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The Quivira Coalition

Working to Achieve Harmony Between Humans and Nature

Grazing in Nature's Image

by Jim Howell

My family ranches in the high altitude grasslands, shrublands, and forests of southwestern Colorado, near the tiny town of Cimarron. We also operate an outfitting business during the fall hunting seasons, and we occasionally fire up the chain saw to generate income through the sustainable harvest of our forest resource. We "custom" graze cattle—both yearlings and cow/calf pairs—through the spring, summer, and early fall growing season. When the snow starts to fly, we load everything up and send them on to their winter homes.

My family has owned this land since 1937, but I personally only had the chance to spend my summers in Colorado while growing up. My dream all through childhood was to return to this land and figure out how to derive my living from it. In 1997, my wife, Daniela, and I had the chance to take over management of the ranch, and so began our current journey of land stewardship in the high altitude Rockies. Prior to moving back to Colorado, we had been working for Allan Savory and the Center for Holistic Management, managing a ranch they had been contracted to operate in the Chihuahuan Desert of southwestern New Mexico. Prior to that, I managed a pasture-based dairy in east Texas, modeled after New Zealand style forage-based dairy production. I spent my senior year of college as an exchange student in New Zealand, where I learned the ins-and-outs of making milk on grass. During college, I was also introduced to the management of cool season annual grasslands in California, where I worked as the assistant manager of my university's beef cattle unit.

During the winter months, Daniela, our daughter Savanna, and I lead small groups on educational agricultural tours to ranches in the southern hemisphere. The ranches we visit cover a broad range of habitats, from the very productive high rainfall savannas of tropical Zimbabwe, to the humid, productive, temperate Pampas of Argentina, to the flat western grasslands of New South Wales, Australia. We have spent time in the rugged and remote Kimberly Region of

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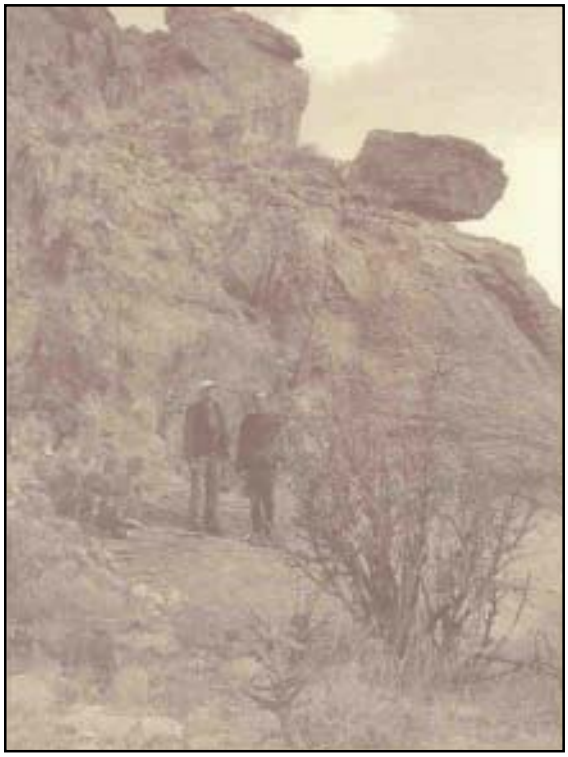
Editor's Note

In this, the third in our series on "Nature's Model," we explore the issue of grazing and how, by following the lessons nature teaches us, grazing can be done in such a way as to protect and sustain the resource and in such a way as to restore it.

From the Founders

Jim Winder
Courtney White
Barbara Johnson



The Quivira Coalition reached a milestone recently when the Board voted to become landowners.

It was an unexpected milestone, to be sure, and one that we reached only after careful thought and investigation. It began one day last January when we opened the mail to discover that a Quivira member had bequeathed us 320 acres in his will. We were both touched and surprised by this gift, especially since we had no idea it was coming.

Our benefactor was Mike Belshaw, a self-described "Kiwi in Cowboy Country" (the title of his autobiography). A former economics professor at Prescott College, Mike lived alone on his small property in the foothills of the San Mateo Mountains, where he raised wolf hybrids, wrote books, and pushed dirt around with his grader (a little too enthusiastically). He also, apparently, appreciated the work of The Quivira Coalition—but we can only assume that because we never actually met Mike!

But his gift raised an intriguing question: Did we want to get into the landowning business? The quick answer after visiting the property was—yes!

Called the Red Canyon Ranch, the property is located a handful of miles west of Interstate 25,

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From the Founders

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nestled up against Forest Service land. When we visited it for the first time last spring, it didn't take us long to see why Mike wanted the property protected—it is a gorgeous piece of land.

We hiked past the windmill (water!) up a small ridge to where Mike had begun work on a home-site prior to his death. The 360 degree view was incredible. A large watershed, touching two federally designated wilderness areas, constricts into a lovely canyon that flows through the property. Dropping down into the canyon we saw cottonwoods, willows, and pictographs. When we spooked a great horned owl we knew we were home.

The will stipulated that the land be protected as a wildlife reserve and used in any way we saw fit in order to maintain its natural values. It also said the land could not be sold for a long, long time. This was fine as the ranch looked to be a perfect place to do education and restoration. It even had a good site to build a small structure—water and four Internet-friendly phone lines (mandatory for the modern age) were already in place!

In fact, the more we thought about it, the more we were attracted to the idea of creating a light-on-the-land Retreat for writers, outdoor enthusiasts, educational events, and other Quivira-style activities.

So, we decided to accept this gift of good land and with the help of our buddy Cullen Hallmark spent the summer and fall getting the paperwork completed. It seems like everything in life is getting more and more complicated, especially if legal work is involved, but thanks to Cullen we persevered and in November the Board of The Quivira Coalition voted officially to accept the deed to the property.

We would like to thank Cullen officially for his skill, diligence, and good humor in negotiating the legal maze—all *pro bono* too! Thanks Cullen—we would not be receiving the deed to the Red Canyon Ranch without your help.

Sometime next year we hope to open the Red Canyon Ranch for visitation. We are going to go slow, concentrating at first on getting the land back to health, but eventually it should be available for overnight visits, retreats, workshops, day hikes, and other fun educational stuff. We are thrilled by the possibilities!

Finally, we wish to thank Mike Belshaw for taking a gamble on us—one we hope will pay off for everybody, plants and animals included.

[Page 2] Courtney and Kirk explore the riparian area. (Photo courtesy of Tamara E. Gadzia.) [Top] View across the ranch. [Bottom] Pictographs. (Photos courtesy of Kirk Gadzia.)

Confessions of a New Rancher

Learning from Scratch the Art and Science of Range Management

by Jim Thorpe

In the land of Quivira, "New Ranchers" sustainably harvest "solar dollars" with low-stressed cattle on their ecologically healthy, economically robust "New Ranches." About five years ago my wife Carol and I aspired to become new ranchers but in an even more literal sense. After the unexpected dissolution of a family business (and our kids heading out on their own), we had the usually-not-even-once-in-a-lifetime opportunity to reinvent ourselves, and after some study, and not too much hesitation, we decided upon ranching.

We had often heard that ranching was a good way to make a small fortune (if you had a larger fortune to whittle it down from). There were certainly more lucrative investments out there (remember the "New Economy" stock market?), and it wasn't a secret that cows would no longer pay for a ranch (for that you needed oil wells, cell towers, or subdivisions). Still, if we could at least get out what we put into it in the long run, and keep our heads above water in between, it would be worth it. Economics—that "Dismal Science"—necessarily assumes that, when it comes to investing, people will make rational decisions based on the highest return for the least risk. Of course, they weren't thinking about ranchers, new or old.

Jim and Carol Thorpe. (All photos with this article are courtesy of the author.)

It wasn't easy finding our ranch but after a lengthy, determined search, a few false starts, and a lucky break, we came upon a good one. It was big enough without being too big: A middle-aging couple—once they knew what they were doing—should be able to handle it with occasional help from neighbors and day cowboys. It was just below the usual snow belt but not too far into the sweltering sauna-belt. It was reasonably close to markets and supply centers. It felt remote but was just a couple of miles from "pavement." In the middle of "nowhere," it was a couple of hours from everywhere. It was in one of the predictably "higher rainfall" areas of New Mexico and fit neatly within one USGS Quad map. Most importantly, it was far from the range war controversies, had been well looked after, and was scenic to boot! As our neighbors told us, it was in some of the best cow country in the world—"when it rains!"

Daunting

Our first evening on the ranch, we lingered a while outside, tired from moving in and getting set up, enjoying a beer, and surveying the scene. Just past sunset we suddenly realized that we were being watched. A small mob of vultures was starkly roosting overhead on the bare limbs of an un-leafed cottonwood. They were looking us over. It was a startling feeling, much worse than sitting down before the banker with a loan application. Were they placing bets on how long it would be before these new ranchers went belly up?

It was as daunting as it was exhilarating to have finally taken possession of a ranch. We had tried to do our homework and learn as much as we could from books, how-to videos, seminars, field-trips, and, of course, the internet. There may be no other industry that has so many valuable resources available to support

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and "educate" its practitioners, veteran and novice alike. Most useful have been the personnel and publications of the Natural Resources Conservation Service (NRCS) and NMSU's Agricultural Extension Service. *The Cow-calf Handbook*, a bulky collection of detailed, updatable articles on nearly every facet of ranching, has become our "Bible." Our copies of *Beef Production and Management Decisions* (Taylor), *Range Management* (Holecheck), and Savory's series on Holistic Resource Management are well-worn, properly highlighted, and plastered with bookmarks. We joined and attended meetings of the New Mexico Cattlegrower's and the Society for Range Management. We subscribed to the advertisingly inclined *Beef and Drovers*, the adversarially aligned *Range* and *High Country News*, and the contrarian *Stockman Grassfarmer*.

