

Ecological site R025XY017ID SHALLOW BREAKS 14-18

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General information

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

MLRA notes

Major Land Resource Area (MLRA): 025X–Owyhee High Plateau

MLRA 25 lies within the Intermontane Plateaus physiographic province. The southern half is in the Great Basin Section of the Basin and Range Province. This part of the MLRA is characterized by isolated, uplifted fault-block mountain ranges separated by narrow, aggraded desert plains. This geologically older terrain has been dissected by numerous streams draining to the Humboldt River. The northern half of the area lies within the Columbia Plateaus geologic province. This part of the MLRA forms the southern boundary of the extensive Columbia Plateau basalt flows. Deep, narrow canyons drain to the Snake River which incise the broad volcanic plain. The Humboldt River, route of a major western pioneer trail, crosses the southern half of this area. Reaches of the Owyhee River in this area have been designated as National Wild and Scenic Rivers.

Ecological site concept

This ecological site meets the NESH 2014 requirements for PROVISIONAL. A provisional ecological site is established after ecological site concepts are developed and an initial state-and-transition model is drafted. Following quality control and quality assurance reviews of the ecological site concepts, an identification number and name for the provisional ecological site are entered into ESIS. A provisional ecological site may include literature reviews, land use history information, some soils data, legacy data, ocular estimates for canopy and/or species composition by weight, and even some line-point intercept information. A provisional ecological site does not meet the NESH 2014 standards for an Approved ESD, but does provide the conceptual framework of soil-site correlation for the development of the ESD.

Associated sites

R025XY001ID	ASPEN THICKET
R025XY004ID	SHALLOW STONY 12-16
R025XY008ID	NORTH SLOPE STONY 12-16
R025XY010ID	CLAYPAN 12-16
R025XY027ID	SOUTH SLOPE GRANITIC 12-16
R025XY039ID	DRY MEADOW
R025XY044ID	VERY SHALLOW STONY LOAM 10-14
R025XY046ID	MEADOW
R025XY011ID	LOAMY 13-16

Table 1. Dominant plant species

Tree	(1) <i>Juniperus occidentalis</i>
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Shrub	(1) <i>Artemisia tridentata</i> var. <i>vaseyana</i>
Herbaceous	(1) <i>Festuca idahoensis</i>

Physiographic features

This site occurs on rolling to steep slopes that range from 10 to 50 percent. It occurs on all aspects and elevation ranges from 5000-7000 feet (1524-2133 m). The topography of the Owyhee High Plateau is strongly influenced by volcanic flows and the streams that have dissected them. This site occurs on two major landforms: (1) rimrock edges and (2) rounded ridges and knolls. On the rimrock edge of mesas, is a zone of deeply fractured rock about 50 to 100 feet wide. This fractured zone supports climax juniper. The older trees have roots deeply buried in the fractured rock. Away from the mesa edge, the site rapidly gives way to sagebrush communities on less fractured bedrock. If fractures exist across the mesa tops, juniper will commonly be found. The second landform occurs where geologic erosion has worn away the mesa landform and rounded ridges and knolls replace them. The historic climax plant community (HCPC) occupies the ridge tops where bedrock comes near the surface.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–7,000 ft
Slope	10–50%
Water table depth	60 in
Aspect	N, S, W

Climatic features

In MLRA 25 summers are hot, especially at lower elevations, and winters are cold and snowy. Precipitation is usually lighter at lower elevations throughout the year. At higher elevations precipitation is much greater, and snow accumulates to a considerable depth. The average total precipitation is 14.39 inches (based on 6 long term climate stations located throughout the MLRA).

The mean annual temperature is 45.9 degrees F. The average high is 59.7 and the average low temperature is 32.1 degrees. The prevailing wind is from the west. Average wind speed is greatest, at about 10 miles per hour, in March.

The frost-free period ranges from 79 to 103 days and the freeze free period ranges from 114 to 140 days.

