Ecological site R025XY008ID
NORTH SLOPE STONY 12-16

Last updated: 4/24/2024
Accessed: 05/05/2024

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 Notes 25—Owyhee High Plateau
This area is in Nevada (56 percent), Idaho (30 percent), Oregon (12 percent), and Utah (2 percent). It makes up about 27,443 square miles. MLRA 25 is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. The western boundary is marked by a gradual transition to the lower and warmer basins of MLRA 24. The boundary to the south-southeast, with MLRA 28B, is marked by gradual changes in geology marked by an increased dominance of singleleaf pinyon and Utah juniper and a reduced presence of Idaho fescue. The boundary to the north, with MLRA 11, is a rapid transition from the lava plateau topography to the lower elevation Snake River Plain.
Physiography:
All of this area lies within the Intermontane Plateaus. 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 province. This part of the MLRA forms the southern boundary of the extensive Columbia Plateau basalt flows. Most of the northern half is in the Payette section, but the northeast corner is in the Snake River Plain section. Deep, narrow canyons draining into the Snake River have been incised into this broad basalt plain. Elevation ranges from 3,000 to 7,550 feet on rolling plateaus and in gently sloping basins. It is more than 9,840 feet on some steep mountains. The Humboldt River crosses the southern half of this area
Geology:
The dominant rock types in this MLRA are volcanic. They include andesite, basalt, tuff, and rhyolite. In the north and west parts of the area, Cretaceous granitic rocks are exposed among Miocene volcanic rocks in mountains. A Mesozoic igneous and metamorphic rock complex dominates the south and east parts of the area. Upper and Lower Paleozoic calcareous sediments, including oceanic deposits, are exposed with limited extent in the mountains. Alluvial fan and basin fill sediments occur in the valleys.
Climate:
The average annual precipitation in most of this area is typically 11 to 22 inches. It increases to as much as 49 inches at the higher elevations. Rainfall occurs in spring and sporadically in summer. Precipitation occurs mainly as snow in winter. The precipitation is distributed fairly evenly throughout fall, winter, and spring. The amount of precipitation is lowest from midsummer to early autumn. The average annual temperature is 33 to 51 degrees F. The freeze-free period averages 130 days and ranges from 65 to 190 days, decreasing in length with elevation. It is typically less than 70 days in the mountains.
Water:
The supply of water from precipitation and streamflow is small and unreliable, except along the Owyhee, Bruneau, and Humboldt Rivers. Streamflow depends largely on accumulated snow in the mountains. Surface water from mountain runoff is generally of excellent quality and suitable for all uses. The basin fill sediments in the narrow alluvial valleys between the mountain ranges provide some ground water for irrigation. The alluvial deposits along the large streams have the most ground water. Based on measurements of water quality in similar deposits in

adjacent areas, the basin fill deposits probably contain moderately hard water. The water is suitable for almost all uses. The carbonate rocks in this area are considered aquifers, but they are little used. Springs are common along the edges of the limestone outcrops.
Soils:
The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic or frigid temperature regime and an aridic, aridic bordering on xeric, or xeric moisture regime. Soils with aquic moisture regimes are limited to drainage or spring areas, where moisture originates or runs on and through. These soils are of a very limited extent throughout the MLRA. They generally are well drained, clayey or loamy, and shallow or moderately deep. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam with ashy texture modifiers in some areas. Argillic horizons occur on the more stable landforms. They are exposed nearer the soil surface on convex landforms, where ash and loess deposits are more likely to erode. Soils that formed in carbonatic parent material in areas that receive less than 12 inches of precipitation are characterized by calcic horizons throughout the profile, while soils in areas that receive more than 12 inches of precipitation do not have calcic horizons in the upper part of the profile. Soils that formed on stable landforms at the lower elevations are dominated by ochric horizons. Soils that formed at the middle and upper elevations are characterized by mollic epipedons. Soils in drainage areas at all elevations that receive moisture running on or through them are characterized by thicker mollic epipedons.
Biological Resources:
This MLRA supports shrub-grass vegetation. Lower elevations are characterized by Wyoming big sagebrush associated with bluebunch wheatgrass, western wheatgrass, and Thurber's needlegrass. Other important plants include bluegrass, squirreltail, penstemon, phlox, milkvetch, lupine, Indian paintbrush, aster, and rabbitbrush. Black sagebrush occurs but is less extensive. Singleleaf pinyon and Utah juniper occur in limited areas. With increasing elevation and precipitation, vast areas characterized by mountain big sagebrush or low sagebrush/early sagebrush in association with Idaho fescue, bluebunch wheatgrass, needlegrasses, and bluegrass become common. Snowberry, curl-leaf mountain mahogany, ceanothus, and juniper also occur. Mountains at the highest elevations support whitebark pine, Douglas-fir, limber pine, Engelmann spruce, subalpine fir, aspen, and curl-leaf mountain mahogany.
Major wildlife species include mule deer, bighorn sheep, pronghorn, mountain lion, coyote, bobcat, badger, river otter, mink, weasel, golden eagle, red-tailed hawk, ferruginous hawk, Swainson's hawk, northern harrier, prairie falcon, kestrel, great horned owl, short-eared owl, long-eared owl, burrowing owl, pheasant, sage grouse, chukar, gray partridge, and California quail. Reptiles and amphibians include western racer, gopher snake, western rattlesnake, side-blotched lizard, western toad, and spotted frog. Fish species include bull, red band, and rainbow trout.

