

Ecological site R013XY056ID Juniper Breaks 12-16 PZ JUOS/PSSPS

Last updated: 9/23/2020
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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): 013X–Eastern Idaho Plateaus

Land Resource Region: B (Northwestern Wheat and Range)
MLRA: 13 (Eastern Idaho Plateaus)

EPA EcoRegion: Level III (Middle Rockies)

LRU notes

013X-Eastern Idaho Plateaus

Precipitation or Climate Zone: 12-16" P.Z.
<https://soils.usda.gov/survey/geography/mlra/index.html>

Classification relationships

No data.

Ecological site concept

Site does not receive any additional water.

Soils are:

not saline or saline-sodic.

Shallow to moderately deep with adjacent rock outcrop, with <35% gravels (<3") cobbles and stones (3-25") cover. skeletal within 20" of soil surface

Not strongly or violently effervescent in surface mineral 10".

textures usually range from sandy loam to silty 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

R013XY001ID	Loamy 12-16 PZ
R013XY002ID	Stony Loam 13-16 PZ ARTRV/PSSPS
R013XY004ID	Shallow Gravelly 12-16 PZ ARTRV/PSSPS
R013XY005ID	Loamy 16-22 PZ ARTRV/FEID-PSSPS

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on steep to very steep foothills and mountain slopes and stony ridges. Exposure is generally west to south. The dominant visual aspect is Utah juniper with a sparse understory of grasses, forbs, and shrubs. Elevations range from 4400 feet to 5600 ft. (1300-1750 meters). Slopes vary from 10 to 75 percent.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope (3) Ridge
Flooding frequency	None
Elevation	1,341–1,707 m
Slope	10–75%
Water table depth	152 cm
Aspect	S, W

Climatic features

Annual precipitation of this site ranges from 12 to 16 inches (30-41 cm) with most of it falling during the winter and spring.

Influencing water features

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

Soil features

The soils of the Reference State are highly variable. They range from rock outcrops, to very shallow and shallow soils, to deeper soils in areas of accumulation. The general characteristic of the site is one of shallow, rocky, fractured, low fertility, or low producing soils. The site does not produce enough understory vegetation to carry a wildfire and therefore, the site seldom if ever burns. For climax juniper to grow on deeper soils it should be surrounded by either rock outcrops or very shallow soils that restrict the advance of fire.

The soils representative of this site are those of unconsolidated residuum between and around rock outcrops. They are generally young, lithic soils with only slightly differentiated A, B, and C horizons. The soil surface is only partially covered by patch vegetation (not continuous) and small amounts of litter. Bare spots commonly have a surface pavement of fine gravels or stones, which is probably the result of the finer soil particles being eroded away. These soils are nearly always shallow to bedrock with depths ranging vertically from zero where rock outcrops are at the surface, to nearly 3 feet deep in small pockets where soil has accumulated. There is irregularity in the soil-bedrock contact due to the fractured nature of the rock. Soil may extend down cracks to depths well below the average bedrock level.

Soil Series Correlated to this Ecological Site

None

Table 3. Representative soil features

Surface texture	(1) Gravelly loam (2) Extremely gravelly
Soil depth	0–91 cm

Ecological dynamics

Ecological Dynamics of the Site:

The dominant visual aspect of this site is Utah juniper with a sparse understory of grasses, forbs, and shrubs. 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), the Reference State (State 1), juniper utilizes most of the available soil moisture, therefore little run-off occurs except during intense convection storms. These mature trees are generally heavily limbed and round-topped giving indication of branching close to the ground. Utah juniper, however, is usually dominated by a single main stem.

The juniper overstory is seldom removed by natural fire due to a lack of fine fuels in the understory. Understory production does not respond significantly to overstory removal due to the low herbaceous production potential of the soils on this site.

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

During the last few thousand years, this site has evolved in a semi-arid climate characterized by dry summers and cold, wet winters and springs. Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, Rocky Mountain elk, lagomorphs, and small rodents.

