

**Memorandum**

JUN 20 2005

**To: Elizabeth Boettcher, Project Manager**

**From: Richard C. Collins – C6 Ranch**

**Subject: Twelfth Quarterly Report and Final Report  
ADEQ Project Grant #4-013**

**Date: May 20, 2005; completed June 10, 2005**

*Revised*

This report covers the period from January 1 through March 31, 2005. The UA Cooperative Extension's report of "Vegetation Monitoring and Trend Analysis for the ranch was received in March. This year we included my utilization data in the report, rather than separately, as I have done in the past. Similarity indices (the degree, expressed as a percent, that a pasture transect vegetation is similar to a like range site in very good condition) were the same as last year and ranged from 64% to 85%. The PFC monitoring in Redrock Canyon scheduled for this quarter was postponed on the advice of the biologists because we have not had a significant flood event since the first determination in 2003, and because they recommend PFC be done every 4-5 years. Ours will be done in 2007 at the end of new Redrock watershed grant and the cost (\$8000) of the determinations and comparisons will be moved to applicant/donor match for the C6 Ranch portion of that new grant.

Installation of the erosion mats in head cuts in CCC flats was done February 17 and 18<sup>th</sup> by the Forest Service (Task 17, see pictures). C6 Ranch supplied 13 hours labor as well as one 4wd pickup and one ATV. On March we ran our 4wd tractor 6 hrs to complete the shaping of the head cuts so Forest Service could finish installation. These items are claimed as applicant match on our time sheets, as well as the cost of the erosion mats which we paid for out of pocket.

The only other task remaining was fencing Hidden Tank. This is being done now as part of the new watershed grant. The contractor started the 4.25 mile fence job on April 25<sup>th</sup> and will finish end of next week May 28<sup>th</sup> (See pictures).

The outreach required under the grant continues to be the discussions, negotiations, writing and submitting and receiving the new ADEQ Redrock Watershed grant to the members of the Canelo Hills Coalition. This month, 5 other neighboring ranches joined the Coalition and we are glad to have them; there's strength in numbers.

**Final Report:**

Project Goals: The main goal was to reduce non-point source (soil erosion) pollution runoff in the Redrock and Sonoita Creek watersheds on the C6 Ranch, a cattle ranch grazing on about 13,000 acres of Forest Service lands in Santa Cruz County, Az. To do this, we had to (1) develop alternate sources of livestock water in the uplands to replace springs and live water in Redrock Canyon, (2) build fences so we could control the movement of cattle, (3) install erosion control in head cuts and gullies, (4) and implement a scientifically valid rangeland and riparian monitoring program that could measure the effects of our efforts on rangeland health and watershed function over the long term. These measures, especially new waters and fences, would allow us to rotate cattle

through the pastures on a time schedule that would rest every pasture during the summer growing season, at least every other year, and rest the riparian pastures in Redrock Canyon every growing season. This deferred rotational grazing plan has been implemented and is generally working much better and is easier to do because of the new improvements. This final report will talk about each group of improvements, water, fencing, erosion control, and monitoring, as well as the "outreach" part.

1. Water development. It is important to understand that new water sources allows the impacts of grazing to be spread more evenly over the watershed, rather than concentrating them. We already had the wells and water storage tanks needed, and we extended pipelines into Red Bear pasture and installed 2 troughs, and into west Corral Canyon to replace a natural spring that we fenced off into a holding pasture (see 2). We used heavy duty polyethylene heat fusion pipe, installed on top of the ground. This generally worked well and carried ample water. However, in one area (west Corral Canyon) we used 1" diameter. 1.25" diameter with a 200 psi rating has had less problems, and we will use this for any future projects. Also, on some reaches, drug smugglers walking from up from Mexico to Highway 83 follow the pipeline and have punched holes. Where the pipeline is on a ranch road, we can bury it. Any future installations will be on roads or in areas not frequented by drug smugglers. As a general comment, our biggest problem by far, and not just for this grant, is vandalism to our waters and fences, gates left open, and trash left behind by drug smugglers and illegal immigrants.

We also installed a wind driven electrical generator at the Forest Service well powered by a gasoline driven generator. During the drought, water level dropped so that the wind generator could lift water only with sustained winds of 15 mph. It did provide water during the windy months of spring and winter and was helpful, but we still have to run the gas generator, especially during the months of high water use (April, May, June). But the wind generator tower was toppled in a thunderstorm (guide wire was tampered with). I have repaired it (cost \$650) but will wait to re-install it until the Border Patrol gets control of the illegals.

