USDA Natural Resources Conservation Service

Ecological site R010XB034OR
JD Loamy 9-12 PZ

Accessed: 04/24/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Associated sites

R010XB044OR	**JD Droughty South 9-12 PZ** south aspect
R010XB064OR	**JD North 9-12 PZ** north aspect

Similar sites

R010XB030OR	**JD Loamy 12-16 PZ** higher production
R010XB051OR	**JD Shallow South 9-12 PZ** shallow soils, south aspect

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. tridentata*
Herbaceous	(1) *Pseudoroegneria spicata ssp. spicata* (2) *Poa sandbergii*

Physiographic features

This site occurs on old, disected low elevation terraces and benches. Slopes range from 0 to 15 percent. Elevation varies from 1500 to 3000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Hill (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,500–3,000 ft
Slope	0–15%
Water table depth	72 in
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 9 to 12 inches primarily as rain November through May. Elevation and aspect affect precipitation and the relative effectiveness of the precipitation and temperatures. Temperature changes can occur rapidly. In addition, the topography also creates localized cold air drainages, along with occasional cold air entrapment and inversions in the valleys.

Table 3. Representative climatic features

Frost-free period (average)	132 days
Freeze-free period (average)	162 days
Precipitation total (average)	12 in

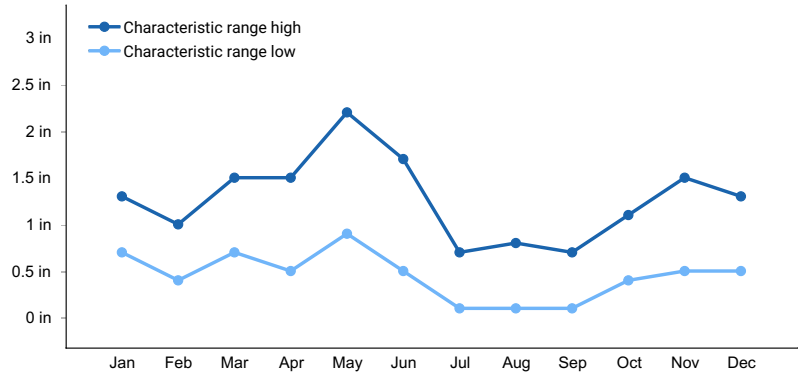

Figure 1. Monthly precipitation range

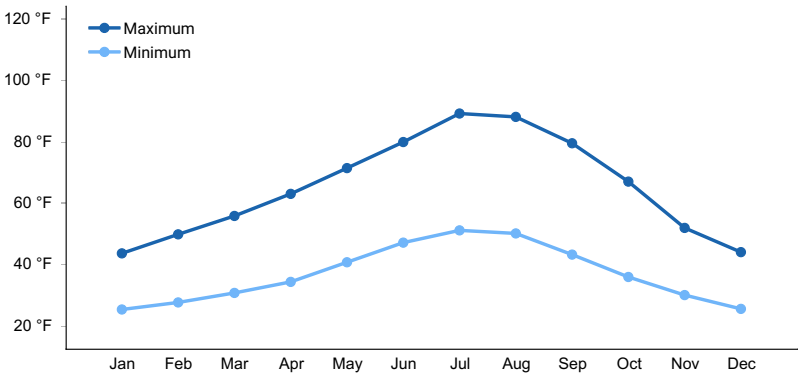

Figure 2. Monthly average minimum and maximum temperature

Influencing water features

Soil features

Soils on this site are typically very deep. The surface is predominantly loam to gravelly ashy loam. These soils are well drained. The soils are formed from alluvium, colluvium and loess from basalt and tuffaceous parent material. Soil temperature regime is mesic and moisture regime is aridic. Although the Drinkwater soils have an abruptic textural change at about 6 inches it does not restrict root penetration of deep-rooted shrubs and herbaceous plants.