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

This site is on mesas and terraces with slopes from 20 to 60 percent on northerly exposures. The elevations are from 4500 to 6000 feet (1371 to 1828cm).

Soils are deep to very deep with an ashy texture and >40 percent rock fragments. Due to the rock fragments the Available Water Capacity (AWC) for this site is low, and due to the slope there is a high risk of water erosion.

This site supports a Wyoming big sagebrush and perenial bunchgrass community with annual production between 700 and 1600 lb/ac.

Associated sites

R025XY011ID	**LOAMY 13-16**
R025XY017ID	**SHALLOW BREAKS 14-18**
R025XY036ID	**SOUTH SLOPE LOAMY 12-16**
R025XY019ID	**LOAMY 10-13**

R025XY024ID	**LOAMY 12-16**

Similar sites

R025XY023ID	**NORTH SLOPE LOAMY 16-22**

Table 1. Dominant plant species

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

Physiographic features

This site occurs on hilly to very steep slopes that range from 20-60 percent on northerly exposures. Elevations are 4500 to 6000 feet (1372-1829 meters).

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Terrace
Runoff class	High to very high
Flooding frequency	None
Ponding frequency	None
Elevation	4,500–6,000 ft
Slope	20–60%
Water table depth	60 in
Aspect	N, NE, E

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 (36cm) (based on 6 long term climate stations located throughout the MLRA).

The mean annual temperature in degrees F is 45.9. The average high is 59.7 and the average low temperature is 32.1. 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 (characteristic range)	79-103 days
Freeze-free period (characteristic range)	114-140 days
Precipitation total (characteristic range)	32-60 in
Frost-free period (average)	92 days
Freeze-free period (average)	122 days
Precipitation total (average)	43 in

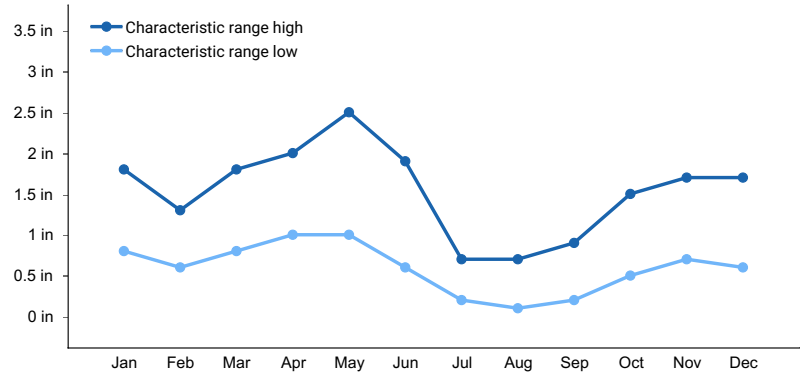

Figure 1. Monthly precipitation range

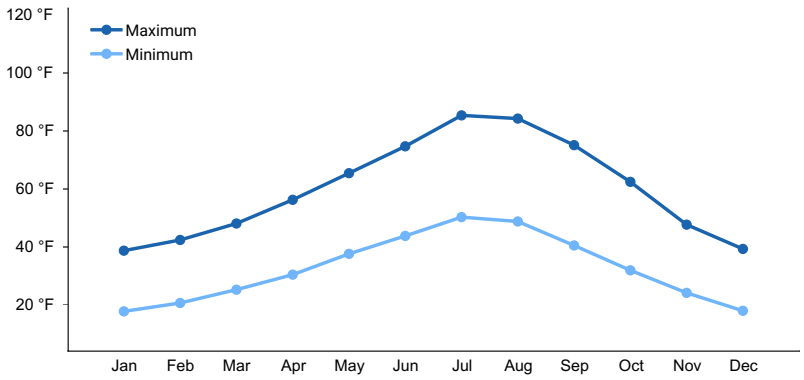

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water or wetland features commonly associated with this site.

