

# Restoring Land Health to Small Properties: Lessons from Quivira's Red Canyon Reserve

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**Abstract:** *Many small parcels of land in the Southwest suffer the same land health challenges as large properties: a past history of overgrazing by livestock, active soil erosion and gully formation, poorly designed and maintained low-standard roads, lack of plant species diversity and vigor, and inadequate or aging infrastructure. Small properties, however, face the additional challenge of not being economically viable which means they cannot easily produce the revenue needed to meet and reverse these challenges. The Quivira Coalition confronted this dilemma when it inherited a 320-acre parcel of land south of Socorro, New Mexico, in early 2003. Our success to date in restoring the land to health on a shoestring budget in a short period of time can provide important lessons for other landowners.*

Nine years ago, the Quivira Coalition was offered a small tract of high desert in the eastern foothills of the San Mateo Mountains, south of Socorro, New Mexico. Bounded on three sides by the Cibola National Forest and bisected by Red Canyon, it was an unexpected bequest from the estate of Michael Belshaw, an economics professor who had retired to the property. Although he was a member of Quivira, no one recalled meeting him. But suddenly here was this wonderful gift of land, called Red Canyon Ranch, bequeathed to us with the stipulation that it be devoted to “the preservation of the land and the wildlife, including, but not limited to, a wildlife refuge, research station, study retreat or a demonstration ranch.” We were honored, but what exactly were we getting? An initial reconnaissance revealed two things.

First, we saw the beauty and richness. The views were stunning, and the silence (except for the wind) was profound. It was an ecologically interesting property with signs that large mammals and many species of birds were inhabiting the property. There was also evidence of historic use by Native Americans, including archaeological sites, campsites and structures and rock art along canyon walls.



View of the Red Canyon Reserve, looking west toward the San Mateo mountains.

Second, we saw that the land was generally in poor condition. Its challenges included dilapidated fences, recent overgrazing by trespass cattle, poor plant vigor in many spots, numerous deep gullies and other soil erosion features, and badly designed and maintained dirt roads.

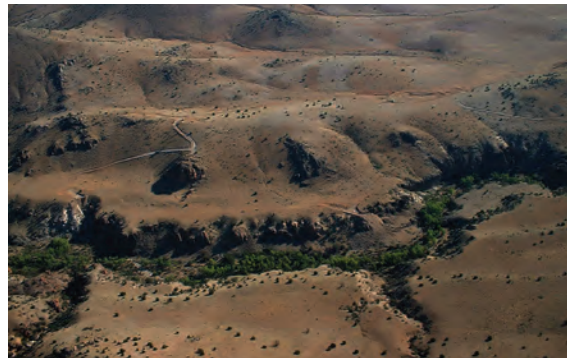
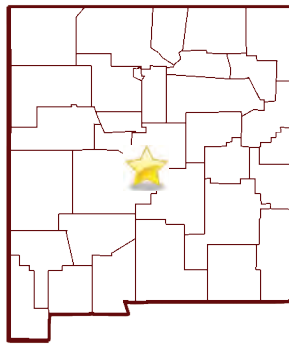
There were pluses—a good water well, decent grass cover in places, a healthy riparian area in the canyon, a few simple wooden infrastructures and decent access from the nearby Interstate.

Professor Belshaw left a small cash endowment, which, when combined with the proceeds from the sale of various unwanted items on the property, added up to approximately \$20,000. When the reconnaissance was done, we had decisions to make.

The first one was easy: We would keep the property. From the beginning, Quivira had directed a variety of land health demonstration projects, so applying our knowledge and organizational experience to restoring Red Canyon Ranch to health was a logical extension of our work. We also believed the property would offer a useful educational site for workshops, research and recreational opportunities. We changed its name to reflect its new purpose to Red Canyon Reserve.

The second decision was harder: Where should we begin? Idling the property wasn't an option. Our mission as an organization was to restore and maintain land health for the benefit of people and wildlife. We knew that resting the land from cattle grazing by itself wouldn't do the job, especially because of the erosion challenges posed by the gullies and deteriorating ranch roads. The property required active management. In addition to asking where to start, we also asked the following questions: How do we use our limited resources? How do we best honor Belshaw's wishes while furthering the goals of the Quivira Coalition? And how do we accomplish all this without over taxing the organization, its staff and volunteers? Fortunately, we had ideas – and friends.

Today, we are happy to report that vegetation cover and ecological diversity are increasing; erosion has been reversed in many places, and the overall health of the land has been



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Photos from around the Reserve shortly after Quivira acquired the property. Aerial view of Red Canyon and Red Canyon Reserve, June 2003.

substantially improved. What follows are Lessons Learned so that other owners of small land parcels may benefit for our experience.

