USDA Natural Resources
Conservation Service

Ecological site R023XY514OR
Pumice 8-10 PZ

Last updated: 4/10/2025
Accessed: 03/13/2026

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.

Ecological site concept

Currently there is only a draft of the initial concept for this ecological site. The initial concept for this site places it within the Ashy or Loamy Skeletal Mod Deep 10-20 PZ High-Resilience Mountain Big Sagebrush and Idaho Fescue Ecological Site Group. To view the General STM and other information available for this ESG please go to https://edit.jornada.nmsu.edu/catalogs/esg/023X/R023XY906NV

Associated sites

R023XY211OR	**PUMICE CLAYPAN 10-12 PZ** Pumice Claypan 10-12 PZ
R023XY210OR	**PUMICE 10-12 PZ** Pumice 10-12 PZ
R023XY221OR	**GRAVELLY TERRACE 10-12 PZ** Gravelly Terrace 10-12 PZ

Similar sites

R023XY211OR	**PUMICE CLAYPAN 10-12 PZ** Pumice Claypan 10-12 PZ

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. vaseyana*

Herbaceous	(1) *Festuca idahoensis* (2) *Achnatherum thurberianum*

Physiographic features

This site occurs on gentle uplands and broad flats or basalt plateaus. Slopes range from 0 - 20 percent. Elevations range from 4,300 to 4,500 feet.

Table 2. Representative physiographic features

Flooding frequency	None
Ponding frequency	None
Elevation	1,311–1,372 m
Slope	0–20%
Aspect	Aspect is not a significant factor

Climatic features

The annual precipitation ranges from 8 to 10 inches which occurs mainly between the months of November and June, mostly in the form of rain and snow. The soil temperature regime is frigid. The average annual air temperature is 43 degrees F with extreme temperatures ranging from -30 to 103 degrees F. The frost free period is 50 to 90 days. The optimum period for plant growth is from mid-April through early July.

Table 3. Representative climatic features

Frost-free period (characteristic range)	5 days
Freeze-free period (characteristic range)	34 days
Precipitation total (characteristic range)	229 mm
Frost-free period (actual range)	5 days
Freeze-free period (actual range)	34 days
Precipitation total (actual range)	229 mm
Frost-free period (average)	5 days
Freeze-free period (average)	34 days
Precipitation total (average)	229 mm

