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Cautionary Wildlife Tales

Learning to Fail or Failing to Learn?

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GEORGE SANTAYANA once famously said, “Those who cannot remember the past are condemned to repeat it” (Santayana 1905). Similarly, when we ignore lessons from nature, we continue to suffer the fate of fools because we compromise our economies and abilities to effectively restore nature. In this short essay, I use several cases that have played out during the last one hundred years to reinforce the above point. Specifically, I describe how our reckless historic pursuit to remove hares from western USA ecosystems has had striking ecological consequences. While the understanding of species interactions within the context of food webs is complex and people with a love of nature and animals may be excused for failing to appreciate nuanced relationships, the time has passed not to notice what has gone wrong by failing to listen.

I was once asked by a rancher from eastern Oregon to come along on a rabbit drive. Being from Los Angeles, I knew little about this practice. I quickly learned. People flock together and corral the rabbits before flogging them to death. The ecological goal is to reduce rabbit densities, and in this high desert landscape agricultural values are the cultural mores. Rabbit drives are not new, having been around for more than one hundred years in “modern times” and occurring from California to New Mexico and on up into Saskatchewan.

For thousands of years before this, Native Americans used similar methods to procure rabbits and bison and pronghorn. Tibetans did similarly for their high elevation antelopes, the chiru. The difference in economic rationale between the distant past and now is virtually none—enriching one’s livelihood. In the past, game, small or big, was harvested for food and clothing. Today’s semirecent drives were

designed for financial rewards, which involved manipulation of nature's food web for individual gains. In this case, the killing of white-tailed and black-tailed jackrabbits (which are true hares) was to reduce these "noted" pests either to minimize forage off-take to benefit livestock or to decrease herbivory on crops. Even today in both Wyoming and Idaho, jackrabbits are officially considered predators or varmints.

In his 1949 book, *A Sand County Almanac*, Aldo Leopold said, "To keep every cog and wheel is the first precaution of intelligent tinkering." The broader issue of course is what we have learned and what we fail to learn about manipulating nature, and assuredly what the knowledge we derive tells us about the land and the lives that remain upon it. Our human legacies are large, and it is we, as world arbiters, who decide what biological diversity remains for future inheritance. Desert and grassland hares offer a valuable metaphor for what we have and have not learned about interactions among species nature and its bearing on conservation.

Much scientific effort is devoted to understanding the extent to which ecosystems are regulated by top-down forces such as predation and bottom-up drivers like plant productivity. With wolves or bears removed many believe that elk or moose multiply and then overbrowse their riparian vegetation, which in turn no longer supports biologically rich communities, including migrant songbirds. With sea otters removed, urchins proliferate, leaving in their wake a decimated kelp community. The explosion of white-tailed deer has reduced acorn masts in the eastern United States and simplified ecological interactions (Estes and Terborgh 2010).

In contrast to top-down effects of carnivores, abiotic drivers such as cold, rain, and snow all shape growing seasons and plant productivity (and diversity), factors that ultimately control the abundance of life ecosystems support. Desert and Arctic environments sustain far less diversity and biomass than do temperate and tropical ones. In turn, such factors regularly dictate the abundance of top carnivores. Such interplay between top-down and bottom-up forcing depends on an area's history, disturbance regime, species composition, and nuances associated with individual species and their densities.

The key question is not what rabbit drives have to do with ecological health, though this is clearly relevant to those of us preoccupied with interfacing science with conservation. It is what our tinkering has done to the landscapes that we humans depend upon and how these changes affect processes that we, as a society, care about. In essence, setting aside a personal zest to conserve biodiversity, I adopt here a human-centric approach and ask how rabbit drives affect our human economies or societal values. Three points come to the fore.

