USDA Natural Resources
Conservation Service

Ecological site R010XC037OR
SR Mountain Shallow 12-16 PZ

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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.

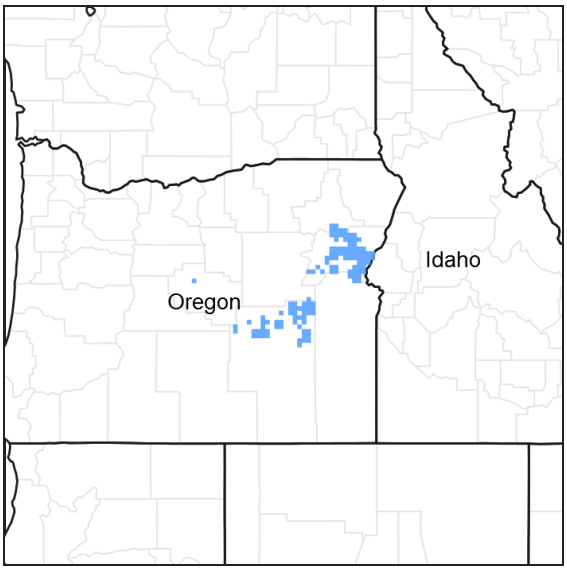


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R010XC032OR	**SR Mountain 12-16 PZ** SR Mountain 12-16 PZ (greater soil depth, higher production)
R010XC039OR	**SR Very Shallow 12-16 PZ** SR Very Shallow 12-16 PZ (very shallow soil depth, lower production, different composition – ARRI2/POSE dominant)
R010XC047OR	**SR Mountain South 12-16 PZ** SR Mountain South 12-16 PZ (greater soil depth, south aspect, higher production, different composition – higher proportion of PSSPS)
R010XC054OR	**SR Mountain Shallow South 12-16 PZ** SR Mountain Shallow South 12-16 PZ (south aspect, different composition – higher proportion of PSSPS)
R010XC066OR	**SR Mountain North 12-16 PZ** SR Mountain North 12-16 PZ (greater soil depth, north aspect, higher production)
R010XC075OR	**SR Mountain Shallow North 12-16 PZ** SR Mountain Shallow North 12-16 PZ (north aspect, different composition – higher proportion of ARTRV and FEID)

Similar sites

R010XC029OR	**SR Shallow Cool 12-16 PZ** SR Shallow Cool 12-16 PZ (lower elevation, different composition - higher proportion of ARTRT-X)
R010XC068OR	**SR Cool Mountain North 12-16 PZ** SR Cool Mountain North 12-16 PZ (lower elevation, greater soil depth, north aspect, higher production)
R010XC033OR	**SR Cool 12-16 PZ** SR Cool 12-16 PZ (lower elevation, greater soil depth, higher production,different composition - higher proportion of ARTRT-X)
R010XC075OR	**SR Mountain Shallow North 12-16 PZ** SR Mountain Shallow North 12-16 PZ (north aspect, different composition – higher proportion of ARTRV and FEID)
R010XC032OR	**SR Mountain 12-16 PZ** SR Mountain 12-16 PZ (greater soil depth, higher production)

Table 1. Dominant plant species

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

Physiographic features

This site occurs on rolling uplands, tablelands and mountain plateaus. Slopes typically range from 2 to 12%. Elevations typically range from 5,000 to 6,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Plateau
Flooding frequency	None
Ponding frequency	None
Elevation	5,000–6,000 ft
Slope	2–12%
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 12 to 16 inches, most of which occurs in the form of snow during the months of December through March. Localized convection storms occasionally occur during the summer. The soil temperature regime is frigid with a mean air temperature of 43 degrees F. Temperature extremes range from 90 to -30 degrees F. The frost free period ranges from less than 30 to 60 days. The optimum growth period for plant growth is early May through June.

Table 3. Representative climatic features

Frost-free period (average)	60 days
Freeze-free period (average)	60 days
Precipitation total (average)	16 in

Influencing water features

Soil features

The soils of this site are typically shallow and well drained. Typically, the surface layer is a stony silt loam about 6 inches thick. The subsoil is a stony clay loam to clay about 10 inches thick. Depth to bedrock or an indurated pan is 10 to 20 inches. Permeability is moderately slow to slow. The available water holding capacity (AWC) is about 2 to 4 inches for the profile. The erosion potential is moderate to severe.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–rhyolite
Surface texture	(1) Stony silt loam (2) Cobbly
Family particle size	(1) Clayey
Drainage class	Well drained to moderately well drained
Permeability class	Moderately slow to slow
Soil depth	10–20 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–20%
Available water capacity (0-40in)	2–4 in

Ecological dynamics

The potential native plant community is strongly dominated by Idaho fescue.
Mountain big sagebrush is common. Sandberg bluegrass is the dominant shallow rooted perennial grass. Bluebunch wheatgrass, prairie junegrass, parsnip flower buckwheat and a variety of other grasses and forbs are present. Deciduous shrubs, wax currant, mountain snowberry, Saskatoon serviceberry and others occur sporadically. Vegetative composition of the community is approximately 75 percent grasses, 10 percent forbs and 15 percent shrubs. Approximate ground cover is 60 to 70 percent (basal and crown).

