USDA Natural Resources
Conservation Service

Ecological site R010XA003OR
Droughty 8-10 PZ

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.

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

R010XA022OR	**Juniper Lava Blisters 8-10 PZ** occurs on exposed lava flows & small knolls with shallower soils; bluebunch wheatgrass (PSSP6) dominant, needle-and-thread is minor component in plant community
R010XA027OR	**Juniper Pumice Flat 8-10 PZ** occurs in areas of lower slopes on nearly level plains and low hills; Mountain (ARTRV) and Basin (ARTRT) big sagebrush are both possible; more Idaho Fescue

Similar sites

R010XA027OR	**Juniper Pumice Flat 8-10 PZ** differentiated by deeper soils and lower slopes, different landscape positions,

Table 1. Dominant plant species

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

Physiographic features

This site occurs on gently sloping alluvial fans, hillslopes and stream terraces, primarily on gravelly outwash plains.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Terrace (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	3,000–3,800 ft
Slope	1–15%
Water table depth	60 in
Aspect	Aspect is not a significant factor

Climatic features

Precipitation is seasonal and occurs mainly during the months of November through June, primarily as rain. Summer thunder storms also occur. The optimum period for plant growth is April through June.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	140 days
Precipitation total (average)	10 in

Influencing water features

none

Soil features

The soils of this site are influenced by volcanic ash and alluvium or colluvium from volcanic rock. Depths range from shallow with a duripan to very deep. Surface textures are very cobbly or gravelly loams to ashy sandy loams. They are usually well drained. The cobbly loam soil is underlain by an indurated hardpan. Soil temperature regime is mesic and soil moisture regime is aridic (torric).

Representative soil for this site is Ayres cobbly loam 3-8% slope; loamy-skeletal, mixed, superactive, mesic shallow Argiduridic Durixerolls.

Table 4. Representative soil features

Surface texture	(1) Very cobbly loam (2) Gravelly loam (3) Ashy sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	20–60 in
Surface fragment cover <=3"	0–25%
Surface fragment cover >3"	0–20%

Available water capacity (0-40in)	0.6–1.9 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)	7.4–7.8
Subsurface fragment volume <=3" (Depth not specified)	5–26%
Subsurface fragment volume >3" (Depth not specified)	5–31%

Ecological dynamics

This site is influenced by run-on events from adjacent uplands and drainageways that deliver sediment and rock during intense storms events. It has a natural level of disturbance that may lead to the presence of annuals and short lived perennials. The well drained soils of this site favors drought tolerant species.

Disturbance Response

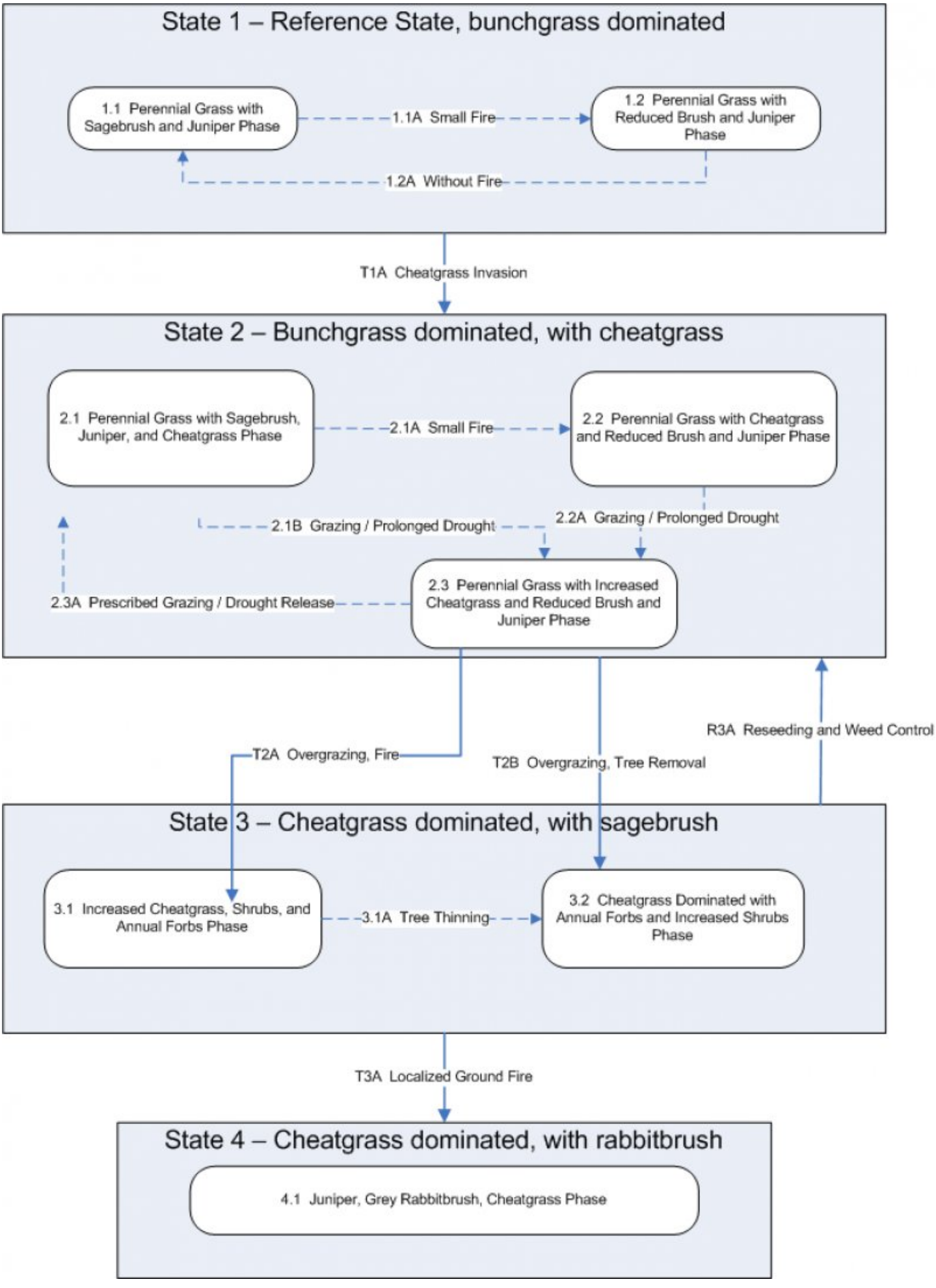
Three primary disturbances were identified for this site: grazing, tree cutting and the infrequent small area fire.

