



The strange phenomenon of moth-eating bears

In the Northern Rockies, adventurous grizzlies climb mountains to feast on as many as 40,000 moths a day, a mysterious ecological marvel.



Furry mountaineers sans equipment, grizzly bears climb mountains to find army cutworm moths. They often move around a fair amount to find prime mothing sites and to dig up tubers. This bear has entered a subalpine meadow, likely seeking plants to eat.

BY DOUGLAS MAIN

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• 15 MIN READ

“I hear ravens up ahead,” says Steven Gnam, a photographer and mountaineer. It’s high noon in Glacier National Park and we’re nearing the end of a 5,000-foot climb up a peak draped in mist and covered with loose rocks.

Momentarily, two coal-black corvids wheel in and out of the clouds. “Is that good a sign?” I ask, considering whether the appearance of these archetypal tricksters has any larger meaning. “Yes,” he says. “They’re here because of the bears.”

As we climb, signs of grizzlies begin to appear everywhere; first, a deep divot, large enough to lie in, where a bear has dug into the loose gravel and rock, also known as scree and talus; then, plentiful piles of scat; finally, the sounds of a bear in the near distance, hidden by mist, raking into tablet-shaped stones and tossing them, which sounds like clattering dinner plates.

In search of army cutworm moths, bears subject themselves to many hazards. This mother grizzly leads her cub across a snowy slope, using long claws to traverse the icy areas. Cubs, like human children, need years of education to learn these survive skills.

What has drawn the grizzly bears to the mountains are army cutworm moths, 1.5-inch-long silvery insects that have migrated here, many from hundreds of miles away.

Every summer, billions of moths flock to the Northern Rockies to escape the heat of the plains and feed on alpine plants. During the day they rest under high-elevation scree; by night, they sup the nectar of flowers. The insects become plump, increasing to upward of 75 percent body fat. Here, [grizzly bears](#) scale peaks of up to 13,000 feet and dig through the talus to consume tens of thousands of moths a day.

The phenomenon illustrates a fascinating link between a charismatic carnivore and a small insect, considered a pest by some, since it can feed on crops.

“It’s this unique story of this tiny little moth and this big bear that is compelled to go up to high elevations to feed on it,” says Erik Peterson, a Washington State University-affiliated biologist whose graduate

research in Glacier National Park involved mapping where both creatures occur in Glacier in unprecedented detail.

Yet the situation presents challenges for land managers, especially as more and more people visit the mountains. Biologist Erika Nunlist, **while at Montana State, conducted a master's thesis in the Absaroka Range**—at the eastern edge of the Yellowstone wilderness—that found on one so-called **“mothing peak,” bears ran away 80 percent of the time** when people approached. This can deprive them of a vital food source late in the season before hibernation, when calories are paramount.





Left: Most people think of the grizzly bear as a mountain animal. However, in past eras the grizzly was widespread in the Great Plains and beyond, and known to follow bison herds. But widespread hunting and trapping extirpated them from 98 percent of their range i...[Read More](#)

Right: A cub playing with a chunk of ice. In the peak of summer, the sunny days are intense, especially if you live in a fur coat. The bears often seek cover in shaded areas and need to stay hydrated by drinking melting snow and ice.



A headlamp illuminates the path of army cutworm moths flying among fireweed, just below a moth slope. The moths emerge from the talus after sunset and feed on the nectar of nearby wildflowers.

“You want bears feeding on these sites, because they are as far removed from people as you can get,” Peterson says. But the people are coming anyway, and not without risk. In late June 2022, experienced hiker Barry Olson climbed a nearby peak and ran into a grizzly that mauled and nearly killed him. But no recorded fatalities have been associated with the phenomenon, and the bears are in general “remarkably tolerant and hospitable with humans,” Peterson says.

In **January, the U.S. Fish and Wildlife Service announced it's** considering removing federal protections for grizzly bears afforded them under the Endangered Species Act, which could pave the way for state-administered hunts in Montana, Wyoming, and Idaho.

Meanwhile, much about the phenomenon remains mysterious. What does the future hold for moths and bears in the Northern Rockies?

Ranging far and wide

Large numbers of grizzly bears, a type of brown bear, were once found throughout most of what is now the western United States and into northern Mexico. But they were shot and trapped and nearly extirpated from the Lower 48 by the mid-1900s, hanging on in a small population of the Northern Rockies listed as an endangered species in 1975.