2. Fencing. Fencing natural water sources must be accompanied by development of alternate water sources, i.e., pipelines, etc. In Corral Canyon Spring and Alamo Spring, we fenced off the areas surrounding the springs to make special use holding pastures where cattle could be held during round-up, for special use (breeding heifers), or when moving to another pasture. During the rest of the time cattle are excluded to allow the springs to recover, since these springs were previously the only source of livestock water for the last 100+ years. This has worked exceptionally well in Alamo spring, where a 400 acre holding pasture was created. The spring is healing, and we have a holding pasture in a critical location at the headquarters. At Corral Canyon, this has been less successful because the drug smugglers leave gates open. But, the fence has only been there one growing season. Also, they leave huge amounts of trash, water bottles, packs, bedrolls, clothes, etc. The exclosure fence in West Redrock pasture around a reach of perennial water in Redrock Canyon has worked very well. Previously, the Forest Service had restrictions on grazing that precluded use of the entire pasture, but now we can use it in our regular rotation.

The fences around dirt ponds or tanks --- Gasline, Hidden, and Red Bear --- allow us to close off the water and force cattle to use another part of the pasture. This has worked

better in Crittenden pasture (Gasline, Hidden Tanks) than Red Bear because we have more water sources cattle can move to.

The fences (corrals) at the Crittenden storage, and especially between Red Bear-Corral Canyon pastures have been a great help. We now brand our calves as they are moved to the next pasture, rather than driving them 5 miles to the main corrals.

(3). Erosion mats in head cuts. We planned to use rock structures, but switched to jute matting because trucks couldn't get in to CCC Flats. The installer, Eco-Systems, Inc gave the Forest Service a workshop on how to install them. The mats are in place, seed has sprouted, and we are waiting to see what happens this first rainy season.

(4). Monitoring. Attached are the final monitoring plan developed with our advisory committee of range specialists. The upland range was evaluated each year since 2002, and a copy of their report for 2004 is attached. As you can see, this was comprehensive and detailed and was done as a demonstration project for other entities – Forest Service, Cattle Growers, BLM, ranchers, etc --- of the "Gold Standard" for what monitoring rangeland health should be, according to Dr. George Ruyle, head of Rangeland Resources for the UA. Also, the technical advisors, gave us a workshop after the first year, to interpret and discuss the data, and to show how we could use monitoring to make better decisions on ranch management. Since then, Cooperative Extension has expanded the monitoring to include the other 3 ranches in the Redrock watershed besides C6 (see outreach).

By comparing the vegetation monitoring data from 2003 and 2004 for the C6 Ranch with 1998 data collected by Forest Service Range Specialists, we could show an estimated 25% reduction in sediment runoff (using the Universal Soil Loss Equation) from 1998 to 2003-04. While only circumstantial, these results suggests that the grant may achieve its primary goal with more time, and adequate rainfall.

On the riparian monitoring, we did the baseline evaluations in 2003 with a multidisciplinary staff of hydrologist, aquatic biologist, botanist, etc., in 2 wet areas of Redrock Canyon. The "Proper Functioning Condition" assessment was applied, and both areas were judged "functioning, at risk." We decided to postpone the follow-up until 2007 (as a part of the new Redrock Watershed Grant) because the creek has not flooded since the baseline as done.

(5). Outreach. Our outreach part of the grant evolved as we went along. We (C6 ranch and UA Cooperative Extension Service) used what we were doing as an example and workshop for the neighbors. The neighbors took a look and liked what they saw --- rangeland health improving, new waters new fences, C6 getting along well with our landlords the Forest Service, and decided to get involved. We formed the Canelo Hills Coalition of the 4 ranches in the Redrock Watershed and started the intensive monitoring program over the whole watershed. We developed a new grant proposal to ADEQ along similar lines and were funded in March, 2005. Since then, 5 other ranches in eastern Santa Cruz county have joined to work on similar proposals. The Sustainable Agriculture Division of the USDA has funded an education outreach based on our experiences aimed at 4-H kids to learn about grass and what grass needs to grow and be healthy. All in all, since 2002, we have had a larger effect on the neighborhood than I expected.