Table 3. Representative climatic features

Frost-free period (average)	103 days
Freeze-free period (average)	140 days
Precipitation total (average)	16 in

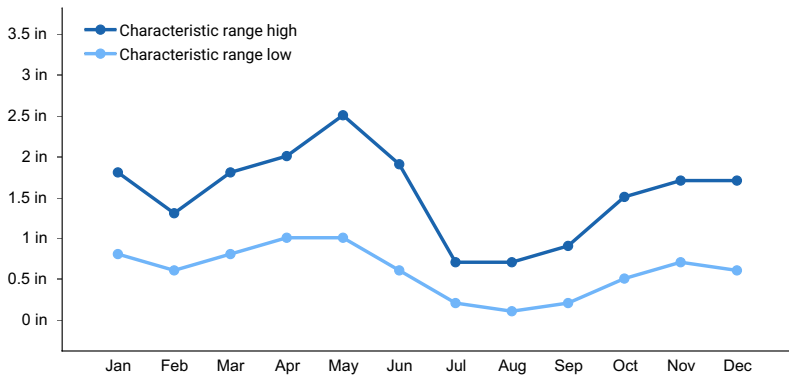


Figure 1. Monthly precipitation range

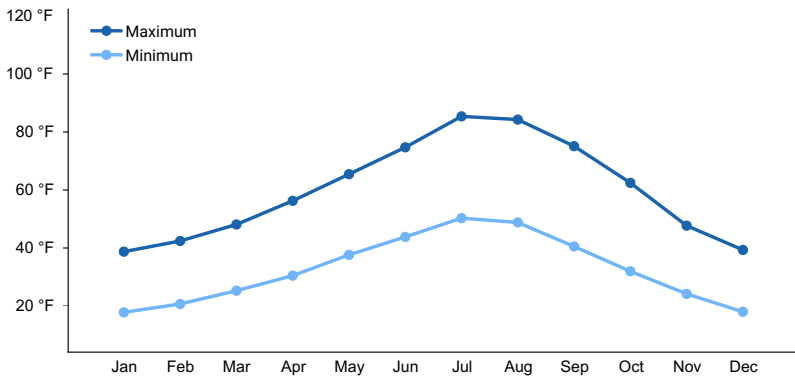


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

This site occurs on rock outcrops and associated very shallow soils. Rock outcrops occur in nearly all of the HCPC and may account for up to 50 percent of the ground surface. The rock, primarily rhyolitic tuff or basalt, is commonly fractured but is seldom weathered. Fractures in both the outcrops and the bedrock are common on the ridge tops and mesa rims and are usually soil filled and provide excellent zones for root penetration and water percolation. The soils representative of this site are those of unconsolidated residuum between and around rock outcrops. The soils supporting this site are very shallow, somewhat excessively or excessively drained, and impermeable due to shallow bedrock. Runoff is very high. The erosion hazard is moderate by water, high by wind. Due to the lack of effective ground cover on this site, erosion plays an active role in removing the finer materials. The available water holding capacity (AWC) is very low with much of the moisture being stored in deep fractures. These soils are nearly always shallow to bedrock with depths ranging from vertically zero where rock comes to the surface, to nearly 3 feet in small pockets where soil has accumulated. The general characteristic of the site is one of shallow, rocky, fractured, low fertility or low producing soils. The site does not produce enough understory vegetation to carry a wildfire; therefore, the site seldom, if ever, burns. For climax juniper to grow on deeper soils it should be surrounded by either rock outcrops or very shallow soils that restrict the advance of fire. They are generally young, lithic soils with only slightly differentiated A, B and C horizons. The surfaces are only partially covered by patchy vegetation and small amounts of litter. Bare spots usually have a surface pavement of fine gravels, which is probably the result of the finer soil particles being eroded away. There is irregularity in the soil-bedrock contact due to the fractured nature of the rock. Soil may extend down cracks to depths well below the average bedrock level. Soil temperature regime is frigid.

