WILD
ABOUT BEARS

An Educator's Guide
To New Mexico's Black Bears

Conservation Education Section
Project WILD
New Mexico Department of Game and Fish
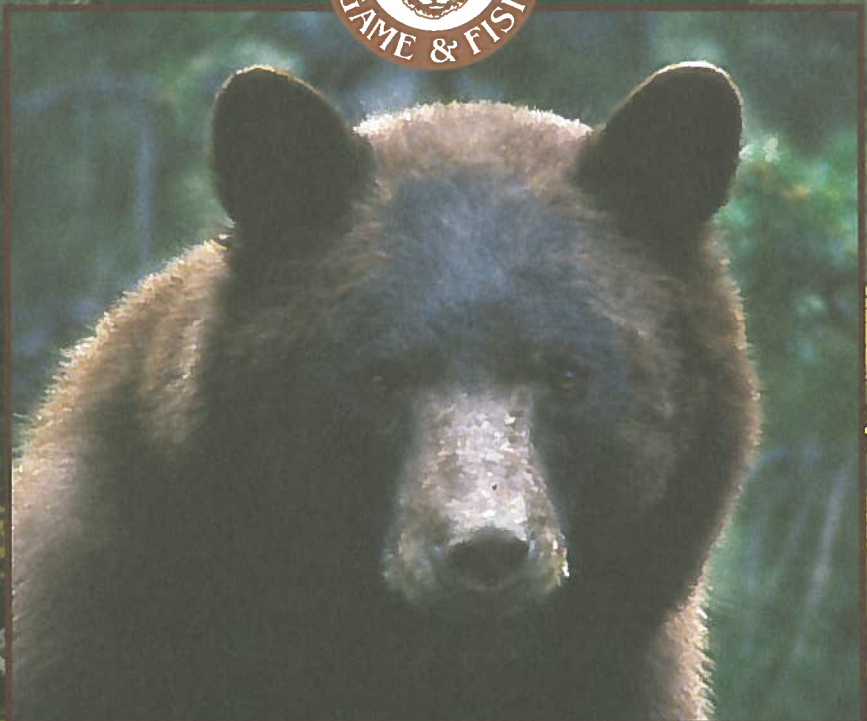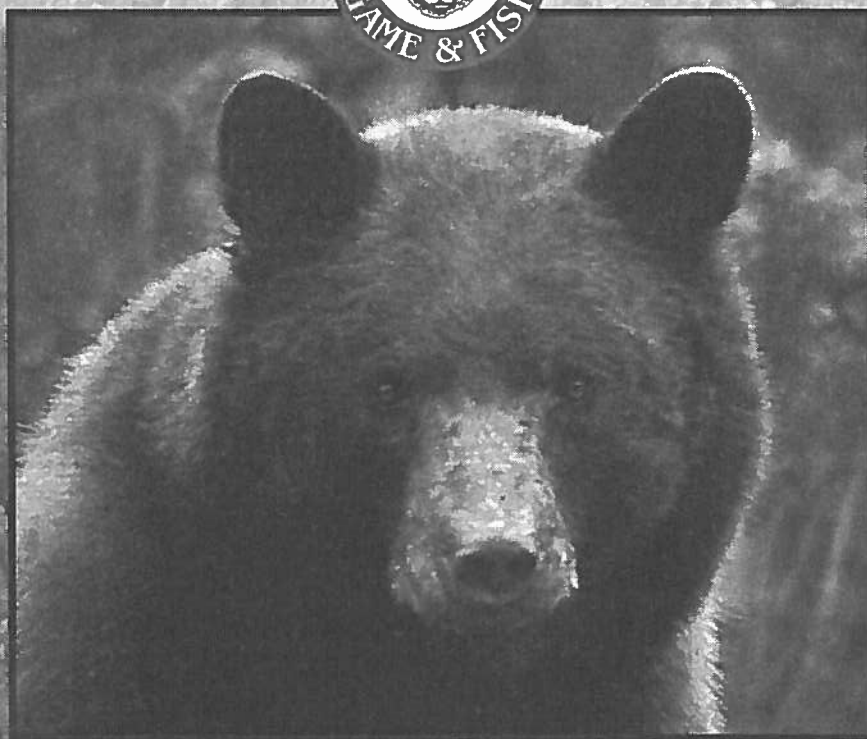
NEW MEXICO · GAME & FISH ·

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PREFACE

WILD About Bears: An Educator's Guide to New Mexico's Black Bears
introduces K–12 teachers to these magnificent animals. Workshops using
this guide are available for educators from the New Mexico Department
of Game and Fish. Background information is reviewed, activities are
conducted and educators experience how to integrate these activities
into the classroom. In addition, educators can order a Bear Education
trunk from the Department which contains supplemental material and
activity supplies such as bear hides, skulls, children's literature, etc.

