USDA Natural Resources Conservation Service

Ecological site R010XY126OR
Sodic Fan 9-12 PZ

Last updated: 12/13/2023
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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.

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 System (closest approximation of reference plant community):

Macrogroup:
M082: Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland
Group:
G537: North American Desert Alkaline-Saline Wet Scrub
Alliance:
A1046: *Sarcobatus vermiculatus* Intermountain Wet Shrubland Alliance
Association:
CEGL001359: *Sarcobatus vermiculatus* / *Artemisia tridentata* Wet Shrubland

Ecological site concept

In reference condition, this site supports a plant community dominated by great basin wildrye (*Leymus cinereus*), black greasewood (*Sarcobatus vermiculatus*), and basin big sagebrush (*Artemisia tridentata* ssp. tridentata). This site is often associated with springs or seeps and exhibits high soil salinity or sodicity thereby favoring salt-tolerant plant species such as black greasewood. Unlike other sodic sites existing on bottom or meadow landforms, this site occurs on fan remnants and hills, has a higher composition of shrub species and lower annual production. The soil temperature regime is mesic and the soil moisture regime is aridic but may experience aquic soil moisture conditions. Historical ecological dynamics would have been driven by infrequent fire, insect outbreaks and periodic drought. Livestock grazing and exotic plant invasion has altered the composition of many of these communities.

Associated sites

R010XB022OR	**JD Clayey 9-12 PZ** Low slope positions with clayey soil textures
R010XB052OR	**JD Droughty Shallow South 9-12 PZ** Nearby shallow soils on south aspects
R010XB065OR	**JD Droughty Clayey North 9-12 PZ** Nearby shallow soils on north aspects

Similar sites

R010XY007OR	**Sodic Bottom** Occupying bottom landforms, higher production
R010XY008OR	**Sodic Meadow** Occupying meadow landforms, higher production
R010XY120OR	**Loamy Fan 9-12 PZ** Loamy soil textures without sodic properties
R010XY121OR	**Droughty Clayey Fan 9-12 PZ** Clayey soil textures without sodic properties

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus* (2) *Artemisia tridentata ssp. tridentata*
Herbaceous	(1) *Leymus cinereus*

Physiographic features

This site occurs on low elevation fans, hills and swales. Slopes range from 1 to 20 percent. Elevation varies from 1,300 to 3,000 feet (400 to 900 meters). This site occurs on all aspects. Geologically, this site is often associated with the John Day and Clarno Formations. A seasonal water table may be present yet data is unavailable for specific ranges of water table depth and seasons. The site is not subject to ponding or flooding.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Hill (2) Foothills > Fan (3) Foothills > Swale
Flooding frequency	None
Ponding frequency	None
Elevation	396–914 m
Slope	1–20%
Water table depth	152 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

The climate of this site is characterized by a Mediterranean pattern of warm, dry summers and cool, wet winters. The site receives 9 to 12 inches (230 to 300 mm) of annual precipitation primarily falling as rain from November through April. It has a mesic soil temperature regime with mean annual temperatures of 8 to 12° C and a frost-free period of 90 to 150 days. Climate graphs are based on the nearest available climate stations to representative site locations and are provided to indicate general climate patterns.

Table 3. Representative climatic features

Frost-free period (characteristic range)	90-150 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	229-305 mm
Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	279 mm