Table 4. Representative soil features

Surface texture	(1) Stony loam (2) Gravelly (3) Ashy
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate

Soil depth	40–60 in
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2.3–8 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–17%
Subsurface fragment volume >3" (Depth not specified)	0–27%

Ecological dynamics

This site occurs on fan remnants, alluvial fans, benches and hillslopes. Grasses with few forbs and shrubs dominate this plant community. Fluctuations in species composition and relative production may change from year to year dependent upon abnormal precipitation or other climatic factors. Bluebunch wheatgrass is well adapted to this site and is the predominant plant if the plant community is in high ecological condition.

Range in Characteristics: Thurber’s needlegrass increases on the shallower soils with gravelly surfaces, especially on the lower end of the precipitation zone within this site.

Response to Disturbance: Improper grazing will cause a decrease in bluebunch wheatgrass and Thurber’s needlegrass while Sandberg bluegrass increases. If deterioration continues Sandberg bluegrass will decline with an increase in annual grasses, weeds, and invasive brush species. The potential for cheatgrass or Medusahead invasion is increased as the site deteriorates.

Multiple pathways of change exist from the Juniper Sagebrush Steppe phase of State 1. If fire is suppressed juniper will continue to expand and out-compete both the bunchgrass and sagebrush understory. When fine fuels are reduced to the point where fire no longer will carry, the site will cross a threshold and transition to Juniper Sagebrush Steppe. With a canopy fire the Juniper Sagebrush Steppe has the potential to transition to cheatgrass. Maturation of the juniper community leads to a juniper woodland with no more than a trace amount of sagebrush and deep-rooted perennial bunchgrasses. The potential for soil erosion increases as the juniper woodland matures and the understory plant community cover declines. The risk of a transition over an abiotic threshold to the Juniper Woodland erosional phase increases with increasing slope and increasing bare ground.

With no fire, improper grazing and/or severe drought within the Juniper Sagebrush Steppe phase of State 1, the perennial bunchgrasses will continue to decline while cheatgrass increases and sagebrush matures further facilitating the decline in bunchgrass. This feedback continues until sagebrush and annual grasses control ecological processes. Frequent fire transitions this community to a cheatgrass dominated state. The risk of a transition over an abiotic threshold to the erosional state increases with increasing slope and increasing bare ground.

Abusive improper grazing can cause seeded phases to transition either to a decadent sagebrush cover or a juniper dominated system. With improper grazing and fire the seeded rangeland has the potential to convert to annual grasses or an eroded state.

Treatment Response: Much of this site occurs towards the 12 inch end of the precipitation zone rather than the 9 inch giving this site greater resistance and resilience to disturbance than other sites in this precipitation zone. One

repair pathway indicates potential exists for rehabilitation of the juniper controlled plant community. Potential for success is dependent upon climatic factors and the existence of annual grasses. If annual grasses are present it will require long term treatment. Mechanical treatment of junipers will provide soil cover to facilitate microsites for seedling establishment of seeded adapted native and/or introduced species.

Fire is not a recommended tool of rehabilitation due to the increased risk presented by the presence of annual grasses.

The repair pathway of the sagebrush cheatgrass phase requires chemical or mechanical control of the sagebrush and annual grasses along with seeding. The potential for failure of rehabilitation projects increases with the increased presence of annual grasses. Every effort should be made to prevent the establishment of annual grasses.

Reference Plant Community

State 1 – Reference State

Three plant community phases occur in the Reference State. They are phase 1.1, the Reference Plant Community Phase (RPCP) which is the perennial grass and forb phase, phase 1.2, the sagebrush phase and phase 1.3, sagebrush dominate or the juniper-sagebrush phase.

Phase 1.1. Reference Plant Community Phase (RPCP) is the perennial grass phase. This plant community is strongly dominated by bluebunch wheatgrass with Sandberg bluegrass and Thurber needlegrass being common and lesser amounts of other perennial grasses and a small amount of forbs. Basin big sagebrush and broom snakeweed are common. Grasses compose 80 % of the community, forbs and shrubs 10% each and Juniper less than 1%. Energy capture, nutrient cycling and water use are controlled by the perennial grasses.

