

# Time ticks away at wild bison genetic diversity

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In this Oct. 26, 2019, file photo, riders herd bison during the annual bison roundup on Antelope Island in Utah. Evidence is mounting that wild North American bison are gradually shedding their genetic diversity across many of the isolated herds overseen by the U.S. government, weakening future resilience against disease and climate events in the shadow of human encroachment. Advances in genetics are bringing the concern in to sharper focus. (AP Photo/Rick Bowmer, File)

Evidence is mounting that wild North American bison are gradually shedding their genetic diversity across many of the isolated herds overseen by the U.S. government, weakening future resilience against disease and climate events in the shadow of human encroachment.

The extent of the creeping threat to herds overseen by the Department of Interior—the backbone of wild bison [conservation](#) efforts for North America—is coming into sharper focus amid advances in [genetic studies](#).

Preliminary results of a genetic population analysis commissioned by the National Park Service show three small federal herds would almost certainly die off—extinguishing their DNA lineage—within 200 years under current management practices that limit transfers for interbreeding among distant herds.

The study is awaiting peer review by other scientists. It does not include Yellowstone National Park's herd of some 5,000 unfenced bison, the largest federal conservation herd that's seen by millions of people who visit the park annually.

"Some of these herds that lost the most [genetic diversity](#) do have a high probability of going extinct, due to the accumulation of inbreeding," explained Cynthia Hartway, a conservation scientist at the bison program with Wildlife Conservation Society who led the analysis.

The preliminary findings were presented at a workshop of the American Bison Society in the buffalo-raising Native American community of Pojoaque, amid impassioned discussions about ensuring the iconic mammal's lasting place in the wild.

Bison squeezed through a perilously small genetic bottleneck in the late 1800s with the hunting and extermination of the massive animals that

had numbered in the tens of millions. At one point, fewer than a 1,000 survived.

Federal wildlife authorities now support about 11,000 genetically pure bison with only the slightest traces of cattle interbreeding. The herds represent one third of all bison maintained for conservation purposes across North America.

Many of the conservation herds overseen directly by the Interior Department have 400 or fewer animals—leaving them prone to problems of inbreeding and genetic drift that reduce environmental adaptability.

The new analysis suggests the problem, left unchecked, would likely spell doom for small herds wandering the immense Wrangell - St. Elias National Park and Preserve in Alaska, the hemmed-in bison at the Chickasaw National Recreation Area in Oklahoma that descended from a group of six animals, and a tiny educational display [herd](#) at Sullys Hill National Game Preserve in North Dakota.

At the same time, strategically exchanging as few as two bison between herds every 10 years would forestall the genetic deterioration of small herds, the research found.





In this Oct. 26, 2019, file photo, a bison looks through the grass on Antelope Island in Utah. Evidence is mounting that wild North American bison are gradually shedding their genetic diversity across many of the isolated herds overseen by the U.S. government, weakening future resilience against disease and climate events in the shadow of human encroachment. Advances in genetics are bringing the concern in to sharper focus. (AP Photo/Rick Bowmer, File)

Hartway said transfers alone don't stop that slow ebb of genetic diversity from the combined "meta-population"—the collective DNA profile of scattered federal conservation herds—and that more large herds may be needed in the long run.

"We're kind of putting a band-aid on the problem. The problem is we have small, isolated herds."

Others see modern reproductive technology as a solution.

Frozen bison embryos and in vitro fertilization hold out promise for easing genetic isolation among herds without the risks of transferring hulking mammals or spreading diseases such as brucellosis that leads to aborted calves, said Gregg Adams, a professor of veterinary biomedical sciences at the University of Saskatchewan who has pioneered the reproductive technologies on bison.

But federal wildlife managers and some indigenous communities are loath to adopt such techniques that move away from natural selection in mating.

Peter Dratch, a senior biologist in Colorado for the Fish and Wildlife Service's wildlife inventory and monitoring program, cautioned against even more subtle human interference in managing wild herds, such as inoculations or rescuing ailing bison for treatable diseases. He believes domestic versions of bison will emerge from commercial herds, where bison number 400,000 or more.

"You don't want to go overboard, to play God," he said.

Wild bison DNA is typically sampled from tail-hair gathered at cattle-style roundups, or with small flesh-biting darts, and even blood samples from animals killed by hunters in remote locations.

In its cooperative effort with federal and state agencies, the Wildlife Conservation Society assembled DNA information from more than 1,800 bison among 16 federal herds, with additional sampling from two publicly managed Canadian herds.

Brendan Moynahan, chairman of the Interior Department's Bison Work Group, said genetic-diversity concerns could add momentum to

initiatives already afoot for larger conservation herds where enough open space can be found, potentially in collaboration with Native American communities that revere the buffalo.

At the Blackfeet Indian Reservation in Montana, tribal leaders who re-established wild bison in 2016 have described their vision for herds that roam freely into neighboring Glacier National Park, the Badger-Two Medicine wilderness and Canada's Waterton Lakes National Park—an area spanning several thousand square miles.

Despite concerns, Moynahan insisted the plains bison and larger northern wood [bison](#) are on a better genetic footing than other wild North American mammals such as the black-footed ferret that have had close brushes with extinction.

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