USDA Natural Resources Conservation Service

Ecological site R030XB049CA
Lake Terrace

Last updated: 2/24/2025
Accessed: 05/12/2025

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.

MLRA notes

Major Land Resource Area (MLRA): 030X–Mojave Basin and Range

The Mojave Desert Major Land Resource Area (MLRA 30) is found in southern California, southern Nevada, the extreme southwest corner of Utah and northwestern Arizona within the Basin and Range Province of the Intermontane Plateaus. The Mojave Desert is a transitional area between hot deserts and cold deserts where close proximity of these desert types exert enough influence on each other to distinguish these desert types from the hot and cold deserts beyond the Mojave. Kottek et. al 2006 defines hot deserts as areas where mean annual air temperatures are above 64 F (18 C) and cold deserts as areas where mean annual air temperatures are below 64 F (18 C). Steep elevation gradients within the Mojave create islands of low elevation hot desert areas surrounded by islands of high elevation cold desert areas.

The Mojave Desert receives less than 10 inches of mean annual precipitation. Mojave Desert low elevation areas are often hyper-arid while high elevation cold deserts are often semi-arid with the majority of the Mojave being an arid climate. Hyper-arid areas receive less than 4 inches of mean annual precipitation and semi-arid areas receive more than 8 inches of precipitation (Salem 1989). The western Mojave receives very little precipitation during the summer months while the eastern Mojave experiences some summer monsoonal activity.

In summary, the Mojave is a land of extremes. Elevation gradients contribute to extremely hot and dry summers and cold moist winters where temperature highs and lows can fluctuate greatly between day and night, from day to day and from winter to summer. Precipitation falls more consistently at higher elevations while lower elevations can experience long intervals without any precipitation. Lower elevations also experience a low frequency of precipitation events so that the majority of annual precipitation may come in only a couple precipitation events during the whole year. Hot desert areas influence cold desert areas by increasing the extreme highs and shortening the length of below freezing events. Cold desert areas influence hot desert areas by increasing the extreme lows and increasing the length of below freezing events. Average precipitation and temperature values contribute little understanding to the extremes which govern wildland plant communities across the Mojave.

Arid Eastern Mojave Land Resource Unit (XB)

LRU notes

The Mojave Desert is currently divided into 4 Land Resource Units (LRUs). This ecological site is within the Arid Eastern Mojave LRU where precipitation is bi-modal, occurring during the winter months and summer months. The Arid Eastern Mojave LRU is designated by the 'XB' symbol within the ecological site ID. This LRU is found across the eastern half of California, much of the mid-elevations of Nevada, the southernmost portions of western Utah, and the mid-elevations of northwestern Arizona. This LRU is essentially equivalent to the Eastern Mojave Basins and Eastern Mojave Low Ranges and Arid Footslopes of EPA Level IV Ecoregions

Elevations range from 1650 to 4000 feet and precipitation is between 4 to 8 inches per year. This LRU is

distinguished from the Arid Western Mojave (XA) by the summer precipitation, falling between July and September, which tends to support more warm season plant species. The 'XB' LRU is generally east of the Mojave River and the 117 W meridian (Hereford et. al 2004). Vegetation includes creosote bush, burrobush, Nevada jointfir, ratany, Mojave yucca, Joshua tree, cacti, big galleta grass and several other warm season grasses. At the upper portions of the LRU, plant production and diversity are greater and blackbrush is a common dominant shrub.

Ecological site concept

This site is found on upper lake terraces below 3600 feet. Headwaters within these watersheds are above 3600 feet and capture enough precipitation to produce a water table within 30 feet of the soil surface at this ecological site. Soils at this site do not have aquic conditions.

This is a group concept and provisional STM that also covers R030XY049NV, R030XA060NV, R030XY048NV.