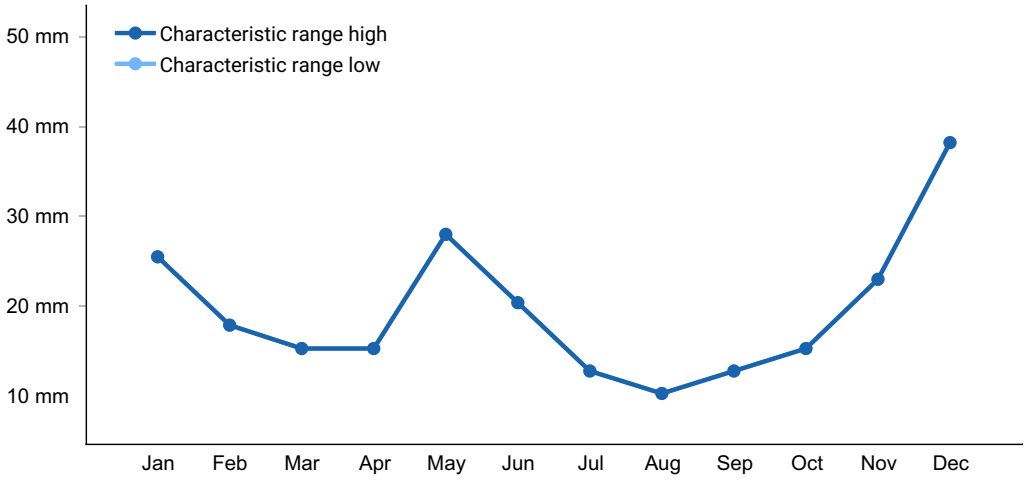


Figure 1. Monthly precipitation range

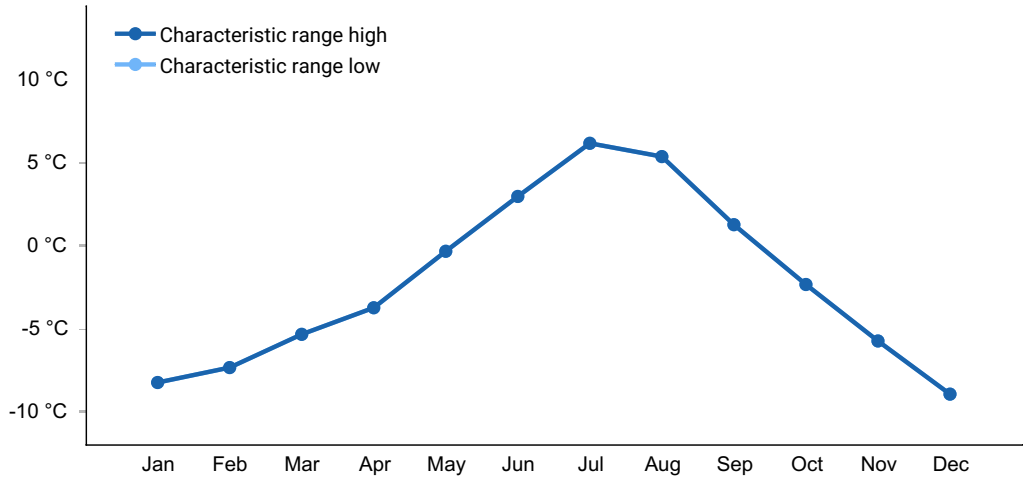


Figure 2. Monthly minimum temperature range

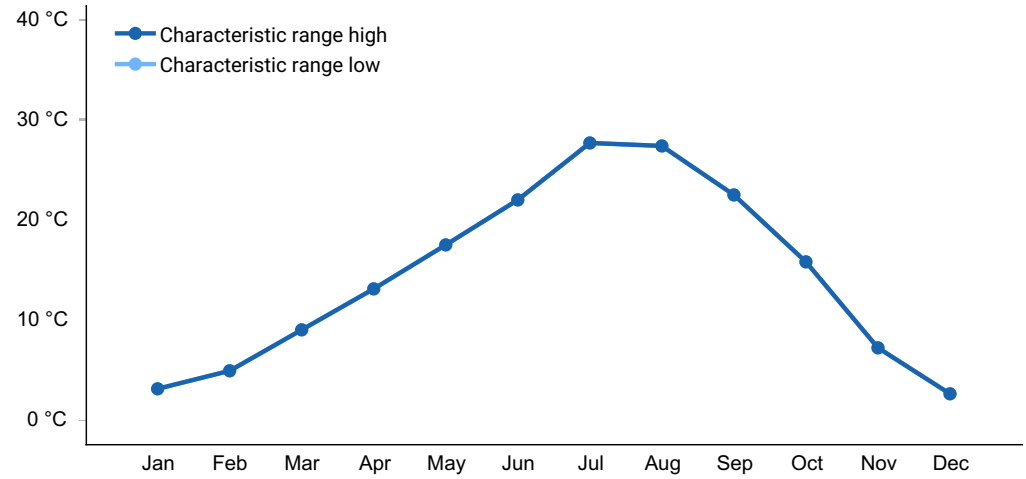


Figure 3. Monthly maximum temperature range

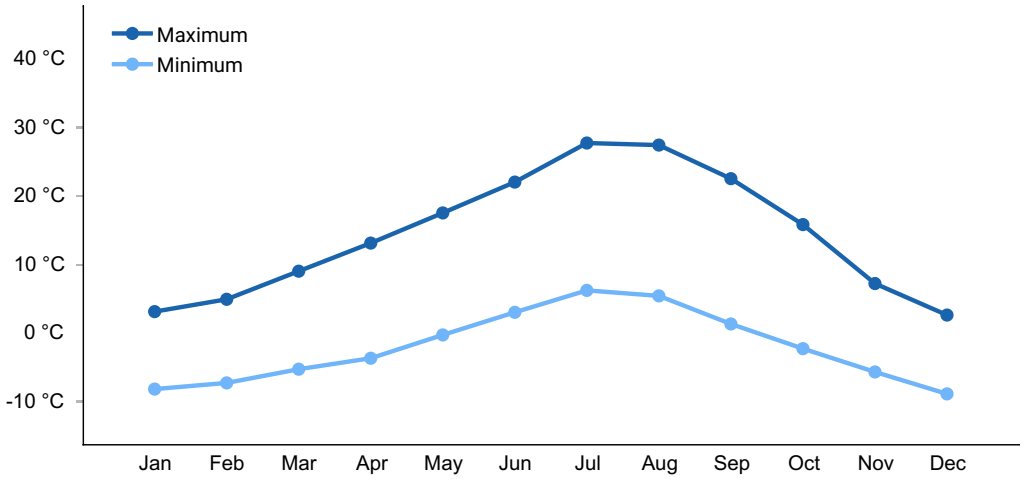


Figure 4. Monthly average minimum and maximum temperature

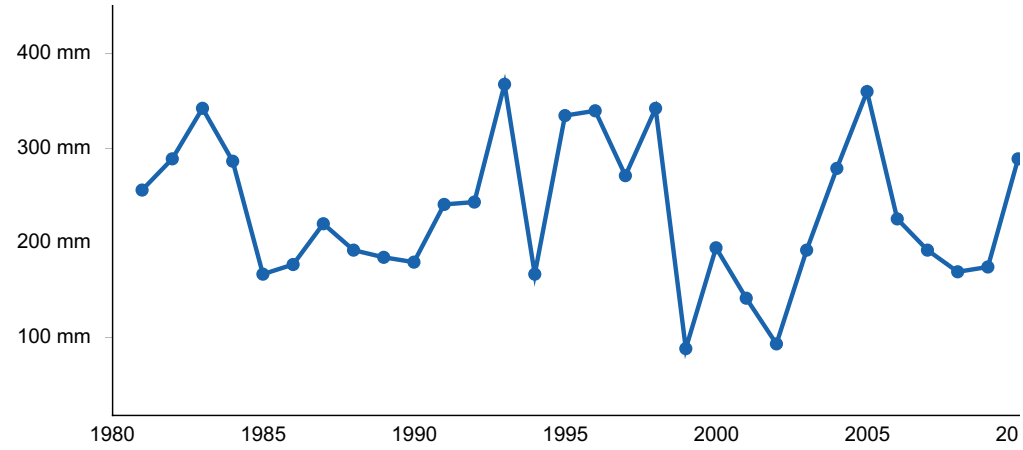


Figure 5. Annual precipitation pattern

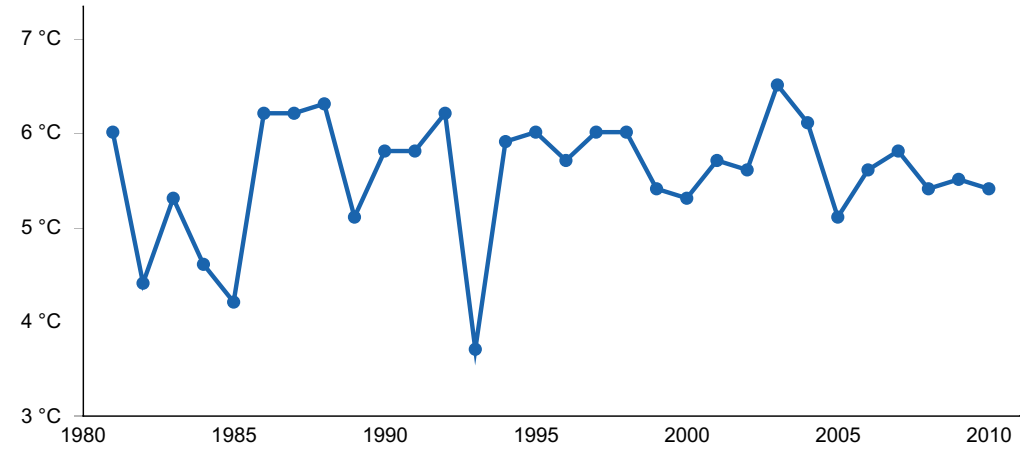


Figure 6. Annual average temperature pattern

Climate stations used

- (1) BROTHERS [USC00351067], Brothers, OR

Influencing water features

Soil features

The soils of this site are moderately deep to very deep, well or excessively drained, and have sandy loam or loamy sand surface textures. They are generally formed from pumice sand over basalt bedrock with compacted sandy layers or hardpan at 20-40 inches or more. Permeability is moderately slow and the available waterholding capacity (AWC) is 8.0 to 12.0 inches for the profile. The potential for wind erosion high. The soils of this site have high infiltration rates and low runoff potential.