Soil features

The soils supporting this site are moderately deep to very deep, usually 40-60 inches deep to either bedrock or a duripan. The soils are well drained, with moderately slow to moderately rapid permeability. Runoff is medium to very high. The erosion hazard is severe or very severe by water. The available water holding capacity (AWC) is very low to low. The surface texture is generally loam or sandy loam with many surface stones. The soils have a thick, dark surface horizon. The subsoil is usually moderately well to well developed with clay ranging from approximately 12 to 52 percent. They often have a clay loam subsoil which will somewhat restrict water and root penetration. These soils are characterized by limited AWC, stoniness, and a xeric soil moisture regime. Soil temperature regime is frigid.

Soil series correlated with this site are: Doodlelink, Player and Stines.

Table 4. Representative soil features

Parent material	(1) Colluvium–volcanic breccia (2) Alluvium
Surface texture	(1) Very cobbly loam (2) Very stony sandy loam (3) Very gravelly loam
Drainage class	Well drained
Permeability class	Moderately rapid
Depth to restrictive layer	30–60 in
Soil depth	30–60 in

Surface fragment cover <=3"	18–38%
Surface fragment cover >3"	2–22%
Available water capacity (0-40in)	2.4–5.1 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0–70%

Ecological dynamics

The dominant visual aspect is mixed shrubs, forbs, and grasses. Composition by weight is approximately 40-60 percent grass, 10-20 percent forbs and 30-40 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 antelope, mule deer, Rocky Mountain elk and lagomorphs.

Fire has historically occurred on the site at intervals of 20-40 years.

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. This plant community is dominated by bluebunch wheatgrass, Idaho fescue and mountain big sagebrush. Bitterbrush is usually present. Subdominant species include Nevada and Sandberg bluegrass, mountain brome, arrowleaf balsamroot and lupine. The plant species composition of Phase 1.1 is listed later under “Reference Plant Community Phase Plant Species Composition”.

Total annual production is 1200 pounds per acre (1345 kilograms per hectare) in a normal year. Production in a favorable year is 1600 pounds per acre (1793 kilograms per hectare). Production in an unfavorable year is 800 pounds per acre (896 kilograms per hectare). 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.

FUNCTION:

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

Due to the relatively high rainfall, elevation and favorable cool-season growing season, it is fairly resistant to disturbances that can potentially degrade the site. The lower elevation portions of the site, those closest to the drainage bottom or draw, are the most vulnerable due to animal and human access.

Due to the relatively high production and deep soils, infiltration is normally high and runoff low to moderate. Runoff, when it does occur is non-erosive except during high intensity convection storms. Snow accumulates on the site due to high elevation, north exposure and presence of tall shrubs.

Impacts on the Plant Community:
Influence of fire:

In the absence of normal fire frequency, shrubs can gradually increase. Juniper can invade the site if a seed source is in the proximity. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, juniper 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), Sandberg bluegrass and bulbous bluegrass along with a variety of annual and perennial forbs including noxious and invasive plants. Where snowbrush ceanothus is present in the stand, it can become a dominant species after fires.

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. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an invasion of both juniper and noxious and invasive plants. An increase in mountain big sagebrush will also likely occur. If there is a juniper seed source in the proximity, an increase in tall 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 cheatgrass increases due to improper grazing management and becomes 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 reduction can lead to gradual increases in mountain big sagebrush and/or western juniper. 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 can increase cheatgrass 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 effected 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. Mortality can occur. Prolonged drought can lead to reduction in fire frequency.

Influence 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. The sagebrush defoliator moth (Aroga websterii) causes mortality in relatively small patches. It seldom kills the entire stand. Mormon cricket and grasshopper outbreaks occur periodically. Outbreaks seldom cause plant mortality since defoliation of the plant occurs only once during the year of the outbreak.