Respectfully submitted,



Richard C. Collins, for C6 Ranch LLC

Enclosures: Photos, Final Monitoring Plan, Veg. Monitoring and Trend Analysis 2004

**MATCH FOR THIS QUARTER**

Time sheet for Richard C. Collins		Totals
Feb 17 <sup>th</sup> Installed erosion mats with FS	4 hrs	\$200
Mar 5 <sup>th</sup> Shaped head cuts with tractor	6 hrs	\$360
Use of tractor 6 hrs @ \$60 includes driver		
Use of 4wd truck 4 hrs @ \$10		\$40
Use of ATV 4 hrs @ \$10		\$40
Time sheets for Richard West Collins		
Feb 17 <sup>th</sup> Installed erosion mats with FS 9hrs @ \$25		\$225
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		\$865

**C6 Ranch  
Final Monitoring and Evaluation Plan  
ADEQ Project Grant #4-013**

**Introduction**

The monitoring and evaluation plan was finalized with the recommendations and suggestions of the advisory committee made up of Dan Robinett, NRCS Senior Range Scientist, George Ruyle, Professor of Range and Natural Resources Univ. of AZ, Phil Ogden Professor of Range and Natural Resources Univ. AZ retired, Robert Lefevre, Hydrologist, Coronado Nat Forest, Kim McReynolds, SE AZ Range Specialist, Cooperative Extension Service Univ. AZ, Jeff Simms, Aquatic Biologist, BLM. A field trip was made March 20, 2002 to see the ranch and areas to be monitored, and additional input was received from committee members afterward to finalize the plan.

**Utilization Monitoring**

Continue monitoring grass utilization in pastures with the grazed/ungrazed plant method, as has been done for the last 3 years. Take readings and photos at established sites in the fall after growing season, and when cattle are moved out of pastures in winter and spring. Continue to check utilization levels while cattle are in a pasture when grass gets short in order to best time movement of the herd to the next pasture. Put a rain gauge at each site and read precipitation in fall for summer growing season moisture and spring for winter moisture. Maintain recorded data and photos in an annual file so comparisons can be made from year to year. Correlate annual and seasonal rainfall with production figures such as weaning weights, calf crop percentages, and average birth date.

**Grazed and Ungrazed Areas of Riparian Redrock Canyon**

Locate vegetation-monitoring plots within the West RR enclosure (ungrazed) and in East RR where cattle are grazed during the dormant season only. This will establish trends in plant species over time. Do 100 plot pace frequency transects in both locations with one line of 50 plots in the deer grass floodplain and the other 50 plots at the water's edge to monitor wetland species. Include FETCH determinations to be consistent with upland monitoring. In both areas, pinpoint the location with GIS of first stream flow and end of stream flow during the dry season. This will determine if stream length is increasing in either area. Forest Service has GPS equipment. In addition, cross sections of the channel at two points will be determined. Elevations will be shot annually or after major flood events (about every 1.5 - 2 years). This will show changes in channel geometry and sediment storage in the flood plain over time.

**Proper Functioning Condition (PFC) in West RR Enclosure**

The project specifies PFC to be done annually. The advisory group decided that once is probably enough, and should be done in the grazed and

ungrazed areas of Redrock Canyon. Vegetation monitoring plots (see above) will provide more useful information on trends in plant species composition over the life of the project than PFC. The first PFC was scheduled for April-July, but because of forest fires and other work commitments, we may have to do it in the fall after monsoon rains. *Repeat after 5 yrs*

### **Upland Monitoring**

Plant species composition and relative abundance, distance to the nearest plant (FETCH), and estimated forage production will be done at Parker 3 Step sites in each pasture in 2002 and 2003. We have data from these sites for 1998 and 2001 from the NEPA evaluations done by the Forest Service. Repeating them in 2002 and 2003 will provide a 3 year baseline. After 2003, one third of the sites will be done every year to follow long term changes in vegetation, soil erosion, and range trend.

### **Alamo Canyon and Corral Canyon Springs**

After construction of fences, Alamo Canyon will be grazed light to moderately, while cattle will be completely excluded from Corral Canyon Spring, except for a few days each year (+/- 7 days). Photo plots will be established to document changes in vegetation at both locations over time. The geomorphology of these two areas is very different, so they are not comparable, one grazed and the other not grazed. Rather, each area will be compared with itself over the time span of the grant (until 2005).