



Ten days after I'd seen the dead bull elk, a grizzly appeared and began to feed, its front paws and curved claws holding down a hindquarter as it tore in with its powerful jaws. The bear was an unforgettable sight—at this point the latest, and by far the largest, in a series of visiting scavengers, each playing a vital ecological role in recycling the mountain of elk carcass.

It was fall, and I was working as a caretaker for several cabins by the Yellowstone River not far from the town of Gardiner and the north entrance to Yellowstone National Park. My kitchen window looked out on the rocky slopes of the Gallatin Range, where one morning I'd spotted the elk carcass lying about a quarter mile away in a juniper-lined ravine. With a spotting scope I could see

details: the tawny body, dark-haired shoulder mane, and, bent to the side, the head and antlers. The cause of the animal's death was not apparent—perhaps disease, age, or even injuries from sparring during the fall rut. Maybe a hunter had mortally wounded the bull but was unable to find it.

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DECOMPOSITION

The remarkable wildlife activity that goes into making an elk carcass disappear.

By Barbara Lee | Illustration by Liz Bradford

All-You-Can-Eat Buffet

How scavengers—from grizzly bears to blowflies—fill their bellies while decomposing an elk carcass

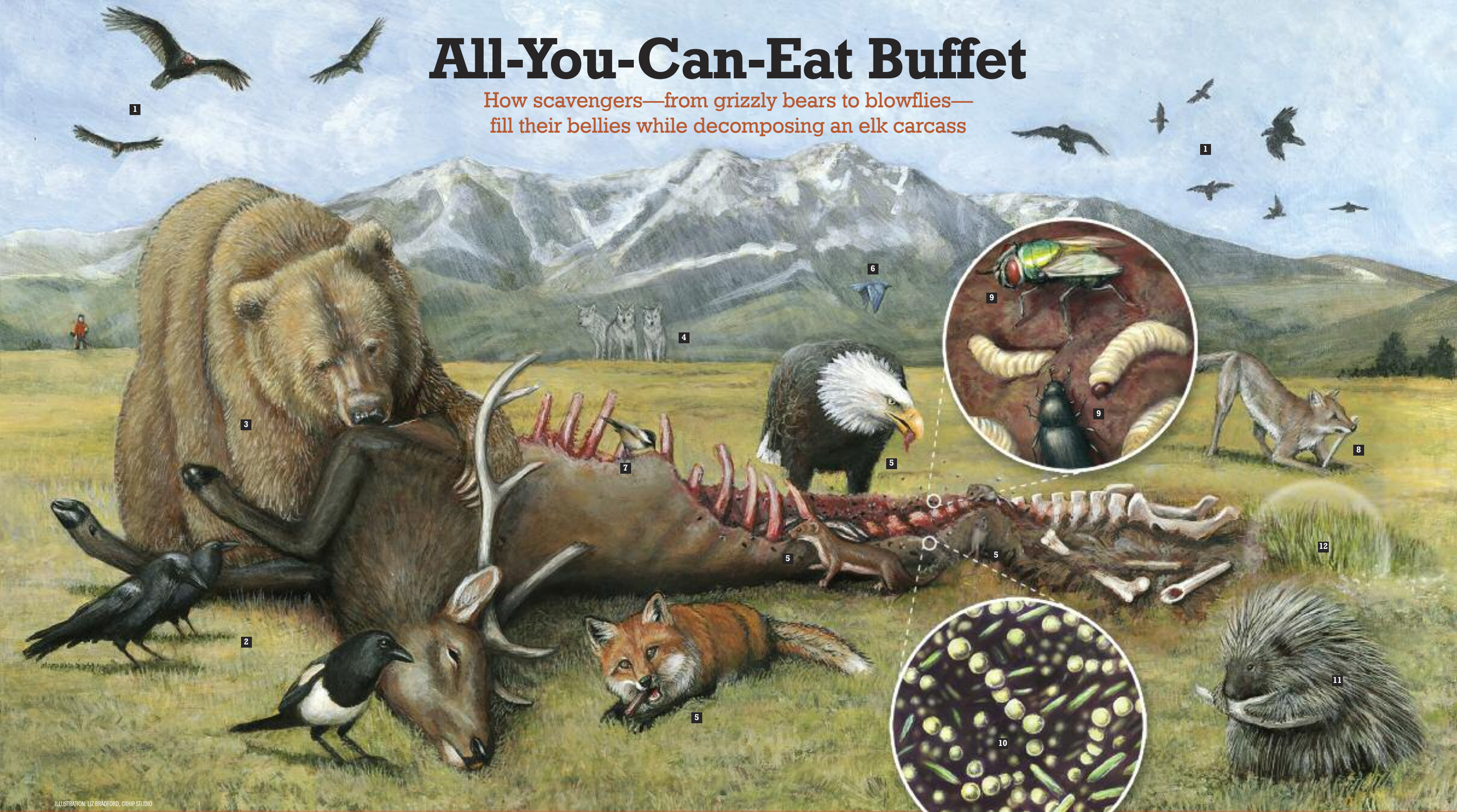


ILLUSTRATION: LIZ BRADFORD, OXHIP STUDIO

An elk carcass can show up for many reasons: the animal died of starvation, old age, predation, or from a hunter who was unable to recover the animal in time. **1.** The first scavengers to arrive are turkey vultures, ravens, and magpies, which spot the carcass from the air. **2.** The birds are not strong enough