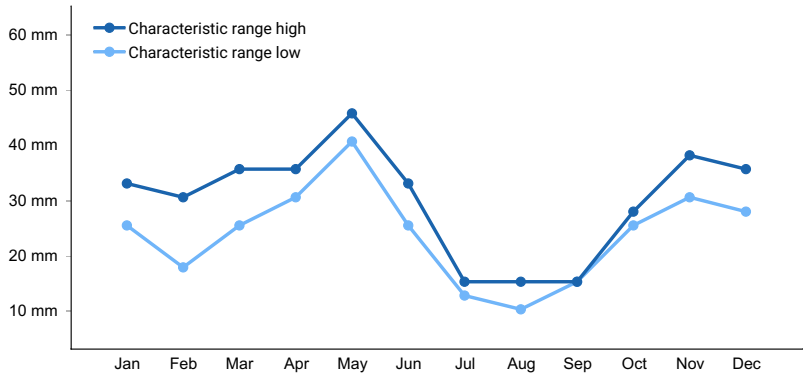


Figure 1. Monthly precipitation range

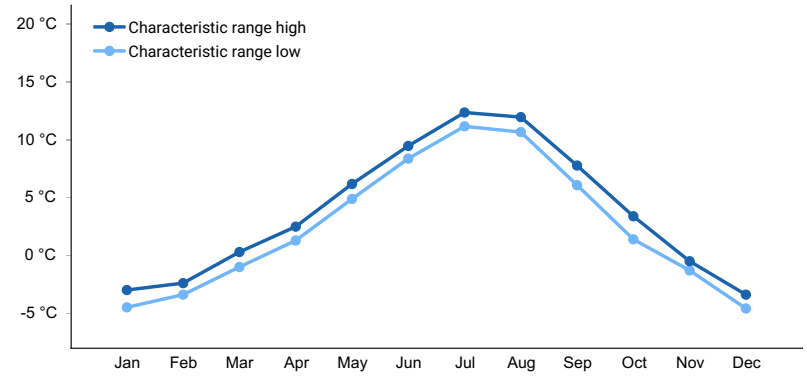


Figure 2. Monthly minimum temperature range

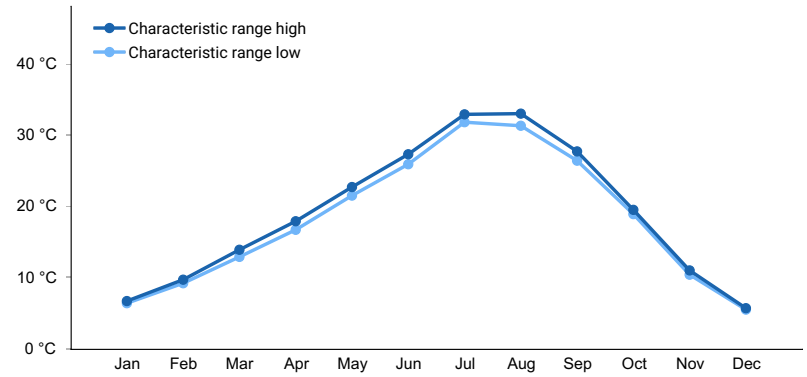


Figure 3. Monthly maximum temperature range

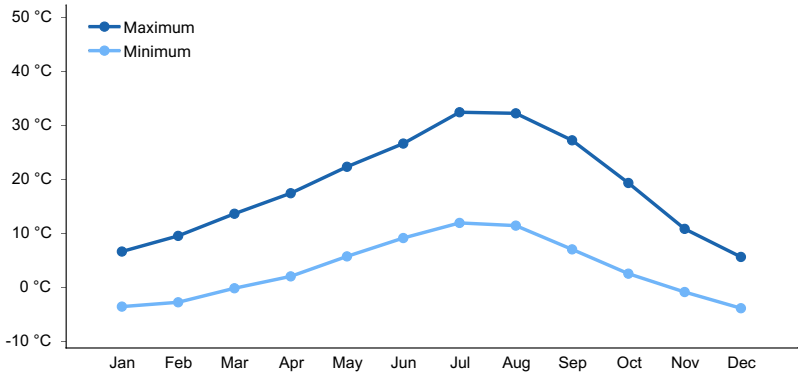


Figure 4. Monthly average minimum and maximum temperature

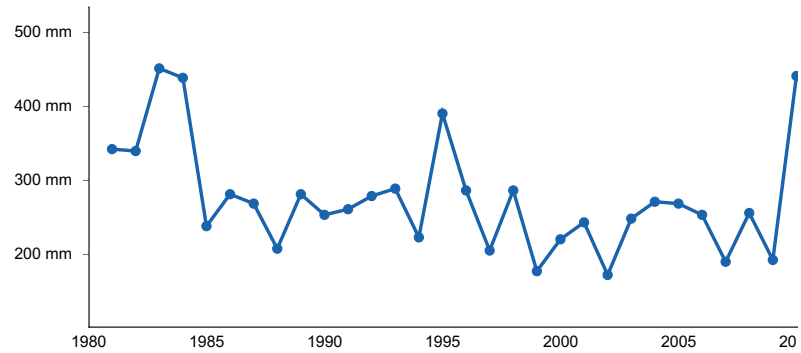


Figure 5. Annual precipitation pattern

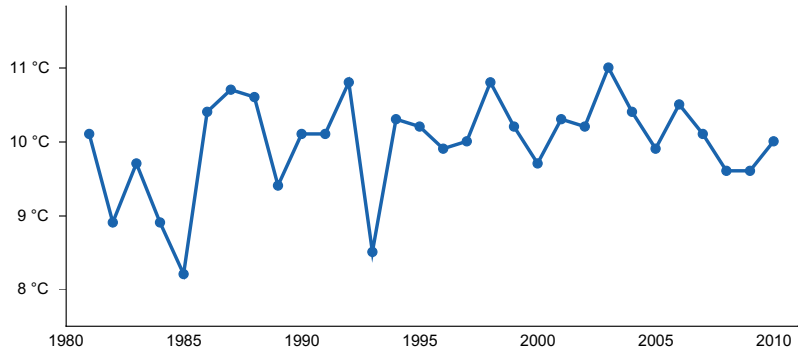


Figure 6. Annual average temperature pattern

Climate stations used

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

Influencing water features

This site may experience supplemental subsurface moisture from springs and seeps. Depth to seasonal water table may also be influenced by snowmelt at upper watershed positions and will in turn influence plant community composition.

Wetland description

Not defined.

Soil features

Soils on this site are very deep and well to poorly drained. They were formed in eolian material and colluvium from

tuffaceous sediments and mudflow deposits. Surface textures range from sandy loam to clay. The soils are generally aridic but may experience aquic soil moisture conditions due to both epi- and endo-saturation. These are alkaline soils with a pH generally greater than 8.0 and secondary carbonates present at variable depths. Salt concentration may be high in these soils and natric horizons may occur, Cambic horizons are also common on this site.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–tuff (2) Colluvium–sedimentary rock
Surface texture	(1) Sandy loam (2) Clay
Family particle size	(1) Fine (2) Loamy-skeletal
Drainage class	Well drained to poorly drained
Permeability class	Slow to moderately slow
Soil depth	203 cm
Surface fragment cover <=3"	0–45%
Surface fragment cover >3"	0–45%
