Prologue to *Grass, Soil, Hope*

This is the story of how I came into Carbon Country.

I'm a former archaeologist and Sierra Club activist who became a dues-paying member of the New Mexico Cattle Growers' Association as a producer of local, grass-fed beef.

For a boy raised in the suburbs of Phoenix, Arizona, during the heyday of sprawl, fast food, and disco music, this was a bewildering sequence of events. I grew up surrounded by cars, malls, concrete, transplanted cacti, and copious amounts of air-conditioning. The closest I came to livestock were the horses my parents owned for trail-riding purposes. Cattle? Local food? Sustainability? I had no clue. Even when I became active with the Sierra Club in the mid-1990s after a move to Santa Fe, New Mexico, my conservation work was highly conventional. I lobbied for new wilderness areas, protested clear-cut logging in national forests, and helped publish a citizen's guide to fighting the environmental damage caused by hard-rock mining. I led activist outings, organized letter-writing campaigns, testified in public hearings, and fought a cynical assault on environmental regulation at the time called "takings" legislation. When I had time to think about livestock grazing at all, it wasn't in a positive light.

This all changed in 1997 when I cofounded the nonprofit Quivira Coalition with a rancher and a fellow conservationist. I did it because the constant brawling between environmental activists and loggers, ranchers, and other rural residents had dispirited me. No one was winning; everyone and everything was losing, especially the land. Even worse was the negative energy employed by all parties involved—attacking each other in the media, pointing fingers in meetings, filing lawsuits in court, even threatening physical violence. There had to be another way. When I met a rancher who not only did things differently on his land but sought a different relationship with environmentalists, I decided it was time to give peacemaking a chance.

With Quivira, we waded into the middle of the grazing wars in a deliberate attempt to create a "third position" outside the continuum of combat. We called it the New Ranch—a meeting place "beyond wrongdoing and rightdoing," to quote the poet Rumi, where people interested in innovative ideas and fruitful dialogue would have a place to meet, talk, listen, and learn.

It wasn't just talk, however. The New Ranch meant managing land differently, including moving livestock around in ways that mimicked the natural behavior of migratory herds of wild grazers. New Ranchers operated on the principle that the natural processes that sustain wildlife habitat, biological diversity, and functioning watersheds are the same processes that make land productive for livestock. It wasn't just a theory—it worked in practice, as I saw over and over on ranch after ranch. The key was land health: the degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained over time. I learned that before land can sustainably support an added value—such as livestock grazing, hunting, recreation, or wildlife protection—it must be functioning properly at a basic ecological level. This included healthy water, mineral, and energy cycles, flowing round and round from the soil to plants and animals and back again.

With Quivira, my conservation work became highly collaborative, with a focus on improving land health, promoting progressive cattle management, implementing creek restoration projects, and repairing damaged relationships. My Sierra Club experience had taught me a hard lesson: that the missing piece of the conservation puzzle was the positive role that people could play. Environmental problems, I came to understand, were as much about social and economic relationships as they were about the environment, thus requiring economic

solutions to go along with ecological ones. I learned this by listening to the many heated confrontations between activists and ranchers and loggers over the years. Conservation, I saw, meant prudence, care, good stewardship, and trust as much as it meant passing laws, enforcing regulations, and establishing new parks. That's why I chose a quote from farmer and author Wendell Berry as Quivira's motto: "We cannot save the land apart from the people; to save either, you must save both." Saving both became the mission of the Quivira Coalition.

Over time, our collaborative work grew to include an annual conference, a ranch apprenticeship program, a capacity-building collaboration with the Ojo Encino chapter of the Navajo Nation, numerous publications, a ton of workshops, and lots of creek restoration projects—including a long-running project in northern New Mexico on behalf of the Rio Grande cutthroat trout. By our calculation, at least 1 million acres of rangeland, 40 linear miles of creeks, and countless people have directly benefited from Quivira's collaborative efforts across the Southwest.

The membership in the New Mexico Cattle Growers' Association happened in 2006 when 49 heifers were delivered to Quivira's 36,000-acre Valle Grande ranch, located on a national forest near Santa Fe. They were the first installment of what would become a 124-head herd of heifers, plus three Corriente bulls, all under our "Valle Grande" brand and our management. Shortly thereafter, an invitation to join the Cattle Growers' Association arrived in our office. We filled out the form, wrote a check, and mailed it back. And just like that, this former Sierra Club activist became a dues-paying cattle rancher!

Our plan was to sell grass-fed beef in Santa Fe, joining the rapidly growing local food movement, and use the revenue to pay for conservation activities on the ranch. For a while it worked. Thanks in part to best-selling books by Michael Pollan and Barbara Kingsolver, grass-fed beef was an easy sell to customers. In 2008 I had the honor of traveling to Turin, Italy, as a delegate to Slow Food's biennial Terra Madre gathering as a producer of local, grass-fed beef. It was an experience that changed my outlook on conservation. Food made people smile, I saw, binding us together. It was positive energy at work again, reminding me that the only lasting change is the one that comes from the heart.