Table 4. Representative soil features

Parent material	(1) Residuum-welded tuff
Surface texture	(1) Stony loamy coarse sand

Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Not specified
Soil depth	4–10 in
Surface fragment cover ≤3"	5–30%
Surface fragment cover >3"	3–7%
Available water capacity (0–40in)	0.13–0.2 in
Calcium carbonate equivalent (0–40in)	0%
Electrical conductivity (0–40in)	0 mmhos/cm
Sodium adsorption ratio (0–40in)	0
Soil reaction (1:1 water) (0–40in)	6.1–7.3
Subsurface fragment volume ≤3" (Depth not specified)	15–60%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

The dominant visual aspect of this site is western juniper with a sparse understory of Idaho fescue and Thurber's needlegrass. All age groups of juniper trees are present; however, the large mature trees give the site its characteristic look. In the Reference Plant Community Phase, juniper utilizes most of the available soil moisture, therefore little run-off occurs except during intense convection storms. These mature trees are generally heavily limbed and round-topped giving indication of branching close to the ground; however, western juniper is usually dominated by a single main stem.

In the northern regions of this site, curlleaf mountain mahogany rarely occurs intermixed with juniper. In the southern and western regions, it intermixes apparently indiscriminately with juniper, making up to 5-15 percent of the overstory. The juniper overstory is seldom removed by natural fire due to a lack of fuel in the understory. Understory production does not respond significantly to overstory removal. This is due to the low potential of the soils of this site for herbaceous production.

Juniper readily invades surrounding sites of deeper and more fertile soils, but likely was kept in check by natural wildfires. Present fire control programs, reduction/removal of the herbaceous understory by improper grazing management and perhaps climate changes have allowed juniper to rapidly invade these other sites.

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, lagomorphs and small rodents.

The Historic Climax Plant Community (HCPC), the Reference State (State 1), moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The Reference Plant Community Phase is Phase 1.1. The plant species composition of Phase 1.1 is listed later under "Reference Plant Community Phase Plant Species Composition".

Fire rarely occurs on this site. When it does occur, it is at intervals of 500-1000 years. The Reference Plant Community Phase of this site is dominated by western juniper in the overstory and Idaho fescue, Thurber's needlegrass and mountain big sagebrush in the understory. Bitterbrush is usually present. Subdominant species include bluebunch wheatgrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot and lupine. Curlleaf mountain mahogany is commonly found on the site. Total annual production is 825 pounds per acre (917 kilograms per hectare) in a normal year. Production in a favorable year is 1100 pounds per acre (1222 kilograms

per hectare). Production in an unfavorable year is 550 pounds per acre (611 kilograms per hectare). Composition by weight is approximately 10 percent grass, 1 percent forbs, 4 percent shrubs and 90 percent trees. Structurally, western juniper dominates the overstory. In the understory, cool season, deep-rooted perennial bunchgrasses are dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted bunchgrasses are subdominant.

FUNCTION:

This site is not well suited for livestock grazing. Understory production is low (even without the overstory) and it is often rough, rocky or inaccessible. It does provide shade for livestock.

The site has high value for mule deer and elk for escape and thermal cover. It has minimal forage value for deer and elk. Mountain lion, bobcat and coyotes use the site for hunting. It provides food and cover for a variety of birds, rodents and reptiles.

Impacts on the Plant Community:

Influence of fire:

In the absence of normal fire frequency, juniper increases to the point of severely reducing nearly all of the understory species. This occurs at an extremely slow rate. There is the possibility that modern man has not seen this condition.

When fire does burn this site, it is a catastrophic event on the plant community. Because of the small amount of understory, fire will usually be carried in the crown of the trees. Fires of this nature rarely involve large acreages due to surrounding rimrocks and other features that limit the spread of fire. Nearly all of the junipers within the burned area, both old and young will be killed. Most of the shrubs will likewise be killed. The few grasses and perennial forbs in the understory will mostly survive. Normally, juniper re-establishes rapidly due to the seed source being present in the soil reservoir and/or from nearby unburned trees. A frequent fire regime of once every 5-10 years, generally will not develop on this site. The soils are too shallow and fuels are not continuous enough for a frequent fire cycle to occur.

Influence of improper grazing management:

Improper grazing management has little impact on this site. Due to the rough and rocky nature of the site, livestock generally prefer not to use it. Livestock use the site primarily for loafing and bedding. Forage production is low. When this site is being impacted by improper grazing management, adjacent sites that are more productive and less rocky are usually being much more severely degraded.