Available water capacity (0-101.6cm)	7.37–13.97 cm
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (10.2-152.4cm)	0–30%
Subsurface fragment volume >3" (10.2-152.4cm)	0–30%

Ecological dynamics

In reference condition, this site is dominated by great basin wildrye (*Leymus cinereus*), black greasewood (*Sarcobatus vermiculatus*), and basin big sagebrush (*Artemisia tridentata* ssp. tridentata). Other bunchgrasses such as Thurber's needlegrass (*Achnatherum thurberianum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), inland saltgrass (*Distichlis spicata*) and Sandberg bluegrass (*Poa secunda*), are also common. There are relatively few native forbs found on this site.

Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors. Plant community composition may vary throughout the site based on factors such as soil sodicity and the presence of surface and subsurface supplemental moisture. Inland saltgrass increases with a higher surface pH and moist surface conditions. Great basin wildrye may decrease were saturated soil conditions are present for much of the year and where soil is highly sodic. Basin big sagebrush will also decrease where soils are saturated and/or highly sodic. Greasewood tolerates very high sodicity as well as saturated soil and will increase where these conditions are present. Western juniper (*Juniperus occidentalis*) may occur on this site but will be limited in areas with high sodicity and salinity levels.

Black greasewood is a phreatophytic (groundwater dependent) shrub species that is highly tolerant of sodic and saline soil conditions and typically prefers heavy soil textures. While fire often leads to topkill of greasewood, it sprouts quickly following all but the most severe fires. The ability to resprout following aboveground damage also helps greasewood to increase in dominance following plant community disturbance.

