USDA Natural Resources Conservation Service

Ecological site R010XB065OR
JD Droughty Clayey North 9-12 PZ

Last updated: 2/14/2025
Accessed: 05/11/2025

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

Landfire biophysical setting (best approximation of community composition and fire dynamics):
0710810: Inter-Mountain Basins Mixed Salt Desert Scrub

US national vegetation classification system:
Macrogroup: M093. Great Basin Saltbush Scrub
Group: G300. Intermountain Shadscale - Saltbush Scrub

Ecological site concept

In reference condition, this ecological site supports a plant community dominated by shadscale saltbush (*Atriplex confertifolia*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Abiotically, this site is typified by moderately to steeply sloping north aspects and very shallow, clayey soils formed in tuffaceous cenozoic sediments. These droughty soils are limited by very shallow depths, fine textures, low precipitation and moderate alkalinity, facilitating the establishment and persistence of shadscale in an area otherwise dominated by sagebrush shrublands. Historical ecological dynamics would have been driven by infrequent fire, insect outbreaks and periodic drought. Presently, livestock grazing and exotic plant invasion have altered ecological dynamics and influence the composition of many of these communities.

Associated sites

R010XB044OR	**JD Droughty South 9-12 PZ** South slopes

R010XB064OR	**JD North 9-12 PZ** Soils are deeper with loamy surface textures, higher production, lower composition of Shadscale
R010XB043OR	**JD Droughty Clayey South 9-12 PZ** Shadscale also common and soils are similar, yet this site occurs on south rather than north slope aspects

Similar sites

R010XB064OR	**JD North 9-12 PZ** Soils are deeper with loamy surface textures, higher production, lower composition of Shadscale
R010XB035OR	**JD Shallow North 9-12 PZ** Soils are typically shallow rather than very shallow with loamy rather than clayey textures, shadscale largely absent
R010XB043OR	**JD Droughty Clayey South 9-12 PZ** Shadscale also common and soils are similar, yet this site occurs on south rather than north slope aspects

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex confertifolia*
Herbaceous	(1) *Pseudoroegneria spicata ssp. spicata*

Physiographic features

This site occurs on northerly exposures of low elevation terraces, hills and canyon slopes composed of early Cenezoic tuffaceous sediments. Slopes typically range from 15 to 60 percent with occasional slopes of 5 to 90 percent possible. Elevation typically varies from 1,800 to 2,900 feet (400 to 600 meters) but may range from 1,300 to 3,800 feet (550 to 1,150 meters). No water table is present within the upper 100 inches of the soil surface and the site is not subject to ponding or flooding.

Table 2. Representative physiographic features

Landforms	(1) Upland > Terrace (2) Upland > Canyon (3) Upland > Hillslope
Flooding frequency	None
Ponding frequency	None
Elevation	1,800–2,900 ft
Slope	15–60%
Aspect	NW, N, NE

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	1,300–3,800 ft
Slope	5–90%

Climatic features

This site generally has an aridic soil moisture regime (typically with a xeric subclass) and a mesic soil temperature regime. Mean annual precipitation ranges from 9 to 12 inches (230 to 300mm) and falls primarily as rain from November through April. The frost-free period ranges from 90 to 140 days. Localized convection storms occasionally occur during the summer. Climate graphs are based on the nearest available climate stations to representative site locations and are provided to indicate general climate patterns.

Table 4. Representative climatic features

Frost-free period (characteristic range)	90-140 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	9-12 in
Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	11 in

