USDA Natural Resources
Conservation Service

Ecological site R010XA002OR
Juniper Shrubby Pumice Hills 8-10 PZ

Accessed: 05/10/2025

General information

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

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R010XA001OR	**Loamy 8-10 PZ** DROUGHTY LOAM 8-10 PZ
R010XA007OR	**Juniper Pumice South 9-12 PZ** SOUTH 10-12 PZ
R010XA018OR	**Juniper Shrubby Loam 10-12 PZ** LOAMY 10-12 PZ
R010XA083OR	**Juniper Shrubby North 9-12 PZ** SANDY NORTH 10-12 PZ

Similar sites

R010XA027OR	**Juniper Pumice Flat 8-10 PZ** PUMICE FLAT 8-10 PZ

Table 1. Dominant plant species

Tree	(1) *Juniperus occidentalis*

Shrub	(1) *Artemisia tridentata ssp. tridentata* (2) *Purshia tridentata*
Herbaceous	(1) *Hesperostipa comata* (2) *Oryzopsis hymenoides*

Physiographic features

This site occurs on flat to gentle slopes and swales in uplands; also on dry basins, drainage terraces, fans, or slopes adjacent to bottomlands.

Table 2. Representative physiographic features

Landforms	(1) Swale (2) Terrace (3) Fan
Flooding frequency	None
Ponding frequency	None
Elevation	2,000–3,500 ft
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation typically ranges from 8 to 10 inches, but occasionally up to 12 inches. Most precipitation occurs between November and early June, mostly in the form of rain and snow. The soil temperature regime is mesic. The average annual air temperature is 48 degrees F. with extreme temperatures ranging from -27 to 105 degrees F. The freeze free period is 90 to 120 days. The optimum period for plant growth is from early March through June.

Table 3. Representative climatic features

Frost-free period (average)	115 days
Freeze-free period (average)	120 days
Precipitation total (average)	10 in

Influencing water features

Soil features

The soils of this site are moderately deep to deep, well or excessively drained, and have sandy textured surfaces. Subsoils are sandy and sometimes gravelly. They are generally formed in isolated deposits of volcanic ash. Permeability is moderately rapid and the available water holding capacity is 4 to 6.7 inches for the profile. The potential for wind erosion is high.

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam (2) Ashy sandy loam (3) Loam
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid to moderately slow

Soil depth	20–60 in
Surface fragment cover <=3"	0–37%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4–6.7 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–18%
Subsurface fragment volume >3" (Depth not specified)	0–9%

Ecological dynamics

The existence of the reference state today is rare or not at all, therefore it is presented in this model as a reminder of what once was. Community changes were likely rare, spatially dispersed, and precipitated by small or single tree fires.

The ecological function of State 2 has not changed from that of the reference state, however the resiliency of the state has been reduced by the presence of cheatgrass.

Burning reduces the cover of sagebrush, bitterbrush, and juniper.

Increasers and invaders include cheatgrass, annual fescue, collinsia, fiddleneck, cryptantha, hemizonia, mustard, pepperweed, snakeweed, and rubber rabbitbrush.

The percent composition for several species, i.e., Idaho fescue, bluebunch wheatgrass, bitterbrush, and juniper may vary considerably depending on the locality, precipitation, and variations in soil characteristics.

Disturbance Response:

Three primary disturbances were identified for this site: grazing, tree cutting and the infrequent small area fire.

