WHEN THE SUN GOES DOWN

SHINING A LIGHT ON THE SECRETIVE NIGHTTIME HABITS OF MONTANA WILDLIFE

BY JULIE LUE

While walking downhill toward my trail camera, weaving my way around clumps of bluebunch wheatgrass, I try to lower my expectations. The device is trained on an old fox den at the forest edge, where ponderosa pines have overtaken the dry meadow. The burrow looks weedy and abandoned. The last time I checked my camera's SD card, I found over 700 images of squirrels and blowing branches.

But I hear things at night from my nearby house. Sometimes when exploring the surrounding hillside, I find the tracks or scat of many wildlife species, some of which I struggle to identify. And it seems that even when it's not occupied, the burrow serves as a stopping place for animals. White-tailed deer and raccoons pause to sniff the news, foxes and coyotes mark their territory, and owls descend from above to snag careless rodents.

As usual, I find hundreds of daytime photos of a red squirrel caching pinecones. But the handful of nighttime pics are what grab my attention. Some reveal just parts of a critter: a furry, triangular ear; the antlers of a whitetail buck; the huge, fluffy tail and delicate, black-edged hind legs of a red fox. One shot shows a coyote with its muscles bunched, ready to pounce, eyes glowing in the camera's LED.

Nothing too surprising this time, but I still appreciate the tiny, blurry window my trail camera has given me into the nighttime world of animals. Vignettes like these have helped spark my interest in learning more about what wildlife are up to when the lights go out—whether they're fast asleep, making a racket, or moving silently, unnoticed, through the darkness. ▸▸

LOGGING IN THE (AFTER) HOURS A trail camera flash illuminates two beavers gnawing on a Douglas fir in the Blackfoot River valley. Though mountain lions are also active at night, the rodents are less vulnerable to other predators like coyotes and wolves, which hunt mainly during the day.
PHOTO BY ALEX BADYAEV

SHIFT CHANGE

Like us, most birds and squirrels are diurnal, or active during the day. Other wildlife, such as deer and beavers, are mostly crepuscular, active primarily at twilight (early morning and late evening). Still others, like skunks and porcupines, are mainly nocturnal, out and about after the sun goes down. But very few species fit neatly into just one category. The activity patterns of animals can be influenced by weather, season, competition, food, offspring, and the presence of humans.

"There's no hard and fast rule," says Torrey Ritter, Montana Fish, Wildlife & Parks regional nongame wildlife biologist in Missoula. "I've even seen bats flying over Lake Como during the middle of the day."

In late evening, the active periods for many species overlap, providing a chance to see diurnal, crepuscular, and sometimes even nocturnal species at the same time (one reason wildlife watchers are often most successful just as the sun goes down). "This 'power hour' period—the hour before and after sunset—is when you'll see a ton of activity," Ritter says, "whether it's fish chasing other fish in the shallows, or hawks, coyotes, and foxes pursuing their prey."

As the light fades, daytime-adapted species need to find warmth and safety. Small birds, for instance, seek out floodplain junipers, clumps of mistletoe, or other thick growth in trees and shrubs for both thermal cover and concealment. "They pile into places like these, which are so dense a hawk or owl can't get in there," Ritter says. Birds don't sleep on their nests unless they have eggs or young, but many will use tree cavities for a nighttime roost. Tree squirrels also use cavities or take refuge in leafy or twiggy nests called dreys. Ground squirrels and marmots sleep underground.

After sunset, hawks and ospreys head for the treetops, taking advantage of a special talent shared with most other birds: They can sleep, perched, without falling over. If a bird's legs remain bent, its Achilles tendons keep its toes and claws tightly curled around a tree branch. When the legs straighten, the toes release.

Some birds also have the ability to let half their brain sleep at a time—in what's called unihemispheric slow-wave sleep—while keeping one eye open and maintaining enough alertness to fly, rest on the water, or keep watch. At night, hummingbirds can enter a state of torpor, like a mini hibernation, in which their body temperature decreases to save energy.

PREDATOR AND PREY Great-horned owls (above) and other owls feed mostly at night, when their sharp eyesight, acute hearing, and silent wings give them an advantage over wary prey species like wild turkeys (below). Active in daylight, wild turkeys sleep at night, roosting high in tall conifers.

