Prologue

Conservation in the Age of Consequences

"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way – in short, the period was so far like the present period…" – Charles Dickens, A Tale of Two Cities

This project was born on a sunny summer day in 2006 when I stepped out of a movie theater with my wife into the warm embrace of a lazy afternoon.

Gen and I had finally found a convenient time to see former vice-president Al Gore's inconvenient documentary on global warming, with its dire warnings of environmental and social turmoil ahead if we maintained Business-As-Usual. Like millions of others, we were unnerved by what we saw. I was especially disturbed by the graphic images of rising sea water snaking through the streets of Manhattan, Shanghai and other low-lying cities around the globe. As we stepped off the curb into the parking lot, blinking in the bright sunlight after the movie, I quipped to Gen "We'd better get to Venice, Italy, quick."

Although I didn't know it at the time, the idea for this chronicle had taken root.

Climate change wasn't exactly news to us – my work as a conservationist, first with a local Chapter of the Sierra Club then as a co-founder of a nonprofit organization dedicated to building bridges between ranchers, environmentalists and others around practices that improved land health, had taught me a fair amount about the topic. But Mr. Gore's documentary raised my anxiety level tenfold. The specter of melting glaciers, disappearing sea ice, vanishing species, expanding deserts and falling quality-of-life for humans as a result of global warming was sobering, to say the least.

My anxiety deepened as I contemplated the movie's unsatisfactory conclusion – that small steps, such as changing light bulbs or inflating car tires, were considered appropriate remedies to rising planetary temperatures. To my mind, they seemed extraordinarily puny. Rather than fostering a hopeful feeling, these 'solutions' suggested instead that we are in a deep box from which there is no easy escape.

I knew that Mr. Gore's documentary was controversial in some quarters. Skeptics of global warming included highly credentialed scientists, for example, and there was (and still is) considerable debate among researchers about the fine line between natural and man-made "forcings" of climate change. But I wasn't sure this debate mattered much anymore. The critical issue, I realized that sunny afternoon, is the emerging consensus that Business-As-Usual means serious trouble for us and the planet.

An image came to mind: a bright warning light – in the shape of a thermometer – shining in the dashboard of a speeding vehicle called *Civilization*, accompanied by an insistent, and annoying, buzzing sound. And like all warning lights, I thought to myself as Gen and I crossed the parking lot, we ignore it at our peril.

Actions have consequences, as Mr. Gore made abundantly clear. Greenhouse gases, created by a century of intense industrial activity, have become important agents in climate change. But inaction has consequences too. The planet is approaching a climatic tipping point, many scientists insist, which when crossed could threaten life as we know it. As a result, we face a great “moral crisis,” as the former vice-president put it, especially when we consider the consequences of our behavior for future generations. We need to get busy, and quickly.

I didn’t dispute the call-to-arms. I knew the warning light wasn’t going to turn itself off.
Still, my take-away message from the movie was a bit different than what Mr. Gore intended: we’re in a pickle of our own making.

That’s because I knew climate change wasn’t the only warning light demanding attention. Two months earlier, while traveling on business to New York City, I picked up James Kunstler’s best-selling book *The Long Emergency*, which tackled a different aspect of our modern predicament whose effects were no less troublesome: the imminent arrival of peak oil.

Here’s what I learned: In the years since the first oil derrick went up in western Pennsylvania in 1859, the world has burned up approximately one-half of all known oil reserves. This is a critical fact because not only is petroleum a finite, non-renewable resource of incalculable value to human well-being, it has become the lifeblood of all industrialized economies. So when the halfway mark is reached – its ‘peak’ – and production begins an inevitable decline this lowering of our collective ‘blood pressure’ will make us dizzy and lead to all sorts of trouble. That’s because there is no adequate substitute for energy-rich, easy-to-produce, easy-to-transport, safe-to-use oil. All other energy sources, including natural gas, coal, and nuclear, come with varying economic or ecological costs, some quite high and hazardous. These costs are the main reason why no viable Plan B has yet materialized to replace oil.

