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Subject: Rosemont Allotment Rangeland Monitoring Analysis

To: District Ranger, NEPA Interdisciplinary Team, Permittee

Introduction

In the fall of 2009, Rangeland Management Specialists from the Nogales Ranger District read five long-term vegetation and soil monitoring transects on the Rosemont Allotment. The purpose of long term monitoring is to assess vegetation and soil condition and trend. The transects were initially established in 1964 according to the Parker three step method and reread in 1995 using the dry weight rank method. The measurement parameters collected in 2009 were plant frequency, dry weight rank, ground cover, fetch distance, and soil condition indicators.

All the monitoring transects on the Rosemont Allotment are in the Natural Resources Conservation Service (NRCS) Southeast Arizona Basin and Range Major Land Resource Area (MLRA) 41-1 in the 16-20 inch precipitation zone (PZ). The closest weather stations are located on the Santa Rita Experimental Range (SRER) only a few miles west of the Rosemont Allotment. The SRER includes both MLRA 41-3, in the 12-16 inch precipitation zone, and MLRA 41-1 in the 16-20 PZ. The precipitation data shown below represent the average of 24-29 rain gages¹. Average annual precipitation for the twelve years from 1997 through 2008 was 13.4 inches. Average summer (July – September) precipitation for the twelve years was 7.5 inches. Summer precipitation for 2009 was 5.37 inches.

Precipitation (Inches)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Annual	13.7	17.4	13.9	18.5	12.9	10.9	10.8	10.6	11.1	12.1	12.8	15.9	TBD
Summer	5.6	8.4	11.3	5.6	5.8	5.5	6.8	5.8	7.4	9.7	8.5	11.3	5.4

Methods

- Dry weight rank and pace frequency estimate plant species composition and provide data for the NRCS Ecological Site Guide similarity index. The similarity index ranks vegetation community status based on a presumed climax native plant community. Calculations were done in accordance with the Interagency Technical Reference *Sampling Vegetation Attributes* #1734-4.
- Fetch is measured as the distance from a point to the base of the nearest perennial plant. Average fetch distance for a site and the asymmetry value (the ratio maximum-median)/(median-minimum) are measures of vegetation distribution. Sites with shorter average fetch values and evenly distributed rather than clumped vegetation patterns are expected to have lower erosion rates due to less surface area exposed to wind and water flow. The asymmetry value cannot be used to compare sites; rather it is used to compare change over time within a given site.
- Ground cover readings were taken at 100 points along the transect (300 in 2009). Ground cover categories are: bare soil, basal vegetation, litter, cryptogam, fine gravel (¼” – ¾”), coarse gravel (¾” – 3”), cobble (>3”), and bedrock.
- The Soil Condition Rating Guide (adapted for the Coronado National Forest) is based on NRCS rangeland health concepts. It ranks hydrologic function (soil surface texture, structure, and compaction), site stability (sheet, rill or gully erosion, pedestaling, soil deposition, and the



presence of an A horizon), and nutrient cycling (plant functional groups, species, litter, and root distribution). Satisfactory is the highest rating and means the site is stable and fully functional.

Results

Monitoring cluster C1 is located in Rosemont North Pasture (T. 18 S., R. 16 E., Section 19; 12R 0523961, 3524079, NAD 83). The ecological site is Loamy Hills. In 1964 the site was rated in fair vegetation condition, excellent in 1995 and good in 2009 according to the NRCS similarity index. Sideoats grama is the dominant perennial grass. Soil condition in 1964 was rated good, and in 2009 it was satisfactory in all categories.

Cluster 2 is located in Rosemont South Pasture (T. 18 S., R. 15 E., Section 36; 12R 0522845; 3520375, NAD 83). The ecological site is Loamy Upland. Vegetation condition was good in 1964 and excellent in 1995 and 2009. Sideoats grama and plains lovegrass are the dominant perennial grasses. Soil condition in 1965 was rated excellent, and in 2009 it was satisfactory in all categories.

Cluster 3 is in Rosemont North Pasture (T. 18 S., R. 16 E., Section 28; 12R 0526924; 3522006, NAD 83) on a Loamy Upland ecological site with sideoats and sprucetop grama the dominant perennial grass species. Vegetation condition was high fair in 1964 and good in 1995 and 2009. Soil was rated good in 1964 and satisfactory in all categories in 2009.

Cluster 4 in East Highway Pasture (T. 18 S., R. 16 E., Section 34; 12R 0528706, 3521836, NAD 83) is a Loamy Upland ecological site with sideoats grama and other mid and short native grasses. Rated good in 1964 and fair in 1995, the similarity index placed the vegetation condition in the good category in 2009. Soil condition was high fair in 1964 and satisfactory in 2009.

Cluster 5 is in Rosemont South Pasture (T. 19 S., R. 16 E., Section 5; 1R 0524801, 3519873, NAD 83) on a Loamy Upland ecological site. The dominant perennial grass is sideoats grama. Vegetation condition improved from high fair in 1964 to good in 1995 to excellent in 2009. Soil condition was good in 1964 and satisfactory in 2009.

Six paced transects were also established in 1964 and reread in 1995 but not in 2009. Vegetation and soil condition for all paced transects were fair or good in 1964, and in 1995 vegetation condition was good for five transects and fair for one.

Summary

The table below summarizes the condition and trend monitoring data for five transects on the Rosemont Allotment.

Condition and Trend

Transect	1964		1995		2009	
	Veg	Soil	Veg	Soil	Veg	Soil
C1	Fair ↑	Good →	Excel		Good	Satis
C2	Good ↑	Excel ↑	Excel		Excel	Satis
C3	High Fair ↑	Good ↑	Good		Good	Satis
C4	Good ↑	High Fair ↑	Fair		Good	Satis
C5	High Fair →	Good ↑	Good		Excellent	Satis

Both vegetation and soil condition on the Rosemont Allotment are stable or have improved since monitoring transects were initially established in 1964. In spite of the ten-plus year drought, vegetation on the Rosemont Allotment is currently in good to excellent condition. Soil condition on all the monitoring sites is satisfactory, the highest category according to the NRCS Soil Condition Rating Guide. This indicates that hydrologic function, soil and site stability, and nutrient cycling are intact on these sites.

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¹ Data sets were provided by the Santa Rita Experimental Range Digital Database. Funding for the digitization of these data was provided by USDA Forest Service Rocky Mountain Research Station and the University of Arizona.