Associated sites

R030XB005NV	**Arid Active Alluvial Fans**

Similar sites

R030XY049NV	**BREAKS 3-7 P.Z.** Same ecological site.
R030XY045NV	**DUNES 3-7 P.Z.** More productive site; SPAI & ATCA2 major plants.
R030XB006NV	**LOAMY 5-7 P.Z.** More productive site ARSP5 major shrub; mesquite absent.
R030XB125NV	**CHANNERY HILL 3-5 P.Z.** More productive site; mesquite absent.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex confertifolia* (2) *Ambrosia dumosa*
Herbaceous	(1) *Pleuraphis rigida*

Physiographic features

This site occurs on fan remnants, pediment remnants, off-shore bars and beach terraces. Slopes range from 2 to 8 percent. Elevations are 2690 to 3020 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Pediment (3) Lake terrace
Elevation	820–920 m
Slope	2–8%

Climatic features

The climate of the Mojave Desert has extreme fluctuations of daily temperatures, strong seasonal winds, and clear skies. The climate is arid and is characterized with cool, moist winters and hot, dry summers. Most of the rainfall falls between November and April. Summer convection storms from July to September may contribute up to 25 percent of the annual precipitation. Average annual precipitation is 3 to 7 inches. Mean annual air temperature is 55 to 76 degrees F. The average growing season is about 140 to 330 days.

Table 3. Representative climatic features

Frost-free period (average)	330 days
Freeze-free period (average)	
Precipitation total (average)	178 mm

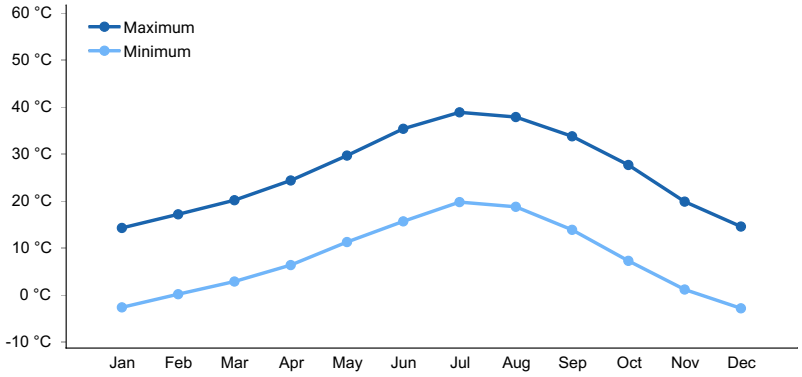


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils in this site are very deep and well drained. They are moderately to strongly alkaline throughout. Textures are fine sandy loam on the surface grading to silt loams or silty clay loams in the subsoil. Available water capacity is moderate and runoff is medium. Potential for sheet and rill erosion is high. The soil series associated with this site include Tanazza

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Silt loam (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow
Soil depth	183–213 cm
Surface fragment cover <=3"	9–30%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.49–15.75 cm
Calcium carbonate equivalent (0-101.6cm)	5–80%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.9–9

Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

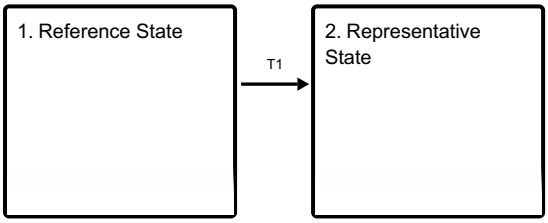
Ecological dynamics

As ecological condition deteriorates, perennial grasses decrease while creosotebush, wolfberry, and white bursage increase. Where the water table is close to the surface and mesquite and alkali sacaton are present, mesquite will increase while alkali sacaton decreases with abusive livestock management. Species likely to invade this site are exotic annual forbs and grasses.