Meanwhile, global energy demand keeps rising. If oil production can’t keep pace, as surely it cannot, and if a Plan B isn’t developed rapidly enough, then in the gap between supply and demand is serious social and economic unrest.

This energy pickle, of course, is entirely our doing as well. Kunstler described our century-long national energy policy this way: *burn it up as fast as possible*. In the 1950s, the United States was the top producer of oil globally (Saudi Arabia was just coming online). We explored, drilled, pumped, refined, and burned up our own oil at a breakneck pace, assuming (I suppose) that the oil fields would never run dry. Imagine our surprise, then, when in 1971 domestic oil production peaked – as predicted by a maverick geologist named M. King Hubbert. It has been a slow but steady decline ever since.

It wasn’t just America. The rest of the world also tapped this fabulous source of prosperity and progress and promptly burned it up as fast as possible. This was entirely understandable,

especially as the munificent benefits of oil became quickly evident. Unfortunately, the negative effects of the fossil fuel bonanza are proving to be equally immense, and no less consequential. They just took longer to manifest themselves. One example is America's love affair with suburban sprawl, which Kunstler harshly, but probably accurately, judges as "a landscape with no future" and "the greatest misallocation of wealth in human history."

When I finished *The Long Emergency*, I took a long walk through the canyons of Manhattan.

When I returned to the hotel, I made a quick list of fossil fuel pros and cons: cheap food, easy mobility, quick wealth, resource wars, rising standards of living, reduced poverty, air pollution, clean water, toxic wastes, penicillin, national parks, Superfund sites, the family vacation, the strip mall, bed and breakfasts, Las Vegas, air conditioning, air travel, global warming, obesity, imported coffee, exported jobs, medi-vac helicopters, the Hummer, the Internet, corn syrup, skyscrapers, disposable diapers, globalization, democratization, desertification, restoration, deforestation, and Saran Wrap – which the comedian Mel Brooks once declared as the great invention in human history.

Time may prove him to be more prescient that he realized.

Clearly a second warning light – in the shape of a 'low oil' pressure gauge – had appeared in the collective dashboard of our speeding vehicle, alongside the noisy thermometer.

As I sat in the dark theater that summer day, listening to Mr. Gore lecture us about our responsibilities and watching the charts and maps of our discontents, I suspected we were seeing only the tip of the iceberg, so to speak. It wasn't just global warming and peak oil – a great deal more lurked, unseen, below the rising water line. So when Mr. Gore quoted Winston Churchill as describing the run-up to World War II as an "era of consequences" – because Hitler's rise was another unhappy pickle of our own making – I immediately thought of the phrase the "Age of Consequences."

I mentioned it to Gen as we approached the car after the movie. As a fellow archaeologist, I knew she would understand its appeal. History is replete with Era, Ages, Periods and Revolutions – Agricultural, Industrial, Technological, and so on. Consider all the monikers that have been attached to the current epoch, including the infamous "Information Age" (infamous because it feels like we're drowning in knowledge while the world situation deteriorates). Why not the "Age of Consequences?" It sounded accurate, after all. Gen concurred and then added that she liked my idea of visiting Venice ASAP as well. "It's been a great party," she said as we climbed into the car. "Too bad it has to end sometime."

Later that summer, I took a stab at these new thoughts in an essay I wrote for The Quivira Coalition's *Journal*. Rather than use the phrase "Age of Consequences," however, I invented the Kunstler-ish term "Pre-postindustrialism" to describe our current era. I argued that since Industrialism is dependent on cheap oil, the end of the era of cheap oil meant we would be entering a post-industrial period. Pre-postindustrialism means we live in the 'run-up' to the coming contraction of society and therefore we should think about how to prepare for it properly.

To support my idea, I quoted futurist Lester Brown: "We are entering a new world. Of that there can be little doubt…The real question, for anyone truly concerned about our future, is not *whether* change is going to come, but whether the shift will be peaceful and orderly or chaotic and violent because we waited too long to begin planning for it."