Great basin wildrye is an important bunchgrass species where it occurs. This large bunchgrass species has an extensive fibrous root system that can stabilize soils and reduce erosion in disturbed areas. Great basin wildrye is generally tolerant of fire and responds by resprouting from root crowns and rhizomes. Plants may be top killed by high intensity fire, especially where older plants have accumulated significant dead material within the crown.

Basin big sagebrush is a prominent shrub in low elevation areas within the sagebrush biome. Compared to other subspecies of big sagebrush, basin big sagebrush is not as common in Eastern Oregon and occurs in areas with greater subsurface moisture accumulation or higher water tables. As a fire intolerant species that is readily killed by most fires and does not resprout, basin big sagebrush will be reduced on a site following fire and may be eliminated with frequent fires. Periodic insect outbreaks of Aroga moth (Aroga websteri) are an important component of the natural disturbance regime for big sagebrush, resulting in complete or partial mortality of sagebrush plants and potentially impacting thousands of acres.

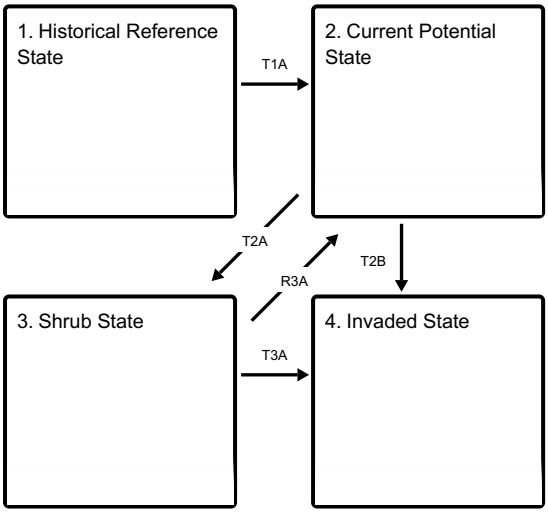
Historically these communities would have likely encountered infrequent stand replacing wildfire due to sparse understory conditions. Estimates of fire return intervals vary between 35 to 100 years for salt desert systems with similar plant community composition. Fires may have been more likely during years with higher production and therefore higher fuel loads. Livestock grazing has likely altered much of the extent of this site. Increases in composition of black greasewood and decreases in great basin wildrye may result from chronic improperly managed grazing.

Given an altered disturbance regime and degraded site conditions, invasions of exotic forb species and annual grass species may occur on this site. These may include pepperweed (Lepidium spp.), whitetop (*Cardaria draba*) and Russian thistle (*Salsola tragus*). Exotic annual grasses such as cheatgrass (*Bromus tectorum*), may also invade the site. Exotic annual grass invasion may increase the frequency of fires and extend the season when fires are likely by augmenting early season fines fuel loads and fuel continuity. In addition to exotic species, native shrub species such as broom snakeweed (*Gutierrezia sarothrae*) and green rabbitbrush (*Chrysothamnus viscidiflorus*) may also increase following disturbance and may be important members of early seral communities. Ecological resilience and restoration success of sites with sodic soils is often strained by the low nutrient levels, low organic matter levels and salt induced dispersion of soil aggregates.

Since this site occupies limited acreage in MLRA 10 in Oregon, an understanding of the site specific ecological dynamics are incomplete. The characteristics of this site resemble those of similar "Sodic" ecological sites in the Great Basin, therefore, the state and transition model below is informed by these sites, especially the Nevada disturbance response group 12AB, (Stringham et al. 2015). Restoration pathways are incomplete for this site but likelihood for success is low.

State and transition model

Ecosystem states



T1A - Introduction of non-native annual plants

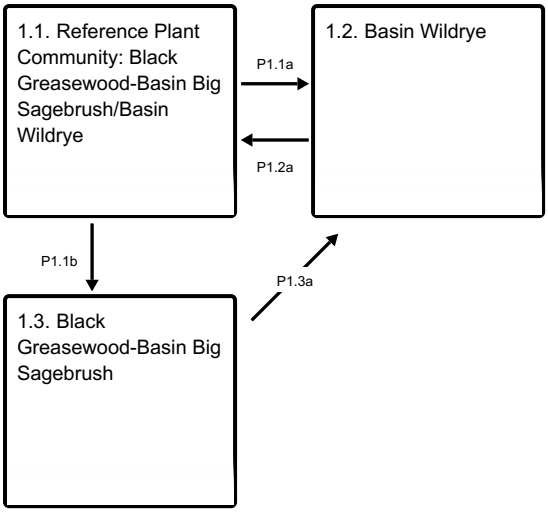
T2A - Improperly managed livestock grazing

