID0302, ARTRV Early Seral.

State 3
Seeded

Dominant plant species

- crested wheatgrass (*Agropyron cristatum*), grass

Community 3.1
Seeded

This plant community results from range seeding. The seeding may be introduced species or it may be made up of native species that attempt to mimic the historic plant community.

Transition T1A
State 1 to 2

T1A. Develops through frequent fire or improper grazing management. The site has crossed the threshold. It is not economically practical to return this plant community to State 1 with accelerating practices.

Transition T2A
State 2 to 3

T2A. Results from range seeding.

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				240–420	
	Idaho fescue	FEID	*Festuca idahoensis*	120–210	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	120–210	–
2				40–80	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	30–50	–
	western needlegrass	ACOC3	*Achnatherum occidentale*	0–25	–
	basin wildrye	LECI4	*Leymus cinereus*	0–25	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–20	–
	squirreltail	ELEL5	*Elymus elymoides*	0–15	–

	sedge	CAREX	*Carex*	0–5	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–5	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	0–5	–
Forb					
3				150–250	
	lupine	LUPIN	*Lupinus*	35–65	–
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	30–50	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–25	–
	milkvetch	ASTRA	*Astragalus*	0–20	–
	Indian paintbrush	CASTI2	*Castilleja*	0–10	–
	geranium	GERAN	*Geranium*	0–10	–
	white hawkweed	HIAL2	*Hieracium albiflorum*	0–10	–
	desertparsley	LOMAT	*Lomatium*	0–10	–
	beardtongue	PENST	*Penstemon*	0–10	–
	longleaf phlox	PHLO2	*Phlox longifolia*	0–10	–
	fleabane	ERIGE2	*Erigeron*	0–5	–
	buckwheat	ERIOG	*Eriogonum*	0–5	–
	white mariposa lily	CAEU	*Calochortus eurycarpus*	0–5	–
	common yarrow	ACMI2	*Achillea millefolium*	0–5	–
	pale agoseris	AGGL	*Agoseris glauca*	0–5	–
	rosy pussytoes	ANRO2	*Antennaria rosea*	0–5	–
	rockcress	ARABI2	*Arabis*	0–5	–
Shrub/Vine					
4				170–300	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	120–210	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	20–35	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	15–30	–
	buckwheat	ERIOG	*Eriogonum*	0–10	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–5	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	0–5	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	0–5	–

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological site provides diverse habitat for many native wildlife species. Large herbivore use of this ecological site is dominated by mule deer, pronghorn antelope, and elk. Important seasonal habitat is provided 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. Changes in the plant community composition can reduce the numbers and diversity of wildlife species in the area. With reduced shrub cover shrub obligate avian and mammal species become rare including sage-grouse, brewer’s sparrow, sage thrasher and pygmy rabbits. Encroachment of noxious and invasive plant species (cheatgrass, Medusahead) replace 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 a negative impact on ground nesting birds, while the loss of shrub cover negatively affects both ground and shrub nesting avians. Water is limited, being provided only by seasonal runoff, artificial water catchments and spring sites. This rangeland ecological site is commonly 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 - Mountain Big Sagebrush/ Idaho Fescue/ Bluebunch 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, desert horned lizard, short horned lizard, sagebrush lizard, western skink, western rattlesnake, western toad, boreal chorus frog, and northern leopard frog. The reference plant community provides habitat for prey species, and cover for the resident reptile species. 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 are provided by this diverse plant community. The plant community supports seasonal needs of large mammals (mule deer, antelope, and elk) providing food and cover on a seasonal basis. Mountain big sagebrush and antelope bitterbrush are preferred browse for wild ungulates. A diverse small mammal population including golden-mantled ground squirrels, chipmunks and yellow-bellied marmots utilize this plant community. Deer mouse is the primary vector for planting bitterbrush seed.

State 1 Phase 1.2 – Mountain Big Sagebrush/ Bottlebrush Squirreltail Plant Community: This plant community is the result of improper grazing management. 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 lower diversity and numbers of insects. The reptile and amphibian community would decline in diversity and population due to a decline in cover and prey species. Reduced herbaceous understory is a key factor in limiting the use of this plant community by avian species. Key shrub-steppe avian obligates include Brewer's sparrow, sage sparrow, sage thrasher and sage- grouse. Critical habitat (lek sites, nesting areas, winter cover and food) for sage-grouse is limited due to a less diverse herbaceous plant community. The plant community supports seasonal needs of large mammals (mule deer, antelope, and elk) providing food and cover on a seasonal basis. Mountain big sagebrush and antelope bitterbrush are preferred browse for wild ungulates. A diverse small mammal population including golden-mantled ground squirrels, chipmunks, deer mouse and yellow-bellied marmots would utilize the habitat. Deer mouse is the primary vector for planting bitterbrush seed.