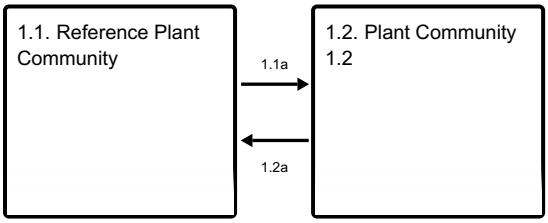
Fire Ecology:
The mean fire return interval for shadscale communities ranges from 35 to 100 years. Shadscale communities are usually unaffected by fire because of low fuel loads, although a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. Increased presence of non-native annual grasses, such as cheatgrass, can alter fire regimes in shadscale communities by increasing fire frequency under wet to near-normal summer moisture conditions. When fire does occur, the effect on the ecosystem may be extreme. Shadscale is fire intolerant and it does not readily recover from fire, except for establishment through seed. Fire generally kills white bursage. Mortality is low in honey mesquite, particularly in lowland areas where root systems are well developed. Screwbean mesquite can survive fire, but little is known of the adaptations that allow for this. Weak resprouting after fire has been reported, but whether this was from surviving apical buds or adventitious buds on the root crown, as in other southwestern mesquites is not discussed. Nevada ephedra generally sprouts after fire damages aboveground vegetation. Underground regenerative structures commonly survive when aboveground vegetation is consumed by fire. However, severe fires may kill shallowly buried regenerative structures. Damage to big galleta from fire varies. If big galleta is dry, damage may be severe. However, when plants are green, fire will tend to be less severe and damage may be minimal, with big galleta recovering quickly. Indian ricegrass can be killed by fire, depending on severity and season of burn. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas. Alkali sacaton is classified as tolerant of, but not resistant to, fire. Top-killing by fire is probably frequent, and the plants can be killed by severe fire.

State and transition model

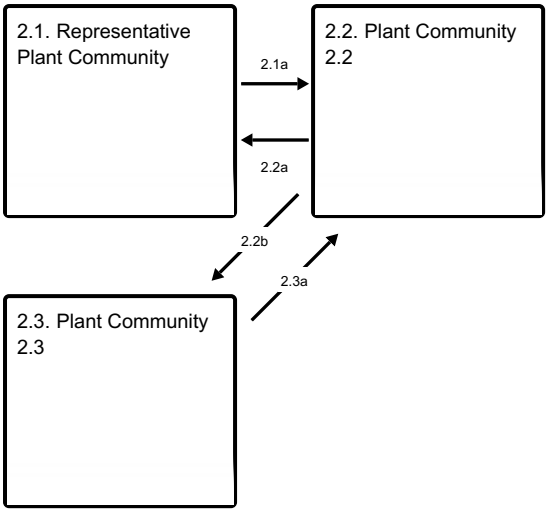
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference State

The reference state is representative of the natural range of variability under pristine conditions. The plant community is shrub dominated with a minor component of perennial grasses. Plant community dynamics are primarily driven by long-term drought, insect outbreaks, and infrequent wildfire. Historically, this state experienced an extended fire return interval due to low fuel loading, which resulted in long-lived stable shadscale plant communities.

Community 1.1
Reference Plant Community

The reference plant community is dominated by shadscale, creosotebush, white bursage and big galleta. Catclaw, mesquite or desert willow may be found along the small drainages or edges of the site. Potential vegetative composition is about 20% grasses and 10% annual forbs and 70% shrubs. Approximate ground cover (basal and crown) is 3 to 8 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	39	78	196
Grass/Grasslike	11	22	56
Forb	6	11	28
Total	**56**	**111**	**280**

Community 1.2
Plant Community 1.2

This plant community is characteristic of a post-disturbance plant community. It is initially dominated by herbaceous vegetation, which may or may not be non-native, woody perennials are increasing. Sprouting shrubs quickly recover and provide favorable microsites for the establishment of shrubs seedlings.

Pathway 1.1a
Community 1.1 to 1.2

Wildfire, disease, prolonged drought, insect attack or any other type of incomplete vegetation removal.

Pathway 1.2a
Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time.

State 2
Representative State

The Representative State is characterized by the presence of non-native annuals in the understory. Plant communities in this state function very similarly to the reference state, however, ecological resilience may be reduced by the presence of the non-natives. Introduced annuals such as red brome, Mediterranean grass and redstem filaree have invaded the reference plant community and have become a component of the herbaceous cover. These non-native annuals are highly flammable and promote wildfires where fires historically have been infrequent. Dominant shrubs persist after this invasion by non-native annuals, however shrub seedlings and desirable grasses suffer reduced vigor and limited reproductive capability due to increased competition from non-natives.

Community 2.1
Representative Plant Community

This plant community is similar to the reference plant community with a trace of non-natives in the understory. Ecological function has been not compromised at this time. Ecological resilience is reduced by the presence of non-native species and this plant community phase will respond differently following a disturbance when compared to non-invaded plant communities.

