

# Ecological site R027XY024NV

## SODIC TERRACE

Last updated: 6/03/2024  
Accessed: 09/04/2026

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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): 027X–Fallon-Lovelock Area

**Physiography** Found in the Great Basin Section of the Basin and Range Province of the Intermontane Plateaus this area is characterized by isolated uplifted fault block mountain ranges trending north to south that are separated by broad, hydrologically closed basins. The entire area occurs in the rain-shadow of the Sierra Nevada mountains and is influenced by Pleistocene Lake Lahontan which reached its most recent high stand about 12,000 years ago. There is substantial evidence suggesting the western Great Basin has been the site of pluvial-interpluvial cycles for at least the past two million years. The mountains and valleys are dissected by the Humboldt, Truckee, Carson, and Walker Rivers and their tributaries, all of which terminate within MLRA 27. Extensive playas can be found throughout this area and are the result of drying of ancient Lake Lahontan. Elevation generally ranges from 3,300 to 5,900 feet (1,005 to 1,800 meters) in valleys, but on some mountain peaks it is more than 7,870 feet (2,400 meters). **Geology** Landforms and soils of this MLRA have been heavily influenced by fluctuating lake level over the last 40,000 years. There is a level line evident on the higher slopes marking the former extent of glacial Lake Lahontan. Almost half of this area has surface deposits of alluvial valley fill influenced by lacustrine sediment. The rest has andesite and basalt rocks of different ages. Mesozoic and Tertiary intrusives are concentrated along the western border of the area, and Lower Volcanic Rocks (17 to 43 million years old) are common on the eastern side of the area. Also, some scattered outcrops of Mesozoic sedimentary and volcanic rocks and tuffaceous sedimentary rocks are in the mountains within the interior of this MLRA. **Climate** The average annual precipitation is 5 to 10 inches (125 to 255 millimeters) in most of the area but is as much as 19 inches (485 millimeters) on high mountain slopes. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The amount of precipitation is very low from summer to midautumn. The precipitation in winter occurs mainly as snow. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 155 days and ranges from 110 to 195 days, decreasing in length with elevation. **Water** The amount of precipitation is very low, and water for irrigation is obtained principally from diversions on the four large rivers in the area and from water stored in the Lahontan, Rye Patch, and Weber Reservoirs. Pyramid Lake and Walker Lakes are terminal lakes for the Truckee and Walker Rivers, respectively. Much of the annual flow of both rivers is diverted for irrigation, causing lake levels to fall and levels of dissolved salts to increase causing problems for the native Lahontan cutthroat trout. **Soils** The dominant soil orders are Aridisols and Entisols. The soils in the area are predominantly a mesic temperature regime, aridic moisture regime, and have a mixed mineralogy. They are generally well drained, loamy or sandy, commonly skeletal, and shallow to very deep. Accumulation of salts, tufa deposits, and eolian sediments with soluble salts over lacustrine deposits influence most of the soils in the basin landforms of this MLRA. Soils on bedrock-controlled landforms are typically comprised of volcanic or tuffaceous sedimentary colluvium over residuum. **Biological Resources** This area supports extensive areas of salt-desert shrub vegetation. Shadscale and Bailey's greasewood are widespread, occurring both individually and together. Grasses are generally sparse, although Indian ricegrass is prominent, especially on the sandy soils. Fourwing saltbush, winterfat, spiny hopsage, wolfberry, ephedra, dalea, and bud sagebrush are common shrubs. Basin wildrye, creeping wildrye, alkali sacaton, saltgrass, black greasewood, rubber rabbitbrush, and big saltbush are important plants on saline bottom lands and terraces. A few marsh areas support cattail, bulrushes, sedges, and rushes. Big sagebrush, along with scattered Utah juniper and singleleaf pinyon, is associated with Thurber needlegrass, desert needlegrass, Sandberg bluegrass, and squirreltail on the higher elevation piedmont slopes and mountains.

### Ecological site concept

The Sodic Terrace site occurs on basin-floor remnants, beach terraces, beach plains, alluvial flats, and lake plain terraces. Slope gradients range from 0 to 4 percent, however, 0 to 2 percent slope are most typical. Elevations are 3300 to 5300 feet. The soils are very deep and moderately well drained to well drained. The soils are moderately to very strongly alkaline.