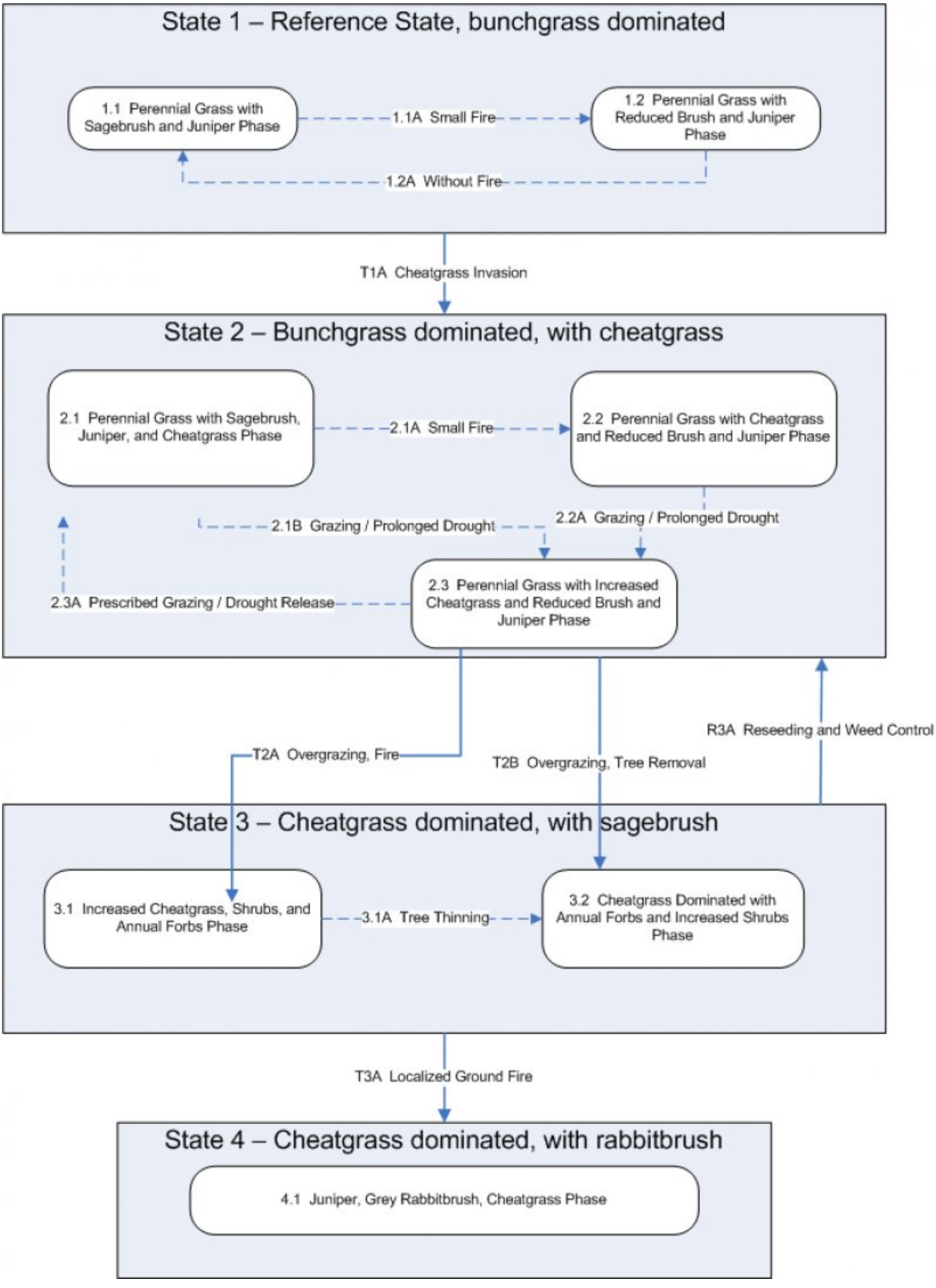
Inappropriate grazing causes a reduction in needle and thread (HECO26), indian ricegrass (ACHY), bluebunch wheatgrass (PSSP6), and other understory grass species. Idaho fescue (FEID) remains in the community under the north side canopy of juniper trees and cheatgrass (BRTE), if present, will increase on all other aspects under the canopy. Interspaces are normally sparse, however with overgrazing granite prickly phlox (LiPU11) increases and grasses decline. Squirreltail (ELEL5) may increase initially as needle and thread and bluebunch wheatgrass decline, however with continued overgrazing this species will also decline. Eventually deep rooted perennial bunchgrasses (DRPBG) are eliminated. Cheatgrass becomes dominate along with rubber rabbitbrush (ERNAN5).

Cutting of juniper (JUOC) leads to an increase in grey rabbitbrush and cheatgrass with or without grazing. Idaho fescue is eliminated from areas where trees are removed due to harsh microclimate and cheatgrass replaces it. The addition of inappropriate grazing would lead to a decline in the other deep-rooted perennial bunchgrasses and an increase in annuals and granite prickly phlox.

Fire was extremely infrequent in the historical community and limited to single tree or small area events (Miller, R. pers. comm. 2006). With juniper cutting and/or improper grazing, cheatgrass will dominate the understory and the probability of ground fire increases, however without ladder fuels the fire would be small in extent. Fire would reduce

the amount of sagebrush and bitterbrush while increasing cheatgrass and other annuals.
Ground fire potential increases with increasing cheatgrass, however fires would be infrequent and small in area.

State and transition model


State 1 – Reference State, bunchgrass dominated
1.1 Perennial Grass with Sagebrush and Juniper Phase
1.1A Small Fire
1.2 Perennial Grass with Reduced Brush and Juniper Phase
1.2A Without Fire
T1A Cheatgrass Invasion
State 2 – Bunchgrass dominated, with cheatgrass
2.1 Perennial Grass with Sagebrush, Juniper, and Cheatgrass Phase
2.1A Small Fire
2.2 Perennial Grass with Cheatgrass and Reduced Brush and Juniper Phase
2.1B Grazing / Prolonged Drought
2.2A Grazing / Prolonged Drought
2.3A Prescribed Grazing / Drought Release
2.3 Perennial Grass with Increased Cheatgrass and Reduced Brush and Juniper Phase
R3A Reseeding and Weed Control
T2A Overgrazing, Fire
T2B Overgrazing, Tree Removal
State 3 – Cheatgrass dominated, with sagebrush
3.1 Increased Cheatgrass, Shrubs, and Annual Forbs Phase
3.1A Tree Thinning
3.2 Cheatgrass Dominated with Annual Forbs and Increased Shrubs Phase
T3A Localized Ground Fire
State 4 – Cheatgrass dominated, with rabbitbrush
4.1 Juniper, Grey Rabbitbrush, Cheatgrass Phase