Table 4. Representative soil features

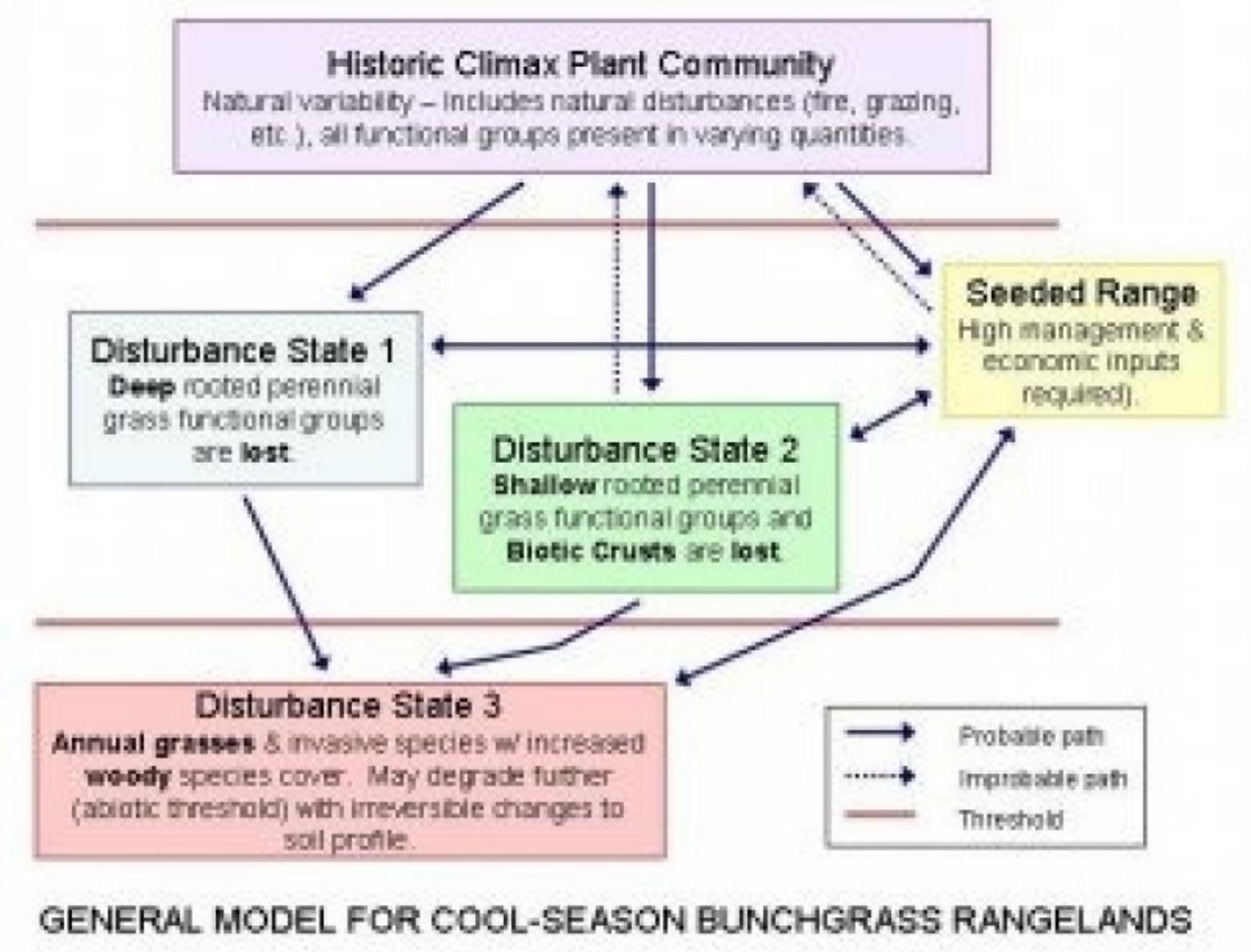
Parent material	(1) Residuum–basalt (2) Pumice
Surface texture	(1) Ashy sandy loam (2) Ashy loamy sand
Drainage class	Well drained to excessively drained
Permeability class	Moderately slow
Depth to restrictive layer	51–203 cm
Soil depth	51–203 cm

Ecological dynamics

Variability in plant composition results from variation in the amount of pumice and in the depth of pumice sand over a restrictive layer (e.g. bedrock, buried soil, hardpan, or cemented sands).

