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Reinterpreting the 1882 Bison Population Collapse

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On the Ground

- Many people believe grazing management is vital to ecosystem health. Others feel ecosystems are only healthy when nature takes its course. The Great Plains bison population of the early 1800s supposedly supports the superiority of goal-free grazing management.
- By 1883, bison were virtually extinct, and hunting is usually blamed. However, records indicate that hunters killed less than the annual increase each year. Evidence implicates disease and habitat degradation instead.
- Comparing Allan Savory's observations in Africa, Lewis and Clark's observations in eastern Montana, and Blackfoot history, indicate the bison disappearance was perhaps triggered by the loss of intelligent human management.

Introduction: The Dr Jekyll and Mr Hyde of Range Management

I love data. I love counting and measuring and estimating and transects. But sometimes, in resource management, we need to take three steps back from the data and take a hard, new look at the instincts, emotions, biases, intuitions, myths, folklore, and common sense that play such a critical role in how resource management is practiced and perceived.

Range management suffers a Dr Jekyll/Mr Hyde dichotomy. On one hand, society is deeply invested in the idea that range management is positive. How many government agencies have how many people spending how much money year after year instituting and disseminating range management practices? How many universities have how many instructors with how many research projects and how many tax dollars teaching range management to class after class and developing newer and better ways to manage range? Everything from soil erosion to noxious weeds to sage-grouse welfare is believed to hinge on range management.

And at the same time, society is just as strongly invested in the opposite viewpoint, that the finest management is that of Mother Nature, unsullied by human involvement. From this perspective, every single one of those hours and dollars and educations and careers is a waste of time and resources and directly harmful to the environment.

Where I live, this perspective is represented by the Charles M. Russell Wildlife Refuge, which changed from rotated to continuous grazing because water developments and fences are unnatural. It is represented by the American Prairie Reserve, which is petitioning the Bureau of Land Management to let it remove interior fences and abandon its grazing plan. It is represented by Yellowstone National Park, whose bison herd ballooned to over an order of magnitude above official carrying capacity when "natural herd management" was instituted.

In *Gardeners of Eden: Rediscovering our Importance to Nature*, Dan Dagget[1] labeled this perspective the Leave-It-Alone assumption. He characterized it by a comment he heard an Earth First!er make to a rancher, "There's only one thing you can do to make this place better. You can leave. Because if you stay, no matter what you do to the land, no matter how good you make it look, it will be unnatural and therefore bad. And if you leave, whatever happens to this place, even if it becomes as bare as a parking lot, it will be natural and therefore good" (p.18). Later, Dagget states, "The Great Plains of North America with their huge herds of bison are offered as… proof of the effectiveness of the Leave-It-Alone approach. As the story goes, the wild and free bison were hunted by Indians who were too few to keep the Great Plains from becoming one of the most biologically productive habitats the earth has ever produced and one of the greatest successes of the Leave-It-Alone approach" (p. 22).

Dagget's thesis[1] that Leave-It-Alone's opinion of Original Americans is, "when it comes to how they managed the environment, the thing most of us value about those peoples is the perception that there were so few of them they couldn't really mess things up. In other words, we value them for being a failure, because that's what most of us assume they were" (p. 135) may seem unnecessarily harsh. However, in his encyclopedic, 602-page indictment of management, *Waste of the West: Public Lands Ranching*, Lynn Jacobs[2] (p. 9) states, "Although (Native Americans) exerted many influences on their environment, as a whole they had an incomparably less destructive impact than those who would follow. Perhaps this was largely because they had lesser means to exploit and destroy."

Now biology is big and messy and mysterious. It is possible both viewpoints are simultaneously true, that good range management is absolutely critical to the health of rangelands and that, at the exact same time, good range management is entirely superfluous and the best range manager is the one that stays as far from the range as possible and never influences it in any way.

But if that is not the case, then a lack of managers should have either catastrophic or exceptional results, and we should hopefully be able to tell the difference.

Now it's time to take a closer look at that "most biologically productive [of] habitats the earth has ever produced," and it's time to look at some data.

The Question: A Mathematical Curiosity

American bison nearly went extinct. On 1 January 1889, there were 456 known to exist (p. 464).[3] They are believed to have descended from approximately 171 separate individuals (calculated from Hornaday[3] and Stermitz Ricketts[4]).