SUPER SENSES

As the sun dips below the horizon in summer, nighthawks wheel through the sky, calling and booming. From their low perches in open country, common poorwills—relatives of the whip-poor-wills found in states to the east of Montana—whistle mournfully, *poorwillip*, and flutter up to snatch bugs from the air. On rivers, myotis bats swoop down to take a drink, and fish start to move into the shallows, relatively safe from aerial predators once ospreys and bald eagles retreat for the day.

Cooler evening temperatures provide a respite from summer heat for large, furry mammals like elk and bears, and small, easily dehydrated amphibians like western toads, which scramble out of their shaded daytime hideouts to patrol for bugs. Growing darkness brings out a banquet of prey species, including mice, voles, and moths and other insects. Short-eared owls hunt over open country. Deer are on the move, constantly alert to the threat of mountain lions, wolves, coyotes, and bears.

Just as they do during the day, animals spend the twilight and nighttime hours going about their business: finding food and mates, caring for their young, defending their territory, seeking shelter. But they need the ability to navigate their surroundings in dimmer light.

Most animals active after hours have better night vision than we do. Some have especially large eyes, with a higher proportion of photoreceptor cells called rods, which sense light, and a lower proportion of cone cells, which allow for color vision. Many species also have a special membrane at the back of the eye called a *tapetum lucidum*. Latin for "bright tapestry," this film reflects light back through the retina, producing better night vision, as well as the "eyeshine" we see reflected back from our headlamps or vehicle headlights at night.

Wildlife also depend heavily on their other senses. Rabbits and hares don't have a *tapetum lucidum*, but like many other creatures active at twilight, they use their keen hearing and senses of smell and touch to help them navigate. Sensitive whiskers—like those on rabbits, hares, dogs, cats, deer, and many other species—help guide animals around or through nearby objects they can't see. Even bats have whiskers, which supplement their vision and sonarlike echolocation, allowing them to locate prey in total darkness. All fish can sense movement in the water with the lateral line organ along each side of their body. The channel catfish's whiskerlike barbels and the burbot's single chin barbel are covered in taste buds, allowing those fish to find food in darkness or in murky water.

OUT THE CABIN WINDOW A northern flying squirrel leaps from tree to tree on a late winter night near Seeley Lake. Flying squirrels are nocturnal and especially active during their late-winter mating season.

SNAKES ALIVE Garter snakes and other reptiles often become nocturnal in summer. Because cold-blooded animals can't regulate their body temperature, they may overheat and die during hot summer days.

FROM TOP: KYRA MYCROFT; BILL KINNEY

FROM TOP: ALEX BADYAEV; NATHAN COOPER

SAFE SLEEPING

All living creatures need sleep, but sleep blunts the senses. Wildlife use many different strategies to meet their sleep needs while staying safe. Many animals are light sleepers or nappers, even "micro-nappers." For instance, to make up for lost nighttime sleep during spring and fall migration, Swainson's thrushes will periodically grab 10 seconds of sleep during the day.

Total sleep needs vary widely. Large predators, and animals like ground squirrels and bats that can retreat to safe shelter, tend to sleep more. Little brown bats can log 19 hours at a time.

Because they must remain alert for predators, hoofed mammals tend to sleep less. Deer clock about 4.5 hours of sleep in a 24-hour period. But they can't just bed down and sleep in one block. "Their daily and nightly life consists of cycles of feeding, ruminating, and sleeping," says Rebecca Mowry, an FWP wildlife biologist in Hamilton. Like other ruminants—including elk, moose, bighorn sheep, mountain goats, pronghorn, and bison—deer need to spend a lot of time eating and processing their food. After quickly filling up on grass or browse, they return to the dense forest or another safe place to regurgitate the vegetation and chew it again, converting the plant matter into a more digestible form, a process known as "rumination" or "chewing their cud." Often when deer are bedded down, they're not sleeping; they're ruminating.

Deer are also trying to avoid being eaten, which can lead to unpredictable schedules. "Their sleep patterns are highly variable depending upon food and habitat availability, prevailing weather patterns, and most importantly predation pressures," says Dr. Kerry Foresman, emeritus professor of wildlife biology at the University of Montana and author of *Mammals of Montana*. As a primary food source for many predators, deer "have developed a 'cat nap' strategy, resting or sleeping for short periods of time but always being vigilant," Foresman says.