Range in Characteristics:
Idaho fescue increases on silty clay loam surfaces. Bluebunch wheatgrass increases at lower elevations and on slight south and west exposures. Thurber needlegrass increases on coarser surfaces and at shallower depths. Deciduous shrubs increase over fractured substratums. Mountain big sagebrush increases at higher elevations and basin big sagebrush increases at lower elevations. Production increases with soil depth and at the upper end of the precipitation zone.

Response to Disturbance:
If the condition of the site deteriorates as a result of overgrazing, Idaho fescue decreases. Mountain big sagebrush and Sandberg bluegrass increase. With continued overgrazing and lack of fire sagebrush and Sandberg bluegrass dominate the site. Juniper invades from isolated rocky areas and stiff sagebrush often invades from very shallow areas. Annual invasion is limited unless ground disturbance occurs. With fire and heavy use or ground disturbance, Sandberg or bulbous bluegrass and annuals dominate the site. Excess erosion in the bare soil interspaces markedly reduces the site productivity and contributes to downstream sedimentation.

States: ARTRV/POSE-Bare Ground; JUOC/ARTRV/POSE-Bare Ground; POSE-POBU -Annuals-Bare Ground (with fire)

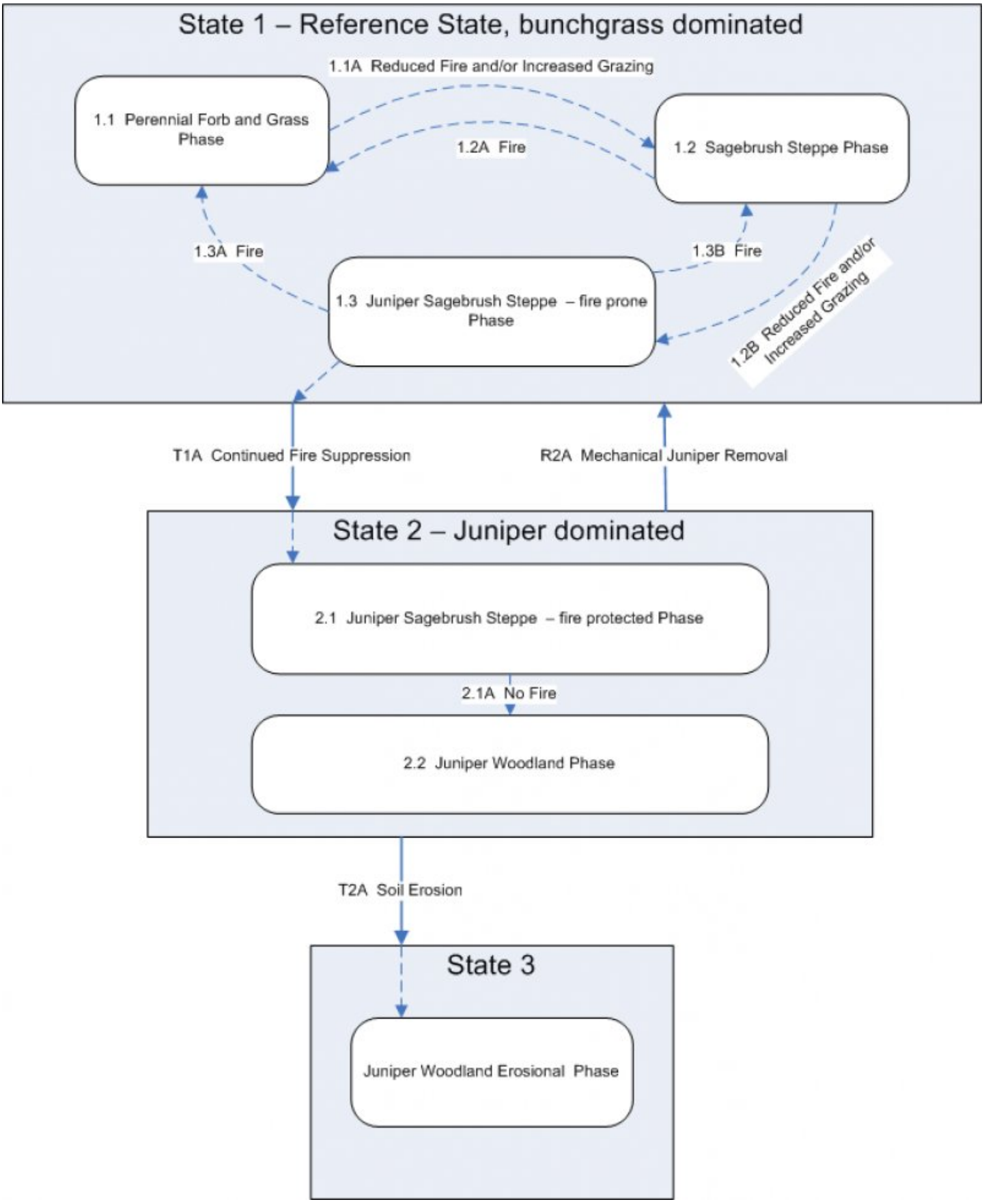
Fine fuel reduction from improper grazing and fire suppression has led to an increase in the historical fire return interval on many western rangelands. A reduction in fire frequency on this site leads to an invasion of juniper, a decrease in sagebrush cover followed by a decrease in herbaceous cover and understory diversity. As juniper invades on north facing aspects sagebrush declines with a subsequent decrease in forbs, bluebunch wheatgrass and needlegrass. Idaho fescue becomes the primary herbaceous species occurring under the canopy of the juniper trees. Sandberg’s bluegrass increases in the plant community on lower elevation north slopes and warmer non-aspect sites while bare ground increases in the interspaces between trees. Bitterbrush is more resistant to juniper encroachment than sagebrush and maintains its presence in the community, however vigor and fitness (seed production) may be thwarted.

