USDA Natural Resources
Conservation Service

Ecological site R025XY002ID
STONY LOAM 16-22

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Accessed: 04/26/2024

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): 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.

Classification relationships

Artemisia vaseyana/ agropyron spicatum HT in “Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho. Moscow, Idaho. Bulletin Number 35”.

Ecological site concept

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**
R025XY023ID	**NORTH SLOPE LOAMY 16-22**
R025XY039ID	**DRY MEADOW**
R025XY044ID	**VERY SHALLOW STONY LOAM 10-14**
R025XY046ID	**MEADOW**

Similar sites

R025XY030ID	**MOUNTAIN BRUSH 18-22**

R025XY022ID	**LOAMY 16-22**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Symphoricarpos oreophilus*
Herbaceous	(1) *Pseudoroegneria spicata*

Physiographic features

This site occurs on steep mountain slopes, ridges, mesas, valley floors and alluvial fans. It is found on all exposures, but is dominantly on south and west facing slopes. Slopes vary from 5 to 70 percent, but are mostly 20 to 40 percent. Elevation ranges from 4600 to 9000 feet (1400 to 2740 meters) in the north and 7000 to 9000 feet (2130 to 2740 meters) in the south.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Mesa (3) Alluvial fan
Elevation	4,600–9,000 ft
Slope	20–40%
Aspect	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

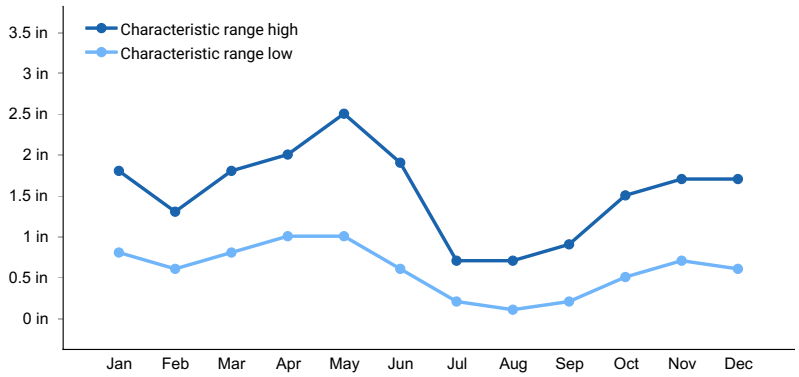

Figure 1. Monthly precipitation range

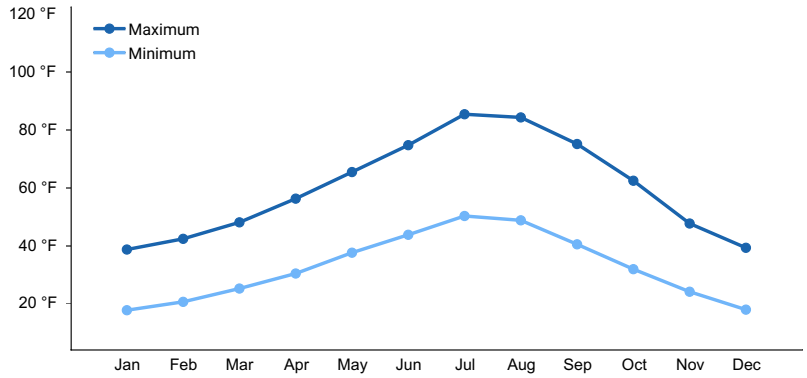

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils on this site are deep, well-drained and very gravelly, very stony or very cobbly (over 50 percent by volume) throughout the major part of the soil profile. They have dark brown or very dark, grayish-brown surface layers. The underlying layers are sandy loam to clay textures that have 50 percent rock fragments by volume.

These soils formed on gently sloping to very steep mountain slopes and hilly plateaus in alluvium and colluvium weathered from sandstone, shale, limestone, quartzite, schist, gneiss and igneous rocks. Intake rate is moderate to rapid and water movement through the soil is moderately slow to rapid. Roots penetrate the soil readily and are forced to grow around the rock fragments. The available water holding capacity (AWC) is 3-5 inches (7.6-12.7 cm) and water supplying capacity is 8-10 inches (20-25 cm). Moisture penetrates deeply because of limited storage capacity in the soil profile. These soils have little surface run-off and slight to no erosion.

Table 4. Representative soil features

Permeability class	Moderately slow to rapid
Available water capacity (0-40in)	3–5 in

Ecological dynamics

This site has a general but somewhat scattered aspect of shrubs. The vegetation is approximately 65 percent grasses, 10 percent forbs and 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 pronghorn, mule deer, Rocky Mountain elk and lagomorphs.