This book is adapted with permission from the Idaho Department of Fish
and Game's *WILD About Bears: An Educator's Guide,* 1995. Both guides
share the same author and feature some of the same material and
background information. Activities were adapted, changed or replaced to
reflect New Mexico's bear biology and ecology. These two guides were
inspired by the international environmental education program, Project
WILD. We encourage you to find about Project WILD and other education
programs by contacting:

New Mexico Department of Game and Fish
Conservation Education Section
1 Wildlife Way
PO Box 25112
Santa Fe, NM 87504

505-476-8000
www.wildlife.state.nm.us

Enjoy learning about the black bears of New Mexico!

WILD
ABOUT BEARS

CONTENTS

NEW MEXICO's BLACK BEARS

Nearly everyone has a bear story to tell. In almost all cases, the bear was huge! Bear weight estimates of more than 400 pounds are common. Even bear researchers have a tough time judging the size of a bear. We often had contests to see who could come closest to guessing a bear's weight. Even though we had a good, long look at the bear and had weighed hundreds of bears before, we often over guessed by 50 pounds.

—John Beecham
***A Shadow in the Forest: Idaho's Black Bear***, 1994,
University of Idaho, Moscow

P eople who live in New Mexico are lucky to share their forests with black bears *(Ursus americanus)*. Bears are generally very wild, secretive animals that will run from you if they see you. Most of the time you will never know they are there. Only if they become food-conditioned and associate people with food do they become nuisances. This happens when people carelessly leave garbage, pet food, or bird feeders accessible to bears.

If a bear loses its fear of humans in this situation, it often loses its life because it must be killed before it hurts someone.

How big is a bear? The size of a bear depends on who you talk to, but you can be sure that a bear is rarely as huge as we think it is. Researchers who study black bears say bears usually weigh half what people estimate. So that 400-pound (180 kg) bear someone saw probably weighed less than a college football player.

HOW BIG IS A BEAR?
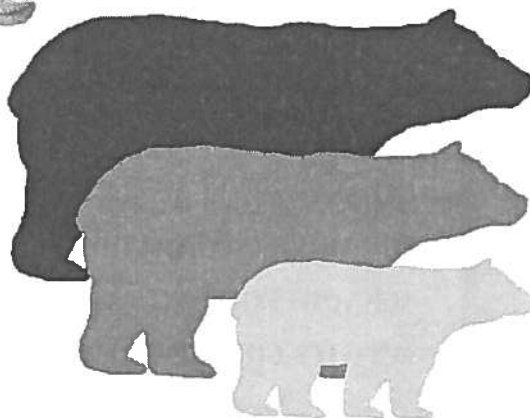
NEWBORNS
eight ounces (0.23 kg) = only 1/2 lb., the weight of 2 sticks of butter

CUBS
5–30 pounds (2.3–13.5 kg)

ONE-YEAR-OLD BEARS
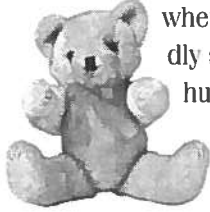25–100 pounds (11.3–45 kg)

MATURE FEMALES (4 + YEARS)
90–235 pounds (40.5–105.8 kg); average is 130 pounds (58.5 kg)

MATURE MALES (4 + YEARS)
150–500 pounds (67.5–225 kg); average is 250 pounds (112.5 kg)

Massiveness is not the only myth about bears. We see them every-where depicted as cud-dly stuffed toys, as humanlike characters in fairy tales and cartoons, and as ferocious beasts. But few people ever see the real thing; a beautiful, playful, shy ani-mal that is far from either its cute toy image or its human-killing myth. A bear's character is actually some-thing like a house cat crossed with a raccoon.