Community 2.2
Plant Community 2.2

This plant community is characteristic of a post-disturbance plant community. It is initially dominated by herbaceous vegetation, woody perennials are increasing. Short lived and pioneering shrubs such as burrobrush provide favorable microsites for the establishment of long lived shrub seedlings.

Community 2.3
Plant Community 2.3

This plant community is characterized by a short disturbance return interval. Non-native annuals take advantage of the increased availability of resources. This plant community is identified as “at risk”. The loss of vegetative cover has reduced the ecological resistance and resilience. Management should be focused on limiting disturbances and protecting remnants of mature vegetation to ensure a seed source is available in the future.

Pathway 2.1a
Community 2.1 to 2.2

Frequent and repeated surface disturbances, wildfire, disease, insect attack, or any other type of incomplete vegetation removal.

Pathway 2.2a
Community 2.2 to 2.1

Absence from disturbance and natural regeneration over time.

Pathway 2.2b
Community 2.2 to 2.3

Frequent and repeated surface disturbances, wildfire, disease, insect attack, or any type of vegetation removal.

Pathway 2.3a
Community 2.3 to 2.2

Absence from disturbance and natural regeneration over time.

Transition T1
State 1 to 2

Introduction of non-native species due to a combination of factors including; surface disturbance, changes in the kinds of animals and their grazing patterns, drought, changes in fire history or any other type of vegetation removal.

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	**Primary Perennial Grasses**			9–19	
	big galleta	PLRI3	*Pleuraphis rigida*	6–11	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–6	–
	alkali sacaton	SPAI	*Sporobolus airoides*	1–2	–
2	**Secondary Perennial Grasses**			1–9	
	threeawn	ARIST	*Aristida*	1–2	–
	squirreltail	ELEL5	*Elymus elymoides*	1–2	–
Forb					
3	**Perennial Forbs**			1–9	
4	**Annual Forbs**			1–9	
Shrub/Vine					
5	**Primary Perennial Shrubs**			33–78	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	11–28	–
	burrobush	AMDU2	*Ambrosia dumosa*	11–22	–
	mesquite	PROSO	*Prosopis*	6–17	–
	Mexican bladdersage	SAME	*Salazaria mexicana*	2–6	–
	jointfir	EPHED	*Ephedra*	2–6	–
6	**Secondary Perennial Shrubs**			11–22	
	catclaw acacia	ACGR	*Acacia greggii*	1–6	–
	fourwing saltbush	ATCA2	*Atriplex canescens*	1–6	–
	Torrey's saltbush	ATTO	*Atriplex torreyi*	1–6	–
	creosote bush	LATR2	*Larrea tridentata*	1–6	–
	desert-thorn	LYCIU	*Lycium*	1–6	–

Animal community

Livestock Interpretations:
This site has limited value for livestock grazing, due to the low forage production. Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of livestock. Shadscale provides good browse for domestic sheep. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets. White bursage is an important browse species. Browsing pressure on white bursage is particularly heavy during years of low precipitation, when production of winter annuals is low. White bursage is of intermediate forage value. It is fair to good forage for horses and fair to poor for cattle and sheep. However, because there is often little other forage where white bursage grows, it is often highly valuable to browsing animals. The fruit of screwbean and honey mesquite is valuable forage for livestock. Cattle, horses, domestic sheep and goats, eat large quantities of the ripe fruit during summer and fall. Livestock do not consume the foliage to any great extent. Foliage consumption is high only during drought years, especially in the early spring when other forage is sparse.

Screwbean and honey mesquite provides cover for large wildlife species and shade for livestock. Nevada ephedra is important winter range browse for domestic cattle, sheep and goats. Big galleta is considered a valuable forage plant for cattle and domestic sheep. Its coarse, rigid culms make it relatively resistant to heavy grazing and trampling. Indian ricegrass is highly palatable to all classes of livestock in both green and cured condition. It supplies a source of green feed before most other native grasses have produced much new growth. Alkali sacaton is a valuable forage species in arid and semiarid regions. Plants are tolerant to moderate grazing and can produce abundant herbage utilized by livestock.
Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year.