We also had become aware of Quivira, that just past fledgling stage organization with the hard to pronounce and impossible to spell name. While its publications and seminars provided a useful compilation of contemporary range science and progressive management approaches, its emphasis on on-the-ground results and realities really helped provide us a synthesizing framework with which to approach our new responsibilities as land managers.

Learning

We may have set an attendance record at Quivira seminars, events, and workshops at places like the CS Ranch, Ghost Ranch, Jim Winder's, Sid Goodloe's, Jack Hagelstein's, Roger Bowe's, the Sevilleta National Wildlife Refuge, and the USDA Jornada Experimental Range. While the seminars were thought provoking, the ranch visits were truly inspiring. These ranchers, who were bold and/or brave enough to bring inquisitive strangers onto their outfits in not the very best of times (in the middle of a drought), had an infectious passion for ranching and range management that they were justifiably proud of and generously willing to share.

The host ranchers made it clear that they didn't think that they knew everything, that they learned something new almost everyday, and that they were willing to make mistakes as long as they learned from them. In short, they didn't purport to have all the answers, but they felt that they were on the right track in their particular environment. They encouraged us to experiment as we learned about our new place, to winnow out from all the competing practices and "paradigms" those that would work for us, and accept the fact that we too would make mistakes from time to time—just make sure that we learned from those mistakes. That was reassuring.

What was not so reassuring was the lack of a consistent scientific endorsement of these approaches, which were being codified, as it were, by Quivira (and others under their own brands) as the "New Ranch." If these "new paradigms" were so effective at maintaining and improving rangeland health and production, why wasn't there some scientific verification? Why weren't these practices being adopted and promulgated by public land agencies? Such published studies as there were were at best inconclusive and at worst downright dismissive. The conventional wisdom seemed to be that there wasn't much advantage for intensive/rotational grazing systems over the long recommended practice of continuous grazing at low to moderate stocking rates, especially when considering the extra start-up

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Confessions of a New Rancher

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Affiliations are listed to convey the breadth of experience that these individuals bring to the governance of The Quivira Coalition.

Grazing Nature's Way: Jack Hagelstein and the Comanche Hill Ranch

Jack Hagelstein. (All photos with this article are courtesy of Courtney White.)

When Jack and Pat Hagelstein bought the Comanche Hill Ranch, located a few miles due east from Roswell, they had two "radical" goals for their cattle operation: guide the management decisions by land health targets, not simply by stocking rate, and make a profit.

Of course, "radical" is not a word Jack would use himself. A former rancher who, as a young man, went into the real estate business, Jack is conservative in his philosophy and businesslike in his approach to ranching. His decisions are deliberate, carefully researched, and focused on the bottom line.

The bottom line, in the Hagelsteins' case, being healthy land.

"It's all about integrity," says Jack, "in family matters, in business, and on the land." In fact, Jack and Pat view themselves as land "healers"—restoring ecological integrity to land through their management of cattle. In four years the Comanche Hill Ranch has seen a reduction in the amount of bare soil visible and an increase in the density and variety of grass. Jack has watched lots of juvenile plants get started and the quantity of vegetative litter increase—all positive indicators of land health. "The ranch was in good condition when we bought it," says Jack, "but we've seen it get better."

A recent Rangeland Health assessment by the BLM—half of the ranch is public land—confirmed the upward trend. "He is meeting all seventeen of the Rangeland Health indicators that we use," says John Spain, the BLM range conservationist for the ranch, "plus four we added for wildlife and endangered species." And the Hagelsteins continue to meet these targets even though the ranch received only five inches of rain this year.

"Their management is definitely contributing to the health of the range," says Spain, "and they've got standing forage even in a bad year."

Yesterday

Born in Lubbock, Jack's family moved to eastern Colorado where his mother taught school and his father ranched. When Jack was half way through high school, the family packed up and moved to a ranch near Hobbs, New Mexico. Bitten by the "ag" bug, Jack majored in economics in college before returning to ranching in Colorado, where he worked for seven years, living the good life.

All that changed upon the dissolution of the family ranch. Suddenly without a career, Jack decided to try his hand at real estate. He earned a license, bought an apartment building, met and married Pat, a speech therapist, and started a family that now includes five children. After a period of tough times, the financial

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Comanche Hill Ranch

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outlook brightened and the Hagelsteins expanded their apartment holdings.

But the call of ranching gnawed at Jack. When the family achieved a financial target in 1996, they began to look for a ranch to buy. Jack didn't consider it a big career leap. "We managed the apartments like we would our ranch," he says. "We grew slowly, watched our debt, managed responsibly, and hired good people." Integrity and honesty were the keys to their success, he says. Their profit came from buying apartments "wholesale," fixing them up so they were attractive places to live and then renting them "retail."

He intended to apply the same business "added value" philosophy to cattle ranching.

This would prove harder than it sounded. After searching fruitlessly for a few years, Jack and Pat spied an ad for a ranch in a newspaper and drove to Roswell to take a look. They made an offer on the place the next day. By the winter of 1999 they had 170 head of cattle on the ranch—and a problem on their hands. "I jumped in with both feet," Jack recalls, "and quickly found out that twenty years proved to be a long time to be out of the business."

By chance, Jack read about The Quivira Coalition in *American Cowboy* magazine and decided to investigate. He came to a tour of Jim Winder's ranch in 2000 and liked what he heard about controlling the timing, intensity, and frequency of cattle impact on the land. He went home and bunched his cattle into one herd and began moving them every two to three weeks through the ranch's eight pastures. To control them, he decided to haul water rather than build new fences. It wasn't just the cost of new fencing. "When this was open country," notes Jack, "the animals didn't stay in one place if there wasn't any feed. They moved on."

Touring Jack's ranch on a hay wagon during a Quivira Drought Workshop.

During the first two years Jack attended almost every QC workshop. In the process he met Kirk Gadzia, who helped the family develop a grazing plan, and rancher Guy Glosson, who became a mentor. Both became key players in the success of the ranch. "Without Kirk and Guy," Jack says matter-of-factly, "we wouldn't be where we are today."

Under Kirk and Guy's tutelage, Jack began to watch the ground carefully and almost immediately he began to notice improvement. He attributes the upward trend to two management methods: 1) the rest he gives the

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Comanche Hill Ranch

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land; and 2) animal impact. Pastures are rested from livestock grazing at least 75% of the year. Jack likens it to the rest we ourselves require as part of our natural model. Animal impact is natural too. "It's nature's way of tilling the soil," says Jack, "so that seeds can get into the soil."

[Top] Early spring (dormant season) grazing. [Bottom] Historic oil and gas development on the ranch.

There was an additional bonus to watching land heal. "We're getting paid to do it," he says with a smile.

Today

In a time when ranchers, especially those on public land, are struggling to stay economically viable, Jack and Pat have a business plan that is profitable. "We trade cattle," he says—buying low and selling high. They buy yearlings at the local sale barn, fatten them up on the ranch, and then sell them for a profit. Jack will rotate cattle through his herd sometimes as often as three times a year, depending on a calculation that Jack uses to determine the right time to sell. "Our costs are low," says Jack, "and I don't have to maximize capacity to make a profit." He summarizes his business philosophy this way: "You make your profit when you buy, but you won't realize it until you sell."

Using this plan, Jack and Pat tripled the size of their operation in two years. They are leasing a second ranch and have plans to lease a third. Today they are selling a truckload of cattle a month. Next year their plan is to sell a truckload every two weeks.

A key part of Jack and Pat's business model is their positive relationship with the BLM. "Jack has been extremely good to work with," says John Spain. "He is extremely cooperative." This relationship was put to an unexpected test in 2001 when the BLM discovered a patch of critically endangered Pecos sunflowers on the ranch. "Jack's response was great," says Spain. "In cooperation with the BLM, the pasture was cross-fenced to allow the area to be deferred during the critical growth period for the sunflower."

"I didn't mind," recalls Jack. "In fact, I took it as a challenge that I wanted to meet."

The Hagelsteins' cooperation with the BLM recently produced another benefit. A Coop-

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Comanche Hill Ranch

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Drought Workshop participants exploring grass on Comanche Hill Ranch.

erative Management Plan was completed which allows Jack to graze numbers above his permit levels, within an established limit, without prior approval by the BLM. Jack's plan is to reduce the mother cow herd numbers and graze an increased number of yearlings during the dormant season. The flexibility offered by the BLM is unusual, to say the least. "He's one of the very few we've done this with," says Spain.

Hopefully, Jack and Pat's blending of the "radical" goals of healthy land and healthy profits will not be seen as so unusual for long.

Grass

"Grass is the forgiveness of nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass grown like rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal.

"Beleaguered by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon solicitation of spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the wasting sea…

"It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year famine would depopulate the world.

"The primary form of food is grass. Grass feeds the ox: the ox nourishes man: man dies and goes to grass again; and so the tide of life, with everlasting repetition, in continuous circles, moves endlessly on and upward, and in more senses than one, all flesh is grass."

—**James Ingalls**, *U.S. Senator from Kansas, 1873-1891*

A Macho Lesson Learned

by Courtney White

It's painful to admit a failure.