Fire occurs rarely on this site. When it does occur it is at intervals of 500-1000 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 A. This plant community is dominated by Utah juniper in the overstory and bluebunch wheatgrass and mountain big sagebrush in the understory. Bitterbrush is usually present. Subdominant species include Sandberg bluegrass, Indian ricegrass, needle and thread, thickspike wheatgrass, and arrowleaf balsamroot. Leaf litter of Utah juniper is allelopathic to Sandberg bluegrass. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 825 pounds per acre (917 kilograms per hectare) in a normal year. Production in a favorable year is 1100 pounds per acre (1222 kilograms per hectare). Production in an unfavorable year is 550 pounds per acre (611 kilograms per hectare). Composition by weight is approximately 10 percent grass, 1 percent forbs, 4 percent shrubs and 85 percent trees. Structurally, Utah juniper dominates the overstory. In the understory cool season deep-rooted perennial bunchgrasses are dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

This site is suited for grazing by domestic livestock but is limited by low volume of forage, surface rock, and steep slopes.

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

Impacts on the Plant Community.

Influence of fire.

In the absence of fire, 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 vegetation, fire is carried in the crown of the trees. Fires typically burn in a mosaic pattern. Fires of this nature rarely involve large acreages due to surrounding rimrocks, rock outcrops, and other features that limit the spread of fire. Nearly all of the junipers within the burned area, both old and young will be killed. Most of the shrubs will likewise be killed. The few grasses and perennial forbs in the understory will mostly survive. After a fire if there is a significant invasion of annual grasses within a few years, fires may become more frequent. Juniper, however, frequently re-establishes fairly rapidly due to the amount of seed being present in the soil reservoir or from nearby unburned trees. A frequent fire regime of one every 5-10 years, generally will not develop on this site. The soils are too shallow and fuels are not continuous enough for a frequent fire cycle to occur.

Influence of improper grazing management:

Improper grazing management has little impact on this site. Due to the rough and rocky nature of the site, livestock generally prefer not to use it. Livestock use the lesser slopes of the site primarily for loafing and bedding. Forage production is low. When this site is being impacted by improper grazing management, adjacent sites that are more productive and less rocky are 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 and bitterbrush. With reduced vigor, recruitment of these species declines. Generally juniper seedlings will replace the desirable grasses and shrubs if improper grazing management continues.

Weather influences:

Above normal precipitation in the spring can increase forage production slightly. Due to the shallow soils, most plants, except juniper, are not able to capitalize on extra spring-time moisture. Below normal precipitation in the spring reduces herbaceous understory production and ultimately can cause plant mortality of the understory species if an extended drought continues.

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

Influence of Insects and disease:

Insects and disease outbreaks can affect vegetation health, particularly bitterbrush from western tent caterpillars (*Malacosoma fragilis*). Two consecutive years of defoliation by the tent caterpillar can cause mortality in bitterbrush.

Utah juniper is occasionally heavily infested by juniper mistletoe (*Phoradendron juniperum* ssp. *juniperum*) and dense mistletoe (*P. bolleanum* ssp. *densum*). Little mortality occurs with these infestations.

Influence of noxious and invasive plants:

Many of these species add to the fine-fuel component and can lead to increased fire frequency. Many of the annual and perennial invasive plants with deep root systems compete with desirable understory 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, fall, and early winter. 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 occurs 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.

Watershed:

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

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 Phase A with no fire.

Phase B to C. Develops with wildfire.

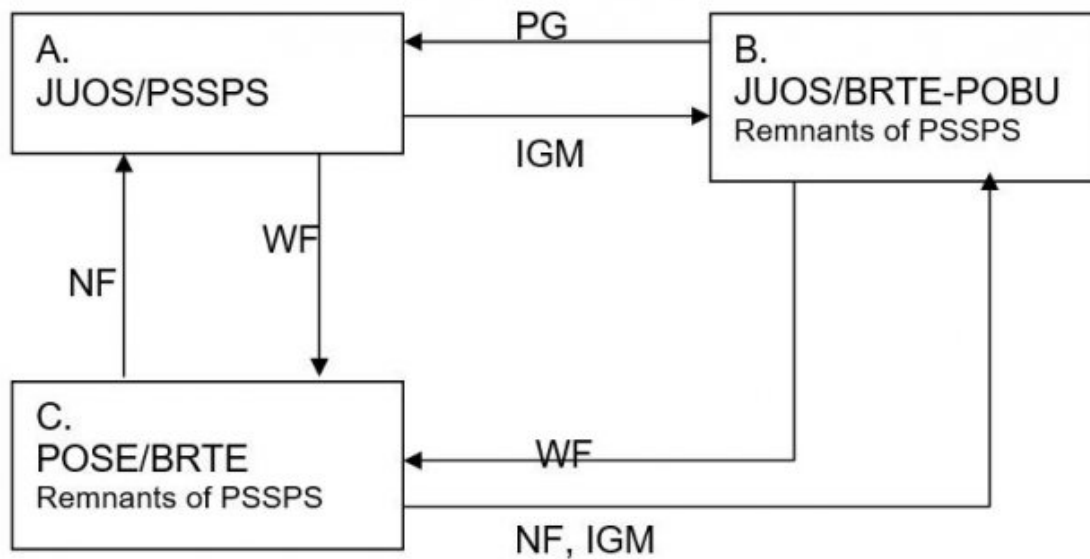
Phase C to B. Develops with no fire and improper grazing management.