Season-long grazing and/or excessive utilization can be detrimental to this site. This type of management leads to reduced vigor of the bunchgrasses and bitterbrush. With reduced vigor, recruitment of these species declines. Generally juniper seedlings will replace the desirable grasses and shrubs if improper grazing management continues.

Weather influences:

Above-normal precipitation in the spring increases forage production slightly. Due to the shallow soils, most plants, except juniper, do not capitalize on extra spring-time moisture. Below-normal precipitation in the spring can reduce production and ultimately cause plant mortality of the understory species if drought continues.

Juniper is very resistant to drought influences. It has a root system that is capable of removing deep moisture in the fractures of the bedrock that is not available to other plants on the site. In addition, juniper is capable of photosynthesizing (growing) anytime the air temperatures are above freezing. It therefore is removing moisture from the soil for 10-11 months of the year. This gives juniper a competitive advantage for moisture over all of the other species on the site.

Influence of Insects and disease:

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.

Mistletoe and a number of insects use juniper. Little mortality occurs with these infestations.

There is an abundant fruticose lichen associated with old juniper. It is bright yellow, erect, multi-branched and grows on semi-dead or dead branches. The moss *Tortula ruralis* is a characteristic of climax stands of juniper. It is generally found growing on the surface layer of duff beneath old juniper trees. Neither organism adversely affects juniper.

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 weeds 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 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 the increase of juniper following fire. Increases in juniper can be triggered by improper grazing management and prolonged drought. The increased runoff occurring during intense convection storms also causes sheet and rill erosion. Abnormally short fire frequency also gives the same results, but to a lesser degree.

Influence of juniper invasion:

In plant communities that are invaded or dominated by juniper, the species has a competitive advantage for the following reasons:

- Juniper is very drought tolerant.
- It has the ability to extract soil moisture from a wide range of soil depths.
- Juniper has high evapo-transpiration rates.
- The species intercepts rain and snow before it reaches the soil surface.
- It has the ability to grow as long as there is soil moisture and the temperature is above freezing.
- Juniper has a relatively rapid growth rate and is long-lived. It can readily over-top shade intolerant species which leads to mortality.
- Nutrient cycling is reduced.
- As the canopy closes, juniper gains control of energy capture.

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

The following hydrological impacts occur on sites invaded by juniper:

- Infiltration in the interspaces is reduced.
- Run-off increases resulting in increased sheet and rill erosion with elevated sediment loads.
- Soil temperatures increase in the interspaces which results in accelerated drying of the soil surface.
- Increased bare ground in the interspaces.
- Soil moisture storage is reduced.

As bare ground and interconnectiveness of patches of bare ground increases, flow rates are accelerated (reduction

of flow sinuosity) and run-off out of the area increases.

Degradation of these systems can result in the formation of a feedback cycle in which greater juniper cover and density results in greater plant and soil disturbance between the canopies.

In summary, a closed juniper community takes control of the following ecological processes- hydrology, energy capture and nutrient cycling. The changes are primarily driven by the hydrological processes. The development of a closed juniper canopy always results in a transition across the threshold to a different state. Generally, when juniper canopy cover nears 20%, the plant community is approaching the threshold.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.

Phase 1.1 to 1.2. Develops with improper grazing management.

Phase 1.2 to 1.1. Develops through prescribed grazing.

Phase 1.1 to 1.3. Develops after wildfire.

Phase 1.3 to 1.1. Moves towards the HCPC with no fire.

Phase 1.2 to 1.3. Develops with wildfire.

Phase 1.3 to 1.2. Develops with no fire and improper grazing management.

Practice Limitations.

This site is not suited to seeding or brush management due to low production potential, shallow soils and rock outcrops.

