

Ecological site R010XC039OR

SR Very Shallow

12-16 PZ

Last updated: 4/10/2025
Accessed: 08/25/2026

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.

Associated sites

R010XC029OR	SR Shallow Cool 12-16 PZ SR Shallow Cool 12-16 PZ (shallow soil, higher production, different composition – ARTRV-X,T/FEID-PSSPS association)
R010XC032OR	SR Mountain 12-16 PZ SR Mountain 12-16 PZ (moderate deep soil, higher production, different composition – ARTRV/FEID association)
R010XC033OR	SR Cool 12-16 PZ SR Cool 12-16 PZ (moderate deep soil, higher production, different composition – ARTRV-X,T/FEID association)
R010XC037OR	SR Mountain Shallow 12-16 PZ SR Mountain Shallow 12-16 PZ (shallow soil, higher production, different composition – ARTRV/FEID association)
R010XC041OR	SR Very Shallow Rockland 12-16 PZ SR Very Shallow Rockland 12-16 PZ (very shallow thin soil with areas of exposed bedrock, lower production, different composition – ACTH7-POSE/ERIOG association)
R010XC042OR	SR Juniper Tableland 12-16 PZ SR Juniper Tableland 12-16 PZ (very shallow soil with a fractured substratum, higher production, different composition – JUOC/ARRI2/POSE association)
R010XC047OR	SR Mountain South 12-16 PZ SR Mountain South 12-16 PZ (moderate deep soil, south aspect, higher production, different composition – ARTRV-X,T/PSSPS association)

R010XC054OR	SR Mountain Shallow South 12-16 PZ SR Mountain Shallow South 12-16 PZ (shallow soil, south aspect, higher production, different composition – ARTRV-X,T/PSSPS association)
R010XC059OR	SR Mahogany Rockland 12+ PZ SR Mahogany Rockland 12+ PZ (shallow soil over fractured bedrock with areas of exposed rock outcrop, higher production, different composition – JUOC/CELE3-PUTR2/PSSPS-FEID association)
R010XC068OR	SR Cool Mountain North 12-16 PZ SR Cool Mountain North 12-16 PZ (moderate deep to deep soil, north aspect, higher production, different composition ARTRV-X,T/FEID association)
R010XC075OR	SR Mountain Shallow North 12-16 PZ SR Mountain Shallow North 12-16 PZ (shallow soil, north aspect higher production, different composition – ARTRV/FEID-PSSPS-POSE association)

Similar sites

R010XC041OR	SR Very Shallow Rockland 12-16 PZ SR Very Shallow Rockland 12-16 PZ (very shallow thin soil with areas of exposed bedrock, lower production, different composition – ACTH7-POSE/ERIOG association)
R010XC038OR	SR Very Shallow 9-12 PZ SR Very Shallow 9-12 PZ (lower elevation and precipitation, less production, different composition – DAUN absent)
R010XC040OR	SR Very Shallow 16-20 PZ SR Very Shallow 16-20 PZ (higher elevation, greater precipitation and production)
R010XC042OR	SR Juniper Tableland 12-16 PZ SR Juniper Tableland 12-16 PZ (very shallow soil with a fractured substratum, higher production, different composition – JUOC/ARRI2/POSE association)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia rigida</i>
Herbaceous	(1) <i>Poa secunda</i> (2) <i>Danthonia unispicata</i>

Physiographic features

This site occurs on terraces, tablelands and rolling uplands. Slopes are typically from 2 to 12 percent with a range of 2 to 20 percent. Elevations range from 4000 to 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Hill
Flooding frequency	None
Elevation	1,220 – 1,830 m
Slope	0 – 10 %
Ponding depth	0 cm
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 to mesic near frigid with a mean air temperature of 45 degrees F. Temperature extremes range from 90 to -20 degrees F. The frost free period ranges from less than 30 to 90 days. The optimum growth period for plant growth is late April through June.

Table 3 Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	
Precipitation total (average)	410 mm

Influencing water features

Soil features

The soils of this site are very shallow over bedrock or duripan and well drained. The surface layer is typically a very cobbly loam to stony loam 3 to 6 inches thick. The subsoil is a very cobbly silty clay loam to stony clay loam over an extremely cobbly clay. Depth to bedrock, a duripan or heavy clay subsoil is less than 10 inches. Permeability is moderately slow to slow. The available water holding capacity (AWC) is about 2 inches for the profile. The erosion potential is moderate to severe.

Table 4. Representative soil features

Parent material	(1) Volcanic ash – rhyolite (2) Eolian deposits – basalt
Surface texture	(1) Very stony loam (2) Very cobbly silty clay loam
Family particle size	(1) Clayey
Drainage class	Well drained to moderately well drained
Permeability class	Moderately slow to slow
Soil depth	10 – 30 cm
Surface fragment cover <=3"	10 – 30 %
Surface fragment cover >3"	10 – 30 %
Available water capacity (0-101.6cm)	1.27 – 5.08 cm
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	10 – 30 %
Subsurface fragment volume >3" (Depth not specified)	10 – 40 %

Ecological dynamics

The potential native plant community is dominated by stiff sagebrush, Sandberg bluegrass and one-spike oatgrass. Idaho fescue is common. Bluebunch wheatgrass, bottlebrush squirreltail and a variety of forbs are present. Vegetative composition of the community is approximately 65 percent grasses, 10 percent forbs and 25 percent shrubs. Approximate ground cover is 40 to 60 percent (basal and crown). There is a strong diversified soil microbiotic crust on the interspaces between plant bases.

