

# **Ecological site R024XY032OR** **ARID SOUTH SLOPES 6-10 PZ**

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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.



**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.

## **Ecological site concept**

This ESC needs work. Skedaddle mapped with 024XY031OR, 024XY015OR (ATCO ESC) and 024XY033OR. Brock has a Bt. Other series are torriorthents.  
ESC notes: 024XY602OR, 24XY638OR, 024XY033OR, 024XY030OR, and 024XY032OR all occur on terraces, hills and mountains. It is possible to split these concepts based on landform & residuum/colluvium, following field check.

## **Associated sites**

R024XY015OR	<b>DESERT LOAM 6-10 PZ</b> Desert Loam 6-10 PZ (non-aspect, higher salts and carbonates, different composition – ATCO dominant)
R024XY016OR	<b>LOAMY 8-10 PZ</b> Loamy 8-10 PZ (non-aspect, deeper soil, higher production)
R024XY017OR	<b>SHALLOW LOAM 8-10 PZ</b> Shallow Loam 8-10 PZ (non-aspect, higher production)
R024XY020OR	<b>SHRUBBY LOAM 8-10 PZ</b> Shrubby Loam 8-10 PZ (non-aspect, higher production)
R024XY030OR	<b>LOAMY SLOPES 6-10 PZ</b> Loamy Slopes 6-10 PZ (higher production, cooler slopes)

R024XY031OR	<b>DROUGHTY SHALLOW SLOPES 6-10 PZ</b> Droughty Shallow Slopes 6-10 PZ (higher salts and carbonates, different composition – ATCO dominant)
R024XY033OR	<b>ARID NORTH SLOPES 6-10 PZ</b> Arid North Slopes 6-10 PZ (higher production, north aspect, different composition - ARTRW8 and PSSPS dominant w/ACTH7 sub-dominant)

## Similar sites

R024XY030OR	<b>LOAMY SLOPES 6-10 PZ</b> Loamy Slopes 6-10 PZ (higher production, cooler slopes)
R024XY638OR	<b>SOUTH SLOPES 8-10 PZ</b> South Slopes 8-10 PZ (higher production, cooler slopes, different composition – ARTRW8 and PSSPS dominant w/ACTH7 sub-dominant)
R024XY031OR	<b>DROUGHTY SHALLOW SLOPES 6-10 PZ</b> Droughty Shallow Slopes 6-10 PZ (higher salts and carbonates, different composition – ATCO dominant)

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata subsp. wyomingensis</i> (2) <i>Salvia dorrii</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i> (2) <i>Achnatherum thurberianum</i>

## Physiographic features

This site occurs on south aspects of terraces, basin hills and low mountain slopes. Slopes typically range from 15 to 50%. Elevation varies from 3500 to 5200 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Terrace (2) Hill (3) Mountain slope
Elevation	1,067–1,585 m
Slope	15–50%
Aspect	S

## Climatic features

The annual precipitation ranges from 6 to 10 inches, most of which occurs in the form of rain during the months of December through March. The soil temperature regime is mesic with a mean air temperature of 50 degrees F. Temperature extremes range from 110 to -20 degrees F. The frost free period ranges from 110 to 140 days. The optimum growth period for plant growth is from the first of April through early June.

**Table 3. Representative climatic features**

Frost-free period (average)	140 days
Freeze-free period (average)	0 days
Precipitation total (average)	254 mm

## Influencing water features

## Soil features

The soils of this site are typically shallow to very shallow over a strongly cemented duripan or bedrock. Substratum's can be either compacted alluvial sediments or bedrock. The surface texture is a very gravelly sandy loam over a very gravelly clay loam subsoil. A desert pavement is common. Permeability is moderately slow to moderate. The available water holding capacity (AWC) is about 1 to 3 inches for the profile. The potential for erosion is severe.