Fire has historically occurred on the site at intervals of 20-40 years. The Reference Plant Community Phase is dominated by bluebunch wheatgrass, Idaho fescue, purple oniongrass, antelope bitterbrush and mountain big sagebrush. Subdominant species include Sandberg bluegrass, prairie junegrass and arrowleaf balsamroot. Total annual production is 1500 pounds per acre (1670 kilograms per hectare)in a normal year. Composition by weight is approximately 65 percent grass, 10 percent forbs and 25 percent shrubs. Structurally, cool season, deep-rooted perennial bunchgrasses are very dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted bunchgrasses are subdominant.

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 Plant Species Composition”.

FUNCTION:

This site is well suited for big game for summer and fall range. It is also well suited for livestock and recreation use in the summer and fall. The site can also be used by big game and livestock and for recreation in late spring.

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

The site has moderately low to moderately high runoff potential. Snow accumulates on the site due to high elevation and presence of tall shrubs.

Ecological Dynamics of the Site:
Influence of fire:

In the absence of normal fire frequency, bitterbrush increases to the point of being co-dominant with mountain big sagebrush. Utah juniper and pinyon pine can also invade if a seed source is in the proximity. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, Utah juniper and pinyon pine can displace most of the shrubs and other understory species.

When fires become more frequent than historic levels (20-40 years), mountain big sagebrush and bitterbrush are reduced significantly. With continued short fire frequency, big sagebrush and 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 at lower elevations and Sandberg bluegrass and bulbous bluegrass in the higher elevation areas along with a variety of annual and perennial forbs including noxious and invasive plants. See “Influence of juniper and pinyon pine invasion” below.

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 reduced vigor of the bunchgrasses and possibly bitterbrush. Tall shrubs such as birchleaf mountain mahogany and serviceberry become “high-lined”. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to juniper and pinyon pine invasion, an increase in mountain big sagebrush and mountain snowberry. An increase in these taller shrubs generally leads to an increase in juniper by providing bird perches and “nursery” sites for juniper establishment.

Continued improper grazing management influences fire frequency by increasing fine fuels. If annuals increase due to improper grazing management and they become co-dominant with Sandberg bluegrass, 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 undesirable shrubs and trees. A planned grazing system can also 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 and trees can increase the annuals which lead to more frequent fire intervals.

Weather influences:

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

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

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment and production are

usually reduced. Prolonged drought can lead to reduction in fire frequency.

Influence of insects and disease:

Insects and disease outbreaks can affect vegetation health. The tent caterpillar (Malacosoma fragilis)defoliates bitterbrush and two consecutive years of defoliation can cause mortality. Mountain big sagebrush is a host to many insects. Entire stands are not normally killed but small patches can be affected. Snowmold can be serious in mountain big sagebrush populations. Due to the resilience of the species little long term damage is done to the population.

An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available.

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 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. Utah juniper and pinyon pine can seriously degrade the grass, forb and shrub understory.

Influence of wildlife:

Big game animals make use of this site in the spring, summer and fall. Their numbers are seldom high enough to adversely affect the plant community. Big game numbers within this MLRA are usually limited by the winter range, not the summer range. Herbivory can be detrimental to bitterbrush and birchleaf mountain mahogany 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 invasion of juniper and pinyon pine. Juniper and pinyon pine invasion is triggered by lack of fire, improper grazing management and prolonged drought. The 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.

Influence of juniper and pinyon pine* invasion:

In plant communities that are invaded 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 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.

** Where pinyon pine occurs in association with juniper, pinyon pine has many of the same attributes and reacts similarly.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

State 1.
Phase 1.1 to 1.2. Develops in the absence of fire. No juniper seed source present.
Phase 1.1 to 1.3. Usually results from improper grazing management and absence of fire. Juniper seed source is present.
Phase 1.1 to 1.4. Results from one or more fires.
Phase 1.1 to 1.5. Develops in the absence of fire. Juniper seed source present.
Phase 1.1 to 1.6. Results from improper grazing management and absence of fire. No juniper seed source is present.
Phase 1.3 to 1.1. Develops with prescribed grazing, prescribed burning or fire.
Phase 1.4 to 1.1. Develops with prescribed grazing and no fire.
Phase 1.5 to 1.1. Develops with prescribed burning or fire and prescribed grazing.
Phase 1.6 to 1.1. Develops with brush management, no fire and prescribed grazing.
Phase 1.2 to 1.4. Results from prescribed burning or fire.
Phase 1.3 to 1.4. Results from prescribed burning or fire.
Phase 1.5 to 1.4. Results from prescribed burning or fire.
Phase 1.6 to 1.4. Results from prescribed burning or fire.