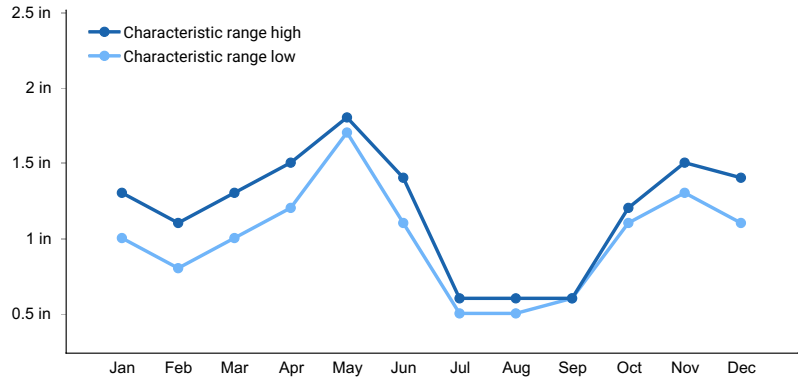


Figure 1. Monthly precipitation range

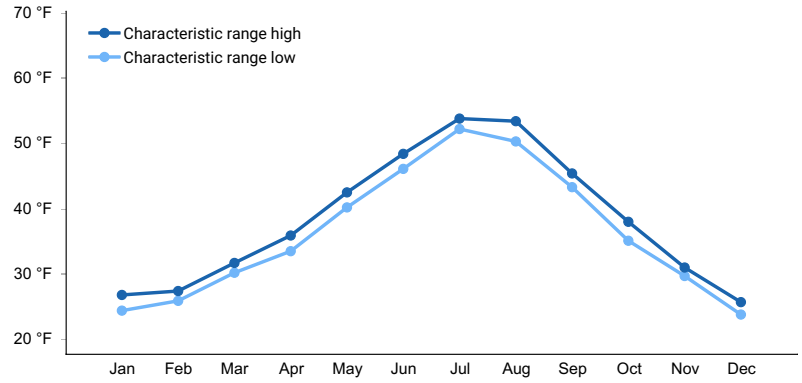


Figure 2. Monthly minimum temperature range

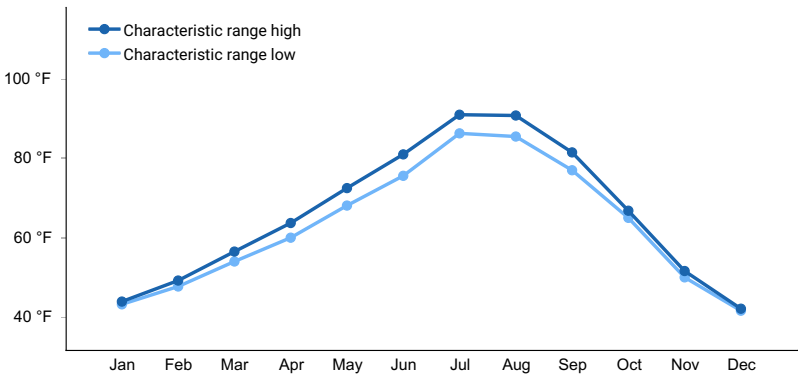


Figure 3. Monthly maximum temperature range

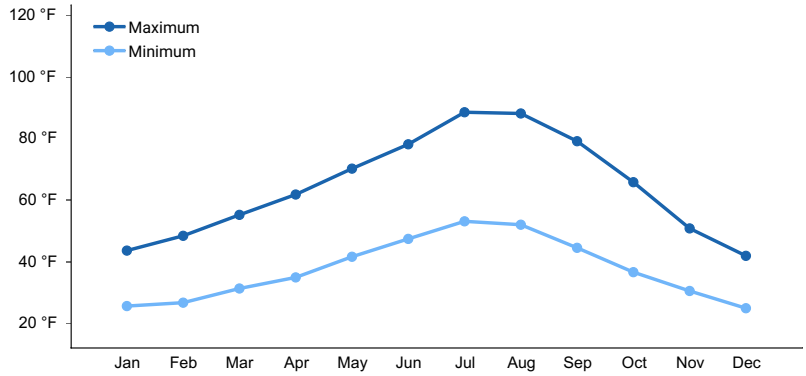


Figure 4. Monthly average minimum and maximum temperature

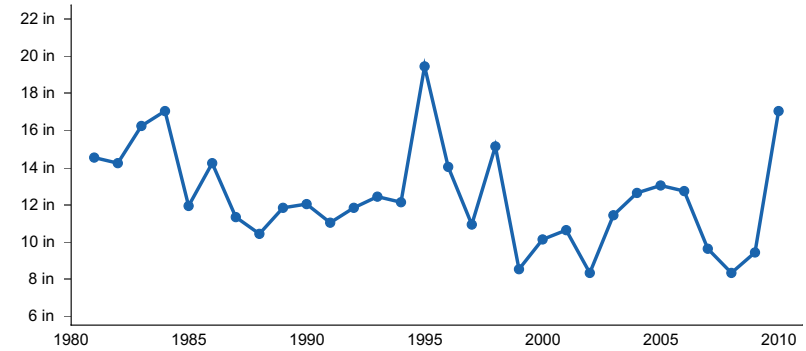


Figure 5. Annual precipitation pattern

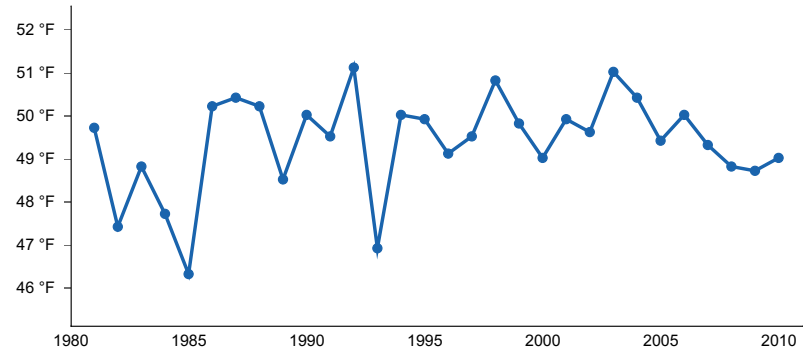


Figure 6. Annual average temperature pattern

Climate stations used

- (1) JOHN DAY 35 WNW [USW00004125], Mitchell, OR
- (2) MITCHELL 2 NW [USC00355641], Mitchell, OR
- (3) MONUMENT 2 [USC00355711], Monument, OR
- (4) MITCHELL 2 E [USC00355638], Mitchell, OR

Influencing water features

This site is not influenced by or associated with water features.

Wetland description

Not applicable

Soil features

Soils on this site are typically clayey, very shallow and well drained. These soils formed in basaltic colluvium, ash and loess over early cenezoic tuffaceous sediments. Surface textures are typically clay loams with very cobbly clay

loam or clay subsurface textures. Depth to a restrictive clay horizon is typically 1 to 4 inches. Soils are typically moderately alkaline with very slow permeability. See Brisbois for a typical soil series associated with this site concept. Soil erosion potential is severe on this site, in part due to slope angles and soil texture.

Table 5. Representative soil features

Parent material	(1) Colluvium–basalt (2) Volcanic ash (3) Residuum–tuff (4) Residuum–sedimentary rock
Surface texture	(1) Clay loam (2) Very cobbly clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow
Depth to restrictive layer	1–4 in
Soil depth	4–10 in
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–15%
Available water capacity (0-20in)	1.1–1.5 in
Soil reaction (1:1 water) (0-20in)	7.4–8.4
Subsurface fragment volume <=3" (0-20in)	20–40%
Subsurface fragment volume >3" (0-20in)	20–40%

Ecological dynamics