Deer can be easily roused at any time, which Foresman notes is "obviously a survival strategy that has evolved in deer species because of this predation pressure. And it isn't lost even if the pressure decreases. Better to be safe than dead."

AT THE GROCERY STORE Two mountain lions prowl the Lolo National Forest in search of prey. The large carnivores are mostly nocturnal and usually not visible to people. But they often live in areas where whitetails and mulies are abundant. "If you've got deer, you've got cats, whether you know it or not," says one expert.

WARY AT SUNSET Deer, elk, and other ruminants emerge from cover at dusk to graze before heading back to safe bedding areas. There they can regurgitate the vegetation and chew it again, making the plant matter digestible, a process known as rumination.

FROM TOP: ZACK CLOTHIER; DUANE HUIE

QUIET NIGHT

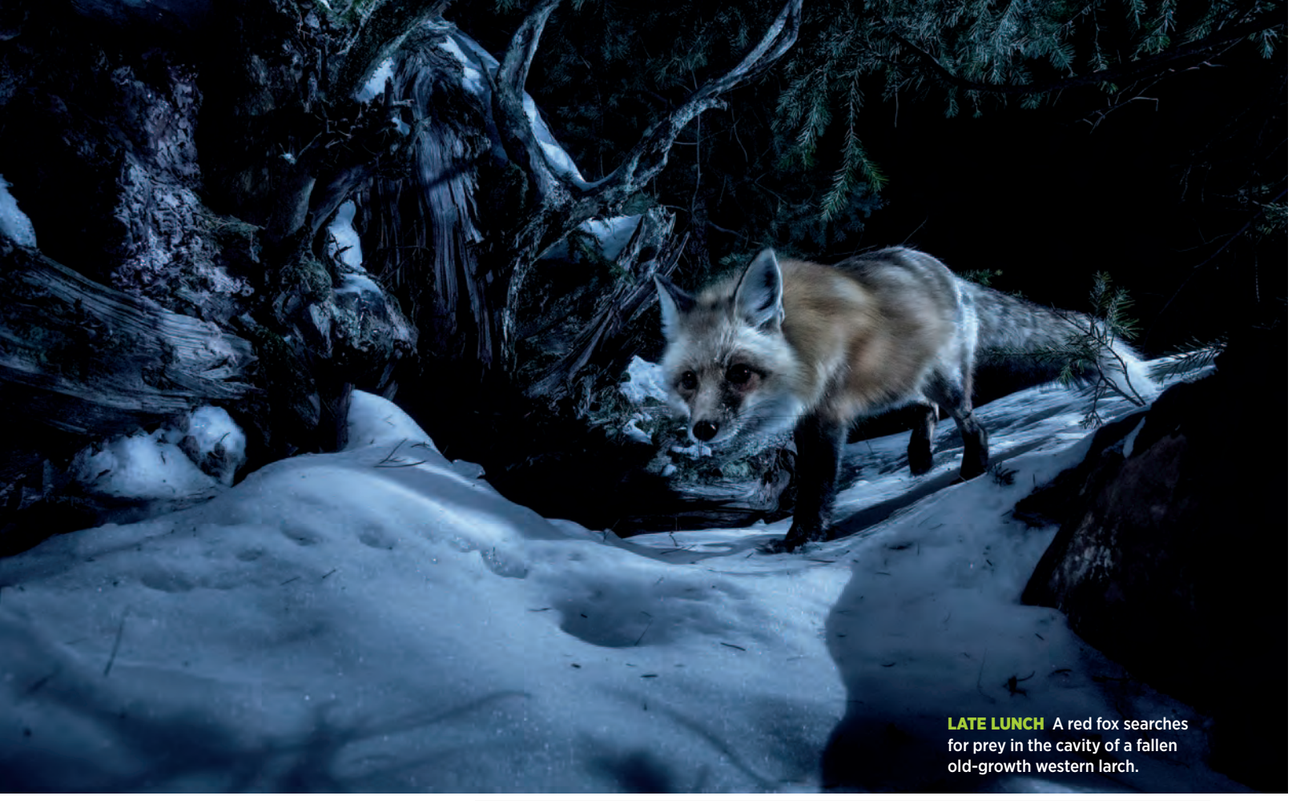
While others sleep, some critters move about so quietly they escape our notice.

