

Ecological site R012XY022ID Shallow Breaks 8-13 PZ JUOS/ARNO4/PSSPS

Last updated: 9/22/2020
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General information

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

MLRA notes

Major Land Resource Area (MLRA): 012X—Lost River Valleys and Mountains

Land Resource Region: B (Northwestern Wheat and Range)

MLRA: 12 (Lost River Valleys and Mountains)

EPA EcoRegion: Level III (Middle Rockies)

LRU notes

012X—Lost River Valleys and Mountains

Precipitation or Climate Zone: 8-13" P.Z.

<https://soils.usda.gov/survey/geography/mlra/index.html>

Ecological site concept

Site does not receive additional water.

Soils are:

Not saline or saline-sodic.

Shallow, with >35% (by volume) coarse fragments, skeletal within 20" of the soil surface.

strongly or violently effervescent in the to 20" of the soil profile.

textures usually range from loam to clay loam in surface mineral 4".

Slope is < 30%.

Clay content is = <35% in surface mineral 4".

Site does not have an argillic horizon with > 35% clay.

Associated sites

R012XY004ID	Gravelly Loam 8-12 PZ ARTRW8/PSSPS
R012XY006ID	Windswept 8-16 PZ ARFR4/POSE
R012XY017ID	Shallow Fractured South 8-12 PZ ARTRW8/PSSPS-LESAS2
R012XY032ID	Loamy 8-12 PZ ARTRW8/PSSPS

Table 1. Dominant plant species

Tree	(1) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Artemisia nova</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>

Physiographic features

This site occurs on rocky and stony bedrock outcrops, ridges and breaks on all exposures. Elevation ranges from 4200 to 6000 feet (1300-1850 meters). Slopes range from 1-30 percent.

Table 2. Representative physiographic features

Landforms	(1) Ridge
Elevation	1,280–1,829 m
Slope	1–30%

Climatic features

MLRA 12 is dominated by dramatic changes in elevation which, in turn, influence local weather patterns. The intermontane valleys have elevations as low as 3800 feet, while the adjacent mountains may reach more than 12,600 feet. The average annual precipitation for the entire MLRA, based on 10 long term climate stations located throughout the MLRA, is approximately 9.38 inches. However, the dry valleys may have averages as low as 6 inches, while the upper peaks may have averages that exceed 46 inches per year. Temperatures vary considerably over the year. The average annual temperature is 42.25 degrees F. The average low is 27.4 degrees while the average high temperature is 57 degrees. In the summer the sun shines 78% of the time, but drops to 40% in the winter. The prevailing wind is location-dependent, and generally flows parallel to the orientation of the dominant valleys. In the summer localized afternoon upslope winds and evening downslope winds are common. The average windspeed is greatest in the spring and early summer. The frost free period ranges from 102 to 107 days while the freeze free period ranges from 134 to 139 days across the MLRA.

Table 3. Representative climatic features

Frost-free period (average)	107 days
Freeze-free period (average)	139 days
Precipitation total (average)	279 mm

