Evaluation Matrix for Rangeland Health

State: OK & KS Office_____ Ecological Site: Deep Sand ID: R080AY014OK
Reference Site Location: Lat: N 36.49054 Long: W -9838913 Elevation: 1347 Feet
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	Departure from Ecological Site Description/Ecological Reference Worksheet				
Indicator	**Extreme**	**Moderate to Extreme**	**Moderate**	**Slight to Moderate**	**None to Slight**
1. Rills	Active eroding rills are common. Headcutting on rills is active. Few, if any, of the sides are covered with vegetation. Rills merge to form conductive channels for water erosion.	There is a presence of rills. Headcutting on most rills is active, and few of the sides are covered with vegetation.	There is a presence of rills. Headcutting on some rills is active, and most of the sides are covered with vegetation.	There is a presence of rills. There is no active headcutting, but a portion of the sides are not covered with vegetation.	**Ecological Reference Worksheet: There are none on this site due to high infiltration rates.**
2. Water Flow Patterns	Water eroded channels are numerous and extensive. Most channels have signs of headcutting and actively eroding bottom channels.	Water flow patterns are visible in the soil surface. Headcutting and/or deposition are common in the water flow channels.	Water flow patterns are visible in the vegetation, but not in the soil surface. Deposition and erosion is moderate. Water tends to flow in channels rather than evenly over the ground.	Some water flow patterns are found in the vegetation, but not in the soil surface. The general flow of the water is distributed evenly over the landscape.	**Ecological Reference Worksheet: There are none on this site due to high infiltration rates.**
3. Pedestals and/or Terracettes	Abundant active pedestalling **(> 1 inch**) and terracettes common. Many rocks and plants are pedestaled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestaled with occasional exposed roots.	Slight active pedestalling **(< ½ inch)**; most pedestals are in flow paths and interspaces. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestal formation, especially in water flow patterns on exposed slopes.	**Ecological Reference Worksheet: There should not be any evidence of erosional pedestals or terracettes on this site.**
4. Bare Ground	Much higher **(>30%)** than expected for the site. Bare areas are large and generally connected. If fire exposes short-term high bare ground, then use Moderate if no other problems exist.	Moderate to much higher than expected for the site. Bare areas are large and occasionally connected.	Moderately higher **(20-25%)** than expected for the site. Bare areas are of moderate size and sporadically connected.	Slightly to moderately higher than expected for the site. Bare areas are small and rarely connected.	**Ecological Reference Worksheet: There is some variability, but it should average 5-15% bare ground on this site. Bare areas are small and not connected.**
5. Gullies	Common with indications of active erosion and down cutting; vegetation is infrequent on slopes and/or bed. Nick points and headcuts are numerous and active.	Moderate in number to common with indications of active erosion; vegetation is intermittent on slopes and/or bed. Headcuts are active; down-cutting is not apparent.	Moderate in number with indications of active erosion; vegetation is intermittent on slopes and/or bed. Occasional headcuts may be present.	Uncommon, vegetation is stabilizing the bed and slopes; no signs of active headcuts nick points, or bed erosion.	**Ecological Reference Worksheet: None, drainages are represented as natural stable channels; vegetation is common with no signs of erosion.**

Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
6. Wind Scoured, Blowout and/or Depositional Areas	Extensive. Blowouts exceed 5% of the area. Litter is blown away.	Common.	Occasionally present. Active white caps and blowouts exceed 2% of the area.	Infrequent and few.	**Ecological Reference Worksheet: None, because plants and litter block the wind.**
7. Litter Movement (wind or water)	Extreme movement **(>60 inches)**; concentrated around obstructions. Most size classes of litter have been displaced.	Moderate to extreme; loosely concentrated near obstructions. Moderate (stems) to small size classes of litter have been displaced.	Moderate movement **(24-48 inches)** of smaller size classes in scattered concentrations around obstructions and in depressions**.**	Slightly to moderately more than expected for the site with only small size classes (leaves) of litter being displaced.	**Ecological Reference Worksheet: Very little movement due to water because of high infiltration. Twelve inches maximum, and only with strong winds.**
8. Soil Surface Resistance to Erosion	Extremely reduced **(Stability Score <2)** throughout the site. Biological stabilization agents including organic matter and biological crusts virtually absent.	Significantly reduced in most plant canopy interspaces and moderately reduced beneath plant canopies. Stabilizing agents present only in isolated patches.	Significantly reduced **(Stability Score 3-4)** in at least half of the plant canopy interspaces, or moderately reduced throughout the site.	Some reduction in soil surface stability in plant interspaces or slight reduction throughout the site. Stabilizing agents reduced below expected.	**Ecological Reference Worksheet: Surface soil is stabilized (Stability Score 5 – 6). Stability scores based on a minimum of 6 samples tested.**
9. Soil Surface Loss or Degradation	Soil surface horizon nearly absent to absent (<25% of **A** horizon in place). Soil structure near surface is similar to, or more degraded, than that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure of surface and subsurface layers.	Moderate soil loss (50-75% of **A** horizon still in place) or degradation in plant interspaces with some degradation beneath plant canopies. Soil structure is degraded (more prismatic structure) and soil organic matter content is significantly reduced.	Some soil loss has occurred and/or soil structure shows signs of degradation especially in plant interspaces.	**Ecological Reference Worksheet: A horizon: 0 to 16 inches; brown loamy fine sand, weak medium sub angular blocky structure. E/Bt horizon: 16 to 29 inches, reddish yellow sand, prismatic structure.**
10. Plant Community Composition & Distribution Relative to Infiltration & Runoff	Infiltration is severely decreased due to adverse changes in plant community composition (increased shrubs/ annuals and loss of midgrasses) and/or distribution (large plant interspaces). Adverse plant cover changes have occurred.	Infiltration is greatly decreased due to adverse changes in plant community composition and/or distribution (plant interspaces connected and bare ground has increased). Detrimental plant cover changes have occurred.	Infiltration is moderately reduced due to adverse changes in plant community composition (midgrass dominated) and/or distribution (plant interspaces increasing). Plant cover changes negatively affect infiltration.	Infiltration is slightly to moderately affected by minor changes in plant community composition and/or distribution. Plant cover changes have only a minor effect on infiltration.	**Ecological Reference Worksheet: Infiltration and runoff are not affected by any changes in plant community composition and distribution. (Tallgrass/Midgrass dominated). Any changes in infiltration and runoff can be attributed to other factors (e.g. compaction).**
11. Compaction Layer (below soil surface)	None	None	None	None	**Ecological Reference Worksheet: There is no compaction layer due to sandy soils.**

Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
12. Functional/ Structural Groups (F/S Groups) See Functional/ Structural Groups Worksheet	Others now dominant (>40%)	Number of F/S groups reduced AND/OR One dominant group and/or one or more sub-dominate groups replaced by F/S groups not expected for the site AND/OR Number of species within F/S groups significantly reduced.	Subdominants > Dominants > Other	Number of F/S groups slightly reduced AND/OR Relative dominance of F/S groups has been modified from that expected for the site AND/OR number of species within F/S groups slightly reduced.	**Ecological Reference Worksheet: This site is made up of a plant community described as the Historic Plant Community in the range or ecological site descriptions. Dominants (>40%): Tallgrasses, Bunchgrasses Subdominants (10-40%): Midgrasses, Forbs Other (<10%): Shortgrasses, Shrubs**
13. Plant Mortality/ Decadence	Dead and/or decadent plants are common.	Dead plants and/or decadent plants are somewhat common.	Some dead and/or decadent plants are present.	Slight plant mortality and/or decadence.	**Ecological Reference Worksheet: There is some plant mortality and decadence on the perennial grasses, especially in the absence of fire and herbivory, but usually <10%.**
14. Litter Amount	Largely absent or dominant relative to site potential and weather. **<45% coverage with <1/4 inch depth; <u>or</u> greater than 2 inches of litter.**	Greatly increased or reduced relative to site potential and weather.	Moderately more or less relative to site potential and weather. **~65% coverage with ~1/4 inch depth; <u>or</u> greater than 1 inch of litter.**	Slightly more or less relative to site potential and weather.	**Ecological Reference Worksheet: Litter should cover >85% of the area between plants with accumulations of ~1/2 inch deep.**
15. Annual Production	Less than 20% of potential production for the site based on recent weather.	20-40% of potential production for the site based on recent weather.	40-60% of potential production for the site based on recent weather.	60-80% of potential production for the site based on recent weather.	**Ecological Reference Worksheet: Normal production is 2600-5000 pounds per year.**
16. Invasive Plants	Dominate the site or a thick stand of annuals. **(Woodies: >30% canopy cover; Herbaceous: >40% composition by weight).**	Common throughout the site. **(Woodies: 10-30% canopy cover; Herbaceous: 25-40% composition by weight).**	Scattered throughout the site. **(Woodies: 5-10% canopy cover; Herbaceous: 10-25% composition by weight).**	Occasional within the site. **(Woodies: Up to 5% canopy cover; Herbaceous: Up to 10% composition by weight).**	**Ecological Reference Worksheet: No invasive species. Invasives might include: eastern redcedar, annuals and non-natives.**