Wildlife Interpretations:
Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of wildlife particularly during spring and summer before the hardening of spiny twigs. It supplies browse, seed, and cover for birds, small mammals, rabbits, deer, and pronghorn antelope. White bursage is an important browse species for wildlife. The fruit of honey mesquite is valuable forage for wildlife. The fruit crop of honey mesquite is quite predictable, annually providing an abundant and nutritious food source for numerous wildlife species upon ripening in July and August. Honey mesquite seeds form an important part of the diet of mice, kangaroo rats, woodrats, chipmunks, ground squirrels, rock squirrels, cottontail, skunks, quail, doves, ravens, the black-tailed prairie dog, black-tailed jackrabbit, porcupine, raccoon, coyote, collared peccary, white-tailed deer, mule deer, wild turkey, and mallard. Mesquite browse is generally not a very important wildlife food source. Screwbean mesquite is important as cover and food to wildlife. Mule deer, bighorn sheep, and pronghorn browse Nevada ephedra, especially in spring and late summer when new growth is available. In southern Nevada, big galleta is heavily utilized by bighorn sheep. Mule deer utilize trace amounts of big galleta. Indian ricegrass is eaten by pronghorn in moderate amounts whenever available. A number of heteromyid rodents inhabiting desert rangelands show preference for seed of Indian ricegrass. Indian ricegrass is an important component of jackrabbit diets in spring and summer. Indian ricegrass seed provides food for many species of birds. Doves, for example, eat large amounts of shattered Indian ricegrass seed lying on the ground. The western salt desert shrub and grassland communities where alkali sacaton is common support an abundance of mule deer, pronghorn, carnivores, small mammals, birds, amphibians, and reptiles.

Hydrological functions

Runoff is medium. Permeability is slow. Hydrologic soil group is C.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers and shrubs during the spring and early summer. This site offers rewarding opportunities to photographers and for nature study. This site is used for camping and hiking and has potential for upland and big game hunting.

Other products

Seeds of shadscale were used by Native Americans for bread and mush. White bursage is a host for sandfood, a parasitic plant with a sweet, succulent, subterranean flowerstalk. Sandfood was a valuable food supply for desert peoples. Mesquites were probably the most important wild plant staple of indigenous Southwest Native Americans. The pods were a very reliable food source because fruiting occurred even during drought years. Pods were collected in large quantities and stored in granary baskets on the roofs of houses or sheds. The beans were ground into flour which was used to prepare cakes and breads, the main staple of the diet. Various refreshing drinks were made from the pods. An alcoholic drink was sometimes prepared by allowing the juices of the pods to ferment. Flowers were eaten raw or roasted, formed into balls, and stored in pottery vessels. Native Americans used the wood for fuel as well as for weapons, tools, and construction. The wood is also used locally for small items, such as tool handles and trinkets. Native Americans used Nevada ephedra as a tea to treat stomach and kidney ailments. Indian ricegrass was traditionally eaten by some Native Americans. The Paiutes used the seed as a reserve food source.

Other information

White bursage may be used to revegetate disturbed sites in southwestern deserts. Mesquites are widely used as ornamental shade trees throughout the Southwest because they need little or no watering and can survive on limited rainfall. The wood can also be used for wood chips. Honey mesquite provides an excellent source of nectar for honey bees. Honey mesquite causes an allergic contact dermatitis in some humans. Nevada ephedra is useful for erosion control, and seedlings have been successfully planted onto reclaimed strip mines. Atrazine may be effective in controlling Nevada ephedra, though some plants can survive through crown sprouting. Irrigation may increase control by atrazine. Big galleta's clumped growth form stabilizes blowing sand. Alkali sacaton is one of the most commonly used species for seeding and stabilizing disturbed lands. Due to alkali sacaton’s salt tolerance, is recommended for native grass seeding on subirrigated saline sites.

Other references

Fire Effects Information System (Online; http://www.fs.fed.us/database/feis/plants/).

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Kottek, M., Grieser, J., Beck, C., Rudolf, B., & Rubel, F. (2006). World map of the Köppen-Geiger climate classification updated. Meteorologische Zeitschrift, 15(3), 259-263.

Salem, B. B. (1989). Arid zone forestry: a guide for field technicians (No. 20). Food and Agriculture Organization (FAO).

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Contributors

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Approval

Sarah Quistberg, 2/24/2025

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	05/12/2025
Approved by	Sarah Quistberg
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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):**

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:**