I also quoted Virginia farmer and sustainable agriculture evangelist Joel Salatin, who described his farm in Michael Pollan's best-selling book *The Omnivore's Dilemma* as a "postindustrial enterprise," adding ominously, "You'll see."

But by October, I had changed my mind about the term.

While preparing to speak at the annual Bioneers Conference, held just north of San Francisco, I stumbled across a publication titled *Ecosystems and Human Well-Being* in the book store of the busy festival. It was the summary of a United Nation's project called the *Millennium Ecosystem Assessment*, which had been ordered by UN Secretary General Kofi Anan to "assess the consequences of ecosystem change for human well-being and to establish the scientific basis for actions needed to enhance the conservation and sustainable use of ecosystems and their contributions to human well-being."

I carried the book outside into the soft sunshine of a lovely California day. The Assessment took five years to complete, I read while sitting on a hay bale, and involved thousands of researchers. Its results were published in twelve publications, of which I now owned the Executive Summary. Here's a small part of what it said:

"The current demand for many ecosystem services is unsustainable," wrote the report's authors. "If current trends in ecosystem services are projected, unchanged, to the middle of the twenty-first century, there is a high likelihood that widespread constraints on human well-being will result."

That's because all people depend on the services supplied by ecosystems, either directly or indirectly. While some ecosystems are relatively healthy, significant areas of forest, cultivated land, rangelands, and coastal and marine systems are now degraded, said the authors, and the area of degradation continues to expand.

"Some ongoing, large-scale human-induced ecosystem changes, such as those involving loss of biodiversity, climate change, excessive nutrient supply, and desertification, are effectively irreversible," they continued. "Urgent mitigation action is needed to limit the degree of change and its negative impacts on human well-being."

This wasn't news to me either. Through my work with ranchers, range scientists, and riparian restoration specialists, I knew the land had been beaten up pretty badly in the Southwest over the decades, making it harder for all species to earn a living. Still, I took the book back to my hotel room and kept reading.

The authors described human well-being as having five essential components:

- Basic material for a good life – adequate livelihood, food, shelter, clothing, goods;
- Health – physical health, clean air and water, healthy food;
- Good social relations – social cohesion, mutual respect, providing for children;
- Security – access to food, energy, water, personal safety, resilience from disasters;
- Freedom of Choice – opportunity to achieve, fairness, equity, democracy, action;

Then the Assessment divided ecosystem services into four categories, arguing that human well-being is dependent on all four:

Provisioning Services are those that provide essential supplies of food, fresh water, wood, fiber, and fuel. They include: agriculture, fishing, wild foods, timber, biomass, fiber (cotton, silk), surface water, “fossil” groundwater, and genetic resources (biodiversity).

Regulating Services are those that mitigate the effects of harmful fluctuations in nature. These include: protection from outbreaks of infectious diseases, modifying the effects of greenhouse gases (CO2 sinks); protection from floods (as extreme weather events become more frequent); the employment of conservation agriculture practices; and the protection of wetlands and other natural waste-cleaning systems.

Supporting Services are the ecological foundations to all life, including nutrient cycling, soil formation, oil stability, biotic integrity, watershed function, and photosynthesis.

Cultural Services are the spiritual, educational, recreational, and aesthetic functions provided by healthy ecosystems.

The authors concluded that the growing demand for provisioning services, such as water, food and fiber, has been largely met at the expense of supporting, regulating, and cultural ecosystem services. This is unsustainable in the long run, they wrote, and will require coordinated action around the planet to repair and reverse.

But here’s the sentence that struck home: “Human impacts are now ubiquitous and of greater intensity than at any time in the past, and in most cases we can no longer plead ignorance of the consequences.”

I suddenly perceived another red warning light going off in C*ivilization’s* dashboard, blinking slowly but steadily. It took the shape of two adults and a child, holding hands.