The potential for soil erosion increases as the juniper woodland matures and the understory plant community cover declines. Excessive erosion in the bare soil interspaces markedly reduces the site productivity and contributes to downstream sedimentation. The combined effect of overgrazing and juniper invasion increases the rate of decline in ecological function and the probability of crossing a threshold is high.

Treatment Response:

North facing aspects respond positively to juniper removal if soil erosion is not significant. Seeding may be necessary if there are less than 1-2 bunchgrass plants per meter square in the understory. Sagebrush and forbs may also need to be seeded if adult plants are no longer present in the understory.

State and transition model



State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference native plant community is strongly dominated by Idaho fescue. Mountain big sagebrush is common. Sandberg bluegrass is the dominant shallow rooted perennial grass. Bluebunch wheatgrass, prairie junegrass, parsnip flower buckwheat and a variety of other grasses and forbs are present. Deciduous shrubs, wax currant, mountain snowberry, Saskatoon serviceberry and others occur sporadically. Vegetative composition of the community is approximately 75 percent grasses, 10 percent forbs and 15 percent shrubs. Approximate ground cover is 60 to 70 percent (basal and crown).

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	600	750	975
Shrub/Vine	120	150	195
Forb	80	100	130
Total	**800**	**1000**	**1300**

Figure 5. Plant community growth curve (percent production by month). OR4521, B10 SR Mtn Souths & Shallows 12-16. SR Mtn Souths & Shallows 12-16 RPC Growth Curves.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	35	25	20	5	5	5	0	0

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	**Dominanat, moderate rooted bunchgrass**			500–700	
	Idaho fescue	FEID	*Festuca idahoensis*	500–700	–
2	**Sub-dominant, moderate rooted bunchgrass**			50–150	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	50–150	–
4	**Common, perennial, shallow rooted grass**			20–50	
	Sandberg bluegrass	POSE	*Poa secunda*	20–50	–
5	**Other perennial grasses**			10–50	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	0–20	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–10	–
	squirreltail	ELEL5	*Elymus elymoides*	5–10	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	5–10	–
Forb					
7	**Dominant, perennial forbs**			60–110	
	buckwheat	ERIOG	*Eriogonum*	20–30	–
	desertparsley	LOMAT	*Lomatium*	10–20	–
	lupine	LUPIN	*Lupinus*	10–20	–
	milkvetch	ASTRA	*Astragalus*	10–20	–
	arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	10–20	–
9	**Other perennial forbs**			20–80	
	stoneseed	LITHO3	*Lithospermum*	5–10	–
	phlox	PHLOX	*Phlox*	3–8	–