State 1 Phase 1.6 to State 2 Phase 2.1. Develops through improper grazing management and no fire. The site has crossed the threshold. It is not economically feasible to move this state back towards the HCPC.

State 1 Phase 1.3 and 1.5 to State 3. Develops with no fire and improper grazing management. The site has crossed the threshold. It is not economically feasible to move this site back to the HCPC.

State 2 Phase 2.1 to 2.2. Develops with frequent fire and possibly improper grazing management. Both phases of State 2 have crossed the threshold.

State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by improper grazing management and/or frequent fire cause this state to retrogress to a new site with reduced potential. It has crossed the threshold.

State 3 to State 2 Phase 2.2. Develops with fire.

State 3 to unknown site. Continued lack of fire and improper grazing management cause this state to retrogress to a new site with reduced potential due to significant soil loss and changes in hydrology. It has crossed the threshold.

Practice limitations.

Moderate to severe limitations exist for brush control and seeding with ground moving equipment due to steep slopes and stony soils.

State and transition model

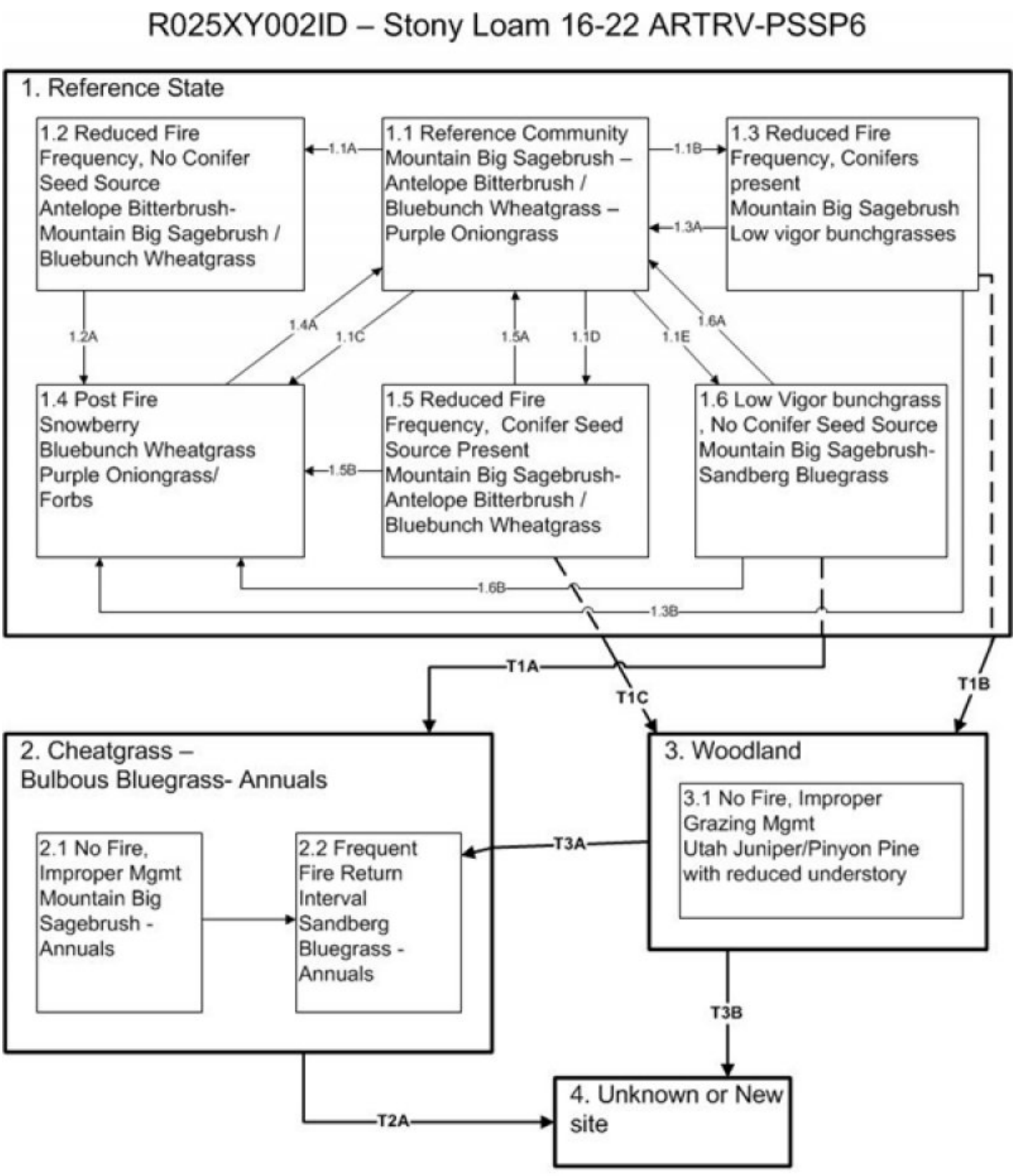

Figure 3. S&T 25x-02

State 1
Reference State

Community 1.1