T2B - High severity fire, or multiple fires at short intervals, in the presence of sufficient seed source or invasive plant species

R3A - Treatments to remove shrubs and seeding of native species. This may require the use of herbicide.

T3A - High severity fire, or multiple fires at short intervals, in the presence of sufficient seed source or invasive plant species

State 1 submodel, plant communities



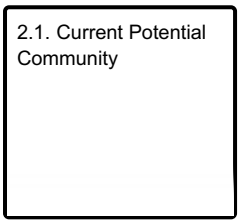
P1.1a - Wildfire occurs

P1.1b - Long intervals without fire, significant herbivory of herbaceous species, or extended drought

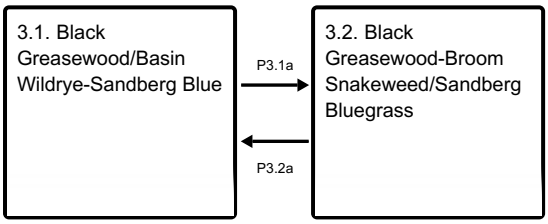
P1.2a - Time without fire will allow shrub species to increase

P1.3a - Wildfire occurs

State 2 submodel, plant communities



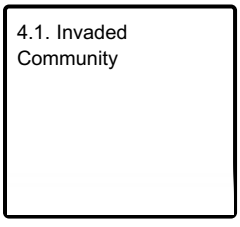
State 3 submodel, plant communities



P3.1a - Fire or soil disturbing treatments

P3.2a - Sufficient time may allow sagebrush and great basin wildrye to recolonize the site if sufficient seed source is available and other disturbances are mitigated

State 4 submodel, plant communities



State 1
Historical Reference State

The 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 elements of ecosystem structure and function 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 periodic drought.

Dominant plant species

- greasewood (*Sarcobatus vermiculatus*), shrub
- basin big sagebrush (*Artemisia tridentata ssp. tridentata*), shrub
- basin wildrye (*Leymus cinereus*), grass

Community 1.1
Reference Plant Community: Black Greasewood-Basin Big Sagebrush/Basin Wildrye

This community is dominated by great basin wildrye (*Leymus cinereus*), black greasewood (sarcobatus vermiculatus), and basin big sagebrush (Artemesia tridentata ssp. tridentata). Other bunchgrasses such as Thurber's needlegrass (*Achnatherum thurberianum*), bluebunch wheatgras (*Pseudoroegneria spicata*), inland saltgrass (*Distichlis spicata*) and Sandberg bluegrass (*Poa secunda*), are also common.

Dominant plant species

- greasewood (*Sarcobatus vermiculatus*), shrub
- basin wildrye (*Leymus cinereus*), grass

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1009	1261	1513
Shrub/Vine	247	308	375
Forb	78	101	118
Tree	11	11	11
Total	**1345**	**1681**	**2017**

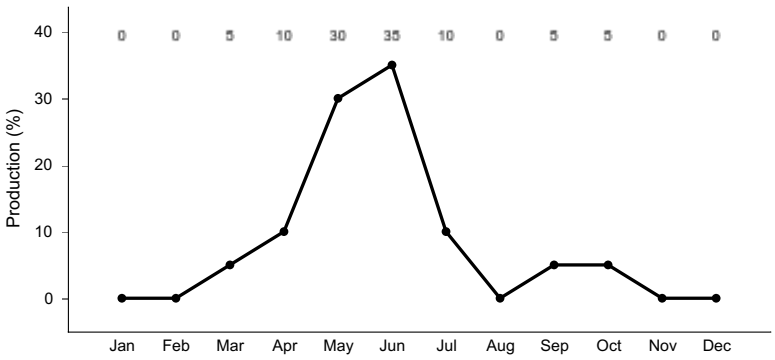


Figure 8. Plant community growth curve (percent production by month). OR4163, B10 JD Sandy Fan C. Disturbance/Juniper (JUOC).