For years now, the Macho Creek demonstration project has been a staple of my slide show, invariably following the "opening credits" on the mission of The Quivira Coalition and the New Ranch. If I have the time, I'll review how The Quivira Coalition got started, why progressive ranchers herd their cattle together and move them so frequently, as well as Jim Winder's original idea of creating a "third position" or neutral ground in the grazing debate.

Macho Creek, May 1998. (All photos with this article are courtesy of Courtney White.)

Then it's on to Macho Creek.

I do so for four reasons: First, it was our earliest demonstration project; second, it is a simple and effective example of the New Ranch toolbox in action—in this case the benefit of dormant season grazing; third, the dramatic "before" and "after" photos always take the audiences' breath away; and fourth, well…

The fourth reason was the project was a success—a "win-win-win" for land health, ranching, and public land management. It was "very Quivira" as well—collaborative, voluntary, science-based, educational, proactive, and provocative.

Then the clock struck midnight and the project turned into a pumpkin.

Review

In May of 1998, the State Land Office asked The Quivira Coalition and Quail Unlimited, a hunting group, to assist with the construction of a two-and-a-half mile long electric fence along the western edge of the riparian zone in Macho Creek, located north of Deming (and a short distance north of Jim Winder's ranch). The goal was a simple one: to create a riparian pasture in order to keep the cattle out of Macho during the summer growing season.

The reason to do so was also straightforward: The riparian area had been overgrazed to the point of being completely non-functional ("cowburnt" is how author Ed Abbey might have put it). One of our Board members, a public land manager, put it more tactfully, calling it a "management opportunity."

Was it ever.

The idea was to build the fence, let the cows graze in the creek only during the dormant, or winter, season, and monitor the ecological response. This was attractive to all of us because—and this is a major point I make in the slide show—it gave lie to the position of anti-grazing activists that riparian recovery and cattle grazing are mutually exclusive. By en-

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Macho Lesson

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couraging ecological recovery **while** the land was simultaneously used for agriculture, we hoped to demonstrate that the debate over cattle in riparian areas need not be painted any longer in the shades of color usually employed—black and white.

At the same time we hoped to demonstrate to the rancher how a new tool—dormant season grazing—could help his bottom line. We also wanted to see the land get healthy, including its wildlife populations, which is one reason why Quail Unlimited was there stringing wire on a hot May day.

All went well, at first. The "fence-raising" proceeded smoothly (this is where I met Kirk Gadzia for the first time) and the cows stayed out of the creek bottom that summer. We contracted with Hawks Aloft, a non-profit organization based in Albuquerque, to conduct five-times-a-year bird surveys in the riparian zone, and the USDA Jornada Experimental Range agreed to do quantitative monitoring of the vegetative response.

And what a response there was!

When I visited Macho in September of 2000, I could hardly believe my eyes. There was grass everywhere, including a species that Jim Winder said he had not seen in a long time. The intervening years had not been particularly wet ones either—which is an illustration of how quickly riparian areas can recover if "set free" from the chains of overgrazing.

The data from Hawk Aloft's surveys backed up our impression. In a report, Gail Garber, Executive Director, observed "The number of bird species detected on winter surveys has shown a steady increase over three years…the numbers of riparian-obligate species are higher than they were when we began." (*The New Ranch at Work: Proceedings of a Conference*, The Quivira Coalition, 2003.)

Macho Creek, September 2000.

I experienced my own "indicator" of riparian recovery while shooting photographs that fine September day. While taking "after" shots with my camera, a red pickup truck pulled off the road abruptly and disgorged a man armed with a shotgun. He quickly raised the gun to his shoulder and began shooting. Unfortunately, he aimed in my general direction, so I just as quickly scooted out of there. But my "shoot" went well too—and I quickly inserted the slides into my talk, where they have remained ever since.

This summer, however, I returned to Macho Creek and shot another round of "after" photos—ones that chronicle an unhappy

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Macho Lesson

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Macho Creek, July 2003.

ending to this particular story.

The Real World

The trouble began with the complex nature of the grazing arrangement. The permittee on the state lands, which make up the bulk of the project site, was a college professor in California—emblematic of the times, I guess. He had subleased his permit to his upstream neighbor who, as it turned out, wasn't exactly an eager participant in the project. After all, it was the neighbor's cattle that had created the "management opportunity" in the first place.

So, we had an absentee landowner, and a reluctant rancher as partners. Additionally, the staff of the State Land Office was stretched far too thin over the 13 million acres under their jurisdiction to keep a close eye on things. When Hawks Aloft began seeing trespass cattle in Macho Creek in the summer of 2001 we knew we had a problem on our hands. The fence was down, they reported, and in need of repairs. Then the drought hit.

But what happened next was the important lesson learned—in 2002 the upstream neighbor suddenly sold his ranch and moved away. The on-the-ground steward, no matter how reluctant, was suddenly gone. The new owner of the ranch was not interested in cattle and declined to become the sublessee. The college professor was not able to do much long-distance; and the State Land Office tried, but failed, to find a new rancher.

Meanwhile, trespass cows were having a field day on all that grass we grew.

In July of 2003, I returned to Macho Creek one more time. I braced myself. Driving up the road I spooked a herd of twenty-five cattle who clearly had been camping out. Cow poop was as ubiquitous as grass was absent. I walked to the photo point where the hunter had pointed his gun in my general direction. There were no birds, there was no grass. No hunter would be returning to Macho Creek any time soon.

The electric fence lay at my feet in a tangled mess—hopelessly beyond repair. And tangled among it was a lesson about the value of stewardship. We lost the steward of Macho Creek when the rancher moved away. He was a reluctant steward, to be sure, but while he remained the land grew healthy again. As soon as he was gone, and no one replaced him, the land deteriorated again.

A cynic might say this makes a case for **no steward** at all—that kicking the cows off the land is the only way to ensure ecological recovery. The lesson learned in Macho Creek, they might say, is what happens when the cows come **back**. Keep the brutes out, and damn the consequences.

The lesson I have learned is different. Despite what the crit-

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Macho Lesson

(con't from page 12)

ics say, we learned that ecological recovery and maintenance **is possible** in the presence of livestock grazing. We saw it, however briefly, and measured it. And I learned a lesson about "eager learners"—that change happens best when guided by those who desire it, not simply by those who acquiesce to it.

The extended lesson is this: Our land needs more and better stewardship, not less. It needs the active manager on the ground, watching the indicators of land health, fixing fences, and moving cattle around.

Perhaps at some point in the future Nature can be "self-willed," as some activists and scientists put it, but right now it needs help. Restoration, after all, is an **active** word—it needs human involvement, guidance, and maintenance. It needs to be local too—it can not be done from a distance. It needs to be done by someone who feels affection for the land, who lives there, and who is an eager learner. The alternative is more of what got us into this situation in the first place.

In this context, maybe our experiment on Macho Creek was not a failure after all. True, the riparian area has become a "management opportunity" again, but next time we'll have more knowledge and experience. Next time we'll get it right.

And maybe we'll find that eager learner.

Cow in Macho Creek, July 2003.

Meanwhile, I've put the "after-after" slides into my talk. I still follow the opening credits with a visit to Macho Creek and I do so for two reasons now: I'm proud of what we accomplished, and I want to be frank about what happened ultimately. I try also to be optimistic. What we've really learned, I tell audiences, is this: The lesson never stops.

Learning is forever.

Errata: In our last newsletter, we left out some information from the article on Craig Allen's work at Bandelier.

Craig would like us to mentioin that for more than ten years he has been working closely with Bandelier staff, especially Brian Jacobs, in a series of restoration experiments.

To clarify why he was using coarse debris chunks in his experiment, he advises that, "Traditional chipping results in fine-textured mulch blankets that tend to suffocate herbaceous plants."

Please see the following website for Craig's work regarding place-based science, fire history and ecology, applied historical ecology, and restoration of Southwestern forests and woodlands:

http://www.fort.usgs.gov/resources/spotlight/place/place_home.asp

The Far Horizon

by Courtney White

"What's past is prologue." – **William Shakespeare**

One of the reasons I became involved with the environmental movement years ago was the lesson it taught about living within limits.

As a member of the Baby Boom generation, barely, I had grown up in a world of excess—there was no shortage of food to eat, things to buy, or land to gobble up. There were no limits in my youth. Everything was there for the taking, at least for those who had the means, encouraged by a culture of "Just Do It."

Gradually, I became aware that I lived in an age where our desires far outstripped our needs. Watching new stoplights near my home plod on, one by one, into the desert I decided to enroll in the conservation movement in order to support its effort to draw the line **someplace**. By the time I graduated from college I was swept up in the work to protect our national parks and wilderness areas against short-sighted exploitation.

At the same time, as a student of anthropology I began to understand that the question of limits was culturally based - that most things began and ended with human behavior.

But the movement's message about limits seems to have been lost amid the sound and fury of recent years. The movement today seems to be motivated more by issues of power and control, as well as an unattractive desire to punish people, particularly rural people. There isn't much constructive talk about limits, ecological or social, anymore, or how we might live and work sustainably within nature's model. Instead of acting as the nation's teacher, instructing and encouraging good behavior, it has become a movement of scolds.

Too much of the movement today is focused on the symptoms, not the causes of environmental problems—"fixing the pump, not the well" is how Aldo Leopold might have put it. And addressing causes means, in my opinion, addressing the issue of limits. This, I've decided, has to be a principal goal of a new conservation movement.