Range in Characteristics:

Plant composition and production is dependent on soil depth, precipitation and bedrock fracture. As soil depth decreases to 4 to 6 inches, Sandberg bluegrass increases. Onespike oatgrass increases at similar depths at higher precipitation and in areas receiving additional spring runoff. Idaho fescue and scabland (stiff) sagebrush will increase on deeper soils closer to 10 inches deep and over fractured bedrock. Bluebunch wheatgrass increases at lower elevations and on slight south and west exposures. Production increases with soil depth and precipitation. Natural fire frequency is low approximating 100 years being dependent on soil depth and production, fine fuel build-up and favorable fire conditions.

Response to Disturbance-States:

If the condition of the site deteriorates as a result of overgrazing, one-spike oatgrass and Idaho fescue initially decrease. Sandberg bluegrass and stiff sagebrush increase. Junipers invade on deeper soils with fire suppression and the lack of adequate fine fuels to carry a fire. With continued overgrazing scattered bluebunch wheatgrass and Thurber’s needlegrass decrease. Stiff sagebrush and Sandberg bluegrass subsequently decrease and bare soil increases. Annual invasion is limited except in seasonal moist drainage areas where ventenata and medusahead may invade. Soil microbiotic crusts are easily disturbed and broken up, particularly by early spring grazing on saturated soils. Accelerated soil erosion on the bare soil interspaces markedly increases, reduces potential site productivity and contributes to downstream sedimentation.

States: ARRI2/POSE-Bare Ground; JUOC/ARRI2/POSE-Bare Ground;

Treatment Response:

The repair pathways from State 2 back to State 1 indicates the need for brush management along with seeding. State 3 back to State 1 will require mechanical and/or chemical treatment of the annual grasses plus seeding. Due to the extremely shallow soils on this site, the potential for seeding failure is medium to high. Maintaining an adequate stand of perennial grasses through prescribed grazing and other management practices are the best approaches to optimizing the economic returns from this site.

Reference Plant Community

There are three phases in the reference state. Phase 1.1 is the perennial grass and forb phase dominated by perennial bunchgrasses with stiff sagebrush being common. Phase 1.2 the stiff sagebrush doiminant phase, results from reduced fire and improper grazing management. Phase 1.3 has an increase in stiff sagebrush and a reduction in the perennial bunchgrasses as a result of no fire and continued improper grazing management.

Phase 1.1 the perennial grass and forb phase, the reference plant community is dominated by one-spike oatgrass, Sandberg bluegrass, Idaho fescue and bluebunch wheatgrass in the understory and stiff sagebrush in the overstory. Vegetative composition of the plant community is approximately 65 percent grasses, 15 percent forbs and 20percent shrubs. The perennial grasses control the ecological processes in this phase.

Phase 1.2 the stiff sagebrush dominant phase results from reduced fire and improper grazing. With fire and prescribed grazing the plant community will move back towards Phase 1.1 (1.2A). With continued lack of fire and improper grazing management the community transitions to Phase 1.3 (1.2B). The perennial grasses and stiff sagebrush control the ecological processes in this phase.

Phase 1.3 the stiff sagebrush-fire prone phase happens as a result of no fire and improper grazing from phase 1.2 (1.2B). With no fire and prescribed grazing, the plant community will move back (1.3B) towards Phase 1.2. Fire and prescribed grazing will move the plant community back (1.3A). towards Phase 1.1. This phase is the “at risk” plant community in State 1. With lack of fire, continued improper grazing and/or drought the community will transition (IRT1A) to State 2. Frequent fire with or without prescribed grazing will move the plant community to State 3 which is the annual grass dominated state. Stiff sagebrush controls the ecological processes in this phase.

State 2 is dominated by stiff sagebrush and it controls the ecological processes on the site. Frequent fire will move the plant community (IRT2A) to State 3, the annual grass dominated state. The one repair pathway (RP2) back to State 1 involves brush management and seeding with native species. Due to the shallow soils this repair pathway would have a high risk of failure and is not economically feasible.

State 3 is the annual grass dominated state and these grasses control all of the ecological processes. A repair pathway (RP3) to State 1 requires chemical and/or mechanical control of the annual grasses and seeding of native species to move it back to State 1. Again, due to the shallow soils this practice has a high risk of failure and is not economically feasible.