Their numbers have since grown and there are thought [to be around 2,000](#) in the continental U.S., surviving in two genetically isolated populations centered around Glacier and the Greater Yellowstone Ecosystem. These bears are resilient and versatile, with a broad diet. One study in the Yellowstone area found they consume 175 species of plants and more than 80 species of animals.



A grizzly cub looks up while its sibling and mother drink from the meltwater at the base of a snow patch. Most of the bears at elevation are females and sub-adults, though some older males make the trek as well.

But none of these foods are as calorie dense as army cutworm moths, which occupy a vast range across western North America. These insects emerge from the soil in the spring as worm-like larvae, or cutworms, that will eat just about any young plant, including crops.

A few weeks after the caterpillars emerge, they form cocoons and develop into moths—then head for the mountains in great numbers, **sometimes creating “moth blizzards,” which are drawn in the tens of thousands to lights, especially inside houses and garages.**

Research by biologist Clare Dittmore, a graduate student at Montana State, and colleagues suggests that most moths migrating to a peak in **the Absaroka Range don’t feed on fertilized crops, instead eating wild plants and weeds as larvae.** This includes invasive species such as cheatgrass: In 2003 in northern Nevada, the moths devoured 1,100 square miles of it. These data show the insects are not merely an agricultural pest, but an important part of the ecosystem.

Her studies also affirm most local moths hail from a broad swathe of Canada. This follows [work by Hilary Robinson](#), now a researcher at Yellowstone National Park, showing that moths choose seemingly **random mountainous locations to migrate and don't return to one spot**, like, say, salmon. Their site-agnostic travels and broad distribution make them less vulnerable to disturbances, Dittmore adds, but climate change [remains a threat to insect migrations](#) because of its wide-ranging and unpredictable effects.



Often when thunderstorms hit the mountains, the bears stopped feeding and begin to play. These two grizzlies put on a long play fight, including lots of dramatic growls, swipes, and teeth baring. Competition for prime moth areas leads to occasional conflict.

At the same time, as some of their other food sources have dwindled, grizzlies are likely increasingly relying on moths as a food source. For instance, grizzlies eat nuts from whitebark pines, but these trees have been hit hard by white pine blister rust, an exotic fungus that has infected and [killed up to 90 percent of these conifers](#) in the Northern Rockies in the last century. Populations of cutthroat trout, another vital food in the Yellowstone area, have also [significantly declined since the](#)

[1990s](#) after the introduction of invasive lake trout, which can outcompete them.

For their study, Dittimore's team set up a transportable radar tracking incoming moths, estimating that up to five million of the insects arrived over a single pass in the Absarokas over a five-day period in summer.

So far researchers have identified more than 30 sites in the Greater Yellowstone Ecosystem where moths and bears flock; a third or more of the bears in some of these areas likely feed on the insects.

In early autumn, once the alpine flowers begin to go to seed, the moths head back toward the plains to breed and lay eggs in loose soil. These eggs develop into larvae that remain dormant underground until spring.

Nobody knows how long bears have been feeding on moths. The first reports date back to Yellowstone in the 1950s, but scientific research **didn't begin until the 1980s. Around the same time, bears were seen** feeding on moths atop McDonald Peak in the Mission Mountains south of Glacier and on traditional land of the Confederated Salish and Kootenai Tribes of the Flathead Reservation. ([Related: Grizzly bears saved this veteran's life. He's returning the favor.](#))

Peak experience

Toward the top of the peak in Glacier, I dig into the talus; a dozen insects emerge and try to hide, crawling deeper down.

The insects' wings are many shades of gray and brown, with a soft sheen that reflects the rocks around them. A closer look reveals an understated beauty, with notes of stone, sagebrush, and cinnamon. Patterns of circular motifs swirl throughout—some charcoal, others the white of a clouded sky. This coloration helps them blend in with the scree and lichen-painted rocks.



Bears seek shelter, like this cave, while in the alpine. The shelter seems to afford protection from storms, other bears, and helps keep them cool. Bears are culturally important to Native Americans. “The grizzly bear is involved in many of the Tribe’s creation stories

The ground is torn up: “Essentially everywhere you look,” Gnam says, “bear paws have turned over rocks looking for moths.”

