

## Ecological Reference Worksheet

**Author(s) / participant(s):** John Tunberg

**Contact for lead author :** 505-761-4488

**Reference site used? Yes/No**

No

**Date:** 9/29/2009 **MLRA:** 36B **Ecological Site:** Salty Bottomland This must be verified based on soils and climate (see Ecological Site Description). Current plant community cannot be used to identify the ecological site.

**Indicators:** For each indicator, describe the potential for the site. Where possible, (1) use numbers, (2) include expected range of values for above and below average years for each community within the reference state, when appropriate & (3) site data. Continue description on separate sheet.

<b>1. Number and extent of rills</b>	None due to flat or nearly flat surface. Do not mistake overland flow patterns from wash conc flow as rills. After wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances rills may appear on this site after high-intensity summer thunderstorms. They should heal naturally and quickly
<b>2. Presence of water flow patterns:</b>	Typically none, but where present flow patterns are short and not connected. Should only be present following intense storm events. Numerous obstructions alter flow paths. Flow pattern length and numbers may double after wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances after high-intensity summer thunderstorms.
<b>3. Number and height of erosional pedestals or terracettes:</b>	Few and minor pedestals less than 1/2 inch in height. Plant or rock pedestals and terracettes are almost always in flow patterns. Wind caused pedestals are rare and only would be on the site following after wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances after high-intensity summer thunderstorms.
<b>4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground) :</b>	10 - 20% with bare patches less than 6 inches in diameter in the intervals between natural disturbance events. Bare ground would be expected to increase to 80% or more the first year following wildfire and then decrease to pre fire levels within 2 to 5 years.
<b>5. Number of gullies and erosion associated with gullies:</b>	Drainages where present are stabilized with native veg. No signs of erosion. Gullies are rare and would only be present when high-intensity summer thunderstorms occur after wildfire, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances. Natural revegetation will be rapid.
<b>6. Extent of wind scoured, blowouts and/or depositional areas</b>	No or minimal evidence of past wind scour. Wind erosion is minimal when the site is in a vegetated condition. Significant wind erosion would only be present following high-intensity summer thunderstorms after wildfire, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances. After rain events , exposed soil surfaces form physical crusts that tend to reduce wind erosion.
<b>7. Amount of litter movement (describe size and distance expected to travel) :</b>	Evenly distributed across site. Litter movement consists primarily of redistribution of fine litter (herbaceous plant material) in flow patterns for distances of not more than 1 to 3 feet. Litter movement up to 5 feet may occur after wildfires, or abnormally high human or herbivore impacts or extended drought or combinations of these disturbances. Litter amounts and size of material moved may increase after particularly high-intensity summer thunderstorms.
<b>8. Soil surface (top few mm) resistance to erosion (stability) values are averages - most sites will show a range of values for both plant canopy and interspaces, if different) :</b>	Moderate to high resistance to erosion. Stability class rating at 3 to 4 in interspaces at soil surface. Under plant shrub or grass plant canopy values will be 5 to 6.
<b>9. Soil surface structures and SOM content (include type and strength of structure, and A-horizon color and thickness for both plant canopy and interspaces, if different) :</b>	Average Soil Organic Matter (SOM) 1 to 3%. Soil is deep to moderately deep. horizon is Ap from 0 to 6 inches; grayish brown (10YR 5/2) clay loam; dark brown (10YR 3/3) moist; weak thin platy structure. First subsurface horizon is C1 from 6 to 18 inches; light brown grey (10YR 6/2) clay loam, dark grey brown (10YR 4/2) moist; weak medium prismatic structure. Second Subsurface is C2 18 to 35" grey brown 10YR 5/2 clay loam dark grey brown 10YR 4/2 moist, redox concentrations and depletions, strongly effervescent.
<b>10. Effect of plant community composition (relative proportion of different functional groups) &amp; spatial distribution on infiltration &amp; runoff:</b>	Basal cover and crown density with small interspaces makes rainfall impact minimal. This site is somewhat poorly drained. Runoff is slow on this site. Diverse grass, forb, shrub functional/structural groups and diverse root structure/patterns reduces raindrop impact slows overland flow providing increased time for infiltration to occur. Extended drought reduces short and mid bunchgrasses causing decreased infiltration and increased runoff. This situation will self correct in 2 to 5 years following disturbance unless a threshold has been crossed.
<b>11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction):</b>	None. Compaction layers are present only after surface activities such as livestock grazing and recreational vehicle use during periods when the soil is moist. There are soil profile features in the top 8 inches of the soil profile that would be mistaken for a management induced soil compaction layer. The clay layer will be easier to penetrate than a management induced compaction layer.

