ILLUSTRATION BY SYDNEY BOVENG

First-Year Perils

The life of every elk calf is a cliffhanger.

BY CHRISTINE PAIGE

On a clear summer day, as I was walking a high sagebrush bench with snow-clad peaks rimming a 360-degree view, I bumped a young cow elk from a timbered edge. She blew, stomped, and high-stepped a few yards off, reluctant to move far. It was then I saw her calf, a dark ball curled beneath a small Douglas fir, not but a few hours old. Scattered across the bench, clusters of cow elk grazed, heads bobbing up to peer to the horizon and down again to feed on greening grasses and early wildflowers. A passing ranch truck drew little notice, but a low black form trotting through the brush brought the cows to attention. A single wolf cut across the bench with purpose, headed to a hillside den at the edge of the timber. The cows watched, casually added a few yards of distance, then grazed again. Elk and wolf, prey and predator both in view, and between them a newborn calf with an uncertain future. ▶▶

Ultimately, nature's unpredictable forces—driving storms and gentle rains, winter snows, summer heat and drought, wildfires and long-term climate swings—continually echo through the landscape and are made visible in the fatness of calves and the vigor of bulls.

VULNERABLE YOUNGSTERS

For all wild animals, the first days, weeks, and months of life are the most perilous, and elk calves are no exception. A calf's chance of surviving its first year varies widely with conditions. But many calves will never reach their first birthday. Annual survival rates can run as low as 10 percent, and only in the richest habitats with few predators do annual calf survival rates climb above 80 percent—a level rarely recorded in the wild and a sign of a ballooning elk population.

Management biologists run annual winter counts of first-year calves and cows to track populations and help set hunting quotas. The ratio of calves to cows needed to sustain a herd varies with the conditions in each range. With a count of at least 20 calves for every 100 cows, a population in good habitat may remain stable. Where there's pressure from multiple predators and hunters, closer to 30 to 35 calves per 100 cows may be needed to keep a herd healthy.

Yet nature is not stingy with life. Creatures eat and are eaten, and prey species have evolved a wealth of predator defenses and reproductive strategies that increase the odds of young ones making it to adulthood. Once an elk celebrates its first birthday, it has a good chance of living many years.

DYNAMIC SYSTEMS

For an elk in its first year, it is not just predators that determine its fate. Everything from winter snowfall, spring storms, and the wealth of summer grass plays a role in calf survival, as does birth date, birth weight, disease, mom's condition, and dad's age.

The scales may be tipped for a calf right at conception. A study at the Starkey Experimental Forest and Range in eastern Oregon found that breeding by older bulls ultimately leads to better calf survival. Older bulls often breed cows earlier in the season and within a single estrus, which leads to synchronized calving in spring within a tight 7- to 10-day window. This leads to a "swamping" effect that overwhelms predators, minimizing calf mortality in the herd—each newborn simply has less chance of getting eaten if the landscape is littered with calves. Breeding by younger bulls is spread out over several weeks, and not all cows are bred in the same estrus cycle. As a result, calving is strung out over 30 or 40 days, and each newborn is more vulnerable to predators. Ultimately, the age structure of bulls can ripple through their offspring's chance of survival.

The condition of cows during pregnancy also weighs on calf survival. A cow must have put on sufficient body fat—about 10 percent by the rut—to carry her calf through the winter months. So forage quality the previous summer and fall can determine how large and healthy her calf will be. A severely dry summer with poor forage may result in fewer calves brought to term. Birth weight can also be a driving factor in calves' summer survival. Low-weight calves are more susceptible to cold, storms, and disease, and they are slower to mature. Some studies suggest that smaller calves are easier for predators to catch.

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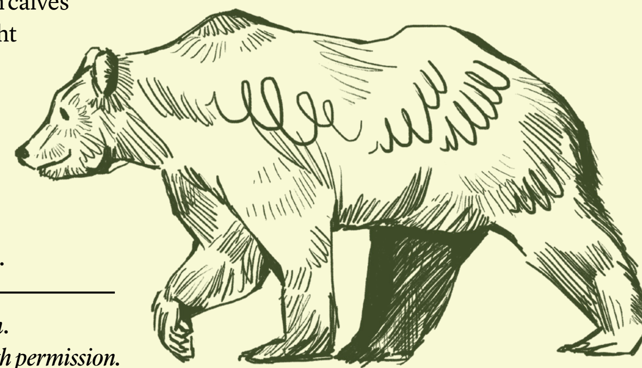


Smaller calves also lose weight faster come the lean days of winter. On the flip side, a robust newborn of 35 pounds or so has a leg up on the rapid growth it needs to join the herd—essential for the precocious offspring of open-country runners.

In regions with short summers, the timing of birth can play into calves' fate as well. Newborns that come too early in the season can be endangered by spring storms or by the lack of fresh greenery available to their mother. Spring forage affects a cow's milk production, both its richness and yield, and as a result, how quickly milk-fed youngsters will grow and be running with the herd. But if calves are dropped too late, they will wean late and may not mature quickly enough to survive the coming winter.

PREDATION LESSONS

Researchers in and around Yellowstone National Park have had a unique opportunity to track predation on elk and their survival after the reintroduction of wolves. Years of study have shown that this multi-predator system—where elk are hunted by wolves, grizzlies, black bears, mountain lions, coyotes, and people—is amazingly dynamic.

