USDA Natural Resources Conservation Service

Ecological site R010XC041OR
SR Very Shallow Rockland 12-16 PZ

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Accessed: 05/10/2025

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): 010X–Central Rocky and Blue Mountain Foothills

This MLRA is characterized by gently rolling to steep hills, plateaus, and low mountains at the foothills of the Blue Mountains in Oregon and the Central Rocky Mountains in Idaho. The geology of this area is highly varied and ranges from Holocene volcanics to Cretaceous sedimentary rocks. Mollisols are the dominant soil order and the soil climate is typified by mesic or frigid soil temperature regimes, and xeric or aridic soil moisture regimes. Elevation ranges from 1,300 to 6,600 feet (395 to 2,010 meters), increasing from west to east. The climate is characterized by dry summers and snow dominated winters with precipitation averaging 8 to 16 inches (205 to 405 millimeters) and increasing from west to east. These factors support plant communities with shrub-grass associations with considerable acreage of sagebrush grassland. Big sagebrush, bluebunch wheatgrass, and Idaho fescue are the dominant species. Stiff sagebrush, low sagebrush, and Sandberg bluegrass are often dominant on sites with shallow restrictive layers. Western juniper is one of the few common tree species and since European settlement has greatly expanded its extent in Oregon. Nearly half of the MLRA is federally owned and managed by the Bureau of Land Management. Most of the area is used for livestock grazing with areas accessible by irrigation often used for irrigated agriculture.

Classification relationships

US National Vegetation Classification:
Macrogroup: M170. Great Basin-Intermountain Dwarf Sagebrush Steppe & Shrubland
Group: G307. Columbia Plateau Scabland Dwarf-shrubland
Alliance: Eriogonum spp. / *Poa secunda* Dwarf-shrub Steppe Alliance

Plant Associations of the Wallowa-Snake Province:
Note: These plant associations may not represent the same buckwheat species as found on this site but are included to provide a regionally relevant reference for similar community types.
Eriogonum strictum/Poa sandbergii (ERST2/POSA3) (FM91 12)
Eriogonum douglasii/Poa sandbergii (ERDO/POSA3) (FM91 11)

Landfire Biophysical Setting Model:
Note: This model was developed specifically for the Columbia Plateau but fits the characteristics of this site very well.
0810650: Columbia Plateau Scabland Shrubland

Ecological site concept

This site occurs on convex landforms of upland plateaus with very shallow soils over hard igneous extrusive geologies (basalt, andesite, rhyolite, tuff, etc.). In the reference state, the site is characterized by buckwheat (Eriogonum spp.), Thurber's needlegrass (*Achnatherum thurberianum*) and Sandberg bluegrass (*Poa secunda*). Areas of exposed rock and rock outcrop are common on this thin soiled site. Unlike related very shallow soil sites, a

lack of deep bedrock fracturing leads to a sparse distribution of scabland sagebrush (*Artemisia rigida*). This is a low production site. Production is limited by the low water holding capacity of the soil. Precipitation comes in the form of snow and rain primarily in the winter and early spring. The soil profile is not able to store all the moisture that the site receives, and excess moves to adjacent sites. Historically, plant community dynamics were driven primarily by drought disturbance and very infrequent fire due to patchy fuel distribution.

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)
R010XC033OR	**SR Cool 12-16 PZ** SR Cool 12-16 PZ (moderate deep soil, higher production, different composition – ARTRV-X,T/FEID association)
R010XC039OR	**SR Very Shallow 12-16 PZ** SR Very Shallow 12-16 PZ (very shallow soil depth with a greater clay content, higher production, different composition – ARRI2/POSE-DAUN-FEID 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

R010XC039OR	**SR Very Shallow 12-16 PZ** SR Very Shallow 12-16 PZ (very shallow soil depth with a greater clay content, higher production, different composition – ARRI2/POSE-DAUN-FEID association)
R010XC038OR	**SR Very Shallow 9-12 PZ** SR Very Shallow 9-12 PZ (lower elevation and precipitation zone, different composition – ARRI2/POSE 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)
R010XC040OR	**SR Very Shallow 16-20 PZ** SR Very Shallow 16-20 PZ (higher elevation, greater precipitation and production)

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Eriogonum*

Herbaceous	(1) *Poa secunda* (2) *Achnatherum thurberianum*

Physiographic features

This site occurs on upland tablelands over bedrock. Slopes are typically 2 to 12 percent with a range of 2 to 40 percent. The site is convex with variable north to south aspects. Elevations are typically from 4,000 to 5,000 feet.