Idaho fescue declines with over-use by livestock.

State and transition model



State 1
Reference

Dominant plant species

- mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), shrub
- Idaho fescue (*Festuca idahoensis*), grass
- Thurber's needlegrass (*Achnatherum thurberianum*), grass

Community 1.1
Reference Plant Community

The potential native plant community is dominated by big sagebrush and Idaho fescue. Thurber needlegrass, western needlegrass, squirreltail, and Indian ricegrass are other prominent grasses. Prickly gilia and low-green rabbitbrush also commonly occur in the stand in minor amounts. Vegetative composition is approximately 70% grasses, 10% forbs, and 20% shrubs/trees.

Dominant plant species

- mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*), shrub
- Idaho fescue (*Festuca idahoensis*), grass
- Thurber's needlegrass (*Achnatherum thurberianum*), grass

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	404	560	723
Shrub/Vine	90	129	163
Forb	67	95	123
Total	**561**	**784**	**1009**

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Perennial, deep-rooted, dominant**			353–392	
	Idaho fescue	FEID	*Festuca idahoensis*	353–392	–
2	**Perennial, deep-rooted, sub-dominant**			110–126	
	western needlegrass	ACOC3	*Achnatherum occidentale*	34–39	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	34–39	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	8–16	–
	squirreltail	ELEL5	*Elymus elymoides*	8–16	–
	Ross' sedge	CARO5	*Carex rossii*	11–16	–
3	**Other perennial grasses, all**			0–16	
	Sandberg bluegrass	POSE	*Poa secunda*	0–8	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	0–8	–
4	**Perennial, rhizomatous**			8–16	
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	8–16	–
Shrub/Vine					
5	**Perennial, dominant**			78–118	
	mountain big	ARTRV	*Artemisia tridentata ssp.*	78–118	–

	mountain big sagebrush	ARVAV	*Artemisia tridentata* ssp. *vaseyana*	16–40	
6	**Other perennial shrubs, all**			8–24	
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	8–16	–
	rubber rabbitbrush	ERNA10	*Ericameria nauseosa*	0–8	–
Forb					
7	**Perennial, dominant**			47–94	
	lupine	LUPIN	*Lupinus*	8–16	–
	phlox	PHLOX	*Phlox*	8–16	–
	hoary tansyaster	MACA2	*Machaeranthera canescens*	8–16	–
	pussytoes	ANTEN	*Antennaria*	8–16	–
	buckwheat	ERIOG	*Eriogonum*	8–16	–
	granite prickly phlox	LIPU11	*Linanthus pungens*	8–16	–
8	**Other perennial forbs, all**			0–31	
	common woolly sunflower	ERLA6	*Eriophyllum lanatum*	0–8	–
	fleabane	ERIGE2	*Erigeron*	0–8	–
	buckwheat	ERIOG	*Eriogonum*	0–8	–
	curvepod milkvetch	ASCU4	*Astragalus curvicarpus*	0–8	–
	Douglas' dustymaiden	CHDO	*Chaenactis douglasii*	0–8	–
	woollypod milkvetch	ASPU9	*Astragalus purshii*	0–8	–
	starlily	LEUCO	*Leucocrinum*	0–8	–
	sego lily	CANU3	*Calochortus nuttallii*	0–8	–

Animal community

Livestock Grazing: Natural water is usually not available on-site. Winter grazing is possible in mild winters with little snow, but protection from the cold for livestock is limited due to a lack of tall cover.

Native Wildlife Associated with the Climax Community: Pronghorn, sage grouse, and deer

Hydrological functions

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

Type locality

Location 1: Deschutes County, OR	
General legal description	At Brothers - Highway rest area Distribution: Eastern Deschutes County; East of Horse Ridge and South or Southeast of West Butte, as far east as Hampton Valley.

Acknowledgments

Original Author: Gene Hickman 3-93

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	03/13/2026
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

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

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

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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

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:

    Sub-dominant:

Other:

Additional:

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

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