Reference Plant Community

This plant community has bitterbrush and Mountain big sagebrush in the overstory with bluebunch wheatgrass dominant in the understory. Other significant species in the plant community are Idaho fescue, purple oniongrass, Sandberg bluegrass and arrowleaf balsamroot. Natural fire frequency is 20 to 40 years.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	650	975	1400
Shrub/Vine	250	375	500
Forb	100	150	200
Total	**1000**	**1500**	**2100**

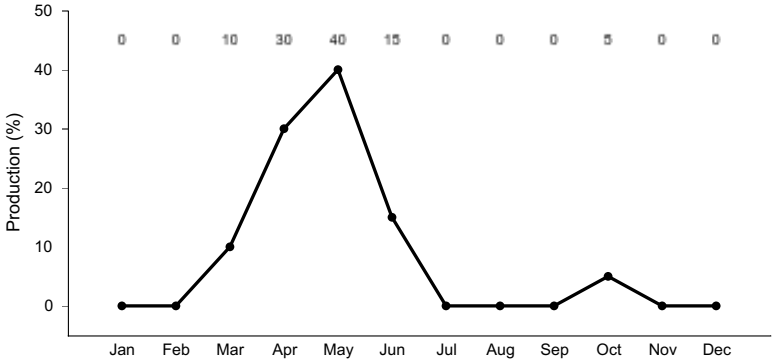

Figure 5. Plant community growth curve (percent production by month). ID0902, D25 ARTRV Early Seral.

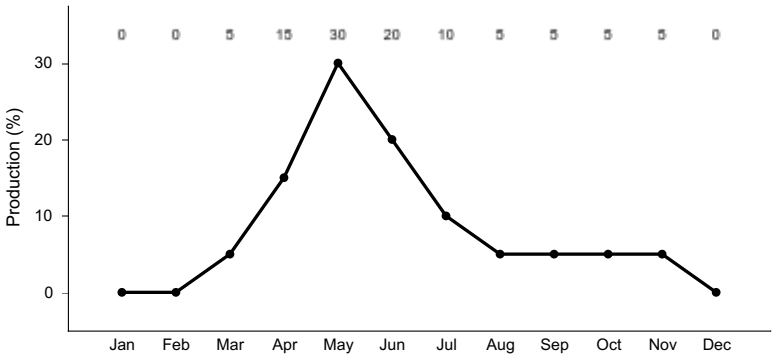

Figure 6. Plant community growth curve (percent production by month). ID0903, D25 JUOC/POSE/ANNUALS.

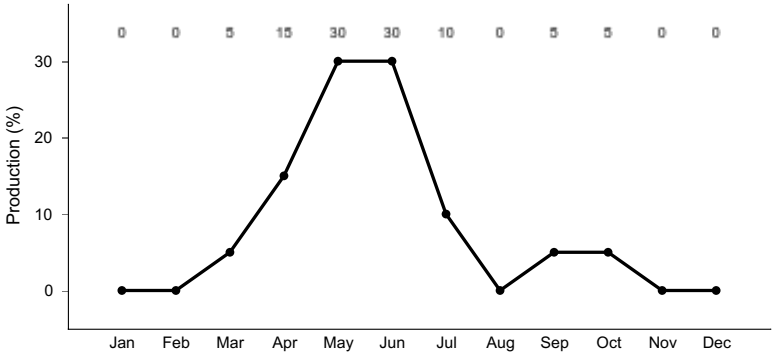

Figure 7. Plant community growth curve (percent production by month).

Community 1.2
Reduced Fire Frequency - No Conifer

This plant community is dominated in the overstory by bitterbrush. Mountain big sagebrush is present. Bluebunch wheatgrass is dominant in the understory. Other perennial grasses and forbs include Idaho fescue, purple oniongrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot and lupine. No Utah juniper or Pinyon pine seed source is present. This state has developed due to fire frequency being much longer than normal.

