Ecological site R036XB010NM
Salty Bottomland

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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.

MLRA notes

Major Land Resource Area (MLRA): 036X–Southwestern Plateaus, Mesas, and Foothills

R036XB010NM – Salty Bottomland is an ecological site that is found on floodplains, drainageways, alluvial fan, stream terraces, valley floors, and arroyos in MLRA 36 (Southwestern Plateaus Mesas and Foothills). The southern portion MLRA 36 is illustrated yellow color on the map where this site occurs. The site concept was established in the Southwestern Plateaus. Mesas, and Foothills – Warm Semiarid Mesas and Plateaus LRU (Land Resource Area). This LRU has 10 to 16 inches of precipitation and has a mesic temperature regime. Lower part of MLRA 36 is dominated by summer precipitation for monsoons, unlike the upper part of MLRA 36 which is almost an equal split.

Classification relationships

NRCS & BLM: Major Land Resource Area 36, Southwestern Plateaus Mesas and Foothills (United States Department of Agriculture, Natural Resources Conservation Service, 2006). USFS: 313Bd Chaco Basin High Desert Shrubland and 313Be San Juan Basin North subsections 313B Navaho Canyonlands Section 313 Colorado Plateau Semi-Desert (Cleland, et al., 2007). 315Ha Central Rio Grande Intermontane, and 315Hb North Central Rio Grande Intermontane subsections 315H Central Rio Grande Intermontane Section 315 Southwest Plateau and Plains Dry Steppe and Shrub (Cleland, et al., 2007). 315Ad Chupadera High Plains Grassland subsections 315A Pecos Valley Section 315 Southwest Plateau and Plains Dry Steppe and Shrub (Cleland, et al., 2007). 331Jb San Luis Hills and 331Jd Southern San Luis Grasslands subsections 331J Northern Rio Grande Basin Section 331 Great Plains- Palouse Dry Steppe (Cleland, et al., 2007). M313Bd Manzano Mountains Woodland subsection Sacramento-Monzano Mountains Section M313 Arizona-New Mexico Mountains Semi-Desert - Open Woodland - Coniferous Forest - Alpine Meadow M331Fg Sangre de Cristo Mountains Woodland and M331Fh Sangre de Cristo Mountains Coniferous Forest subsection M331F Southern Parks and Rocky Mountain Range Section M331 Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow M331Gk Brazos Uplift and M331Gm Jemez and San Pedro Mountains Coniferous Forest subsections M331G South Central Highlands Section M331 Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow EPA: 21d Foothill Shrublands and 21f Sedimentary Mid-Elevation Forests 21 Southern Rockies 6.2 Western Cordillera 6 Northwestern Forested Mountains (Griffith, 2006). 20c Semiarid Benchlands and Canyonlands 20 Colorado Plateaus 10.1 Cold Deserts 10 North American Deserts (Griffith, 2006). 22m Albuquerque Basin, 22i San Juan/Chaco Tablelands and Mesas, 22h North Central New Mexico Valleys and Mesas, 22f Taos Plateau, and 22g Rio Grande Floodplain, 22 Arizona/New Mexico Plateau 10.1 Cold Deserts 10 North American Deserts (Griffith, 2006). USGS: Colorado Plateau Province (Navajo and Datil Section) Southern Rocky Mountains Basin and Range (Mexican Highland and Sacramento Section)

Ecological site concept

The 36XB ecological site was drafted from the existing R036XB010NM – Salty Bottomland range site MLRA 36XB (NRCS, 2003). This site occurs floodplains, drainageways, alluvial fan, stream terraces, valley floors, and arroyos. They are affected by sodium. The surface layers range from clay loam, silty clay loam, loam, clay, silt loam, and sandy loam. Surface texture range in clay percent from 15 to 45% clay. The subsoil is usually a clay, silty clay loam or clay loam. The clay percentage at 20 inches in depth ranges from 30 to 50%. The parent material consists of recent alluvium; alluvium derived from sandstone and shale; stream alluvium derived from sandstone and shale; fan and stream alluvium derived from sandstone and shale; and/or stream alluvium derived from gypsum. It has an aridic ustic/ustic arid moisture regime and mesic temperature regime. The effective precipitation ranges from 10 to 16 inches.