Phase 1.2. Sagebrush phase. The sagebrush phase results with prescribed grazing with normal fire frequency of 40-60 years (1.1A). The composition of sagebrush within the plant community will increase as the length of time between fires gets longer. Improper grazing can accelerate the increase in sagebrush even if the bunchgrass plant community is maintained. Under prescribed grazing and fire the plant community pathway (1.2A) moves back toward Phase 1.1, the perennial grass and forb plant phase. With the continued absence of fire and improper grazing management or drought (1.2B), the plant community will move towards phase 1.3, sagebrush dominate or the juniper-sagebrush plant phase.

Phase 1.3. The sagebrush or juniper-sagebrush communities are dominated by either juniper or basin big sagebrush, bluebunch wheatgrass, Thurber’s needlegrass and Sandberg bluegrass. The plant community is a result of the absence of fire with improper grazing or drought and can occur through community pathways 1.1B or 1.2B. This phase is the “at risk” plant community within State 1. As the site deteriorates the potential for cheatgrass invasion increases. With prescribed grazing and fire this phase can be returned to Phase 1.1 by community pathway 1.3A. Since this phase is “at risk” it can transition to State 2 (IRT1A) or State 3 (IRT1B) with the continued lack of fire and improper grazing or drought. With frequent fire this plant community can transition to State 4 (IRT1C).

State 2. Juniper dominated state. This State is dominated by juniper which controls all of the ecological processes. Initially, Phase 2.1, the Juniper-sagebrush phase is occupied by juniper, basin big sagebrush, bluebunch wheatgrass, Thurber’s needlegrass and Sandberg bluegrass with a trace of cheatgrass. If fire continues to be suppressed and severe improper grazing continues, juniper will continue to increase and out compete both the sagebrush and bunchgrass understory. When fine fuels are reduced and will no longer carry fire (fire proof), the site transitions to a juniper woodland community (Phase 2.2). The potential for soil erosion increases as the juniper woodland matures and the understory plant community declines. If a crown fire occurs, State 2 will transition (IRT 2A) to State 4. The risk of an irreversible transition (IRT2B) over an abiotic threshold to the juniper woodland erosional phase of State 5 increases with increasing slope and increasing bare ground. The repair pathway (RP2) from State 2 back to State 1 is generally not economically feasible and would require mechanical treatment of the junipers and seeding to adapted native grasses, forbs and shrubs.

State 3. Sagebrush dominated state. This state is dominated in the understory by cheatgrass and in the overstory by decadent basin big sagebrush (Phase 3.1). This state has developed as a result of continued improper grazing

or drought in the absence of fire (IRT 1B). If fire occurs, the plant community transitions to State 4 (IRT 3A) a cheatgrass, Sandberg bluegrass, broom snakeweed and rabbitbrush plant community. The risk of an irreversible transition (IRT3B) to the eroded conditions of State 5 is paramount with severe improper grazing in combination with fire. The repair pathway (RP3) from State 3 back to State 1 is generally not economically feasible and requires mechanical and/or chemical treatment of the basin big sagebrush and rabbitbrush, as well as the cheatgrass and reseeding of adapted native grasses, forbs, and shrubs. Ecological processes in this state are controlled by the sagebrush.

State 4. Cheatgrass dominated state. This state is dominated by cheatgrass and shallow-rooted grasses in the understory with broom snakeweed and/or rabbitbrush (4.1) in the overstory. This state is recognized as the cheatgrass phase and is a result of fire and improper grazing. The ecological processes in this state are controlled by cheatgrass.

State 5. Eroded state. This is the eroded state and is recognized by the soil erosion that is occurring or has occurred on site. Since this state has occurred through either widespread erosion or through severe improper grazing in combination with or without fire all of the other states can transition to this State. The increase in bare ground facilitates the susceptibility of the site to an increase in wind and/or water erosion. Abiotic factors control site resources and ecological functions. Rehabilitation of this state may not be practical or possible due to extreme soil loss.