Community 1.3
Reduced Fire Frequency - Conifers Present

This plant community is dominated by mountain big sagebrush in the overstory with Utah juniper and Pinyon pine seedlings and saplings. Sandberg bluegrass is the dominant grass in the understory. Bluebunch wheatgrass and Idaho fescue are present but in reduced amounts and typically in low vigor. This state has developed due to improper grazing management and lack of fire. A seed source of Utah juniper and Pinyon pine is in the proximity.

Community 1.4
Post Fire

This plant community is dominated by bluebunch wheatgrass. Idaho fescue, Purple oniongrass, Sandberg bluegrass and other perennial grasses and forbs are subdominant. Mountain snowberry is the dominant shrub. This plant community developed as a result of prescribed fire or wildfire.

Community 1.5
Reduced Fire Frequency -Conifer Seedlings

This plant community is similar to Phase A except that Utah juniper and Pinyon pine seedlings and saplings are invading the site due to a lack of fire. A juniper seed source is in the proximity. This state has developed due to the absence of fire.

Community 1.6
Low Vigor Bunchgrass - No Conifers present

This plant community is dominated by mountain big sagebrush in the overstory. Sandberg bluegrass is the dominant grass in the understory. Bluebunch wheatgrass and Idaho fescue are present but in reduced amounts and typically in low vigor. This state has developed due to improper grazing management and a lack of fire. No Utah juniper or Pinyon pine seed source is in the proximity.

State 2
Cheatgrass- Bulbous Bluegrass - Annuals

Community 2.1
No Fire - Improper Mgmt

This plant community is dominated by mountain big sagebrush with annuals in the interspaces. This state has developed due to improper grazing management and the absence of fire. It has crossed the site threshold. It is not economically feasible to move this state back towards State 1.

Community 2.2
Frequent Fire

This plant community is dominated by Sandberg bluegrass and other annual and perennial grasses and forbs. Root sprouting shrubs such as mountain snowberry, dwarf green rabbitbrush and gray horsebrush are present. This state has developed due to frequent fires and improper grazing management. The site has crossed the threshold. It is not economically feasible to move this state back towards State 1.

State 3
Woodland

Community 3.1
No Fire - Improper Mgmt

This plant community is dominated by Utah juniper and Pinyon pine. Remnants of bluebunch wheatgrass and Idaho fescue can be found in the understory. Shallow-rooted grasses, such as Sandberg bluegrass, and other annuals can be found in the interspaces. Few shrubs are present. This state has developed in the absence of fire and improper grazing management. Generally, shrub cover is below 12-13%, bare ground is above 27-28%, juniper cover is greater than 20% and infiltration less than 6 cm/hr. The site is near or has crossed the threshold to this state. It is not economically feasible to move this state back towards state 1.

State 4
Unknown or New site

Community 4.1
Unknown

This plant community has gone over the threshold to a new site. Site potential has been reduced. Significant soil loss has occurred. Infiltration has been reduced and run-off has become more rapid. This state has developed due to continued improper grazing management and/or frequent fires or the continued absence of fire where a Utah juniper and Pinyon pine seed source is present. This unknown new site can be reached from State 3 with further dominance of the site by juniper and Pinyon pine. It is not economically feasible to move this new site back towards State 1.

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				650–1400	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	195–420	–
	purple oniongrass	MESP	*Melica spectabilis*	60–125	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	30–70	–
	Idaho fescue	FEID	*Festuca idahoensis*	30–70	–
	muttongrass	POFE	*Poa fendleriana*	25–55	–
	Sandberg bluegrass	POSE	*Poa secunda*	10–30	–
	bearded wheatgrass	ELCA11	*Elymus caninus*	10–30	–
	squirreltail	ELEL5	*Elymus elymoides*	0–15	–
	needle and thread	HECO26	*Hesperostipa comata*	0–15	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	0–15	–
	sedge	CAREX	*Carex*	0–15	–
	basin wildrye	LECI4	*Leymus cinereus*	0–15	–
	spike fescue	LEKI2	*Leucopoa kingii*	0–15	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–15	–
Forb					
2				100–200	
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	10–30	–

