Ecological site R070BB006NM
Gyp Upland

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on valley floors, plains, fan piedmonts, piedmont slopes or relic lakebeds on basins. The parent material consists of mixed alluvium and or eolian deposits derived from sedimentary rock or residuum weathered from gypsum. Slopes range from 0 to 35 percent and average less than 8 percent. The soil does not meet hydric critera, the calcium carbonate equivalent with in the control section is less than 20 percent and gypsum percent greater than 40 percent. Elevations range from 2,800 to 5,000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan piedmont (2) Fan remnant (3) Basin-floor remnant
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	None to occasional
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	2,800–5,000 ft
Slope	0–35%
Aspect	Aspect is not a significant factor

Climatic features

The frost free season ranges from180 to 221 days between early April and late October. The optimum growing season of the major native warm season plants coincides with the summer rains during June, July, August, and September. However, plants can make some growth at any time during the frost free period when moisture is available and minimum daily temperatures stay above 51 degrees F.

Vegetation on this site will be limited to plants which can take advantage of moisture at the time it falls, since the soil profiles have large amounts of available water for short periods of time and then rapidly dry. The majority of precipitation comes in the form of high intensity, short duration thunderstorms. Little or no available moisture can be stored in the soil profiles of this site. Strong winds from the southwest blow during January through June which accelerate soil drying within the plant root zone and further discourage cool season plant growth or occupancy of the site.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	240 days
Precipitation total (average)	13 in

Influencing water features

This site is not influenced by water from wetlands or streams.

Soil features

Soils are shallow to moderately deep to gypsum material. Surface and subsurface textures range from loam, fine sandy loam or sandy loam. Substratum is a dense layers of soft or cemented gypsum material and gypsiferous earth at various depths. The gypsum materials commonly outcrop to the surface as inclusions of raw gypsumland which are void of vegetation and not part of the ecological site. In the lower part of the profile the semi indurated gypsum and caliche make up about 75 percent of the mass and are restrictive to root development. The plant, soil, air, water relationship is poor. The site has a droughty appearance because of the soils inability to support a dense stand of vegetation. If unprotected by plant cover or organic residue, the soil becomes easily wind blown and water eroded.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic Soils:
Holloman
Alamogordo
Aztec
Cottonwood
McCullough
Malargo
Reeves
Reflection
Yesum

Table 4. Representative soil features

Surface texture	(1) Gypsiferous fine sandy loam (2) Loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate

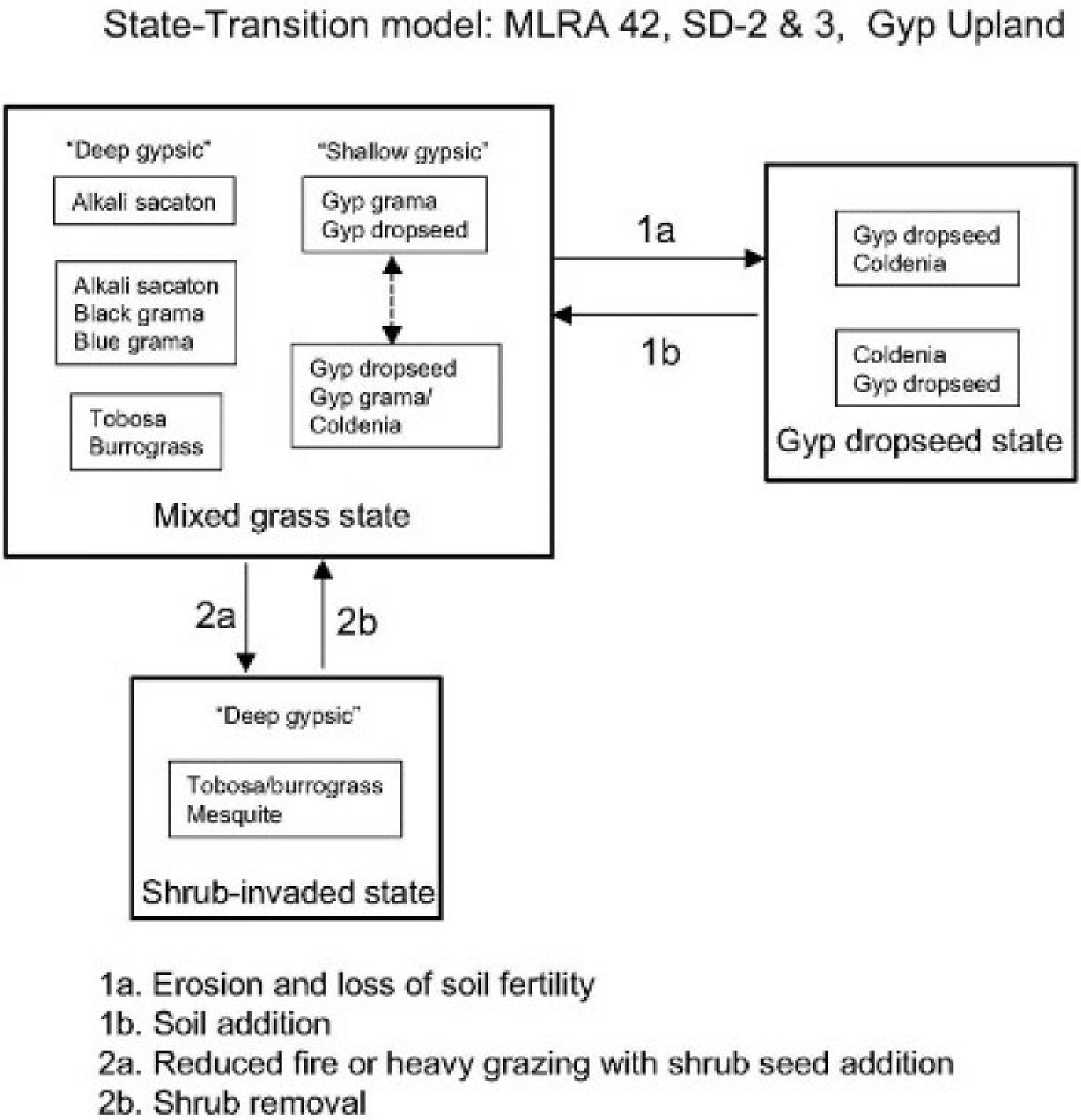
Soil depth	25–72 in
Surface fragment cover <=3"	0–3%
Surface fragment cover >3"	0–1%
Available water capacity (0-40in)	4–8 in
Calcium carbonate equivalent (0-40in)	5–30%
Electrical conductivity (0-40in)	2–16 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1
Soil reaction (1:1 water) (0-40in)	7.4–8.6
Subsurface fragment volume <=3" (Depth not specified)	0–8%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Overview

The vegetation of this site often intergrades with that of Loamy sites, depending on the amounts of gypsum, soil texture, and depths of gypsic horizons. Low-lying areas where run-in water occurs behave like draws. Areas where gypsum outcrops are exposed harbor little vegetation. Gyp Uplands may intergrade with the Salt Flats site depending on salinity levels. Thus, the vegetation of this site is very patchy, variable, and difficult to characterize. The historic plant community types that are likely to be associated with the gyp uplands site include 1) an alkali sacaton (*Sporobolus airoides*) and black grama (*Bouteloua eriopoda*) or blue grama (*B. gracilis*)-dominated community associated with soils having relatively deep (> 10 “) gypsic horizons and 2) a gyp grama (*Bouteloua breviseta*) and gyp dropseed (*Sporobolus nealleyi*)-dominated community on soils with shallow (< 10”) gypsic horizons. Tobosa (*Pleuraphis mutica*), burrograss (*Scleropogon brevifolius*), and/or saltbush (*Atriplex canescens*) may also dominate depending on texture, land-use history, or other features. The subshrub Coldenia (Coldenia spp) increasingly dominates sites with very shallow gypsic horizons as grasses decline. Gyp upland sites are susceptible to erosion when vegetation cover is reduced due to drought and overgrazing. Mesquite (*Prosopis glandulosa*) may invade soils with deeper gypsic horizons within the site that are dominated by tobosa or burrograss. Erosion of A horizons bring gypsic horizons closer to the surface and can shift community composition to dominance by gyp dropseed, coldenia, and bare soil.

