



Black Bear

Ursus americanus

Bears have endured a paradoxical reputation for centuries. At once being associated with cuddly teddy bears and the helpful Smokey Bear, as well as a ferocious, blood-thirsty beast. As we learn more about their mind-boggling biology however, they may start to occupy a new niche in the popular mind - that of a natural marvel.

Back in Black.

Over the past century plus, the population of black bears in the northeast experienced a strong recovery as forests once again replaced pastures. Now, about 55,000 black bears - the vast majority in Maine (35,000) - inhabit the region, and their population is still rising in some areas.

Black bears are largely vegetarian, with as much as 90% of their food consisting of nuts, acorns, fruits, and vegetation. The other ten percent is mostly insects, some carrion, and the occasional hunted mammal or fish.

Hacking Hibernation

What on the surface would appear to be a simple question: "Do bears hibernate?" once elicited heated debates between otherwise civil biologists. But in recent years the view that the state of hibernation exists on a spectrum rather than as a binary yes-or-no condition is becoming more entrenched. That an animal the size of a black bear can even hibernate at all, and essentially at-will, is somewhat of an anomaly. Most animals that do so are rodent-sized and are weighed in ounces. A full-sized male black bear preparing to enter its winter den can weigh as much as a couple of NFL linebackers.

Bears, though not considered "deep" hibernators, are certainly highly efficient ones. Hibernation is commonly defined as a temporary reduction of metabolism that coincides with seasonal/environmental pressures of food scarcity and cold temperatures. That sounds deceptively simple, but the amount of harmonious physiological choreography needed to essentially shut down a creature as big as a bear is not easily explained. For months on end, black bears can abstain from eating, drinking water, and expunging waste. They are so efficient at nutrient recycling that urea, a urine waste product that is otherwise fatal at high levels to humans and most other animals, is internally broken down with the resulting nitrogen used to build protein. Even as they lose 30% of their body weight as fat reserves are burned, this protein lets bears keep muscle mass, strong bones, and healthy organ tissues.

The dramatic reduction in metabolic rate to 25% of the norm can happen because of a likewise drop in body temperature, heart rate, and respiration through the desolate winter months. When contrasted to an extreme end of the spectrum deep-hibernator like an Arctic ground

squirrel, changes in a bear's bodily processes are relatively minor. The squirrel's body temperature drops from 99°F to as low as 26°F, and their heartbeat plummets from 300 bpm to 3 or 4. A black bear's heart rate goes from about 45 bpm to 8, and its large mass means its body temperature cools slowly, with a relatively small 12°F drop to 88°F from the norm of 100°F. That said, a human being begins experiencing potentially fatal hypothermia at a mere 3.6°F drop in body temperature.

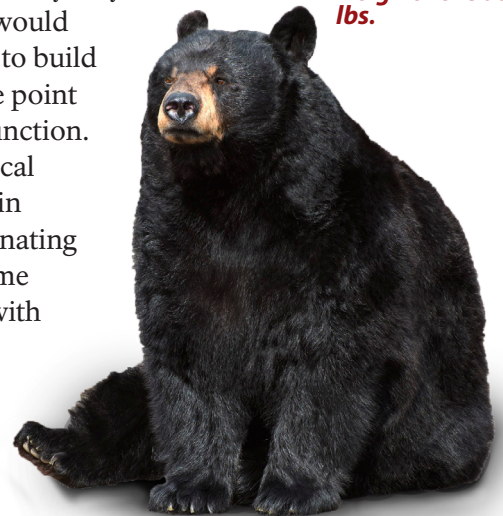
Depending on where a bear lives has a big impact on the length and depth of its hibernation. In the northernmost part of their range, hibernation has been known to last as long as 7 months during some especially lean years and a bear can be poked and prodded for several minutes before waking. Bears posting up in Florida or Mexico however may never take the big sleep and if they do, are easily aroused.

It is a common myth that female bears give birth while essentially asleep. They're not only awake during this time, but in the days before birthing, expectant mothers will often add bedding to the den by chewing materials into smaller pieces and arranging them just-so. After the 1 to 3 half-ounce to 1 lb cubs are born, she meticulously licks them clean, and provides warmth and mother's milk as they grow to about 5 lbs by the time they emerge in spring.

Wake up! It's Time to Sleep it Off.