State and transition model

R025XY017ID – Shallow Breaks 14-18 JUOC/FEID

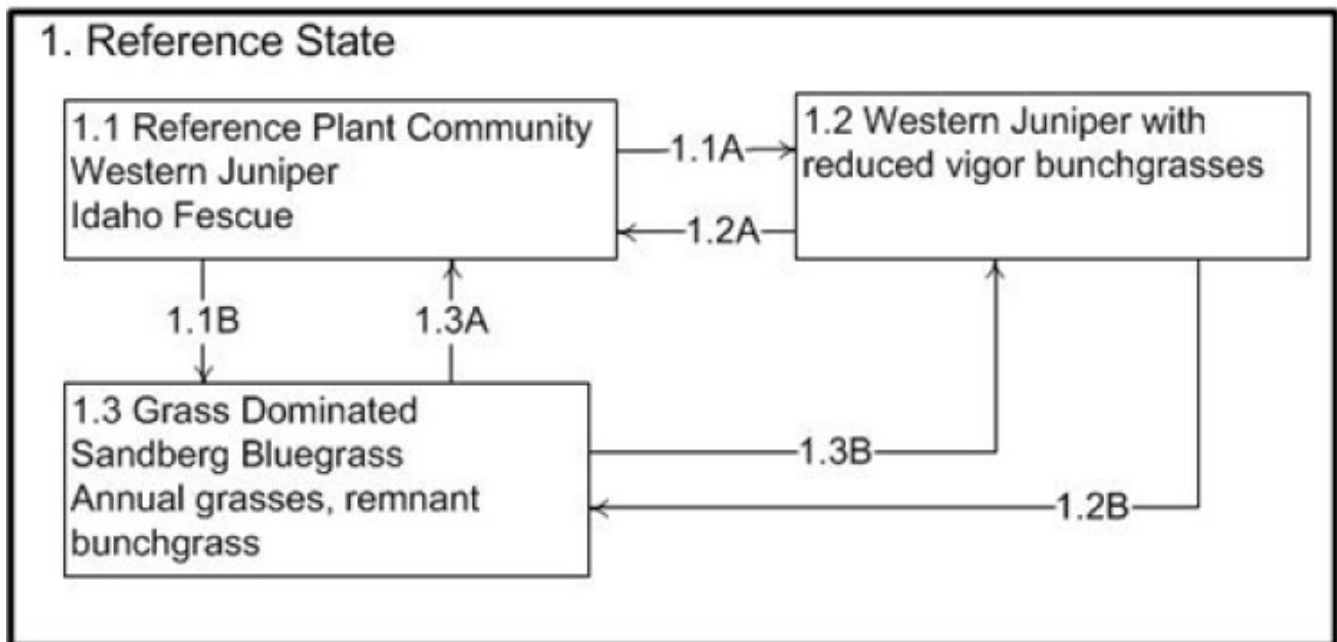


Figure 3. 25x-017

State 1
Reference State

Community 1.1

Reference Plant Community

This plant community has a western juniper overstory with a sparse understory of Idaho fescue and Thurber's needlegrass. Small amounts of mountain big sagebrush, antelope bitterbrush and curleaf mountain mahogany are present. All age classes of juniper are present. Soils are very shallow to bedrock. The bedrock is fractured allowing the roots of the juniper to penetrate deep into the rock. The site rarely, if ever, burns. Historic natural fire frequency is approximately every 500 to 1000 years. But when the site does burn, it is a devastating event on the plant community. Fires are typically small in size, burning just a few acres.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Tree	475	707	940
Grass/Grasslike	50	80	110
Shrub/Vine	20	30	40
Forb	5	8	10
Total	550	825	1100

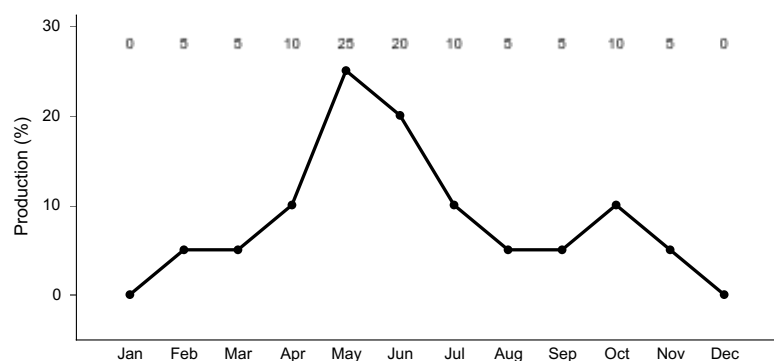


Figure 5. Plant community growth curve (percent production by month). ID0916, Juniper.