Community 1.2
Basin Wildrye

This community represents an early seral phase following disturbance and is dominated by perennial grasses such as great basin wildrye (*Leymus cinereus*), Thurber's needlegrass (*Achnatherum thurberianum*), bluebunch wheatgras (*Pseudoroegneria spicata*), inland saltgrass (*Distichlis spicata*) and Sandberg bluegrass (*Poa secunda*). Sprouting shrubs will decrease following fire but will soon increase in abundance while non-sprouting shrubs will take longer to recolonize.

Community 1.3
Black Greasewood-Basin Big Sagebrush

Following a lack of fire for an extended period, black greasewood (sarcobatus vermiculatus), and basin big sagebrush (Artemesia tridentata ssp. tridentata) will increase in abundance while perennial grasses will decrease.

Pathway P1.1a
Community 1.1 to 1.2

Wildfire occurs reducing aboveground biomass and favoring an increase in grasses followed by fire adapted sprouting shrubs.

Pathway P1.1b
Community 1.1 to 1.3

Long intervals without fire, significant herbivory of herbaceous species, or extended drought will increase shrub composition and decrease perennial grass composition. Perennial grasses will decrease yet inland saltgrass may increase depending on herbivory dynamics.

Pathway P1.2a
Community 1.2 to 1.1

Time without fire will allow shrub species to increase

Pathway P1.3a
Community 1.3 to 1.2

Wildfire occurs reducing aboveground biomass and favoring an increase in grasses followed by fire adapted sprouting shrubs.

State 2
Current Potential State

This state is similar to the Reference State. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. 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 elements of ecosystem structure and function 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.

Dominant plant species

- greasewood (*Sarcobatus vermiculatus*), shrub
- basin big sagebrush (*Artemisia tridentata ssp. tridentata*), shrub
- basin wildrye (*Leymus cinereus*), grass

Community 2.1
Current Potential Community

Current potential plant communities mirror those of the above Reference State 1 with the addition of a low level of invasive exotic plants.

State 3
Shrub State

Plant community dynamics within this state are primarily driven by shrub species. Native perennial grass

composition has been reduced considerably. Sprouting species such as black greasewood, green rabbitbrush and broom snakeweed as well as non-sprouting species such as big sagebrush are dominant on the site. Western juniper may also be present. Exotic herbaceous species are often present..

Dominant plant species

- greasewood (*Sarcobatus vermiculatus*), shrub
- basin big sagebrush (*Artemisia tridentata ssp. tridentata*), shrub
- broom snakeweed (*Gutierrezia sarothrae*), shrub
- rabbitbrush (*Chrysothamnus*), shrub

Community 3.1
Black Greasewood/Basin Wildrye-Sandberg Blue

Black greasewood dominates the shrub layer, basin big sagebrush may be codominant. Deep-rooted perennial grasses have been reduced yet are still present. Shallow-rooted perennial grasses are increasing.

Dominant plant species

- greasewood (*Sarcobatus vermiculatus*), shrub
- basin wildrye (*Leymus cinereus*), grass
- Sandberg bluegrass (*Poa secunda*), grass

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	504	622	740
Grass/Grasslike	269	336	404
Forb	90	112	135
Tree	34	50	67
Total	**897**	**1120**	**1346**

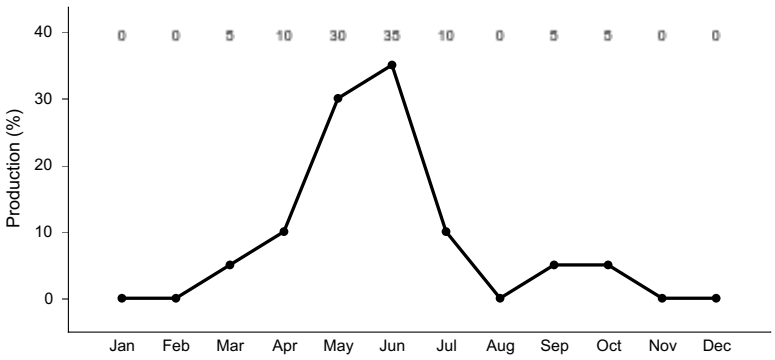


Figure 10. Plant community growth curve (percent production by month). OR4163, B10 JD Sandy Fan C. Disturbance/Juniper (JUOC).

