



LOVELY, DARK, AND DEEP

Winters in West Virginia can be harsh, but some animals have an ingenious way of staying alive and well until spring. Hibernation isn't just a long naptime.

WRITTEN BY MIKENNA PIEROTTI

PHOTOGRAPHED BY STEVE SHALUTA PHOTOGRAPHY

It's late fall. And somewhere in West Virginia, in a thick stand of prickly pine and brush, a three-year-old black bear is carving out a den with her long claws. Her chosen site is under a massive fallen white pine. The tree rests at a 45-degree angle against the hillside, making for a perfect winter hiding place—dark and protected—just under the thick roots. Right now the weather is still mild. The sky is robin's egg-blue and foraging opportunities are plentiful. This bear ate her fill of acorns, hickory nuts, and black cherries just this morning. The red maples are on fire across the hills, and the air smells crisp. Instinctively this bear knows the food will soon run out. Winter is on its way. "In all of nature you have to feed to survive," says Jeff Hajenga, wildlife biologist with the wildlife diversity program, a unit of the West Virginia Division of Natural Resources (DNR). "In winter, animals either have to go where the food is, or they have to have a strategy that allows them to survive without it."

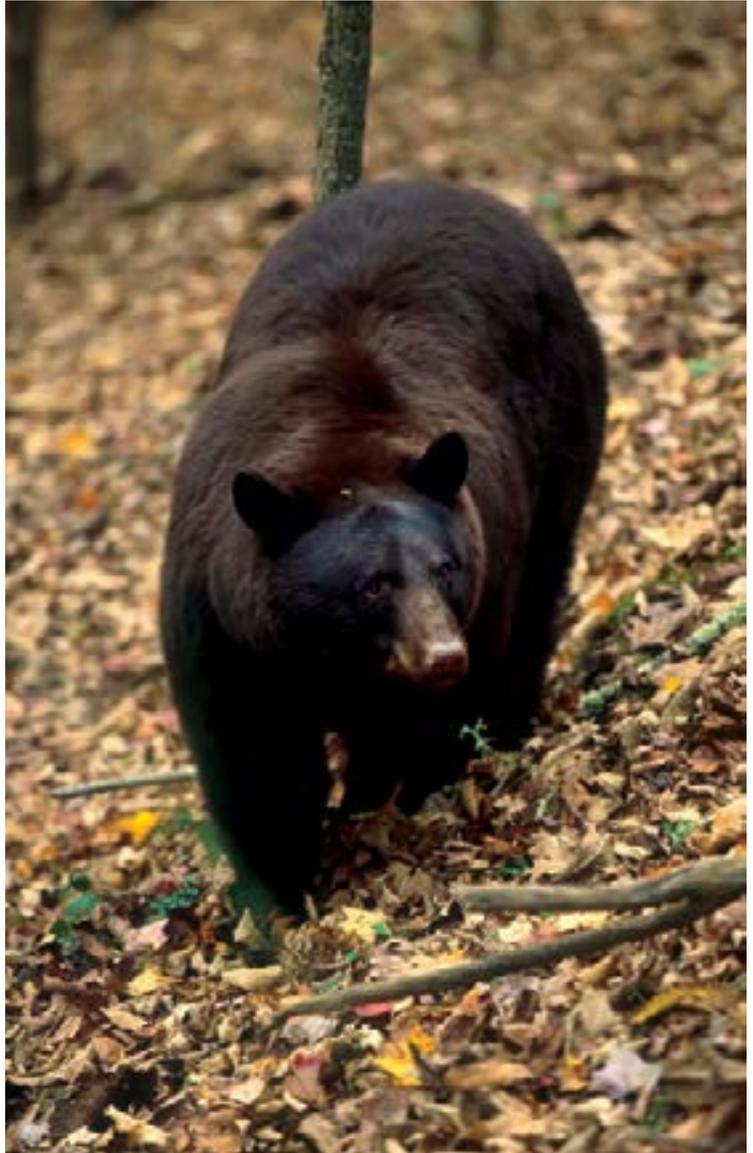
For the young black bear that means sleeping until spring or, if you want to get technical, hibernating—broadly defined as a period of specialized, seasonal dormancy characterized by a reduction in metabolism during times of scarce food and cold temperatures. Like many creatures—from frogs to little brown bats to chipmunks—bears can't easily escape winter's harsh reality. So sleep is the only alternative. "Anything that can't maintain its activity in winter conditions, or a species that's unable to leave or can't tough it out, has had to evolve another mechanism for survival," Hajenga says.

But hibernation isn't just sleep. These animals have actually learned to minimize their own biological needs by storing up body fat, hunkering down, and using just enough energy to stay alive through the winter. In West Virginia, the classic hibernators are small mammals like chipmunks, which overwinter in protected burrows and will drop their body temperatures for days at a time during the cold months, periodically raising their temperatures back up just

long enough to eat some of their stored food and expel body waste.