In forests, big-eyed northern flying squirrels silently glide between tall trees. In mountains, tiny, lungless Coeur d'Alene salamanders leave rock crevices near seeps and springs, or their refuges behind waterfalls, to search for insects. Over fields and through forests, owls glide without a sound, the serrated leading edge of their softly feathered wings breaking up the turbulent air that typically creates a swooshing noise as birds fly. And nearly everywhere in Montana, mountain lions hunt.

Lions are experts at staying under the radar, according to Jim Williams, retired FWP regional director, large carnivore specialist, and the author of *Path of the Puma*. But wherever whitetails and mule deer live, mountain lions do, too. "If you've got deer, you've got cats, whether you know it or not," Williams says.

Mountain lions hunt mostly during low-light periods around dusk and dawn, at the same time that deer, young bighorn sheep, elk calves, and other favored prey move about. "They're active when their grocery store is active," Williams says. But the best cover for a stalk-and-ambush predator is complete darkness.

Mountain lions are visual predators. Their huge eyes and highly adjustable pupils allow them to see well at night. Quiet, secretive, and stealthy, mountain lions are a "perfect predatory machine," Williams says. And the big cats' ability to live their lives largely unnoticed by humans, often under cover of darkness, has allowed them to make an impressive comeback. According to Williams, "Cats are the only large carnivores on planet Earth that have reclaimed or are reclaiming



LATE LUNCH A red fox searches for prey in the cavity of a fallen old-growth western larch.

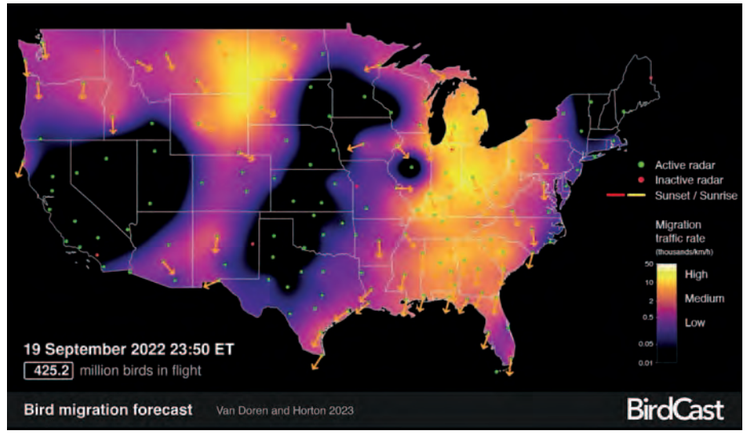
their historic habitat and distribution and range." People generally tolerate increased lion numbers as long as they stay out of sight, he adds, but when cats show themselves with tracks in the snow or on trail cams, "that's when FWP and other wildlife agencies start to get the frantic phone calls."

NIGHT FLIGHT

Some animals can be on the move at any time day or night. For instance, most birds that are active during the day actually migrate at night, using Earth's magnetic field and starlight to find their way. According to the World Migratory Bird Day website, most birds journey after dark to avoid daytime predators like hawks and falcons. Plus, cooler night air keeps them from overheating during their journey.

Unfortunately, urban and rural sprawl has greatly increased light pollution throughout the world. Studies show that artificial lighting can cause birds to become disoriented, making them more susceptible to exhaustion and collisions with power lines and buildings.

Lucky for us, scientists and dedicated birders record and identify nocturnal flight calls to help determine which species are migrating. And the analysis of weather radar data allows us to "see" waves of migration as the birds sweep over the land. You can track migrations at BirdCast.info—a project of the Cornell Lab, Colorado State University, and the University of Massachusetts Amherst.



WHERE BIRDS MIGRATE AT NIGHT Colorado State University and the Cornell Lab of Ornithology produce bird migration forecast maps that show predicted nocturnal migration (above) and live, real-time maps showing daily and nightly migration intensity. See both maps at BirdCast.info.

On a warm evening in mid-September, I find myself sitting in my yard after sunset. The night is quiet, and I can't see much of anything. But something amazing is happening overhead. When I open BirdCast on my phone, radar shows the first flickers of activity in Montana as flocks of birds begin their nocturnal flight. Hours later, migration will peak for the night with an estimated 13 million birds in flight over our state, heading south. As we sleep, the sky far above us will be filled with wings.

FROM TOP: ZACK CLOTHIER; BIRDCAST.INFO