Community 1.2 Reduced Vigor Bunchgrasses

This phase has developed through improper grazing management. Antelope bitterbrush and Idaho fescue are in low vigor. Cheatgrass and possibly bulbous bluegrass have invaded the site. Due to the inaccessibility of much of this site, the area impacted by improper grazing management is generally small in size.

Community 1.3 Post Fire - Grass Dominated

This phase has developed after a wildfire. Most of the juniper and shrubs have been killed by fire. Sandberg bluegrass and cheatgrass have responded aggressively after the fire. There are remnants of Idaho Fescue. Due to the lack of continuous fuels, rocks and low production in the understory, wildfires typically are small in size. The site rarely burns in its entirety. This site does not cross the threshold to a new and unknown site.

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				50–110	
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	30–60	–
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	15–30	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	5–10	–
	sedge	CAREX	<i>Carex</i>	0–5	–
	onespike danthonia	DAUN	<i>Danthonia unispicata</i>	0–5	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	0–5	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–5	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–5	–
Forb					
2				5–10	
	onion	ALLIU	<i>Allium</i>	0–2	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–2	–
	rockcress	ARABI2	<i>Arabis</i>	0–2	–
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	0–2	–
	maiden blue eyed Mary	COPA3	<i>Collinsia parviflora</i>	0–2	–
	quill cryptantha	CRAF	<i>Cryptantha affinis</i>	0–2	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	0–2	–
	dwarf groundsmoke	GAHU2	<i>Gayophytum humile</i>	0–2	–
	desertparsley	LOMAT	<i>Lomatium</i>	0–2	–
	tailcup lupine	LUCA	<i>Lupinus caudatus</i>	0–2	–
	oblongleaf bluebells	MEOB	<i>Mertensia oblongifolia</i>	0–2	–
	beardtongue	PENST	<i>Penstemon</i>	0–2	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	0–2	–
Shrub/Vine					
3				20–40	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	15–35	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	15–35	–
	little sagebrush	ARAR8	<i>Artemisia arbuscula</i>	10–20	–
	curl-leaf mountain mahogany	CELE3	<i>Cercocarpus ledifolius</i>	1–10	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	1–10	–
Tree					
4				475–940	
	western juniper	JUOC	<i>Juniperus occidentalis</i>	475–940	–

Animal community

Animal Community – Wildlife Interpretations

Large herbivore use of the reference plant community is dominated by mule deer and elk. Site can provide winter habitat for mule deer and elk. The rangeland habitat provides seasonal habitat for resident and migratory animals

including western toad, sagebrush lizard, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark and western meadowlark. In isolated areas encroachment of noxious and invasive plant species (cheatgrass and bulbous bluegrass) have replaced native plant species which provided critical feed, brood-rearing and nesting cover for a variety of native wildlife. Water is limited, being provided only by seasonal runoff, artificial water catchments and spring sites.

State 1 Phase 1.1 – Western Juniper/ Idaho Fescue/ Thurber’s Needlegrass Plant Community (HCPC): This plant community provides a diversity of grasses, forbs and shrubs, used by native insect communities that assist in pollination. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, western toad 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. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird and Virginia’s warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. The plant community provides limited spring, fall and winter forage needs for mule deer and elk. Mule deer and elk use this plant community for thermal cover and young of year cover. Mountain lion, bobcat and coyote frequent these areas. A small mammal population including golden-mantled ground squirrels, jackrabbits, deer mice and Great Basin pocket mice may utilize this plant community.