Dust Bowl

For anyone interested in limits, I highly recommend two books. The first is Donald Worster's gripping history of the Depression-era ecological and social tragedy called *The Dust Bowl*. It is a highly instructive lesson in what happens when humans shatter ecological boundaries, as well as a cautionary tale about culture and society.

"The dust storms that swept across the southern plains in the 1930s," writes Worster, "created the most severe environmental catastrophe in the entire history of the white man on this continent. In no other instance was there greater or more sustained damage to the American land, and there have been few times when so much tragedy was visited on its inhabitants."

The "dirty thirties," as they were called, were primarily the work of man, not nature, Worster argues. Nature had a role, to be sure—without the winds the soil would have stayed put and without the drought the land would have been covered with healthy crops. "But natural factors did not make the storms," writes Worster, "they merely made them possible." Farmers had stripped the landscape of its grass cover to such an extent that there was no defense against the dry winds. "The sod had been destroyed to make the farms to grow wheat for cash."

Between 1925-1930 more than five million acres of grassland were torn up by tractors. Then

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drought returned, as it always does. When the dust storms began in 1935, one-third of the Dust Bowl region—33 million acres—lay exposed to the winds. Kansas and Oklahoma topsoil blew as far as Washington, D.C.—and then out to sea.

Society, in the form of mechanized agriculture, had destroyed a unique ecological complex. Eons of alternating cycles of drought and rainfall in the southern plains had created an ancient, but fragile, set of natural alliances, much of it based on the presence of grass. Out of some 4500 species of grasses that have evolved on the planet, Worster notes, the Great Plains became home of several hundred. And the grass had endured every disruption—drought, silting, and Ice Age climate shifts—everything but the plow.

Of course, the farmers didn't see it this way. The dominant slogan of the age—"rain follows the plow"—suggests that many thought they worked within natural limits.

They didn't. In fact, according to Worster, all this demonstrated a complete absence of environmental realism. "The ultimate meaning of the dust storms in the 1930s," he writes, "was that America as a whole, not just the plains, was badly out of balance with its natural environment. Unbounded optimism about the future, careless disregard of nature's limits and uncertainties, uncritical faith in Providence, devotion to self-aggrandizement—all these were national as well as regional characteristics."

Actually, it went deeper. The real trouble, according to Worster, started two centuries earlier when humans began to believe they were autonomous from nature—free of the restraints that control other species. "There has been no more important change in the human condition," he writes, "than the transition from a traditional sense of intimate dependence on the ecological community to the modern feeling of absolute free will and human autonomy…[that] all ecological limits were simply challenges to be overcome by human energy."

The Dust Bowl is a lesson in the consequences of breaking these limits.

It is a lesson we keep relearning. "The discovery of expansionary limits has recurred in modern American history," Worster concludes, "like the experience of a runner pausing for breath along his course. Each time he rests is in a different place, sees a new terrain, assess his reserves by what lies ahead—and then goes on to run again." During these pauses the nation is filled with mixed feelings about the race itself, whether it has been worth the effort, and what could be done to run the next leg more wisely. "'Conservation'," he writes, "is the word that sums up these disparate attitudes; it has meant for some a rejection of the race itself, for others a preparation to plunge ahead."

Brave New Future

Plunging ahead is exactly what worries Bill McKibben, author of the 1980s bestseller *The End of Nature* and a long-distance runner himself. In his new book *Enough: Staying Human In An Engineered Age*, McKibben tackles the thorny, and alarming, questions surrounding the rapid advance of biotechnology, including the brave new frontiers of genetic engineering, nanotechnology, cryogenics, and cloning.

He worries about a future described candidly by bioengineers and other techno-prophets as "posthuman." He observes that we have come to a technological threshold where we are poised to alter the very essence of what it means to be

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human, both biologically and socially. For example, he argues that enhancing intelligence or longevity, perhaps even to the point of eliminating death altogether, through gene manipulation will change us fundamentally—and not for the better. Not only will it change us profoundly physically, but who, for example, gets to be immortal first? The rich?

Imagine the religious, social, and environmental consequences of breaking the mortality boundary!

The biofuturists, he notes, believe we are deeply flawed as a species, starting with our bodies. Our multi-purpose mouth, for example, is awkward to the point of "absurdity" they say. One theorist puts it this way: "I don't much like how people are now. We're too shallow, slow, and ignorant….we seemed to have reached a plateau in our intellectual development. There's no sign that we're getting smarter." This theorist sees it as a hard-wiring problem that can be fixed by technology—creating neural connections between our brains and the Internet, for instance.

Here's another example from another theorist: Eventually "smart chips" will be implanted inside you, then "your body temperature might give your stereo system clues as to your mood and it would select appropriate music." The chip could also, according to the theorist, "compute how much of your body weight is fat, and offer suggestions for diet recipes ***to the refrigerator***." [Emphasis added.] McKibben is not making this stuff up. It is quite real, as he documents in detail, and it is hurtling toward us with great speed.

The bottom line in all cases is this: These Transhumanists, as they call themselves, oppose limitations, either technical, social, or biological. Transcending mankind's tragic flaws, in fact, is their overriding goal.

McKibben's response is to shout: "Enough!"

"We need to do an unlikely thing," he writes. "We need to survey the world we now inhabit and proclaim it good. Good enough. Not in every detail…but good enough in its outlines, in its essentials. We need to decide that we live, most of us in the West, long enough…[that] we have ease enough….we have enough stuff. Enough intelligence. Enough capability. Enough."

He lays some of the blame for this emerging "posthuman" world at the feet of the environmental movement. "The movement to value everything else on earth has often talked carelessly about people, spreading the idea that we are a grim and uncontrollable race, a cancer cell metastasizing unchecked across the defenseless fabric of nature."

In fact, he notes that some environmentalists are embracing this brave new future, believing that new technology, will, in the words of one bioengineer, "reverse the harm done by the industrial revolution." Cloning could be the solution to the endangered species crisis, they argue. Nanotechnology could replace farming. "Humanity will become a low-pollution system largely decoupled from nature," exults one writer.

McKibben thinks this is a bad idea. "We are leaping across thresholds," he writes. "While the jump to microscale technology may have made life easier, the further jump to nanoscale engineering will eventually drown us in a gushing cornucopia. While the jump to modern medicine may have freed us from many ills, the next leap to human genetic manipulation will imprison us in a house of distorting mirrors. That's how thresholds work: up to a certain point something is good, and past

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that point there's trouble."

We are approaching that threshold now. "Our food has been genetically modified," he writes, "which makes us uneasy; our children are about to be, which should make us cringe."

For McKibben, it's a fundamental choice between Enough and More. As a species, we have procrastinated the decision. "But now the hour draws near," he concludes. "Faced with a challenge larger than any we've ever faced—the possibility that technology may replace humanity—we need to rally our innate ability to say no."

Yes

Worster and McKibben are not scolds. Their message about living within limits, while alarming and disturbing, is not punitive or misanthropic. It is, in fact, a message of optimism—and a guide for a new conservation movement.

Worster argues for reform of an economic system that he sees as unnecessarily exploitative, not for its abandonment. He also argues for a stronger 'sense of place' among all Americans. The possession of more knowledge is not enough—if it were, he writes, "then the most highly advanced cultures in terms of science and machinery would also be the most well fitted to their environments. In fact, those cultures are among the least well adapted in the world."

Adaptation is the key. It requires knowledge, of course, and appropriate technology, but it also requires a sense of place—a sense of self-identity intimately connected to the land. "Adaptation follows almost instinctively," he writes, "like a pronghorn moving through sagebrush. Houses and fields, tools and traditions, grow out of the earth with all the fitness of grass; they belong in their place as surely as any part of nature does. This is genuine adaptation, and it implies much more than shallow managerial skill. It comes from having a sense of place, which is at once a perception of what makes a piece of land function as it does and a feeling of belonging to and sharing in its uniqueness."

This is the chore, and the hope, of a new conservation movement—to fuse function and feeling in our western landscapes.

A great deal of "a sense of place" in the West is expressed in its poetry, novels, songs, photography, and painting—its art and lierature. And a great deal of these musings are focused on the question of limitations—aridity, wilderness, the wolf, loss of open space, loss of self-identity. Western writers and artists have been grappling with boundaries, both internal and external, since there has been a West, and they have created an impressive body of thought from which we can draw.

The time has come, it seems to me, to bring these two "halves" together into a fruitful dialogue about sustainability and healing in the region.

This will be difficult, but I am convinced that one cannot survive with the other—that science without art will prove to be impractical in the long run, and art without knowledge will prove to be ineffective. But it is an effort that needs to be made. A new conservation movement is trying to blend fact and fiction in a way that draws lessons from the past so that we may chart a reasonable, and more "natural," path into the future.