ILLUSTRATIONS BY ELAINE ATKINSON

From birth through summer, elk calves in Yellowstone are most vulnerable to bears. In a study that spanned 2003 to 2005, nearly 70 percent of elk calves died in their first year, and 90 percent of the mortalities occurred during summer. Bears, both grizzly and black, took roughly 60 percent of all calves that died in their first month, while coyotes and wolves each accounted for approximately 10 to 15 percent of early calf deaths. Grizzlies search for newborns and bedded calves methodically, looking and sniffing as they zigzag through the landscape. Although calves sometimes escape, newborns can't outrun an adult bear, and this boost of elk protein is a boon to mother bears feeding young cubs.

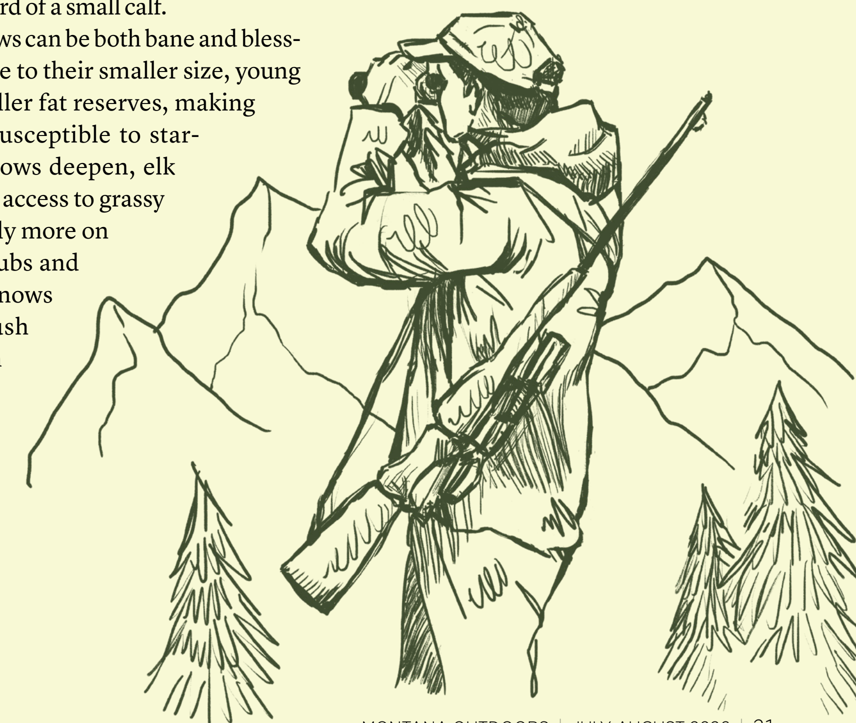
Bears are also efficient predators of elk calves in areas without grizzlies. A 3-year study of calf mortality in the Bitterroot Valley found black bears were responsible for around 11 percent of calf deaths. Wolves killed just 5 percent, while mountain lions proved to be the top predator by far, claiming 36 percent of calf mortalities. An ongoing study in northwestern Montana is also examining the role of predators in calf survival, and how it might differ there from other parts of the state.

Biologist Douglas Smith tracked wolf-elk dynamics in Yellowstone in the early 2000s and uncovered some striking patterns. He found wolves preyed on calves and bulls disproportionately more than cows. The elk herd then was about 60 percent cows, yet wolves took cows only about a third of the time and very rarely in summer. When wolves did kill cows, they tended to focus on older animals.

On the other hand, harvest data from outside Yellowstone showed that hunters choose adult cows over calves (more meat, of course). The majority of hunter-harvested cows during the research were 2 to 9 years old, which suggested that hunters might have more of an effect on elk reproduction by harvesting prime-age females than wolves did by killing calves and very old cows.

During the first years after wolf reintroduction in Yellowstone, around half of wolves' diet was calves, primarily in winter. Curiously, that proportion later declined closer to 30 percent, and the Yellowstone wolves shifted to taking more bull elk over winter. By measuring bone marrow fat in bulls in early winter, when fat supplies should be at their yearly peak, biologists found that bull elk were in very poor shape. The region suffered a long-term drought in the early 2000s, which corresponded with a decline in the condition of bulls. Smith speculated that wolves were killing more bulls in winter because they became easier targets and provided five times the meat reward of a small calf.

Winter snows can be both bane and blessing to elk. Due to their smaller size, young elk have smaller fat reserves, making them more susceptible to starvation. As snows deepen, elk also have less access to grassy forage and rely more on browsing shrubs and trees. Deep snows can also push them down onto private ranches where they may damage hay stores, pastures, and fences.



Yet deep snows in winter also nourish spring and summer plants. A lush year can produce five times as much elk forage as a drought year, making for fat cows, healthy bulls, and robust calves. Verdant habitat also aids reproduction, which helps temper elk losses to predators and weather.

Ultimately, nature's unpredictable forces—driving storms and gentle rains, winter snows, summer heat and drought, wildfires and long-term climate swings—continually echo through the landscape and are made visible in the fatness of calves and the vigor of bulls.

How much good elk country remains—with room for the timeless rhythms of birth and death to carry on—comes down to our human choices.