Unfortunately, our happy little world began to unravel in the fall of 2008. The financial meltdown on Wall Street, a product of huge amounts of negative energy (greed), triggered a cash-flow crisis for Quivira and other nonprofits as the stock portfolios of foundations and donors shrank dramatically. Grass-fed beef suddenly looked expensive to customers as well. All of this put our Valle Grande ranch in financial jeopardy, calling to mind the old joke: "How do you make a small fortune in ranching? Start with a big one." We didn't start with any fortune, big or small. Soon we were forced to sell our cattle herd to pay the bills. Eventually we had to sell the ranch too. This was a big disappointment personally, but I vowed to put our experience to good use somehow.

Meanwhile, I had begun to fret about the Big Picture.

It started in the spring of 2006, during a fund-raising trip to New York City. Rummaging in an airport bookstore for something to read on the outward leg of my journey, I came across James Kunstler's best-selling cautionary tale The Long Emergency: Surviving the Converging Catastrophes of the Twenty-First Century. Curious, I plucked the book from the rack and flipped it over to survey the promotional blurbs, reading how the author "graphically depicts the horrific punishments that lie ahead for Americans for more than a century of sinful consumption and sprawling communities, fueled by the profligate use of cheap oil and gas." Yikes! Then I thought, "Oh come on, how bad could things be?" I handed the clerk fifteen dollars to find out.

Bad enough to refocus Quivira's mission, as it happened.

At our annual conference in 2007, Wendell Berry said that "we are not walking a prepared path," in response to a question from the audience about the difficulties posed by the twenty-first century. In other words, to meet new challenges we need to blaze a new trail. That suggested unexplored country ahead, which is after all what the word quivira originally designated on old Spanish maps of the New World. After some thought, I decided this new trail was building ecological and economic resilience, which the dictionary defines as "the ability to recover from or adjust easily to misfortune or change." In ecology, it refers to the capacity of plant and animal populations to handle disruption and degradation caused by fire, flood, drought, insect infestation, or other disturbance. The word also has a social dimension. Ranching, for instance, is the epitome of resilience, having endured centuries of cyclical drought, low cattle prices, and other challenges.

Resilience is also an important concept for those of us who live in cities, as I had learned the previous winter when a major snowstorm shut down both highways into Albuquerque, New Mexico, isolating the city. In a story for the local newspaper, a reporter asked how long it would take for the shelves of Albuquerque's grocery stores to be emptied of food. His answer: six days. That's not very resilient. What about other challenges, I wondered, such as our supply of fresh water? Was it resilient for the long run? Were we?

Realizing that the times were changing, in the fall of 2007 we added the words "build resilience" to Quivira's mission statement. In doing so, I realized that I was now a long way from the grazing wars of the 1990s—not to mention the suburbs of Phoenix.
There was a lot to learn in this new country. Take climate change. It wasn't on our radar screen at all in 1997, but a decade later it had become a major concern. As I learned, the rising content of heat-trapping gases in the atmosphere, carbon dioxide (CO_2) especially, poses a dramatic threat to life on Earth. Here's a graph from the Scripps Institution of Oceanography at the University of California–San Diego, which pretty much sums it all up.1 It's a scientific projection of CO_2 (in parts per million).

In 2013, the CO_2 level rose above 400 ppm for the first time in five million years, according to researchers, and it is on a trajectory to reach 600 to 700 ppm by the end of the twenty-first century, with all sorts of bad consequences, unless we act quickly. Double yikes!

Something needed to be done, but what? In 2009, I found a partial answer in an op-ed written by James Hansen, the director of NASA's Goddard Institute for Space Studies and the nation's top climate scientist. Reducing the carbon dioxide content of the atmosphere back to 350 ppm, he said, is imperative to preserve a habitable planet. "If we cut off the largest source of carbon dioxide—coal—we have a chance to bring CO_2 back to 350ppm," he wrote, "and still lower through agricultural and forestry practices that increase carbon storage in trees and soil."2 Cool! I thought to myself. But what did he mean by "carbon storage"?

An explanation arrived a month later when a publication came across my desk from the Worldwatch Institute titled Mitigating Climate Change through Food and Land Use. Its authors, Sarah Scherr and Sajal Sthapit, wrote that for political, technological, and economic reasons, the only possibility for large-scale removal of greenhouse gases from the atmosphere currently is through improved ecosystem function, climate-friendly livestock practices, conserving land, and restoring degraded watersheds.3 I did a mental double take. That sounded like the work of the Quivira Coalition!

The miracle cure is called photosynthesis. As Scherr and Sthapit pointed out, plants naturally pull CO2 out of the air and convert it into soil carbon, where it is safely stored for long periods of time in the ground unless disturbed—by plowing, for instance. This process has been going on for billions of years, and all it requires is sunlight, green plants, water, nutrients, and soil microbes. It creates a simple equation: more plants and deeper roots = less CO2 in the atmosphere.