The reference community of this site supports a grassland-shrub community. The potential grass understory is dominated by bluebunch wheatgrass (*Pseudoroegneria spicata*) with minor amounts of Sandberg bluegrass (*Poa secunda*) also common. Shadscale saltbush (*Atriplex confertifolia*) is the dominant shrub on this site and is a strong indicator of the site where it occurs on north aspects.

As a facultative halophyte, shadscale can tolerate soils with high salinity/sodicity (Simonin 2001). In MLRA 010X, shadscale is often associated with clayey textures in areas receiving 9 to 12 inches of annual precipitation. Shadscale communities historically experienced very infrequent fire due to low fuel loads and discontinuity, however, robust evidence of pre-settlement fire is lacking and estimates of fire return intervals range from 35 to greater than 600 years (Simonin 2001, Landfire 2007). This historical lack of fire may explain why the plant did not evolve fire adapted habits and is considered intolerant of fire, experiencing high mortality rates and relying on seed for post-fire recolonization.

Bluebunch wheatgrass is a drought tolerant bunchgrass with an extensive root system (Zlatnik 1999). Bluebunch is considered to be a highly fire adapted grass species with low growing buds often protected from fire. This morphology allows for rapid recovery following fire and bluebunch wheatgrass often increases relative to other plants post fire, especially after spring burning. Broom snakeweed is typically associated with disturbed habitats and early seral conditions in the sagebrush biome (Tirmstein 1999). It can rapidly invade following improperly managed grazing and as a highly drought tolerant species, may rapidly increase in density following drought periods. While broom snakeweed is typically killed by fire, seeds are often unharmed and rapid colonization from nearby sites is common. While it effectively compete with many grasses (similar rooting depth and possible allelopathy) it is often out-competed by other shrubs overtime.