Nearby, pioneering scientist Don White Jr. discovered in the 1990s that the bears can eat 40,000 moths daily. He also found that when bears got spooked by humans, their caloric intake of moths could drop **significantly. Now Peterson’s research, which has yet to be published,** shows that grizzly bears visit about 70 percent of the talus slopes where moths occur in the park. Helicopter surveys have also found moth-eating bears in locations they were not known to frequent.

At the peak’s summit, we look at comments left behind in a log kept there for peak baggers. Quite a few mention the bears, revealing a mix of awe, surprise, and occasionally fear. “Surrounded by bears,” wrote a 12-year-old in 2021. “Beautiful views!” writes another. “Six grizzlies near the top!”



Left: An army cutworm moth (*Euxoa auxiliaris*) scurries past a wavy grizzly hair. Scat and hairs are found all over moth sites. The insects are the base of an enigmatic and little-studied food web, providing nourishment to ravens, bears, and other creatures in the alpine.

Right: A moth blends into rocks made of ancient ocean sediments. The moths prefer the loose mix of rocks called talus, with large interstitial spaces that they can move through and hide within.

This peak is one of the more frequently visited mothing sites, and the bears have become somewhat accustomed to people. But that doesn't mean they're unbothered. ([Learn more: *The odd things grizzly bears eat, from elk to moths.*](#))

“Everybody wants to go up there—we’re sort of at a quandary as to how to deal with that,” says John Waller, a biologist with Glacier National Park. The day is “fast approaching” when limits on visitation may be necessary, he says.

In tribal lands of the Flathead Reservation, land managers have already restricted human access to McDonald Peak between July and mid-October since the 1980s. And “there are no plans to remove the seasonal closure,” says Kari Kingery, a wildlife biologist with the Confederated Salish and Kootenai Tribes.



A grizzly takes a pause from digging. You can hear the moths scurrying around under the talus; presumably bears use the insects' sound and smell to focus their efforts. Bears that dig for moths have shorter, blunter claws than bears that don't use moth sites.

Grizzly bears' land, first

To see the bears in another ecosystem, we head to the Absaroka Range, a nine-hour drive from Glacier. One peak, at just over 13,000 feet, attracts a modest amount of climbers. And, of course, bears.

To navigate the gnarly road to the top, you need a four-wheel-drive vehicle with high clearance. At **11,000 feet, there's a ridgetop plain with** a view of the mountain where Gnam and I spent four days camping; one night, 60 miles-per-hour winds lashed our vehicles. There are no marked trails, and the main route along the ridge is littered with bear beds—where the animals have raked out divots for sleeping—and scat full of moth wings. The only mark of humanity is the dirt road and a **sign saying “WARNING: HIGH BEAR DENSITIES IN THIS AREA.”**

During one hike we climbed a drainage, and, due to the contour of the **land, didn't see a massive male bear until we were 75 yards away. He** looked sleepy, half-laying on the ground, but his ears perked up as he sniffed the air.



A light snow falls on a sleeping grizzly. The bears will scoop a depression into the rocks or dirt, a bear bed, and then curl up to sleep. They can be somewhat meticulous, removing all the sharp stones from their bed, leaving a smooth hollow.

“He’s showing us he’s not too concerned,” Gnam says. “But we should keep moving.” After a quick climb, we filtered water in a snowfield, finding bear hair and scat all over. I’d never felt more clearly that I was in the realm of another creature.

We began to feel the elevation, a feeling like brain-freeze, progressing to a headache. The view at the peak makes it worth it, with the entirety of the Yellowstone region before us, framed by the distant Tetons. On the west side of the peak, below, we spy two grizzlies. One is napping; the other is digging into the talus for moths.



At sunset, a cub steps onto its mother's back for a better view: there's a lone male grizzly traveling below them. Mothers must remain watchful of aggressive males. Cubs learn from their mothers to seek out army cutworm moths, a behavior that is passed down to future...[Read More](#)

During our time there, we saw dozens of bears. Most were far off searching out moths. A handful ran off when we got close enough for them to smell or see us.

I think about the words of Kingery, who explained to me that tribal members traditionally view Earth **“as the grizzly bear's land first.”** Being here, the sentiment rings true.

That's why it's “important to honor and respect grizzly bears and live peacefully with them,” Kingery says. For their sake, and our own.

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