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 invasive perennial 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 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 invasion of juniper. Juniper invasion can be triggered by lack of fire, poor 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 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 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 in the absence of fire and some degree of improper grazing management. A juniper seed source is present.
Phase 1.1 to 1.3. Develops with fire. Prescribed grazing management can be present. No juniper seed source is present.
Phase 1.1 to 1.4. Develops in the absence of fire. Some degree of improper grazing management is present.
Phase 1.2 to 1.1. Results from prescribed burning and prescribed grazing.
Phase 1.3 to 1.1. Results from absence of fire and prescribed grazing.
Phase 1.4 to 1.1. Results from prescribed grazing.
Phase 1.4 to 1.3. Results from fire.

State 1 Phase 1.3 to State 2 Phase 2.1. Develops through improper grazing management and no fire. This site has crossed the threshold. It is economically impractical to move it back to State 1 with accelerated practices.

State 1 Phase 1.3 to State 2 Phase 2.2. Develops through improper grazing management and frequent fire. This site has crossed the threshold. It is economically impractical to move it back to State 1 with accelerated practices.

State 1 Phase 1.2 to State 3. Develops with no fire and improper grazing management. This site has crossed the threshold. It is economically impractical to move this site back to State 1 with accelerated practices.

State 2. Phase 2.1 to 2.2. Results from prescribed burning or frequent fires and improper grazing management.

State 2. Phase 2.2 to 2.1. Develops with no fire.

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. This site has crossed the threshold. It is economically impractical to move this site back to State 1 with accelerated practices.

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. This site has crossed the threshold. It is economically impractical to move this site back to State 1 with accelerated practices.

Practice Limitations:

Severe limitations exist for brush control and seeding on this site with ground moving equipment due to steep slopes and stoniness.