Inappropriate grazing causes a reduction in bluebunch wheatgrass (PSSP6), needle-and-thread (HECO26), Indian ricegrass (ACHY) and other understory grass species. Basin big sagebrush (ARTRT) and rubber rabbitbrush (ERNA10) increase with grazing disturbance but will decreases with expansion of western juniper (JUOC). Idaho fescue (FEID) remains in the community under the north side canopy of western juniper trees (JUOC) and cheatgrass (BRTE), if present, will increase on all other aspects under the canopy. Interspaces are normally sparse, however with overgrazing, prickly gilia (LIPU11) will increase and grasses decline. Bottlebrush 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 are eliminated. Cheatgrass becomes dominant along with rubber rabbitbrush.

Cutting of juniper leads to an increase in rubber rabbitbrush and an increase in cheatgrass with or without grazing. Idaho fescue is eliminated and cheatgrass will replace it from areas where trees are removed (due to harsh microclimate) unless trees are lopped and slash is scattered. If tree harvest is combined with inappropriate grazing, it would lead to a decline in the other deep-rooted perennial bunchgrasses and an increase in annuals and prickly gilia.

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

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 western juniper, basin big sagebrush, needle and thread, bluebunch wheatgrass, and Indian ricegrass. Idaho fescue may occur beneath juniper trees and Thurbers Needlegrass will be present on coarser textured soils. Vegetative composition is approximatly 80% grasses, 5% forbs, 12% shrubs, and 3% trees.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	480	640	800
Shrub/Vine	70	95	120
Tree	20	30	40
Forb	30	35	40
Total	**600**	**800**	**1000**

Figure 5. Plant community growth curve (percent production by month). OR4061, B10A Dr. Juniper Fan RPC. B10A Dr. Juniper Fan RPC.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	15	40	35	5	0	0	0	5	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, deep rooted bunchgrass**			280–400	
	needle and thread	HECO26	*Hesperostipa comata*	240–400	–
2	**Perennial, deep rooted bunchgrass**			150–250	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	90–150	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	60–100	–
3	**Perennial, deep rooted bunchgrass**			60–100	
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	30–100	–
	Idaho fescue	FEID	*Festuca idahoensis*	12–50	–
	western needlegrass	ACOCO	*Achnatherum occidentale ssp. occidentale*	12–50	–
4	**Perennial, shallow rooted bunchgrass**			30–50	
	Sandberg bluegrass	POSE	*Poa secunda*	30–50	–
5	**Perennial, other**			0–6	
	squirreltail	ELEL5	*Elymus elymoides*	0–6	–
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	0–6	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–6	–

