

Ecological site R025XY037ID

CEANOTHUS THICKET 16-24

Last updated: 4/25/2024
Accessed: 08/31/2026

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.

Ecological site concept

This site is on rolling to moderately steep slopes that range from 2 to 30 percent. Elevation varies from 5800 to 8200 feet (1750 to 2500 meters). The site is on all aspects and is associated with concave side slopes and shoulders of hills, mountains and plateaus. The soils supporting this site are moderately deep to deep and typically have greater than 30 percent rock fragments. The soils of this site are well drained, with moderate permeability. Runoff is high or very high. The erosion hazard by water is severe to very severe. The available water holding capacity is very low or low. The plant community is dominated by snowbrush with perennial bunch grasses.

Associated sites

R025XY022ID	LOAMY 16-22 Loamy 16-22 is typically 40 to 60 inches to bedrock. Dominant species are ARTRV/FEID.
R025XY030ID	MOUNTAIN BRUSH 18-22 Mountain Brush 18-22 dominant species are ARTRV/BRMA4.

Similar sites

R025XY022ID	LOAMY 16-22 Loamy 16-22 is typically 40 to 60 inches to bedrock. Dominant species are ARTRV/FEID.
R025XY030ID	MOUNTAIN BRUSH 18-22 Mountain Brush 18-22 dominant species are ARTRV/BRMA4.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Ceanothus velutinus</i>
Herbaceous	Not specified

Physiographic features

This site is on rolling to moderately steep slopes that range from 2 to 30 percent. Elevation varies from 5800 to 8200 feet (1750 to 2500 meters). The site is on all aspects and is typically on concave side slopes of mountains and lava plateaus.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Lava plateau > Mountain slope (3) Hills > Hill
Runoff class	Medium to very high
Flooding frequency	None
Ponding frequency	None
Elevation	1,770 – 2,500 m
Slope	0 – 30 %
Water table depth	150 cm
Aspect	W, NW, N, NE, E, SE, S, SW

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 of the MLRA is 14.39 inches (based on 6 long term climate stations located throughout the MLRA).

The average Mean Annual Precipitation for this site is estimated to be 20 inches.

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

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

No climate stations exist nearby site.

Table 3 Representative climatic features

Frost-free period (characteristic range)	80-100 days
Freeze-free period (characteristic range)	110-140 days
Precipitation total (characteristic range)	480-640 mm
Frost-free period (actual range)	80-100 days
Freeze-free period (actual range)	110-140 days

Precipitation total (actual range)	480-640 mm
Frost-free period (average)	90 days
Freeze-free period (average)	130 days
Precipitation total (average)	510 mm

Influencing water features

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

Soil features

The soils supporting this site are moderately deep to deep (The soils at this site are 20 inches or more deep), well drained and with moderate permeability. Runoff is high or very high. The erosion hazard by water is severe to very severe. The available water holding capacity is very low or low.

The surface texture is typically a dark colored loam or gravelly loam with a subsoil texture of loam or clay loam. The soil surface at some instances of the site may have boulders. The soils often contain cobbles, stones and other coarse fragments. Soils are relatively acidic and may have very low-base saturation. Soil temperature regime is cryic and soil moisture regime is xeric.

Soil Series Correlated to this Ecological Site:

Bluebell and Kavon

Table 4. Representative soil features

Parent material	(1) Colluvium (2) Residuum
Surface texture	(1) Very gravelly loam (2) Loam
Family particle size	(1) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	50 – 150 cm
Soil depth	50 – 150 cm
Surface fragment cover <=3"	0 – 40 %

Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	7.37 – 13.97 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	3.5 – 5.5
Subsurface fragment volume <=3" (Depth not specified)	20 – 50 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

The dominant visual aspect is a snowbrush ceanothus thicket with scattered bittercherry, serviceberry, and common chokecherry. Indian paintbrush and low Oregon grape are common in the understory. Composition by weight is approximately 3-8 percent grasses, 10 to 20 percent forbs, and 75 to 85 percent shrubs.

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

Fire has historically occurred on the site at intervals of 20-40 years. If the fire frequency moves to relatively long intervals, Douglas fir and/or Western juniper may invade and chokecherry may increase on the 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 snowbrush ceanothus with minor amounts of grasses and forbs in the understory. Major understory species include mountain brome, slender wheatgrass, Columbia needlegrass, Western needlegrass, Indian paintbrush, low Oregon grape, northwest cinquefoil, and mountain snowberry. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 1250 pounds per acre (1400 kilograms per hectare) in a normal year. Production in a favorable year is 1750 pounds per acre (1960 kilograms per hectare). Production in an unfavorable year is 750 pounds per acre (840 kilograms per hectare).

Structurally, tall shrubs are very dominant, followed by perennial forbs being greater than perennial grasses.

FUNCTION:

This site is well suited for deer, elk, raptors, and other wildlife in summer and early fall. Big game animals use the site for both thermal and hiding cover. It is used by livestock in the summer but is not well suited to domestic grazing due to low amounts of grass and forbs and low palatable shrubs. The site has high value for big game hunting.