State 6. Seeded state. As in State 1, three plant community phases occur in the seeded state. They are 6.1, seeded grass phase; 6.2 Sagebrush seeded grass phase; and 6.3 Sagebrush and/or Juniper seeded grass phase. These three plant communities respond to improper grazing, fire or no fire the same as the plant community phases in State 1. As in 1.3, phase 6.3 is the “at risk” plant community in this state. The seeded state with introduced species is a common occurrence on this ecological site. Improper grazing of the seeded rangeland can cause a reduction in deep rooted perennial grasses in favor of Sandberg’s bluegrass, cheatgrass, sagebrush and or juniper. State 6 can transition to any of the other states, except State 1, with improper grazing and/or fire.

State and transition model

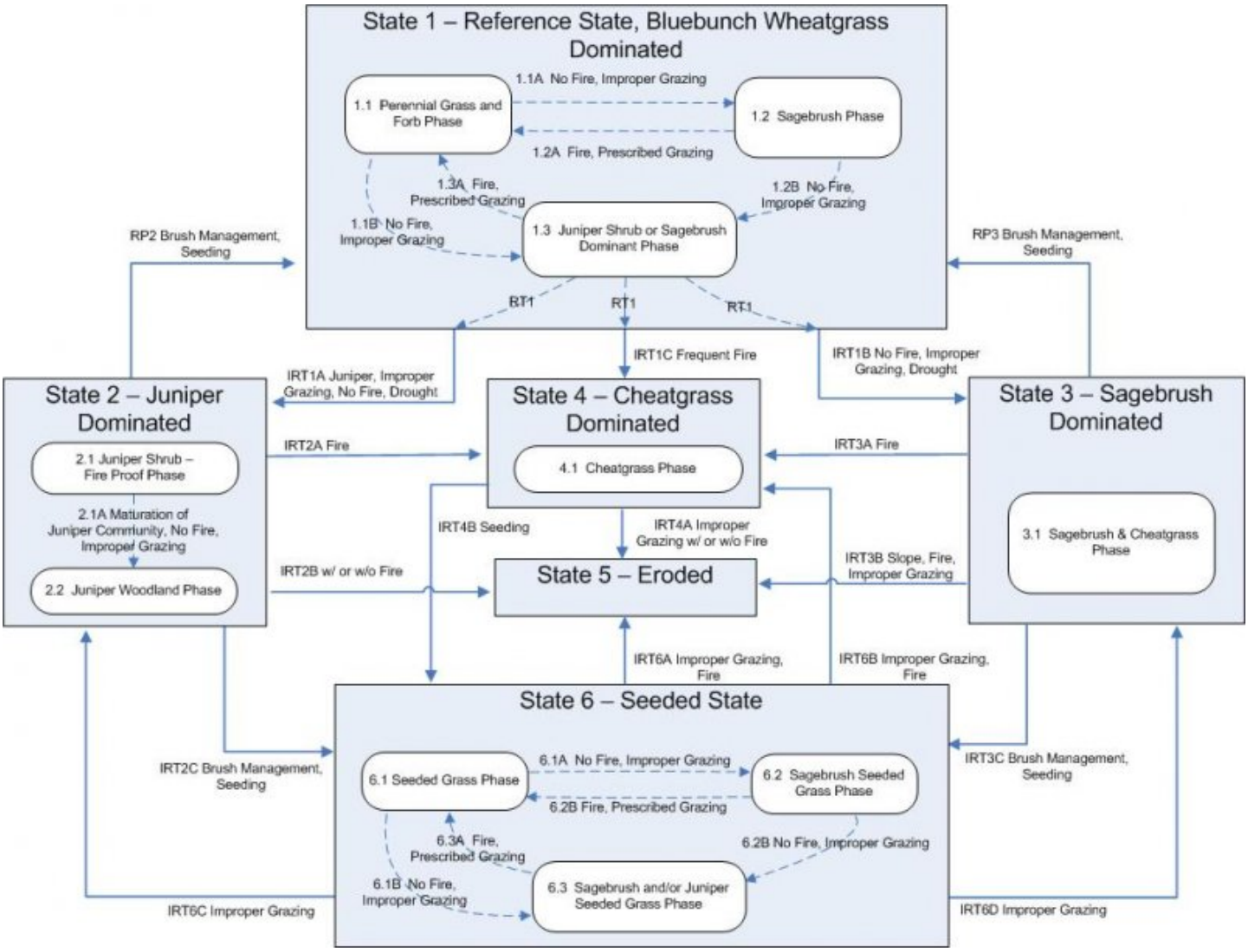

Figure 3. JD LOAMY 9-12 - R010XB034OR

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