Associated sites

F036XA005NM	**Riverine Riparian** Site has a water table at 12-36” Landforms are V-shaped valleys, U-shaped valleys and Overflow Stream (channel).
F036XA001NM	**Pinyon Upland** Pinyon Upland (south of Gallup 13-16) - Slope 1-35%; Soils are very shallow to shallow and non-skeletal; soil surface is loam, channery loam or clay loam. Landforms are broad mesas, cuestas, and hills interspersed with numerous deep canyons and dry washes.
F036XB133NM	**Pinyon-Utah juniper/skunkbush sumac** Pinyon-Juniper/Skunkbush Sumac - Slopes are 1-65%; Soils are moderately deep to deep and skeletal and non-skeletal. Surface texture of gravelly to very gravelly sandy loam, very gravelly loam, loam, para-gravelly-ashy loamy coarse sand, and extremely cobbly coarse sandy loam with a sandy subsoil. Landform is mesas, hills, fan piedmonts, valley sides, plateaus, mountain slopes, structural benches, breaks and ridges.
R036XB002NM	**Clayey** Clayey - Slopes are 0-15%; Soils are moderately deep to deep; soil surface loam, clay loam, silty clay loam, and silty clay over clayey subsoil with textures of clay loam, clay to silty clay loam or silty clay. Landforms are stream terraces, valley floors, fan remnants, alluvial fans, dipslopes on cuestas, mesas, hills, and valley floors.
R036XB006NM	**Loamy** Loamy - Slopes are 1-15%; Soils are moderately deep to deep; soil surface range from loam, gravelly loam, loamy fine sand, fine sandy loam, sandy loam, silt loam and clay loam. Subsoil is loamy and range from loam to clay loam. Landforms are mesas, plateaus, fan remnant, terraces, dipslopes on cuestas, and broad upland valley sides.
R036XB008NM	**Meadow** Meadow - Water table 28-72” in depth; slopes 1-5%; soils are deep, Surface textures are silty clay loam, and clay loam with a subsoil of stratified loams, silt loams, silty clay loams, clay loams, very gravelly sand and gravelly sand. Landform is nearly level to gently sloping floodplains.
R036XB009NM	**Salt Meadow** Water table 36-72” in depth; slopes are 1-5%; soils are deep, Surface textures are loam, fine sandy loam, clay loam, silty clay loam with a subsoil of clay or clay loam. Landform is nearly level to gently sloping floodplains. This site is dependent on sub-irrigation and overflow for its moist condition. This site is affected by sodium.
R036XB010NM	**Salty Bottomland** Water table 42-72” in depth; soils are deep, high in sodium, soils are gravelly to skeletal (15-35% rock fragments). Surface textures are loam, fine sandy loam, clay loam and silty clay loam with a subsoil of clay or clay loam. Landform is floodplain.

R036XB011NM	**Sandy** Sandy - Slopes are 1-15%; soils are deep to very deep; Surface textures are loamy sand, gravelly loamy sand, loamy fine sand, fine sandy loam and sandy loam with sandy subsoil. Landforms are nearly level to gently sloping landscapes on dunes, fan remnant and alluvial fans.
R036XB017NM	**Swale** This site is enhanced by runoff during periods of high runoff (intermittent). The water table depth is greater than 6 ft. Soils are deep to very deep soils that have surface textures of loams, silt loams to clays with loamy subsoil. Landforms are broad valley bottoms, floodplains, and in depressions.