Table 2. Representative physiographic features

Slope shape across	(1) Convex
Slope shape up-down	(1) Convex
Landforms	(1) Plateau (2) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	4,000–5,000 ft
Slope	2–12%
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	2–40%

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 mesic to frigid near mesic 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 50 to 90 days. The optimum growth period for plant growth is late April through early June. Climate graphs below are based on the nearest available climate stations to mapped site locations and are provided to indicate general climate patterns rather than representative values.

Table 4. Representative climatic features

Frost-free period (characteristic range)	50-90 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	12-16 in

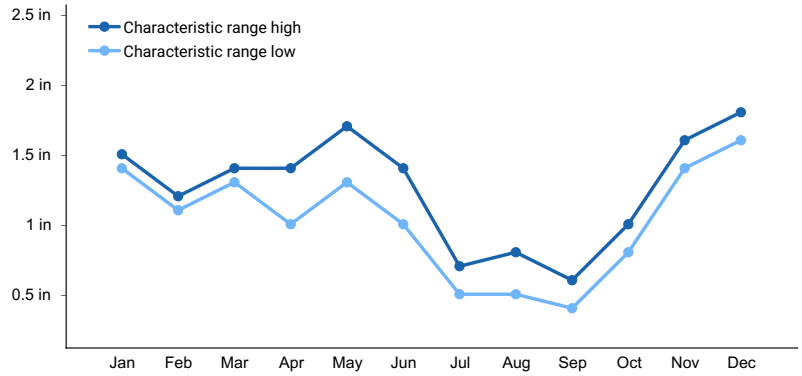


Figure 1. Monthly precipitation range

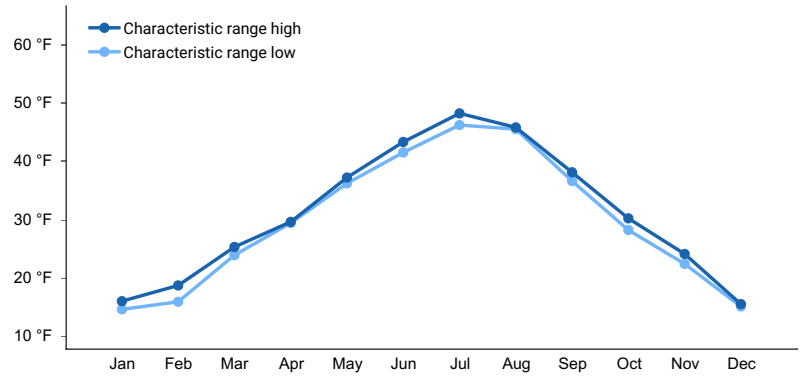


Figure 2. Monthly minimum temperature range

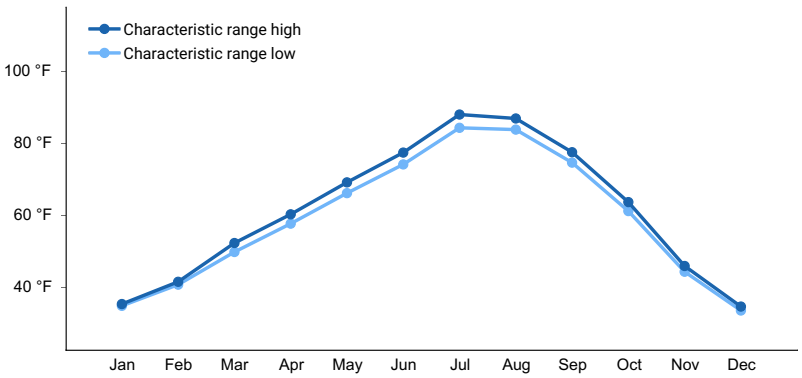


Figure 3. Monthly maximum temperature range

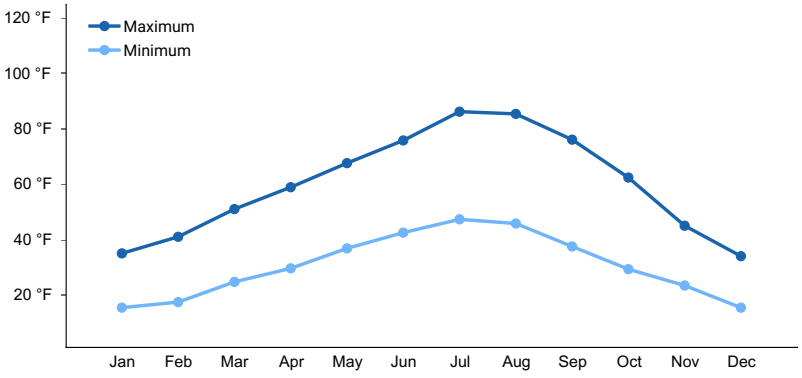


Figure 4. Monthly average minimum and maximum temperature

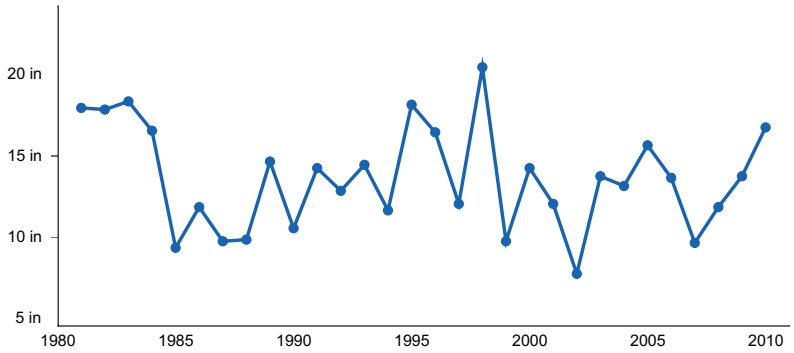


Figure 5. Annual precipitation pattern

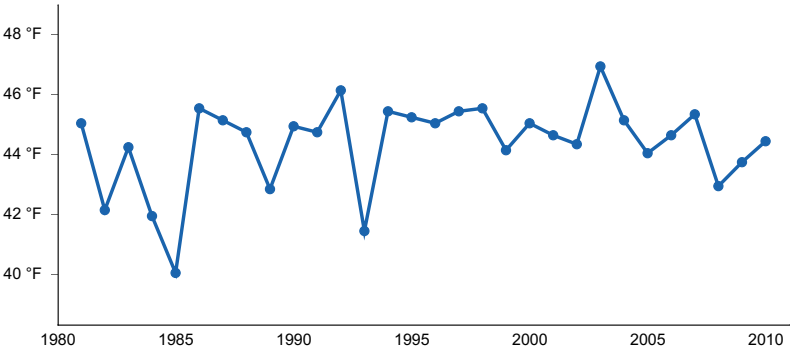


Figure 6. Annual average temperature pattern

Climate stations used

- (1) MASON DAM [USC00355258], Baker City, OR
- (2) DREWSEY [USC00352415], Drewsey, OR

Influencing water features

This site is not influenced by adjacent or onsite water features.

Wetland description

Not applicable

Soil features