### What We Do

There have been six steps to restoring Red Canyon Reserve (RCR), each one implemented according to available resources, time, opportunities and relationships. To implement these steps, Quivira created a committee of staff, board members and interested volunteers who:

- set goals and develop and update a management plan;
- conduct assessments and implement a monitoring program;
- improve the vegetative cover by fixing fences, resting the land and implementing a planned grazing program;
- get to know the neighbors;
- close and repair roads, and arrest and repair gully erosion; and
- upgrade infrastructure, conduct volunteer programs and improve wildlife habitat.



Challenges met: closing and revegetating unnecessary roads; trespass cattle fenced out; and a “loo.”

***We set goals, made a plan and built an outhouse.***

Through our experience, we knew that the key to successful land management was an overall holistic goal and a sound plan, without which we would be making things up as we went along.

After a series of discussions, we wrote:

*The RCR should be managed so that it is economically, ecologically, and socially sustainable, and in compliance with the larger mission of the Quivira Coalition. This includes:*

- *reliance upon income generated from property activities, with minimal reliance upon outside grants and donations;*
- *a balancing of the various goals, rather than emphasis upon one or very few objectives;*
- *use of natural resources (water, flora, fauna, and minerals) in a manner that improves or does not deplete availability or quality for future users; and*
- *installation of an infrastructure that minimizes expense and adverse impacts upon other property objectives.*

*RCR should serve as a model of collaborative resource management. This objective should be accomplished by:*

- *providing a positive example of the management of finances, natural resources, infrastructure and human resources;*
- *establishing an outreach program that identifies potential collaborative projects and partners that furthers management objectives;*

- *conducting educational workshops and collaborative projects; and*
- *maintaining positive relationships with neighbors and other users of RCR resources.*

*The RCR should encourage and facilitate scientific inquiry and education by:*

- *encouraging work with people who wish to study and implement resource management hypotheses;*
- *developing techniques that test and demonstrate various hypotheses of resource management; and*
- *maintaining relationships with colleges and other institutions that have the ability to disseminate the results of the experiments.*

In the meantime, our good friend, Steve Carson, built a very nice outhouse for the property. Goals and plans are important, but so is an outhouse!

***We conducted assessments and created a monitoring program.*** In order to carry out the plan, we needed to understand what we had and where we were going. We have done this by carrying out a series of surveys, developing a monitoring system and updating our management plans.

For example, we took an inventory of the roads, trails, fences, water system and buildings. The road inventory resulted in the closure of unnecessary

roads and the correction of problems that interfered with water movement or increased road maintenance expenses. The trail inventory allowed us to improve access to certain parts of the ranch. The fence, water system and building inventories provided us with a maintenance and replacement schedule and an understanding of threats to systems integrity.

Next, we commissioned volunteer geological, botanical and wildlife surveys which we have maintained over the years. The wildlife surveys led to a decision to install a wildlife drinker system and “lizard ladders” to enhance accessibility of existing water sources. The botanical surveys affected decisions on the timing, location and extent of livestock grazing. These surveys have drawn the interest and attention of scientists and teachers who use the surveys in their own projects and then reciprocate with expertise and advice.

We set up a series of monitoring points along roads, at restoration projects and at selected sites around the ranch. At least once a year we take photos of these points as well as conduct a more detailed assessment of conditions on the ground. This monitoring gives us objective data on how our management plan is affecting the land. (1)

***We fixed fences and implemented a planned grazing program.*** Red Canyon Reserve is located in a very ‘brittle’ (arid) environment and is subject to wide extremes of climate. Livestock grazing had taken place on the property regardless of the amount of rainfall received during any particular season and without any apparent control of the timing, intensity or frequency of the grazing impact on the land. This management regime had



Cullen Hallmark took the lead in setting up the monitoring program on the Reserve.

left much of the uplands with marginal ground cover and reduced plant diversity, vigor and functionality.

During the first two years of Quivira’s ownership of RCR, we allowed a neighbor’s small herd of cattle to graze the property for two months during the dormant season (winter). However, after reviewing rangeland health assessment data and fixing the fences around the property to keep out trespass cattle, we decided that livestock grazing on the RCR would be suspended for a period of time. This would allow preferred species to regenerate and plant litter (dry grass and plant parts) to accumulate on the ground surface.

Today, the rangeland health monitoring shows that positive results have been achieved in 14 different health indicators. Plant species diversity, vigor and quantity have rebounded significantly.