I closed the book and flipped open my laptop. Within a few minutes I had created a new ending to my Bioneers presentation, titling it “The Age of Consequences.” I grabbed a photo of Hurricane Katrina from the Internet, which seemed to be a proper symbol for the gathering storm of consequences, and inserted it next to a list that I quickly composed:

- Climate Change (getting hotter)
- Human Health (obesity, cancer rates)
- Energy (the end of the Fiesta)
- Population (carrying capacity)

- Species Extinction (biodiversity loss)
- Water & Food Shortages (overuse)
- Social Inequity (increasing)
- Damaged Land (widespread)
- Suburban Sprawl (multiple effects)
- Consumerism (lack of production)
- Nature Deficit (broken bond with nature)
- Civic Disharmony (decline in community)
- Alienation (all of the above)

Looking over the list, I became depressed. I closed the program and shut down the laptop, opting for a walk. Outside, I circulated through the eco-village created at the festival every year, whose booths of organic food and eco-entrepreneurialism I knew would boost my spirits. Then I slowly circled the large pond nearby, where I took additional solace in the ducks that came quacking up to me, looking for food. They didn't think about consequences, I thought to myself. They didn't make lists either. Good for them.

Upon retuning home to Santa Fe, I cracked open another book purchased at the Bioneers book store. It was the 3rd edition of the classic study 'Limits To Growth' by Meadows and Randers. Beginning in the early 1970s, they have argued that our rate of economic growth is bounded by physical limits, and when these limits are exceeded serious trouble starts. This contradicts the prevailing economic paradigm, of course, which argues that there are no significant limits, or consequences, to growth – or at least no limit that cannot be overcome by market forces.

They described the boundaries to growth as the physical limits of planetary *sources* to provide materials and energy and the limits of planetary *sinks* to absorb the pollution and waste. Sources include mineral deposits, aquifers, and soil. Sinks include the atmosphere, landfills, wetlands, oceans and other water bodies.

These are not limits to the number of people, cars, houses, or factories, they noted. Rather, they are limits to *throughput* – to the steady flow of energy and materials needed to keep people, cars, houses, and factories functioning. "They are limits," they wrote, "to the rate at which humanity can extract resources (crops, grass, wood, fish) and emit wastes (greenhouse gases, toxic substances) without exceeding the productive or absorptive capacities of the world."

The bad news, they reported, is that many crucial sources are depleting or degrading, and many sinks are filling up or overflowing.

"*The throughput flows presently generated by the human economy cannot be maintained at their current rates for very much longer*," they concluded [emphasis added].

They call it "overshoot." It's what happens when a society's "ecological footprint" – the sum of all effects of resource extraction, pollution, energy use, biodiversity destruction, urbanization, and other consequences of unbridled physical growth – crosses a threshold of sustainability into a dangerous zone defined by shortages and adverse consequences. The effects of overshoot are amplified when its signals are ignored for too long, delaying necessary corrective action.

The authors calculated that humanity entered overshoot in the 1980s and is now at least 20% over the planet's carrying capacity.

When I put the book down, I imagined a new warning light in the speeding dashboard – in the shape of a broken arrow, pointing up until the break, then pointing down.

By now, you may be wondering: *why does he keep reading these books?*

Well, I don't read them to make myself *feel down*. I don't like hopelessness. That's the main reason why I started The Quivira Coalition, to help end the war between ranchers and environmentalists – a war that, on the surface, looked very much like a hopeless situation in the mid-1990s. But when I met Jim Winder, a progressive rancher who was doing great things on the land, I saw the possibilities of peace in his work. I took action. I wanted to do something positive, I wanted to *contribute*.

It was the same with these warning lights. I wanted to understand the nature of the problem, and then I wanted to help solve them somehow. But by the fourth warning light, I began to wonder: *help by doing what?* How do we reach under the hood of our speeding juggernaut and attempt to fix the engine? The job looked damn near impossible.

By the end of 2006, however, I had an idea. It had been bouncing around in my head for a while, but it came into focus while contemplating the photo of Hurricane Katrina that I inserted into my presentation. Specifically, what I pondered was *resilience*, a term I had picked up from my study of range ecology. Resilient systems are those which have the capacity to adjust as the world changes while still maintaining their integrity and functionality. The dictionary defines resilience as "the ability to recover from or adjust easily to misfortune or change."