The soils of this site are very shallow over bedrock and well drained. They are interspersed with large areas of convex exposed bedrock and widely scattered small sharp pinnacles. The surface layer is typically a thin surface very gravelly loam to loam 2 to 6 inches thick. The subsoil is a similar very gravelly loam over rhyolitic and basalt bedrock. Depth is typically 4 to 8 inches. Permeability is moderate. The available water holding capacity (AWC) is 1 to 2 inches for the profile. The water erosion potential is severe.

Table 5. Representative soil features

Parent material	(1) Volcanic ash–rhyolite (2) Loess–basalt
Surface texture	(1) Very gravelly loam (2) Loam
Family particle size	(1) Loamy (2) Loamy-skeletal
Drainage class	Well drained to moderately well drained

Permeability class	Rapid to moderate
Depth to restrictive layer	2–8 in
Soil depth	2–8 in
Surface fragment cover <=3"	10–30%
Surface fragment cover >3"	0–10%
Available water capacity (0-40in)	1–2 in
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Subsurface fragment volume <=3" (Depth not specified)	10–30%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The potential native plant community is dominated by buckwheat (Eriogonum spp.), Thurber's needlegrass (*Achnatherum thurberianum*) and Sandberg bluegrass (*Poa secunda*). Bluebunch wheatgrass (*Pseudoroegneria spicata*), bottlebrush squirreltail (*Elymus elymoides*) and a variety of forbs are present. Scabland sagebrush (*Artemisia rigida*) is scattered. Vegetative composition of the community is approximately 75 percent grasses, 20 percent forbs, and 5 percent shrubs. Approximate ground cover is 40 to 60 percent (basal and crown). There is a weak diversified soil microbiotic crust between plant interspaces.

