Thad Box

What Would Jardine and Sampson Do?

In January I sampled Australian hospitality in Marg Friedel's back yard with a mob of arid-land scientists and their spouses. Dick Kimber, Marg's historian husband, asked us what the currently hot ecological problems were on rangelands. As the foreigner, I had to answer first. I rattled off a whole host of problems dealing with climate change that were driving our thinking. The Australians generally agreed, but said invasive species, perhaps as associated with climate change, were particularly troubling.

We talked about how invasive annuals had changed the fire ecology of our Great Basin deserts and destroyed good winter range. And how, in my lifetime, I had seen good cold desert shrublands reduced to introduced annual grasses.

Deserts that evolved largely in the absence of hot fires are in danger throughout the world, and they are becoming more common in Australia. Undoubtedly, human activity has caused many of the invasive species problems. But changes are occurring in areas with minimal human activity.

The sacred mountain, Uluru (Ayers Rock), rises from the desert a couple of hundred miles southwest of Alice Springs, Australia. The next 500 miles or so to the south and west comprise some of the most arid and vacant land on the planet. Few permanent water holes exist, and those that do occur seldom supply enough water for a profitable livestock operation. But people and native animals have used these waters—both the ephemeral and the permanent—for millennia.

In January I traveled over part of that area with scientists studying some of the rare and remote water holes. Most waters last only days or weeks after a rain. Others are more permanent soaks or springs. Most are sacred sites for aboriginal people. Information about them is passed from generation to generation by elders.

I will not, indeed cannot, write about the water holes themselves or the cultural/religious activities of the people who have used the waters for thousands of years. But what has happened to the land between the water holes, much of it never having been grazed by domestic livestock, is worth the attention and concern of those of us who claim to be land care professionals.

The story of two recent, successful immigrants—one plant and one animal—is important during this time of rapid climate change. The story of the camel and buffelgrass in central Australia is a remarkable, slow-motion look at the worldwide problem of invasive species. These two established themselves in an area essentially devoid of modern human populations and their domestic animals.

Camels were introduced into Australia from Pakistan in the mid-1800s by explorers seeking a way to cross the arid center. The camel's adaptations to aridity and its versatility as a beast of burden made it an ideal tool for development of the vacant center of a growing country. Prior to the coming of the train and motor cars, camels were used extensively in commercial enterprises. As motorized travel became practical, camel transport declined. Camels moved from a valued domestic animal to a feral pest in much of Australia.

The first seeds of buffelgrass, a small low-growing variety, probably arrived with the camels as saddle padding. The grass established itself in small colonies in the arid zone—a quiet, nonaggressive immigrant often welcomed by stockmen as an additional forage plant.

In 2008, as we traveled the largely unoccupied lands, often miles from the nearest settlement or livestock station, the most common "wild" animals we saw were feral camels. Their tracks were everywhere. They used all the water holes.

Disturbed areas along roads, trails, and watercourses were covered with swarms of an apparently aggressive buffelgrass. Individual plants often differed from plants of the same species growing nearby. After the recent rains the native spinifex (a coarse, native grass of the deserts) and the invader, buffelgrass, made the landscape look more like a healthy prairie than a hostile desert.

The camel story is fairly straightforward. Abandoned domestic camels became feral. They were trapped or killed on most livestock properties where they tore down fences and fouled water holes. But those that retreated into the desert no one wanted became a successful, naturalized population. Today fat, healthy camels of all age classes graze far from any human being.

The buffelgrass story is more complicated. Almost a century after the first seeds established in Australia, livestock operators encouraged research agencies to develop a new and better buffelgrass. They wanted a reliable source of grass seed to "improve" their stations. Subspecies and cultivars of buffelgrass were brought in from Asia, Africa, and America. State and federal research organizations established trials in several locations to determine the best cultivars. None proved to be the wonder grass pastoralists had hoped for. Some of the varieties reseeded themselves and became established in habitats favorable for their strain. Successful cultivars crossed and new "wild" strains evolved. Recent genetic studies suggest there are numerous crosses, some of which are capable of invading about 60% of Australia.

Success of buffelgrass is not necessarily good news. Many of the cultivars are not highly palatable to grazing animals. In some places the new cultivars outcompete native plants and degrade the habitat for native species. And in all places it grows, it increases the fuel available for wildfires. The threat of more frequent and hotter fires form a clear and present danger for destroying native plants and animals throughout Australia's interior lands.

The deliberate importation of a useful domestic animal for development has led to vast herds of unwanted feral animals. The accidental introduction of buffelgrass was benign for decades. But attempts to improve the grass brought in new genes to create aggressive invading varieties with the potential to irreversibly change native communities over vast areas.

The point of this story is that camels and buffelgrass, two "good" species, successfully invaded an area with perhaps the least human activity of any spot on the planet. Their increase cannot be blamed on modern man's uses or overgrazing by his livestock.

We live in a time of rapid and significant climatic change. New habitats are created and old ones modified. Many niches will become available for alien species and evolution will create new ones. Managing the world's changing landscape shapes up as one of the major problems facing those of us who consider ourselves land care professionals.

First, we have to understand the principles and processes associated with our changing world. Then we dare predict new communities as the controlling factors of ecosystems realign themselves, creating new thresholds for living organisms. And perhaps we will be called upon to manipulate these new communities for wants and needs of future generations.

High among our responsibilities will be anticipating and warning about unintended consequences of well-meaning actions. A recent issue of the journal *Science* has two papers warning that the production of biofuels will lead to more, not less, greenhouse gases. One paper suggested that clearance of grassland produces 93 times the amount of greenhouse gases that would be saved from fuel made annually on that land.

The problems facing land care professionals today are not such a long way from overgrazing problems that caused our profession to form. Ecological principles apply to both. The need has never been greater for people who understand interconnections and relationships in systems, and who dare apply their knowledge to making the world better. That's not such a big step from what Jardine, Sampson, and our pioneer range people tackled. What will we do?

Thad Box, thadbox@comcast.net.