First, on public lands in the American West, domestic sheep grazing has

occurred for more than a century. It continues although the sheep industry is less robust now than in the past. Both US government and state efforts still target coyotes through predator control programs because coyotes have been and remain important predators of domestic sheep (Berger 2006). The amount of predation is inversely related to jackrabbit abundance, at least in the northern Great Basin desert; with fewer black-tailed jackrabbits, more sheep are killed (Knowlton and Stoddart 1992). While it is unclear how widespread this pattern is and despite the millions of dollars spent in eradication campaigns, these relationships have not been studied elsewhere. It is possible that with other factors equal, the killing of jackrabbits inadvertently exacerbates predation on domestic sheep because hares, as alternative, semilarge prey, are scant.

Second, an interesting dynamic links coyotes and jackrabbits with an ecological process of societal interest—long distance migration. In and around Grand Teton National Park in Wyoming, pronghorn move from the park's summering grounds to spend their winters at distant sites in the Upper Green River Basin. This is the longest terrestrial mammal migration between Canada and Tierra del Fuego, with some animals moving about 700 kilometers round-trip (Berger, Cain, and Berger 2006). Because of its length and national prominence, this migration has been afforded federal protection through approved national forest management plans (Cohn 2010).

Federal policy, however, does not necessarily assure long-term conservation of this unusual migration because of the nuanced yet complex interactions between coyotes and jackrabbits that was set in motion through human actions a century ago. We now know that where wolves have been eradicated, coyote abundance seems to increase, in part because wolves dampen coyote densities (Berger and Gese 2007). Coyotes in the Grand Teton region account for up to 80 percent of pronghorn fawn mortalities (Berger, Gese, and Berger 2008), an issue of concern if sustaining migration is a goal as adequate fawn recruitment is requisite to maintain a population. Of note is that white-tailed jackrabbits once occurred within Grand Teton but they are now considered extirpated (Berger 2008). Why jackrabbits no longer occur is unknown.

Although speculative, it is possible that—as in the above described sheep model—coyote predation on fawns intensifies because white-tailed jackrabbits are no longer available as prey and, hence, coyotes switch to neonatal ungulates instead (Berger 2008). Whether the forty-seven historic leases that enabled cattle grazing within the confines of what is now Grand Teton National Park have had a long-term impact that aggravated this predator-prey dynamic is conjectural. Only a comparative study elsewhere will facilitate knowledge about ecosystem-level effects of hare extirpation and its consequent impact on the migrations humans strive to protect.

Third, rabbit drives are likely to have had unintended consequences that shift a system's ecology. The pummeling of hares a century ago creates an interesting thought experiment with possible consequences for human health and further finances, specifically the possible spread of malaria (Livingston 2010). In California's Fresno County more than 43,000 were killed during a two-month period in 1892 (Palmer 1896). By 1915, to the south in Kern County, residents in the town of Bakersfield called for the creation of a tax-funded mosquito abatement program, suggesting mosquitoes had grown worse. While ecological relationships are rarely so simple and many confounding variables are likely involved, if—lacking abundant hares as prey—mosquitoes switched to humans, then we indirectly created a food web impact that affected human livelihoods in an unanticipated fashion.

There are obviously direct and indirect effects that stem from human actions, some of which lead to a misunderstanding about how nature functions and some of which do not. When tsetse flies are poisoned in areas of Africa with low human densities, the habitat has been subsequently rendered more habitable for people. Conscious decisions were put in place to manipulate local ecologies with a goal to increase human occupancy. People move in, and it's not unexpected that wildlife declines. These are direct effects of humans.

Indirect effects stem from a spate of interactions set in motion by human action when a third species or intermediary is involved. In such cases and especially in our past, little foresight appears to have been given to the longer-term ecological consequence of removing or altering a key species. This is understandable given our lack of knowledge of ecological dynamics. More recently, we seem to pay the price. In the case of rabbit drives, this might involve exacerbated predation on sheep. It might involve affecting a long distance migration through influences on juvenile recruitment. It might involve human health. Can we learn from the past—sure. Do we? It's clear that we continue to suffer from an unkind past and some present pursuits in the name of making a better world. Until we pay attention to, rather than ignore, lessons from nature, George Santayana may have gotten it right.

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