Range in Characteristics:
Plant composition and production is dependent on soil depth, precipitation and bedrock fracture. The soil typically tapers to a very thin layer adjacent to extensive areas of convex bedrock. Sandberg bluegrass increases as the soil depth decreases to less than 4 inches. Thurber's needlegrass increases on deeper gravelly loams. Bluebunch wheatgrass increases over silt loams on southerly aspects. Idaho fescue (*Festuca idahoensis*) increases over deeper silt loams on northerly aspects. Soil microbiotic crust development is limited on gravelly surface textures. Western juniper (*Juniperus occidentalis*) is not prevalent due to the thin soil surface and unfractured bedrock. Junipers occur primarily on widely scattered small rock outcrops. Production increases with soil depth and precipitation.

Buckwheat species vary in their response to fire with some resprouting following low severity fire and others commonly experiencing mortality. Many species may be reduced immediately following fire yet in the absence of repeated fire will return to pre-burn levels or even increase in a few years following fire (Gucker and Shaw 2019, Monson et al. 2004, Landfire 2014). Thurber's needlegrass is considered to be the least fire-resistant needlegrass, Thurber's is often damaged by moderately severe fire. It recovers slowly following fire and regenerates primarily by seed rather than resprouting from crowns (Archer 2000). Bluebunch wheatgrass is considered to be a highly fire adapted grass species with low buds often protected from fire. Recovery following fire is rapid and it often increases relative to other plants post fire, especially after spring burning. While burning may improve the nutritional quality of bluebunch, defoliation during the regeneration period can be very detrimental to the stand and grazing should be avoided immediately after (Zlatnik 1999). Stiff sagebrush is killed by fire and does not sprout (Young 1983). Establishment after fire is from seed, generally blown in and not from the seed bank (Bradley et al. 1992).

Climate cycles would have been an important driver of ecological dynamics historically, with drought periods possibly leading to reductions in sagebrush cover and wet years increasing fire occurrence due to increased perennial grass production and fine fuels loads. Historically these communities would have likely encountered very infrequent fire due to patchy fuel, possibly on the order of 250 years between fires (Landfire 2014).

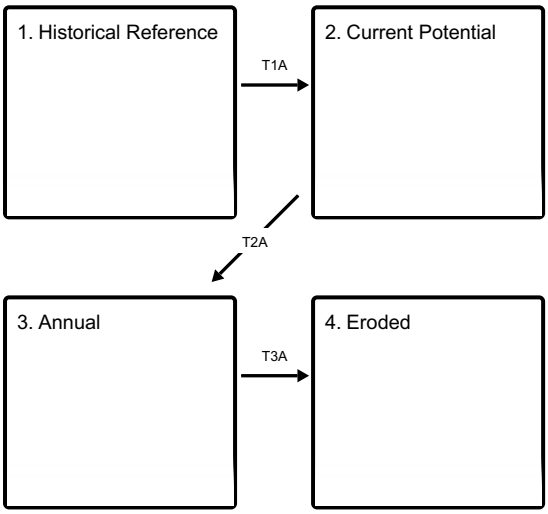
If the condition of the site deteriorates as a result of chronic improper grazing management, Thurber's needlegrass, other bunchgrasses and Sandberg bluegrass decrease. Exotic annual grasses such as cheatgrass (*Bromus tectorum*), North African grass (*Ventenata dubia*), and medusahead (*Taeniatherum caput-medusae*) may invade

and become problematic. Exotic annual grass invasion may increase the size and frequency of fires and extend the season when fires are likely by augmenting early season fine fuel loads and fuel continuity. Sites may be particularly fire prone following years of above average precipitation during which invasive annual grass production can increase dramatically (Pilliod et al. 2017). On very thin surfaces less than 2 to 4 inches bare soil increases. The very thin surfaces have insufficient water holding capacity to support high annual plant densities. Early spring grazing on saturated soils increases erosion by loosening the exposed thin surface and breaking up soil microbiotic crusts. Accelerated soil erosion on the bare soil interspaces increases and areas of exposed bedrock markedly increase. Soil erosion contributes to downstream sedimentation and potential site productivity is reduced. According to Johnson and Simon (1987) similar buckwheat dominated plant community types in near the Wallowa Mountains may be the result of soil loss due to wind and water erosion exacerbated by livestock grazing. Many of these buckwheat scabland sites are heavily invaded by invasive annual grasses and may be imperiled in the region (Natureserve 2020). Rehabilitation of native plant communities will be very difficult on this site due to thin soils, high potential for invasive annual grass encroachment, susceptibility of soils to erosion and damaging frost heaving, and mechanical limitations due to areas of rock outcrop.

