USDA Natural Resources
Conservation Service

Ecological site R028AY134UT
Desert Sand (Four-Wing Saltbush)

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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.

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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Minor rill development may be evident in the reference community only following a recent significant storm or snow melt events. Rill presents may be more evident where run-on from adjacent upland sites or exposed bedrock concentrate flows. Any rill development will be short (< 5') and spaced 6' – 8'. Evidence of rills will decrease in the months following major weather events due to the affects of wind on this sites very coarse textured surface soil.

2. **Presence of water flow patterns:** Slight evidence of water flow may be evident in the reference community following significant storm events. Flow patterns affect < 5% of the site. Flow patterns are normally <20 feet long, follow natural contours, and are typically spaced 10 to 15 feet apart.

3. **Number and height of erosional pedestals or terracettes:** Very minor pedestal development caused by wind erosion is evident in the reference community, but there should be no exposed roots. 1 – 3 inches of depositional mounding in Indian ricegrass bunches, and under Four-wing saltbush canopies are normal. Some evidence of wind generated soil movement is evident; any unstable areas present have mostly healed over.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 20% - 40% in the reference community. Ground cover (the inverse of bare ground) typically includes: coarse fragments – 2% to 5%; plant canopy – 20% to 30%; litter – 20% to 30%.

5. **Number of gullies and erosion associated with gullies:** Developed gully channels are a normal component of desert environments. Gullies associated with the reference state will typically have stable, partially vegetated sides and bottoms with no evidence of head-cutting. Some evidence of disturbance may be evident following significant weather events or when gullies convey runoff from higher elevation rocky or naturally eroding areas.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** Some evidence of wind generated soil movement is normal in reference communities on this site. Evidence of small (100 sq feet) wind generated blowouts may also be present; any blowout areas present appear stable and are being stabilized with perennial vegetation. Some depositional mounding around Indian ricegrass bunches, and under fouwing saltbush canopies is a normal characteristic of this site.

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7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place within or under plant canopies. Some movement of fine material (< ¼") may move (2' – 4') in the direction of prevailing winds or down slope if being transported by water. Some accumulation is observed behind obstructions. Larger woody litter (> ½") is mostly found under or near shrubs.

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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):** This site should have a soil stability rating of 2 to 4. Surface textures are typically coarse loamy sands containing 0% to 5% coarse fragments.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface ranges from 5 to 12 inches deep and structure is very weak to weak, thin platy. The A-horizon color range from 10YR 6/3 to 10YR7/3. Soils have an Ochric epipedon that extends 5 to12 inches into the soil profile. The A horizon is normally deeper and better developed under plant canopies.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The presence of rhizomatous grasses such as James galleta or Western wheatgrass combined with healthy perennial bunchgrasses and Four-wing saltbush in the reference community provides for the best infiltration and least runoff from storm events and snow melt. As perennial vegetation decreases and bare ground increases, runoff increases and soil loss is accelerated.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Soils are deep to very deep.

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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: Dominant: cool season grasses (e.g. Indian ricegrass and Needleandthread) 30 – 40%, > Sprouting shrubs (e.g. Four-wing saltbush and Winterfat) 20 – 30%.

    Sub-dominant: Sub-dominant: Sprouting shrubs (e.g. Spiny hopsage and Rubber rabbitbrush) 5 – 15%, > warm season grasses (e.g. Galleta) 5 – 10%, > Cool season grasses (e.g. Western wheatgrass and Bottlebrush squirreltail) 1-3%.

    Other: Others: Shrubs (e.g. Shadscale and Bud sage 1-3%), perennial forbs (e.g. Scarlet globemallow and Cushion wild

buckwheat) 3-5%, biological soil crusts (e.g. lichens, mosses, cyanobacteria) trace%.

Additional: Moss and lichen communities will normally be found under plant canopies while the cyanobacteria will be found throughout the site. Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state. Perennial and annual forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with average to above-average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. There may be partial (<30%) mortality of individual bunchgrasses and other shrubs during severe drought.

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14. **Average percent litter cover (%) and depth (in):** Litter cover ranges from 20 to 30% with a spike when shrubs drop their leaves. Depth varies from ¾ to 1/2 inch with depth increasing near plant canopies.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 450 - 550 pounds on an average year.

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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:** Broom snakeweed, Russian thistle, Redstem storksbill, annual bromes and Halogeton are likely to increase in or invade this site.

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17. **Perennial plant reproductive capability:** All perennial plant species have the ability to reproduce in most years except drought years.