Western juniper (*Juniperus occidentalis*) is a native conifer species in western North America, but its density and

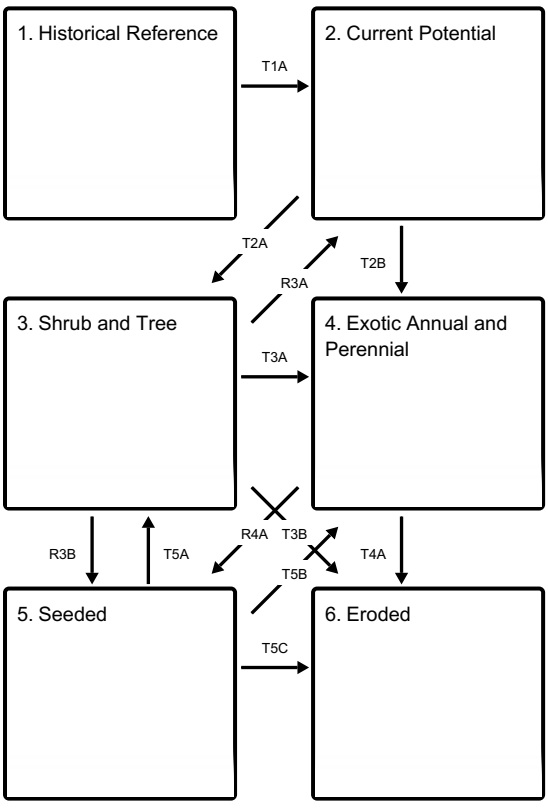
range have dramatically increased since the late 1800s. This is likely due to a combination of factors, principally: reductions in fire frequency; heavy livestock grazing; and increased atmospheric carbon dioxide (Fryer and Tirmenstein 2019). Juniper is sensitive to fire and most young trees are killed by even low severity fire. As Juniper trees mature and bark thickens, however, they become resistant to low severity fire yet are still killed by crown fires or high severity surface fires.

Climate cycles would have been an important driver of ecological dynamics historically, with drought periods potentially increasing relative composition of snakeweed and wet years increasing fire occurrence due to increased perennial grass production and fine fuels loads. Large die offs of shadscale in the Great Basin during periods of high precipitation (and associated fungal disease outbreaks) have been recorded (Simonin 2001). Further, decreases in shadscale density associated with extreme drought have also been recorded in regions receiving less annual precipitation than this site, yet attesting to the importance of climate in driving community composition (Lei 1999). This may be especially true when drought stress is combined with livestock grazing pressure (Chambers and Norton 1993). Livestock grazing may have altered the plant community composition of this site. Increases in broom snakeweed cover and decreases in perennial grass cover may result from chronic improperly managed grazing. Given an altered disturbance regime and degraded site conditions, invasions of exotic forb species, such as prickly lettuce (*Lactuca serriola*) and annual grass species such as annual bromes (Bromus spp.) and medusahead rye (*Taeniatherum caput-medusae*) may occur on this site. At high levels of invasion, exotic annual grasses may increase the 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 prone to fire following years of above average precipitation during which invasive annual grass production can increase dramatically (Pilliod et al. 2017). As site degradation progresses, either due to native vegetation loss or juniper encroachment, the highly erosive soils on this site may be lost due to wind and water erosion, causing a reduction in site potential which may be extremely difficult to restore.

An understanding of the site specific ecological dynamics for this site are incomplete. Thresholds between states and phases have yet to be quantified and restoration pathways and outcomes are poorly understood. 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. The model below draws from the ecological dynamics described in disturbance response group 2 of Stringham et al. 2017, with several important modifications.

State and transition model

Ecosystem states



T1A - Introduction of non-native, invasive plants

T2A - Chronic improperly managed grazing or sufficient time without shrub and tree controlling fire

T2B - Catastrophic fire, soil disturbing treatments or prolonged improperly managed grazing in the presence of non-native, invasive species

R3A - Shrub/Tree management and seeding of native species coupled with minimal soil disturbance, potentially requiring the use of herbicide

T3A - Catastrophic fire or failed woody species treatment, possibly in combination with prolonged improperly managed grazing in the presence of invasive plant species

R3B - Shrub/Tree management and seeding of desired species coupled with minimal soil disturbance, potentially requiring the use of herbicide

T3B - Prolonged time without stand replacing fire

R4A - Reduction of exotic plant species through management actions such as herbicide, prescribed grazing, or mowing, and seeding of desired species coupled with minimal soil disturbance