State and transition model



State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

This site has a grassland aspect with patches of bare or lichen covered soil surface exposed between patches of vegetation. The potential plant community is dominated by alkali sacaton, short and mid grass perennials and forbs, with half shrubs and shrubs sparsely and evenly distributed. Mixed grassland State: Alkali sacaton, black grama, and blue grama (only in SD-3) dominate soils that have relatively deep gypsic horizons that are deeper than 10" (e.g. Reeves series). Saltbush may be an abundant shrub. Alkali sacaton cover may be continuous in run-in settings surrounded by sparsely vegetated areas (alkali sacaton community). On fine-silty or fine loamy calcareous gypsid soils (e.g. Milner or Reeves series), tobosa or burrograss may be dominant. Dominance by burrograss or tobosa might represent grazing-induced retrogression from an alkali sacaton-grama community type on these soils, but this has not been confirmed. In some cases, saltbush may be extremely dominant, (e.g. Malargo series) but it is not clear why. Gyp grama, black grama, and gyp dropseed dominate soils with shallow gypsic horizons and gyp dropseed, mormon tea (Ephedra spp.), and coldenia tend to dominate where the gypsic horizon is shallowest (< 3”). These communities exhibit low production, perhaps due to the comparatively shallow infiltration in gypsic soil and other chemical properties (Campbell and Campbell 1938). Outcrops of gypsum, often revealing a whitish floury mass at the surface, may be devoid of vegetation. Heavy grazing may reduce grama grasses and increase the dominance of gyp dropseed and coldenia, but it is important to recognize that these plants may dominate some patches without heavy grazing. Soil degradation due to surface compaction and reduced infiltration may be important on this site and result in reduced grass cover. Slight variations in the depth to the gypsic horizon, whether human induced or not, exert a powerful control on plant community composition. Where gypsic horizons are deep, soil texture or soil chemistry may govern composition. Diagnosis: Soils with deeper gypsic horizons should have continuous grass cover with a high representation of alkali sacaton and black grama. Shallower soils should have gyp grama and black grama but gyp outcrops will be dominated by gyp dropseeds or coldenia. Depending upon the depths to a gypsic horizon, large (< 1 m) bare patches may be common but they should not be common where the depth to gypsic horizon is greater than 5”. This site has a grassland aspect with patches of bare or lichen covered soil surface exposed between patches of vegetation. The potential plant community is dominated by alkali sacaton, short and mid grass perennials and forbs, with half shrubs and shrubs sparsely and evenly distributed.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	300	470	640
Forb	45	71	96
Shrub/Vine	30	47	64
Total	**375**	**588**	**800**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	25%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	16%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	57%

Figure 5. Plant community growth curve (percent production by month). NM2806, R042XC006NM Gyp Upland HCPC. R042XC006NM Gyp Upland HCPC Warm Season Plant Community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	10	25	30	15	5	0	0

State 2
Transition to gyp dropseed

Community 2.1
Transition to gyp dropseed

Transition to gyp dropseed state (1a): Reduced grass cover caused by poor grazing management and/or drought may result in erosion of surface horizons. As the depth to the gypsic horizon decreases, plant communities will become increasingly dominated by gyp dropseed and/or coldenia. Mechanical disturbance of the soil surface and soil degradation may contribute to this effect. Key indicators of approach to transition: Increased bare ground, pedestalling, water flow patterns, blowouts, and eventually the loss of the A horizon.