Similar sites

R036XB009NM	**Salt Meadow** Water table 36-72” in depth; slopes are 1-5%; soils are deep, Surface textures are loam, fine sandy loam, clay loam, silty clay loam with a subsoil of clay or clay loam. Landform is nearly level to gently sloping floodplains. This site is dependent on sub-irrigation and overflow for its moist condition. This site is affected by sodium.
R036XB008NM	**Meadow** Meadow - Water table 28-72” in depth; slopes 1-5%; soils are deep, Surface textures are silty clay loam, and clay loam with a subsoil of stratified loams, silt loams, silty clay loams, clay loams, very gravelly sand and gravelly sand. Landform is nearly level to gently sloping floodplains.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Sarcobatus vermiculatus* (2) *Atriplex confertifolia*
Herbaceous	(1) *Sporobolus airoides* (2) *Achnatherum hymenoides*

Physiographic features

This alluvial floodplain site receives additional moisture from adjacent uplands. Landforms this site is found on include: floodplains, drainageways, alluvial fan, stream terraces, valley floors, and arroyos. It is dissected by shallow rivulets, which will develop into deep, vertical-walled gullies when the vegetation has deteriorated. Slopes range from 1 to 8 percent. Elevation ranges from 5,700 to 7,200 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Drainageway (3) Alluvial fan

Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	1,740 – 2,200 m
Slope	0 – 10 %
Water table depth	110 – 180 cm
Aspect	Aspect is not a significant factor

Climatic features

This site has a semi-arid continental climate. There are distinct seasonal temperature variations. Mean annual precipitation varies from 10 to 16 inches. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. Wide yearly and seasonal fluctuations are common for this climatic zone which can range from 5 to 25 inches. Of this, approximately 25-35% falls as snow, and 65-75% falls as rain between April 1 and November 1. The growing season is April through September. As much as half or more of the annual precipitation can be expected to come during the period of July through September. August is typically the wettest month of the year. The driest period is usually from November to April; and February is normally the driest month. During July, August, and September, 4 to 6 inches of precipitation influence the presence and production of warm-season plants. Fall and spring moisture is conducive to the growth of cool-season herbaceous plants and maximum shrub growth. Growth usually begins in March and ends with plant maturity and seed dissemination when the moisture deficiency and warmer temperatures occur in early June. There is also a period of growth in the fall. Summer precipitation is characterized by brief thunderstorms, normally occurring in the afternoon and evening. Winter moisture usually occurs as snow, which seldom lies on the ground for more than a few days. The average annual total snowfall is 29.1 inches. The snow depth usually ranges from 0 to 1 inches during the winter months. The highest snowfall record is 57.1 inches during the 1993-1994 winter. The frost- free period typically ranges from 110 to 145 days and the freeze free period is from 140 to 170 days. The last spring freeze is the middle of April to the first week of May. The first fall freeze is the middle of October to the first week of November. Mean daily annual air temperature is about 29ºF to 69ºF, averaging about 37ºF for the winter and 67ºF in the summer. The coldest winter temperature recorded was -20ºF on January 6, 1971 and the warmest winter temperature recorded was 70ºF on February 28, 1965. The coldest summer temperature recorded was 26ºF on June 1, 1980. The hottest day on record is 100ºF on July 9, 2003 and June 21, 1968. Data taken from Western Regional Climate Center (2017) for El Rito, New Mexico Climate Station.

Table 3 Representative climatic features

Frost-free period (average)	130 days
Freeze-free period (average)	150 days
Precipitation total (average)	330 mm

- (1) ABIQUIU DAM [USC00290041], Gallina, NM
- (2) LYBROOK [USC00295290], Dulce, NM

- (3) COCHITI DAM [USC00291982], Pena Blanca, NM
- (4) EL RITO [USC00292820], El Rito, NM
- (5) CUBA [USC00292241], Cuba, NM
- (6) NAVAJO DAM [USC00296061], Navajo Dam, NM
- (7) SANTA FE 2 [USC00298085], Santa Fe, NM

Influencing water features

This site may be influenced by water from a wetland or stream.

Soil features

The soils generally are deep and well drained. They are affected by sodium. The surface layers range from clay loam, silty clay loam, loam, clay, silt loam, and sandy loam. Surface texture range in clay percent from 15 to 45% clay. The subsoil is usually a clay, silty clay loam or clay loam. The clay percentage at 20 inches in depth ranges from 30 to 50%. The parent material consists of recent alluvium; alluvium derived from sandstone and shale; stream alluvium derived from sandstone and shale; fan and stream alluvium derived from sandstone and shale; and/or stream alluvium derived from gypsum. Water intake rate is slow to very slow. Plant roots may be restricted by the sodium content of the soil.