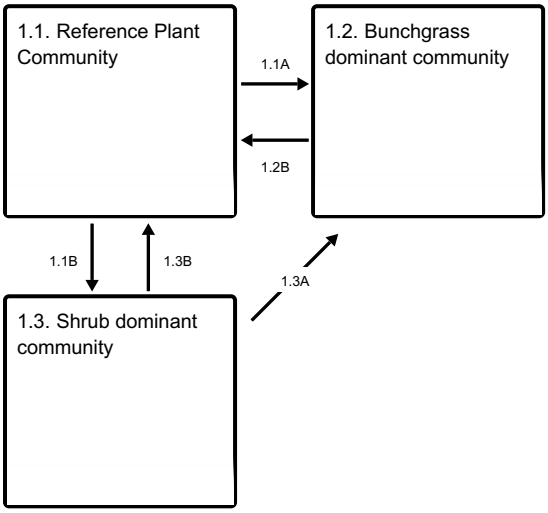
T4A - Catastrophic fire, failed rehabilitation attempt

T5A - Prolonged improperly managed grazing, or lack of fire with sufficient intensity to remove woody species, for an extended interval in the presence of shrubs and western junipe

T5B - Catastrophic fire, multiple fires or failed rehabilitation attempt in the presence of invasive plant species

T5C - Catastrophic fire, or multiple fires in short succession, possibly in combination with prior prolonged disturbance such as successive grazing

State 1 submodel, plant communities



1.1A - Fire occurs with enough severity to kill most of the shrub community or an extended wet period occurs

1.1B - Time and lack of fire, or a prolonged drought

1.2B - Time and lack of fire, or a prolonged drought

1.3B - An extended wet period

1.3A - Fire occurs with enough severity to kill most of the shrub community, or an extended wet period leads occurs

State 1
Historical Reference

The Historical Reference State is representative of the natural range of variability for the site under pristine conditions. The reference state is a 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.

Dominant plant species

- shadscale saltbush (*Atriplex confertifolia*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass

Community 1.1
Reference Plant Community

Bunchgrasses and shrubs dominate the reference plant community of this site, which was likely the most common expression of the site historically. Dominant species include shadscale and bluebunch wheatgrass. Broom

snakeweed may occur in minor amounts.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	480	640	800
Shrub/Vine	120	160	200
Forb	0	0	0
Total	**600**	**800**	**1000**

Community 1.2
Bunchgrass dominant community

This community represents an early seral phase following disturbance and is dominated by perennial grasses such as bluebunch wheatgrass. Given the historical scarcity of fire on this site, this was likely an uncommon community. Sprouting shrubs will decrease following fire but will soon increase in abundance while non-sprouting shrubs, such as shadscale, will take longer to recolonize.

Community 1.3
Shrub dominant community

This community is characterized by an increased dominance of shrubs, particularly shadscale saltbrush. Perennial grasses will be decreased relative to the other communities in this state.

Pathway 1.1A
Community 1.1 to 1.2

Fire occurs with enough severity to kill most of the shrub community or an extended wet period leads to a die-off of shadscale and an increase in bunchgrasses.

Pathway 1.1B
Community 1.1 to 1.3

Time and lack of fire, or a prolonged drought, facilitates an increase in the shrub community.

Pathway 1.2B
Community 1.2 to 1.1

Time and lack of fire, or a prolonged drought, allows for regeneration of the shrub community.

Pathway 1.3B
Community 1.3 to 1.1

An extended wet period leads to a partial die-off of shadscale and an increase in bunchgrasses.

Pathway 1.3A
Community 1.3 to 1.2

Fire occurs with enough severity to kill most of the shrub community, or an extended wet period leads to a die-off of shadscale and an increase in bunchgrasses..

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 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's bluegrass) and shrubs, among other changes.

Dominant plant species

- shadscale saltbush (*Atriplex confertifolia*), shrub
- bluebunch wheatgrass (*Pseudoroegneria spicata*), grass

State 3
Shrub and Tree

Within this state, site resources are primarily controlled by shrub species and western juniper. Native perennial grass composition has been reduced considerably. Sprouting and non-sprouting shrubs as well as western juniper are present. Exotic herbaceous species are often present. Multiple plant community phases are likely within this state, influenced by livestock herbivory and fire. Sprouting species such as rabbitbrush and broom snakeweed as well as non-sprouting species such as shadscale may be dominant but will be outcompeted by western juniper overtime as canopy closure and moisture competition progresses. Invasive annual grasses such as cheatgrass and medusahead are likely. Juniper encroachment can decrease cover of grasses and shrubs by reducing light availability and altering site hydrology through increased interception of precipitation, reduced infiltration and increased erosion. Bare ground will increase and erosion may be increased rendering the site at risk of transitioning to an eroded state (State 6).