Due to the relatively high rainfall, elevation and favorable cool-season growing conditions, the site is fairly resistant to disturbances that can potentially degrade it.

Because of the relatively high production and deep soils, infiltration is normally high and runoff moderately low. Runoff, when it does occur is non-erosive except during high intensity convection storms following a wildfire event. Snow accumulates on the site due to high elevation and presence of tall shrubs.

Impacts on the Plant Community.

Influence of fire:

In the absence of normal fire frequency, most shrubs can gradually increase, however, Snowbrush ceanothus becomes decadent. Grasses and forbs decrease as shrubs increase. With the continued absence of fire, Douglas fir and/or Western juniper can displace most of the shrubs and other understory species if a seed source is nearby. These trees are usually stunted, irregular or poorly shaped. Douglas fir and/or Rocky Mountain juniper do not increase to the point where they control the function of the site and move the site across the threshold to another state.

When fires become more frequent than historic levels (20-40 years), snowbrush ceanothus will maintain itself in the community or increase due to sprouting. Other shrubs on the site will also resprout. With continued short fire frequency many of the desirable understory species such as mountain brome may be eliminated. These species will be replaced by Kentucky bluegrass and slender wheatgrass along with a variety of annual and perennial forbs including noxious and invasive plants. Mountain snowberry will increase due to sprouting. If the fire is severe, low Oregon grape may be killed. Near the end of the fire cycle, soils become more acidic and this favors the re-establishment of snowbrush ceanothus following fire. Prescribed fire will help to maintain a snowbrush ceanothus plant community.

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. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to Rocky Mountain juniper and/or Douglas fir invasion and an increase in mountain snowberry, bittercherry, snowbrush ceanothus, and noxious and invasive plants. Kentucky bluegrass may invade the site.

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 affected when perennials have good vigor.

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

Prolonged drought adversely affects this plant community in several ways. Vigor, recruitment, and production are usually reduced. Mortality can occur. Prolonged drought can lead to a reduction in fire frequency.

Influence of insects and disease:

Outbreaks can affect vegetation health. An outbreak of a particular insect is usually influenced by weather but no specific data for this site is available. 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. Annual and perennial invasive species 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.

Watershed:

Few differences in the hydrologic function of the site would be expected between phases of this site.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases:

- State 1.
- Phase A to B. Develops in the absence of fire and improper grazing management. There is a Western juniper or Douglas fir seed source present in the vicinity of the site.
- Phase A to C. Results from a fire.
- Phase A to D. Results from improper grazing management and no fire. There is no Douglas fir or Western juniper seed source present in the vicinity.
- Phase B to C. Results from a wildfire or brush management.
- Phase B to A. Occurs with prescribed grazing and brush management or prescribed burning.
- Phase C to A. Results from prescribed grazing and no fire.
- Phase D to A. Occurs with prescribed grazing.
- Phase D to C. Occurs with fire or prescribed burning and prescribed grazing.
- Phase C to D. Occurs with no fire and improper grazing management.

Practice Limitations.

This site has limited value for livestock grazing due to low amounts of palatable species. This site is not recommended for rangeland seeding or other accelerating practices due the limited size of the site, low pH, and bouldery character of the soils.

State and transition model

Figure 3. 25x-37

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

Wildlife Interpretations. Animal Community – Wildlife Interpretations This plant community is dominated by ceanothus offering excellent food and cover habitat for birds and mammals. Mule deer and elk are the large herbivores using the site. The plant community provides seasonal habitat for resident and migratory animals including western toad, shrews, ground squirrels, mice, coyote, red fox, and badger. Virginia's warbler, Merriam's shrew, and mountain quail are area sensitive species that maybe associated with this site. Encroachment of