Livestock grazing is still part of the management tool box and will likely be applied again in the near future. It will be targeted at achieving specific objectives and may involve higher numbers of animals for a shorter period of time. Whatever the prescription, we will work



More challenges met: fences repaired, eroded areas treated, roads permanently closed and East Red Canyon crossing upgraded.

closely with our neighbors on this management option and closely monitor the results towards our goal.

***We created working relationships with our neighbors.*** As news of our ownership spread among neighbors, it was apparent that many were unclear about Quivira’s mission. They believed us to be radical environmentalists, antagonistic to their way of live. We worked hard to correct this misperception with efforts that included: face-to-face meetings, invitations to workshops and other neighborly gestures. While we made mistakes early on, and we haven’t been able to overcome every suspicion, our relations with neighbors are much better today.

The key has been an ongoing effort to maintain open communications. First and foremost, we have made sure that the neighbors know how to reach us and that we know how to reach them. We don’t just store this information in a file, but try to contact them regularly to discuss issues when they arise. For example, we initially had a trespass cattle problem. Rather than calling the livestock inspector or pushing the cattle out through the nearest gate, we were

able to work out a plan with our neighbors for handling this problem as it arose.

In another opportunity to work with our neighbor, we clarified the maintenance of our shared water system. We prepared a written water well-sharing and maintenance agreement and then registered the well with the State Engineer. Recently, we cost-shared for a new solar water pump for the well and we continue to inform our neighbor of leaks and other maintenance issues with the system.

In a third illustration, Quivira was also able to resolve a road issue with our neighbor. The access road to the ranch, an easement through the neighbor’s property, was in bad shape, drying out part of his pasture and creating erosion problems. Consulting with our neighbor, we prepared and implemented a road repair plan that not only made it easier for us to access our property, but improved vegetation cover on our neighbor’s property.

To be sure, good communication does not always eliminate disputes. But we find that if people feel that they are able to freely discuss problems, they tend to stay small and are usually easier to resolve.

***We closed roads, repaired others and commenced erosion stabilization.*** Our assessment showed us that the road system across the property had been badly designed and poorly constructed. Many roads were washing away due to the lack of proper drainage. Numerous new roads had been cut across the property that served no apparent purpose and were now contributing to erosion and lack of vegetation. It was clear that the road system needed to be stabilized quickly or

it would degrade further with every rain event. The need for a plan and action was urgent!

Utilizing the \$20,000 from the Belshaw estate and the expertise of road restoration specialists Bill Zeedyk and Steve Carson, we set down our first priorities:

- rework and properly drain the more than two miles of access road and a half mile of ranch roads deemed necessary to keep open;
- close, decommission and reseed all unnecessary roads (approximately 1.75 miles, or 80 percent of the total);
- Relocate and properly drain the road to the windmill; and
- rework the failing earthen dams and start the stabilization of the large gully in Windmill Draw.

We considered this the baseline stabilization work for all subsequent years. The goals were:

- to stop the downward trend of rapid soil loss; and
- to hold things in place until an upward, healing trend could get established. Later projects and priorities could then be built into the baseline. The plan moved forward and all the baseline stabilization was completed before the monsoon season of 2004.

We monitored the existing road system to determine if the drainage and water harvesting treatments were functioning as designed. Our monitoring findings told us that we still had road surface scour, i.e., water running too far down the road surface and removing the surfacing materials, which deprived pastures of needed moisture. To reduce this road surface erosion we had to add more Rolling Dip Cross Drains to the system. (2) So, over the next six years a number of Rolling Dips have been added to the road system with the goal



A rolling dip in action on Red Canyon Reserve. Moving water off the road and onto a buffer zone—harvesting water to grow vegetation.

of creating a road system that is as close to scour-free as possible. Today, we have largely achieved this goal.

**Lessons Learned:** When in doubt, install more Rolling Dips. This lesson has been applied to all the road workshops and road drainage projects that we have been involved in over the last six or seven years. This is a good example of collateral knowledge and why a place like RCR is valuable as a laboratory. Knowledge gained from road and other work can now be used, disseminated and transferred to other locations with confidence in the practice and the end results.

Once this emergency stabilization phase was completed, a two-pronged plan was developed for the next step:

- develop “creature comfort” infrastructure for volunteers and staff to improve the logistics of working and doing workshops at RCR; and,
- start work on stubborn erosion control challenges in Windmill Draw in order to stabilize erosion, begin water harvesting and get vegetation growing again (note: Windmill Draw utterly lacked vegetation when we began).



Installing wildlife drinkers on the reserve in 2011. Water supplied by our solar-powered well.

