

Arkansas Black Bears: Biology and Habits

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Description

The American black bear (*Ursus americanus*) is a bulky and husky mammal native to Arkansas (Figure 1). Adults are about 50 to 75 inches long from nose to rump and measure 35 to 48 inches at the shoulder when standing on all four feet. Black bears usually appear taller at the hips than at the shoulders. They can reach over 6 feet tall when standing erect. Male black bears are known to exceed 600 pounds. In Arkansas, adult males typically range from 130 to 300 pounds and adult females from 90 to 150 pounds. Their weights vary considerably within a single year and even between years, depending on food abundance.

American black bears occur in a variety of colors ranging from black to almost white. The black color phase is virtually the only one found in the eastern U.S. Black bears may occasionally have a white patch or "blaze" on the chest. Brown and cinnamon-colored black bears become increasingly common in the more variable, drier and mountainous habitats in the western U.S.

An interesting exception to this rule occurs in Arkansas. Approximately 23 percent of bears in the Ozark Mountains and 3 percent of bears in the Ouachita Mountains are brown or cinnamon-colored. Their ancestors were transplanted from Minnesota and Manitoba, Canada, into the Ozark and Ouachita Mountains between 1958 and 1968. Cinnamon and brown-colored black bears are fairly common in these areas.

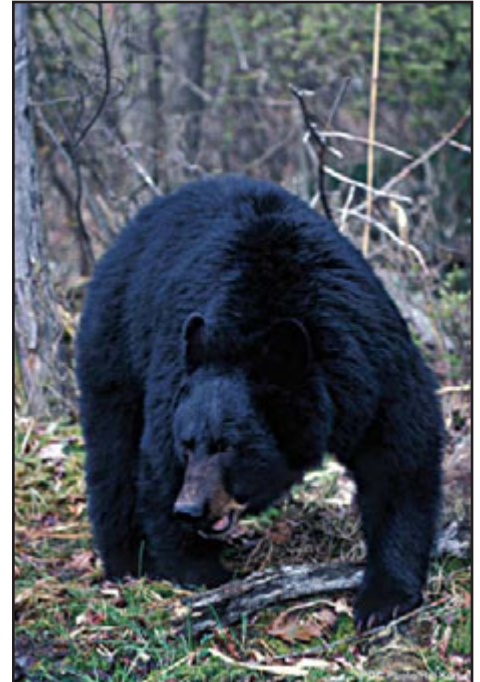


Figure 1. The American black bear is the most abundant bear in North America.
Photo by Hal Korber, Pennsylvania Game Commission

Adult black bears have a long muzzle with a straight facial profile. The ears are medium-sized, rounded and erect. They have short, inconspicuous tails. Black bears walk on the entire foot (called plantigrade locomotion) rather than on the toes as cats and dogs do (called digitigrade locomotion). Bears have good eyesight, excellent night vision, and recent research suggests that they see some colors. They have an excellent sense of smell. Frequently, a black bear will stand on its hind legs with its nose in the air to scent the wind. Under favorable atmospheric conditions, bears can detect carrion (dead animals), which they scavenge, from long distances away.

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Unlike those of the coyote or bobcat, the lips of black bears are free from the gums and can be manipulated with amazing dexterity. Combined with a long manipulative tongue, black bears can easily eat small berries and insects.

Each foot has five curved claws, which cannot be retracted. The claws are strong and are used for digging up roots and ripping open stumps and logs when searching for food. Black bear claws are curved for climbing, and each is about 1 3/4 inches long.

Black bears appear deceptively awkward and slow as they shuffle along the forest floor. However, their musculature is designed for massive strength and quickness; black bears can run up to 30 miles per hour, or about 44 feet per second, over short distances. For comparison, a world-class Olympic sprinter under ideal conditions can run only about 33 feet per second for very short distances. Bears are excellent swimmers and easily and routinely swim across rivers and small lakes.

Black bears are rarely vocal, but they do have several distinct calls. These calls include growls and huffs of anger, whining and sniffs of various sorts. Females may warn their cubs of danger with a “woof-woof-woof” and call the cubs back to them with whining or whimpering sounds. The cry of a bear cub is similar to that of a human baby.