State and transition model

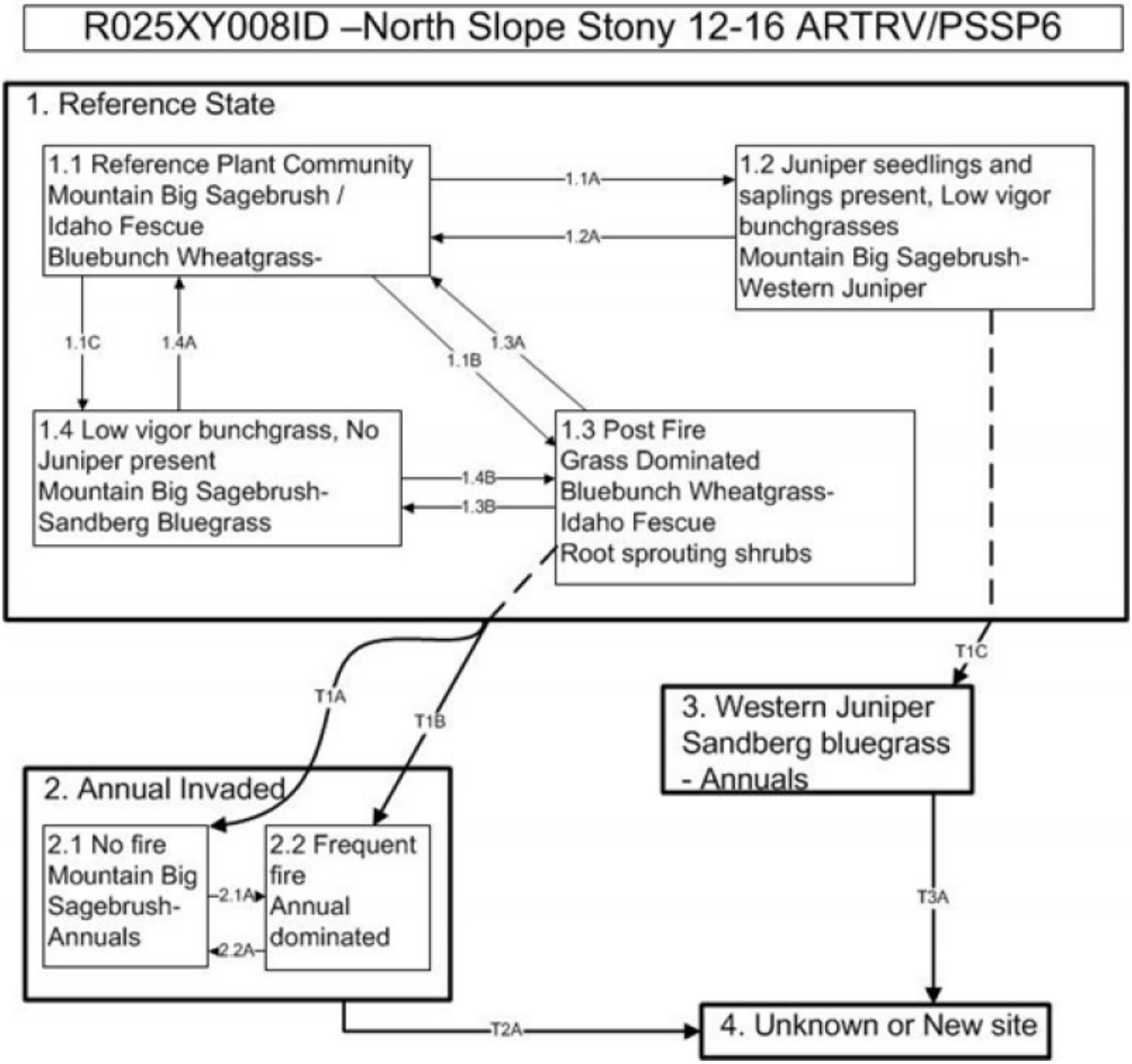

Figure 3. 25x-08

State 1
Reference State

Community 1.1
Reference Plant Community

This plant community has mountain big sagebrush in the overstory with bluebunch wheatgrass and Idaho fescue co-dominant in the understory. Other significant species in the plant community are mountain brome, slender wheatgrass, Nevada bluegrass, Sandberg bluegrass, arrowleaf balsamroot and antelope bitterbrush. 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	400	600	800
Shrub/Vine	280	420	560
Forb	120	180	240
Total	**800**	**1200**	**1600**

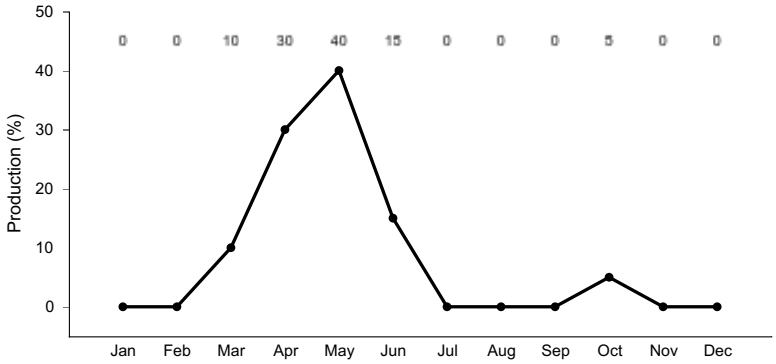

Figure 5. Plant community growth curve (percent production by month). ID0902, D25 ARTRV Early Seral.

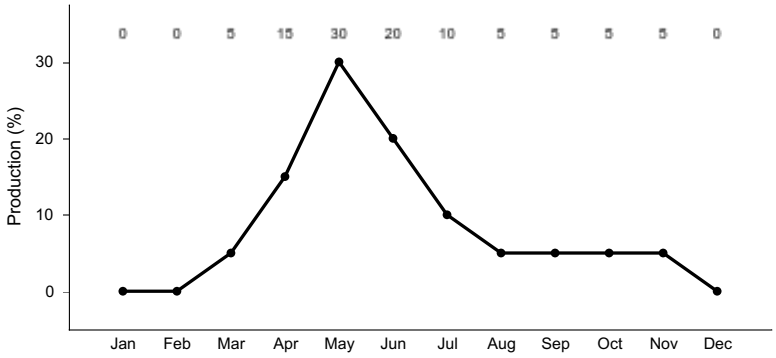

Figure 6. Plant community growth curve (percent production by month). ID0903, D25 JUOC/POSE/ANNUALS.