Over the past four years, we have devoted considerable time and energy to arresting and reversing the severe gullying on the property. This was accomplished by volunteer hands over the course of many workshops under the direction of restoration specialists Bill Zeedyk, Steve Carson and Craig Sponholtz. The restoration methodology that we implemented has been employed in arid upland sites across the Southwest and involves the general principle of “letting the water do the work.” This work has paid off handsomely despite a few setbacks, including a couple of large storm events. The problems of erosion and gully formation across the property are significantly better than it was when we took over—but there’s no end to the work needed! (3,4)

***We upgraded infrastructure, implemented wildlife projects, and opened the property to groups.*** From 2004 to present, there has been a mix of work to improve the base camp site and make it more useful to Quivira staff and volunteers. This work has gone slowly but has adhered to the original goal of maintaining

the camp’s primitive character. We have water, but no other utilities. We removed unnecessary structures and debris, provided a sheltered cooking area, designated camping spots and maintained the outhouse. This has made the RCR a pleasant place to visit for volunteers. We have plans to implement further upgrades without altering the camp’s primitive character, and continuing to work on a shoestring budget.

In recent years, the property has attracted school and Boy Scout groups interested in conservation, geology, astronomy and wildlife.

In 2011, we installed a wildlife drinker system at RCR with the help of a U.S. Fish & Wildlife Service Partners Grant. (5) This addition was a quantum leap towards our goal of creating a wildlife refuge. The diversity of available permanent watering locations allows wildlife access to different parts of RCR.

### **Lessons for Other Landowners**

***Incrementalism works.*** Having a master plan and chipping away at it day by day, year after year, is effective. Even with only small amounts of time, landowners can propel the health of



One of our many educational workshops and project tours on the Reserve.

their land forward towards their goal—build a One Rock Dam, cut two trees, mend a fence. The results speak for themselves. Knowledge has been gained from the laboratory with many restoration volunteers taking away practical information to be utilized elsewhere. Land health on RCR is on a strong upward trend.

***If the land has been hard used, restoring it to health requires a combination of passive and active management.*** If the land has been overgrazed or is suffering from drought conditions, it will likely require a period of rest from livestock use until sufficient vegetative cover and overall ecological health has been reestablished. Conversely, ongoing erosion and gully formation will continue unless checked by active repair and thoughtful stewardship. Roads in particular are an underutilized source of opportunities and challenges on small properties—poorly designed and maintained roads can cause serious problems and letting them go unattended will make the situation much worse. With active repair and management, however, good roads can help a

landowner harvest water efficiently across the property.

***You don't need to spend a lot of money to get significant results.*** Setting goals, writing a plan, implementing a monitoring program, resting the land and even fixing erosion (with low-tech methods) are all low-cost activities, especially if volunteers are involved. Big yellow diesel machines, loads of cement, tons of rock and wire, and other big expenses normally associated with restoration work are NOT required to improve the health of the land. Of course, some money is necessary, but too often landowners start with the presumption that bigger is better (and thus more expensive) when, in fact, a parsimonious approach to land improvement and management is just as effective, if not more so, because you can accomplish more.

***It is important to have friends.*** Collaboration brings diverse ideas, perspectives and opportunities to the table. No one should presume they know it all. Owners need to ask questions, seek advice, entertain ideas on the





Big things can happen in small places! Mega Zuni bowl on Red Canyon Reserve.

fringe and engage diverse opinions. Rummaging through the land management tool box is important too. New tools are being developed every day. If you are an absentee landowner, as we are, it is also important to have friends. In the case of the RCR, we have been very fortunate to have a friendly neighbor, Larry Cary, looking after the property. His prior knowledge of the management of RCR has been very helpful and his proximity to the property has allowed him to be our eyes and ears at RCR. Larry also has a great love for the Reserve which gives a pride of ownership and stewardship that has helped reinforce and propel all the other efforts that have taken place there.

**Summary:**

At Quivira, we often get inquiries from owners of small properties about what to do with their land. There are many options, we tell them, depending on their goals and resources. In our experience, however, there is a *core* element to all small properties, especially if they have been hard used historically, as many parcels of land across the Southwest have been. The core is land health. Is the land functioning properly at the level of soil, water and grass? If it is not, then achieving your goals for the property, whatever

they may be, will be difficult, if not impossible. If the land is healthy, however, then much is possible, as we have happily discovered on Red Canyon Reserve. ☺

**Keys to Success:**

- Sick to the priorities and take care of the most important and weakest links first.
- Make sure someone is in charge and responsible for following through and getting things done.
- Maximize the available dollar resources by doing as much work as possible at one time; and monitor the work to determine if it is functioning as intended and if adjustments are needed.



Mountain Lion paw print.



Red Canyon Reserve headquarters.

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