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Subject: Stone Springs Allotment Rangeland Monitoring Analysis

To: District Ranger, NEPA Interdisciplinary Team, Permittee

Introduction

In the fall of 2010, Rangeland Management Specialists from the Nogales Ranger District read three long-term vegetation and soil monitoring transects on the Stone Springs Allotment. The purpose of long term monitoring is to assess vegetation and soil condition and trend. The transects were initially established in 1969 according to the Parker three step method. The measurement parameters collected in 2010 were plant frequency, dry weight rank, ground cover, fetch distance, and soil condition indicators.

All the monitoring transects on the Stone Springs Allotment are in the Natural Resources Conservation Service (NRCS) Southeast Arizona Basin and Range Major Land Resource Area (MLRA) 41-3 in the 12-16 inch precipitation zone (PZ). The closest weather stations are located on the Santa Rita Experimental Range (SRER) only a few miles southwest of the Stone Springs 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 2009 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	9.5
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

Cluster 1 in Stone Springs Pasture (12R 0523847, 3527284, NAD 83) is a Sandyloam Upland ecological site with Black grama, Sprucetop grama and other mid and short native grasses. Rated fair in 1969 and poor in 2010, Lehmann love grass currently makes up 77 percent of the species composition. The Lehmann love grass is why the scoring came out as poor. Soil condition was fair in 1969 and satisfactory in 2010. Grass production in 2010 was estimate at 900 pounds per acre.

Cluster 2 in Stone Springs Pasture (12R 0524048, 3525584, NAD 83) is a Granitic Hills ecological site with sideoats grama, plains lovegrass and other mid and short native grasses. Site rated fair in 1969 and excellent in 2010. Soil condition was fair in 1967 and satisfactory in 2010. Grass production in 2010 was estimate at 400 pounds per acre.

Cluster 2A in Fagan Pasture (12R 0527278, 3530870, NAD 83) is a Loamy Upland ecological site with sideoats grama, Sprucetop grama and other mid and short native grasses. Rated fair in 1969 and good in 2010, Lehmann love grass currently makes up 16 percent of the species composition. Soil condition was fair in 1969 and satisfactory in 2010. Grass production in 2010 was estimate at 600 pounds per acre. This pasture was once the Fagan Allotment.

The Fagan and Stone Springs Allotments were joined together in the 80's. This allotment has issues dealing with access from the north side of the allotment. Due to the number of new homes encroaching from Tucson to the forest boundary much of the access has been eliminated. However several wildcat roads have been observed on the allotment coming from these housing developments. The only current access onto the allotment is through the Rosemont Allotment.

Summary

The table below summarizes the condition and trend monitoring data for eleven transects on the Stone Springs Allotment.

Condition and Trend

Transect	1969		2010	
	Veg	Soil	Veg	Soil
C1	Fair→	Fair→	Poor↓	Satisfactory
C2	Fair→	Fair→	Excellent↑	Satisfactory
C2A	Fair→	Fair→	Good↑	Satisfactory

Both vegetation and soil condition on the Stone Springs Allotment are stable or have improved since monitoring transects were initially established in 1969. In spite of the ten-plus year drought, vegetation on the Stone Springs Allotment is currently in poor 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.