	Indian paintbrush	CASTI2	*Castilleja*	0–15	–
	meadow thistle	CISC2	*Cirsium scariosum*	0–15	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–15	–
	buckwheat	ERIOG	*Eriogonum*	0–15	–
	oneflower helianthella	HEUN	*Helianthella uniflora*	0–15	–
	pea	LATHY	*Lathyrus*	0–15	–
	western stoneseed	LIRU4	*Lithospermum ruderale*	5–15	–
	fernleaf biscuitroot	LODI	*Lomatium dissectum*	0–15	–
	lupine	LUPIN	*Lupinus*	0–15	–
	owl's-clover	ORTHO	*Orthocarpus*	0–15	–
	beardtongue	PENST	*Penstemon*	0–15	–
	phlox	PHLOX	*Phlox*	5–15	–
	mule-ears	WYAM	*Wyethia amplexicaulis*	5–15	–
	deathcamas	ZIGAD	*Zigadenus*	0–15	–
	common yarrow	ACMI2	*Achillea millefolium*	5–15	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	5–15	–
	timber milkvetch	ASMI9	*Astragalus miser*	0–15	–
Shrub/Vine					
3				250–500	
	antelope bitterbrush	PUTR2	*Purshia tridentata*	60–125	–
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	45–100	–
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	10–30	–
	yellow rabbitbrush	CHVIV4	*Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus*	10–30	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	10–30	–
	horsebrush	TETRA3	*Tetradymia*	0–15	–
	creeping barberry	MARE11	*Mahonia repens*	0–15	–
	Saskatoon serviceberry	AMAL2	*Amelanchier alnifolia*	0–15	–

Animal community

Wildlife Interpretations.

The 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. Mule deer, elk and occasionally pronghorn antelope utilize the site. The south and west facing slopes may provide winter habitat for deer and elk. The rangeland habitat provides seasonal habitat for resident and migratory animals including western toad, shrews, bats, ground squirrels, mice, coyote, red fox, badger, Ferruginous hawk and prairie falcon. Area sensitive animal species include Brewer’s sparrow, sage thrasher, sage sparrow, sage-grouse, northern leopard frog and Columbia spotted frog. Water features are sparse provided by seasonal runoff, artificial water catchments and springs.

State 1 Phase 1.1 – Antelope Bitterbrush/ Mountain Big Sagebrush/ Bluebunch Wheatgrass/ Idaho Fescue/ Purple Oniongrass 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 bird and mammal species utilize this habitat based on the availability of invertebrate prey species. The reptile and amphibian community is represented

by common sagebrush lizard, western rattlesnake, western toad, Columbia spotted frog and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Development of spring sites that collect all available water would exclude amphibian use on these sites. Native shrub-steppe obligate bird species utilizing the habitat include the Brewer's sparrow, sage sparrow and sage thrasher. Sage-grouse habitats (nesting, brood-rearing and winter) are provided by this plant community. The plant community provides seasonal food and cover for large herbivores including mule deer and elk. Antelope bitterbrush is present in this plant community, along with bluebunch wheatgrass and Idaho fescue are important forage for mule deer and elk. South facing slopes may provide winter food habitat for mule deer and elk. A small mammal population including golden-mantled ground squirrels, Merriam's shrew, Columbia Plateau ground squirrel, bushy-tailed woodrat, jackrabbit and yellow-bellied marmots utilize this plant community. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase1.2- Antelope Bitterbrush/ Bluebunch Wheatgrass/ Idaho Fescue/ Mountain Big Sagebrush Plant Community: This state has developed due to fire frequency being much longer than normal. An increase in canopy of antelope bitterbrush and sagebrush contributes to a declining herbaceous understory. The reptile community will be similar to State 1 Phase 1.1 community represented by common sagebrush lizard and western rattlesnake. Sagebrush provides brood-rearing, winter cover and winter food for sage-grouse but as understory vegetation declines and bitterbrush increases the quality of this habitat for nesting is reduced or eliminated. The plant community supports spring, fall and in mild winters forage for mule deer and elk. A small mammal population including golden-mantled ground squirrels, Merriam's shrew, Columbia Plateau ground squirrel, bushy-tailed woodrat, jackrabbit and yellow-bellied marmots utilize this plant community. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed.

State 1 Phase 1.3 –Mountain Big Sagebrush/ Sandberg Bluegrass/ Utah Juniper/ Pinyon Pine Plant Community: This plant community is the result of improper grazing management and lack of fire. An increase in canopy of sagebrush, junipers and pinyon pine contributes to a sparse herbaceous understory. A reduced herbaceous understory results in less diversity and numbers of insects. The reptile community will be similar to State 1 Phase 1.1 community. The reduced understory cover may reduce quality of food and cover for reptile populations. As juniper and pinyon pine increases, habitat quality for Brewer's sparrow, sage thrasher and sage sparrow may decrease. Remaining sagebrush provides brood-rearing, winter cover and winter food for sage-grouse but as juniper and pinyon pine encroaches the quality of this habitat is severely reduced or eliminated. No sage-grouse nesting habitat is provided. The increase in pinyon pine provides habitat for pinyon jay, Clark's nutcracker and western scrub jay. These bird species are beneficial to this site as they are the principal vector for planting pinyon pine seed. The quality of spring and fall grazing habitat for mule deer and elk is significantly reduced due to the loss of vigor and production of bluebunch wheatgrass and Idaho fescue. Juniper and pinyon pine can provide winter habitat (cover and food) for mule deer. As juniper encroaches the site will provide additional thermal cover for large mammals. A small mammal population would be similar to State 1 Phase 1.2 small mammal community.