### Associated sites

|                    |                                                                       |
|--------------------|-----------------------------------------------------------------------|
| <b>R027XY010NV</b> | <b>BEACH TERRACE</b><br><br>ATCO dominant plant; less productive site |
| <b>R027XY012NV</b> | <b>SODIC SANDS</b><br><br>ATCO minor shrub if present                 |

### Similar sites

|                    |                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------|
| <b>R027XY076NV</b> | <b>GRAVELLY SODIC TERRACE</b><br><br>Less productive site; very high surface cover of cobbles and stones |
| <b>R027XY036NV</b> | <b>DRY SODIC TERRACE</b><br><br>Less productive site; LYSH important shrub                               |
| <b>R027XY025NV</b> | <b>SODIC FLAT</b><br><br>SAVE4 dominant plant; DISP dominant grass                                       |
| <b>R027XY013NV</b> | <b>LOAMY 4-8 P.Z.</b><br><br>ATCO-ARSP5 codominant shrubs; SAVE4 minor shrub if present.                 |

Table 1. Dominant plant species

|            |                                                                         |
|------------|-------------------------------------------------------------------------|
| Tree       | Not specified                                                           |
| Shrub      | (1) <i>Atriplex confertifolia</i><br>(2) <i>Sarcobatus vermiculatus</i> |
| Herbaceous | (1) <i>Achnatherum hymenoides</i>                                       |

### Physiographic features

The Sodic Terrace site occurs on basin-floor remnants, beach terraces, beach plains, alluvial flats, and lake plain terraces. Slope gradients range from 0 to 4 percent, however, 0 to 2 percent slope are most typical. Elevations are 3300 to 5300 feet.

Table 2. Representative physiographic features

|              |                                                                  |
|--------------|------------------------------------------------------------------|
| Landforms    | (1) Basin-floor remnant<br>(2) Lake terrace<br>(3) Alluvial flat |
| Runoff class | Very low to very high                                            |

|                    |                                    |
|--------------------|------------------------------------|
| Flooding duration  | Very brief (4 to 48 hours)         |
| Flooding frequency | Rare to occasional                 |
| Ponding frequency  | None                               |
| Elevation          | 1,010 – 1,620 m                    |
| Slope              | 0 %                                |
| Water table depth  | 120 – 170 cm                       |
| Aspect             | Aspect is not a significant factor |

### Climatic features

The climate associated with this site is arid, characterized by cool, moist winters and hot, dry summers. Average annual precipitation is about 4 to 8 inches. Mean annual air temperature is 49 to 55 degrees F. The average growing season is about 100 to 130 days.

**Table 3 Representative climatic features**

|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 130 days |
| Freeze-free period (average)  |          |
| Precipitation total (average) | 200 mm   |

### Influencing water features

This site may receive additional moisture by flooding due to its occurrence on beach terraces, beach plains, alluvial flats, and lake plains.

### Soil features

The soils associated with this site are very deep and moderately well drained to well drained. These soils have formed in mixed alluvium or lacustrine materials. The soils are moderately to very strongly alkaline. Available water capacity is very low to high. Surface runoff is very low to very high. The potential for sheet and rill erosion is slight. The soil moisture regime is typic aridic and the soil temperature regime is mesic. The soil series associated with this site include Appian, Biddleman, Boton, Chuckles, Hooten, Lox, Mazuma, Orizaba, Slawmaster, Swingler, Trocken, and Vigor.

The representative soil series is Appian, a fine-loamy, over sandy or sandy-skeletal, mixed, superactive, mesic Typic Natargids. An ochric epipedon occurs from the soil surface to 8 cm and a natric horizon occurs from 8 to 28 cm. Secondary carbonates are present from 8 to 28 cm.

**Table 4. Representative soil features**

|                                                          |                                         |
|----------------------------------------------------------|-----------------------------------------|
| Parent material                                          | (1) Alluvium<br>(2) Lacustrine deposits |
| Surface texture                                          | (1) Loam<br>(2) Sandy loam              |
| Family particle size                                     | (1) Loamy                               |
| Drainage class                                           | Moderately well drained to well drained |
| Permeability class                                       | Moderate to moderately rapid            |
| Soil depth                                               | 180 – 210 cm                            |
| Surface fragment cover <=3"                              | 0 – 20 %                                |
| Surface fragment cover >3"                               | Not specified                           |
| Available water capacity<br>(0-101.6cm)                  | 7.62 – 20.07 cm                         |
| Calcium carbonate equivalent<br>(0-101.6cm)              | 0 – 10 %                                |
| Electrical conductivity<br>(0-101.6cm)                   | 0 – 30 mmhos/cm                         |
| Sodium adsorption ratio<br>(0-101.6cm)                   | 10 – 90                                 |
| Soil reaction (1:1 water)<br>(0-101.6cm)                 | 8.4 – 9.4                               |
| Subsurface fragment volume <=3"<br>(Depth not specified) | Not specified                           |

|                                                         |               |
|---------------------------------------------------------|---------------|
| Subsurface fragment volume >3"<br>(Depth not specified) | Not specified |
|---------------------------------------------------------|---------------|

## Ecological dynamics

As ecological condition declines, Indian ricegrass and bottlebrush squirreltail decrease as shadscale and black greasewood increase. Species likely to invade this site are halogeton, annual mustards and cheatgrass.