This site is characterized by a dominance of Bluebunch wheatgrass. Forbs and shrubs make up a smaller portion of the climax community.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	960	1120	1280
Shrub/Vine	120	140	160
Forb	120	140	160
Total	**1200**	**1400**	**1600**

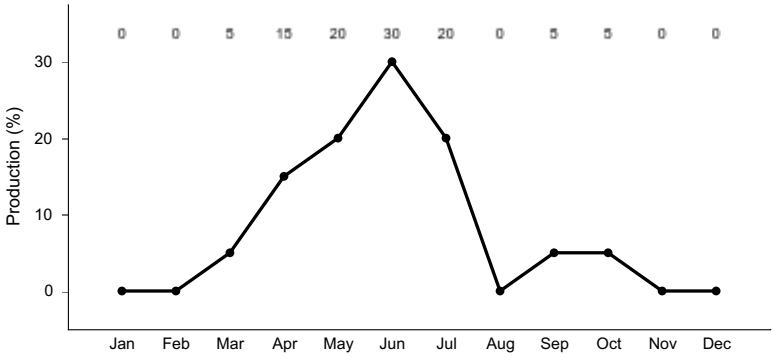

Figure 5. Plant community growth curve (percent production by month). OR4171, B10 JD Loamy & North RPC. JD Loamy & North RPC (Basin Big Sagebrush, Bluebunch wheatgrass, Sandberg bluegrass).

State 2
State B: Disturbance (JUOC/ARTRT/BRTE)

Community 2.1
State B: Disturbance (JUOC/ARTRT/BRTE)

This site is dominated by Western Juniper and Basin Big Sagebrush. Cheatgrass has moved in after heavy use. This sis a stable site. Some areas may have localized medusahead.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Tree	300	400	500
Shrub/Vine	150	200	250
Grass/Grasslike	90	120	150
Forb	60	80	100
Total	**600**	**800**	**1000**

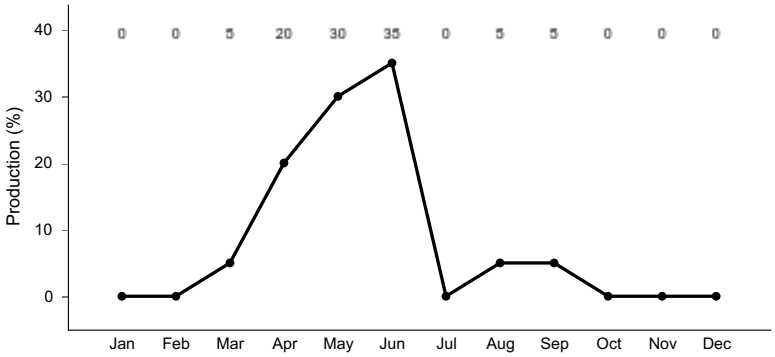

Figure 7. Plant community growth curve (percent production by month). OR4172, B10 JD Loamy B. Disturbance (JUOC/ARTRT/BRTE).

