

COLD WARRIORS



How do wildlife survive
Montana's brutal winters?

By DAVE CARTY



Maybe the meadowlarks and mourning doves have the right idea: When the snow flies, take the first flight out of here.

So where does that leave bears, deer mice, frogs, and other wildlife when Montana's long, cold winter sets in? Like you and me, they're stuck here for the duration, dealing with it.

Grizzlies seem to have mastered the art of winter survival. The bears in and around Yellowstone National Park begin preparing for winter as early as August, when they start gorging on cutworm moths. Their appetite only increases over the next few months as they frantically consume calories—a period of intense eating known as hyperphagia—to build fat reserves. According to Kevin Frey, a Fish, Wildlife & Parks grizzly bear management specialist in Bozeman, there's not much grizzlies won't eat in the weeks before cold weather arrives. "Animal carcasses, berries, whitebark pine nuts—they're all high-protein and high-fat foods the bears are looking for to get heavy enough to make it through winter," he says.

Meanwhile, grizzlies are also digging dens, usually on north-facing slopes, which are less likely to see cycles of freezing and thawing in winter. "Otherwise, they get water leaking into their bedroom," explains Frey. The bears' metabolism undergoes dramatic changes before they enter a state of semi-hibernation known as dormancy or lethargy.



STEVE MITCHELL

COPING WITH THE COLD In the months leading up to winter dormancy, grizzly bears (left) and black bears go on a feeding frenzy known as hyperphagia, consuming carrion, berries, nuts, and anything else they can find. Mink (below) stay active all winter, feeding on fish, crayfish, and small mammals.

"Throughout the fall, their body temperature will start dropping off, and while their food sources are diminishing, they're getting sleepier and slower," Frey says. "Their average temperature is 101 degrees. But we've captured bears in October that are already down to 97 degrees. It's kind of odd, because even though they're getting furrer, they're cooling down at the same time."

Unlike ground squirrels and marmots, which go into a near-death slumber known as deep hibernation, grizzlies and black bears awaken occasionally—notably to give birth to cubs—before drowsily falling back asleep. Then in April or May they rouse themselves for good, emerging from their dens to begin a ravenous search for food.

UNDERGROUND SLUMBER

Many species survive winter by fully hibernating, which conserves energy by severely



IMASLOWSKI PRODUCTIONS

slowing normal body functions. Ground squirrels are extreme hibernators, dropping from 200 breaths per minute to just one or two, while their heartbeat declines from 400 beats per minute to five or six. Hibernating bats also experience a dramatic drop in heart rate—from a high of 1,200 beats per minute while in flight down to just three or four during hibernation. This allows the winged mammals to survive during a time when flying insects—their regular food source—are unavailable.

Marmots, badgers, and many other mammals don't hibernate but survive by burrowing underground below the frost line, where temperatures stay above freezing. The close quarters also retain the animals' body heat. Deer mice and meadow voles stay warm by digging extensive tunnels under the snow. The earth's ambient temperature combined with insulation provided by snowpack keep them relatively warm all winter. Voles and mice eat seeds, sedges, and other bits of food they cached in summer along with additional morsels they find while moving under the snow. During extreme cold snaps, several deer mice may curl up together for commu-

nal warmth and doze for a few days. When temperatures ease, they resume their hyperkinetic search for food.

The American pika is another animal that survives winter underground—actually, under rock. These gerbil-sized mammals live in boulder fields and talus slopes in high alpine areas. In late summer they harvest grasses much as ranchers do, building up "hay" supplies. In winter they squeeze into rock burrows and live off the cured vegetation stored near the entrance. Because pikas do not hibernate, skiers in high-country areas occasionally spot them sunning themselves on rocks during warm winter days.

Even more active in winter are beavers, which live in ice-covered ponds created behind the dams they build. As fall days get shorter, beavers construct a lodge of mud, sticks, and grass. The structure, impenetrable to predators, has several underwater entrances that allow the rodents to swim to submerged cottonwood and aspen saplings that they cut and stored the preceding sum-



PUTTING UP HAY In early fall, American pikas cut grasses and forbs then store their "hay stacks" near the entrances of rocky burrows, feeding on the cured vegetation throughout winter.

STEVEN ANGE

mer. A thick, lustrous coat of fur and a layer of fat keep beavers warm in icy water just a few degrees above freezing.

Insects, amphibians, and other cold-blooded animals are among the first to go dormant before winter's onset. They can't afford to wait too long or cold temperatures will slow them down before they can find a suitable place to hole up. For instance, by September snakes often gather in communal dens, called hibernacula, in rocky areas deep below the frost line, sometimes in groups of dozens or even hundreds.