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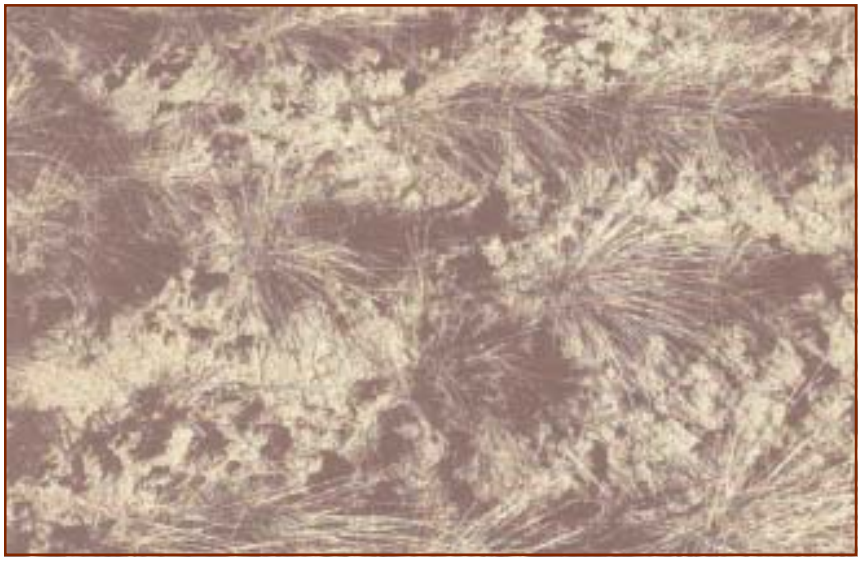
northwest Australia, the true deserts of Namibia, and the acacia-dominated savannas of South Africa. Through our tours, we have had the great opportunity to study and learn from some of the world's most creative and successful rangeland managers—people who are restoring the ecological integrity of their landscapes, and generating true wealth and happy families in the process. And through our work experience on the land, in a wide variety of habitats, we have gained many valuable insights into the practical challenges of regenerating rangeland resources.



Perennial grasses in Canyonlands National Park, which have been left ungrazed and undisturbed for so long that they have died from overrest. (All photos with this article are courtesy of the author.)

A theme common to all of the ranches we visit is their focus on imitating natural processes and patterns in the management of their domestic livestock. This article will examine the act of grazing (and, by association, all of its correlated activities, like trampling, dunging, urinating, scratching, and rubbing) as it occurs in a natural context, especially in the world's erratic, highly seasonal rainfall landscapes—habitats that characterize the majority of western North America. It will then attempt to apply those lessons from nature to our domestic management situations.

The grazing debate is one of the most emotionally charged and misinformed issues on the West's natural resource management agenda. This article won't delve into who is or isn't right. It will try to objectively examine grazing as the natural process that it is, the intention being to shed some light on how our grazing management practices can more effectively mimic this natural process and become an effective ecosystem restoration tool in the process.

Grass and Grazers—Made for Each Other

Perennial grass plants and large grazing mammals—from mammoths to mule deer—have been living together for millions of years. Grasses are adapted to periodic defoliation, and in fact benefit from the occasional removal of above-ground leaf material. Most grasses grow from growth points that lie at the base of the plant, beyond the reach of the grazing animal's muzzle. When a plant is defoliated, it can immediately begin to resume the production of new leaf area from intact growth points as soon as adequate soil moisture and sufficiently warm temperatures are present. If severely grazed (i.e., the bulk of the leaf material has been removed), initial growth will resume with energy stored in the roots, crown, and stem base of the plant. As soon as sufficient new leaf area has grown, the plant can begin to manufacture new carbohydrates through photosynthesis. It will then replenish its energy reserves, and go on to build new reserves and new leaf area. Given sufficient time, the plant can completely recover from the severe grazing. Woody plants have growth points

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along their stems, and as long as the plant isn't cut off at its base and is given adequate recovery time, it will recover from defoliation just as the grass plant does. Overgrazing takes place when a plant is severely regrazed before it has had the chance to completely recover both its carbohydrate reserves and above-ground leaf area.

Grazers are adapted to consuming this fibrous form of nutrition due to large fermentation vats in their digestive systems. In foregut fermenters (or ruminants), like cattle, sheep, goats, deer, elk, and all the antelope species, the fermentation vat is called the *rumen*, and it is the first chamber of their four-chambered stomach. Here billions of bacteria and protozoa break down the cellulose of the plant into volatile fatty acids. These fatty acids are then absorbed into the bloodstream across the rumen wall to provide the grazing animal with the bulk of its energy needs. In hindgut fermenters, the fermentation vat lies at the end of the small intestine, and is called the *cecum*, which is the equivalent organ of the human appendix. In these grazing animals (including horses, elephants, rhinos, rabbits and hares, and most rodents), the cecum, instead of being useless as in humans, is a massive organ full of cellulose-digesting microbes. It essentially performs the same digestive function as the rumen in ruminant grazers. The ruminants are adapted to consuming fairly high-quality forage, while the hindgut fermenters like the elephant are adapted to consuming very large quantities of low-quality forage.

So we have plants that are adapted to defoliation and animals that are adapted to eating them. Moreover, the bulk of the world's grazing animals live in areas with either highly seasonal or highly erratic precipitation patterns. The soil surface condition is therefore dry and arid for much of the year, which means that microbes and insects in charge of decomposing plant material into the soil die off or become dormant during the dry, non-growing season. The only place that these decomposers survive during these long dry spells is in the gut of the grazing animal. In these seasonal environments, the grazing animals are therefore critical to maintaining the flow of carbon from the atmosphere to the plants and into the soil.

Perennial grasses just outside the boundary of Canyonlands National Park. Due to the periodic removal of their above-ground material, these plants are alive and vigorous.

Is Grazing Just Grazing?

So the actual act of grazing and the associated digestion of that plant material is about as natural as natural gets. That reality is undeniable. Why then, do we normally associate grazing livestock with the destruction or simplification of plant communities? How can something natural be destructive? Is it because they aren't the "natural" grazers native to our western environments? In their homeland of Eurasia, sheep, cattle, and

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[Top] Bighorn sheep may once have played a major role in cycling carbon and keeping grass plants alive and healthy in the highly brittle American West. [Bottom] Elephants are one of nature's most effective carbon cyclers and agents of disturbance in high production, highly brittle environments. Until their eradication by modern hunter-gatherers, elephants and their close relatives occupied every habitable continent except Australia, where the same niche was filled by rhino-sized diprotodontids.

goats create just as much ecological damage as they do here, so that's probably not why. Not only that, but deer and elk, our predominant surviving "native grazers," really aren't native at all. The only truly native grazers in North America include the horse family, the camel family, and the pronghorn family, each of which originated here on the North American continent. The rest (the deer family, bison, bighorn sheep, mountain goats) are immigrants from Eurasia.

Mule deer and elk, actually, are extremely recent arrivals on the North American grazing scene, having only been here in large numbers since the extinction of the megafauna (mammoths, mastodons, shrub oxen, long-horned bison, six species of camel, dozens of species of horses, eleven species of pronghorn, long-legged and stout-legged llamas, to mention a few), on the order of 10,000 years ago, a micro-second on the evolutionary time scale (*Geist*, 1998). All of the plants that occur today in the West existed along with all of these large herbivores throughout all of the Pleistocene, which began about 1.9 million years ago. Even if we acknowledge that elk and deer are more native than cows or sheep, there still is abundant evidence that they can create just as much ecological damage as their domestic counterparts if not behaving as nature intended.

But we're still left with the question of how grazing can be sustainable. To answer that we may have to look at how grazing animals interact with their environment under truly natural conditions. Fortunately, there are still a few places where these natural conditions remain mostly intact, or at least were intact into the middle to late 1900s, and by studying these intact communities we may better understand how it all works.

The first important point these intact communities teach us is that certain types of herbivores tend to dominate in certain types of environments. The seasonal rainfall environments where we find these animals are actually highly variable in terms of their forage productivity. High rainfall savannas in Africa, where 30-60 inches of rain may come over the course of a short 4-5 month growing season, produce prodigious amounts of forage, but it's very low-quality forage that is dormant for the majority of the year. Going back to our discussion of grazing animal digestive systems, it would stand to reason that the animals adapted to consuming high volumes of low-quality plants would tend to dominate in these areas. That's exactly what we find. In these areas, the hindgut fermenters, like the elephant and rhino, comprise the bulk of the large mammal community (*Owen-Smith*, 1988). They are the animals adapted to consuming this abundant but low-quality forage.

As we transition into the lower production environments,

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which include all of the arid and semi-arid steppelands of the world (including most of the western United States), the makeup of the large mammal populations starts to change. The plants in these drier areas are much less productive and grow more slowly than those in the higher production tropics, which means their structures contain smaller amounts of digestible fiber and higher amounts of protein. In other words, these areas grow lots less forage, but what does grow is much higher in quality. They are environments much more suited to ruminants, which are adapted to consuming fairly low volumes of high-quality forage, and in fact it is the ruminants that dominate in these areas—and not just ruminants, but *migratory ruminants*. In their native condition, the numbers of large migratory herbivores in these low production environments greatly outnumber all other herbivore species combined, in some instances by an order of magnitude (i.e., ten times as many). In other words, there are typically many more migratory herbivores than resident or sedentary herbivores (*Fryxell and Sinclair*, 1988). Moreover, the size of these migratory populations is limited by forage availability, while resident herbivore populations tend to be limited by predation. The migratory populations therefore have a major impact on plant communities.

The Basics of Migration

Now, why can these huge herds of migratory ruminants sustainably coexist with their plant communities? Could it be tied to the fact that they migrate in the first place? Getting back to the theme that it is the way animals interact with their environment that is most important, what is it about migratory behavior that leads to sustainability? It turns out that migratory patterns tend to be predictable on a broad scale, but very unpredictable on a more local scale. The less productive the environment, the less predictable is the migratory behavior of the herbivores. For example, the wildebeest (which are in an environment ranging from fairly low annual production in the south of their range to fairly high production in the north) can always be expected to be in the northern woodlands during the middle of the dry season and in the southern plains during the middle of the wet season. The timing of their migrations north and south, however, can vary by one or two months (*Sinclair and Norton-Griffiths*, 1979). The actual migration routes can also vary from year to year, as can the time spent on a given seasonal range. Over a twelve year study from 1961 to 1973, the wildebeest spent between 5-32% of each year in the northern woodland savanna, 12-40% in the western mixed savanna, 7-15% in the central mixed savanna, and 22-60% in the open southern plains savanna (*Pennycuick*, 1975).