State 1 Phase 1.4 – Mountain Snowberry/ Bluebunch Wheatgrass/ Idaho Fescue/ Purple Oniongrass/ Sandberg Bluegrass Plant Community: The plant community is a result of recent wildfire or prescribed burning. The plant community, dominated by herbaceous vegetation with little or no sagebrush and antelope bitterbrush would provide less vertical structure for animals. Patches of mountain snowberry would add vertical structure and desirable forage for large herbivores over time. Insect diversity would be reduced but a native forbs plant community similar to State 1 Phase 1.1 would still support select pollinators. Reptile community would be similar to State 1 Phase 1.1 community. 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 and antelope bitterbrush canopy would limit use of these areas as nesting habitat by Brewer's sparrow, sage sparrow and sage thrasher. Brood-rearing habitat for sage-grouse would be provided when adjacent to sagebrush cover. The dominant herbaceous vegetation improves habitat for grassland avian species (horned lark, savannah sparrow, vesper sparrow and western meadowlark). Mule deer and elk use would be seasonal (spring, summer and fall) and offer reduced thermal cover and young of year cover due to the loss of bitterbrush and sagebrush. The diversity and populations of small mammals would be dominated by open grassland species. Large blocks of this plant community would fragment historic plant community and reduce the quality of habitat for shrub-steppe obligate animal species.

State 1 Phase 1.5 – Mountain Big Sagebrush/ Antelope Bitterbrush Bluebunch Wheatgrass/ Idaho Fescue/ Purple Oniongrass/ Utah Juniper/ Pinyon Pine Plant Community: This plant community is the result of a lack of fire. An increase in canopy of sagebrush, juniper and pinyon pine contributes to a sparse herbaceous understory. The

insect community would be similar to State 1 Phase 1.1 community. The reptile community will be similar to State 1 Phase 1.1 community. As juniper and pinyon pine increases, habitat quality for Brewer's sparrow, sage thrasher and sage sparrow may decrease. Remaining sagebrush provides brood-rearing, winter cover and winter food for sage-grouse but as juniper and pinyon pine encroaches the quality of this habitat is severely reduced or eliminated. The increase in pinyon pine provides habitat for pinyon jay, Clark's nutcracker and western scrub jay. These bird species are beneficial to this site as they are the principal vector for planting pinyon pine seed. The quality of spring, summer and fall grazing habitat for mule deer and elk is reduced due to the loss of vigor and production of understory vegetation. As juniper and pinyon pine encroaches the site will provide additional thermal cover for large herbivores. The increase in juniper and pinyon pine provides winter habitat (cover and food) for mule deer. A small mammal population including golden-mantled ground squirrels, Merriam's shrew, Columbia Plateau ground squirrel, bushy-tailed woodrat, jackrabbit and yellow-bellied marmots utilize this plant community.

State 1 Phase 1.6 – Mountain Big Sagebrush/ Sandberg Bluegrass/ Plant Community: This plant community is the result of improper grazing management and lack of fire. An increase in canopy of sagebrush contributes to a sparse herbaceous understory. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, western toad and northern leopard frog. Shrub-steppe obligate bird species include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Quality of habitats (brood-rearing and nesting cover) for sage-grouse is reduced due to a less diverse herbaceous plant community. Winter habitat (cover and food) for sage-grouse is provided. The reduced vigor and production of understory vegetation provides for a shorter grazing season for mule deer and elk. Small mammal diversity and populations would be similar to State 1 Phase 1.2.

State 2 Phase 2.1 – Mountain Big Sagebrush/ Annuals Plant Community: This state has developed due to improper grazing management and the absence of fire. An increase in canopy of sagebrush contributes to a reduction of bluebunch wheatgrass and Idaho fescue. The reduced diversity of herbaceous understory results in less diversity of insects. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, western toad and northern leopard frog. The reduced diversity of insects may reduce reptile populations. Shrub-steppe obligate bird species include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Reduced herbaceous understory will lower quality of habitat for ground nesting bird species. Quality of habitats (brood-rearing and nesting cover) for sage-grouse is reduced due to poor vigor, low production and less diverse herbaceous plant community. Winter habitat (cover and food) for sage-grouse is provided. Young of year cover would be provided for mule deer and elk. Forage quality is reduced for mule deer and elk. Small mammal diversity and populations would be similar to State 1 Phase 1.2.