Another misconception is that hibernation is just a really intense kind of sleep. Not so. As noted previously, during hibernation bodily functions are deeply suppressed, including brain activity which can be undetectable. Sleep, in contrast, is a resting state in which unconscious bodily functions are still performed and brain activity can be high. Research has shown that even the deepest hibernators must arouse periodically, perchance paradoxically, so that they may sleep. Not doing so would allow "tau" proteins to build up in the brain to the point where they impair function. It is not lost on medical science that, at least in some respects, hibernating bear brains share some striking similarities with the brains of people suffering from Alzheimer's and Parkinson's disease.

Black bears can weigh over 500 lbs.





Left to right: A habituated black bear tried breaking into this Vermont residence for food in 2022. Black bears are skilled tree climbers and often do so for shelter and food. This beech tree exhibits a "bear nest" where a bear pulled beechnut laden branches towards its perching spot near the tree trunk. Black bear climbing claw marks can persist on a beech tree trunk many years after the event.

When tau proteins build up in human brains, they form tangles that progressively get worse causing memories and motor function to diminish. Hibernating bears also experience a massive accumulation of tau in the brain (the proteins may help protect neurons during inactivity), but hibernating bears can quickly clear out the tau-tangles upon waking with their brains no worse for the wear, memories and motor skills firmly intact. Research is only at an early stage, but the goal is to one day provide human patients drug therapies that can flush out tau proteins in a similar fashion. Hacking hibernation may also reduce the harmful effects of numerous other human maladies. Heart attack and stroke victims can suffer severe brain damage from a catastrophic reduction in the supply of oxygen and nutrients to the brain. If doctors could put patients into a kind-of artificial hibernation within the first hour of a stroke, they could turn what normally is minutes to restore blood flow into weeks, allowing the brain ample time to heal before doing so.

Convalescing in a hospital bed for long periods due to injury or illness, human bones thin and muscles wither. But hibernating bears suffer no such losses. A study published in 2021 revealed that they can actually switch off the genes involved with bone breakdown. Medical science is looking into ways to manipulate the same genes in humans stop osteoporosis and bone deterioration resulting from inactivity and aging.

No talk of human hibernation would be complete without mentioning space travel. Sci-fi movies are rife with scenes of human hibernation-like suspension for long-distance space travel. NASA indeed is funding hibernation research that they hope can help astronauts on future missions by protecting them from everything from cabin fever and radiation, to preventing muscle and bone loss in prolonged zero gravity.

A Bloodhound Beatdown.

Bloodhound dogs are rightly revered for their keen sense of smell which is an impressive 300 times more sensitive than our own sad sniffer. A black bear's almost supernatural schnozz is at least 7 times more powerful than even a bloodhounds. As a family, bears are believed to have the keenest sense of smell of any land mammal, and perhaps even in the animal kingdom. It is so powerful in fact, there are some that claim we still

don't know it's true limitations. The distance any animal can smell potential food is greatly influenced by many variables, including wind speed/direction, humidity, and topography. But if conditions are just right, a hungry black bear can smell a feeder full of birdseed up to 2 miles away. Polar bears have been know to smell prey from over 20 miles away.

Living with Bears

Mounting pressures related to a warming climate and forest degradation mean that the future of bears in our region is an unknown commodity. Even as their population grows in some parts of the northeast, urbanization is concurrently encroaching on our ursine neighbors. Habitat loss is a big issue for black bears that are often travelling long distances to reach seasonal concentrations of natural foods. If droughts, floods, or extreme hot/cold temperatures limit the calories available from those wild foods, especially acorns and beech nuts in this region, it inevitably leads to more conflicts between people and bears. In fact 2020 saw the most bear-incidents yet recorded in the state of Vermont, and 2022 had the highest number of physical bear altercations with people and pets in one year.

Black bear sightings can be common this time of year. Mating season spans through June and July, which is also the time in which many juveniles are exploring new territories after being chased off by their mothers. These juveniles can be mischievously curious, and will continue exploring until they find good sources of food and shelter. This is why it is so important not to tempt hungry bears with easily accessible garbage and birdseed. The phrase "A fed bear is a dead bear" too often come true, as many bears that become habituated to human foods often end up in trouble by damaging property, getting hit by cars, or becoming more brazen/aggressive towards humans. Regional biologists recommend taking down bird feeders from March through December (landscape with bird-friendly plants instead), keeping garbage locked away in odor-containing areas, and putting compost in sealed black cylinders.

For More Information

-Get a bunch more tips on [living with black bears](#) from the Vermont Fish & Wildlife website.