noxious and invasive plant species (Kentucky bluegrass and western juniper) in isolated areas can replace native plant species which provide critical feed, brood-rearing, and nesting cover for a variety of native wildlife. Water features are sparse provided by artificial water catchments and springs. State 1 Phase 1.1 –Snowbrush Ceanothus/ Mountain Brome/ Slender Wheatgrass/ Columbia Needlegrass Reference Plant Community (RPC) This plant community is dominated by snowbrush ceanothus offering pollinators early spring habitat. Reptiles may use this plant community for escape cover. Amphibians (western toad and northern leopard frog) may be 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. The diverse vertical structure offers habitat for many bird species including mountain bluebird, rock wren, grouse, and flycatchers. Birds and small mammals eat ceanothus seed and use the shrub for nesting and escape cover. The plant community provides fair forage for large mammals including mule deer and elk in all seasons. Ceanothus is a favorable winter browse for elk. The site provides thermal cover and young of year cover for mule deer and elk. A small mammal population including deer mouse, woodrat, golden-mantled ground squirrels, and Merriam's shrew may utilize this site and adjacent open areas. State 1 Phase 1.2 – Snowbrush Ceanothus / Slender Wheatgrass/ Western Juniper Plant Community: This phase has developed due to fire return intervals being much longer than normal and improper grazing management. Insect diversity may be lowered due to the reduction of forbs. Reptiles may use this plant community for escape cover. Bird species utilizing the site would be similar to those in State 1 Phase 1.1. As juniper increases, habitat cover for Brewer's sparrow, sage thrasher, and sage sparrow may increase. Mule deer and elk would still browse the ceanothus but as juniper encroaches the quality of the browse will be lowered for elk. The site would provide thermal and young of year cover for large mammals. A small mammal population including deer mouse, woodrat, golden-mantled ground squirrels, and Merriam's shrew may utilize this community. State 1 Phase 1.3- Snowbrush Ceanothus / Slender Wheatgrass/ Mountain Brome Plant Community: This phase has developed due to fire. The plant community is similar to that in State 1 Phase 1.1 and would support a similar invertebrate community. The diverse vertical structure offers habitat cover for many bird species including mountain bluebird, rock wren, grouse, and flycatchers. The plant community provides fair forage for mule deer and elk in the spring, summer, and fall. Ceanothus is a fair winter browse for elk. The site provides thermal and young of year cover for mule deer and elk. A small mammal population including deer mouse, woodrat, golden-mantled ground squirrels, and Merriam's shrew would utilize this site and adjacent open areas. State 1 Phase 1.4 – Snowbrush Ceanothus / Slender Wheatgrass Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy cover of snowbrush ceanothus contributes to a sparse herbaceous understory. A reduced herbaceous understory results in lower diversity and numbers of insects. The reptile community will be similar to the one in State 1 Phase 1.1. The reduced diversity of insects and understory cover may reduce quality of food and cover for reptiles. Bird species using the site will be similar to the species using the State 1 Phase 1.3 plant community. The plant community provides fair browse year round for elk. The site will provide thermal and young of year cover for large mammals. A small mammal population including golden-mantled ground squirrels, jackrabbits, and deer mice may utilize this site and adjacent open areas. Grazing Interpretations: This site is used by livestock in the summer but is not well suited to domestic grazing due to low amounts of grass and forbs and the low palatability of the shrubs. The site has high value of hunting, hiking, and horseback riding. 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 C. They have moderate to rapid runoff potential.

Recreational uses

This site provides fair opportunities for big game hunting. Aesthetic value is derived from the landscape diversity of the site.

Wood products

None.

Other products

None.

Other information

Field Offices Marsing, ID Twin Falls, ID Mountain Home, ID Burley, Idaho Ontario, OR

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 Leah Juarros, Resource Soil Scientist, NRCS, Idaho Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Elko County, NV	
Township/Range/Section	T47N R53E S14
General legal description	SE 1/4, NE 1/4

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

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Approval

Kendra Moseley, 4/25/2024

Rangeland health reference sheet

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

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Date	06/25/2009
Approved by	
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production
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Indicators

1. **Number and extent of rills:** rills rarely occur on this site. If rills are present they are most likely to occur on slopes greater than 15 percent and immediately following wildfire. Rills are most likely to occur on soils with surface textures of silt loam.

2. **Presence of water flow patterns:** water-flow patterns rarely occur on this site. They are most likely to occur on slopes greater than 15 percent immediately after fire. When they occur they are short, disrupted by cool season perennial grasses and tall shrubs and are not extensive.

3. **Number and height of erosional pedestals or terracettes:** both are rare on this site. In areas where flow patterns and /or rills are present, a few pedestals may be expected.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** on sites in late-seral status, bare ground may range up to 5 percent.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to one foot following a significant run-off event. Tall shrubs trap fine litter. Coarse litter generally does not move.

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 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** The A or A1 horizon is typically 6 inches thick. Structure ranges from weak fine granular to weak medium subangular blocky. Soil organic matter (SOM) needs to be determined.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** tall shrubs and bunchgrasses slow run-off and increase infiltration. Shrubs accumulate snow in the interspaces.

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: tall shrubs

Sub-dominant: perennial forbs

Other: grasses

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): snowbrush ceanothus will become decadent in the absence of fire. Grass and forb mortality will occur as tall shrubs increase following a wildfire.
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14. Average percent litter cover (%) and depth (in): annual litter cover in the interspaces will be 20-30 percent to a depth of <0.2 inches. Under the mature shrubs litter is greater than 0.5 inches. Fine litter can accumulate in the interspaces.
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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): is 1250 lbs. per acre in a year with normal precipitation and temperatures. Perennial grasses produce 3-8 percent of the total, forbs 10-20 percent, and shrubs 75-85 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: includes Kentucky bluegrass, Douglas fir, Western juniper, spotted and diffuse knapweed, leafy spurge, and Canada thistle. None of these, however, are expected to dominate the site and control the function.
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17. Perennial plant reproductive capability: all functional groups have the potential to reproduce in most years.
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