Quick and Dirty Guide to Bison

Cara Cannon Byington

Do Not Disturb
Johne Richardson

QUICK AND DIRTY GUIDE TO BISON

"So. You want to try the poop thing?" is a sentence I hear way more than you'd think.

I've come to the Tallgrass Prairie National Preserve in Kansas to learn more about bison and their singular role in engineering North America's grasslands. Since grazing is a big part of that story, I should have expected the poop. It's a sunny day in June, and we've been walking the prairie looking for a pat with just the right texture.

"This one looks good," says Tony Capizzo, The Nature Conservancy's Flint Hills Initiative director, as he kneels next to a bison patty the size of a dinner plate. Tony taps it with the tip of the saw blade from the small silver multi-tool in his hand and smiles, "Got a good crust on it, but not too dried out."

Flies scatter as he cuts a neat four-inch circle in the top of that good crust and then flips it up and aside, exactly like he was opening (forgive me) a bread bowl. And I think about two things: (one) yes, I can easily see why bison poop contributes to the nutrient cycle in prairie soils, and (two) I may never eat spinach-and-artichoke dip again. Ever.

Well, seeing is believing.

Bison are considered a "keystone species" for prairies, meaning they disproportionately affect the overall health and productivity — the whole trophic cascade of life — in the ecosystem.

The ways bison graze and wallow, what they prefer to graze on and where and how they prefer to do it, the ways they move and poop and shed their fur, the ways they live and die — all of these behaviors once helped create (and can still shape), well, pretty much everything about the ecology of a prairie, like the one I'm standing on here in the Flint Hills.

It's a fascinating story and a really long one, so we're just going to hit a few high points on this whirlwind tour of key bison behaviors and why they matter.

STOP #1: DEFECATION AND URINATION

Bison poop, it turns out, is an entire ecosystem of its own. According to the National Park Service (NPS), "bison pies are elixirs of nutrients for the prairie, spreading seeds, fertilizing the soil and attracting insects" like dung beetles and flies.

As bison graze the prairies, microbes in their stomachs, or, per NPS, in their "four-chambered digestive systems," get to work breaking everything down. Eventually, the microbes and any undigested plant matter that passes through those four chambers end up deposited on the prairie through bison urine and feces.

These bodily functions are foundational to the nutrient flow on grasslands. Both bison feces and urine provide sources of nitrogen, phosphorus, calcium, sulphur and magnesium. The insect communities they attract — as many as 300 different species of insects may be found in a single bison pat — are key to spreading nutrients to the rest of the prairie.

STOP #2: GRAZING

Bison's most obvious influence on prairie health is the way they graze. They tend to be selective eaters and prefer native prairie grasses, such as little bluestem and sedges (a grass-like plant with sharp edges and solid blades) over forbs (broad-leaved plants).

That selectivity for grasses and sedges leads naturally to selectivity in grazing locations. Bison go where their favorites are — and where their favorites are is influenced by fire or previous grazing that creates high-quality food. While it's true that bison tend to drift across the prairie as they graze, they will return frequently to burned and previously grazed areas to forage on the regrowth in the same season.

Ultimately, bison grazing selectivity creates a kind of patchwork of grazed and ungrazed areas that cycle through different species year over year as the plants and animals react to the changes caused by grazing.

This constantly changing patchwork allows more light to reach plant species that taller species may have shaded out. Grazing can also reduce competition for water and nutrients between plants as some species flourish in the changed conditions, and others aren't as successful.

Bison Wallow After Rain, Konza Prairie
Bison Wallow in Drought, Konza Prairie
Rena Detrixhe

As plant communities change and change again based on grazing, they also create habitats that attract different grassland species. Thirteen-lined ground squirrels and horned larks really like heavily grazed areas.

THE COMBINATION OF FIRE AND BISON HELPS KEEP PRAIRIE PLANT COMMUNITIES DIVERSE. AND A DIVERSE PRAIRIE TENDS TO BE A HEALTHY ONE.

Given a choice, bison (and cattle, too) will prefer to graze on (relatively) recently burned areas.

The combination of fire and bison helps keep prairie plant communities diverse. And a diverse prairie tends to be a healthy one. One quick way to assess grassland health (especially if you aren't up on all of your native prairie plants) is to look at structure, listen for sound and watch for color.

STOP #2.5: GRAZING AND FIRE

America's sweeping grasslands are, in many ways, the legacy of glaciers, Indigenous Peoples, bison and fire. For generations, Indigenous Peoples of the Great Plains set the grasslands on fire because they knew burned areas attracted the bison that were the foundation of their cultures and economies. With the slaughter of the bison in the 19th century and the ensuing violence against Native Peoples, the land lost its stewards, its fire and its largest grazers.

The violence also severed Native nations' historical, cultural, traditional and spiritual relationship with buffalo. As the buffalo have returned from the thinnest edge of extinction, they have also been returning home to the Tribes. The connection between Native nations and buffalo is intricate and sacred and goes far beyond the role of bison in an ecosystem. The cultural story is not mine to tell, but it's important to acknowledge that the connection between fire and grazing is not new.

STOP #3: WALLOWING

If you've never seen a more-than-1,000-pound animal roll around on the ground, the sight can be a little disconcerting.

"It really can," Tony says. " A preserve visitor once reported a bison struggling to get up, so I went out to see if we had one in distress. They all looked really healthy, and then one wallowed, and I realized what the visitor probably saw."

As in, they saw a bison sink to its knees and then kind of tip over, kick all four hooves in the air (likely with an impressive cloud of dust) and then heave itself back upright. Repeatedly. It's a little like watching a toy boat capsizing and then righting itself in a bathtub. And it does look uncomfortable. So why do it?

Apparently, wallowing serves many purposes. Males and females do it. It may help the bison get rid of flies and other biting insects, or shed winter fur, or scratch places it can't reach any other way. Or all of the above and more.

Wallowing clearly benefits both bison and the prairie.

The animals tend to use the same places to wallow and over time, with so many large animals rolling around in the same spot, the soil gets packed down. Compressed soils (and changing chemical compositions caused by bison urination and defecation in the wallow) favor the growth of different kinds of plants, and if a wallow is deep enough and the soil hard-packed enough, it can fill with rainwater and become an ephemeral wetland.

Wallowing bison are not the only source of ephemeral wetlands on the prairie, but they can play a significant role in creating them. Many migratory shorebirds, like long-billed curlews, rely on such wetlands to complete their life cycles.

EVER-CHANGING, EVER THE SAME

Ultimately, prairies are living, and they have cycles — and cycles within cycles — like all living things. Chris Helzer, TNC's director of science in Nebraska, talks about thinking of a prairie as a ball rolling around in a bowl.

"As it rolls around — because it's getting pushed by drought, grazing, fire — it gets pushed into different places within the bowl. And every time it moves to a different place," he says, "it looks different. But as long as it stays within the bowl, it keeps its identity as a prairie."

In that way, healthy prairies are a bit like streams in that you can never step in the exact same one twice. They are essentially ever-changing and (if they stay healthy) ever the same. Poop, wallows, grazing, fire and all.

Cara Cannon Byington is a science writer for The Nature Conservancy (TNC), covering TNC's work around the world. Born on an island off the coast of Florida, she first learned to love the North American prairie at TNC's Nachusa Grasslands Preserve in Illinois. She's getting good at prairie plant identification but has yet to master the songs of grassland birds beyond the easy ones, like meadowlarks. Her writing appears regularly in TNC's "Cool Green Science" online magazine.