Riparian and Browse Analysis

Greenback Holistic Resource Management Unit

by

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Introduction

The Greenback Holistic Resource Management (HRM) Unit was established as a test area for application and evaluation of grazing practices under HRM concepts. Since riparian area management and improvement goals were established in the Tonto Land and Resource Management Plan, riparian area improvement was selected as one of three criteria for evaluation of HRM implementation. Methodology for monitoring riparian areas was designed by Jerry Davis and was initiated in 1983. The following report describes the findings of this monitoring effort and offers recommendations for grazing strategies that will meet riparian area goals and objectives.

Methodology

Two riparian areas, Greenback Creek and Oak Creek, occur within the Greenback Holistic Resource Management Unit. Greenback Creek is normally perennial, while Oak Creek is ephemeral for most of its length within Greenback and Tonto Basin allotments. Both creeks appear capable of producing quality riparian vegetation, but Greenback Creek has far more potential due to its perennial flows.

In fall 1983, plots were established on these creeks to measure the response of riparian vegetation to the changes in proposed grazing management under HRM. One hundred, one-hundredth acre plots were established on Greenback Creek. These plots began near the holding corral and continued downstream. Plots were spaced approximately one chain (66 feet) apart and alternated across the stream channel. Twenty plots were also established on Oak Creek within the Greenback HRM and twenty plots within the Tonto Basin Allotment. Plots began at the division fence between these allotments and alternated across the stream channel at one chain intervals.

Plot centers were marked with rebar. Woody species were tabulated by diameter class and height. In 1983 and 1984, canopy cover was estimated and photos taken at every tenth plot. In 1988 and 1989, photos were taken of general views of each plot in order to better document overall changes.

Plots were reread in October 1984, 1988, and 1989. In 1988, 54 plot stakes were lost due to high water from a summer thunderstorm, but the 46 surviving plots were read. The 54 plots lost in 1988 were replaced in approximately the same locations in the 1989 survey.

Twenty browse plots were established in brushfields on the north and south ends of the HRM area. Brush species are predominantly Ceanothus, with mixtures of holly, turbinella oak and some mahogany in the transect above Oak Creek. Methodology followed the Aldous Deer Browse survey technique with 10 one-hundredth acre plots established at each location. Pellet groups (deer), cow flops, and browse condition were measured at each plot. Plots were read in 1983, 1984, and 1988.

Results

Greenback Creek

Figures 1,2, and 3 summarize data from the riparian plots on Greenback Creek. Changes in the number of stems by diameter class is compared for each of the three major riparian species - sycamore, cottonwood and willow.

Little change in riparian vegetation occurred between 1983 and 1984. A slight response was noted, but overall densities did not change greatly. The 1988 survey data (not shown) indicate that sycamore densities were improving and developing a two year age class, but willow and cottonwood populations remained virtually unchanged. The 1989 survey, however, indicated an increase in the smallest diameter class for all three riparian species. Sycamore showed a slight increase in two-year old plants, but no change in three-year old plants. Cottonwood and willow again had little increase in two-year old+ plants.

Figure 1

Greenback Creek

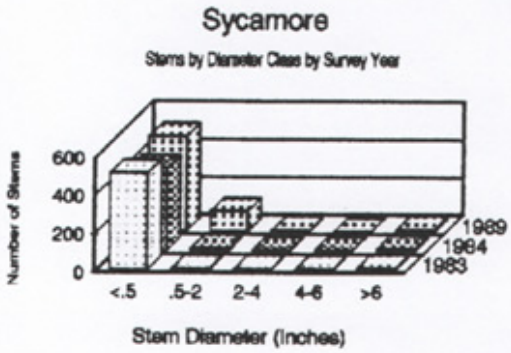


Figure 2

Greenback Creek

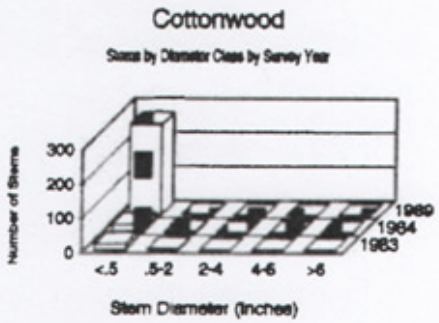
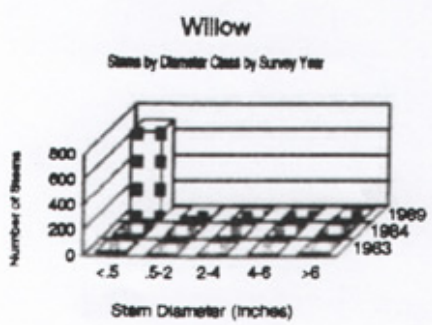