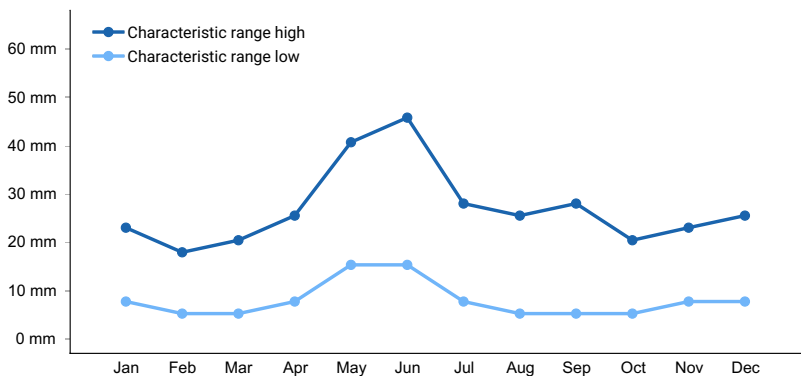


Figure 1. Monthly precipitation range

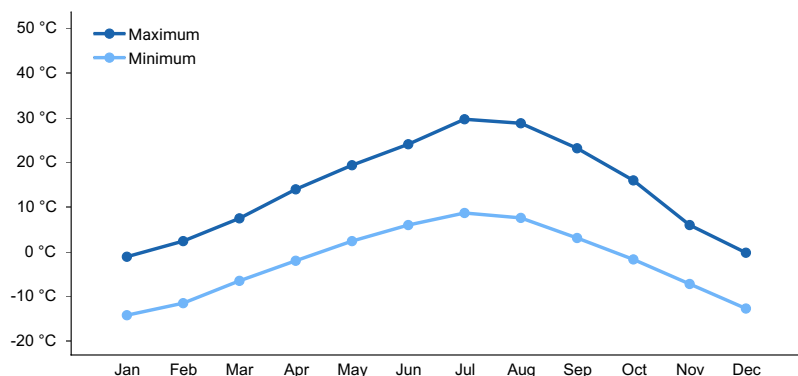


Figure 2. Monthly average minimum and maximum temperature

Influencing water features

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

Soil features

The soils on this site have stony loam surface textures. Coarse fragments usually exceed 35 percent by volume throughout the whole profile. The soil is shallow to bedrock, less than 20 inches. The soils are well drained with moderate permeability. The available water capacity is low. The soils have an aridic soil moisture regime and a frigid soil temperature regime.

Table 4. Representative soil features

Surface texture	(1) Stony loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	25–51 cm
Surface fragment cover ≤3"	0–25%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	5.59–7.37 cm
Calcium carbonate equivalent (0-101.6cm)	20–40%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume ≤3" (Depth not specified)	10–40%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The dominant visual aspect of this site is Utah juniper with a sparse understory composed primarily of bluebunch wheatgrass. All age groups of juniper trees are present; however, the large mature trees give the site its characteristic look. In the Historic Climax Plant Community (HCPC), juniper utilizes most of the available soil moisture, therefore little run-off occurs except during intense convection storms. These mature trees are generally heavily limbed and round-topped giving an indication of branching close to the ground. Curlleaf mountain mahogany is normally a minor component on the plant community at higher elevations, especially when the bedrock is composed of limestone. Fire rarely occurs on this site. When it does, it is at intervals of 500-1000 years. Fire does

not burn the entire site.

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 A. This plant community is dominated by Utah juniper in the overstory and bluebunch wheatgrass and black sagebrush in the understory. Subdominant species include Indian ricegrass, Sandberg bluegrass, arrowleaf balsamroot, tapertip hawksbeard and phlox. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 450 pounds per acre (500 kilograms per hectare) in a normal year. Production in a favorable year is 600 pounds per acre (666 kilograms per hectare). Production in an unfavorable year is 325 pounds per acre (360 kilograms per hectare). Composition by weight is approximately 35 percent grass, 10 percent forbs, 20 percent shrubs and 35 percent trees. Structurally, Utah juniper dominates the overstory. In the understory cool season deep-rooted perennial bunchgrasses are dominant, followed by medium shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

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

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

Due to the shallow stony soils and relative inaccessibility, the site is not easily degraded by improper grazing management.

Impacts on the Plant Community

Influence of fire.

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

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

Influence of improper grazing management.

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

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

Proper grazing management will maintain the integrity of the plant community.

Weather influences.

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

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

Influence of Insects and disease.

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

Influence of noxious and invasive plants.

Many of these species add to the fine-fuel component and lead to increased fire frequency. Many of the annual and perennial invasive species with deep root systems compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory.

Influence of wildlife.

Big game animals use this site in the spring, summer and fall. Mule deer and Rocky Mountain elk may use the site during the winter for thermal cover and food; however, forage quality of Utah juniper is below maintenance level. Big game numbers are seldom high enough to adversely affect the plant community.

Watershed.

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

Plant Community and Sequence.