According to zoologist Bryce Maxell, interim director of the Montana Natural Heritage Program, most of Montana's salamanders and toads overwinter below the frost line in burrows they dig themselves or ones constructed by other species. The plains spadefoot toad, for example, digs down as deep as 20 feet below the surface of



ROD SCHLECHT

OTHER STRATEGIES Tiger salamanders escape the cold by moving to underground rodent burrows below the frost line or deep inside rotten logs. Rough-legged hawks actually migrate into Montana each winter from northern Canada. In our relatively mild climate, the hearty raptors feed on rodents they can hear, even while flying, scurrying along tunnels beneath the snow.



ANDREW MERWEN

loose, sandy soils. Montana's two native aquatic frog species, the northern leopard frog and the Columbia spotted frog, overwinter below the ice of lakes and ponds for up to nine months each year, absorbing oxygen from water through their skin. A few Montana frog species can actually survive being partially frozen above ground. Their livers produce glycerol, which acts as a natural antifreeze that prevents the formation of damaging ice crystals within individual cells while the spaces around the cells freeze. As much as 65 percent of a frog's body can freeze solid repeatedly throughout winter with no apparent ill effects.

HEARING DINNER

Many species are able to endure winter living entirely above ground. Weasels, foxes, and coyotes survive by wearing a thick fur coat and eating mice and voles, which they scent through air shafts in snow tunnels. They also find the small rodents by listening to the sounds of scurrying beneath the snow.

Birds of prey are especially good at this. Impossible as it might seem, some raptors can actually hear a mouse beneath a blanket of snow when perched in a tree or even circling in the frigid winter air above. In fact, Montana's rodent population actually attracts snowy owls and rough-legged hawks each winter from nesting grounds on tundra in the Arctic. Long after most of the state's songbirds and waterfowl have fled Montana in search of warmer weather, rough-legged hawks and snowy owls migrate in—looking for food.



KENTON ROWE

SLIPPERY SURFACE A thick, woolly coat helps bison endure cold temperatures that would kill many other animals, but their hard hooves make it tough to negotiate icy conditions.

It would be nice, at least once in our lives, to spend winter somewhere warm.

Typically, rough-legged hawks show up around late October in valleys and prairies across the state. They're a ubiquitous winter raptor that Montanans see regularly during the cold months. Snowy owls are far less common. Their southern migration into Montana typically stops somewhere around U.S. Highway 2, a region infamous for bitter winters. According to Denver Holt, a snowy owl expert and founder of the Owl Research Institute near Charlo, the cold doesn't bother these birds, thanks to their extraordinary feather insulation. He describes their feathers as "second only to Adeline penguins for insulative value and comparable to arctic fox and Dall sheep for mammals."

Dave Carty is a frequent contributor to Montana Outdoors.

Just as hunger drives snowy owls and rough-legged hawks down from the Arctic, it pushes many ungulates down from the mountains. Elk and deer spend their summers in high-elevation areas where grasses are abundant and temperatures stay cool. When the snow flies, they head downhill into foothills and open valleys. Most congregate in open grasslands, where strong winds sweep the underlying grass free of snow. Julie Cunningham, FWP area wildlife biologist in Bozeman, says migrating elk move quickly when cold weather hits. "They don't dawdle; they pick up and go," she says. "We've had GPS collars taking locations every half hour, and what they show is there's not a lot of resting or stopping. Elk have a destination in mind. It could be 70 miles away, and they will just go until they get there."

Deep snow and bitter cold are major problems for wintering elk. Snow covers grass and hinders their movement, causing the animals to burn up precious calories as they wade through deep drifts. During severely cold winters, elk in open, windswept areas bed down in tight groups or move back up into dense timber, where conifers provide some insulation. Elk also seek south-facing mountainsides and sunny slopes, where they can stay as warm as possible.

As elk, deer, and other mountain species move down in elevation, dusky (blue) grouse, strangely enough, insist on doing the opposite. In early fall these timber birds forage along the edges of mountain meadows, stuffing themselves with grasshoppers, berries, and the leaves of wild strawberries and other forbs. When the thermometer drops and snow buries their foods, dusky grouse actually migrate farther uphill to high-elevation stands of Douglas-fir. There they spend winter feeding almost exclusively on conifer needles.

Ruffed grouse also must adapt when snow covers their foods. But instead of moving to higher elevations, they stick close to home and feed in trees on aspen and alder buds throughout the winter. At night, perhaps taking a cue from voles and deer mice, they burrow into the snow, using its natural insulation to stay warm. During dry winters when snow is sparse, ruffed grouse are forced to roost in conifers, which are much colder dwellings and expose them to raptors.

I sometimes wonder if, like me, those shivering ruffed grouse and other wild creatures ever consider joining migrating meadowlarks and mourning doves in September. It would sure be nice, at least once in our lives, to spend winter somewhere warm. 🐻

"TRUDGERY" Elk burn up precious calories plowing through deep snow in search of open, windswept areas where they can feed on exposed grass and bed down.



JUDY WANTULOK