Figure 3

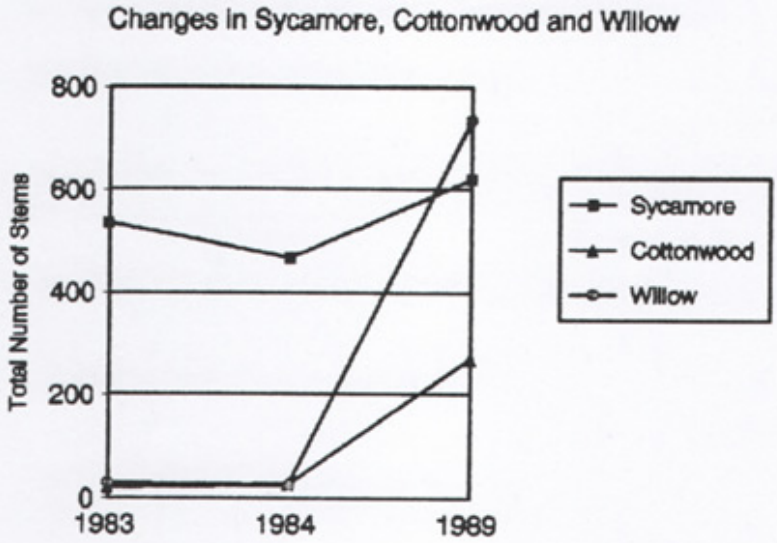
Greenback Creek



Increases in the total amount of riparian vegetation between 1983 and 1984 is shown in Figure 4. Overall numbers of stems for three three major riparian species increased between 1984 and 1989, although the previous Figures have shown this to be mostly due to current year's production.

Figure 4

Greenback HRM



Plots were not reread in 1990; however, a brief survey of Greenback Creek was made. The survey indicated that vegetation responded better in 1990 than during any previous year. Several age classes were noted for all species and herbaceous vegetation was dense giving the area a lush appearance not found during the previous four surveys.

Oak Creek

Figures 5,6,7 and 8 show changes in alder and sycamore populations for portions of Oak Creek within the Tonto Basin Allotment and the Greenback HRM area. Data for cottonwood and willow are not presented, since these species do not occur within plots on Greenback HRM. Two and three age classes have developed under the grazing strategy for Greenback, while the Tonto Basin Allotment shows little age class differentiation.

Most of the alders and sycamores numbers recorded in the advanced age classes appeared to have developed between 1983 and 1984 surveys and may have established prior to 1983. Grazing records and rainfall data have not been evaluated for these years to determine the reason for the sudden response in vegetation. Based on the age class distribution from the 1989 surveys, it appears that production by alder and sycamore was suppressed in the previous season, since number of stems in the .5" size class should have been much greater than that actually recorded.