Dominant plant species

- western juniper (*Juniperus occidentalis*), tree
- shadscale saltbush (*Atriplex confertifolia*), shrub
- broom snakeweed (*Gutierrezia sarothrae*), shrub
- rabbitbrush (*Chrysothamnus*), shrub

State 4
Exotic Annual and Perennial

Within this state, site resources are primarily controlled by exotic annual and perennial herbaceous species. Native perennial grass composition has been greatly diminished. Shrub species and western juniper may also be present. Multiple plant communities are possible within this state, all of which are dominated by invasive annual grasses such as cheatgrass and medusahead as well as invasive annual and perennial forbs, such as prickly lettuce, or Russian thistle (*Salsola tragus*). Native invader shrub species such as broom snakeweed may also be common Overtime, with increasing invasion by annuals, soil stabilizing perennial root biomass will be decreased, and bare ground may increase outside of the growing season, elevating potential for erosion and rendering the site at risk of transitioning to an eroded state (State 6).

Dominant plant species

- medusahead (*Taeniatherum caput-medusae*), grass
- cheatgrass (*Bromus tectorum*), grass

State 5

Seeded

Within this state, site resources are primarily controlled by introduced range grasses such as crested wheatgrass (*Agropyron cristatum*). Multiple community phases may occur within this state and will include different compositions of native and invasive shrub and grass species and western juniper. Plant composition will be dependent on seeded species mixes used and the effectiveness of the revegetation effort. Similar to the ecological dynamics within other states of this site, shrub species and western juniper will increase with greater time since fire and herbivory pressure. While introduced range grasses may provide some analogous ecological functions to native perennial grasses, they may competitively exclude native grasses in the long-term.

Dominant plant species

- crested wheatgrass (*Agropyron cristatum*), grass

State 6
Eroded

This state is characterized by the loss of soil through wind and water erosion. Low herbaceous cover is available to stabilize the soil and renders the soil surface vulnerable to raindrop impacts, runoff and entrainment of soil particles by wind. The potential for a shift to this state is greatly increased toward the steeper 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 and western juniper are likely. Rehabilitation of this state is unknown but would likely pose significant challenges due to degradation of abiotic function of the site.

Dominant plant species

- western juniper (*Juniperus occidentalis*), tree

Transition T1A
State 1 to 2

Introduction of non-native, invasive plants.

Transition T2A
State 2 to 3

Chronic improperly managed grazing or sufficient time without shrub and tree controlling fire, allowing an increase in grazing resistant and/or fire intolerant woody species such as shadscale and western juniper, and a decrease in the perennial grass seedbank.

Transition T2B
State 2 to 4

Catastrophic fire, soil disturbing treatments or prolonged improperly managed grazing in the presence of non-native, invasive species.

Restoration pathway R3A
State 3 to 2

Shrub/Tree management and seeding of native species coupled with minimal soil disturbance, potentially requiring the use of herbicide.

Context dependence. Generally, drill seeding should not be attempted on slopes steeper than 30% (Doerr 1986), yet broadcast, hydroseeding or aerial application may still be possible. Risk of failure may be high due to low site resilience as a result of the droughty nature of the site, steep slopes, and shallow, clayey soils.

Transition T3A
State 3 to 4

Catastrophic fire or failed woody species treatment, possibly in combination with prolonged improperly managed grazing in the presence of invasive plant species.

Restoration pathway R3B
State 3 to 5

Shrub/Tree management and seeding of desired species coupled with minimal soil disturbance, potentially requiring the use of herbicide.

Context dependence. Generally, range drill seeding should not be attempted on slopes steeper than 30% (Doerr 1986), yet broadcast, hydroseeding or aerial application may still be possible. Risk of failure may be high due to low site resilience as a result of the droughty nature of the site, steep slope angles, and shallow, clayey soils.