	fleabane	ERIGE2	*Erigeron*	4–8	–
	common yarrow	ACMI2	*Achillea millefolium*	4–8	–
	hawksbeard	CREPI	*Crepis*	2–6	–
	ragwort	SENEC	*Senecio*	0–6	–
	sagebrush buttercup	RAGL	*Ranunculus glaberrimus*	2–5	–
	Indian paintbrush	CASTI2	*Castilleja*	0–5	–
	bitter root	LERE7	*Lewisia rediviva*	0–5	–
	onion	ALLIU	*Allium*	2–5	–
	Scouler's woollyweed	HISC2	*Hieracium scouleri*	0–4	–
	woodland-star	LITHO2	*Lithophragma*	1–3	–
	pussytoes	ANTEN	*Antennaria*	1–3	–
	agoseris	AGOSE	*Agoseris*	1–3	–
	stonecrop	SEDUM	*Sedum*	0–3	–
	deathcamas	ZIGAD	*Zigadenus*	0–3	–
	brodiaea	BRODI	*Brodiaea*	1–2	–
	mariposa lily	CALOC	*Calochortus*	0–2	–
Shrub/Vine					
10	**Dominant, evergreen, non-sprouting shrub**			30–80	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	30–80	–
11	**Other evergreen shrubs**			0–30	
	threetip sagebrush	ARTR4	*Artemisia tripartita*	0–20	–
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	0–20	–
	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	0–20	–
	big sagebrush	ARTRX	*Artemisia tridentata ssp. xericensis*	0–20	–
14	**Other shrubs**			10–60	
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–20	–
	wax currant	RICE	*Ribes cereum*	5–20	–
	common snowberry	SYAL	*Symphoricarpos albus*	0–15	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	5–15	–
	littleleaf horsebrush	TEGL	*Tetradymia glabrata*	0–15	–
	Saskatoon serviceberry	AMAL2	*Amelanchier alnifolia*	5–15	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	5–15	–
	wild crab apple	PERA4	*Peraphyllum ramosissimum*	0–15	–
Tree					
15	**Evergreen trees**			0–20	
	ponderosa pine	PIPO	*Pinus ponderosa*	0–20	–
	Douglas-fir	PSME	*Pseudotsuga menziesii*	0–20	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	0–10	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–10	–
	currant	RIBES	*Ribes*	0–10	–
	horsebrush	TETRA3	*Tetradymia*	0–10	–

Animal community

Livestock grazing:
This site is suitable for livestock grazing use in the late spring, summer, and fall under a planned grazing system. Use should be postponed until the soils are firm enough to prevent trampling damage and soil compaction. Grazing management should be keyed to Idaho fescue. Deferred grazing or rest is recommended at least once every three years.

Native Wildlife Associated with the Potential Climax Community:
This site is commonly used by mule deer, elk, antelope, rabbits, rodents, upland birds and various predators. It is a preferred site for upland bird nesting and rearing areas. Mule deer and elk make excellent use of the site for spring and late fall forage.

Hydrological functions

The soils of this site are typically in an upland topographic position. They have moderate high runoff potential and medium infiltration rates when the hydrologic cover is high. Under frozen ground conditions runoff potential is significantly increased. This occurs for extended periods when deep rooted perennial bunchgrass cover is negligible. Hydrologic cover is good when the Idaho fescue deep rooted bunchgrass component is greater than 70 percent of potential. The soils are in hydrologic group D.

Other information

Juniper invasion is a major risk on this site. Increases in western juniper and the subsequent competition for moisture will lead to a reduction of available forage. Overgrazing can easily reduce ground cover and accelerate soil loss. Juniper control measures include prescribed burning and/or cutting followed by rest to improve vigor, density and seed production of existing deep rooted perennials. Consider seeding following control measures if an inadequate stand of bunchgrass is present.

When incised channels are present, rehabilitation will markedly improve production, reduce downstream sedimentation, and restore good hydrologic characteristics. On altered sites, the reintroduction of Idaho fescue and basin wildrye may be needed to fully restore the site potential.

This site is generally not suited to mechanical seeding because of its shallow depth and stony surface.

Contributors

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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)	Jeff Repp and Bruce Franssen
Contact for lead author	Oregon NRCS State Rangeland Management Specialist
Date	04/26/2003
Approved by	Bob Gillaspy

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

Indicators

1. **Number and extent of rills:** None

2. **Presence of water flow patterns:** None

3. **Number and height of erosional pedestals or terracettes:** None to very few (some frost heaving)

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5-20%

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine - limited movement

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Moderate resistant to erosion: aggregate stability = 3-5

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Moderate fine granular to weak medium platy to moderate fine subangular blocky structure, dry color value 4-5, 2-6" thick; low OM (1-4%).

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Moderate to significant ground cover (50-70%) and gentle to moderate slopes (0-30%) moderately limit rainfall impact and overland flow

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None

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: Perennial, deep-rooted bunchgrasses

Sub-dominant: Evergreen shrubs

Other: Forbs > perennial, shallow-rooted bunchgrasses

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Normal decadence and mortality expected

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Favorable: 1300, Normal: 1000, Unfavorable: 800 lbs/acre/year at high RSI

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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:** Western Juniper readily invades the site. Cheatgrass and Medusahead invade sites that have lost deep rooted perennial grass functional groups

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17. **Perennial plant reproductive capability:** All species should be capable of reproducing annually

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