Figure 5

Oak Creek - Greenback HRM

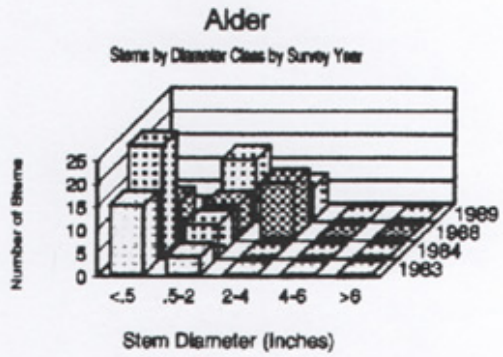


Figure 6

Oak Creek - Greenback HRM

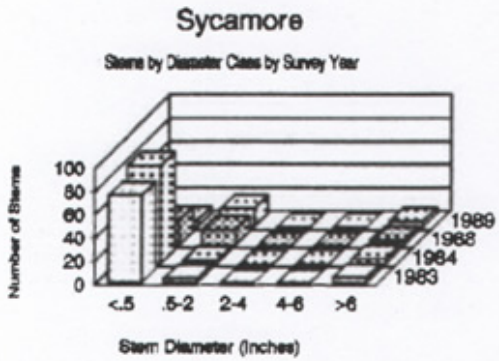


Figure 6

Oak Creek - Tonto Basin Allotment

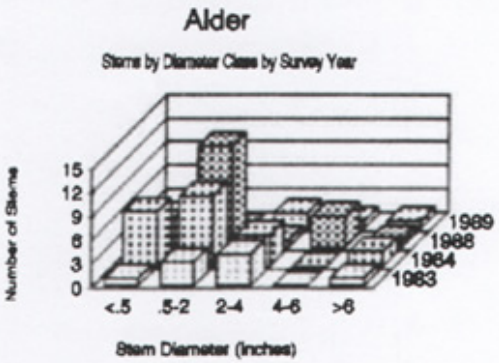
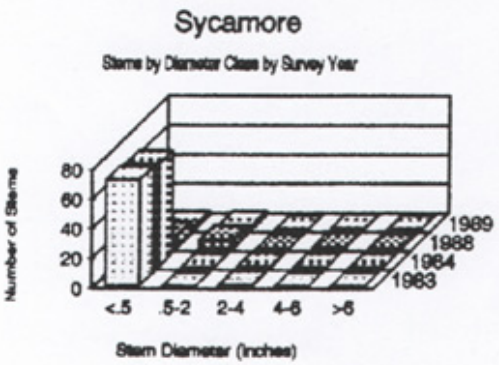


Figure 7

Oak Creek - Tonto Basin Allotment



Figures 9 and 10 demonstrate the difference between the total numbers of key riparian species, alder and sycamore, in the two allotments in 1983 and 1989. Total number of plants have decreased on the Tonto Basin Allotment, while increasing on the Greenback HRM unit (Figure 9). Figure 10, however, indicates that trends in riparian vegetation on the two allotments were almost identical with increases and then declines in total numbers.

Figure 9

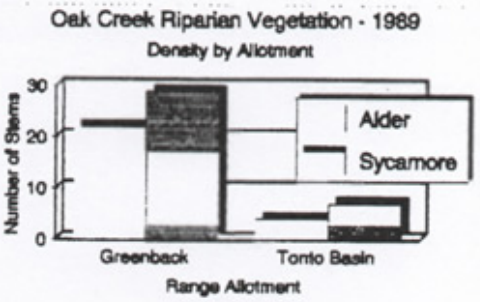
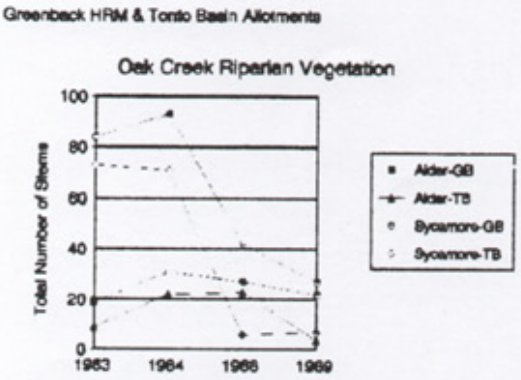


Figure 10



Browse

Browse plots were last read in October, 1988. Plot data for 1988 indicate a significant difference between the browsing of Ceanothus on the Oak Creek and Boneyback portions of the allotments. On the Boneyback transect, browsing was light to moderate with prewinter utiliztion estimated at 20 percent of current years growth. Deer pellet groups were 190 per acre and cow flops were 20 per acre. Age and form class of the shrubs were good.

At the transect on the northside of Boneyback, above Oak Creek, browse utilization was very different. Prewinter utilization was estimated to be 60 percent of current year's growth. There were 90 deer pellet groups and 220 cow flops per acre. Form class was heavily hedged on most of the transect, with the most use occurring on the lower half of the transect near Oak Creek.

Discussion

Greenback Creek

The four surveys on Greenback Creek indicate that the grazing strategy practiced for six years did not significantly improve the condition of the riparian area. The 1988 flood depressed overall densities of riparian vegetation, but was not a major factor in riparian response. Livestock were allowed to graze for limited intervals throughout the year, with at least two grazing periods during summer and fall. In 1990, Eddie Conway changed the grazing period for pastures adjoining Greenback Creek. The units were grazed in early spring, but livestock were kept out of the pastures in summer and fall. Numerous studies indicate that summer and fall grazing is usually detrimental to riparian vegetation without strict utilization standards. The permittee has agreed to im-

plement winter/spring use and bypass these units in summer/fall. Transects will be read in 1991 to assess any changes in vegetation.

Oak Creek

Initially, the data indicate that riparian vegetation is responding under the current grazing management within the Greenback HRM area. Although stands of sycamore and alder have essentially outgrown livestock, there appears to still be suppression of riparian vegetation. Cottonwood reproduction is absent from the Greenback HRM portion of the drainage although the species is found in the drainage. On the Greenback HRM, woody riparian vegetation is limited to only two short stretches, while the remainder of the channel has no woody riparian species. Riparian vegetation in this drainage appears to be limited by subsurface flow which occurs near the surface in the two areas with good vegetation.