**Table 4. Representative soil features**

Parent material	(1) Loess–rhyolite
Surface texture	(1) Very gravelly sandy loam (2) Fine sandy loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Moderate to moderately slow
Soil depth	15–51 cm
Available water capacity (0–101.6cm)	2.54–7.62 cm

## Ecological dynamics

The reference native plant community is dominated by Wyoming big sagebrush and Indian ricegrass. Thurber's needlegrass and bluebunch wheatgrass are prominent in the stand. Spiny hopsage, bottlebrush squirreltail and Sandberg bluegrass are common. Desert needlegrass, purple sage and mormon tea are sporadic. Vegetative composition of the community is approximately 65 percent grasses, 5 percent forbs and 30 percent shrubs. The approximate ground cover is 20 to 30 percent (basal and crown).

Four states have been identified for this site: a reference state; a state with the presence of annuals; a state with a shrub/annual co-dominance; and a state with annual dominance.

Reference: Plant community phase change is driven by infrequent fire. Wyoming and basin big sagebrush decline after fire while Thurber's needlegrass, Indian ricegrass and other grasses increase. May see a temporary increase in rabbitbrush after fire. Time facilitates the reintroduction of sagebrush. The introduction of invasive annual grasses and forbs transitions into the state 2.

State 2: Compositionally similar to the reference state with a trace of cheatgrass and weedy forbs. Ecological function has not changed, however the resiliency of the state has been reduced by the presence of invasive weeds. Prescribed grazing and infrequent fire (> 50 year return interval) maintain state dynamics. The timing and/or intensity of grazing or prolonged drought favors Wyoming and basin big sagebrush, squirreltail and Sandberg's bluegrass. Prescribed grazing and/or release from drought may reverse the decline in needlegrass and Indian ricegrass production. Infrequent fire reduces the shrub community and promotes the bunchgrass component. Mismanaged grazing and/or prolonged drought leads to a biotic threshold and into state 3.

State 3: Wyoming and basin big sagebrush is decadent with little recruitment. The perennial grass component is significantly reduced in both density and productivity. Cheatgrass and/or annual forbs and/or Sandberg's bluegrass along with sagebrush control site resources and drive ecological dynamics. Bare ground is abundant. Spatial and temporal energy capture and nutrient cycling has been truncated. Infiltration may be reduced due to lack of ground cover. Risk of soil erosion by both wind and water is increased. Catastrophic wildfire will lead to an abiotic threshold and into state 4.

State 4: Cheatgrass and/or annual weed dominated plant community with limited to no shrub or perennial grass component. Soil erosion and redistribution along with changes in dynamic soil properties affect the hydrologic cycle and thus the nutrient cycle. Harsh environmental factors increase state resiliency to change.

Range in Characteristics-

The depth to a restrictive layer and aspect influences the composition and production of the site. Production will increase with greater soil depth. Indian ricegrass will increase on shallow coarse soils and warm slopes. Desert needlegrass will increase on deeper soils. Bluebunch wheatgrass will increase on east slopes. Thurber's needlegrass increases on loamy surfaces. Purple sage will increase on warm steep droughty slopes and ephedra will increase on toe slopes and over fractured substratums. On older higher terraces with stable erosion pavement the erosion pavement has developed a distinctive desert varnish. The distinctive dark color is due to precipitated concentrates of manganese and lesser amounts of iron.

#### Response to Disturbance - States

If the condition of the site deteriorates as a result of over grazing, Indian ricegrass, bluebunch wheatgrass, Thurber's needlegrass and desert needlegrass will decrease in the stand. Wyoming big sagebrush, squirreltail and Sandberg bluegrass will increase. Minor amounts of annuals will invade. With further deterioration, bare ground rapidly increases, erosion accelerates and site productivity decreases. The invasion of annuals and the natural re-establishment of native perennials is limited on eroded surfaces and in areas of heavy erosion pavement.