Transition T3B
State 3 to 6

Prolonged time without stand replacing fire allowing juniper encroachment to advance and outcompete other functional plant groups, possibly followed by additional disturbance such as a low intensity fire or excessive grazing that diminishes understory vegetation but leaves trees intact. Stand replacing fire occurring after advanced juniper encroachment has eliminated understory species and associated seedbanks may also trigger this transition.

Restoration pathway R4A
State 4 to 5

Reduction of exotic plant species through management actions such as herbicide, prescribed grazing, or mowing, and seeding of desired species coupled with minimal soil disturbance.

Context dependence. Generally, range drill seeding should not be attempted on slopes steeper than 30% (Doerr 1986), yet broadcast, hydroseeding or aerial application may still be possible. Risk of failure may be high due to low site resilience as a result of the droughty nature of the site, steep slopes, persistent exotic species seedbanks and shallow, clayey soils.

Transition T4A
State 4 to 6

Catastrophic fire leading to a loss of vegetative cover, large increase in bareground and potential augmentation of soil hydrophobicity, creating highly erosive conditions. Additionally, a failed rehabilitation attempt with excessive soil disturbance can trigger this transition.

Transition T5A
State 5 to 3

Prolonged improperly managed grazing, or lack of fire with sufficient intensity to remove woody species, for an extended interval in the presence of shrubs and western juniper.

Transition T5B
State 5 to 4

Catastrophic fire, multiple fires or failed rehabilitation attempt in the presence of invasive plant species.

Transition T5C
State 5 to 6

Catastrophic fire, or multiple fires in short succession, possibly in combination with prior prolonged disturbance such

as successive grazing, especially on steeper slopes within the range of this site.

Context dependence. This transition may be especially likely on steeper slopes within the range of this site.

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	**Perennial Grasses**			416–576	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	400–560	–
	Sandberg bluegrass	POSE	*Poa secunda*	16	–
2	**Other Perennial Grasses**			–	
	squirreltail	ELEL5	*Elymus elymoides*	0	–
Shrub/Vine					
7	**Shrubs**			80–160	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	80–160	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0	–
	purple sage	SADO4	*Salvia dorrii*	0	–
Forb					
3	**Forbs**			0	
	desertparsley	LOMAT	*Lomatium*	–	–

Animal community

Wildlife: Bluebunch wheatgrass is one of the most important perennial grasses for forage for livestock and wildlife in the Western US (Zlatnik 1999). Considered moderately grazing tolerant during dormancy, bluebunch wheatgrass is very sensitive to damage from defoliation during periods of active growth and is deferment of grazing is suggested until at least the late boot stage by some. Broom snakeweed is considered to provide poor quality browse to most ungulates but may be utilized by mule deer, pronghorn and numerous small mammals and birds. Broom snakeweed provides cover and nesting sites for small birds and mammals, and in Oregon has been found to provide nesting habitat for Columbia Basin burrowing owls. Shadscale is considered an important browse species for many species of wildlife, with nutritious fruits and leaves (Simonin 2001).

Livestock: Broom snakeweed can be toxic to livestock in large quantities and generally provides little browse. Shadscale is considered good browse for domestic sheep and goats but the spiny branches are not favored by cattle. This spinescent habit may lead to increases of shadscale in areas where heavy utilization by cattle decreases competition by other more preferentially browsed species.

Type locality

Location 1: Grant County, OR	
Township/Range/Section	T11S R21E S6
General legal description	SW 1/4 NE 1/4 Sec 6 T11S R21E Unnamed canyon 3/4 mile south of Painted Hills Parking lot (90% SI)

References

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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)	
Contact for lead author	
Date	08/07/2012
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None to some on steeper slopes, moderate sheet & rill erosion hazard

2. **Presence of water flow patterns:** None to some on steeper slopes

3. **Number and height of erosional pedestals or terracettes:** None to some on steeper slopes (terracettes)

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5-10%

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

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

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):** Moderately resistant to erosion: aggregate stability = 3-5

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Very shallow, well drained cobbly clay loams: moderate OM (2-4%)

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Moderate ground cover (60-70%) and gentle to very steep slopes (5-70%) moderately limit rainfall impact and overland flow

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

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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: Bluebunch wheatgrass > Idaho fescue > other grasses > shrubs > forbs

    Sub-dominant:

    Other:

    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: 1000, Normal: 800, Unfavorable: 600 lbs/acre/year at high RSI (HCPC)

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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:** Perennial brush species will increase with deterioration of plant community. 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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