It's more complicated than that, of course. But here's the really exciting part: if land that is bare, degraded, tilled, or monocropped can be restored to a healthy condition, with properly functioning carbon, water, mineral, and nutrient cycles, and covered year-round with a diversity of green plants with deep roots, then the added amount of atmospheric CO2 that can be stored in the soil is potentially high.
Globally, Scherr and Sthapit wrote, soils contain about three times the amount of carbon that's stored in vegetation and twice the amount stored in the atmosphere. Since two-thirds of the earth's land mass is grassland, additional CO2 storage in the soil via better management practices, even on a small scale, could have a huge impact. Grasslands are also home to two billion people who depend on livestock—an important source of food and wealth (and culture) to much of the earth's human population. Both these animals and their human stewards could be mobilized for carbon action.

This made huge sense to me, so I called Scherr and invited her to speak at Quivira's annual conference in the fall of 2010, which I had titled "The Carbon Ranch." The purpose of the event was to describe the many ways by which food and stewardship can be used to build soil, store carbon, and fight climate change. I told her I was determined to explore this exciting country and spread the good news. When she agreed to make a presentation, I began calling up other carbon pioneers, eventually assembling an exciting lineup of speakers. But then a thought struck me: Where was I going? Climate? Carbon? Where had we wandered off to?

I decided we needed a map.

I sat down one morning at my dining room table and began sketching on a sheet of paper. I drew every joyous, sustainable, resilient, regenerative, land-healing, relationship-building, climate-mitigating, local food–producing activity I could pull from my experience, putting them into a single mythical landscape. I sketched (badly) cattle-herding ranchers, weed-eating goats, bat-friendly water tanks, creek-restoring volunteers, land health–monitoring crews, fish-friendly wetlands, grass-fed beef businesses, no-till farms, and on-site renewable energy projects. Then I added cities, schools, farms, beavers, wolves, bird-watchers, kitchen gardens, wildlife corridors, compost piles, and more. I intentionally left out boundaries, including property lines, political divisions, and geographical separations. There was no distinction on my map between public and private land, or between wild country and nonwild. It was all one map—all one vision in which wolves, cattle, bats, organic farmers, biologists, artists, foxes, fish, cities, and ranchers all worked together and got along.
When I was done, I sat back and studied my map. I knew this place. It was the land I had been exploring for years—except it wasn't. I hadn't considered it from a carbon perspective before. It felt like a new country, ripe for further exploration. But where would I go? What would I discover? Were there actual on-the-ground solutions to the rising challenges of the twenty-first century? If so, was there an answer to an increasingly anguished question being asked by Americans of all stripes: what can I do to help?

I knew a few things going in:

- Carbon is key. It's the soil beneath our feet, the plants that grow, the land we walk, the wildlife we watch, the livestock we raise, the food we eat, the energy we use, and the air we breathe. Carbon is the essential element of life. Without it we die; with too much we suffer; with just the right amounts we

thrive. A highly efficient carbon cycle captures, stores, releases, and recaptures biochemical energy, making everything go and grow from the soil up. In the last century or so, however, the carbon cycle has broken down at critical points, most importantly in our soils, which have had their fertility eroded, depleted, and baked out of them by poor stewardship. Worse, carbon has become a source of woe to the planet and its inhabitants as excess amounts of it accumulate in the atmosphere and oceans. It's all carbon. Climate change is carbon, hunger is carbon, money is carbon, politics is carbon, land is carbon, we are carbon.

- We don't have to invent anything. Over the past thirty years, all manner of new ideas and methods that put carbon back into the soil and reduce carbon footprints have been field-tested and proven to be practical and profitable. We already know how to graze livestock sustainably, grow organic food, create a local food system, fix creeks, produce local renewable energy, improve water cycles, grow grass on bare soil, coexist with wildlife, and generally build resilience into the land and in our lives.

- It's mostly low-tech. It's sunlight, green plants, animals, rocks, mud, shovels, hiking shoes, windmills, trees, compost, and creeks. Some of the work requires specialized knowledge—such as herding livestock or designing an erosion-control structure in a creek—and some of it has high-tech components—such as solar panels or wind turbines—but most of Carbon Country can be easily navigated by anyone.

- Lastly, you're on the map too. Everyone is, whether you live in a city, go to school, graze cattle, enjoy wildlife, grow vegetables, hike, fish, count grasses, draw, make music, restore creeks, or eat food—you're on the map. You live in Carbon Country. We all do. It's not a mythical land; it exists.

This is what I knew—and all that I knew. Surveying the map, I realized that there were specific questions that needed answers: (1) Was it actually possible to significantly increase the amount of CO2 in soils via land management practices and thus impact climate change, as the experts suggested? (2) What were the range of activities that sequestered carbon in soils? (3) Was it practical to scale up sequestration practices and their cobenefits in ways that would address rising challenges in the twenty-first century? (4) What paradigms would need to be shifted to make this work possible? (5) What were the best incentives to make all of this work economically? (6) Who was going to do all this new work?

It wasn't clear, so with my rough map in hand, I set out to explore this new land. Here's what I discovered.