

Babocomari River Riparian Protection Project

Dan Robinett

Robinett Rangeland Resources LLC, Elgin, Arizona

Linda Kennedy

Appleton-Whittell Research Ranch of the National Audubon Society, Elgin, Arizona

Abstract—The Babocomari River is a major tributary of the San Pedro River in Santa Cruz and Cochise counties, Arizona. This 140,000 acre catchment includes rolling grasslands on the Sonoita plain, oak woodlands in the Canelo Hills and the pine-oak forests of the northwestern Huachuca Mountains. The Babocomari River runs for 22 miles from its headwaters near Sonoita at 5000 feet elevation, eastward to join the San Pedro at Fairbanks at an elevation of 3850 feet. The U.S. Geological Survey estimates that this important tributary contributes about 6000 acre-feet of water annually to the San Pedro River system. The Arizona Department of Water Resources funded this 5-year study with a grant (09-164WPF) in 2009. Monitoring transects were installed in 2009 and 2010 and will be re-read each year through 2013. Objectives: Construct 2 miles of riparian boundary fence to restrict access by livestock from the Babocomari River. Install six stream riparian vegetation and geomorphic monitoring transects and six vegetation and geomorphic transects on riparian grasslands (sacaton) on tributaries to the Babocomari River. Analyze and summarize data annually and present that information to the participating ranch properties for use in making management decisions. Riparian monitoring stations were established in May of 2010 at three locations along the Babocomari River below the Babocomari Ranch (BR) headquarters and at three locations in June of 2010 on the Appleton-Whittell Research Ranch (ARR) of the National Audubon Society. These riparian monitoring transects were re-read in June of 2011. Riparian grasslands include large bottomlands of giant sacaton (*Sporobolus Wrightii* Monro ex Scribn) on both the BR and the ARR. Riparian grassland monitoring stations (three on each property) were established in the fall of 2009, re-read in 2010 and 2011. In addition to this monitoring effort the Babocomari Ranch has begun to protect private lands along the Babocomari River by selling development rights and placing conservation easements on the land. The land on the Research Ranch is already protected from development.

Introduction

The Babocomari River is a major tributary of the San Pedro River in Santa Cruz and Cochise counties, Arizona. This 310 square mile catchment includes rolling grasslands on the Sonoita plain, Chihuahuan desert scrub of the Whetstone pediment, oak woodlands in the Canelo Hills and the pine-oak forests of the northwestern Huachuca Mountains. The Babocomari River runs for 25 miles from its headwaters near Sonoita at 5000 feet elevation, eastward to join the San Pedro at Fairbanks at an elevation of 3850 feet (Cook and others 2009). This important tributary contributes about 6000 acre feet of water annually to the San Pedro River system (ADWR, 2005). Protection and monitoring of the Babocomari River and associated ecosystems are an important part of the management of water resources in the area. The Arizona Department of Water Resources funded a 5-year

study with a grant (09-164WPF) in 2009. Monitoring transects were installed in 2009 and 2010 and will be re-read each year through 2013.

The objectives of the grant are (1) construct 2 miles of fence to restrict access by livestock to the Babocomari River corridor; (2a) install six vegetation and geomorphic transects on riparian grasslands (sacaton); (2b) install six riparian vegetation and geomorphic monitoring transects; (3) present annual results to the participating ranch properties for use in making management decisions. This paper addresses objectives 2a and 2b.

Methods and Results

Riparian Grasslands (Sacaton)

Large bottomlands of giant sacaton (*Sporobolus Wrightii* Monro ex Scribn) are found on both ranches. Six riparian grassland monitoring sites were established in the autumn of 2009 and were re-surveyed for canopy and basal cover by vegetative species in 2010 and 2011. Transects are re-surveyed for changes in channel morphology annually.

We present data from one riparian grassland (sacaton) transect as an example.

Transect # 1 is on the ARR just below the confluence of Post Canyon and O'Donnell Canyon and was established by Dr. Ron Tiller in 1997. A rain gauge is within 600 meters and a piezometer (7 m deep well) nearby is read quarterly for depth to groundwater. This transect

In: Gottfried, Gerald J.; Ffolliott, Peter F.; Gebow, Brooke S.; Eskew, Lane G.; Collins, Loa C., comps. 2013. Merging science and management in a rapidly changing world: Biodiversity and management of the Madrean Archipelago III; 2012 May 1-5; Tucson, AZ. Proceedings. RMRS-P-67. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

is 448.5 meters long. The southern half of the cross section burned in the Canelo fire (wildfire) on May 6, 2009. Everything north of the Post/O'Donnell Canyon channel was unburned. Ten, 100-meter lines were re-sampled for vegetative cover by species and soil cover at fixed stations along this transect.