Transition pathways between common vegetation states and phases:

State 1.

Phase A to B. Develops with improper grazing management.

Phase B to A. Develops through prescribed grazing.

Phase A to C. Develops after wildfire.

Phase C to A. Moves towards the HCPC with no fire.

Phase B to C. Develops with wildfire.

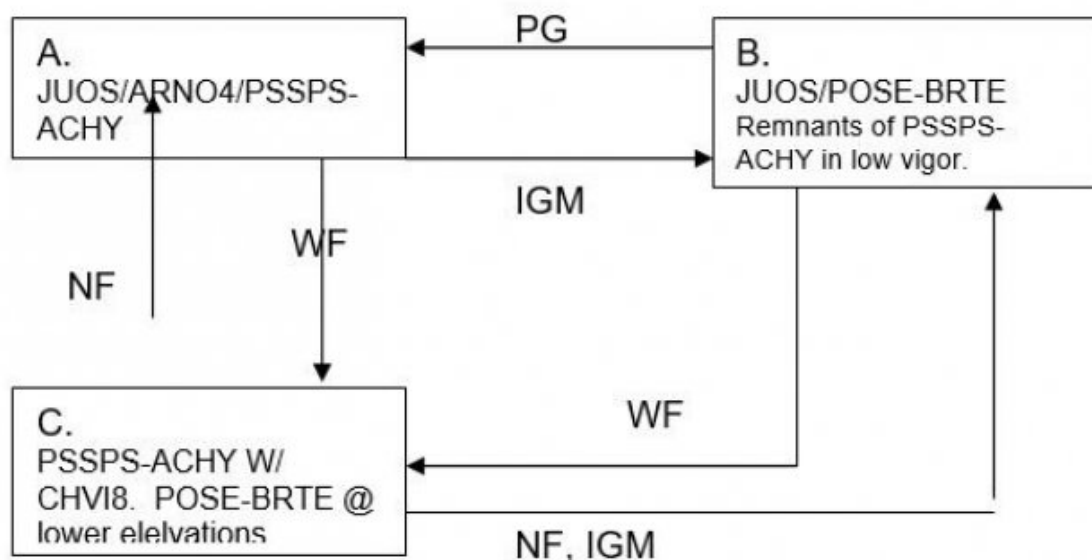
Phase C to B. Develops with no fire and improper grazing management.

Practice Limitations.

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

State and transition model

State 1. Plant community phases



PLANT LEGEND

JUOS - Utah Juniper
 ARNO4 - Black Sagebrush
 PSSPS - Bluebunch Wheatgrass
 ACHY - Indian Ricegrass
 POSE - Sandberg Bluegrass
 BRTE - Cheatgrass
 CHVI8 - Green Rabbitbrush

State 1

State 1, Phase A, Reference Plant Community Phase

Community 1.1

State 1, Phase A, Reference Plant Community Phase

This plant community has a Utah juniper overstory with an understory of black sagebrush, bluebunch wheatgrass and Indian ricegrass. All age classes of juniper are present. Soils are very shallow to bedrock. The bedrock is

fractured allowing the roots of the juniper to penetrate deep into the rock. The site rarely, if ever, burns. Historic natural fire frequency is approximately every 500 to 1000 years. But when the site does burn, it is a devastating event on the plant community. Fires are typically small in size, burning just a few acres.

State 2

State 1, Phase B

Community 2.1

State 1, Phase B

This phase has developed through improper grazing management. Bluebunch wheatgrass and Indian ricegrass are in low vigor. Cheatgrass has invaded the site at lower elevations. Due to the inaccessibility of much of this site, the area impacted by improper grazing management is generally small in size.

State 3

State 1, Phase C

Community 3.1

State 1, Phase C

This phase has developed after a wildfire. Most of the juniper and shrubs have been killed by the fire. Bluebunch wheatgrass and Indian ricegrass are still present but have been weakened by the fire. Sandberg bluegrass and cheatgrass at lower elevations have responded aggressively after the fire. Green rabbitbrush has resprouted. Due to the lack of continuous fuels, rocks and low production in the understory, wildfires typically are small in size. The site rarely burns in its entirety. This site does not cross the threshold to a new and unknown site.