State 1 Phase 1.2 –Western Juniper/ Cheatgrass/ Bulbous Bluegrass Plant Community: This phase has developed due to improper grazing management. The loss of native forbs and reduced vigor of understory vegetation will reduce insect diversity on the site. The lack of flowering plants has reduced pollinator use by butterflies and moths. Reptile species diversity would be similar to State 1 Phase 1.1. Quality of cover and food habitat for reptiles would decline with the loss of understory vegetation. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird and Virginia’s warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Hunting success by raptors may decrease due to heavy overstory of juniper. The plant community supports limited seasonal grazing habitat for mule deer and elk in spring and fall. Juniper is considered desirable forage throughout the year for mule deer. The site will provide thermal cover in the winter for large herbivores.

State 1 Phase 1.3 –Sandberg Bluegrass/ Cheatgrass Plant Community:
This plant community is the result of fire. The reduced forbs and shrub component in the plant community would support a very limited population of pollinators. Most reptilian species identified in State 1 Phase 1.1 are not supported with food, water or cover. Diversity of grassland avian species is reduced due to poor cover and available food. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Hunting success by raptors may increase. Mule deer and elk may utilize the herbaceous vegetation in spring and fall or early part of the year when the invasive annuals (cheatgrass) are more palatable. At other times of the year large mammals would not regularly utilize these areas due to poor food and cover conditions. Winter habitat (thermal cover) for mule deer and elk would not be available. Cover for mountain lion, bobcat and coyote would be reduced or eliminated due to losses of juniper. Small mammal populations and diversity would be reduced due to poor quality cover and food and an increase in success of hunting by predators.

Grazing Interpretations.

This site is not well suited to livestock grazing. Understory production is low and the site is often rough, rocky or inaccessible. It does provide shade for livestock using surrounding areas.

Estimated initial stocking rate will be determined with the landowner or decision-maker. They will be based on the inventory, past use history and type, condition of vegetation, production, season of use and seasonal preference.

Hydrological functions

The soils on this site are in hydrologic group D. When ground cover is at potential, the erosion hazard is moderate to high.

Recreational uses

Recreational use of this site includes hunting, hiking, horseback riding, plant and animal observation.

Due to the relative abundance of wildlife that use this site, hunting is one of the primary uses.

Wood products

Mature juniper on the site can be cut for posts, poles, firewood and lumber.

Other products

None.

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used.

Those involved in developing this site description include:

Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC

Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC

Jim Cornwell, State Rangeland Management Specialist, NRCS, Idaho (retired)

Joe May, State Rangeland Management Specialist, NRCS, Idaho

Leah Juarros, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Assistant State Conservationist, NRCS, Idaho (retired)

Other references

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Contributors

Dave Franzen And Jacy Gibbs

Approval

Kendra Moseley, 4/25/2024

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	USDA/NRCS 9173 W. Barnes Drive, Suite C Boise, ID 83709 208-378-5722
Date	07/02/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills do not occur on this site.

2. **Presence of water flow patterns:** Water-flow patterns are not present on this site.

3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or terracettes do not occur on this site.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Estimated to be 20-30 percent of the area where soil is present.

5. **Number of gullies and erosion associated with gullies:** Gullies do not occur on this site.

6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind-scoured, blowouts, and/or deposition areas do not occur.

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move up to 3 feet and usually moves into the fractures in the adjacent bedrock or accumulates above surface rock.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Values should range from 4-6 .

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The A or A1 horizon is typically 2 to 4 inches thick. Structure ranges from moderate fine and medium subangular blocky. Soil organic matter (SOM) needs to be determined.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Bunchgrasses and perennial forbs slow run off and increase infiltration. The

amount of stones and bedrock on or near the surface are the over-riding influence on infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compaction Layer is not present.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: Juniper>>cool season grasses= shrubs

Sub-dominant: Perennial forbs

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Juniper can die from old age. Lightning strikes can also cause mortality. Shrubs and grasses decline in the plant community as juniper increases.
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14. **Average percent litter cover (%) and depth (in):** Litter immediately beneath juniper can be greater than 4 inches and occupy 100 percent of the surface. Litter in the interspaces beyond the drip-line is usually <.1 inches and <5% 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 825 pounds per acre (917 kilograms per hectare) in a normal year.
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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 and bulbous bluegrass.
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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in most years.
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