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The potential native plant community is dominated by an open stand of juniper and needle and thread. Other prominent grasses include indian ricegrass, Thurber's needlegrass, Sandberg bluegrass, and bluebunch wheatgrass. Idaho fescue is usually poresent in high precipitation zones, but restricted to areas beneath the tree canopy if present in low precipoitation areas. Bitterbrush and big sagebrush are also present. The vegetative composition of the community is approximately 75% grass, 10% forbs, and 15% shrubs/trees.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	450	600	750
Shrub/Vine	60	80	100
Forb	60	80	100
Tree	30	40	50
Total	**600**	**800**	**1000**

Figure 5. Plant community growth curve (percent production by month). OR4001, B10A Mesic, Low Elev., N/A, Sandy, Good Condition. B10A Mesic, Low Elev., N/A, Sandy, Good Condition RPC Growth Curve.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	20	55	15	5	0	0	0	0	0

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Perennial, bunch-grass, deep-rooted**			300–500	
	needle and thread	HECO26	*Hesperostipa comata*	300–500	–
2	**Perennial, bunch-grass, deep-rooted**			42–70	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	42–70	–
3	**Perennial, bunch-grass, deep-rooted**			30–50	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	30–50	–
4	**Perennial, bunch-grass, deep-rooted**			30–50	
	Idaho fescue	FEID	*Festuca idahoensis*	18–30	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	12–20	–
5	**Perennial, bunch-grass, shallow-rooted**			30–50	
	Sandberg bluegrass	POSE	*Poa secunda*	30–50	–
6	**Other perennial grasses**			6–30	
	Ross' sedge	CARO5	*Carex rossii*	0–10	–
	squirreltail	ELEL5	*Elymus elymoides*	0–10	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–10	–
	basin wildrye	LECI4	*Leymus cinereus*	0–10	–
Forb					

7	**Perennial**			48–80	
	common yarrow	ACMI2	*Achillea millefolium*	6–10	–
	pussytoes	ANTEN	*Antennaria*	6–10	–
	milkvetch	ASTRA	*Astragalus*	6–10	–
	hawksbeard	CREPI	*Crepis*	6–10	–
	fleabane	ERIGE2	*Erigeron*	6–10	–
	desertparsley	LOMAT	*Lomatium*	6–10	–
	lupine	LUPIN	*Lupinus*	6–10	–
	spreading phlox	PHDI3	*Phlox diffusa*	6–10	–
9	**Other perennial forbs**			12–20	
	agoseris	AGOSE	*Agoseris*	0–10	–
	woollypod milkvetch	ASPU9	*Astragalus purshii*	0–10	–
	Douglas' dustymaiden	CHDO	*Chaenactis douglasii*	0–10	–
	phacelia	PHACE	*Phacelia*	0–10	–
	deathcamas	ZIGAD	*Zigadenus*	0–10	–
Shrub/Vine					
11	**Evergreen, dominant**			18–30	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	18–30	–
12	**Evergreen, subdominant**			12–20	
	slender buckwheat	ERMI4	*Eriogonum microthecum*	12–20	–
13	**Deciduous, dominant**			18–30	
	antelope bitterbrush	PUTR2	*Purshia tridentata*	18–30	–
15	**Other shrubs**			12–20	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–10	–
	granite prickly phlox	LIPU11	*Linanthus pungens*	0–10	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	0–10	–
Tree					
16	**Evergreen trees**			30–50	
	western juniper	JUOC	*Juniperus occidentalis*	30–50	–

Animal community

This site is suitable to grazing by livestock.

Mule deer, coyotes, and passerine birds may be found on this site.

Hydrological functions

The soils of this site have high infiltration rates and low runoff potential.

Wood products

Firewood and posts.

Other information

Key species for cattle are needle and thread, indian ricegrass, Thurber needlegrass, Idaho fescue, and bluebunch wheatgrass. Species adapted to use in range seeding include crested wheatgrass, siberian wheatgrass, indian

ricegrass, tall wheatgrass, secar bluebunch wheatgrass, and sheep fescue (in higher precipitation areas).

Other references

Site also associated with B10B Sites
Droughty South 9-12 PZ #010XB042OR
Droughty North 9-12 PZ #010XB084OR

Contributors

Cici Brooks
Gene Hickman
K.Kennedy

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)	Jeff Repp and Bruce Franssen
Contact for lead author	State Rangeland Management Specialist for NRCS - Oregon
Date	04/24/2003
Approved by	Bob Gillaspy
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

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

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10-15%

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

6. **Extent of wind scoured, blowouts and/or depositional areas:** Some to few

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 = 3-4

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak very fine to fine granular structure, dry color value 5-6, 8 to 10 inches thick; low OM (1-2%)

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Significant ground cover (55-65%) and level to moderately steep slopes 0-30%) 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: Deep-rooted, perennial bunch-grasses > perennial forbs

    Sub-dominant: Evergreen shrubs >= deciduous shrubs

    Other: Evergreen trees

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

---

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 invade sites that have lost deep rooted perennial grass functional groups

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