Part of the two million head herd of migrating wildebeest on Tanzania's Serengeti Plain.

Unfortunately, long-term studies designed to quantitatively study this type of behavior are either non-

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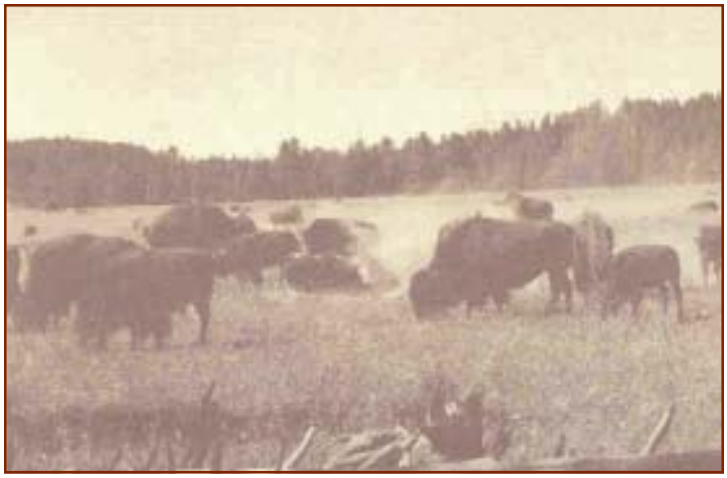
existent or extremely scarce for other species of migratory herbivores. However, less formal observations of these populations tend to paint a similar picture. Scientists studying the chiru of the Tibetan Plateau were unable to predict their seasonal migration routes. After expectantly setting up their observation camps on the route the chiru took the previous year, these scientists were frequently disappointed to realize that the migration was passing dozens of miles away (*Schaller*, 1998). The same occurs when trying to predict the exact migration routes of the caribou.



Bison in Yellowstone—part of a cohesive herd that Jim estimated to number about 1000 head.

Variable migration routes then tend to lead to different areas of summer or winter ranges being used from one year to the next. The 800,000 head George River caribou herd of northern Canada was observed to use the same summer range only once every six years (*Russell*, 1998). Depending on when the large lakes freeze over (so that the caribou are able to cross rather than having to travel around them), the migrations may end up in totally different winter range from one year to the next (*Calef*, 1981). Migrations of saiga antelope in Kazakhstan and Mongolian gazelles in eastern Mongolia are reportedly very erratic. Depending on snow and drought conditions, migration routes to and from calving grounds and seasonal use areas are highly variable. In the extremely harsh steppe-desert on the edge of the Sahara, the behavior of the surviving migratory dorcas gazelle is described as nomadic. There is no pattern to annual movements at all (*Nowak*, 1964). Their grazing patterns are totally dictated by ephemeral rains that create the odd green spot in their austere landscape. As a result, they might not return to the same area for years.

Management Implications of Migratory Behavior

The lower the potential productive capacity of a grassland, steppeland, or savanna, the more erratic and seemingly chaotic the migratory movements of the associated herbivores seem to be. What does that mean for the plants and the soil surface condition? In practical terms, how does the erratic migratory behavior of huge herds of herbivores affect the timing, frequency, and intensity of plant defoliation and soil surface disturbance? Because the commencement of a migration might vary by up to two months from year to year, the timing of defoliation in a certain area may also be variable. Also, a specific site might fall in the path of the spring migration this year, but next time the animals come through that spot it may be the next year on their fall return to winter range. Again, the result is *variable timing of grazing*. Because migration routes and specific localities of seasonal use change from year to year, frequency between defoliations might stretch out to several years. The lower the productive potential of an environment, the less frequent grazing periods tend to be. Because length of occupancy of specific ranges tends to

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vary from year to year, the degree of utilization, or intensity of overall plant defoliation, will also vary on an annual basis.

How do we translate these lessons to a domestic livestock grazing scenario? Luckily, we as land managers have lots of control over these three critical variables of timing, frequency, and intensity. However, because most of us like routines, we tend to vary them very little. We turn out in the same pasture at the same time of year with the same number of animals and leave them there for the same amount of time. That's an entrenched pattern and it's not natural.

In most situations, our herds are small and/or our stock density is extremely low, which results in very uneven grazing and little soil surface disturbance. But the massive migrating herds don't always bunch up in tight herds. In fact, they often are distributed fairly thinly. The white-eared kob antelope seldom reach densities over 1000 head/km^2, which works out to only four head to the acre (*Fryxell and Sinclair*, 1988). But because the herds are so huge (especially relative to our domestic herds), by the time thousands of animals traveling in cohesive family groups pass a given area, the result is an extremely well-distributed pattern of grazing and animal impact. Depending on how fast the herd is moving, the intensity of defoliation may be light, moderate, or heavy, but whatever the case, it will tend to be uniform over the landscape the herd is traveling through.

By increasing stock density (through herding, fencing, and herd amalgamation to achieve larger herds, including combinations thereof), we have the ability to mimic this even level of impact and grazing severity with our domestic herbivores. By controlling the length of our grazing periods, it is then easy to vary intensity. On my family's ranch, we typically will have 400 yearlings grazing about 40-acre temporary pastures. A one-day grazing period will result in an even but light intensity of grazing and impact, two days a moderate level, and three days a heavy level of grazing and trampling. From year to year, we can intentionally vary this level of utilization, or grazing intensity. Because we can control exactly where we want them to be from the beginning to the end of the grazing season, we also have total control over the timing of grazing. In other words, we can always be sure to graze a certain area at a different time in successive years. For rangelands dominated by cool season plants that are active both in spring and fall, this is especially critical. Recent research indicates that cool season plants produce new tillers in the fall, and it is these tillers which contribute to the bulk of new vegetative growth the following spring. We often assume that fall grazing is minimally damaging to a plant, but in fact this may be a cool season plant's most critical time. Many low elevation ranges are traditionally grazed both in the spring and fall, which is probably the

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Herd of 400 yearlings on a 40-acre patch of grass on Cerro, Jim's family's lower elevation (7500' average) ranch east of Montrose, Colorado. Note the portable electric fence in the foreground.

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worst combination from the plant's point of view.

We also have complete control over the frequency of grazing. In our situation, we'll seldom have a grazing period last longer than a week, so plants have little chance of suffering a second bite on regrowth. We can also plan to ensure plants are not regrazed in a subsequent grazing period until those plants are fully recovered from the previous defoliation. The migratory herbivores often stay out of areas for up to several years at a time, allowing for very long recovery periods and abundant vegetation accumulation. We've started to plan for these long recovery periods (two full growing seasons) on roughly 20% of our land per year, the results of which have convinced us that a periodic extended recovery period is essential to accumulating a source of older material to serve as vital soil-covering litter. Our biological monitoring transects have shown an increase in total cover (soil-covering litter plus living plants) from 78% to 97% after a two-year recovery period. Production (measured in animal-days of forage harvested per acre) also increased by 51%. These periodic longer recovery periods seem especially critical the lower the inherent productive capacity of a range, such as the steppe environments of the western United States.

So, to summarize, we can deliberately vary the timing, the intensity, and the frequency of grazing on any given piece of ground. We can create the sort of chaotic conditions that nature would have produced with migratory herbivores. For example, one year we might plan to graze a pasture lightly in the spring, then heavily during the next year's summer, then give it the following year completely off. These actions require good planning and careful monitoring. We use the Holistic Management™ Grazing Planning Procedure. We've found it an invaluable aid in bringing together all of these complex variables into a practical, simple plan that can realistically be executed on the ground. At the end of the season, the completed plan serves as a fantastic record of past events, and helps guide and inform future planning. With an awareness of nature's model in our respective habitats, combined with careful observation, disciplined planning, and skilled implementation, we can sustain and even recover the ecological integrity of our valuable rangeland resources. Just as importantly, we can do this while generating economic activity and preserving our ranching culture in the process.

Editor's Note: *Parts of this article first appeared in* ***In Practice*** *#83, the bi-monthly publication of the Savory Center for Holistic Management.*

Confessions of a New Rancher

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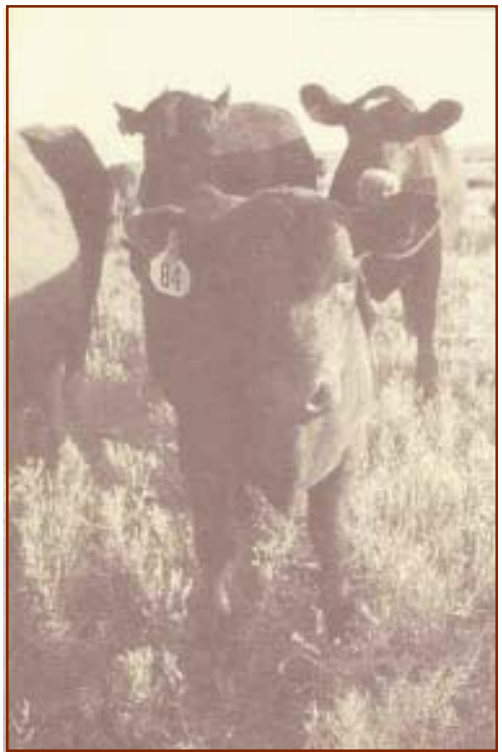
costs of fencing and water development.