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				840–1120	
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	840–1120	–
2	**Deep-rooted bunchgrass**			72–96	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	60–80	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	12–16	–
3	**shallow rooted bunchgrass**			60–80	
	Sandberg bluegrass	POSE	*Poa secunda*	60–80	–
Forb					
4	**perennial forbs**			120–160	
	common yarrow	ACMI2	*Achillea millefolium*	36–48	–
	milkvetch	ASTRA	*Astragalus*	36–48	–
	fleabane	ERIGE2	*Erigeron*	24–32	–
	buckwheat	ERIOG	*Eriogonum*	12–16	–
	desertparsley	LOMAT	*Lomatium*	12–16	–
Shrub/Vine					
5	**tall evergreen shrub**			60–80	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	60–80	–
6	**other shrubs**			60–80	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	48–64	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	12–16	–

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				50–175	
	cheatgrass	BRTE	*Bromus tectorum*	50–175	–
Forb					
2				50–100	
	mustard	BRASS2	*Brassica*	20–80	–
Shrub/Vine					
3				200–275	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	110–160	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	50–75	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	25–60	–
Tree					
4				200–250	
	western juniper	JUOC	*Juniperus occidentalis*	100–150	–

Animal community

Grazing Livestock- Grazing is suitable for this site as long as management objectives include the improvement or maintenance of this site. It is easy to overuse this site and cause a shift in vegetation that is difficult to change. This

site has the potential to produce a large amount of high quality forage. Management should be aimed at harvesting the forage as quickly as possible, letting the site recover from the grazing event prior to fall dormancy. Initial stocking rates will be determined with the landowner or decisionmaker. 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.
Wildlife- The main wildlife species of concern on this site are large herbivores. These are mule deer and elk. These wildlife species can possibly overuse this site before the time cattle or sheep are planned to be grazed. Being an open grassland, this site is home to a variety of small herivores, birds and their associated predators. This site is mainly a foraging area for the larger wildlife. No threatened or endangered wildlife species rely on this site for any of their habitat requirements.

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. Overgrazing can easily reduce ground cover and accelerate soil loss. Improving infiltration and permeability, and reducing runoff should be the immediate goal of juniper control.

Type locality

Location 1: Grant County, OR	
Township/Range/Section	TT12 S RR26 E S6
General legal description	SW1/4 NW1/4 Sec 6 T12S R26E WM West boundary Sheep Rock Unit (80% SI)
Location 2: Grant County, OR	
Township/Range/Section	T12S R26E S5
General legal description	Southeast corner Foree Unit
Location 3: Grant County, OR	
Township/Range/Section	T11S R26E S31
General legal description	1/2 mile southeast of Goose Rock nest to road

Other references

Soil Conservation Service, Relative Forage Preferences of Plants for Grazing Use by Season, Oregon Range Technical Note No. 16, 1982. Western Regional Climate Center, NOAA, National Weather Service, Portland, OR. web site - http://nimbo.wrh.noaa.gov/Portland/climate.html.

Natural Vegetation of Oregon and Washington, Jerry F. Franklin and C. T. Dyrness. The Ecological Provinces of

Oregon, E. William Anderson, Michael M. Borman, and William C. Krueger.

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

USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Contributors

Ed Petersen, Rangeland Management Specialist, John Day Field Office, And Alan Bahn, Rangeland Management Specialist, Baker City Field Office

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	James A. Cornwell, State Rangeland Management Specialist, NRCS, Idaho (Retired) Lee Brooks, Assistant State Conservationist, NRCS, Idaho (Retired)
Contact for lead author	State Rangeland Management Specialist for NRCS - Oregon
Date	09/01/2009
Approved by	Bob Gillaspy
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None. Moderate sheet and rill erosion hazard.

---

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):** Bare ground on this site ranges from 40-50%.

---

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

---

6. **Extent of wind scoured, blowouts and/or depositional areas:** None, slight 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):** Soil organic matter 1 to 3%; structure: strong thin and very thin platy and moderately fine granular to weak medium and coarse subangular blocky.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Moderate to significant ground cover (50-60%) and gentle slopes (0-15%) 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: Deep-rooted cool season bunchgrasses>>

    Sub-dominant: Shallow-rooted, perennial, cool season bunchgrasses>

    Other: Tall shrubs> Forbs

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Basin big sagebrush will become decadent in the absence of normal fire frequency and ungulate grazing. Grass and forb mortality will occur as tall shrubs increase. Normal decadence would be expected in the bluebunch wheatgrass. This would be evidenced by the dead centers in the plants.

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: 1600; Normal: 1400; Unfavorable: 1200

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 annually.