State 3
Transition to shrub-invaded state

Community 3.1
Transition to shrub-invaded state

Transition to shrub-invaded state (2a): Reduced grass cover in deep gypsic soils may result in mesquite invasion. Key indicators of approach to transition: Increasing bare ground, presence of mesquite seedlings. Shrub-invaded: On deep gypsic soils and soils with less strong gypsic horizons (i.e. have a lower percentage of gypsum) within this site, mesquite may invade and cause some reduction in grass cover due to competition with grasses. These communities are dominated by tobosa or burrograss. Saltbush may also be an important component. It is not known if shrub presence and resulting erosion may result in the loss of dominant perennial grasses across broad areas on gypsic soils. As soil characteristics grade toward those of the loamy ecological site, widespread grass loss may be increasingly probable. Diagnosis: Moderate densities of mesquite, bare ground patches associated with mesquite patches.

State 4
Transition to mixed grassland (2b)

Community 4.1
Transition to mixed grassland (2b)

Transition to mixed grassland (2b): Shrub removal may result in the eventual recovery of perennial grasses. Gyp dropseed: These communities are dominated by gyp dropseed or coldenia, and often exhibit high amounts of bare ground and exposed gypsum at the surface. Gyp grama, black grama, and alkali sacaton may persist in small patches, especially in low-lying spots receiving run-in water and/or in which soils are protected from erosion. The frequency with which these community types represent degradation from mixed grassland due to poor management versus "natural" is unknown. The conditions under which gyp dropseed and coldenia dominate are unknown. Diagnosis: Dominance by gyp dropseed or coldenia, high amounts of bare ground, sometimes associated with a high cover of microbiotic crusts.

State 5
Transition to mixed grassland (1b)

Community 5.1
Transition to mixed grassland (1b)

Transition to mixed grassland (1b): Restoration or recovery of a non-gypsic A horizon would be required. Information sources and theoretical background: Communities, states, and transitions are based upon information in the ecological site description and observations by Brandon Bestelmeyer, Jornada Experimental Range and David Trujillo, NRCS. Information on the the role of gypsum in concert with soil chemical features in determining plant composition is sorely needed.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)

Grass/Grasslike					
1	**Warm Season**			266–323	
	alkali sacaton	SPAI	*Sporobolus airoides*	266–323	–
2	**Warm Season**			29–88	
	black grama	BOER4	*Bouteloua eriopoda*	29–88	–
3	**Warm Season**			6–59	
	gypsum grama	BOBR	*Bouteloua breviseta*	6–59	–
4	**Warm Season**			18–88	
	bush muhly	MUPO2	*Muhlenbergia porteri*	18–88	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	18–88	–
5	**Warm Season**			6–18	
	gyp dropseed	SPNE	*Sporobolus nealleyi*	6–18	–
6	**Warm Season**			6–18	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	6–18	–
7	**Warm Season**			6–18	
	blue grama	BOGR2	*Bouteloua gracilis*	6–18	–
8	**Warm Season**			18–88	
	threeawn	ARIST	*Aristida*	18–88	–
	low woollygrass	DAPU7	*Dasyochloa pulchella*	18–88	–
	ear muhly	MUAR	*Muhlenbergia arenacea*	18–88	–
Shrub/Vine					
9	**Shrub**			18–41	
	fourwing saltbush	ATCA2	*Atriplex canescens*	18–41	–
	jointfir	EPHED	*Ephedra*	18–41	–
	littleleaf sumac	RHMI3	*Rhus microphylla*	18–41	–
10	**Shrub**			6–18	
	javelina bush	COER5	*Condalia ericoides*	6–18	–
	knifeleaf condalia	COSP3	*Condalia spathulata*	6–18	–
	crown of thorns	KOSP	*Koeberlinia spinosa*	6–18	–
11	**Cactus**			6–18	
	pricklypear	OPUNT	*Opuntia*	6–18	–
	yucca	YUCCA	*Yucca*	6–18	–
Forb					
12	**Forb**			29–59	
	woody crinklemat	TICAC	*Tiquilia canescens var. canescens*	29–59	–
13	**Forb**			6–88	
	Forb, annual	2FA	*Forb, annual*	6–88	–
	trailing windmills	ALIN	*Allionia incarnata*	6–88	–
	daisy	CHRYS2	*Chrysanthemum*	6–88	–
	golden tickseed	COTI3	*Coreopsis tinctoria*	6–88	–
	leatherweed	CRPOP	*Croton pottsii var. pottsii*	6–88	–
	Seven River Hills buckwheat	ERGY	*Eriogonum gypsophilum*	6–88	–