In New Mexico, you are more likely to see a black bear that is brown than a black bear that is black. Black bears that live in the western states are often various shades of brown, similar to grizzly bears. Eastern bears are usually black. Black bears also come in white (the Kermode bear or Spirit bear of coastal British Columbia) and a sil-ver gray that looks blue (the glacier bear of west-central British Colum-bia and southeastern Alaska). ▮
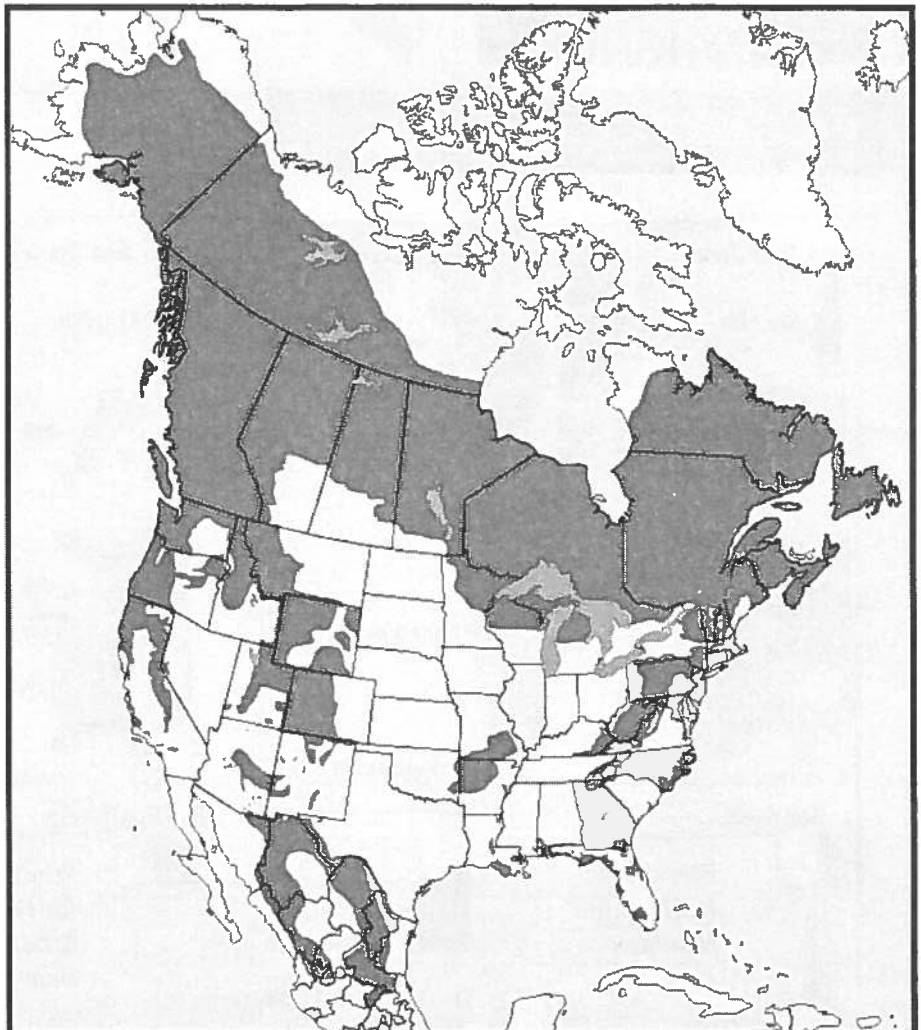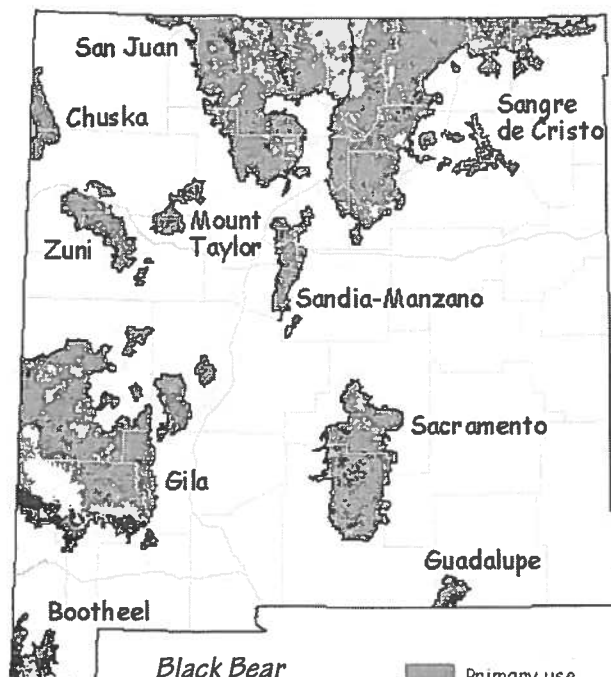