Precipitation in 2011 (13 inches) was much lower than in 2010 (21.5 inches) and was only 75% of the long-term average. Total perennial grass foliar cover on this transect was 43% with 7% basal cover, down slightly from 2010 with giant sacaton dominating. Vine mesquite (*Hopia obtusa*), blue grama (*Bouteloua gracilis*), green sprangletop (*Leptochloa dubia*) and sideoats grama (*Bouteloua curtipendula*) made up the remainder of the cover. Basal cover of litter was higher and bare soil lower in 2011, although the differences are within sampling error. Annual forb cover was less in 2011 due to a "La Nina" winter and very poor winter-spring moisture. (figs. 1, 2).

Riparian Stream

Monitoring stations were established in May of 2010 at three locations along the Babocomari River below the ranch headquarters. They were re-read in June 2011. Data from one monitoring station is included as an example.

BR #1 is on the Babocomari River and begins about 100 meters downstream of the USGS stream gauge (#09471380), about 4 miles east of the Ranch headquarters. It runs from the southwest to northeast. This portion of the Babocomari River was fenced to make a separate (River) pasture in 1996 and has been managed by grazing only during the winter months and for short periods of time (2 to 3 weeks) since then. The pasture was not grazed in either 2009 or 2010.

The monitoring at this location consists of a cluster of three riparian green-line transects for herbaceous vegetation paired with three belt transects (3 m wide) on both banks to record tree species by canopy

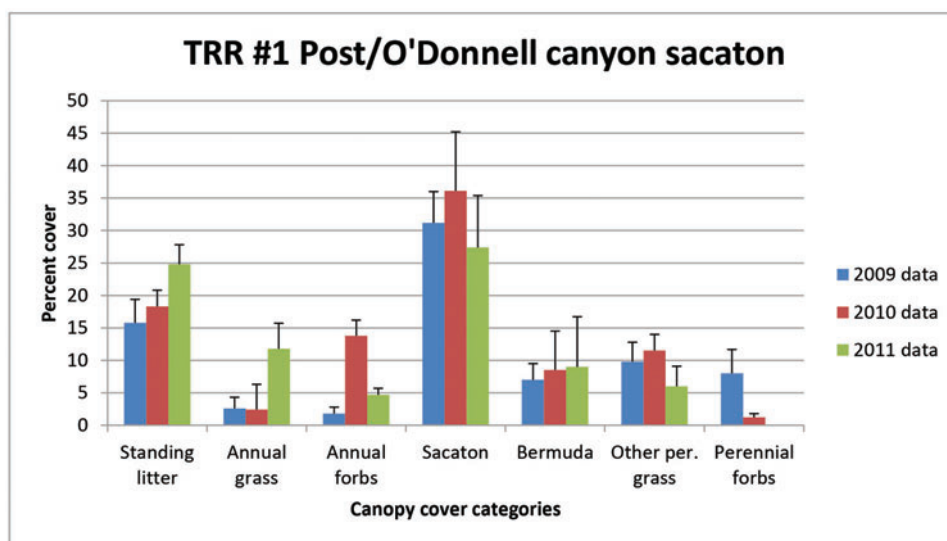


Figure 1—Percent canopy cover for TRR #1.

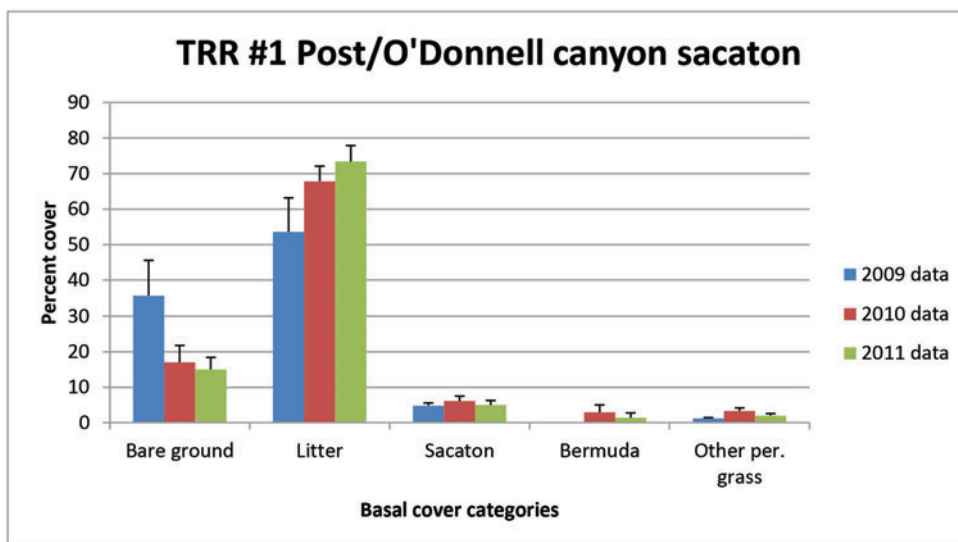


Figure 2—Percent basal cover for TRR #1.