Forb					
6	**Perennial forbs**			12–20	
	phlox	PHLOX	*Phlox*	12–20	–
	phlox	PHLOX	*Phlox*	12–20	–
7	**Other forbs**			8–20	
	yarrow	ACHIL	*Achillea*	6–10	–
	pussytoes	ANTEN	*Antennaria*	6–10	–
	woollypod milkvetch	ASPU9	*Astragalus purshii*	0–6	–
	milkvetch	ASTRA	*Astragalus*	0–6	–
	buckwheat	ERIOG	*Eriogonum*	0–6	–
	desertparsley	LOMAT	*Lomatium*	0–6	–
	deathcamas	ZIGAD	*Zigadenus*	0–6	–
Shrub/Vine					
8	**Evergreen shrubs**			60–100	
	basin big sagebrush	ARTRT	*Artemisia tridentata ssp. tridentata*	60–100	–
9	**Deciduous shrubs**			10–15	
	slender buckwheat	ERMI4	*Eriogonum microthecum*	10–15	–
10	**Other shrubs**			0–5	
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–5	–
	spiny hopsage	GRSP	*Grayia spinosa*	0–5	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–5	–
	spineless horsebrush	TECA2	*Tetradymia canescens*	0–5	–
Tree					
11	**Evergreen Trees**			20–40	
	western juniper	JUOC	*Juniperus occidentalis*	20–40	–

Animal community

This site is suitable for livestock grazing. Wildlife present includes mule deer from fall through spring, coyotes, a variety of bird species and small mammals. Natural water sources for livestock or wildlife are usually absent from this site.

Hydrological functions

Runoff or overland flow from this site occurs following extreme convection events occurring on adjacent uplands. An indurated hardpan, if present, prevents deep percolation of soil water. Significant amounts of precipitation are intercepted by juniper trees and lost by evaporation to the atmosphere, especially after light storms. Hydrologic Group for soils of this site is "B".
Hydrologic impacts from juniper removal will vary depending on method of removal (chaining vs lop & scatter), and understory vegetative cover. For watershed improvement projects, a site by site evaluation of the impacts of juniper reduction or removal is recommended.

Recreational uses

Hunting, camping, hiking, biking, horseback riding, and nature walks are examples of recreational uses for this site.

Wood products

Juniper wood products, if present includes firewood, posts, & boughs.

Other products

none

Other information

none

Inventory data references

Vegetation-Soil Units in the Central Oregon Juniper Zone, by Richard S. Driscoll. PNW Forest & Range Experiment Station, Research Paper, PNW-19, 1964.

Final Report for Agreement No. 68-0436-4090
USDA Ecological Site Description, January 26, 2007, by Tamzen Stringham, Associate Professor, Dept. of Rangeland Ecology and Management, Oregon State University, Corvallis, OR

Type locality

Location 1: Crook County, OR	
Township/Range/Section	TT16s R14e S34-NE
General legal description	Location is in midseral condition and located on broad elevated fan-terrace east of the highway.

Other references

THE ECOLOGICAL PROVINCES OF OREGON, by E. William Anderson, Michael M. Borman and William C. Krueger, Oregon Agricultural Experiment Station. SR 990. 1998.

BIOLOGY, ECOLOGY, AND MANAGEMENT OF WESTERN JUNIPER, by Richard F.Miller, Jon D. Bates, Tony J. Svejcar, Fred B. Pierson, and Lee E. Eddleman, Oregon Agricultural Experiment Station. Technical Bulletin 152. June 2005

Contributors

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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)	Cici Brooks
Contact for lead author	State Rangeland Management Specialist for NRCS - Oregon
Date	03/20/2008
Approved by	Bob Gillaspy
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Few-due to extreme storm events.

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2. **Presence of water flow patterns:** Few-associated with extreme storm events which carry water from adjacent uplands above this site.

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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):** 10-15%

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5. **Number of gullies and erosion associated with gullies:** Few-due to convection storms and the ashy nature of the soils.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Site is not highly prone to wind erosion.

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7. **Amount of litter movement (describe size and distance expected to travel):** Fine - limited movement

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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

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** SOM 1-4%; Moderate very fine granular structure or weak thin platy structure parting to weak fine granular structure.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The scattered shrubs & bunchgrasses of this plant community may allow little runoff and good infiltration in normal storm events. However, in high storm events with runon from adjacent uplands, some runoff may occur. Reference natural plant community has an approximate percent canopy cover of approximately 55% and basal cover is approximately 8%; microbiotic crusts are approximately 5-10% cover.

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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; depth to duripan, when present, is 10 to 20 inches.

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Deep rooted perennial grass/grasslike

    Sub-dominant: Evergreen shrubs>Evergreen trees>Decidious shrubs

    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):** Total above ground production is approximately 600 lbs. in unfavorable years, 800# in normal years and 1000# in favorable years.

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 annual forbs invade sites that have lost deep rooted perennial grass functional groups

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