Marking trees with claw and/or teeth marks is another means of communication between bears. Why bears mark trees, however, is not well understood by biologists, though there are numerous theories. Perhaps males mark trees to warn other males they are in the area, since most markings are made during the breeding season in late spring or early summer. Or a marked tree may announce the availability of a potential mate. They may be nothing more than the result of stretching and scratching.

Tree climbing is second nature to black bears. Cubs readily take to trees when frightened or alarmed. Black bears climb trees using a series of quick bounds, grasping the tree with their forepaws and pushing up with their hind legs. When descending a tree, they climb down rump first, sometimes jumping down the last 5 to 10 feet.

Unless bears are accompanied by cubs, it is virtually impossible to distinguish males from females (cubs will accompany the mother, not the father). Because male black bears are about 25 to 40 percent larger than females, one may be able to ascertain sex if both sexes are observed together to allow body size comparisons. Even then there is a good chance for error.

Aging black bears is also difficult, especially in the field. Black bears in captivity have lived for 25

to 30 years, but most bears in the wild rarely get older than 10 to 15 years old, especially in populations that are hunted. Biologists determine age by extracting a single tooth, usually the first lower premolar. After cutting a thin cross section from the root of the tooth, the tooth section is placed on a microscope slide, then stained. A biologist using a microscope counts tooth growth rings (called cementum annuli) to ascertain age, much like aging trees by counting their growth rings. The distance between 2 growth rings = 1 year.

In the field, one must rely on body size and shape to age bears. Cubs are easy to identify; their small size and playful behavior give them away. Subadults and adults are sometimes difficult to tell apart. Subadults are relatively long-legged, long-eared and gangly in appearance compared to adults. Adults appear short-legged, short-eared and rotund compared to subadults. Technically, subadults are 1.5 to 3.5 years old, do not accompany their mothers and are not yet sexually mature. Adults are sexually mature and are at least 3.5 to 4.5 years old. Interestingly, black bears in the northern and western U.S. may require 5.5 to 7.5 years or even longer before reaching sexual maturity.

Black bears are individualistic. Except when breeding or caring for young, they are normally solitary wanderers and exhibit individual patterns of behavior. Several researchers have reported two individual bears responding in opposite ways to the same situation.

Denning Behavior and Hibernation

Denning is an important activity for black bears. The duration of denning and den type vary among geographic regions and habitat types. Bears in southern latitudes generally den for shorter periods of time than bears in northern areas where winters are longer and more severe. Black bears in Arkansas den for approximately 100 days or so each winter. Bears in the bottomland hardwood forests of Arkansas, however, may den for 150 days or more during extensive seasonal flooding. They enter their dens in early January through mid-February and emerge in March and April.

Pregnant females usually den first and for a longer period of time than males and nonpregnant females. A suitable den site may be within a rock crevice (Figure 2), under a live or dead tree stump, brush pile or overturned log, or a bear may excavate nothing but a shallow depression on the forest floor. Black bears in bottomland hardwood habitats den in elevated tree cavities to escape their seasonally flooded environment. Most dens, regardless of den type, are only large enough to accommodate a bear when it is curled up to prevent heat loss.



Figure 2. Black bears den in rock crevices, especially in the Ozark and Ouachita Mountains. Photo by Arkansas Game and Fish Commission

Hibernation is probably essential to bear survival in areas where bears experience a scarcity of food, deep snow accumulation and low air temperatures. With adequate fat reserves, bears are capable of fasting for 6 months with only a slight reduction in body temperature. They do, however, exhibit a marked depression in heart rate and respiratory frequency. Decreased day length and inclement weather in autumn influence the onset of hibernation.

Biologists debate the use of the term “hibernation” for bears because the body temperatures of bears do not drop as low as most hibernators like woodchucks and ground squirrels during winter. Some hibernation researchers, however, consider bears to have adaptations that are superior to other hibernators, particularly in the areas of nitrogen and bone metabolism.

Bears are apparently unique in the animal kingdom in their ability to prevent toxic products from protein digestion from accumulating in their blood. Bears have unique biochemical pathways that rebuild protein, not allowing nitrogen-containing waste products, like urine that contains ammonia, to accumulate. Current evidence also suggests that the inactivity of winter sleep does not result in the breakdown of bone and the excretion of calcium as it does in other hibernators and in humans subjected to prolonged bed rest.