to tear open the carcass, so they can only peck at the soft eyes and anus until larger scavengers show up. **3.** It takes the powerful jaws of a grizzly bear or gray wolf to tear through the elk's thick hide and expose the insides to other scavengers. **4.** Wolves will keep their distance until a grizzly eats its fill.

5. Once the "buffet door" has been opened, smaller scavengers such as eagles, foxes, weasels, mice, and shrews can begin eating. None of the carcass goes to waste. **6.** Mountain bluebirds and other bird species may take tufts of elk hair to line their nests. **7.** Black-capped chickadees will peck

at scraps of fat left on the ribs. Wolves will break open thigh bones and eat the rich marrow inside. **8.** A coyote might find a broken bone and gnaw it for marrow, meat, and fat scraps. **9.** Blowflies alight on exposed body portions and lay eggs that hatch into maggots, which, along with carrion

and dermestid beetles, feed on moist tissue. **10.** At a microscopic level, bacteria, fungi, and other "decomposers" further break down tissue. **11.** Even the antlers are consumed by porcupines and

other rodents, who gnaw at the hardened bone to wear down their teeth. **12.** Bone dust, hair, and microbes enter and enrich the soil. In time the soil will grow plants such as bunchgrass that elk eat, thus completing the ecological cycle that began one day when a bull died in a field. ■

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Curious about what would happen to the elk carcass, I began to read about scavengers. I learned that soon after an animal dies, bacteria already present in its body start the process of breaking down the flesh. This produces gas that gives off a putrid odor that attracts scavengers. The first to show up on this particular carcass were probably carrion (blow) flies. Dozens of species occur in North America, including the aptly named *Cynomya cadaverina* and *Calliphora vomitoria*.

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These shiny, blue-green insects immediately laid eggs and, about eight hours later, maggots hatched and set to work eating. Carrion beetles were most likely the next to appear and start feeding, mating, and laying eggs.

At dawn on the third day, I saw the first birds arrive—ravens and magpies. These, along with turkey vultures and other winged scavengers, generally can't consume much of an elk carcass in the first few days because they can't break through the thick hide. That's why they feed initially on carrion beetles and peck at the eyes and anus.

Ravens and magpies have keen eyesight and are constantly on the lookout for carcasses. Highly vocal, both communicate to other members about feeding opportunities.

Other scavengers, in turn, keep an eye out for flocks of ravens and magpies as indicators that carrion is present.

During the early morning of day four, a pair of bald eagles and a pair of golden eagles appeared, probably after spotting the boisterous ravens and magpies. The eagles fed on the carcass at different times, the balds usually deferring to the larger goldens. Though both raptor species are skilled hunters, neither will pass up an easy meal of dead elk, deer, or other large prey species.

I watched as each eagle worked on the carcass in the same way, using its talons and beak to try to rip a hole in the hide. Though these powerful raptors can tear into smaller carcasses such as jackrabbits



OPENING THE BUFFET With their powerful jaws, scavengers such as bears and wolves open up a carcass, exposing the insides to smaller animals such as foxes, raptors, weasels, and shrews. The big animals also break down hide and bones into edible chunks for others at the carrion buffet.

On the morning of the tenth day, the grizzly showed up. It could have followed the stench from many miles away.

and even deer fawns, they weren't able to pierce the bull elk's thick skin. They and other scavengers often wait patiently for a large carnivore like a bear or wolf to open an elk, bison, or moose and reveal the meat and softer tissue inside. That was the case here, because by sundown the carcass remained unopened. The eagles and other birds would have to wait.

On day five, as the carcass was being worked over—for the most part fruitlessly—by the ravens, magpies, and eagles, a nervous-looking coyote trotted in from the brush. Coyotes often travel in pairs, and an equally skittish hunting partner soon joined its comrade. I'd heard a chorus of howling in the distance the night before. Maybe it was from these two or their kin, relaying news of the food discovery.

Usually coyotes aren't strong enough to open an elk carcass, but these two were. They took turns laboring to open the body, pushing against it with their front legs and pulling the hide mightily with their teeth. The following morning, I could see that the pair had succeeded and were feeding, likely on the elk's hindquarters and other meaty areas. They also lunged frequently at the scavenging birds, which were eager to finally feast on the elk's viscera.