Community 3.2
Black Greasewood-Broom Snakeweed/Sandberg Bluegrass

Black greasewood and broom-snakeweed dominate the shrub layer. Other sprouting shrubs such as green rabbitbrush may also be present. Non-sprouting shrubs such as basin big sagebrush are largely absent. Deep rooted perennial grasses have been greatly reduced. Shallow rooted perennial grasses are increasing.

Dominant plant species

- greasewood (*Sarcobatus vermiculatus*), shrub
- broom snakeweed (*Gutierrezia sarothrae*), shrub
- Sandberg bluegrass (*Poa secunda*), grass

Pathway P3.1a
Community 3.1 to 3.2

Fire or soil disturbing treatments will reduce the sagebrush overstory and allow for an increase in sprouting shrubs.

Pathway P3.2a
Community 3.2 to 3.1

Sufficient time may allow sagebrush and great basin wildrye to recolonize the site if sufficient seed source is available and other disturbances are mitigated, yet data is lacking to fully support this pathway.

State 4
Invaded State

Plant community dynamics within this state are primarily driven by exotic annual and perennial herbaceous species. Native perennial grass composition has been greatly diminished. Shrub species and western juniper may also be present. Rehabilitation of this state is uncertain given the difficulty of establishing plant material in the sodic soils and under the influence of an aridic soil moisture regime.

Dominant plant species

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

Community 4.1
Invaded Community

Common exotic species may include cheatgrass (*Bromus tectorum*), pepperweed (Lepidium spp.), whitetop (*Cardaria draba*) and Russian thistle (*Salsola tragus*).

Transition T1A
State 1 to 2

Introduction of non-native annual plants leading to a decrease in site resilience relative to reference conditions.

Transition T2A
State 2 to 3

Improperly managed livestock grazing may dramatically reduce native perennial grasses and increase shrub cover. When heavy herbivory is combined with fire or mechanical removal of shrub species, basin big sagebrush may be reduced or eliminated.

Transition T2B
State 2 to 4

High severity fire, or multiple fires at short intervals, in the presence of sufficient seed source or invasive plant species may lead to a loss much of the native plant community composition and a dramatic increase in invasive annual plants.

Restoration pathway R3A
State 3 to 2

Treatments to remove shrubs and seeding of native species. This may require the use of herbicide.

Context dependence. Chance of success is limited by the droughty, sodic soils.

Transition T3A
State 3 to 4

High severity fire, or multiple fires at short intervals, in the presence of sufficient seed source or invasive plant species may lead to a loss much of the native plant community composition and a dramatic increase in invasive annual plants.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Perennial Grasses**			874–1513	
	basin wildrye	LECI4	*Leymus cinereus*	673–1009	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	84–252	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	84–168	–
	saltgrass	DISP	*Distichlis spicata*	34–84	–
2	**Other Perennial Grasses**			67–135	
	Sandberg bluegrass	POSE	*Poa secunda*	17–34	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	17–34	–
	squirreltail	ELEL5	*Elymus elymoides*	17–34	–
	sedge	CAREX	*Carex*	17–34	–
Forb					
4	**Forbs**			34–168	
	milkvetch	ASTRA	*Astragalus*	–	–
	common yarrow	ACMI2	*Achillea millefolium*	–	–
	Blue Mountain prairie clover	DAOR2	*Dalea ornata*	–	–
	gooseberryleaf globemallow	SPGR2	*Sphaeralcea grossulariifolia*	–	–
	sunflower	HELIA3	*Helianthus*	–	–
Shrub/Vine					
7	**Shrubs**			118–420	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	84–252	–
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	34–168	–
8	**Other Shrubs**			34–67	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	17–34	–
	rabbitbrush	CHRYS9	*Chrysothamnus*	17–34	–
Tree					
6	**Trees**			0–17	
	western juniper	JUOC	*Juniperus occidentalis*	0–17	–