An understanding of the site specific ecological dynamics for this site are incomplete. Little is known about the ecological dynamics of buckwheat dominated sites and how these plants may respond to disturbance. Current and anticipated effects of climate change are not included in this model, yet this site may experience significant impacts as climate continues to change. Ecological dynamics of this site are informed by disturbance response group 7 described in Stringham et al. 2016 yet are considerably different due to the dominance of buckwheat rather than scabland sagebrush on this site. This model is likely to undergo refinements and revisions as more data becomes available.

State and transition model

Ecosystem states

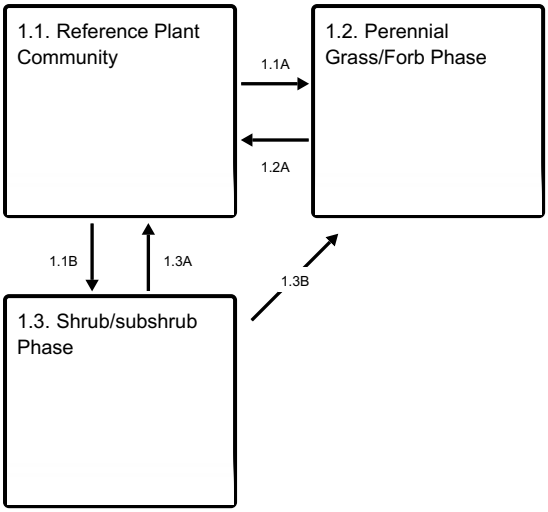


T1A - Introduction of non-native species.

T2A - Catastrophic fire and soil disturbing treatments. Inappropriate grazing management in the presence of non-native annual species, may be combined with higher than normal spring precipitation.

T3A - Continued inappropriate grazing management leading to excessive trampling, compaction and soil loss.

State 1 submodel, plant communities



1.1A - Low severity fire; high severity fire

1.1B - Time and lack of disturbance. Excessive herbivory and/or long-term drought

1.2A - Time and lack of disturbance

1.3A - Low severity fire

1.3B - Moderate severity fire

State 1
Historical Reference

The Reference State is representative of the natural range of variability for the site under pristine conditions. The reference state is a low productivity, bunchgrass shrubland. State dynamics are maintained by interactions between climatic patterns and disturbance regimes. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These are maintained by ecosystem processes and structural elements such as the presence of all structural and functional plant groups, the retention of organic matter and the maintenance of plant community cover. Plant community phase changes are primarily driven by infrequent fire and/or periodic drought.

Community 1.1
Reference Plant Community

The reference native plant community is dominated by buckwheat, Thurber’s needlegrass and Sandberg bluegrass. Bluebunch wheatgrass, bottlebrush squirreltail and a variety of forbs are present. Scabland sagebrush is scattered. Vegetative composition of the community is approximately 75 percent grasses, 20 percent forbs and 5 percent shrubs. Approximate ground cover is 40 to 60 percent (basal and crown). There is a weak diversified soil microbiotic crust between plant interspaces.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	75	225	375
Forb	20	60	100
Shrub/Vine	5	15	25
Total	**100**	**300**	**500**

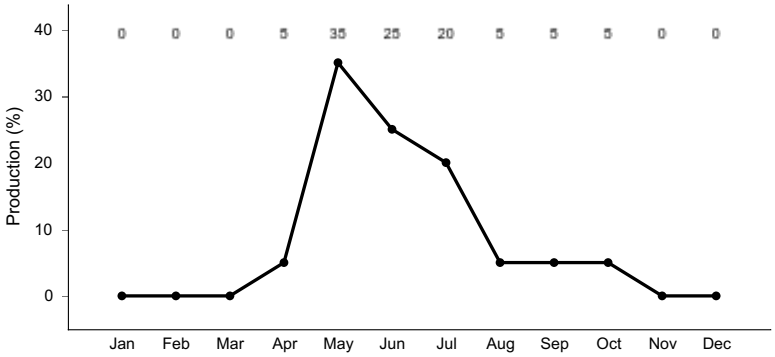


Figure 8. Plant community growth curve (percent production by month). OR4521, B10 SR Mtn Souths & Shallows 12-16. SR Mtn Souths & Shallows 12-16 RPC Growth Curves.