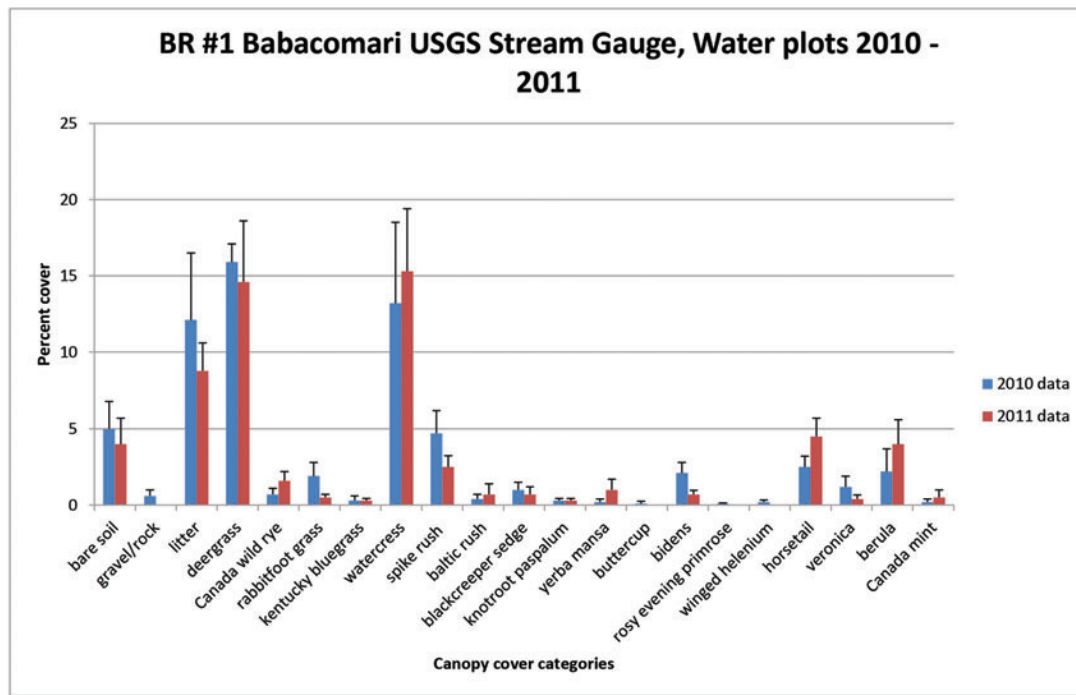


Figure 3—Percent canopy cover for BR #1.

cover. Green-line transects (Medina 2008) are 40 m in length along both banks. This technique helps segregate the plant community into bank loving and water loving species. Data are presented separately for bank plots and water plots. Herbaceous vegetative data are presented as average canopy cover by species summed for all three transects in a cluster. Tree vegetative data are presented as average canopy cover by species and average total canopy cover for the transect area. Total cover is often less than the sum of individual tree species cover because individual tree canopies overlap.

Geomorphic monitoring includes three survey cross sections, one perpendicular to the stream channel at the midpoint of each transect in the cluster.

The vegetative data show a diverse plant community dominated by native wetland species. Deergrass (*Muhlenbergia rigens*) dominates the bank plots with lesser amounts of horsetail (*Equisetum laevigatum*) and spike rush (*Eleocharis palustris*) (fig. 3).

Deergrass and watercress (*Rorippa nasturtium-aquaticum*) dominate the water plots with lesser amounts of spike rush, horsetail, and several important aquatic forbs. Banks are extremely well vegetated with only 4 to 5 % bare (exposed) soil. There were no significant changes in the understory plant community from 2010 to 2011. Total tree canopy cover averaged over all three transects is 63%. Cottonwood (*Populus fremontii*) is dominant and Gooding willow (*Salix goodingii*) is sub-dominant. There were no significant changes in tree canopy from 2010 to 2011.

Geomorphic cross sections were surveyed at 2- to 3-meter intervals and perpendicular to the stream at each transect. Cross sections spanned the floodplain and low stream terraces on either side. Re-survey of the cross sections show little change in the last 3 years.

Conclusions

Monitoring information developed during this study is being used to help make management decisions that maintain and improve vegetative conditions along the Babocomari River, several major tributaries, and the Babocomari Cienega. Both the BR and ARR management intend to continue monitoring at these sites after this WPF grant expires. The water, plant, and animal resources of this system are diverse and rarely found intact with such good environmental and hydrologic conditions. In addition to this monitoring effort, the BRR has begun to place conservation easements on the land. The land on the ARR is already protected from development. The Babocomari River and its upper watershed are worth preserving and protecting for generations to come.

References

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