Table 8. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
2	**Other Perennial Grasses**			56–84	
1	**Perennial Grasses**			224–280	
	basin wildrye	LECI4	*Leymus cinereus*	84–168	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	45–90	–
	saltgrass	DISP	*Distichlis spicata*	45–90	–
Forb					
3	**Forbs**			67–112	
	tarweed	HEMIZ	*Hemizonia*	17–22	–
	goatsbeard	TRAGO	*Tragopogon*	2–17	–
	smotherweed	BASSI	*Bassia*	2–17	–
	whitetop	CADR	*Cardaria draba*	2–17	–
Shrub/Vine					
4	**Shrub/Vine**			616–673	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	168–224	–
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	112–168	–
	rubber rabbitbrush	ERNAB	*Ericameria nauseosa ssp. nauseosa var. bernardina*	84–112	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	84–112	–
Tree					
5	**Trees**			34–67	
	western juniper	JUOC	*Juniperus occidentalis*	34–67	–

Animal community

Wildlife: This site is home to a variety of small herbivores, birds, and their associated predators. This site is mainly a foraging area for the larger wildlife. The tall stature of great basin wildrye provides excellent cover for small animals and birds, quality nesting habitat for upland birds, as well as important feed for native herbivores. Big sagebrush leaves and seeds provide high forage value for numerous large mammals and is especially important to wildlife during winter in many areas. Many birds, small mammals and invertebrates depend on sagebrush for habitat and feed as well. Black greasewood can provide important cover for small mammals as well as mule deer. It can also provide important browse to wildlife species in winter and may be used in spring and summer by mule deer and pronghorn.

Grazing: Livestock grazing is suitable for this site as long as management objectives include the improvement or maintenance of this site. This site has the potential to produce a large amount of high quality forage yet it is easy to overuse this site and cause a shift in vegetation that is difficult to change. Great basin wildrye can be a high forage producer, but since growing points are elevated it is susceptible to damage from defoliation if it is grazed during spring and summer. Domestic sheep and cattle may browse greasewood but high concentrations of sodium and potassium oxalates can be poisonous in large quantities. Management should be aimed at avoiding grazing during periods when grasses are most vulnerable to damage from defoliation (namely spring and early summer for this site) and letting the site recover from the grazing event prior to fall dormancy. Initial stocking rates will be determined with the landowner or decision maker. They will be based on past use histories and type and condition of the vegetation. Calculations used to determine an initial starting stocking rate will be based on forage preference ratings.

Hydrological functions

The site has a high potential in low seral condition to produce significant run-off to receiving waters. The hydrology of this site is characterized by high intensity thunderstorms during the summer months and by low intensity frontal storms during the winter.

Recreational uses

None

Wood products

No wood products are associated with this site.

Other products

None

Other information

Increase in western juniper and the subsequent competition for moisture will lead to a reduction of available forage. Mismanaged grazing can easily reduce herbaceous cover and accelerate soil loss. Improving infiltration and permeability, and reducing runoff should be the immediate goal of juniper control.

Type locality

Location 1: Wheeler County, OR	
Township/Range/Section	T11S R21E S10
General legal description	NE 1/4 NW 1/4 Sec. 10 T11S R21E West of Bridge Creek- Painted Hills (30% SI)

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Contributors

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Approval

Kirt Walstad, 12/13/2023

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	05/20/2024
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None, moderate sheet & rill erosion hazard

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

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3. **Number and height of erosional pedestals or terracettes:** None to some

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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 to some, severe 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):** Slightly resistant to erosion: aggregate stability= 1-2

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Very deep, well drained coarse, fine, and very fine sandy loams: low OM (1-2%)

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 slopes (1-8%) 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: Needleandthread > bluebunch wheatgrass > sand dropseed > other grasses > shrubs > forbs

    Sub-dominant:

    Other:

    Additional:

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

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: 1800, Normal: 1500, Unfavorable: 1200 lbs/acre/year at high RSI (HCPC)

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

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