Thad Box

Landscapes, Connections, Sunsets, and the Idea Factory

South of Las Cruces, New Mexico, though not yet to the Texas border, I turned my pickup east toward the Organ Mountains. Jenny and I were headed to a cave where an archeologist friend found and described 5,000-year-old corn—one of the earliest records of corn in the United States. I had no global positioning system (GPS) unit or coordinates. I came only with my friend's verbal directions and a promise I would not reveal his location to anyone.

I took a seldom-used dirt road through mesquite. Each tree anchored a large sand dune, its branches reaching skyward above the sand. Among creosote bushes, the road turned to a service track for a power line. I parked when the track became a trail. I could have picked my way through the shrubs with my pickup, but the desert soils had suffered enough without my adding tire marks. We took our packs and hiked toward the hills.

We found the cave easily, but vandals had found it first. A 4-wheel-drive truck had come in from the north, uprooting shrubs and overturning boulders. In the cave, someone dug large holes and left them unfilled. Beer cans and fast food containers littered the ground. The site's historical value existed now in my friend's words in a professional journal.

Slightly higher on the hill, we found shade in a rock shelter—an unimpressive notch in the mountain where a large boulder had split from the cliff. We spread our blanket and laid out our picnic lunch on the area protected by the overhanging ledge. The underside of the ledge was black from past fires.

Ancient rock paintings were layered with soot. Names of modern people were scratched on top of them. Petroglyphs etched into the face of the cliff above where the boulder had fallen matched those on the boulder that lay below us. Mortars were worn in fallen rocks. Meal from mesquite beans or corn had been ground thousands of years ago. Pottery shards, flint chips, cartridge casings, beer caps, condoms, and facial tissues testified to use by many generations.

Jenny and I shared our lunch and wondered about those who used the shelter before us. My archeologist friend said modern sheepherders, Apaches, Mimbres people, and at least one culture of unnamed ancients had made the cave he excavated home.

We looked out over the marvelous landscape of the valley below us. Distinct desert plant communities followed geologic patterns of uplift and outflow as the land sloped toward the Rio Grande. Across the river, a plateau rose and sloped upward toward the distant Florida Mountains.

I tried to imagine what the valley was like in 1598 when Juan de Oñate forded the Rio Grande a few miles south and took the first permanent European settlers of what is now the United States to Santa Fe. Earlier explorers had livestock with them, but it was Oñate who brought sheep and cattle that have been part of the ecosystem for the past 400 years.

From Oñate's first settlement until the mid-1800s, when the Treaty of Guadalupe Hidalgo and the Gadsen Purchase transferred the land to the United States, the valley below us was the major thoroughfare for commerce between New Mexico colonies and New Spain—the

famous Chihuahua Trail. During the 18th and first half of the 19th centuries, hundreds of thousands of livestock passed through the funnel-like valley below me, grazing their way toward markets in Chihuahua and points south.

Gone are the cottonwood groves where market herds of wethers, under military escort to prevent them from being stolen by Apaches, shaded during their trek. Carefully tended pecan orchards now replace natural bosques. Grassy flood plains of the past are irrigated farms. Towns and villages have grown into one another, making a continuous human settlement from El Paso, Texas, to the metropolitan area of Las Cruces, New Mexico.

Interstate Highway 10 follows the Chihuahua Trail from El Paso, Texas, to Las Cruces, New Mexico, then turns west across the desert toward Los Angeles, California. Thousands of cars speed along the freeway. Trucks carry cheap trade goods from factories in unAmerica to big box stores throughout our country. Fertilizers mined in Morocco or manufactured elsewhere replace nutrients used by crops.

Jenny and I watched in hushed reverence as the sun set over the spectacular landscape. Dust from farming and tailpipe emissions filled the air, enhancing brilliance of reds, oranges, and yellows as the sun dropped behind the Floridas.

This issue of *Rangelands* is about landscapes—their use and management. During recent decades, landscape ecology has become an expanding subbranch of the science of ecology. As ecologists developed principles for their science, those principles were applied to ever-expanding geographical areas. New theories were proposed for the flow of energy and the transfer of matter between ecological units of large areas.

Applied ecologists and land-care professionals were long ago forced to consider large land areas. Soil scientists used geological formations, soil families, and other tools to group the land into similar units. Hydrologists and water scientists used watersheds as their collective land unit. Foresters used timber stands and habitat types. Range managers used plant communities and range sites. All searched for ways to group unique individual ecological units into manageable systems.

Economists, planners, and social scientists likewise searched for ways to group land and human populations into units—political, social, economic, religious. These units are intertwined with, and ultimately dependent upon, the land itself. But what land? How are they connected?

These questions relate more appropriately to systems science than to ecology of individual units. A new breed of system scientists develops theories and tools to answer those questions. Kevin Kelley, in his all too appropriately named book, *Out of Control*, explores the relationship between the new biology, social systems, machines, and the economic world.

He advocates system science, biology, and artificial intelligence as ways to understand complex systems. He writes the wildness of nature is the chief source for clarifying insights into our postindustrial future: "As we look at human efforts to create complex mechanical things, again and again, we return to nature for directions. Nature is more than a diverse gene bank harboring undiscovered herbal cures for future diseases—although it is certainly that. Nature is also a *meme bank*, an idea factory. Vital, postindustrial paradigms are hidden in every jungle ant hill."

Researchers working in their own, ofttimes narrow, disciplines give us understanding of individual units in a landscape. We have a great deal of knowledge about individual species and processes. But the management of landscapes requires understanding interconnectedness—the location, strength, and importance of the connections within a system and between systems.

The range management profession exists to promote sustainable rangelands—to keep options open for future generations. Based on ecology, our profession formed while working with interconnections, but in a limited time period. Range management is only a little over 100 years old. It is not enough to know the connections in the landscape below an Organ Mountain rock shelter today. Or how the Mimbres people used the landscape.

We seek to know how, and why, the Merino sheep and cattle that Oñate drove up the river in 1598 changed the system through time to what it is today; what connections were changed or broken. We want to understand what combinations of events caused the desert grassland to drop below base survival levels, why shrubs crossed a threshold to take its place. Such knowledge is more vital to sustainability of the landscape than knowing how many cows can be run safely today on a square mile below the rock shelter.

As scientists expand our knowledge of ecological units and interconnections within large areas, landscapes help provide cultural wants and needs of each generation. Past activities of each generation need to be documented, as my archeologist friend did in the 5,000-year-old cave, so connections through time can be as accurate as possible.

To keep the basic productivity of landscapes sustainable, we embrace the experience of past and present land stewards, the careful observation of naturalists, and the controlled experimentation scientists. We balance Leopold's land ethic of being one with the land against the constantly changing character of the land itself.

To develop new concepts about the future of this balancing act, we draw on nature, Kelly's meme bank, the factory of ideas. Sustainability of landscapes and the future of human kind depend on our ability to draw freely from that factory and invest those ideas in principles for managing change.

And chances for success are improved by spending time with one you love, enjoying a sunset over a desert landscape.

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