Indicator	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
17.Reproductive Capability of Perennial Plants (native or seeded)	Capability to produce seed or vegetative tillers is severely reduced. **(<25% as compared to what should be expected).**	Capability to produce seed or vegetative tillers is greatly reduced. **(25-50% as compared to what should be expected).**	Capability to produce seed or vegetative tillers is moderately reduced. **(50-75% as compared to what should be expected).**	Capability to produce seed or vegetative tillers is slightly reduced. **(>75% as compared to what should be expected).**	**Ecological Reference Worksheet: All plants capable of reproducing at least every 3 years. Seed stalks, stalk length, and seedheads are numerous and what would be expected. Overall health of plants is what would be expected.**

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Functional/Structural Groups Worksheet

State_OK_____ Office_____ Ecological Site__ Deep Sand _____ Site ID__ R080AY014OK __

Observers_____ Date_____

Functional/Structural Groups			Species List for Functional/Structural Groups
Name	Potential[1]	Actual[2]	Plant Names
Tallgrasses	D		
Midgrasses	S		
Shortgrasses	M		
Forbs	S		
Cool-season Perennial Grasses	M		
Shrubs	M		
Annuals	M		
Additional species groups of interest			
Noxious Weeds			
Invasive Native Plants			Eastern Red Cedar, Annuals
Invasive Exotic Plants			Non-natives
Biological Crust[3]			

Indicate whether each "structural/functional group" is a Dominant (D) (roughly 40-100 % composition), **a Sub-dominant (S)** (roughly 11-40% composition) **a Minor Component (M)** (roughly 2-10% composition), or a Trace Component **(T)** (<2% composition) based on weight or cover composition in the area of interest (e.g., "Actual[2]" column) relative to the "Potential[2] " column derived from information found in the ecological site/description and/or at the ecological reference area.

Biological Crust[3] dominance is evaluated solely on **cover** not composition by weight.

Evaluation Worksheet for Rangeland Health

Aerial Photo:_____.

Management Unit_____ **State** _____ **Office** _____ **Range/Ecol. Site Code**: _____
(Allotment or pasture)

Ecological Site Name:_____ **Soil Map Unit/Component Name**:_____

Observers: _____ **Date**: _____

Location (description):_____

T. ____ **R**. _____ **or** _____**N. Lat. Or UTM E**_____**m Position by GPS? Y / N**
UTM Zone____, **Datum**_____
Sec. _____, _____ _____**W. Long. N**_____**m Photos taken? Y / N**

Size of evaluation area _____

Soil / site verification:

Range/Ecol. Site Descr., Soil Surv., and/or Ecol. Ref. Area:

Surface texture _____
Depth: very shallow __, **shallow** __, **moderate** __, **deep** __
Type and depth of diagnostic horizons:

1. _____ **3.** _____
2. _____ **4.** _____
Surf. Efferv.: none__, **v. slight**__, **slight**__, **strong**__ **violent**__

Parent material _____ **Slope** _____**% Elevation** _____**ft.**

Average annual precipitation _____*inches*

Evaluation Area:

Surface texture _____
Depth: very shallow __, **shallow** __, **moderate** __, **deep** __
Type and depth of diagnostic horizons:

1. _____ **3.** _____
2. _____ **4.** _____
Surf. Efferv.: none__, **v. slight**__, **slight**__, **strong**__, **violent**__

Topographic position _____ **Aspect** _____

Seasonal distribution _____

Recent weather (last 2 years) (1) drought ___, **(2) normal** ____, **or (3) wet** _____.

Wildlife use, livestock use (intensity and season of allotted use), and recent disturbances:

_____
_____
_____
_____

Off-site influences on evaluation area:

_____
_____
_____
_____

Criteria used to select this particular evaluation area as REPRESENTATIVE (specific info. And factors considered; degree of "representativeness")

_____
_____
_____
_____

Other remarks (continue on back if necessary)

_____
_____
_____
_____

Reference: **(1) Ecological Reference Worksheet**:_____**; Author**: _____; **Creation Date**: _____
or (2) Other (e.g. name and date of ecological site description, locations of ecological reference area(s))_____