

<https://www.wsj.com/articles/bringing-back-bison-is-a-genetic-challenge-4c618d16>

ESSAY

Bringing Back Bison Is a Genetic Challenge

The rescue of the American bison from the brink of extinction is a conservation success story, but the DNA of today's herds is very different from those that once roamed the Great Plains.



By Christopher Preston

March 3, 2023 3:53 pm ET

When American settlers arrived on the Great Plains in the 19th century, the bison they found seemed inexhaustible. Herds stretched dozens of miles from one end to the other, and paddle steamers plying the Missouri stopped for half a day while tens of thousands of bison crossed in front of them. Despite their numbers, however, the bison were no match for the settlers' rifles. The prairie's most perfectly adapted tenant was an easy source of meat and hides for the aggressive newcomers. By 1890, bison numbers had plummeted from an estimated 60 million to less than a thousand in just four decades of bloodletting.

Yet in 2020, on a visit to the Blackfeet Reservation near Glacier National Park in Montana, I watched a healthy herd of 200 bison graze happily by the side of the road. Native American reservations across the Great Plains support a growing number of the animals that the Blackfeet call *Iinnii*, and today the total U.S. bison population is estimated at 500,000. It's a huge conservation success, but it comes with a twist with far-reaching implications for species recovery: Genetically, these animals are different from their wild ancestors, with a measurable portion of their DNA coming from cows.

Bison and cattle form an odd couple. They are not the same species or even the same genus, yet they are able to interbreed successfully. When bison numbers plummeted at the end of the 19th century, entrepreneurial cattlemen in Kansas, Texas and the Dakotas got their hands on some of the last remaining animals to experiment with crossbreeding. Wild bison were muscular, independent and hardy, able to flourish on grasslands too dry for most cattle in summer. Breeding bison traits into cattle could provide an advantage in a tough business. Ernest Seton, a turn-of-the-century naturalist, wrote at the time of the first crosses: "The hybrid animal is to be a great improvement on both of its progenitors, as it is more docile and

a better milker than the Buffalo, but retains its hardihood, while the robe is finer, darker and more even, and the general shape of the animal is improved by the reduction of the hump and increased proportion of the hindquarters.”

To suggest that a hybrid bison riddled with cattle genes is the same animal that roamed the Plains in Paleolithic times would be, for many people, to commit wildlife heresy.

The challenge was to create hybrid animals that could reproduce. For a long time, only female crosses could breed. It took decades of experimentation before a rancher in Montana created a hybrid bull that was reliably fertile. Farmers no longer had to keep unruly wild bison on hand to fertilize the females. Beefalo became an official strain of cattle marked by a genome that was five-eighths cow and three-eighths bison.

Further genetic dilution took place under the radar, with odd mixes of cattle and bison genes produced by experiments in crossbreeding. Bison can contain a lot of cattle genes before they stop looking like bison. Knowing whether an animal is genetically pure by sight is more or less impossible. By the time DNA testing technology arrived, cattle genes had made their way into the vast majority of bison herds.

Most of the bison now grazing across the U.S. are destined for slaughterhouses, where they will be turned into steaks and burgers. Only 30,000 are preserved for the purpose of conservation, and only a fraction of these are thought to be relatively free of cattle genes. The mixing of bison and cattle genes doesn't matter much from the point of view of a rancher. But if you are trying to save a vanishing species, genetic integrity is often considered the heart of it. “Species conservation is more than skin deep,” says James Derr, a professor in the department of veterinary pathology at Texas A&M University. “It is more than how they look, it is how they are—that’s the genome.”



A 19th-century engraving depicts a bison hunt, common at the time.

PHOTO: GETTY IMAGES

Hybrid species—and especially species hybridized to satisfy human needs—are valued less by conservationists than species with their original genetic legacy intact. To suggest that a hybrid bison riddled with cattle genes is the same animal that roamed the Plains in Paleolithic times would be, for many people, to commit wildlife heresy, like saying the difference between your neighbor’s kitty and a Himalayan snow leopard didn’t matter.

The only bison to have lived wild and free on the same landscape since the slaughter ended a century ago are the herd in Yellowstone National Park, which number close to 5,000. Their mystique has garnered them their own environmental group, the Buffalo Field Campaign. It’s a mystique they thoroughly deserve. A big bull bison, frosted in snow and huffing ice crystals on Yellowstone’s Blacktail Plateau, is about as otherworldly as a bison can get.

Even so, the Yellowstone bison have genetic complications woven into their history. For years, they were kept semi-domesticated at a buffalo ranch in the Lamar Valley. The small herd was boosted at one point by a few animals brought in from outside. Eventually, the feeding and corralling they underwent was deemed incompatible with the park’s mission, and they were released. The bison in Yellowstone today certainly roam wilder than any other herd in the U.S., but nobody knows for sure whether some cattle genes didn’t sneak in at some point.

These genetic complexities are taken seriously by American Prairie, an upstart conservation outfit in Bozeman, Mont., that aims to build “the largest nature reserve in the contiguous United States, a refuge for people and wildlife preserved forever as part of America’s heritage.” Using market mechanisms and philanthropy rather than government edict and law enforcement, the group hopes to turn 3.2 million acres of central Montana into a homespun Serengeti with huge herds of ungulates dodging a suite of predators on a landscape scale.

American Prairie has stepped in to provide a kind of genetic reassurance to the bison conservation community. “Our goal has always been to have the gold standard for a conservation herd in terms of genetics,” says Pete Geddes, the group’s vice president and chief external relations officer. They work diligently to ensure the genetic diversity of their herd. Every bison brought onto American Prairie’s land has been genetically tested by a lab in Missouri.

As DNA technologies improve, the animals have been retested. When bison are brought into a corral for an inoculation or a census, blood from a random sample of the herd is sent back to the lab. Animals with cattle genes have been killed or given away. The policy has been ruthlessly enforced. In 2010, when American Prairie’s herd was only 200 strong, bison managers removed 90 animals because of genetic impurities. As a result, if an animal is grazing on American Prairie’s land, you can be pretty confident it meets a high genetic threshold.

Being sticklers for genetics is an investment that American Prairie is making in wild bison’s future. For now, these animals are privately owned and treated as livestock according to Montana law. In 2019, however, the state’s Fish, Wildlife, and Parks agency released a report acknowledging an unfulfilled obligation to restore wild bison to the state, suggesting that they are wildlife, not livestock.

The report is vague about how—or when—the state is going to make that happen, but American Prairie sees itself as a potential future partner in any restoration process. “If the people of Montana want a herd of wild bison at some point,” Mr. Geddes told me diplomatically, “we would be happy to contribute our animals.” American Prairie has the golden eggs, should anybody decide on a suitable place to put them.

—Mr. Preston is a professor of philosophy at the University of Montana. This essay is adapted from his new book, “Tenacious Beasts: Wildlife Recoveries That Change How We Think about Animals,” published by MIT Press.

Appeared in the March 4, 2023, print edition as ‘Bringing Back Bison Is a Genetic Challenge’.