State 1 Phase 1.3 - Bluebunch Wheatgrass/ Idaho Fescue/ Bottlebrush Squirreltail Plant Community: This plant community is the result of frequent fire. The plant community, dominated by herbaceous vegetation with little or no sagebrush provides less vertical structure and limits use by shrub obligate species. Insect diversity would be lowered but a diverse native forb plant community would still support select pollinators. Cave dwelling insects and mammals from adjacent habitats would be supported by this plant community. 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 little sagebrush canopy cover would prevent 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 if sagebrush habitat is adjacent to the site. Sage-grouse would not use the area for wintering habitat. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark and western meadowlark). Large mammal (mule deer, antelope, and elk) use for food would be seasonal but would offer little thermal cover and young of year cover. Small mammal diversity would be reduced and the plant community would not provide suitable habitat for pygmy rabbits.

State 2 – Cheatgrass/ Bulbous Bluegrass and Annual Plant Community: This plant community is the result of continued improper grazing management and/or frequent fire. The loss of the native shrub and herbaceous plant community would not support a diverse insect community. The reduced forb component in the plant community would support a very limited population of pollinators. Most native 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 food conditions. 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 and bulbous bluegrass 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 this site for bats. The diversity and populations of small mammals would be dominated by open grassland species like the Columbian ground squirrel.

State 3 - Range Seeding Plant Community: The seeding mixture (native or non-native) determines the animal species that 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 that prefer uniform vertical strata and large expanses of uniform cover would persist. Birds of prey including hawks and falcons may range throughout this community looking for prey species.

Grazing Interpretations:

This site is best suited for grazing in the late spring, summer, and fall. If water is available, the site is easily grazed due to gentle slopes. This site is often used as a key grazing area.
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 4,500 to 6,500 feet generate most runoff from snowmelt. The site is typically protected by vegetation when snowmelt and runoff occur, from mid spring through summer. Shallow subsurface flow to drainages, especially on steeper slopes, is common. Runoff averages about 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 Reference Plant Community.
In the Reference Plant Community, especially on less steep slopes, 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 the Reference Plant Community to protect the site from runoff and erosion. Moss in the sagebrush understory is a good indicator of proper hydrologic function. Dominance of bunchgrasses (bluebunch wheatgrass and 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, aspect, and microtopography). Little sediment is delivered off-site, even 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 (9% of water budget) occurs in late spring, and is dependent on winter snow cover. Good grazing management that addresses frequency, duration, and intensity of grazing can keep fine fuels from developing, 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 Mountain Big Sagebrush - Bottlebrush Squirreltail.

Increasing sagebrush and bitterbrush 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 the Reference Plant Community. 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 (> 30%) 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 Bluebunch Wheatgrass - Idaho Fescue - Bottlebrush Squirreltail.
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 occurs on the soil surface, with burned coppices being most impacted. Mosaic burn patterns on a pre-fire HCPC site will somewhat mitigate erosion and runoff effects. Repellency is typically gone after two seasons following fire, and hydrologic function improves significantly as vegetation cover increases. 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 - Cheatgrass - Bulbous Bluegrass - Annuals
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 will 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 meltoff 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.

State 3 Seeded
Seeding is not likely to reduce runoff or erosion in the year following a burn. However, seeding of native or desired species, if successful, will help stabilize the erosion process and improve hydrologic conditions over time. As sagebrush and other shrubs establish, hydrologic function of this state will approach the Reference Plant Community if significant soil loss has not occurred prior to seeding. Where shrubs successfully establish or increase naturally into the seeding, snow accumulation increases resulting in improved infiltration, deep percolation and reduced erosion. Seeding and restoration of the site will be dependent on how far the site productivity and hydrologic condition has diminished before management.

Recreational uses

This site provides opportunities for big game hunting, hiking, and horseback riding. Flowering forbs in the spring offers opportunities for photography. ATV’s use the site due to the gentle slopes.

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:
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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	06/08/2009
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. If rills are present they are likely to occur on slopes greater than 15 percent and 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: rarely occur on this site. When they occur they are short and 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. In areas where slopes approach 15 percent and where flow patterns and/or rills are present, a few pedestals may be expected.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare Ground: On sites in mid-seral status bare ground may range from 45-55 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 2 feet following a significant run-off event. Coarse litter generally does not move.

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 4 to 6.

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 4 to 26 inches thick. Structure ranges from weak, moderate very fine and fine granular, to weak, moderate or strong thin and thick platy, to weak very fine, fine medium, coarse or moderate medium subangular blocky. Soil organic matter (SOM) ranges from 1 to 5 percent, except Moonville which has a maximum of 15 percent.

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.

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.

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 = shrubs > shallow rooted bunchgrasses.

    Sub-dominant:

    Other:

    Additional:

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.

14. **Average percent litter cover (%) and depth (in):** Litter Amount: additional litter cover data is needed but is expected to be 20-25 percent to a depth of 0.1 inches. Under mature shrubs litter is >0.5 inches deep and is 90-100 percent ground cover.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual Production: is 800 pounds per acre (896 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 40-50 percent of the total production, forbs 20-30 percent and shrubs 25-30 percent.

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 bulbous bluegrass, whitetop, rush skeletonweed, musk and scotch thistle and diffuse and spotted knapweed. Cheatgrass and medusahead may invade at lower elevations of site.

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