

## Case Study

# Plant Species Diversity, Drought, and a Grazing System on the Arizona Strip

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## On the Ground

- Maintaining plant diversity under livestock grazing and long droughts is a challenge in arid rangelands.
- Maintaining the plant diversity can and has been done through rotation grazing and movement of cattle from pasture to pasture at a trigger point.
- The trigger point is utilization levels of between 40% and 50% of annual growth of forage plants.

**Keywords:** grazing system, frequency, species composition, utilization, diversity, Arizona Strip.

Rangelands 1–8

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One of the plant ecological and range management goals on western rangelands is to maintain a healthy plant species composition to provide a year-round supply of good forage for all animals and cover for watersheds. What is good species composition? The Ecological Site Guides<sup>1</sup> provide guidance on the quality and quantity of the species for a particular site. The occurrence of cool season grasses, warm season grasses, browse, shrubs, and a variety of forbs on rangeland site provides value. Of even more value is a system that maintains good diversity while in a long drought. Expected diversity is now detailed in Ecological Site Guides to help guide field managers in setting expected levels of plant species composition. There has been ample research and experimental grazing research<sup>2,3</sup> published on how to accomplish healthy rangelands, but applying research on the ground has been harder to put into practice for many reasons (drought, water availability, and lack of management). There are, however, ranches and operations that have put good practices into their daily operations. One such allotment is the Mt Trumbull Allotment located on the Arizona Strip District of the Bureau of Land Management.

## Location and Description of the Mt Trumbull Allotment

The Mt Trumbull allotment is located 58 miles south of St. George, UT, on the Arizona Strip District of the Bureau of Land Management. The four summer pastures (Rim, North and South Stockade, Boys) are above the Hurricane Cliffs. The three spring/fall pastures (Whitmore, Side of the Mountain, and 160) are below the Cliffs. The two Frog and Cane pastures are in the inner gorge of the Grand Canyon and are used in the winter.<sup>4</sup>

The total acreage of the allotment is about 33,000 acres, which includes public lands, state lands, and private land. The elevation ranges from 3,300 feet to almost 7,000 feet.<sup>5</sup> Precipitation averages 13.1 inches per year at the Side of the Mountain precipitation gauge (Fig. 1).<sup>6</sup> The allotment goes from the upper Mojave Desert shrubs to the pinyon forests. The allotment has a large acreage that is pinyon and juniper woodland and some of this was chained and seeded. The desert grasslands on the allotment are in the chained areas. This can be seen in the Side of the Mountain trend picture (Fig. 2) of the key area where the vegetation monitoring is done.

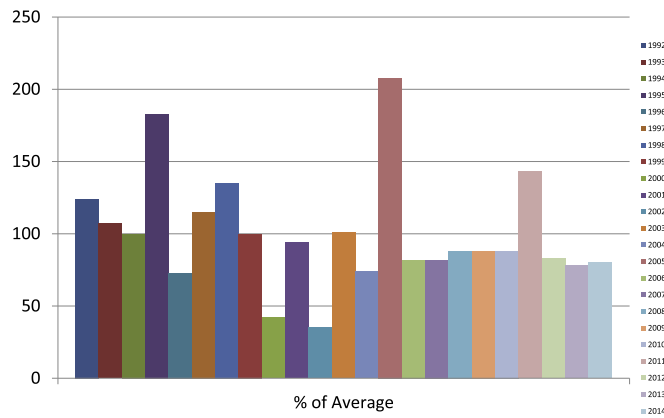
The Rim Pasture's key area is in the Pinyon woodland, which was chained and seeded in the late 1960s and early 1970s. The trees are slowly returning into the key area (Fig. 3). Sagebrush openings and meadows are scattered through the woodlands. The desert shrub and creosote bush country all occur at the lower elevation Frog and Cane pasture of the allotment.

## Livestock

The basic operation is 144 head of cattle yearlong and rotating through the pastures on a seasonal basis as described. It is a cow/calf setup. The allotment has belonged to the Orvel Bundy family, (Fig. 4)<sup>7</sup> since the 1960s, before which his father owned the ranch.

## The Grazing System

The summer/early fall grazing system is a rest rotation system; the spring, late fall, and winter pastures are on a



**Figure 1.** Percent of average precipitation 1992 to 2014. The precipitation data are from the Side of the Mountain precipitation gauge, which is the only gauge on the allotment. The gauge is read every 3 months for four readings a year. The average precipitation is determined by a running average from 1992 to the present and changes each year. The average is 13.15 inches. The bar graphs show the percent of average per year on the x-axis, and the overall percent average is on the y-axis.

deferred grazing system (Tables 1 and 2). The management of the pastures is flexible in accordance with forage available, so some pastures will have slightly altered periods of use in some years. The grazing system of moving cattle from the low-elevation country used in the winter to intermediate-elevation pastures in

the spring to the high-elevation pastures in the summer was started in the late 1960s. (The spring use pastures are also used in the fall.) In the 1960s and 1970s, the large land treatments began as planned in the management plan. Cross fencing for the three upper pastures (Rim, North, and South Stockade) occurred in the



**Figure 2.** Trend photos for Side of the Mountain Pasture in 1984 and 2012.

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