This site is found in NM606, NM656, NM650, NM678, NM698, NM672, and NM692 soil surveys. This ecological site has been correlated to the following soils with the listed particle control sections:

Fine-Loamy:

Breadsprings, San Mateo, Werlog

Fine-Silty:

Billings
Fine:
Alkali Alluvial Land, Cementlake, Christianburg, Conchovar, Galisteo, Gobernador, Heshotauthla, Nahodish. Navajo, Rehobeth, Sparank, Sparham

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale (2) Alluvium – rock gypsum
Surface texture	(1) Silt loam (2) Silty clay loam (3) Clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	150 – 0 cm
Surface fragment cover <=3"	Not specified

Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	7.87 – 18.8 cm
Electrical conductivity (0-101.6cm)	0 – 20 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0 – 50
Soil reaction (1:1 water) (0-101.6cm)	7.3 – 9.6
Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

MLRA 36 occurs on the higher elevation portion of the Colorado Plateau. The Colorado Plateau is a physiographic province which exists throughout eastern Utah, western Colorado, western New Mexico and northern Arizona. It is characterized by uplifted plateaus, canyons and eroded features. The Colorado Plateau lies south of the Uintah Mountains, north of the Mogollon transition area, west of the Rocky Mountains, and east of the central Utah highlands. The higher elevation portion of the Colorado Plateau which is represented by MLRA 36 is characterize by broken topography, and lack of perennial water sources. This area has a long history of past prehistoric human use for years. MLRA 36 shows archaeological evidence indicating that pinyon-juniper woodlands where modified by prehistoric humans and not pristine and thus where altered at the time of European settlement (Cartledge & Propper, 1993). This area also included natural influences of herbivory, fire, and climate. This area rarely served as habitat for large herds of native herbivores or large frequent historic fires due to the broken topography. This site is extremely variable and plant community composition will vary with the water fluctuations on this site.

The lower part MLRA 36 developed under climatic conditions that include hot, dry summers with summer rains showers and little to no snow with the mild winter temperatures. This area has climatic fluctuations and prolonged droughts are common occurrences. Between an above average year and a drought year. Forbs are the most dynamic component of this community and can vary up to 4 fold (Passey et.al. 1982). The precipitation and climate of MLRA 36 are conducive to producing Pinyon/juniper, and sagebrush complexes with high productive sites in the bottoms of the canyons. Predominant species on the Colorado Plateau are Wyoming big sagebrush (Artemisia tridentata var. wyomingensis), mountain big sagebrush (A. tridentata var. vaseyana), and black sagebrush (A. nova), basin big sagebrush (A. tridentata var. tridentata), Utah juniper (Juniperus utahensis), one-seed juniper (Juniperus monosperma), and two-needle pinyon (Pinus edulis). One-seed juniper has the capability to discontinue active growth when moisture is limited but can resume growth when moisture availability improves. This growth pattern may represent an important adaptation allowing them to survive on very arid sites. It is possible that small trees may be killed by drought; mature one-seed junipers are resilient to drought, especially in comparison to two-needle pinyon (Johnsen, 1962).

Salt meadows and bottom are areas where it floods frequently or has a shallow water table with some wetland properties, but it is not classified as a riparian community. As wettest of species that occur on this site would be classified as facultative species. These usually small scale on the landscape. This site is important part of the landscape as it often serves as habitat for plants, birds and other wildlife.