Recent studies of black bear physiology have shown that denned bears show some characteristics of true hibernators. Although body temperatures are only slightly lowered (8° to 12°F below regular body temperature during hibernation), heart rates are greatly reduced. Heart rates drop from 40 to 50 beats per minute to 8 to 12 beats per minute. Oxygen consumption drops by 50 percent or more. In addition, unlike many small mammal hibernators, bears do not have to eat or eliminate wastes during hibernation, but subsist entirely on fat reserves. Bears develop a fecal plug to seal off their digestive tract. A hibernating

black bear can be aroused if prodded sufficiently, which is an important adaptation for cub protection and defense or escape from predators.

With the coming of spring and warmer temperatures, bears emerge from their dens and search for food. During the winter they may have lost up to 30 percent of their predenning weight. Most bears continue to lose weight during early summer until about mid-June.

Bears that occur in regions with mild climates show a lesser degree of hibernation than bears in regions with harsh winter climates. During winter months in Arkansas, bears become lethargic, decrease their activity and sleep often. During warm winter days, some bears may wake up and wander around for short periods of time before denning again. Human disturbance of a den causes a bear to abandon it.

Reproduction

In Arkansas, mating occurs for about 8 weeks from mid-May to mid-July (Figure 3). Estrous, the period of time a female is receptive to a male and could get pregnant, lasts for about a month. A male isolates and defends a female in areas of low bear density; but in areas of high bear density, males and females may both be promiscuous. If a female is promiscuous, it is possible that her cubs (if she has more than one cub) could have different fathers. This is called multiple paternity and has only recently been discovered to occur in bears. Bears are thought to be induced or stimulatory ovulators, which means that the physical act of mating stimulates the female to release eggs from her ovaries.

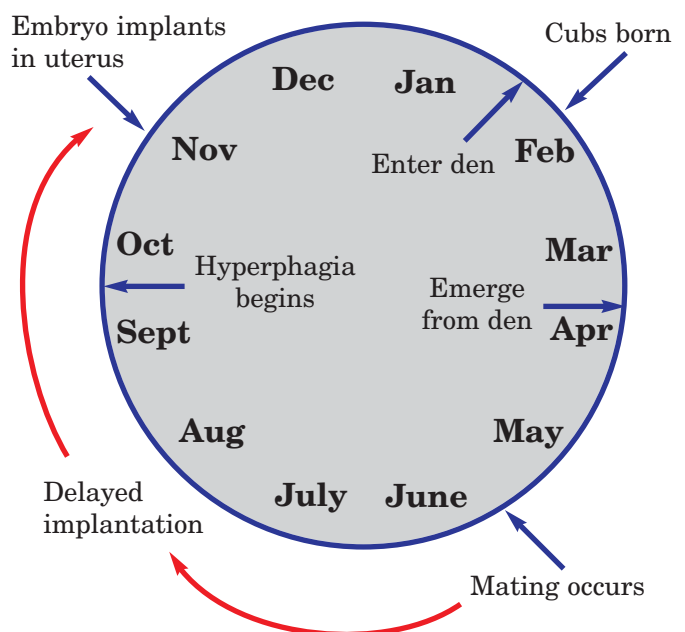


Figure 3. The annual cycle of reproduction and denning of black bears in Arkansas.

Although mating occurs in June or July, the fertilized eggs, called blastocysts, do not implant into the wall of the uterus immediately. The development of the embryo is delayed until November (Figure 3). The eggs will implant in November or December if the mother has deposited enough fat to sustain herself and her cub(s) through the winter denning period (Figure 3). If the mother is in poor physical condition, she will resorb the embryo(s), terminating her pregnancy. This reproductive process is called delayed implantation. Due to delayed implantation, the gestation period for black bears is approximately 230 days, or about 8 months.



Figure 4. Newborn black bear cubs are born with their eyes closed. Photo by Mark Bertram, U.S. Fish and Wildlife Service

Cubs are born in January and February, after only a couple of months in the uterus. The cubs are not well developed at birth; they weigh only about 12 ounces, are 8 inches long (about the weight and size of a can of soft drink) and their eyes are closed (Figure 4). Newborn cubs are covered with a fine, gray, down-like hair. The phrase “licked into shape” comes from an old belief that bears were born so soft and shapeless that their mothers had to lick them into the shape of a bear. Compared to other mammals, bear cubs are very small relative to their mother’s weight. For example, a female black bear weighing 150 pounds is 200 times heavier than her 12-ounce newborn cub. For comparison, a human female weighing 130 pounds is only 19 times heavier than her 7-pound newborn infant.