BEARS OF NORTH AMERICA

Black bears or their relatives live on most continents, but not Africa, Australia, and Antarctica. Approximately 630,000–725,000 American black bears live in 32 states. They also inhabit 11 Canadian provinces and Mexico. Grizzly bears (also known as brown bears) and polar bears also inhabit North America.
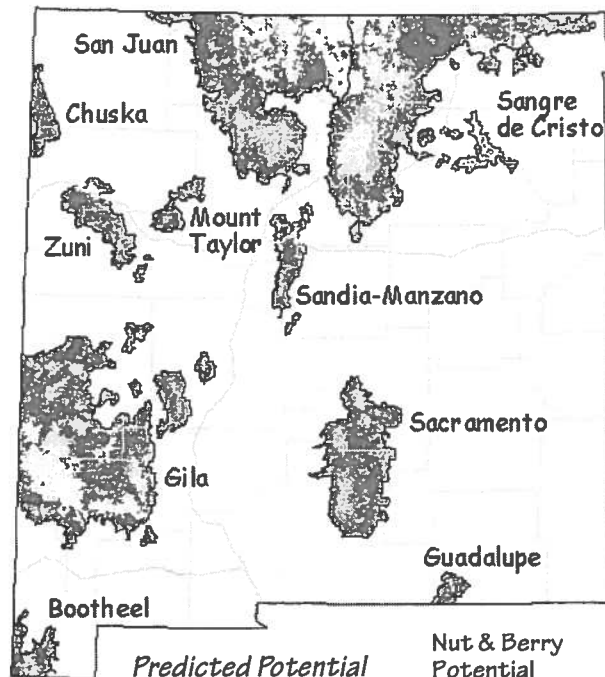
SOLITARY SHADOWS

WHERE ARE THE BEARS?

Black Bear Habitat in New Mexico

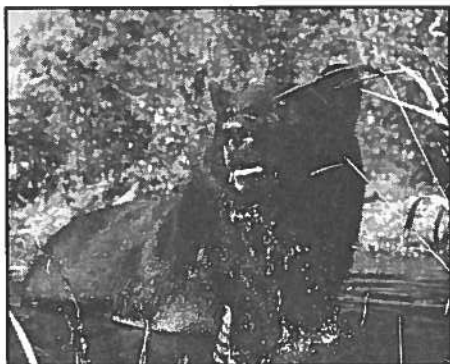N

Primary use
Secondary use
Edge use

0 50 100 Kilometers

Predicted Potential for Producing Nuts & Berries in Black Bear Habitat

Nut & Berry Potential
High
Low
None

Maps labeled with: San Juan, Chuska, Sangre de Cristo, Zuni, Mount Taylor, Sandia-Manzano, Sacramento, Gila, Guadalupe, Bootheel

Bears readily take to the water to cool off in hot weather.

New Mexico's black bears are creatures of the forest. Camouflaged by its brown or black fur, a black bear easily fades into the shadows. It can move quietly on its soft, broad foot pads. Being able to navigate the forest quietly and unseen helps a bear avoid other bears as it searches for food. This camouflaged coloration and its habit of staying in thickly forested areas also aided the black bear in avoiding grizzly bears in the past. Grizzly bears are the black bear's only real predator in the lower 48. Grizzly bears once roamed the higher mountainous areas of New Mexico but were eliminated before protective game laws were passed. If a young bear accidentally encounters a large adult male, who could consider the youngster a competitor, the younger animal needs to retreat before being detected. Male black bears will occasionally kill and eat other males in their home range. If necessary, bears can run 30–40 miles per hour (48–64 kilometers per hour/kph) or paddle across a lake.

In the forest, bears rely on their acute hearing and super sense of smell to gather information. Their noses perceive smells much fainter

The black bear is New Mexico's state mammal. It is also the symbol of the State Game and Fish Department.

THE BEAR TRUTH

Bears can see very well and in color.

A bear sometimes stands upright to see or smell scents carried by the wind—not to be aggressive. It rarely walks on its hind legs.

Black bears can run up to 30–40 miles per hour (48–64 kph)—much faster than humans.

They seldom enter campgrounds where humans are present—unless careless campers leave food or garbage available.

Bears who live far from humans are most active in the morning and early evening. Bears who live near humans prefer to avoid humans and are often more active at night.

Black bears are beautiful creatures, but they are not lovable, friendly animals that we should approach in the wild.

Bears rarely attack people, but serious injuries and fatalities have occurred. People who enjoy the outdoors are far more likely to be killed or seriously injured by lightning or hypothermia.

than humans can detect. With this super sense of smell, they can detect other animals that are nearby, and they can find fruit, insect larvae, and other foods.

Bears can also see what goes on around them, probably as well as humans can. They observe moving objects better than stationary objects, which helps them hunt. And their sharp color vision helps them find lots of food on the ground. Although their night vision is also excellent, bears usually forage for fruit during the day when they can better perceive colors.