### Fire Ecology:

The mean fire return interval for shadscale-greasewood communities range from 35 to over 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. Black greasewood may be killed by severe fires, but it commonly sprouts soon after low to moderate-severity fire. Budsage is killed by fire. Budsage communities rarely burn due to insufficient fire loads. Indian ricegrass reestablishes on burned sites through seed dispersed from adjacent unburned areas. Low culm density in Indian ricegrass reduces charring of crowns below soil, thereby protecting the growing points during a fire.

Bottlebrush squirreltail's small size, coarse stems, and sparse leafy material aid in its tolerance of fire. Postfire regeneration occurs from surviving root crowns and from on- and off-site seed sources. Frequency of disturbance greatly influences postfire response of bottlebrush squirreltail. Undisturbed plants within a 6 to 9 year age class generally contain large amounts of dead material, increasing bottlebrush squirreltail's susceptibility to fire. Saltgrass rhizomes occur deep in the soil where they are insulated from the heat of most fires. Saltgrass survives fire by sending up new growth from rhizomes.

## State and transition model

## Additional community tables

Table 5. Community 1.1 plant community composition

| Group                  | Common Name                        | Symbol | Scientific Name                | Annual Production () | Foliar Cover (%) |
|------------------------|------------------------------------|--------|--------------------------------|----------------------|------------------|
| <b>Grass/Grasslike</b> |                                    |        |                                |                      |                  |
| 1                      | <b>Primary Perennial Grasses</b>   |        |                                | 48-150               |                  |
|                        | Indian ricegrass                   | ACHY   | <i>Achnatherum hymenoides</i>  | 20-59                | –                |
|                        | squirreltail                       | ELEL5  | <i>Elymus elymoides</i>        | 20-39                | –                |
|                        | saltgrass                          | DISP   | <i>Distichlis spicata</i>      | 8-31                 | –                |
| 2                      | <b>Secondary Perennial Grasses</b> |        |                                | 8-31                 |                  |
|                        | basin wildrye                      | LECI4  | <i>Leymus cinereus</i>         | 2-8                  | –                |
|                        | sand dropseed                      | SPCR   | <i>Sporobolus cryptandrus</i>  | 2-8                  | –                |
| <b>Forb</b>            |                                    |        |                                |                      |                  |
| 3                      | <b>Perennial</b>                   |        |                                | 8-31                 |                  |
|                        | saltgrass                          | DISP   | <i>Distichlis spicata</i>      | 8-31                 | –                |
|                        | globemallow                        | SPHAE  | <i>Sphaeralcea</i>             | 2-8                  | –                |
|                        | princesplume                       | STANL  | <i>Stanleya</i>                | 2-8                  | –                |
|                        | thelypody                          | THELY  | <i>Thelypodium</i>             | 2-8                  | –                |
| 4                      | <b>Annual</b>                      |        |                                | 0-12                 |                  |
|                        | sand dropseed                      | SPCR   | <i>Sporobolus cryptandrus</i>  | 2-12                 | –                |
| <b>Shrub/Vine</b>      |                                    |        |                                |                      |                  |
| 5                      | <b>Primary Perennial Shrubs</b>    |        |                                | 165-316              |                  |
|                        | shadscale saltbush                 | ATCO   | <i>Atriplex confertifolia</i>  | 78-138               | –                |
|                        | greasewood                         | SAVE4  | <i>Sarcobatus vermiculatus</i> | 78-138               | –                |