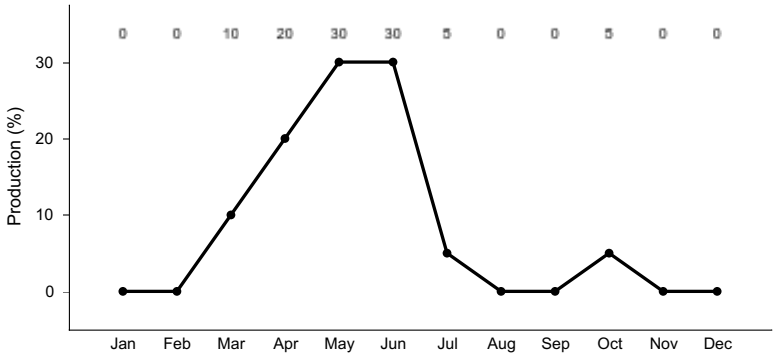

Figure 7. Plant community growth curve (percent production by month). ID0904, ARTRW8/PSSPS/ACTH7 HIGH PRECIP.

Community 1.2
Low Vigor Bunchgrasses - Juniper Present

This plant community is dominated by mountain big sagebrush with some invaded western juniper in the form of saplings in the overstory. There is a reduced amount of bluebunch wheatgrass and Idaho fescue and an increase in Sandberg bluegrass and forbs. Bluebunch wheatgrass and Idaho fescue are typically in low vigor. This state has developed due to improper grazing management and lack of fire.

Community 1.3
Post Fire - Grass Dominated

This plant community is co-dominated by bluebunch wheatgrass and Idaho fescue. Sandberg bluegrass and other perennial grasses and forbs are subdominant. No shrubs are present due to wildfire.

Community 1.4
Low Vigor Bunchgrasses - No Juniper

This plant community is dominated by mountain big sagebrush in the overstory. There is a reduced amount of bluebunch wheatgrass and Idaho fescue and an increase in Sandberg bluegrass and forbs. Bluebunch wheatgrass and Idaho fescue are typically in low vigor. This state has developed due to improper grazing management and lack of fire. No juniper seed source is in the proximity.

Pathway P1.1a
Community 1.1 to 1.2

Develops in the absence of fire and some degree of improper grazing management. A juniper seed source is present.

Pathway P1.1B
Community 1.1 to 1.3

Develops with fire. Prescribed grazing management can be present. No juniper seed source is present.

Pathway P1.1c
Community 1.1 to 1.4

Develops in the absence of fire. Some degree of improper grazing management is present.

Pathway P1.2a
Community 1.2 to 1.1

Results from prescribed burning and prescribed grazing.

Pathway P1.3a
Community 1.3 to 1.1

Results from absence of fire and prescribed grazing.

Pathway P1.3b
Community 1.3 to 1.4

Develops in the absence of fire. Some degree of improper grazing management is present.

Pathway P1.4a
Community 1.4 to 1.1

Results from prescribed grazing.

Pathway P1.4b
Community 1.4 to 1.3

Results from fire.

State 2

Annual Invaded

Community 2.1
No Fire - Mountain Big Sagebrush- Annuals

This plant community is dominated by mountain big sagebrush with annuals and some Sandberg's bluegrass in the interspaces. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices. This state has developed due to poor grazing management and the absence of fire.

Community 2.2
Frequent Fire - Annual Dominated

This plant community is dominated by Sandberg bluegrass, annual grasses and forbs. Root sprouting shrubs such as gray rabbitbrush can be present. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices. This state has developed due to frequent fires and improper grazing management.

State 3
Woodland

Community 3.1
Western Juniper- Sandberg Bluegrass

This plant community is dominated by juniper. Remnants of bluebunch wheatgrass and Idaho fescue can be found in the understory. Shallow-rooted grasses, such as Sandberg bluegrass, and annuals can be found in the interspaces. Few shrubs are present. This site has crossed the threshold. It is economically impractical to return this state to State 1 with accelerated practices. This state has developed in the absence of fire and improper grazing management.

State 4
Unknown new site

Community 4.1
Unknown new site

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 juniper seed source is present. It is economically impractical to move this site back to State 1 with accelerated practices.

Transition T1A
State 1 to 2

Develops through improper grazing management. This site has crossed the threshold. It is economically impractical to move it back to State 1 with accelerated practices. This transition may be to either phase of State 2 depending on presence or absence of fire.

Transition T1C
State 1 to 3

Develops with no fire and improper grazing management. This site has crossed the threshold. It is economically impractical to move this site back to State 1 with accelerated practices.

Transition T2A
State 2 to 4

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. This site has crossed the threshold. It is economically impractical to move this site back to State 1 with accelerated practices.