LOOKING FOR FOOD

Acorns from the gambel oak are very important food sources for black bears.

WHAT BLACK BEARS EAT

- Grasses and sedges
- Forbs (broad-leaved plants) and shrubs such as the New Mexico locust
- Mushrooms and bear corn
- Elk calves, deer fawns
- Ground squirrels and other small rodents
- Ants, wasps, bees (adults and larvae) and honey
- Carrion
- Prickly pear fruit and mesquite seed pods
- Nuts! Especially acorns and piñon nuts
- Berries! Juniper berries, gooseberry, chokecherry, and hawthorn berry are favorites.

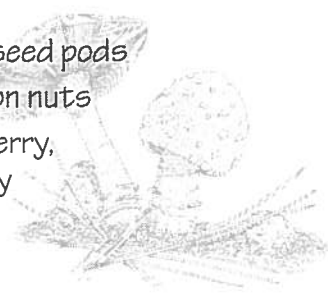Bears can feed during all times of the day or night. In the spring and summer, they seem to prefer the hours around dawn and dusk. During autumn, though, they eat constantly day and night.

Bears will eat an amazing variety of food. Although they are often portrayed as ferocious carnivores, bears are in practice *omnivores*—they eat both meat and plants. Many studies have shown that vegetation often makes up more than 70 percent of a bear's yearly diet. Black bears can digest plant fibers better than other meat-eaters, but they do not possess the efficient multi-chambered stomachs of elk and other herbivores. For this reason, they must eat a lot of plants to obtain enough nutrition.

In spring, bears search for newly emerged grasses and forbs (broad-leaved plants), and the carcasses of animals that died during the winter. To conserve energy, they rest a lot. In late spring, though, bears may look for newborn deer and elk. Although many people believe that fawns and calves have no scent, they probably have a faint odor. Humans are not able to detect it, but bears, with their super sense of smell, can pick it up.

During summer, plants are no longer as easy to digest. Instead, bears maintain themselves by consuming

other animals. Contrary to popular portrayal, bears seldom hunt or chase big animals. They might occasionally catch a ground squirrel or other rodent. But the bulk of their animal diet consists of ants, wasps, and other insects. Bears use their teeth and curved front claws to rip open a log full of swarming ants or a nest of yellow jackets, or to dig up an anthill and lap up the insects by the hundreds.

Late in the summer and into the fall, bears' rate of feeding increases as berries and acorns ripen. With its curved claws, a black bear can climb trees to get to nuts and fruits that deer cannot reach. It will also spend hours delicately plucking berries from a bush. It does not have dexterous fingers as humans have to pluck fruit. Instead, it uses its flexible lips. A bear's lips can bend and grasp much the way a monkey's prehensile tail can grasp a limb. With these quasi-prehensile lips, a bear can grasp berries one by one. By eating the most when the best quality food is available and by foraging up to 23 hours a day, bears quickly fatten up for their coming hibernation.

Nuts—mostly acorns and some piñon nuts—provide bears with vital nutrition. During a good acorn year, bears thrive. But if the crop fails, as it does periodically, bears may have difficulty finding enough food. Near the town of Reserve, for example, if all the acorn crops fail, bears may have to depend on juniper berries. The berries aren't as fattening as the acorns, so the bears will have to eat much, much more. Near Cimarron,

bears don't have an effective replacement for acorns. If the nut crop fails, bears will have a tough time building up their reserves for the winter. If they don't have enough food to eat in the late summer and fall, their chances of surviving the following spring and summer are reduced. Nut crop failures, especially of acorns and junipers, have a significant negative effect on female bears' ability to produce young the following winter.

People who portray bears as roly-poly butterballs haven't seen a scrawny bear emerging from its den in the spring. During hibernation, a black bear may lose 30–50 percent of its fat reserves. This weight loss continues in the spring and summer because food is scarce. During the fall, when nuts are ripe, bears may finally begin gaining weight again. They repeat the same pattern annually, gaining weight in the fall, then losing it in the winter, spring, and summer. Females that are rearing cubs may lose weight the entire year that they are nursing their young. ■
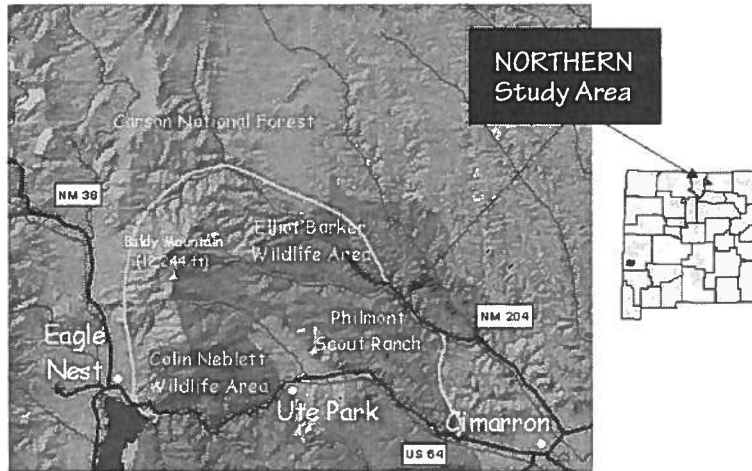