This carried on for each of the next several days, with the coyotes continuing to break down the carcass and the birds feeding on scraps. Other scavengers that could have fed at the site were mountain lions, wolves, black bears, red foxes, pine martens, and weasels. A few wolverines live in the mountains nearby, and one of those powerful furbearers might have visited. Ordinarily turkey vultures would show up, but these avian scavengers had migrated south from

Montana earlier in the fall.

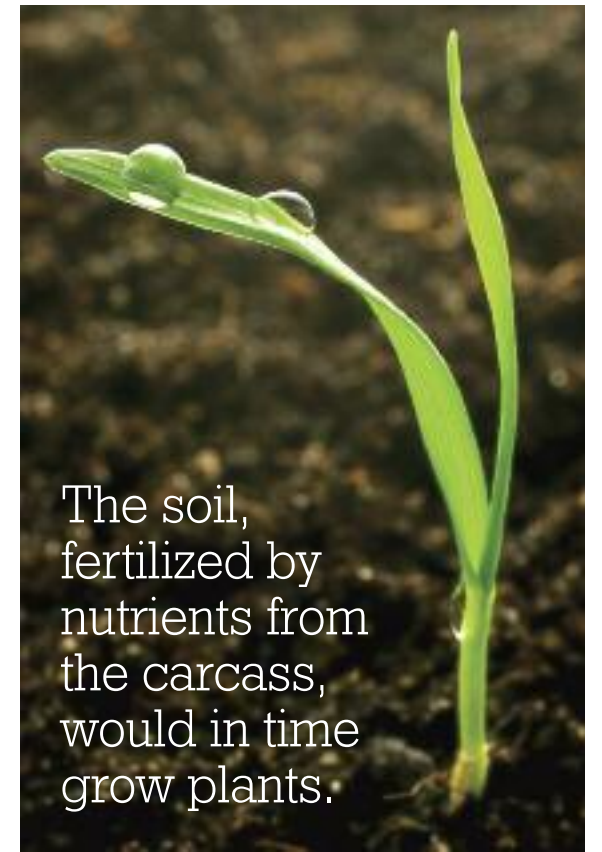
On the morning of the tenth day, the grizzly showed up. Both black bears and grizzlies have an excellent sense of smell, and by that time the elk likely stunk to high heaven. The grizzly could have followed the stench from many miles away. It began consuming the dead elk, at times from a straddling position that looked like an embrace. My best guess was that it was trying to prevent other animals from taking over the prize. Biologists say that a bear may spend days alternating between eating a carcass and sleeping on it, but this one was gone the next day, having consumed pretty much all that was left of the elk.

By this time no scavengers were visible from my cabin window, and the spot under the junipers appeared quiet, even serene. After waiting another week, I decided it was time to hike over to take a look.

Was I ever wrong. Up close, the site was anything but serene. Though I saw only beetles and other insects, it was obvious that larger scavengers had been there recently. Most of the skeleton was still present, torn into three twisted pieces and draped in hide. Elk hair and animal tracks covered the muddy ground, and mounds of displaced earth indicated that chunks of the body may have been buried and then dug up not long before I arrived. A patch of snow revealed the fresh trail of something being dragged away, probably earlier that day.

Realizing I'd made a serious mistake, I left immediately. Montana Fish, Wildlife & Parks strongly warns people never to go near a carcass if bear or lion presence has been noticed. The large carnivores are highly possessive of their cache. In fall especially, grizzlies are hurriedly putting on calories in preparation for hibernation and will attack anything—or anyone—they consider a threat to their food. "This can be an extremely dangerous situation," one FWP official told me.

Though that was the last time I saw the



The soil, fertilized by nutrients from the carcass, would in time grow plants.

elk remains, scavenger activity no doubt continued. Wolves, if they visited, cracked open bones for the marrow inside. Mice, shrews, and other small animals scavenged for tidbits of flesh and fat missed by larger animals. Flies, carrion beetles, and maggots stuck around until all tissue had been eaten or dried. Dermestid beetles then continued consuming hair, dried fat, and skin until nothing remained but the skeleton and antlers. Even those remnants eventually were whittled away by gnawing mice, porcupines, and other rodents. Bacteria, fungi, and other "decomposers" further broke down the remains into nutrients that, along with mineral dust from gnawed bones and antlers, washed into the soil with each rain. The nutrients (carbon and nitrogen) fertilized the soil and helped grow new plants, such as bunchgrass or forbs.

Someday an elk may wander past and feed on that vegetation. Thus an ecological cycle, begun with a dead bull elk carcass and made possible by countless scavengers, from the microscopic to the dangerously large, would be completed once again. 🐾