

# Ecological site R034AY166WY Shallow Sandy Green River and Great Divide Basins (SwSy)

Last updated: 9/28/2023  
Accessed: 05/02/2024

## 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.

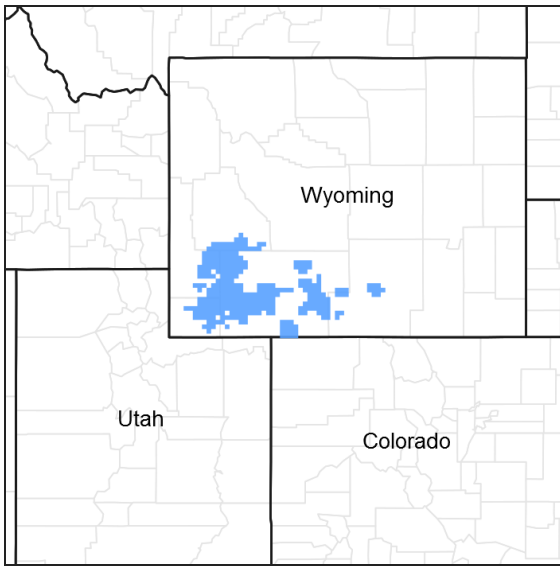


Figure 1. Mapped extent

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

R034AY122WY	<b>Loamy Green River and Great Divide Basins (Ly)</b> Loamy
R034AY150WY	<b>Sandy Green River and Great Divide Basins (Sy)</b> Sandy

## Similar sites

R034AY162WY	<b>Shallow Loamy Green River and Great Divide Basins (SwLy)</b> Shallow Loamy (SwLy) 7-9GR has finer soil texture and more diverse plant species.
R034AY266WY	<b>Shallow Sandy Foothills and Basins West (SwSy)</b> Shallow Sandy (SwSy) 10-14W has higher production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

This site usually occurs in an upland position on south and west facing slopes, but may be found on all slopes and positions.

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Escarpment (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,829–2,195 m
Slope	0–45%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

## Climatic features

Annual precipitation ranges from 7-9 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about July 15. Some green up of cool season plants may occur in September if moisture is available.

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/cgibin/state.pl?state=wy> website. Other climate stations representative of this precipitation zone include "Bitter Creek", "Farson", "Rock Springs FAA AP", and "Wamsutter" in Sweetwater County; "Church Buttes Gas PLT", and Mountain View" in Uinta County; "Fontenelle", "La Barge", and "Sage 4 NNW" in Lincoln County; and "Big Piney" in Sublette County.

**Table 3. Representative climatic features**

Frost-free period (average)	121 days
Freeze-free period (average)	132 days
Precipitation total (average)	229 mm

## Influencing water features

There are no water features associated with this site.

## Soil features

The soils of this site are shallow (8-15" deep to hard or soft bedrock, or less commonly, sandy-skeletal material) well-drained soils formed in alluvium, residuum or eolian deposits from sedimentary rocks.

Major Soil Series correlated to this site include: Gasson and Huguston.

Other Soil Series in MLRA 34 correlated to this site include: Pepton, some phases of Haterton and Tasselman series.

**Table 4. Representative soil features**

Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	20–38 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.29–7.11 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.4–9
Subsurface fragment volume <=3" (Depth not specified)	0–25%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## Ecological dynamics

As this site deteriorates from improper grazing management, species such as rabbitbrush, low sage, needleleaf sedge, and Sandberg bluegrass will increase. Bunchgrasses such as Indian ricegrass and needleandthread will decrease in frequency and production. This site has relatively low productivity potential, and is not well suited to grazing improvement practices unless treated as part of a larger unit containing more productive areas.

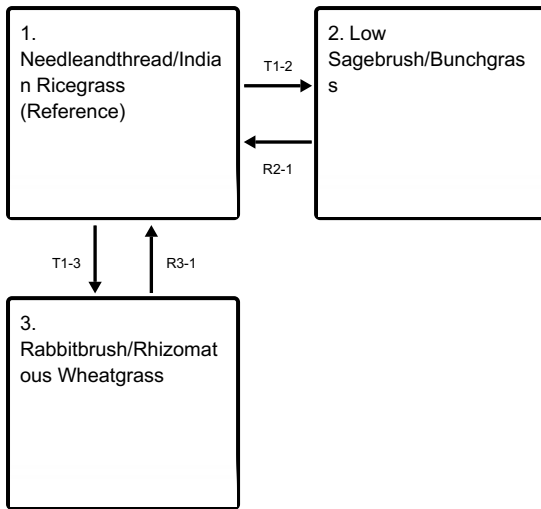
These plant communities narratives may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC’s) will be determined by the decision-makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

The Reference Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

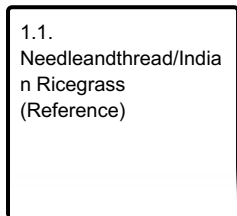
The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