© Lynn Rogers

In late summer when berries ripen, bears will eat almost non-stop to put on the body fat they will need to survive the long winter.

HOME ALONE

STUDY AREA FOR NEW MEXICO BLACK BEAR RESEARCH

NORTHERN Study Area

Carson National Forest

NM 38

Baldy Mountain (12,441 ft)

Elliot Barker Wildlife Area

Eagle Nest

Colin Neblett Wildlife Area

Philmont Scout Ranch

NM 204

Ute Park

Cimarron

US 64

NM 12

Reserve

Eagle Peak

US 180

Gila National Forest

Bearwallow Mountain (9,954 ft)

Mogollon

SOUTHERN Study Area

NM 159

Glenwood

0   10   20 Kilometers

N

Much of the information we have about NM black bears comes from research conducted by the Department and Hornocker Wildlife Institute in these two study areas. From 1992–2000 they captured 300 bears 517 times, observed 339 bears in dens on 680 occasions, and placed radio transmitters on 316 bears.

Because bears have to eat so much, they need lots of room to search for their food and not much competition with other animals. Bear biologists theorize that this is why bears usually live alone, unless they have cubs.

In areas where food supplies are limited, bear home ranges tend to be large and have loose boundaries. Using radio telemetry, researchers have documented bears traveling as far as 85 air miles (136 km) from their point of capture. Female bears occupy home ranges that often overlap with other females. Male ranges generally are larger than female ranges and will include the ranges of several females. This arrangement usually increases the opportunity for a male bear to mate with more than one female.

Bears have a definite social system for those times when they congregate around rich food sources. As with other large and powerful animals, social order allows bears of differing age, sex, and strength to feed closely without erupting into violent battles. Roaring or raising hackles is often all it takes for an adult bear to establish its dominance.

Bears also communicate with vocalizations and with scent. A bear might stand and rub its back, shoulder, and head on a tree to leave a fragrant message that tells other bears, "I've been here," or "I'm ready to mate."