Community 1.2
Perennial Grass/Forb Phase

Within this community phase, site resources are controlled primarily by perennial grasses and forbs. Shrub and subshrub species, such as buckwheat and scabland sagebrush, have been reduced considerably. Fire adapted, sprouting buckwheat species will return more quickly than those that are top killed by fire and rely on seed for regeneration (Monson et al. 2004, Landfire 2014). Some common species in Oregon will be reduced immediately following fire but will often recover or increase after a few years post fire unless repeated disturbance occurs (Gucker and Shaw 2019).

Community 1.3
Shrub/subshrub Phase

Within this community phase, site resources are primarily controlled by buckwheat and scattered scabland sagebush. Native deep-rooted perennial grass composition has been reduced, with shallow-rooted and disturbance adapted grasses such as Sandberg bluegrass increasing.

Pathway 1.1A
Community 1.1 to 1.2

Low severity fire creates shrub-subshrub/grass mosaic; high severity fire significantly reduces shrub/subshrub cover and leads to early/mid seral community, dominated by grasses and forbs. Fires are uncommon in this fuel limited system and may only occur on intervals approximately 250 years (Landfire 2014).

Pathway 1.1B
Community 1.1 to 1.3

Time and lack of disturbance. Excessive herbivory and/or long-term drought may also reduce perennial understory.

Pathway 1.2A
Community 1.2 to 1.1

Time and lack of disturbance allows for shrub/subshrub regeneration.

Pathway 1.3A
Community 1.3 to 1.1

Low severity fire creates shrub-subshrub/grass mosaic. Fires are uncommon in this fuel limited system and may only occur on intervals approximately 250 years (Landfire 2014).

Pathway 1.3B
Community 1.3 to 1.2

Moderate severity fire significantly reduces shrub/subshrub cover and leads to early/mid seral community, dominated by grasses and forbs. Fires are uncommon in this fuel limited system and may only occur on intervals approximately 250 years (Landfire 2014).

State 2
Current Potential

This state is similar to the Reference State. Ecological function has not changed fundamentally, however the resiliency of the site has been reduced by the presence of invasive plants. Additionally, livestock herbivory may be present as a disturbance process and changes in climate may be altering ecological dynamics. Non-native plant species may increase in abundance but will not become dominant or control ecological processes within this state. These species can be highly flammable and can promote fire where historically fire had been infrequent. Negative feedbacks enhance ecosystem resilience and contribute to the stability of the state. These are maintained by ecosystem processes and structural elements such as the presence of all structural and functional groups, and retention of organic matter and nutrients. Positive feedbacks driven by plant community invasion decrease ecosystem resilience and stability of the state. These include exotic plant species' high seed output, persistent seed bank, rapid growth rate, ability to cross pollinate, and adaptations for seed dispersal. Plant community phase changes are primarily driven by infrequent fire, periodic drought and ungulate herbivory. Current potential plant communities also mirror those of the above Historical Reference (State 1) yet with the addition of a low level of invasive exotic plant invasion and influences of livestock herbivory. Livestock herbivory may result in decreases in deep rooted perennial grasses, and related increases in shallow-rooted perennial grasses (such as Sandberg bluegrass), unpalatable forbs and shrubs.

State 3
Annual

Within this state, site resources are primarily controlled by exotic annual herbaceous species. Native perennial grass and forb composition has been greatly diminished. Fire frequency may be increased by higher fine fuel loads, potentially having significant ecological consequences for this otherwise fuel limited site. Rehabilitation of this state will be extremely difficult due to thin soils, high potential for invasive annual grass encroachment, susceptibility of soils to erosion and damaging frost heaving, and mechanical limitations due to areas of rock outcrop. Multiple plant communities are possible within this state, all of which are dominated by invasive annual grasses such as cheatgrass, ventenada and medusahead and potentially invasive annual and perennial forbs. Subshrub and shrub species may also be present. Overtime, with increasing invasion, soil stabilizing perennial root biomass will be decreased. Bare ground will increase, potentially increasing erosion of these thin soils and risking a transition to an eroded state.