|   |                                   |        |                                                        |      |   |
|---|-----------------------------------|--------|--------------------------------------------------------|------|---|
|   | globemallow                       | SPHAE  | <i>Sphaeralcea</i>                                     | 2-8  | – |
|   | princesplume                      | STANL  | <i>Stanleya</i>                                        | 2-8  | – |
|   | thelypody                         | THELY  | <i>Thelypodium</i>                                     | 2-8  | – |
| 6 | <b>Secondary Perennial Shrubs</b> |        |                                                        | 8-31 |   |
|   | Forb, annual                      | 2FA    | <i>Forb, annual</i>                                    | 1-12 | – |
|   | fourwing saltbush                 | ATCA2  | <i>Atriplex canescens</i>                              | 2-12 | – |
|   | rubber rabbitbrush                | ERNAN5 | <i>Ericameria nauseosa ssp. nauseosa var. nauseosa</i> | 2-12 | – |
|   | spiny hopsage                     | GRSP   | <i>Grayia spinosa</i>                                  | 2-12 | – |
|   | Shockley's desert-thorn           | LYSH   | <i>Lycium shockleyi</i>                                | 2-12 | – |
|   | seepweed                          | SUAED  | <i>Suaeda</i>                                          | 2-12 | – |

## Animal community

**Livestock Interpretations:** This site is suitable for livestock grazing. Grazing management should be keyed to perennial grass and palatable shrub production. 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. Bottlebrush squirreltail is very palatable winter forage for domestic sheep of Intermountain ranges. Domestic sheep relish the green foliage. Overall, bottlebrush squirreltail is considered moderately palatable to livestock. Saltgrass's value as forage depends primarily on the relative availability of other grasses of higher nutritional value and palatability. It can be an especially important late summer grass in arid environments after other forage grasses have deceased. Saltgrass is rated as a fair to good forage species only because it stays green after most other grasses dry. Livestock generally avoid saltgrass due to its coarse foliage. Saltgrass is described as an increaser under grazing pressure. Shadscale provides good browse for domestic sheep. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets. Black greasewood is an important winter browse plant for domestic sheep and cattle. It also receives light to moderate use by domestic sheep and cattle during spring and summer months. Black greasewood contains soluble sodium and potassium oxalates that may cause poisoning and death in domestic sheep and cattle if large amounts are consumed in a short time. Indian ricegrass has good forage value for domestic sheep, cattle and horses. Black greasewood is an important winter browse plant for domestic sheep and cattle. It also receives light to moderate use by domestic sheep and cattle during spring and summer months. Black greasewood contains soluble sodium and potassium oxalates that may cause poisoning and death in domestic sheep and cattle if large amounts are consumed in a short time. Budsage is palatable and nutritious forage for domestic sheep in the winter and spring although it is known to cause mouth sores in lambs. Budsage can be poisonous or fatal to calves when eaten in quantity. Budsage, while desired by cattle in spring, is poisonous to cattle when consumed alone. Bailey's greasewood is an important winter browse plant for domestic sheep and cattle. It also receives light to moderate use by domestic sheep and cattle during spring and summer months. Greasewood contains soluble sodium and potassium oxalates that may cause poisoning and death in domestic sheep and cattle if large amounts are consumed in a short time. 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:** The shadscale fruits and leaves are a food source for deer, pronghorn antelope, small rodents, jackrabbits, game birds, and songbirds. Black greasewood is an important winter browse plant for big game animals. It also receives light to moderate use by mule deer and pronghorn during spring and summer months. Black greasewood is an important winter browse plant for big game animals and a food source for many other wildlife species. It also receives light to moderate use by mule deer and pronghorn during spring and summer months. Budsage is palatable, nutritious forage for upland game birds, small game and big game in winter. Budsage is rated as "regularly, frequently, or moderately taken" by mule deer in Nevada in winter and is utilized by bighorn sheep in summer, but the importance of budsage in the diet of bighorns is not known. Bud sage comprises 18 – 35% of a Pronghorn's diet during the spring where it is available. Chukar will utilize the leaves and seeds of bud sage. Budsage is highly susceptible to effects of browsing. It decreases under browsing due to year-long palatability of its buds and is particularly susceptible to browsing in the spring when it is physiologically most active. Bailey's greasewood is an important winter browse plant for big game animals and a food source for many other wildlife species. It also receives light to moderate use by mule deer and pronghorn during spring and summer months. Indian ricegrass is eaten by pronghorn in "moderate" amounts whenever available. In Nevada it is consumed by desert bighorns. 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. In Nevada, Indian ricegrass may even dominate jackrabbit diets during the spring through early summer months. 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. Bottlebrush squirreltail is a dietary component of several wildlife species. Bottlebrush squirreltail may provide forage for mule deer and pronghorn. Saltgrass provides cover for a variety of bird species, small mammals, and arthropods and is on occasion used as forage for several big game wildlife species.