I thought: if a hurricane of change was coming ashore, as now seemed inevitable, then perhaps we should consider preparing for its consequences by becoming as resilient as possible.

Which brings me to the third book that I purchased at the Bioneers book store. Its title is '*Resilience Thinking: Sustaining Ecosystems and People in a Changing World*' and its authors are Brian Walker and David Salt. Here's their thesis: "At the heart of resilience thinking is a very simple notion – things change – and to ignore or resist this change is to increase our vulnerability and forego emerging opportunities. In doing so, we limit our options."

Limiting our options, as the warning lights in the speeding dashboard indicated, was exactly the problem, it seemed to me.

Resilience refers to the capacity of plant and animal populations to handle disruption and degradation caused by fire, flood, drought, disease or insect infestation, I knew. That's only the dramatic stuff. Resilience also describes a community's ability to adjust to incremental change, such as a slow shift in rainfall patterns, or a rise in global warming.

But the word also has a social dimension, I saw. The ranching community, for instance, is the epitome of resilience, having endured a century or more of cyclical drought, low cattle prices, as well as a host of modern challenges. Of course, some ranches were not strong enough to ride out the storm, succumbing to sprawl, loss of income, or the loss of the next generation. But many endure and are finding ways to keep hope alive.

I decided to focus my work on resilience. During the summer of 2007, I wrote a new plan for The Quivira Coalition, emphasizing ecosystem restoration, local food production, capacity building, and other 'relocalization' efforts. We even added "building resilience" to our mission statement. These actions felt right – and they certainly gave me plenty to do. Although I hadn't forgotten about visiting Venice, I figured I was set for a while.

But then the idea of a chronicle slipped into my mind.

Its genesis was a conversation I had with Wes Jackson in the summer of 2007 at his home on the campus of the Land Institute, in Salina, Kansas. Over a lunch of ham sandwiches, Wes said something that jolted me upright. We were discussing the general state of things globally – Wes' prism is the Institute's effort to develop a sustainable agriculture based on perennial grain crops – when he casually commented that "We live at the most important moment in human history."

We did? I asked him for a clarification. He replied that the convening crises in food, energy and climate were unprecedented historically in both their scale and their potential impact on the planet (and us by extension). He also repeated the warning that time was short if we wanted to blunt the worst of these problems. A definitive moment of action confronted the human species, he said as we ate.

I didn't disagree, but then I thought: "If we live at the most important moment in human history, shouldn't someone *document* it?" Won't people ask eventually about what was it like to live back then? What we did? What was our perspective on events? What was it like to live through them? And perhaps more importantly: *what the hell were you all thinking?*

"Hmm," I thought. However, the spark for actually starting a chronicle didn't happen until something that I now call the 'polar bear incident.'

It happened one morning when our eight-year old twins, Sterling and Olivia, overheard a story on public radio about the possibility of all polar bears dying out as a consequence of global warming. The story began as we were settling in for breakfast. After a minute or two, the kids froze mid-meal as they listened. Their faces turned ashen as the disembodied voice of a biologist explained that disappearing sea ice at the North Pole likely spelled doom for the bears.

They turned their faces to Gen and myself and as if on cue, burst into tears. Their expressions said it all: *how could we let the polar bears die?*

We had no answer to their lament. We did try to explain to them that no one really knows if the polar bears are doomed or not. The biologist might be wrong. After all, the species has been

around for a very long time and has survived a variety of adverse conditions before. Maybe they'll pull through climate change too.

This seemed to mollify them and they trooped off to school with their spirits restored. But it didn't mollify us – their tears continued to burn. Gen and I sat down and talked over the issue: what if the polar bears *did* die off? What if the kids never got to see one in the wild – *ever*? And what if it *were* our fault, as the experts say?

We lapsed into silence.