HOME RANGES OF NEW MEXICO'S BLACK BEARS

NORTHERN Study Area

Females

Males

10   0   10

SOUTHERN Study Area

Females

Males

N
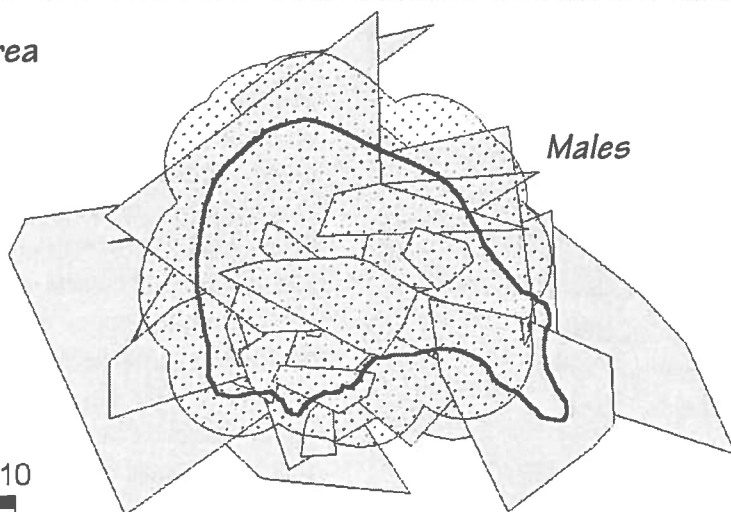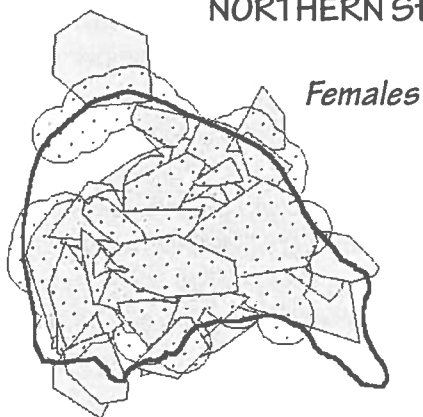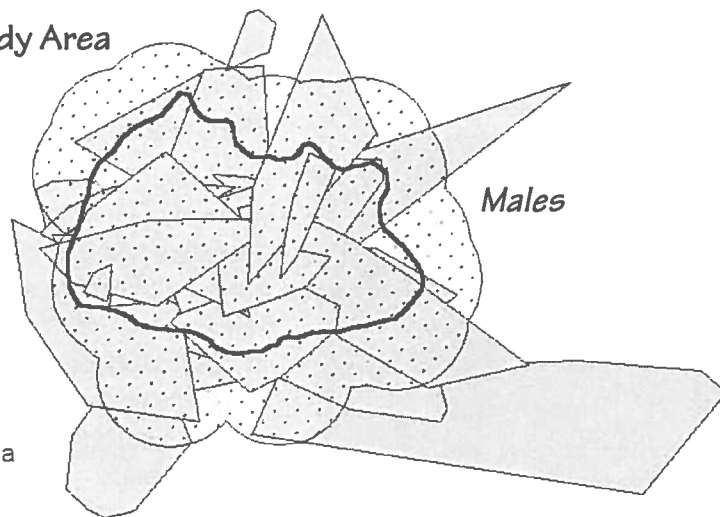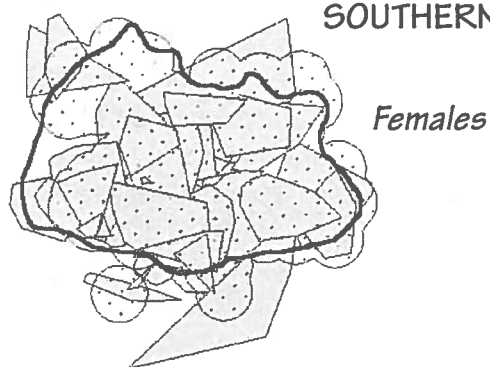
☐ Study area boundary
⬚ Effective sampling area
◇ Primary home ranges

BEAR "TALK"

Cubs talk more than adults:

- Squall in distress
- Whine when approaching their mother
- Hum when nursing or warm
- Make a fast scratching noise when going up a tree

Bears of all ages:

- Bawl when in pain
- Moan, huff, blow if afraid
- Bellow in combat
- Grunt to greet each other
- Huff, chomp jaws if threatened
- Swing their heads from side to side if afraid
- Turn their bodies sideways to you if afraid

BLACK BEAR NAMES

Scientific Name:
Ursus americanus

Common Names:
Baby: **CUB**
Female: **SOW**
Male: **BOAR**

Bear biologists remind us, though, that bears are not closely related to pigs!

Closer relatives are dogs and wolves.

Black bear cubs just out of the den are naturally curious about their new world, but they need to stick close by their mother.

Female black bears become sexually mature when they are large enough and strong enough to withstand pregnancy. They reach that size, about 100 pounds (45 kg), faster if they eat more nutritious food. A bear's food in New Mexico is usually a healthy mix of insects, acorns, and berries, but it's not as abundant as the diet of fruit, nuts, and plants available to bears in the eastern United States or on the West Coast. That's why black bears in New Mexico begin mating at a later age and have fewer cubs than eastern bears. Beginning when they are four to six years old, female bears will usually mate every two to three years, and produce one to three cubs.

Mating season occurs in May and June (and may extend into August), but not all bears participate. Females with new cubs won't be part of this event because they must devote all their energy and time to finding enough food for their family. Yearlings and 2- or 3-year-old bears also will be out of the action. And not all of the mature males will find a mate. Generally, the younger males lose out to the bigger and more aggressive older males.

Although bears mate in the spring, cubs are not born until the following winter. Biologists theorize that a fertilized egg undergoes *delayed implantation;* it won't begin developing until late fall or early winter when the female bear enters her den. Even then, the egg will implant on the uterine wall and develop only if the bear has enough fat reserves to ensure her survival through the winter.