## Hydrological functions

Surface runoff is negligible to low. Rills are none. Water flow patterns are often numerous in areas subjected to summer convection storms. Flow patterns are short and stable. Pedestals are rare with occurrence typically limited to areas within water flow patterns. Sparse shrub canopy and associated litter provide some protection from raindrop impact. Medium to fine textured surface soils have moderate to slow infiltration and medium runoff.

## Recreational uses

This site has potential for upland and big game hunting.

## Other products

Shadscale seeds were used by Native Americans of Arizona, Utah and Nevada for bread and mush. The leaves, seeds and stems of black greasewood are edible. The leaves, seeds and stems of black greasewood are edible. The leaves, seeds and stems of greasewood are edible. Indian ricegrass was traditionally eaten by some Native American peoples. The Paiutes used seed as a reserve food source.

## Other information

Re-vegetation of shadscale communities is inherently difficult. Dry soil surfaces resulting from low humidity, high irradiation, and moderate to strong winds are major obstacles in re-vegetation projects. Black greasewood is useful for stabilizing soil on wind-blown areas. It successfully revegetates processed oil shale and is commonly found on eroded areas and sites too saline for most plant species. Indian ricegrass is well-suited for surface erosion control and desert revegetation although it is not highly effective in controlling sand movement. Bottlebrush squirreltail is tolerant of disturbance and is a suitable species for revegetation. Given its extensive system of rhizomes and roots which form a dense sod, saltgrass is considered a suitable species for controlling wind and water erosion.

## Inventory data references

NASIS soil component data.

## Type locality

|                                 |                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location 1: Pershing County, NV |                                                                                                                                                                                                                                                       |
| Township/Range/Section          | T27N R31E S9                                                                                                                                                                                                                                          |
| General legal description       | Approximately 5 miles northwest of Lovelock, about 260 feet east and 100 feet north of the southwest corner of Section 9, T27N, R31E, Pershing County, Nevada. This site also occurs in Churchill, Lyon, Mineral, Storey and Washoe counties, Nevada. |

## Other references

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

USDA-NRCS Plants Database (Online; <http://www.plants.usda.gov>).

## Contributors

DK/GD

## Approval

Kendra Moseley, 6/03/2024

## 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)                    | GK BRACKLEY                           |
| Contact for lead author                     | State Rangeland Management Specialist |
| Date                                        | 06/20/2006                            |
| Approved by                                 |                                       |
| Approval date                               |                                       |
| Composition (Indicators 10 and 12) based on | Annual Production                     |

## Indicators

1. **Number and extent of rills:** Rills are none.

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2. **Presence of water flow patterns:** Water flow patterns are often numerous in areas subjected to summer convection storms. Flow patterns short and stable.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas within water flow patterns.

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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 40-50%, depending on amount of surface rock fragments.

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5. **Number of gullies and erosion associated with gullies:** None

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None to slight.

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7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) is expected to move the distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

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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 values should be 2 to 4 on most soil textures found on this site. Areas of this site occurring on soils that have a physical crust will probably have stability values less than 3. Soils having thin surface sand sheet will have lower stability values. (To be field tested.)

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9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Surface structure is typically moderate thick platy. Soil surface colors are grays and soils are typified by an ochric epipedon. Organic carbon of the soil (2 to 3 inches) is less than 1 percent.

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10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Sparse shrub canopy and associated litter provide some protection from raindrop impact.

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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): Compacted layers are none. Massive sub-surface horizons, subsoil calcic or argillic horizons are not to be interpreted as compacted layers.

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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: Reference Plant Community: Salt desert shrubs (shadscale & black greasewood). (By above ground production)

Sub-dominant: Cool season perennial grasses > associated shrubs = rhizomatous grasses = deep-rooted, cool season, perennial forbs = fibrous, shallow-rooted, cool season, annual and perennial forbs. (By above ground production)

Other:

Additional:

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13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Dead branches within individual shrubs are common and standing dead shrub canopy material may be as much as 35% of total woody canopy; mature bunchgrasses commonly ( $\pm 25\%$ ) have dead centers.

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14. Average percent litter cover (%) and depth (in): Between plant interspaces (10-20%)  $\pm$  and depth ( $\pm \frac{1}{4}$  in.)

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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production): For normal or average growing season (February thru April [May])  $\pm 350$  lbs/ac; Spring moisture significantly affects total production. Favorable years  $\pm 500$  lbs/ac and unfavorable years  $\pm 150$  lbs/ac.

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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: Potential invaders include halogeton, Russian thistle, annual mustards, and cheatgrass.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years.
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