Based soley on the differences in densities of alder and sycamore, Greenback HRM portion of Oak Creek appears to be in better condition than the Tonto Basin portion. However, both of these species are less desirable to livestock than cottonwood and willow, which are absent in the Greenback HRM reach of the creek. Livestock use may have been altered enough to allow alder and sycamore to maintain growth, while suppressing cottonwood and willow.

Also, as shown in Figure 10, trends in total number of stems of riparian species on these two allotments were not significantly different. This seems to indicate that management strategies on the HRM unit provided for more improvement in riparian than did management on Tonto Basin Allotment. However, it may also indicate that conditions for riparian species, alder and sycamore in this case, are better in the upper portion of the drainage due to subsurface water or temperature. Although data on moisture and temperature are not available, it appears that these are the primary factors determining the differences in riparian response.

There is an absence of herbaceous vegetation along this creek in both allotments. This may be due to the ephemeral nature of the creek, but it could be due to utilization by livestock. In the 1988 survey, the entire creek had been heavily impacted by livestock trailing and trampling. Information on livestock utilization was not recorded in the 1983-84 surveys.

Some of the loss of riparian vegetation on the Tonto Basin Allotment may be due to disease or changes in temperature or rainfall. Substantial mortality of alder has occurred on this reach of the creek. In 1988, a few of the larger alder had died, but by the 1989 survey, a majority of the alder had died. Alder mortality was not noted in the Greenback HRM reach of the creek.

Although gains have been made in woody riparian vegetation under management of the Greenback HRM, it is unlikely that riparian vegetation on Oak Creek could achieve ecological potential under the current rotational strategy. The area still lacks herbaceous vegetation and diverse species compostion. It could likely improve further if managed under a spring only grazing strategy similar to that recommended for Greenback Creek.

Browse

Utilization of browse on the south side of Boneyback is near levels of use which can provide browse for the deer in this area during the remainder of fall and early winter. The deer population on the south side of the mountain is good and requires sufficient quantities of high-quality browse to maintain the population.

Utilization on the north side of Boneyback is too high and continued use at these levels will result in loss or significant damage to the plants. Current years growth of browse has been totally removed on many plants with a significant reduction in avialability and quality of deer forage.

Recommendations

Greenback Creek

Continue grazing management under spring use only. Reevaluate in 1991 and adjust season as needed. Under a spring only grazing strategy, seedling production of woody riparian species should avoid utilization by livestock and numbers of stems in the larger diameter classes should increase significantly. In addition, herbaceous vegetation will be allowed to regrow during the summer, resulting in accumulation of litter. This litter will trap and hold sediment during summer and winter rains and aid in soil deposition and stream agradation.

Oak Creek

Graze Oak Creek under a spring only strategy similar to that proposed for Greenback Creek. Riparian vegetation should be evaluated over the next two seasons to determine if additional riparian vegetation response is possible on this creek.

Browse areas

Reduce late summer/fall use in areas with significant amounts of ceanothus, mahogany or other preferred species. Maintain the current level of grazing on the south side of Boneyback and reduce the amount of utilization on the north side. Attempt to develop periods of complete rest one year out of two or more.

Comments

Implementation of any grazing management strategy requires delineation of sensitive wildlife areas and objectives for their management. These areas were identified for Greenback HRM, but as far as can be determined, objectives were never developed. Some of the concerns over the

grazing strategies proposed under HRM is the potential impacts to sensitive wildlife areas under multi-season high intensity use. Objectives may have helped in alerting the permittee and district that changes were required in the seasonal movement of livestock.

The concepts and practices of HRM may work, but, as with any strategy, the timing of livestock use within riparian areas is the key factor in how these areas respond. Effects of short duration grazing on woody and herbaceous riparian vegetation may not be as severe as longer periods of use, but even short duration use must be applied at the correct time of the year. In order for riparian areas to improve, seedlings must be lightly utilized or not utilized at all. A period of regrowth must be provided for both herbaceous and woody species. Utilization on herbaceous species must not only allow for regrowth, but must also allow for accumulation of litter for stream bank stabalization and building during the rainy seasons.

To date, these criteria have not been applied in management of riparian areas within the Greenback HRM Unit. Additional fencing may be needed to further divide pastures in order to achieve proper grazing within riparian areas along Greenback and Oak creeks and the browse areas around Boneyback.