Transition T3A
State 3 to 4

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. This site has crossed the threshold. It is economically impractical to move this site back to State 1 with accelerated practices.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				400–800	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	140–280	–
	Idaho fescue	FEID	*Festuca idahoensis*	120–240	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	30–60	–
	California brome	BRCA5	*Bromus carinatus*	30–60	–
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	1–25	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	1–25	–
	Sandberg bluegrass	POSE	*Poa secunda*	1–25	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	1–10	–
	basin wildrye	LECI4	*Leymus cinereus*	0–10	–
	oniongrass	MEBU	*Melica bulbosa*	1–10	–
	sedge	CAREX	*Carex*	1–10	–
	squirreltail	ELEL5	*Elymus elymoides*	1–10	–
Forb					
2				120–240	
	lupine	LUPIN	*Lupinus*	30–60	–
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	30–60	–
	geranium	GERAN	*Geranium*	30–60	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	15–30	–
	ragwort	SENEC	*Senecio*	15–30	–
	buckwheat	ERIOG	*Eriogonum*	10–25	–
	nettleleaf giant hyssop	AGUR	*Agastache urticifolia*	10–25	–
	longleaf phlox	PHLO2	*Phlox longifolia*	10–25	–
	pale agoseris	AGGL	*Agoseris glauca*	0–10	–
	threadleaf phacelia	PHLI	*Phacelia linearis*	0–10	–
	aster	ASTER	*Aster*	1–10	–
	blue eyed Mary	COLLI	*Collinsia*	0–10	–
	western stoneseed	LIRU4	*Lithospermum ruderale*	1–10	–
Shrub/Vine					
3				280–560	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	140–280	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	50–100	–
	snowbrush ceanothus	CEVE	*Ceanothus velutinus*	0–40	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–40	–
	snowberry	SYMPH	*Symphoricarpos*	15–30	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	1–25	–
	Saskatoon serviceberry	AMAL2	*Amelanchier alnifolia*	1–25	–
	currant	RIBES	*Ribes*	1–10	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	0–10	–

Animal community

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 and elk may utilize the site at different times of the year. 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 bird species include Brewer's sparrow, sage thrasher, sage sparrow and greater sage-grouse. Water features are sparse provided by seasonal runoff, artificial water catchments and springs.

State 1 Phase 1.1 – Mountain Big Sagebrush/ Bluebunch Wheatgrass/ Idaho Fescue 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 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 (leks, nesting, brood-rearing and winter) are provided by this plant community. The plant community provides seasonal (spring, summer and fall) food and cover for mule deer and elk. Antelope bitterbrush may be present in this plant community, along with Idaho fescue and bluebunch wheatgrass are desirable forage species for large herbivores. 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 1.2- Mountain Big Sagebrush/ Western Juniper/ Bluebunch Wheatgrass/ Idaho Fescue/ Sandberg Bluegrass Plant Community: This state has developed due to fire frequency being much longer than normal or improper grazing management with no fire. An increase in canopy of sagebrush and junipers contributes to a sparse herbaceous understory. A reduced herbaceous understory results in less diversity and numbers of insects. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, and western toad. Amphibians are associated with adjacent spring sites. The reduced diversity of insects and understory cover may reduce quality of food and cover for the reptile community. As juniper 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 encroaches the quality of this habitat is severely reduced or eliminated. The plant community supports limited seasonal (spring and fall) habitat for elk. The quality of winter habitat for mule deer will increase. As juniper encroaches the site will provide additional thermal cover for large mammals. 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 1.3 – Bluebunch Wheatgrass/ Idaho Fescue/ Sandberg Bluegrass Plant Community: The plant community is a result of recent wildfire, prescribed burning or brush management. The plant community, dominated by herbaceous vegetation with little or no sagebrush would provide less vertical structure for animals. Insect diversity would be reduced but a native forbs plant community similar to State 1 Phase 1.1 would still support select pollinators. Habitat for common sagebrush lizard and western rattlesnake would be limited due to the loss of sagebrush. The dominance of herbaceous vegetation with little sagebrush 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 if site is adjacent to sagebrush cover. The dominant herbaceous vegetation improves habitat for grassland bird species (horned lark, savannah sparrow, vesper sparrow and western meadowlark). Mule deer and elk use would be seasonal (spring and fall) and site would offer little thermal cover and young of year cover due to the loss of shrub cover. 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 1.4 – Mountain Big Sagebrush / Bluebunch Wheatgrass/ Idaho Fescue/ Sandberg Bluegrass Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy

of sagebrush contributes to a sparse herbaceous understory. The reduced herbaceous understory results in less diversity of insects. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake and western toad. Amphibians are associated with springs adjacent to the site. Reduced herbaceous understory is a factor in limiting the use of this plant community by ground nesting bird species. Shrub-steppe obligate bird species include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Habitat (brood-rearing and nesting cover) quality 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 of understory vegetation provides for a shorter foraging season for mule deer and elk. Young of year cover would be provided for mule deer. Small mammal diversity and populations would be similar to State 1 Phase 1.1 small mammal community.