Practice Limitations.

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

State and transition model

State 1. Plant community phases



PLANT LEGEND STATE 1

JUOS - Utah Juniper
 PSSPS - Bluebunch Wheatgrass
 BRTE - Cheatgrass
 POBU - Bulbous Bluegrass
 POSE - Sandberg Bluegrass

State 1 State 1 Phase A

Community 1.1 State 1 Phase A

Reference Plant Community Phase. This plant community has a Utah juniper overstory with a sparse understory of bluebunch wheatgrass. Small amounts of mountain big sagebrush and antelope bitterbrush are present. All age classes of juniper are present. Soils are very shallow to bedrock. The bedrock is fractured allowing the roots of the juniper to penetrate deep into the rock. The site rarely, if ever, burns. Historic natural fire frequency is approximately every 500 to 1000 years. But when the site does burn, it is a devastating event on the plant community. Fires are

typically small in size, burning just a few acres.

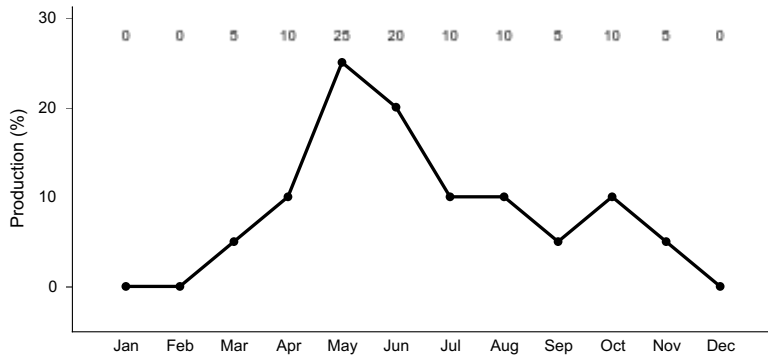


Figure 1. Plant community growth curve (percent production by month). ID0816, Juniper. State 3.

State 2 State 1 Phase B

Community 2.1 State 1 Phase B

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

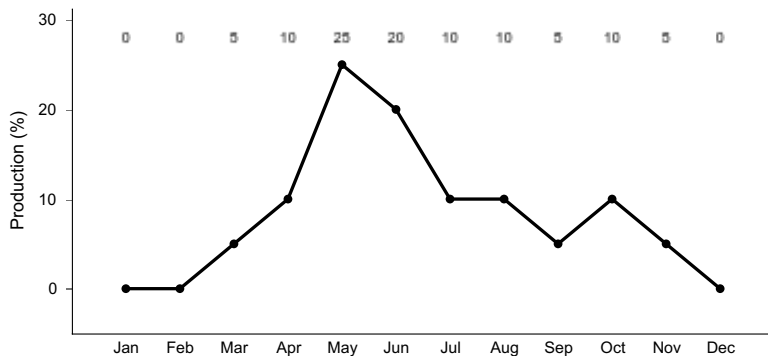


Figure 2. Plant community growth curve (percent production by month). ID0816, Juniper. State 3.

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. Sandberg bluegrass and cheatgrass have responded aggressively after the fire. 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.

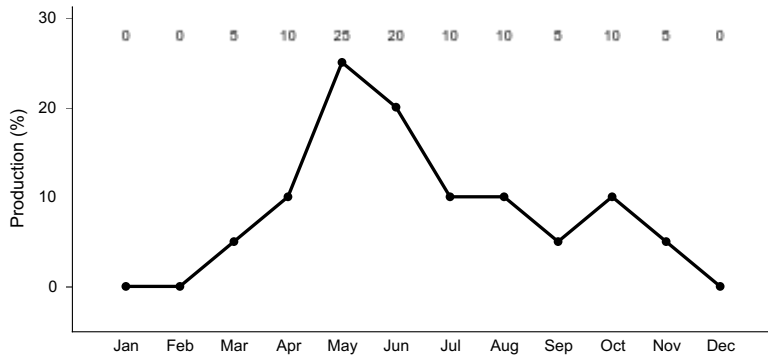


Figure 3. Plant community growth curve (percent production by month). ID0816, Juniper. State 3.