States: ARTRW8/ELEL5-POSE-bare ground with erosion pavement; Annuals (scattered)-bare ground with erosion pavement

#### **State and transition model**

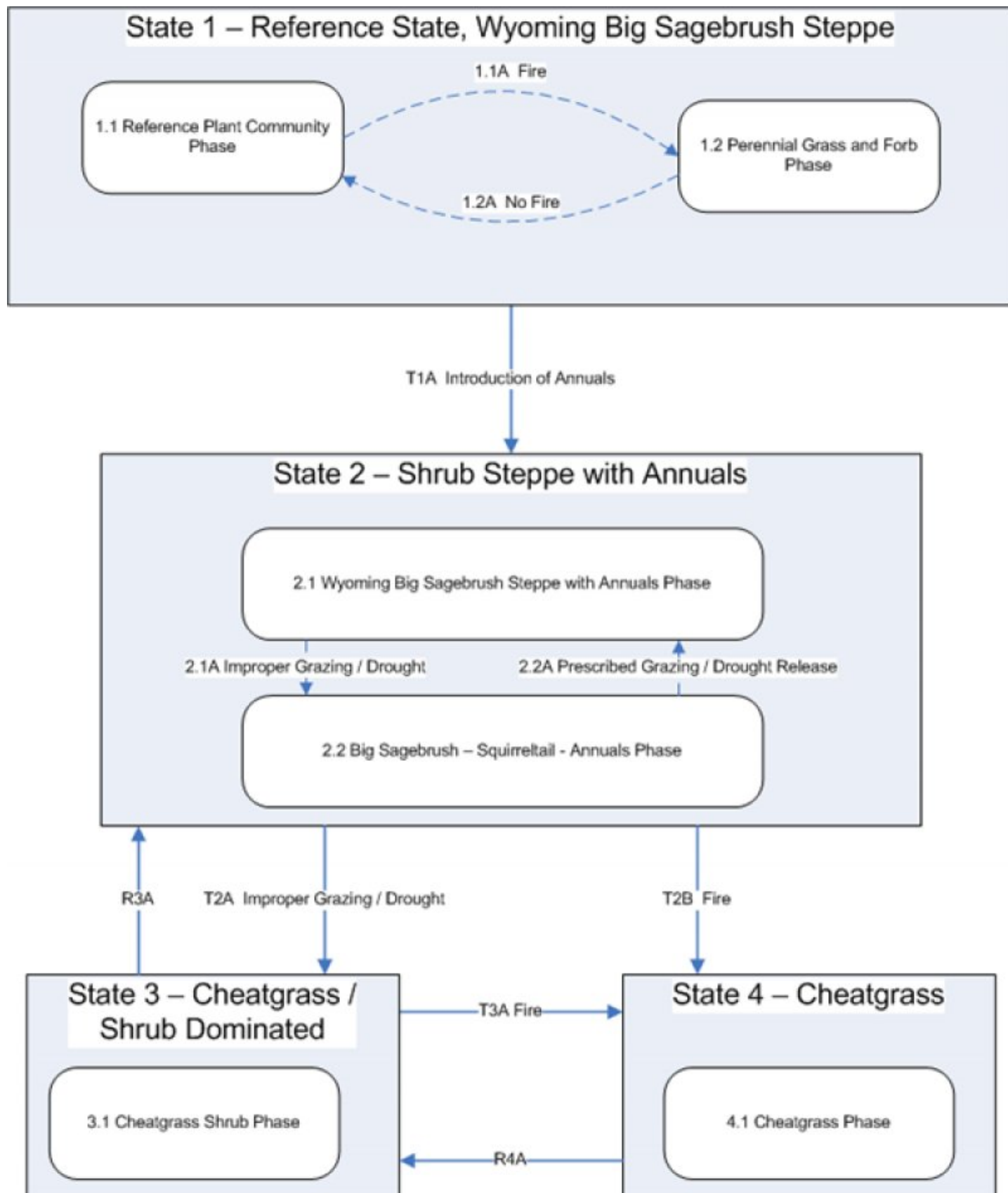


Figure 3. Group 6, STM

## State 1 Reference State

### Community 1.1 Reference Plant Community

The reference native plant community is dominated by Wyoming big sagebrush and Indian ricegrass. Thurber's

needlegrass and bluebunch wheatgrass are prominent in the stand. Spiny hopsage, bottlebrush squirreltail and Sandberg bluegrass are common. Desert needlegrass, purple sage and mormon tea are sporadic. Vegetative composition of the community is approximately 60 percent grasses, 10 percent forbs and 30 percent shrubs. The approximate ground cover is 20 to 30 percent (basal and crown).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	135	202	336
Shrub/Vine	67	101	168
Forb	22	34	56
<b>Total</b>	<b>224</b>	<b>337</b>	<b>560</b>