# State and transition model

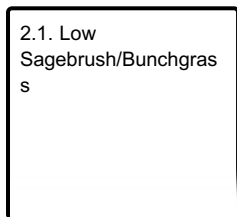
## Ecosystem states



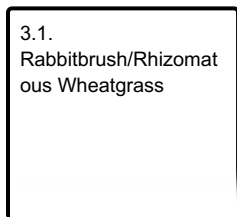
## State 1 submodel, plant communities



## State 2 submodel, plant communities



## State 3 submodel, plant communities



## State 1

### Needleandthread/Indian Ricegrass (Reference)

## Community 1.1

### Needleandthread/Indian Ricegrass (Reference)

The interpretive plant community for this site is the Reference Plant Community. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs, and 20% woody plants. The major grasses include needleandthread, Indian ricegrass, thickspike wheatgrass, and galleta. Other grasses include Letterman needlegrass, Sandberg bluegrass, prairie junegrass, bluebunch wheatgrass, bottlebrush squirreltail, Salina wildrye, and needleleaf sedge. Green rabbitbrush is the major woody plant. Other woody plants include Wyoming big and low sagebrush, shadscale, and winterfat. A typical plant composition for this state consists of needleandthread 15-30%, Indian ricegrass 15-30%, thickspike wheatgrass 5-15%, galleta 5-15%, other grasses and grass-like plants 10-20%, perennial forbs 5-10%, green rabbitbrush 5-10%, and 5-15% other woody species. Ground cover, by ocular estimate, varies from 10-20%. The total annual production (air-dry weight) of this state is about 350 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 450 lbs./acre in above average years. The state is stable and well

adapted to the Cool Central Desertic Plains and Plateaus climatic conditions. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Nonuse and No Fire will convert this plant community to the Low Sagebrush/Bunchgrass State. • Heavy Continuous Season-long Grazing will convert this plant community to the Rabbitbrush/Rhizomatous Wheatgrass State.

**Table 5. Annual production by plant type**

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	157	275	353
Shrub/Vine	45	78	101
Forb	22	39	50
<b>Total</b>	<b>224</b>	<b>392</b>	<b>504</b>

**Figure 5. Plant community growth curve (percent production by month). WY0401, 7-9GR, UPLAND SITES. ALL UPLAND SITES.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

## State 2 Low Sagebrush/Bunchgrass

### Community 2.1 Low Sagebrush/Bunchgrass

This plant community is the result of nonuse and lack of fire. The understory of grass includes Indian ricegrass, needleandthread, and rhizomatous wheatgrass. Low sagebrush is dominant making up 20-40% of the annual production. Green rabbitbrush will also increase, lowering herbaceous production. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 400 lbs./acre in above average years. The state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact, however forage value will decrease and wildlife values will shift toward different species. The watershed is functioning. Transitional pathways leading to other plant communities are as follows: • Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Reference Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

**Figure 6. Plant community growth curve (percent production by month). WY0401, 7-9GR, UPLAND SITES. ALL UPLAND SITES.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

## State 3 Rabbitbrush/Rhizomatous Wheatgrass

### Community 3.1 Rabbitbrush/Rhizomatous Wheatgrass

This plant community is the result of frequent and severe grazing. With sagebrush removed, it is dominated by green rabbitbrush, a sprouting shrub species. Thickspike wheatgrass and unpalatable annual and perennial forbs dominate the herbaceous understory. There is a substantial amount of bare ground. The total annual production (air-dry weight) of this state is about 150 pounds per acre, but it can range from about 50 lbs./acre in unfavorable years to about 250 lbs./acre in above average years. The soil is not protected and erosion will increase if management is not changed. The biotic integrity may be reduced due to low vegetative production and blowing sand. The watershed is functioning at risk. Transitional pathways leading to other plant communities are as follows:

• Chemical Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Reference Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

Figure 7. Plant community growth curve (percent production by month). WY0401, 7-9GR, UPLAND SITES. ALL UPLAND SITES.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

### Transition T1-2 State 1 to 2

Nonuse and No Fire will convert this plant community to the Low Sagebrush/Bunchgrass State.

### Transition T1-3 State 1 to 3

Heavy Continuous Season-long Grazing will convert this plant community to the Rabbitbrush/Rhizomatous Wheatgrass State.