Why are bear cubs born so underdeveloped? Giving birth to such premature young enables the cubs to take advantage of their mother’s highly nutritious milk. Black bear milk is high in fat (about 30 percent on a dry weight basis). An 8-ounce glass of bear’s milk contains about 900 kcal. For comparison, an 8-ounce glass of whole cow’s milk or human milk contains about 600 kcal. During hibernation, adult bears burn only fat to fuel their metabolism. Since glucose (a simple sugar) is required for fetal growth,

fetal growth is hindered by the mother’s limited ability to make glucose from fat. This metabolic process may have been the determining factor in the birth of very immature young. A bear’s ability to convert fat into glucose is limited, but fat-rich milk is abundant. The sooner cubs are born, the sooner they have access to atmospheric oxygen that allows them to burn fat for growth instead of glucose.

Female black bears breed every other year at best and may skip an additional year if food conditions are poor. Females probably must have body fat levels of at least 15 to 20 percent of their total body weight in order to reproduce. Males and females usually reach sexual maturity at 3.5 to 4.5 years of age. First litters are not produced until a female is about 3.5 to 4.5 years of age. The young stay with their mother through the yearling year. Therefore, an adult female may only reproduce every 2 to 3 years. Two cubs are the normal litter size in Arkansas, although three or four cubs occasionally occur.

Cubs grow rapidly both before and after emergence from the den. Cubs are 2 pounds when they reach 6 weeks old, 5 pounds at 8 weeks and 35 to 50 pounds when 6 months old. Only about 50 percent of cubs born each year reach sexual maturity. The primary causes of cub mortality are other bears, especially adult males (cannibalism has been documented in bears) and humans.

Nutrition has been implicated as an important factor that may influence reproduction in black bears. Several biologists in several states have found that reproductive rates decline when mast crops are poor the previous fall. The age at which sexual maturity is reached, breeding intervals (the time between breeding events) and litter sizes are altered by nutritional factors.

Habitat Preferences

Good black bear habitat is characterized by relatively inaccessible terrain, thick understory vegetation, abundant sources of food in the form of shrub- or tree-borne soft and hard mast and adequate denning areas. Inaccessible, thick understory vegetation provides protection from poaching and other sources of harassment. Adequate denning areas contain a variety of den types, including dense vegetation, tree cavities, downed timber, brush piles and rock crevices. In Arkansas, black bears are predominately found in the oak-hickory forests of the Interior Highlands and on lowland hardwood and swamp sites in the Mississippi River Alluvial Plain (the Delta) (Figure 5). For additional information about bear habitat, see *Encountering Black Bears in Arkansas*, FSA9087.

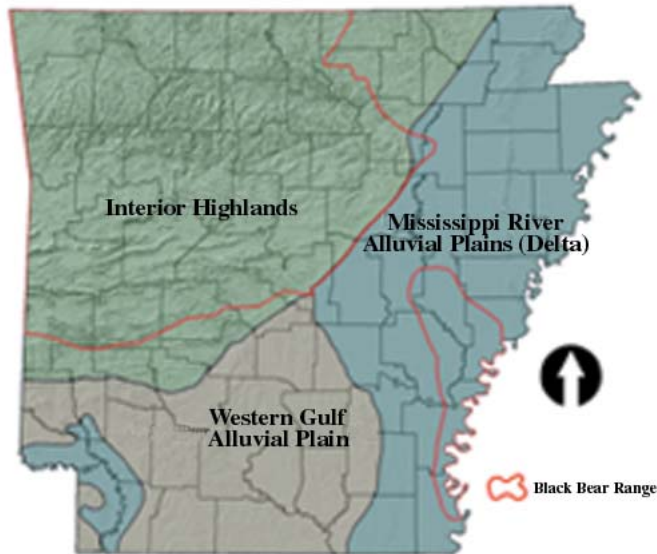


Figure 5. The physiographic regions of Arkansas and black bear range. *Paul Medley*

Food Habits

Black bears are omnivores, which means that they will eat almost anything. Grass and herbs make up the majority of their spring diet when these forages are young and succulent. Acorns and berries become important as the grasses dry out and mature in summer. Soft mast (berries) and hard mast (acorns) are particularly important to weight gain, an important process that prepares bears for winter (Figure 6). Insects and carrion may also be important if available. Bears drink frequently and are usually found in the vicinity of water.