Additional community tables

Animal community

Wildlife Interpretations

Animal Community – Wildlife Interpretations

Large herbivore use of the reference plant community is dominated by mule deer and elk. The site can provide winter habitat for mule deer and elk. The site provides important seasonal habitat for resident and migratory animals including western toad, sagebrush lizard, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, horned lark, and western meadowlark. In isolated areas, encroachment of noxious and invasive plant species (cheatgrass) can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water is limited, being provided only by seasonal runoff, artificial water catchments, and spring sites.

State 1 Phase 1.1 – Utah Juniper/ Black Sagebrush/ Bluebunch Wheatgrass/ Indian Ricegrass Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs used by native insect communities that assist in pollination. The reptile and amphibian community is represented by leopard lizard, short horned lizard, sagebrush lizard, western skink, and western toad. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Spring developments that capture all available water would preclude the use of these sites by amphibians. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird, and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. The plant community provides limited spring, fall, and winter forage needs for large mammals including mule deer and elk. Mule deer and elk use this plant community for thermal cover in the winter. Mountain lion, bobcat, and coyote frequent these areas. A small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

State 1 Phase 1.2 – Utah Juniper/ Sandberg Bluegrass/ Cheatgrass Plant Community: This phase has developed due to improper grazing management. The loss of native forbs and reduced vigor of understory vegetation will reduce insect diversity on the site. The lack of flowering plants reduces pollinator use by butterflies and moths.

Reptile species diversity would be similar to State 1 Phase 1.1. Quality of cover and forage habitat for reptiles would decline with the loss of understory vegetation. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird, and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Hunting success by raptors may decrease due to a heavy overstory of juniper. The plant community provides limited seasonal habitat for mule deer and elk in spring and fall. The site will provide thermal cover in the winter for large mammals.

State 2 – Bluebunch Wheatgrass/ Indian Ricegrass/ Green Rabbitbrush/ Sandberg Bluegrass/ Cheatgrass Plant Community:

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

Grazing Interpretations.

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

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. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Recreational uses

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

Due to the relative abundance of wildlife that uses this site, hunting is one of the primary uses. There is some aesthetic value from the greenery on the landscape provided by the Utah juniper.

Wood products

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

Other products

None.

Inventory data references

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

Those involved in developing this site description include:

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

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

Jim Cornwell, Range Management Specialist, IASCD

Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

Kristen May, Resource Soil Scientist, NRCS, Idaho

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.

Approval

Kendra Moseley, 9/22/2020

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)	
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Date	01/23/2008
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** More data is needed, but bare ground is estimated to be 20-30 percent of the area where soil is present.
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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 depositional areas do not occur.
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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter in the interspaces may move 1-2 feet and usually moves into the fractures in the adjacent bedrock or accumulates above surface rock.
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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 3 to 5 but need to be tested.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Structure ranges from weak thin platy to moderate thin platy. The A or A1 horizon is typically 2 to 4 inches thick. Soil organic matter (SOM) ranges from 0.5 to 1 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 and perennial forbs slow run off and increase infiltration. The amount of stones and bedrock on or near the surface are the over-riding influence on infiltration.
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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: Juniper>>
- Sub-dominant: Cool season grasses> shrubs>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): Lightning strikes and wildfire are the primary cause of mortality in juniper. Shrubs and grasses decline in the plant community as juniper increases.

14. **Average percent litter cover (%) and depth (in):** Litter immediately beneath juniper can be greater than 4 inches and occupy 100 percent of the surface. Litter in the interspaces beyond the drip-line is usually <.1 inches and <5% cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production is 450 pounds per acre (500 kilograms per hectare) in a normal year.
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Invasive species include cheatgrass and mustard.
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17. **Perennial plant reproductive capability:** All functional groups have the potential to reproduce in most years.
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