Other hibernators, like little brown bats, must find the perfect hibernating conditions before they can shut their eyes. But when they do, they can drop their body temperatures to near freezing, even decreasing their respiration to less than a single breath per minute, and live entirely on their stored fat reserves. To us this might seem extreme, but to a bat, it's just logic. "There are generally no insects in the winter," Hajenga says. "So the bats have to find conditions within certain caves and crevices that allow them to survive. They have to have certain moisture levels and certain temperatures. And different species will actually utilize different areas within the same cave depending on their needs. Some tolerate high humidity. Some need to be consistently drier and cooler," he says.

Cold-blooded creatures like snakes and amphibians, as well as insect species like ladybugs, also choose the big nap for their winter survival strategy. "They can't produce their own body heat, and the cooler they get



There are classic hibernators, like chipmunks, that sleep and wake all winter, feeding and eliminating waste when needed. And there are black bears, which have evolved mysterious mechanisms for survival that allow them to live entirely off fat reserves and recycle their own body waste.



In seasonal climates like West Virginia's, animals that can't fly to find food or can't tough it out must hibernate or die. Amphibians,

snakes, some bats, and chipmunks are some of the more common examples. Each has its own way of storing energy to live on

until the landscape thaws. Frogs and toads burrow in mud to stay alive, and bats slow their breathing and heart rates to nearly nothing.



Just because animals hibernate doesn't mean they are perfectly safe. Predators like hawks continue to feed on hibernators when they can find them.

the less active they get. The less active they are, the more susceptible to predation they become," Hajenga says. "They also become unable to find a consistent food source." This triggers amphibians like frogs to bury their bodies in the earth or silty bottoms of ponds and wait for spring. Thanks to high glucose levels in their blood and tissue, some frogs can even survive being completely frozen for a period of time.

Hibernation isn't without its risks, however. If an animal doesn't store up enough fat or food reserves, if it's woken up too often or too early, or if winter lasts too long, it might starve and never wake up—one big

reason not to explore caves and turn over rocks on your winter walk. And just because some critters chose to nap through winter doesn't mean every animal is asleep. Many predators stay wide-awake and hungry. "A lot of the food generalists—opossum, raccoon, skunks, hawks—any active winter critter, will continue to seek out prey animals. Hibernating ones are easier to catch because they don't really have any defenses," Hajenga says.

And the young black bear? She has one of the most creative ways of cheating a wintry death—one that still has scientists and researchers scratching their heads. Some have even argued bears aren't real hibernators because of their strange tactics. "True hibernators drop their body temperature to within a few degrees of ambient temperature, and they continue to urinate and defecate," says Colin Carpenter, black bear project leader at DNR. "Hibernating bears' body temperatures drop only about eight to 10 degrees, and they don't urinate, defecate, eat, or drink the entire period. Somehow they are able to recycle their body waste in a really interesting way." Bears are also light sleepers. They can be fairly easily roused during winter. "There's been a whole lot of research into how and why bears are able to do this, and it's still being done. But it's unique."

To survive winter, American black bears, West Virginia's only species of bear, first instinctively enter a stage called hyperphagia. "This is a period of eating constantly to gain as much weight as possible before they enter the den," Carpenter says. In most parts of the eastern United States, nuts, berries, and other foods flourish even into fall. And bears will gorge themselves on these dwindling

resources—putting on many pounds of fat a week—as well as plenty of water to cleanse their systems, until food runs out.

As frost settles over the valleys, about the time most of us are sipping hot apple cider and preparing for the holidays, bears are entering the next stage. Carpenter says this is when bears' bodies begin to prepare for the long sleep. They eat less but continue to drink, and everything begins to slow down, from their heart rates to their active time. "It's called the denning response. And all bears exhibit a similar response to lack of food," Carpenter says.

Bears head to their dens around the time we're



“
 ANYTHING THAT CAN'T
 MAINTAIN ITS ACTIVITY
 IN WINTER CONDITIONS,
 OR A SPECIES THAT'S
 UNABLE TO LEAVE OR
 CAN'T TOUGH IT OUT,
 HAS HAD TO EVOLVE
 ANOTHER MECHANISM
 FOR SURVIVAL.”

JEFF HAJENGA
 wildlife biologist
 West Virginia Division of Natural Resources

polishing off the last of the Thanksgiving turkey. They can stay there as long as 150 days. By the time the snow falls deep, the bears, bats, frogs, and many other animals are already curled up in their hideaways waiting for spring.

But wintertime in the wild world isn't all stillness and cold. At some point during the long dark months, many black bears are doing something pretty amazing—creating new life. In another unique bear ability, females can delay their own pregnancies, even while carrying fertilized eggs, until the right time within the hibernation process. If weather conditions are too extreme or if a bear wasn't able to build up her fat reserves well enough in summer and fall, she can even end her pregnancy altogether. “It's a reproductive strategy for them,” Carpenter says. But if all goes right, sometime in January, a pregnant bear will wake up just long enough to give birth to one or more cubs in her den and then go right back to sleep, waking only periodically after that to care for the newborns. The cubs will live off their mother's milk, staying warm beside her. By the time the spring sun returns and melts the last of the ice, a new generation of bears—and millions of other hibernating creatures—will be waking up and peering out at a whole new world. 🐾