There had obviously been a bit of a backlash to "Holistic Management" and kindred systems in the ranching as well as the academic community. I found a widespread skepticism towards "Savory" and other "Silver Bullet" systems promulgated by experts from over the horizon who promised to save ranchers from what amounted to their ignorance and past sins. I'd often hear of good ranches that had been "ruined" by it—gone broke—and was urged to be very careful. This was perplexing and troubling, and had to involve more than just, as was sometimes suggested, professional rivalries and the envy of those well-paid, step-on-your-toes consultants lavished with uncritical media attention. Was it really all just so much sham ecological elixir unable to withstand the scrutiny of peer review?

While, outside of its committed adherents, Savory and the like had become somewhat "unsavory," the veteran Quivira ranchers were not neophytes or gadflies enchanted with the latest fad. Even among "traditional" ranchers there had long been recognition of the benefits of occasional rest for pastures and that some form of "rotation" could be helpful. We concluded that even if, in fact, the New Ranch wasn't any better than conservative conventional practice, at least the ranchers were paying much closer attention to what was happening on the land under their care at both micro and macro levels; more detailed knowledge about natural processes, better monitoring, and more "tools in the toolbox" could only lead to desirable outcomes.

A Multidisciplinary Endeavor

Ranch management is truly a multidisciplinary endeavor, requiring, if not mastery, at least a good working familiarity with a variety of diverse skills, from rudimentary plumbing, auto mechanics, and welding, to such mundane and often overlooked topics as accounting and marketing. While it all rests on the foundations of soil and grass and "solar dollars," the short-term currency that ranchers are paid in is still cattle (pounds of live animal). The husbandry of these cattle, which involves all the subdisciplines of health, behavior/handling, nutrition, reproduction, etc., is obviously one of the most critical areas. For truly new ranchers such as ourselves (who, to start with, could not tell one of our mostly black cows apart from another), learning cattle management was certainly just as important as learning the intricacies of our rangeland ecosystems. Fortunately we have good neighbors whose help and guidance have been invaluable (they are the backbone of our branding and shipping crews), as well as helpful "backup" from the NRCS, county extension agents, emails from Ph.Ds, and sage advice from our long-mustachioed ranch vet.



Rain

Our second night after moving onto the ranch the entire region enjoyed three plus inches of rain in about 48 hours. We were literally stuck on the ranch as it was so muddy we couldn't go in or out or anywhere. We had to delay the processing of the cow herd, which we were buying with the ranch, and generally felt quite inconvenienced. Our neighbors, however, seemed quite jolly about it all. "You better take a picture," they said,

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[Top] Jim working on his EQIP project. [Bottom] Kirk Gadzia inventorying forage.

"so you can remember it." A week later, when the grass had turned a green so bright that it almost hurt our eyes, we saw that such inconveniences had an appreciable silver lining, or rather, green (green is the rancher's favorite: the color of grass, money, and manure!).

We took those pictures and refer to them quite longingly through these dry times. It didn't take us long to learn through experience what we had "learned" in the books and seminars—rainfall really is variable. Though ranches are bought and sold and rated on average carrying capacity, a direct function of average rainfall, no one year is ever average and most are below average (especially the last four).

It's variable over the ranch too. We are now up to eight rain gauges, most within a mile of each other, and they seldom, if ever agree. It might rain all night outside our window and we sleep contentedly knowing how the pastures are soaking it all up; the next morning upon venturing forth, we find it's as dry as a bone just a quarter mile away.

But our native grassland ecosystems seem superbly adapted to this state of affairs. The grasses, which seem to curl up and crouch down into semi-dormancy during drought, will suddenly spring back up with tremendous energy and spurts of growth when they finally get watered. Annual plants ("weeds") will appear seemingly from nowhere. Sometimes most of the season's rain, and plant growth, will be concentrated in just one or two events. Rangeland critters too, especially the toads and frogs, will suddenly come forth from their underground semi-hibernation and "do their thing" for a few days until everything dries back up again. At night they can make enough racket to drown out the coyotes. The water delivery cycle here seems to be one of feast or famine; the ecosystem components make the most out of such sporadic feasts so that they can persevere through the periodic famines.

Designing a Grazing Program

This certainly poses some challenges in designing a grazing program, as it has to be flexible enough to respond to such random rainfall patterns. Controlling the timing, intensity, and frequency of grazing, as oft stated theoretically, is indeed the key, but it is not always the easiest thing to put into practice. Variable rainfall means variable pasture conditions and production. It's not uncommon for it to rain in the pasture you just came out of—should you go right back to give your thin cows some desperately needed green? Or do you stay away for an appropriate rest period? The predictable Grazing Management 101 answer is, "It depends." One has to be both disciplined and flexible.

In our case, the previous owner had already started planning with the NRCS a series of improvements under EQIP (Environmental Quality Improvement Program) to enable greater flexibility. The design

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process and red tape had already been completed, and with a few minor modifications, we were able, with new fencing, watering developments, and brush control to significantly increase both the number of pastures (and their quality/useability) over the next couple of years. The plan didn't set out to create a super intensive pie-shaped grazing cell system; rather it opted for a set of flexibly arranged connecting pastures that would suit a rotational system as well as a more traditional approach (such as having several single-sire breeding groups). We invited "world renowned" grazing consultant Kirk Gadzia to join us in our initial planning and assessments; he returns once a year to help us inventory forage and give us one of his hard-nosed "reality checks."

Conventional practice in continuous grazing calls for low to moderate stock densities with cattle spread out as much as possible. Rotational grazing approaches call for higher densities for shorter periods of time. Putting all or most of your cattle into one large herd seems counter-intuitive in big pasture country where it is not uncommon for a cow to spend her entire career in one large home pasture.

The Cow Herd

While we embarked upon these improvements we also had to learn our cowherd. We were fortunate in buying our herd with the ranch. Not only did they prove to be a good set of cows, they were well adapted and acclimatized to the native forage and conditions. They knew what to eat and what not to eat. They knew where the sweet spots and the waters were (they also knew all the good hiding places). They didn't, like we did, have to figure out a new place (which may perhaps be one of the initial complications of grass-banking)—they just had to figure out some new people.

They were somewhat wary of us at first, but as we had one of the most powerful behavior modification tools available, a cake truck, we soon gained, if not, as we liked to imagine, their affection, at least their confidence. A cake truck is a pickup with a cube-feed dispenser on the back; its effect, when cruising through a pasture, augmented by a honking horn or, as in our case, an air-raid siren, is much like that of a Good-Humor truck ringing its bell through a summer suburban neighborhood. We got the siren because we were wearing out more horns than a New York cabbie (someday I hope to hook up a loudspeaker and CD player, and see if our cows could learn to bawl for Pavaroti). Our cake truck is used for moving our cattle in pasture rotations, leading them into the pens for branding and shots (cowboy backup sometimes required!), and to assemble them for roll call and inspection (those that are absent may be off having a calf). Our ranch motto: "Let them eat cake!"

Cows following the "cake truck."

Training (or retraining) your cows to make frequent moves might take some time, but as long as the grass is really greener on the other side of the fence they will take to it. There

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[Top] Cows being selective in their diet. [Bottom] Mother and calf.

does seem to be some definite antagonism, however, between what is nutritionally best for your cows (at least in the short run) and what is best (strategic rest) for your pastures. As cows are indeed very selective in their diets, the more they have to choose from (as when cow densities are low), the better diet they can select. When a large group of cows are concentrated in a small area, timid cows and those lower in the social hierarchy, such as a heifer with her first calf, tend to get pushed around and relegated to the less choice areas of a pasture by the boss cows (who also get more of their fair share of any supplemental feed). It's easy to lose track of potential problem cows or overlook weak or sick calves when there are so many swirling about—it's hard to notice who's missing when you are not apt to notice that anyone is missing in the first place.

Our first season, in the midst of initial fencing, we kept the first calf-heifer pairs with the main herd to ensure some pastures a bit of rest. According to the theory, as I inflexibly understood it, that was what we were supposed to do. At the end of the year we found that only 60% of these had rebred. After that catastrophic disappointment we made some doctrinal compromises. Now, during the growing/breeding seasons, we have two main groups, the main cow herd and a smaller combined first calf/heifer and replacement heifer group. The heifers get first go at the best pastures and are put on "weed patrol" on the young tumbleweeds, kochia, and pigweeds that spring up around the Headquarters traps and pastures which stay palatable and nutritious before they make seed. These young, impressionable cattle are moved and handled frequently, which generally engenders a compliant disposition. Being in a smaller group means they have greater selectivity. Their breeding and rebreeding rates are now over 90% and these near-the-house pastures, always prone to over-use, are actually starting to show some improvement.

Health of Land and Cattle

We have learned that we can keep track of cattle nutrition by not just monitoring their body condition scores but by examining their literal output. Periodically we scoop up manure samples and ship them to the near-infrared spectroscopy lab at Texas A&M. The report we receive via email tells us the crude protein and carbohydrate levels that the cattle are finding in our forage. Over time we have built a nutritional profile of our pastures through the seasons, information that helps us fine tune our grazing plans and our winter season

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and drought protein and mineral supplementation strategies. Improvements in such nutritional management have contributed to improved weaning weights (steers 525-550 lbs.), rebreeding rates (95%), and a tighter calving season (90% in 60 days).