	blazingstar	MENTZ	*Mentzelia*	6–88	–
	fiddleleaf	NAMA4	*Nama*	6–88	–
	whitest evening primrose	OEAL	*Oenothera albicaulis*	6–88	–
	beardtongue	PENST	*Penstemon*	6–88	–
	Texan phacelia	PHINT	*Phacelia integrifolia var. texana*	6–88	–
	white milkwort	POAL4	*Polygala alba*	6–88	–
	desert unicorn-plant	PRAL4	*Proboscidea althaeifolia*	6–88	–
	whitestem paperflower	PSCO2	*Psilostrophe cooperi*	6–88	–
	threadleaf ragwort	SEFLF	*Senecio flaccidus var. flaccidus*	6–88	–
	Hopi tea greenthread	THME	*Thelesperma megapotamicum*	6–88	–

Animal community

This site provides habitats which support a resident animal community that is characterized by coyote, hooded skunk, desert cottontail, whitethroated woodrat, sparrow hawk, cactus wern, scaled quail, logggerhead shrike, mourning dove, and a number of ground nesting birds including, varied bunting, grasshopper sparrow, and Baird's sparrow Texas horned lizard, lesser earless lizard, and western diamondback rattlesnake.

Fourwing saltbush, littleleaf sumac, spiny allthorn, common javilinabush, and knifeleaf condalia provide protective cover for scaled quail. Seed, green herbage and fruit from a variety of grasses, forbs and shrubs provide food for a number of birds and mamals, including scaled and Gambel’s quail, mourning dove and prairie dogs. The fruit of tesajo cactus is relished by quail.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series Hydrologic Group
Cottonwood C
Holloman C
Yesum B
Alamogordo B
Aztec C
Malargo B
Reeves C
Reflection B

Recreational uses

This site offers recreation potential for hiking, horseback riding, rock, gem, and mineral collecting, nature observation and photography, and quail, dove, and predator hunting.
During years of abundant moisture, a colorful array of wildflowers can be observed from spring through fall.

Wood products

This site provides little or no wood products other than curiosities and small furniture which can be made from the roots and stems of mesquite where it has invaded the site. The woody pods of devils claw are also used in curiosities.

Other products

This site is suitable for grazing during all seasons of the year. Care must be taken to leave enough vegetation cover for soil protection during windy and rainy periods or severe soil erosion will result. About 300 pounds per acre of total vegetation and litter is minimal for soil protection. This site is best suited and most efficiently utilized by cattle. It can also be utilized by small numbers of goats and sheep in combination with cattle where control or protection from predators can be provided. Grazing management that results in a mosaic of use patterns provides diversity for wildlife.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index Ac/AUM
100 - 76 5.5 – 8.0
75 – 51 7.5 – 11.0
50 – 26 11.0 – 15.0
25 – 0 25.0 +

Type locality

Location 1: Eddy County, NM	
Township/Range/Section	T26S R24E S27

Other references

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)	
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:**

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:

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

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):**

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:**

17. **Perennial plant reproductive capability:**