### Restoration pathway R2-1 State 2 to 1

Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Reference Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

### Restoration pathway R3-1 State 3 to 1

Chemical Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Reference Plant Community (Needleandthread/Indian Ricegrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

## 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				59–118	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	59–118	–
2				59–118	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	59–118	–
3				20–59	
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	20–59	–
4				20–59	
	galleta grass	PLEUR12	<i>Pleuraphis</i>	20–59	–
5				39–78	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–20	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0–20	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–20	–

	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–20	–
	saline wildrye	LESA4	<i>Leymus salinus</i>	0–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–20	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–20	–
<b>Forb</b>					
6				20–39	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–20	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–20	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–20	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–20	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–20	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–20	–
	aster	EUCEP2	<i>Eucephalus</i>	0–20	–
	granite prickly phlox	LIPU11	<i>Linanthus pungens</i>	0–20	–
	nailwort	PARON	<i>Paronychia</i>	0–20	–
	beardtongue	PENST	<i>Penstemon</i>	0–20	–
	phacelia	PHACE	<i>Phacelia</i>	0–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–20	–
	stonecrop	SEDUM	<i>Sedum</i>	0–20	–
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0–20	–
	clover	TRIFO	<i>Trifolium</i>	0–20	–
	violet	VIOLA	<i>Viola</i>	0–20	–
<b>Shrub/Vine</b>					
7				20–39	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	20–39	–
8				20–59	
	little sagebrush	ARAR8	<i>Artemisia arbuscula</i>	0–20	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–20	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	0–20	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–20	–

## Animal community

### Animal Community – Wildlife Interpretations

Needleandthread/Indian Ricegrass Plant Community (HCPC): Suitable thermal and escape cover for most wildlife is limited due to the low height and density of woody plants. However, sagebrush, which can approach 15% protein and 40-60% digestibility, provides important winter forage for mule deer and antelope. Open and bare ridges are suitable locations for sage grouse leks. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles.

Low Sagebrush/Bunchgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community.

Rabbitbrush/Rhizomatous Wheatgrass Plant Community: These communities provide limited forage for antelope and mule deer due to low production. Generally, these are not target plant communities for wildlife habitat management.

#### Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity.

#### Plant Community Production (lb./ac) and Carrying Capacity\* (AUM/ac)

Needleandthread/Indian Ricegrass (HCPC) 200-450 lb./ac and .11 AUM/ac

Low Sagebrush/Bunchgrass 200-400 lb./ac and .09 AUM/ac

Rabbitbrush/Rhizomatous Wheatgrass 50-250 lb./ac and .04 AUM/ac

\* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

### Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration is low when soils are wet due to shallow depth to bedrock and/or impervious subsurface layer. Runoff potential for this site varies from high to moderate depending on soil depth, bedrock type (impervious vs. permeable) and ground cover (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogammic crusts are present, but only cover 1-2% of the soil surface.

### Recreational uses

This site provides hunting opportunities for upland game species.

### Wood products

No appreciable wood products are present on the site.

### Other products

None noted.

### Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations



from range trained personnel were also used. Those involved in developing this site include: Bill Christensen, Range Management Specialist, NRCS; Karen Clause, Range Management Specialist, NRCS; and Everet Bainter, Range Management Specialist, NRCS. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

## Contributors

Karen Clause

## Approval

Kirt Walstad, 9/28/2023

## 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.

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Date	03/16/2007
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Rare to nonexistent. Where present, short and widely spaced.

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

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

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground can range from 35-65%.

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5. **Number of gullies and erosion associated with gullies:** Active gullies, where present, should be rare.

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

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7. **Amount of litter movement (describe size and distance expected to travel):** Herbaceous litter expected to move only in small amounts (to leeward side of shrubs) due to wind. Large woody debris from sagebrush will show no 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):** Soil Stability Index ratings range from 1 (interspaces) to 6 (under plant canopy), but average values should be 2.5 or greater.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Typically an A-horizon of 3-6 inches (7-15 cm) with weak granular structure that is brown to light brownish gray (hues of 10YR or 2.5 Y, values of 5-6, and chromas of 2-3) in color with OM of .5 to 1%.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant community consists of 65-75% grasses, 10% forbs, and 15-25% shrubs. A sparse plant canopy (20-40%) and litter, but moderately rapid infiltration rates result in minimal to slight runoff. Basal cover is typically less than 5% for this site and does very little to effect runoff on this site. Surface rock fragments of 10-20% provide stability to the site, but reduce infiltration.
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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. A coarse, dry subsurface will often refuse a probe, causing misidentification of a compaction layer. Most soil profiles must be described by hand dug holes.
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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: Mid-size cool season bunchgrasses>> cool season rhizomatous grasses=perennial shrubs>perennial forbs>short cool season bunchgrasses
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Minimal decadence, typically associated with shrub component.
- 
14. **Average percent litter cover (%) and depth ( in):** Litter ranges from 5-20% of total canopy measurement with total litter (including beneath the plant canopy) from 10-40% expected. Herbaceous litter depth is typically very shallow, ranging from 1-5mm. Woody litter can be up to a couple inches (4-6cm).
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-**

**production):** English: 200-450 lb/ac (350 lb/ac average); Metric: 224-504 kg/ha (392 kg/ha average).

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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: Bare ground greater than 80% is the most common indicator of a threshold being crossed. Rabbitbrush, Sandberg bluegrass, and phlox are common increasers. Annual weeds such as halogeton, kochia, and Russian thistle are common invasive species in disturbed sites.
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17. **Perennial plant reproductive capability:** All species are capable of reproducing, except in drought years.
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