State 2 Phase 2.1 – Mountain Big Sagebrush / Annuals/ Sandberg Bluegrass Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy of sagebrush and improper grazing management contributes to an increase in cheatgrass. The reduced diversity of herbaceous understory and increase in invasive plants results in less diversity of insects. The reptile and amphibian community is similar to State 1,Phase 1.4. The reduced diversity of insects may reduce reptile diversity and populations. Reduced herbaceous understory will lower quality of habitat for ground nesting bird species. Shrub-steppe obligate bird species include Brewer's sparrow, sage sparrow, sage thrasher and sage-grouse. Quality of habitat (brood-rearing and nesting cover) for sage-grouse is reduced due to poor vigor and less diverse herbaceous plant community. Winter habitat (cover and food) for sage-grouse is provided. Limited forage for large mammals is available in the spring when annuals are more palatable. Young of year cover would be provided for deer. Small mammal diversity and populations would be similar to State 1,Phase 1.1 small mammal community.

State 2 Phase 2.2– Sandberg/ Annuals/ Forbs/ Dwarf Gray Rabbitbrush Plant Community: The community has developed due to continued improper grazing management and frequent fire. The plant community does not support a diverse insect community. The reduced forbs and shrubs in the plant community would support a very limited population of pollinators. Quality of food and cover habitat for reptilian species is reduced. This plant community does not support the life requisites for sage thrasher, Brewer's sparrow, sage-grouse or sage sparrow. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Large herbivores may utilize the herbaceous vegetation in spring and early summer when the vegetation is more palatable. The diversity and populations of small mammals would be dominated by open grassland species. Large blocks of this plant community would fragment historical plant community and reduce the quality of habitat for shrub-steppe obligate animal species.

State 3 – Western Juniper/ Sandberg Bluegrass/ Annuals 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. 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 and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Hunting success on the site by raptors may decrease due to heavy overstory of juniper. Hunting success by raptors on adjacent ecological sites may increase due to an increase in roosting sites. As juniper increases, the site will provide additional thermal cover for large mammals. This site can provide food and cover for mule deer in spring, fall and winter.

Grazing Interpretations.

The site is best suited for livestock grazing in the spring, summer and fall.

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

Hydrological functions

The soils in this site are in hydrologic group B. When the hydrologic conditions of the vegetative cover is good, natural erosion hazard is slight.

Recreational uses

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

vehicle use. Stoniness and steepness can make access difficult or limit opportunities.

Due to the relative abundance of wildlife that use this site, hunting is one of the primary uses. ATV's using this site can cause soil erosion and plant mortality due to the steep topography.

Wood products

Mature juniper that has invaded and increased 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
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Lee Brooks, Assistant State Conservationist, NRCS, Idaho (retired)

Type locality

Location 1: Cassia County, ID	
Township/Range/Section	T30 R15 S S22 E

Other references

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USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; version 4-2005.

Contributors

Dave Franzen And Jacy Gibbs

Approval

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.

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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 rarely occur on this site. If rills are present, they are likely to occur on slopes greater than 30 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 occur on the site. They occur as short and disrupted flows. They are disrupted by rocks, cool season grasses and tall shrubs and are not extensive.

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

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** On sites in mid-seral status, bare ground may range from 25-35 percent.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Wind-scoured, blowouts, and/or deposition areas are 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 4-6 .

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The surface horizon is typically 2 to 9 inches thick. Structure typically includes weak fine and medium or moderate medium granular. Soil organic matter (SOM) ranges from 1 to 5 percent.

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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):** 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 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 25-35 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 1200 pounds per acre (1345 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 40-60 percent of the total production, forbs 10-20 percent and shrubs 30-40 percent.

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

for the ecological site: Invasive Plants include cheatgrass, bulbous bluegrass, whitetop, rush skeletonweed, musk and scotch thistle and diffuse and spotted knapweed.

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