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Dominant, perennial, moderate rooted bunchgrass</b>			67–101	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	67–101	–
2	<b>Sub-dominant, moderate rooted bunchgrasses</b>			50–151	
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	34–67	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	0–50	–
	bluebunch wheatgrass	PSSPS	<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>	17–34	–
3	<b>Other moderate and shallow rooted bunchgrasses</b>			17–50	
	Webber needlegrass	ACWE3	<i>Achnatherum webberi</i>	0–17	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–17	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0–17	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–17	–
	foxtail wheatgrass	PSSA2	× <i>Pseudelymus saxicola</i>	0–17	–
<b>Forb</b>					
4	<b>Perennial Forbs</b>			17–50	
	curvepod milkvetch	ASCU4	<i>Astragalus curvicaupus</i>	0–7	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–7	–
	Indian paintbrush	CAST12	<i>Castilleja</i>	0–7	–
	Douglas' dustymaiden	CHDO	<i>Chaenactis douglasii</i>	0–7	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	0–7	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–7	–
	granite prickly phlox	LIPU11	<i>Linanthus pungens</i>	0–7	–
	beardtongue	PENST	<i>Penstemon</i>	0–7	–
	phlox	PHLOX	<i>Phlox</i>	0–7	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–7	–
	princesplume	STANL	<i>Stanleya</i>	0–7	–
	largehead clover	TRMA3	<i>Trifolium macrocephalum</i>	0–7	–
<b>Shrub/Vine</b>					

5	<b>Dominant, evergreen, non-sprouting shrub</b>			34–67	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	34–67	–
6	<b>Sub-dominant, deciduous, sprouting shrub</b>			7–34	
	purple sage	SADO4	<i>Salvia dorrii</i>	7–34	–
7	<b>Other evergreen, non-sprouting shrub</b>			7–17	
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	7–17	–
8	<b>Other, deciduous, sprouting shrubs</b>			0–27	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–7	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0–7	–
	littleleaf horsebrush	TEGL	<i>Tetradymia glabrata</i>	0–7	–
	shortspine horsebrush	TESP2	<i>Tetradymia spinosa</i>	0–7	–
9	<b>Deciduous, non-sprouting shrubs</b>			7–30	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	7–17	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–7	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	0–7	–

## Animal community

### Livestock Grazing

This site has limited suitability for livestock grazing use in the late spring and fall under a planned grazing system. Use should be postponed until the soils are firm enough to prevent trampling damage and soil compaction. Care should be taken to avoid plant crown damage and soil movement when the soils are wet. The shallow soils on the steep slopes of this site are very susceptible to movement and compaction from hoof action. Grazing management should be keyed to bunchgrasses, Indian ricegrass, bluebunch wheatgrass and needlegrasses. Deferred grazing or rest is recommended at least once every three years.

### Wildlife

This site offers food and cover for mule deer, desert bighorn sheep and a variety of birds, rodents and associated predators. It is an important spring, fall and winter use area for mule deer and desert bighorn sheep.

## Hydrological functions

The soils of this site have a high runoff potential because of low intake rates, low water holding capacity, shallow depths and steep slopes. Hydrologic cover is fair to good when the Indian ricegrass and other bunchgrass components are greater than 70 percent of potential. The soils are in hydrologic group D.

## Other information

This site has virtually no potential for range seeding because it is steep, very droughty and usually has a gravelly surface. Extended drought can inhibit germination and establishment of presently available species. In areas where a heavy erosion pavement exists, the potential for natural seeding reestablishment is low.

## Contributors

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SCS/BLM Team, Hines (1985&1994)

## 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	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

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

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

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

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

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

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

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

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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):**

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

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial**



distribution on infiltration and runoff:

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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):**
- 

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):**
- 

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:**
-