Two studies were found on saline meadow dynamics. The first one, Brotherson (1987) studied species in a saline meadow adjacent to the Utah Lake in Utah and found 5 vegetation zones all with saltgrass present. He found that the species distribution was a mixed of competition, soil moisture, soil chemistry and texture, soil minerals and soil moisture. Salts were found to be leached during high water times and that the salts “wicked” up during drier time from the deeper soils. Depression areas had increase in soil moisture and consequently decreased salinity. Annuals and introduced species were found on the ridges/mounds with higher salinity and higher pH occurred. The second study showed that succession following lowered water tables caused by groundwater pumping in the Owens Valley of California found alkali meadow (dominated by alkali sacaton and saltgrass) was followed by rubber rabbitbrush-meadow. Therefore, rabbitbrush became more prevalent on the site when the water table dropped. (Johnson, 2000, Hauser, 2006, Elmore et al 2006)

Records of fire with alkali sacaton and saltgrass present are rare. The communities listed do not include salt meadows for fire regimes. In general, marshes, grasslands and dry meadow sites have a fire frequency of 1 to 10 years while desert grasslands and greasewood sites have a fire return interval of 35 to 100 years (Johnson, 2000, Hauser, 2006). Another source, has greasewood-saltgrass communities with a fire return interval is

State and transition model

Figure 5. STM

Figure 6. Legend

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				353-412	
	alkali sacaton	SPAI	*Sporobolus airoides*	353-412	–
2				59-118	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	59-118	–
3				235-295	
	western wheatgrass	PASM	*Pascopyrum smithii*	235-295	–
4				118-177	
	squirreltail	ELEL5	*Elymus elymoides*	118-177	–
5				118-177	
	James' galleta	PLJA	*Pleuraphis jamesii*	118-177	–
6				59-118	
	blue grama	BOGR2	*Bouteloua gracilis*	59-118	–
7				59-118	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	59-118	–
	saltgrass	DISP	*Distichlis spicata*	59-118	–
	mat muhly	MURI	*Muhlenbergia richardsonis*	59-118	–
Forb					
8				36-59	
	iodinebush	ALOC2	*Allenrolfea occidentalis*	36-59	–
	goldenweed	PYRRO	*Pyrrocoma*	36-59	–
9				36-59	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	36-59	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	36-59	–
	ragwort	SENEC	*Senecio*	36-59	–
Shrub/Vine					
10				36-59	
	greasewood	SAVE4	*Sarcobatus vermiculatus*	36-59	–

11				36-59	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	36-59	–
12				36-59	
	big sagebrush	ARTR2	*Artemisia tridentata*	36-59	–
13				59-118	
	fourwing saltbush	ATCA2	*Atriplex canescens*	59-118	–
14				36-59	
	winterfat	KRLA2	*Krascheninnikovia lanata*	36-59	–
15				12-36	
	Shrub, deciduous	2SD	*Shrub, deciduous*	12-36	–
	bud sagebrush	PIDE4	*Picrothamnus desertorum*	12-36	–

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Table 8. Community 2.1 plant community composition

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

Table 9. Community 3.1 plant community composition

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

Animal community

Habitat for Wildlife: This site provides habitats which support a resident animal community that is characterized by mule deer, coyote, desert cottontail, plains pocket mouse, deer mouse, Botta's pocket gopher, scaled quail, house finch, short-horned lizard, striped whiptail, and Western spadefoot toad.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups. Hydrologic Interpretations Soil Series----------Hydrologic Group Billings----------B Breadsprings----------C Cementlake----------D Christianburg----------D Conchovar----------C Gobernador----------D Heshotauthla----------D Nahodish----------D Navajo----------D Ravola----------D Rehobeth----------D San Mateo----------B Sparank----------D Sparham----------D Venadito----------D Werlog----------C

Recreational uses

These sites have very low potential for outdoor recreation.

Wood products

This site has no significant potential for wood production.

Other products

Grazing: This site is well suited for grazing use during all seasons of the year by both small and large animals. Periodic rest from grazing use by domestic livestock during the growing season is necessary to maintain a balanced, healthy plant community.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month Similarity Index----------Ac/AUM 100 - 76----------2.0 – 3.0 75 – 51----------2.9 – 5.9 50 – 26----------5.8 – 11.0 25 – 0----------11.0+

Type locality

Location 1: Sandoval County, NM
Location 2: Rio Arriba County, NM
Location 3: San Juan County, NM

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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	09/25/2026
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):**

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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:

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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:**