Emotions about polar bears aside, this incident raised an important question in my mind: how do you explain to your children what's happened to the planet – *to their planet* – over the past sixty years or so as a consequence of our hard partying? How do you explain to them not only our actions but our inaction as well? It's not enough simply to say, as we have, that adults behave in complex, confusing, and often contradictory ways. That's not sufficient anymore because children today can see the warning lights in *Civilization's* dashboard for themselves. When they point, what do we say?

Then in early 2008, as I turned over these thoughts, another warning light appeared in the speeding dashboard.

The price of oil had been climbing steadily on international markets and by early March it surpassed the previous all-time record of $102-per-barrel. It kept going too, with the consequence of rising gasoline prices at the pump. By April, the nationwide price for unleaded regular surged past $3.00 a gallon, prompting much hand wringing and finger-pointing by consumers, energy experts, and political leaders alike.

The discontent spread quickly. Airlines, for example, began to report huge losses due to rising fuel costs, causing experts to issue dire predictions for the future of the industry. A few small airlines even went out-of-business. It was a similar story across the economic landscape: rising energy costs began to bite everyone.

It wasn't just oil – all through the spring prices for various essential commodities, including wheat, corn, soybeans, and rice, steadily rose. It wasn't because these commodities were becoming scarce – they weren't as far as I could tell. They were just becoming much more expensive. While a variety of reasons were given for this 'spike' in commodity prices, much of it related to the rise in oil prices, none of the explanations eased the hunger of the millions of the planet's poorest people who found themselves unable to purchase enough food for their survival.

And just like that, in early April a "global food crisis" exploded across the media. There were food riots around the planet, millions of people were starving, governments were in peril, and no relief was in sight.

Just as suddenly, a fifth warning light appeared on *Civilization's* dashboard. It took the form of a bushel of wheat surrounded by a red circle with a slash through it. And it too began to buzz annoyingly.

Thinking about all five lights – rising temperatures, low oil pressure, declining human well-being, limits to economic growth, and the expanding inaccessibility to basic commodities – I began to understand that our main preoccupation during the Age of Consequences is ***crisis management.*** Possibilities of cultural and economic improvement – what we've been calling *Progress* for the past two centuries – including Thomas Jefferson's famous "pursuit of happiness," will largely be put on hold now while we attended to these emergencies. I suspect we'll be tending to them for a very long time.

In 1960, when I was born, crisis management of this sort was decidedly NOT on the nation's To Do list. We were still on a post-war high. The vehicle called *Civilization* was picking up speed and the road ahead looked like clear sailing. All systems were 'go.' America was trying to get a man to the moon, of all things, and I remember the shiver of thrill I felt at each televised moon-shot. Sure, there were rumors of trouble – a messy foreign war, discontent on the home front, problems with our rivers and our air – but they seemed fixable and transitory. Things would inevitably get better again, as they always had in the past. Climate change? It was barely a gleam in some professor's eye.

Now, 1960 seems infinitely far away. The tranquility and hopefulness of that era has been replaced with the insistent clanging of alarm bells and periodic bouts of gloominess. We race now, as a nation, from emergency to emergency, hoping, praying to find a way to turn those damn alarm bells off.

What happened? How did we get from there to here? And where are we going exactly? I suspect that nobody knows. I don't. That's the problem with crisis management, you can't make plans. You become reactive, and anxious. Eventually you become scared.

When the fifth warning light went off in the speeding dashboard, I decided to keep an official record. In choosing to create a chronicle of the Age of Consequences, I aim at two goals: first, to bear witness to this important moment in human history – for I suspect that Wes Jackson is correct in his assessment of our situation; and second, to attempt to explain to subsequent generations why we did what we did, or didn't do.

So, on Earth Day, 2008, I began this project. It's only my perspective on events – nothing else. My fondest hope is that my children will read it someday, and perhaps their children too, and that it will help them understand a sequence of events that undoubtedly will be affecting their lives. Perhaps it will also help them solve what to me looks like an unanswerable riddle. The riddle being: *why?*

I'll try my best to help. Meanwhile, I'm still planning to see Venice.