Figure 6. Soft mast such as blackberries is an important summer and fall food for black bears in Arkansas. *Photo by John J. Mosesso, NBII.gov*

Although bears eat mostly vegetation, they don't digest it very well. The cells of many plants that bears eat are surrounded by a tough cell wall containing cellulose. Because of the kind of chemical bond that keeps the molecules of cellulose bound together, it is very difficult to digest, at least for most

vertebrates, including bears. Deer and cattle have solved the problem of cellulose digestion; they have multi-chambered stomachs that contain a soup of microorganisms that produce an enzyme that can break the chemical bonds in cellulose.

Bears, however, have simple, one-chambered stomachs that do not contain cellulose-digesting microorganisms. Then how can bears make a living eating mostly vegetation? They rely on new, actively growing plants as food in spring and early summer. Young, fast-growing, succulent grasses and forbs do not contain a lot of cellulose; therefore, they are much more digestible to a bear than are the same plants when mature.

Early growth plants are also nutritious. They can be as high as 20 to 30 percent protein on a dry-weight basis. As these plants mature, however, their protein content falls to as little as 3 to 4 percent. Young plants are adequate for maintenance of weight, but their high water content and limited caloric content are not very good at building the fat reserves that bears need to survive the winter when food is limited.

In late summer and early fall, a bear changes metabolically and increases its feeding efforts (a process called hyperphagia). Increased foraging produces weight gains of 1 to 2 pounds per day. Grasses and other plants have matured and dried by this time and are inadequate for fattening. High-energy foodstuffs must be available if fattening is to occur. Carrion is used but is in very limited supply. Acorns are a highly desirable fattening food for all bears in Arkansas. Other important bear foods in Arkansas include hickory nuts, blueberries, pokeberries and insects. Grasshoppers, crickets and insect larvae torn from logs are examples of insects eaten. Ants have a high-energy content and are occasionally eaten but require a lot of foraging effort. Black bears do not eat fire ants.

Home Range Size and Activity Patterns

Black bears are capable of traveling great distances. Biologists who have live-trapped and relocated bears 100 miles or more from their capture site have found that some bears are capable of returning to their original home range. It is unknown how bears find their way in areas they have never been before.

The activity patterns of black bears vary from area to area depending on a number of factors, including the level of human disturbance. In areas with low human activity, black bears are usually most active from dawn until dark, whereas bears in

areas with high human activity may be mainly nocturnal to avoid contact with people.

Meeting nutritional requirements has an important influence on bear movements. Bear home range size varies according to climate and annual food production. During years when food is abundant, home range size is smaller compared to years when food availability is poor.

The home ranges of adults frequently overlap. Adult males generally have home ranges two to four times larger than those of females. Several biologists have found that the home ranges of females are smaller when they have cubs but increase in size when the cubs become yearlings, presumably to meet increased nutritional requirements. Overall, black bear home range sizes in Arkansas vary from 5 to 30 square miles (Figure 7).



Figure 7. Areas bears occupy vary in size from 5 to 30 square miles, depending on habitat quality. Photo by Terry Spivey, U.S. Forest Service, Bugwood.org

Disease

Some black bears harbor parasites such as tapeworms and roundworms, but they seem to have little negative effect on black bears. In general, wild black bears have remarkably few internal or external parasites. Their solitary nature prevents spreading infectious diseases and parasites between bears compared to more social species like white-tailed deer or birds. Trichinosis, which is caused by a roundworm, can be present in bears and transferred to people who eat undercooked bear meat. All bear meat should be cooked until the juices run clear.

Threats to Black Bears

Biologists monitor the black bear population in Arkansas (Figure 8). A major threat to black bears in Arkansas is habitat destruction associated with human subdivisions and developments. Landowners can help reverse this trend by creating habitat for bears. Beneficial land management practices are reported in *Encountering Black Bears in Arkansas*, FSA9087.



Figure 8. Cub production is monitored by wildlife biologists using radio-telemetry; hibernating mother bears wearing radio-collars are located in their dens. Average litter size in Arkansas is two cubs. Photo printed with permission by Margie Peech.

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