State 4 State 2

Community 4.1 State 2

This site does not cross the threshold to a new and unknown site.

Additional community tables

Animal community

Wildlife Interpretations.

Animal Community – Wildlife Interpretations

This rangeland ecological 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. Large herbivore use of the reference plant community is dominated by mule deer and elk. This site can provide winter habitat for mule deer and elk. 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/ 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 Great Basin spadefoot toad, sagebrush lizard, 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. Areas with antelope bitterbrush and sagebrush provide winter food for mule deer. Mountain lion, bobcat, and coyote frequent these areas. The small mammal population may include Idaho pocket gopher, golden-mantled ground squirrels, and chipmunks.

State 1 Phase 1.2 – Utah Juniper/ Cheatgrass/ Bulbous Bluegrass Plant Community: This phase has developed due to improper grazing management. The loss of native forbs and reduced vigor of the remaining 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 that in State 1 Phase 1.1. Quality of cover and food habitat for reptiles would decline with the loss of understory vegetation. Birds using this site as resident or migratory habitat include Juniper titmouse, western bluebird, and Virginia's warbler. The Juniper titmouse relies heavily on juniper seeds for winter food. Hunting success by raptors may decrease due to a heavy overstory of juniper. The plant

community provides limited seasonal habitat for mule deer and elk in spring and fall. Winter feed for large mammals would be minimal. The site will provide additional thermal cover in the winter for large mammals.

State 1 Phase 1.3 – Sandberg Bluegrass/ Cheatgrass Plant Community:

This plant community is the result of fire. The reduced forb, shrub, and tree components in the plant community would support a very limited population of pollinators. Most reptilian species identified in State 1 Phase 1.1 are not supported with food, water, or cover. Diversity of grassland avian species is reduced due to poor cover and available food. Birds of prey including hawks and falcons may range throughout these areas looking for prey species. Hunting success by raptors may increase. Mule deer and elk may utilize the herbaceous vegetation in the early part of the year when the invasive annuals (cheatgrass) are more palatable. At other times of the year large mammals would not regularly utilize these areas due to poor food and cover conditions. Winter habitat (thermal cover) for mule deer and elk would not be available. Cover for mountain lion, bobcat, and coyote would be eliminated 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 suitable for grazing by domestic livestock but is limited by low volume of forage and by steep slopes. 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.

Hydrological functions

Soils on this site are in hydrologic group B and have moderately low run-off potential.

Recreational uses

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

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

Wood products

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

Other products

none.

Other information

Field Offices

American Falls, ID

Blackfoot, ID

Burley, ID

Driggs, ID

Idaho Falls, ID

Malad, ID

Pocatello, ID

Rexburg, ID

Soda Springs, ID

St. Anthony, ID

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

Kristen May, Resource Soil Scientist, NRCS, Idaho

Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Franklin County, ID

Location 2: Bonneville County, ID

Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number "35".

USDA Forest Service, Rocky Mountain Research Station. 2004. Restoring Western Ranges and Wildlands. General Technical Report RMRS-GTR-136-vols. 1-3.

USDA, NRCS.2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, Forest Service, Fire Effects Information Database. 2004. www.fs.fed.us/database.

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

DF

Approval

Kendra Moseley, 9/23/2020

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.

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Date	05/02/2008
Approved by	Kendra Moseley
Approval date	

Indicators

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

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

3. **Number and height of erosional pedestals or terracettes:** neither occur on this site.

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 is estimated to be 20-30 percent of the area where soil is present.

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** does not occur.

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 1-2 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** no data.

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 Utah juniper canopy intercepts raindrops, thus reducing raindrop impact. The amount of stones and bedrock on or near the surface are the over-riding influence on infiltration.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** not present.

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: juniper

Sub-dominant: cool season grasses

Other: shrubs

Additional: perennial forbs

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** juniper can die from old age. Lightning strikes can also cause mortality. Shrubs and grasses decline in the plant community as juniper increases.
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14. **Average percent litter cover (%) and depth (in):** litter immediately beneath juniper can be greater than 4 inches and occupy 100 percent of the surface. Litter in the interspaces beyond the drip-line is usually <.1 inches and <5% cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 825 pounds per acre (917 kilograms per hectare) in a normal year.
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** includes cheatgrass and bulbous bluegrass.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years.
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