What caused that near-extinction? Everyone knows: hunting. According to *Ocean of Grass: A Conservation Assessment for the Northern Great Plains*, by the World Wildlife Fund (p. 11–13),[5] "[Bison] numbers... totaled some 30 million or more. Others have placed the number much higher, generally around 65 million. A recent estimate based on forage productivity estimated historic bison carrying capacity at between 21–88 million... By the mid-19th century… [t]he railroads brought... the means to transport the hundreds of thousands of hides taken annually... By the mid 1880s, the North American bison was virtually extinct." What is wrong with this statement? There were tens of millions of bison. Every year hundreds of thousands were harvested. If they were fossils or statues and you took hundreds of thousands from 21 to 88 million every year, then in 21 to 440 years, you would get rid of them all. But what do tens of millions of bison have every year? They have millions of calves. And if not, they have problems that are much more serious than hundreds of thousands of bullets!

Being snide about the World Wildlife Fund's scholarship would be unfair. The quote accurately presents the conclusion of the seminal paper on the bison disappearance by Dr William T. Hornaday.[3] Page 466 states, "Notwithstanding the merciless war that had been waged against the buffalo for over a century... and the steady decrease of its numbers... there were several million [two million increase by about 400,000 a year]... [before] 1870... [hunters] took annually less that one hundred thousand..." This mathematical curiosity, paraphrased, "Hunters yearly killed less than the annual increase until bison had been exterminated by hunting," appears throughout the paper, illustrated by various years, ranges, herd sizes, and kill rates.

Hornaday[3] (p. 498–501), using actual records plus a generous 705% factor to cover unrecorded kills, estimated that just over 1.2 million bison were killed annually during the 3 years that bison slaughter was at its peak (1872–1874). Otherwise, the total annual kill was definitively in the hundreds of thousands.

When considered critically, the numbers are clear. Bison were not exterminated, wantonly slaughtered, or overhunted. They were sustainably harvested. According to the United States Department of Agriculture,[6] there were 92 million cattle in the United States in 2016 (which is approximately 1–3 times the common bison herd estimates) and in 2015, 28.8 million head were slaughtered (24 times the recorded bison slaughter over the 3 years it was at its peak). Cattle are in no danger of disappearing from the continent. According to VerCauteren,[7] whitetail deer populations exceed 30 million (the low end of bison herd projections). The Quality Deer Management Association[8] compiled records from 37 state wildlife agencies and came up with almost 5.6 million legally harvested whitetails in the 2014 to 2015 season (over four and a half times the highest annual bison harvest). The harvest was low that season, and the numbers do not include any animals poached, killed by vehicles, or killed in the 13 states that did not provide data. According to VerCauteren,[7] whitetail numbers are increasing. Looked at from the other end, I started with the bison known to exist after near-extinction, then worked backward using the most extreme yearly slaughter estimates (calculated from Hornaday,[3] Koucky,[9] and Lepley and Lepley[10]) and a very conservative herd increase factor. I determined that for those slaughter rates to wipe out bison, the total bison herd of North America never, ever reached 7 million animals. I have never seen anyone claim that the North American bison herd was that small. If our ecological philosophy grants any value at all to predation, the slaughter of the North American bison was just not harmful to the bison, it was helpful. So what happened?

The First Hypothesis: Epidemic Makes the Numbers Make Sense

I stumbled upon the discrepancy between accepted bison numbers and bison kills when my father asked rhetorically how people could shoot 60 million animals. The question intrigued me. While collecting articles and data, I found a brilliant paper by Dr Rudolph Koucky[9] that did a careful, scholarly analysis of the disappearance of the Northern bison herd, the final remaining large herd of bison, between 1874 and 1883. He concluded that extermination by hunters "is a myth initiated and maintained by bad journalism and poor scholarship" (p. 23). He posited death by epidemic and provided some convincing arguments.

My veterinarian mother and I studied Koucky's[9] article and found two disease candidates, anthrax in the Nebraska area and Texas tick fever in the Montana area. They are sufficiently deadly to wipe out tens of millions of animals, seem native to the hemisphere,[11] match the snippets of historic observations reported by Koucky,[9] and have convincing narratives of infection and spread.[12]

Koucky[9] estimated bison at four million in 1874, based on available sources. His very conservative annual increase estimate was 500,000. Careful review indicates the total annual kill never reached 840,000 (calculated from Hornaday,[3] Koucky,[9] and Lepley and Lepley[10]). In 1883,