State and transition model

Figure 1. SR Mountain Very Shallow 12-16 PZ - R010XC039OR

Additional community tables

Table 5. Community 1.1 plant community composition

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

Grass/Grasslike				
1	Dominant, perennial shallow rooted grasses			135-269
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	90-179
	onespike danthonia	DAUN	<i>Danthonia unispicata</i>	45-90
2	Perennial, deep-rooted grasses			72-143
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	45-90
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata ssp. spicata</i>	22-45
	squirreltail	ELEL5	<i>Elymus elymoides</i>	4-9
Forb				
5	Dominant, perennial forbs			27-67
	serrate balsamroot	BASE2	<i>Balsamorhiza serrata</i>	4-13
	buckwheat	ERIOG	<i>Eriogonum</i>	4-13
	desertparsley	LOMAT	<i>Lomatium</i>	4-13
	phlox	PHLOX	<i>Phlox</i>	4-9
	fleabane	ERIGE2	<i>Erigeron</i>	4-9
	common yarrow	ACMI2	<i>Achillea millefolium</i>	4-9
8	Other perennial forbs			4-13
	onion	ALLIU	<i>Allium</i>	1-2
	pussytoes	ANTEN	<i>Antennaria</i>	1-2
	balsamroot	BALSA	<i>Balsamorhiza</i>	1-2
	larkspur	DELPH	<i>Delphinium</i>	0-2
	bitter root	LERE7	<i>Lewisia rediviva</i>	0-2
	woodland-star	LITHO2	<i>Lithophragma</i>	1-2
	bluebells	MERTE	<i>Mertensia</i>	0-2
	sagebrush buttercup	RAGL	<i>Ranunculus glaberrimus</i>	1-2
	stonecrop	SEDUM	<i>Sedum</i>	0-2
	blue-eyed grass	SISYR	<i>Sisyrinchium</i>	0-2
	largehead clover	TRMA3	<i>Trifolium macrocephalum</i>	0-2
Shrub/Vine				
11	Dominant deciduous shrub			67-112
	scabland sagebrush	ARRI2	<i>Artemisia rigida</i>	67-112
15	Other shrubs			0-22
	little sagebrush	ARAR8	<i>Artemisia arbuscula</i>	0-9
	western juniper	JUOC	<i>Juniperus occidentalis</i>	0-9
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0-9

Animal community

Livestock Grazing: This site provides limited spring forage to livestock. The very shallow soils have low water holding capacity for extended plant growth. This site is easily damaged by early grazing and trampling when soils are saturated. Grazing management should be keyed for one-spike oatgrass and the limited amount of Idaho fescue. Deferred grazing or rest is recommended at least once every three years. **Wildlife:** This site is commonly used by mule deer, elk, rabbits, rodents, upland birds and various predators. Forbs are a nutritional food source for spring broods. Open exposed areas are preferred lek sites for sage grouse. Mule deer and elk make use of the site for spring and winter forage. Stiff sagebrush seedheads are palatable in August and September. Good browse is furnished by stiff sagebrush during winter dormant periods following leaf drop.

Hydrological functions

The soils of this site are typically in an upland topographic position. They have high runoff potential and low available water storage potential even when the hydrologic cover is good. Under frozen ground conditions runoff potential is significantly increased. This occurs

for extended periods when perennial grass and microbiotic crust cover is negligible. Hydrologic cover is good when the onespike oatgrass, Sandberg bluegrass and microbiotic crust components are greater than 70 percent of potential. The soils are in hydrologic group D.

Other information

Juniper invasion on deeper soils of this site is a risk. The primary control measure is cutting followed by rest to improve the vigor, density and seed production of existing perennial grasses. As the site acts as a natural fire break, prescribed burn is not a practical juniper control measure except under very limited conditions requiring a fine fuel buildup and more extreme fire weather conditions. This site is not suited to range seeding due to the very shallow soils. Special designs are needed for fence construction.

Other references

Stringham, Tamzen, 2007. Final Report for USDA Ecological Site Description. Oregon State University, Corvallis, Oregon.

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

A. Bahn, J. Thompson, G. Kuehl, H. Barrett
M. Parks (OSU)
T. Bloomer, B. Gillaspay, E. Petersen, A. Bahn
T. Bloomer & A. Bahn

Approval

Kirt Walstad, 4/10/2025

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)	James A. Cornwell, State Rangeland Management Specialist, NRCS, Idaho (Retired) Lee Brooks, Assistant State Conservationist, NRCS, Idaho (Retired).
Contact for lead author	State Rangeland Management Specialist for NRCS in Oregon.
Date	09/12/2009
Approved by	
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.

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): 50-70 %.

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. Litter movement typically would be < two feet.

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values): Soil stability values should range from 3-5 but needs to be verified.

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): The surface structure is moderate medium platy and moderately fine subangular blocky. SOM is 1 to 3 percent. The A horizon thickness is 2 to 4 inches.

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Above average plant cover (30-50 % basal and crown) mediates the rainfall impact. The root mass of perennial bunchgrasses provides significant soil stability.

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site): None. Depth to bedrock, an indurated pan or bedrock is less than 10 inches.

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 bunchgrasses=large bunchgrass>

Sub-dominant: deciduous shrub = small bunchgrass >

Other: forbs

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
Normal decadence would be expected in the perennial bunchgrasses and stiff sagebrush.
-

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

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):
Favorable: 600; Normal: 400; Unfavorable: 200 lbs/ac/yr.
-

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: cheatgrass and medusahead
-

17. Perennial plant reproductive capability: All species should be capable of reproducing most years.
-