State 4
Eroded

This state is characterized by significant soil loss through wind and water erosion. Most herbaceous cover has been lost and soil stabilizing microbiotic soil crusts are degraded. Loss of these components reduces soil stabilization and renders the soil surface vulnerable to raindrop impacts, runoff and entrainment of soil particles by wind. Extensive areas of erosion pavement are common. The potential for a shift to this state is greatly increased toward the steeper end of the slope range of this site. Positive feedbacks develop as low vegetative cover leads to decreased litter and organic matter production, higher soil temperature variability, and decreased nutrient cycling, further destabilizing soil and decreasing potential plant establishment. Grass and forb vegetative cover is low yet invasive annual plants are likely and some shrubs and subshrubs may remain where soil persists in areas of fractured bedrock. Potential for rehabilitation of this state is unknown but would likely pose significant challenges due to degradation of abiotic function of the site, the susceptibility of soils to erosion and damaging frost heaving, and mechanical limitations due to areas of rock outcrop.

Transition T1A
State 1 to 2

Introduction of non-native species.

Transition T2A
State 2 to 3

Catastrophic fire and soil disturbing treatments. Inappropriate grazing management in the presence of non-native annual species, may be combined with higher than normal spring precipitation.

Transition T3A
State 3 to 4

Continued inappropriate grazing management leading to excessive trampling, compaction and soil loss. Potentially exacerbated by prolonged drought, repeated fire, or extreme weather events during periods of low soil cover.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant, moderate rooted bunchgrass**			90–150	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	90–150	–
2	**Sub-dominant, shallow rooted perennial grass**			60–90	
	Sandberg bluegrass	POSE	*Poa secunda*	60–90	–
3	**Other, perennial grasses**			10–40	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	0–20	–
	Idaho fescue	FEID	*Festuca idahoensis*	0–20	–
	squirreltail	ELEL5	*Elymus elymoides*	6–15	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–10	–
Forb					
5	**Dominant, perennial forbs**			40–90	
	arrowleaf buckwheat	ERCO12	*Eriogonum compositum*	15–45	–
	buckwheat	ERIOG	*Eriogonum*	15–30	–
	desertparsley	LOMAT	*Lomatium*	3–9	–
	phlox	PHLOX	*Phlox*	3–6	–
	fleabane	ERIGE2	*Erigeron*	3–6	–
8	**Other perennial forbs**			5–15	
	balsamroot	BALSA	*Balsamorhiza*	1–8	–
	common yarrow	ACMI2	*Achillea millefolium*	1–5	–
	onion	ALLIU	*Allium*	1–2	–
	pussytoes	ANTEN	*Antennaria*	1–2	–
	larkspur	DELPH	*Delphinium*	0–2	–
	bitter root	LERE7	*Lewisia rediviva*	0–2	–
	woodland-star	LITHO2	*Lithophragma*	1–2	–
	sagebrush buttercup	RAGL	*Ranunculus glaberrimus*	0–2	–
	stonecrop	SEDUM	*Sedum*	0–2	–
	largehead clover	TRMA3	*Trifolium macrocephalum*	0–2	–
Shrub/Vine					
11	**Dominant, deciduous shrub**			5–20	
	scabland sagebrush	ARRI2	*Artemisia rigida*	5–20	–
15	**Other shrubs**			0–20	
	little sagebrush	ARAR8	*Artemisia arbuscula*	0–10	–
	western juniper	JUOC	*Juniperus occidentalis*	0–10	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–10	–

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 Thurber’s needlegrass and Sandberg bluegrass and the limited amount of bluebunch wheatgrass or 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. Mule deer and elk make use of the site for winter and spring forage.

Hydrological functions

The soils of this site are in an upland topographic position. They have high runoff potential and medium infiltration rates 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 Thurber's needlegrass, Sandberg bluegrass and microbiotic crust components are greater than 70 percent of potential. The soils are in hydrologic group D.

Other information

If an inadequate stand of bunchgrass is present seeding has limited applicability due to the very shallow thin soil and availability of adapted species. Special designs are needed for fence construction.

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Approval

Kirt Walstad, 2/14/2025

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	
Date	09/12/2009
Approved by	Kirt Walstad
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.