We also learned, little by little, how to keep track of the health of our pastures. The first step was learning what was out there. All grasses looked alike and the weeds, forbs and flowers were all very confusing (though often pretty!). One of my morning coffee-time rituals was to repeatedly leaf through the range plant guides hoping to "imprint" the pictures to the point of in-the-field recognition (I did this for birds and other critters too). I'd take samples of those I couldn't find to the extension office and sometimes email pictures to other experts. Any knowledgeable visitor was pestered with queries. On his first visit, local NRCS agent Robert Abercrombie pointed out isolated instances of "ice-cream" plants hidden inside a mesquite clump or under a thorny cactus. "The seed bank is here," he promised. "Give it a few years under a rotation and a little bit of rain and you'll see all these plants coming back all over." That was an exciting thought.

Monitoring

Our monitoring was fairly basic at first, confined mainly to taking photos and learning to read out landscapes according to the interagency publication, *Interpreting Indicators of Rangeland Health*. We tried to observe such classic rules of thumb like "Take half and leave half," even as we weren't really sure what "half" was. Was that for the whole year or after each grazing period? What about the winter? As the cows were being very selective, they seemed to take a lot more than half of some plants and hardly touch others. Was that half of what they were eating, or half of everything?

After a while we put up little wire cages—mini-exclosures—to help us keep track (I saw it in a magazine). They weren't super scientific but they at least gave us some idea of what was being consumed. The cows sometimes rub against them and trample about which skews things—you have to step out a ways to get a fair comparison. The cages need to be placed on different species, too. There are detectable differences, even in drought. We've even left a few in place since the beginning to see the effects of complete rest—inside these the grass is thick and tall, but also gray and crumbly.

Brush Control

According to local "old-timers" both the mesquite and the juniper have increased substantially over the last several decades, obscuring meadows with thickening thickets. Whatever the causes, which are surely multiple, this steady encroachment into grasslands has become a region-wide challenge. Large scale, landscape wide treatments may ultimately be required, but in the meantime we can do what we can to maintain our meadows and "savannahs" through selective cutting and herbicide use. In the long run, maintaining good ground cover is really the best form of brush and weed control. Woody and invasive species are relatively absent from vigorous stands and patches of grass. While it's very easy to agonize over

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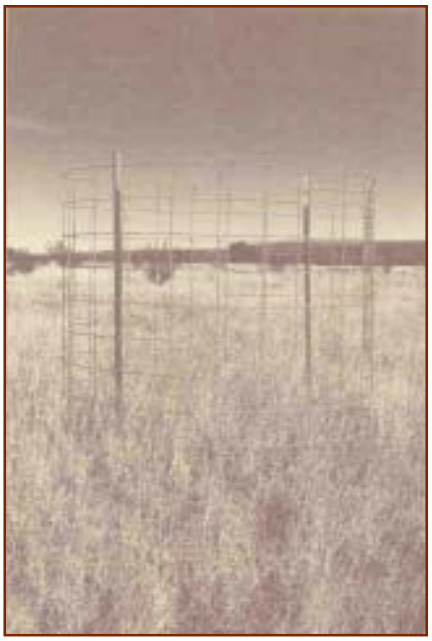

[Top] Monitoring cage. [Bottom] Treatment of encroaching juniper.

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Plains Bristlegrass.

runaway mesquite thickets and overpopulated juniper groves (we have our fair share of both), it's more cost effective to focus on the areas at risk and on the edge of transition rather than on sites much less productive and diverse.

The Challenge of Drought

The "old-timers" remember the neighbors and little communities that are no longer around, and they also remember the droughts, the long dry spells.

Pete Ortiz, now in his eighties, remembers as a boy the government buying up everyone's starving cattle. There's a covered-over pit somewhere not too far to the west of our headquarters where he said they shot them all. In his history of the Comanche Indians, Stanley Noyes describes how a starving band came to Santa Fe during a late 18th century drought to parley a truce in exchange for corn; the buffalo had left and their ponies were weak and thin. In *We Fed Them Cactus*, author Faviola C de Baca, recalls the 1918 drought that finally broke many of the dry-farming homesteaders in our area. As her title describes, they literally resorted to burning the spines off the cactus for cattle feed (a common practice in south Texas today).

Don Driggers, a spry 73-year-old rancher trotting along on a willing 20-year-old horse, told me the other day that the present drought is getting to be "almost as bad" as the one in the 1950s. "Of course," Don said, "nowadays we can haul in hay and water and really beat up the country if we want to"—and of course, that's not really the idea. Yet I've often heard this worried comment: "I know I need to cut back on my stocking but I can't afford to." In a low margin business such as ranching, you need every bit of income (calf) that you can get. It's hard to think long term when bills are getting overdue.

In our own case we have been—so far—very lucky. We couldn't afford to get fully stocked to our average carrying capacity to begin with, and that turned out to be a blessing in disguise. We inventory our fall grass and have a stand-by destocking plan that fortunately—so far—we haven't had to implement. While our rainfall has been getting farther below average for all of the last four years (this year is 63%), what rainfall we have gotten has been fortuitously timed and, for the most part, seems to have been well utilized. Yet, if this drought continues, we too may be shipping cattle off our ranges like too many others have throughout the region, not just the normal shipments of weaned calves, but shipments of mother cows—the seed corn—as well.

In Summary

Despite drought we have been seeing some increases in cover, diversity, and even production in many of our pastures. Key indicator species, such as side oats gramma, plains bristlegrass, western wheat, and winterfat are on the increase, while heretofore strangers like Canada wild rye, white tridens, and Arizona cotton top are making more than just guest appearances. The seedbank is indeed there. Our "riparian" swales are thickening with fluffy grass seed heads swaying in the autumn breeze. We're seeing more young plants, more seed heads, less bare ground for the tarantulas to prowl across and the dung

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beetles to roll around on. Willows are starting to edge out salt cedars at the north water gap. Wild turkeys are gobbling in the horse pasture, migrating ducks linger on the stock ponds, and a Cooper's hawk has persuaded those vultures to roost further out.

There have been little setbacks, heartaches like first calf heifers that don't make it through their first calving and disappointments like having a big hit-the-jackpot rainstorm just brush on by, but so far no big wrecks. There are certainly threats out there, many beyond our control (such as an occurrence of BSE—"Mad Cow"—disease in the U.S., or the accidental or bio-terrorist introduction of Foot and Mouth Disease), as well as the ongoing campaign by the various anti-grazing zealots and self-annointed "guardians" to disrupt if not altogether end an economic and cultural relationship between people, land, and livestock that has been millennia in the making (I think they should redirect their efforts towards the planet's failing ocean ecosystems).

As long as the voting public remains largely misinformed as to the true on-the-ground realities, the grazers will have an increasingly difficult, uphill battle in the ongoing struggle over the future of grazing and ranching on public and private lands. This reality, however, is being increasingly shaped by more and more ranchers who have learned to work more in harmony with nature than ever before. Quivira—and others—is hard at work getting this good news out. Rotational grazing, planned and flexible, is not an anomaly anymore; it's becoming conventional wisdom. While any human cultural activity (like such agricultural activities as ranching) may not be completely "natural" (free from the influence of man), to succeed in a sustainable manner it must successfully work within, and be responsive to, natural processes in their natural context. What other human activities, besides sustainably practiced farming and ranching, can so closely come to being "in nature's image?"

It's been a steep five-year climb up the ranching learning curve but we're getting to the point where we feel we are practicing some of the art while utilizing much of the science of range management. While we've asked many dumb questions and done a few dumb things, Mother Nature has proven to be very resilient and forgiving to a pair of novices. If you listen close and pay attention, she'll show you the way. We've taken many pages from many different ranching cookbooks to come up with the particular recipe that seems to suit our landscape and critters. We're always learning something new and on the lookout for a better way. The income has certainly been modest (no surprises here), but the amenities are beyond all accounting. We may not have quite reached "Quivira land," but we feel like we are approaching its frontiers.

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One of the tarantulas who will soon be finding less bare ground.

Editor's Note: *In fall 2003, Jim and Carol Thorpe hosted a Quivira Ranch Roads workshop and an NRCS Range Monitoring workshop on their ranch near Newkirk in eastern New Mexico. In October, they received the* ***Outstanding Conservation Rancher*** *award from the Guadalupe Soil and Water Conservation District.*

Announcing: The QC Bulletin

We recently received feedback from one of our friends that set us to thinking. She said that while she loved our newsletter, she admitted that she often didn't have time to read it cover to cover (we're shocked!). She feared that she was missing timely information as a result and wondered if other readers might be in a similar situation?

We thought this was a very good question.

Her recommendation: pull out the time-sensitive stuff and publish it separately. We thought this was a fine idea—which is why we're going to try a regular Bulletin.

The timing is right, we believe. As The Quivira Coalition grows (and the newsletter gets thicker) we think a quarterly vehicle for broadcasting upcoming events, announcements, publications, as well as "reviews" of current projects is in order. And as we grow more diverse a Bulletin will help us reach new audiences.

The Bulletin will arrive between newsletters, so look for a copy in the next month or so. And as always, let us know what you think.

Errata: In our last newsletter, we forgot to mention that the article "Grass, Brush, Timber and Fire in southern Arizona," by Aldo Leopold, was reprinted courtesy of the Aldo Leopold Foundation, Inc. The article in its entirety can be found in *The River of the Mother of God* and *Aldo Leopold's Southwest.*

Southwest Grassfed Livestock Alliance (SWGLA) News

Be sure to look for information on the First Annual SWGLA meeting in our next newsletter, including a rundown on the Board of Directors election and notes from their first meeting.

For information on all **Upcoming Events**, see our website,
www.quiviracoalition.org

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