State 2 Phase 2.2 – Sandberg/ Annuals/ Forbs/ Dwarf Green Rabbitbrush Plant Community: This state has developed due to improper grazing management and frequent fire. The reduced forbs and shrub component in the plant community would support a very limited population of pollinators. Habitat for common sagebrush lizard and western toad would be limited due to the loss of sagebrush. The loss of sagebrush and antelope bitterbrush would severely reduce the quality of habitat for sage thrasher, Brewer's sparrow, sage-grouse and sage sparrow. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Mule deer, elk and occasionally pronghorn may utilize the herbaceous vegetation in the early part of the year when the vegetation is more palatable. The diversity and populations of small mammals would be dominated by open grassland species. Hunting success on small mammals by predator species would increase. Large blocks of this plant community would fragment historic plant community and reduce the quality of habitat for shrub-steppe obligate animal species.

State 3 – Utah Juniper/ Pinyon Pine/ Sandberg Bluegrass Plant Community: This site has developed due to improper grazing management and no fire. The loss of native forbs and understory vegetation will reduce insect diversity on the site. The lack of flowering plants has reduced pollinators including butterflies and moths. Habitat for common sagebrush lizard and western toad would be limited due to the loss of sagebrush and understory cover. This plant community does not support life requisites for sage-grouse. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird, Pinyon pine, Clark's nutcracker, western scrub jay and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Pinyon jay, Clark's nutcracker and western scrub jay are beneficial to this site as they are the principal vector for planting pinyon pine seed. Off-site hunting success by raptors may increase due to an increase in perch sites. As juniper encroaches, the site will provide additional thermal cover and young of year cover for large mammals. An increase in juniper and pinyon pine provides food and cover for mule deer in the spring, fall and winter.

Grazing Interpretations.

This site is valuable for use by cattle, sheep and horses for use in the spring, summer and fall. It has a good variety of grasses, forbs and shrubs to give balanced animal nutrition. 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 in this site are in hydrologic groups B and C. They have moderately low to moderately high runoff potential.

Recreational uses

This site has good values for aesthetics and natural beauty. It has a large number of forbs and shrubs which have flowers in bloom from early spring throughout the summer and into the fall. It has a combination of grasses, forbs, small shrubs and large shrubs which offer some possibilities for screening and value as camping and picnicking areas. Hunting for upland game, elk and mule deer is good to excellent on this site.

Recreation use of this site includes hunting, hiking, horseback riding, plant and animal observation. Little motorized vehicle use can be done on the site due to the stony soils and steep slopes.

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

Wood products

Mature juniper and Pinyon pine that has invaded 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, 4/24/2024

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/Natural Resources Conservation Service 9173 W. Barnes Drive, Suite C Boise, ID 83709 (208) 378-5700
Date	08/07/2007
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills are common on this site. If rills are present, they are likely to occur on slopes greater than 20 percent and immediately following wildfire. Rills are most likely to occur on soils with surface textures of silty clay loam.

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2. **Presence of water flow patterns:** Water-flow patterns are common on this site. When they occur, they are short and disrupted by cool season grasses, tall shrubs and surface cobbles. They are not extensive.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals and/or terracettes occur on this site. In areas where slopes approach 20 percent and where flow patterns and/or rills are present, few pedestals may be expected. Terracettes are also common, especially on slopes greater than 20 percent.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not**

bare ground): On sites in mid-seral status, bare ground may range from 25-45 percent.

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

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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):** 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):** Values should range from 4 to 6.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** There is no data available on thickness of the A or A1 horizon. No data available on structure ranges. Soil organic matter (SOM) needs to be determined.

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

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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 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: Cool season, deep-rooted perennial bunchgrasses>>tall shrubs.

    Sub-dominant: Perennial forbs>shallow rooted bunchgrasses.

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Mountain big sagebrush and antelope bitterbrush will become decadent in the absence of fire and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase.

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14. **Average percent litter cover (%) and depth (in):** Additional litter cover data is needed but is expected to be 20-25 percent to a depth of 0.2 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 1500 pounds per acre (1670Kg/ha) in a year with normal precipitation and temperatures. Perennial grasses produce 65 percent of the total production, forbs 10 percent and shrubs 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. In addition, Utah juniper and pinyon pine can invade on this site.

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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in most years.