**12. Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: indicate much greater than (>>), greater than (>), and equal to (=) :**

Dominants: warm-season tall bunchgrass>cool-season mid rhizomatous> subdominants: cool-season bunchgrass> cool-season mid-short bunchgrass> warm-season mid rhizomatous > shrubs, mid tall shrubs > short semi-shrubs > forbs. After wildfires, the functional/structural dominance changes to the herbaceous components with a slow 10-20 year recovery of the nonresprouting shrubs (e.g., big sagebrush). Resprouting shrubs tend to increase until the sagebrush reestablishment and increase reduce the resprouting component. High human or herbivore impacts, extended drought, or combinations of these factors tend to increase shrub functional/structural groups at the expense of the herbaceous groups and biological crust.

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

Typically minimal. Expect short/mid bunchgrasses mortality/decadence during or following drought. Most of the perennial plants in this community are long lived, especially the perennial forbs and shrubs. After moderate- to high-intensity wildfires, all of the nonresprouting shrubs would die, as would a small percentage of the herbaceous understory species. Extended droughts would tend to cause relatively high mortality in short-lived species such as squirreltail. Shrub mortality would be limited to severe with multiple year droughts. Combinations of wildfires and extended droughts would cause even more mortality for several years following the fire than either disturbance functioning by itself would cause.

**14. Average percent litter cover ( 20 % ) and depth ( 0.5 inches).**

After wildfires, high herbivore impacts, extended drought, or combinations of these disturbances, litter cover and depth decreases to none immediately after the disturbance (e.g., fire) and dependent on climate and plant production increases to post-disturbance levels in one to five growing seasons. If invasive annual grasses (e.g., cheatgrass) dominate the plant community or is a major component of the shrub understory, litter cover can increase to 70-100% and depth can increase to 1-3." This situation contributes to more frequent fire return intervals and significantly fewer opportunities for desirable perennial plant reproduction and biological crust recovery. This would be a WIDE departure from the reference condition.

**15. Expected annual production (this is TOTAL above-ground production, not just forage production):**

(Low Production 450 lbs./ac.) (Average RV Production 819lbs./ac.) (High Production 1133 lbs./ac.) After wildfires, high herbivore impacts, extended drought, or combinations of these disturbances, can cause production to be significantly reduced (100-200 lbs per acre the first growing season following a wildfire) and recover slowly under below average precipitation regimes. A seven-year study of cheatgrass production on an ungrazed monoculture of cheatgrass produced production ranges of 1000 to 2,300 lbs/ac in a period that included dry and wet springs. This would be a WIDE departure from the reference condition.

**16. Potential invasive (including noxious) species (native and non-native). List species which characterize degraded states and which, after a threshold is crossed, "can, and often do , continue to increase regardless of the management of the site and may eventually dominate** Squirreltail can initially increase but not dominate following disturbance. Long term excessive livestock

impacts can favor blue grama. It can dominate the site and site functions. Invasive plants should not occur in reference plant community. However, cheatgrass, Russian thistle, kochia, and other nonnative annuals may invade following extended disturbance. Cheatgrass is the greatest threat to dominate this site after disturbance (primarily following wildfires but also includes high human or herbivore impacts and extended drought). Knapweeds are also a threat to site integrity if allowed to proliferate. Greasewood and saltgrass are reference state plants that can dominate the site particularly where inappropriate grazing removes the other herbaceous components. All these conditions would be a departure from the reference state.

**17. Perennial plant reproductive capability :** All plant species should be capable of reproduction depending on water regime.

All plants should be vigorous, healthy and reproductive depending on disturbance (e.g., drought). Plants should have numerous seed heads, vegetative tillers, etc. The only limitations are weather-related effects, wildfire, and natural disease that may temporarily reduce reproductive capability.