As the female bear settles into her winter sleep, her own energy needs decline and her stored resources go toward nurturing the embryo. She gives birth to cubs in late January or early February, waking long enough to clean them and guide them to her nipples. The cubs are helpless when born, their eyes are closed, and their thin fur is not enough to keep them warm. On the average they weigh 8 ounces. For humans an 8-pound baby at birth is about 7 percent of the weight of a 120-pound mother. A newborn bear cub is just a fraction of 1 percent of the mother bear's weight! If they snuggle close against their mother's belly, they will find warmth and plenty of her high-fat milk to drink. For the next few months, they grow in this dark, cozy place.
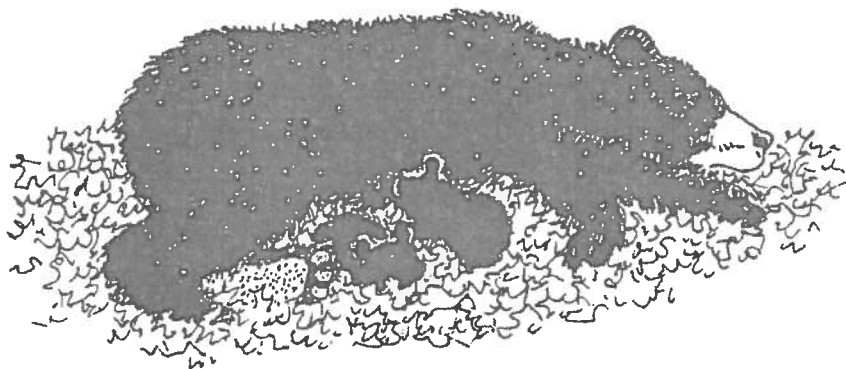
When a cub greets the outside world in late April or early May, it weighs 4 to 10 pounds (1.8 to 4.5 kg) and is usually strong enough to climb trees. It still cannot outrun predators, and so stays close to its mother for the first few weeks. Cecily Costello, who studied New Mexico bears, says, "If a mother bear senses danger, she will make vocalizations to the cubs to tell them to climb a tree. Once up the tree, the cubs stay very still and quiet. This happens even a few days outside of the den."

As the cub explores this bright new world, it begins to sample the same plants and other solid food that its mother eats. But the cub will depend on mother's milk throughout the summer to help it grow strong and ready for winter hibernation. When the time comes to den, the cubs will usually den with their mother the first year.

How big is a bear den? Big enough for the bear! A young, single female's den is probably smaller than a big, old male bear's sleeping quarters. And a middle-aged female with a couple of yearling cubs will dig a den large enough to hold the family. Whatever their age or size, bears might dig a den in a hillside under rock or under a tree, or they might find a spot inside a hollow tree, log, or natural rock cavity. They might even expand an old coyote or badger den. Wherever a bear makes its winter home, it usually lines the den with soft brush, grass, and the thickly-needled branches of evergreen trees. ■

These cubs are in their second spring with their mother but will likely be on their own by summer.
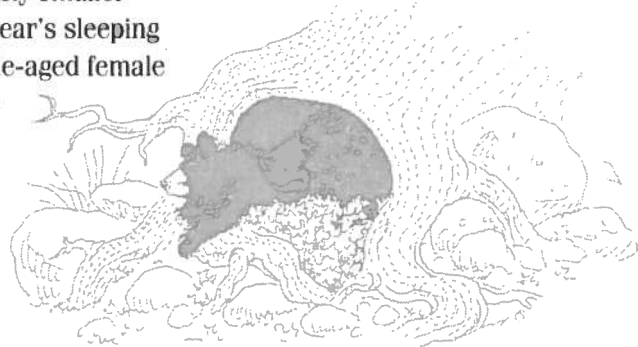
WINTER SLEEP

Depending on where they live, most American black bears go into dens for at least part of the winter. Hibernation lets them remain in places where food is scarce or seasonal, instead of migrating as animals such as elk do. It also benefits pregnant females in conserving energy and nurturing helpless newborns. For this reason, female black bears hibernate for part of the winter wherever they live. Males might not hibernate at all if they live in warm, food-rich areas such as California, North Carolina, Louisiana

Black bears often line their dens with grass and other soft vegetation to smooth out the bumps and keep them warm.

or Mexico. Some male bears in New Mexico's southern areas may not den either. It has also been shown that food-conditioned male bears in some areas may not hibernate if food resources are available year around, such as in the Lake Tahoe Basin in California and Nevada.

Contrary to popular belief, weather does not seem to affect the time that bears go into their dens. They are just as likely to begin hibernating on a warm December day as during a blizzard. What does appear to affect their timing is food. If food is scarce, bears might den earlier. If food is abundant, they might delay denning so they can continue feeding.

When a bear hibernates, it goes into a state that alternates between deep sleep and a groggy sleep. Its metabolic rate slows to help conserve energy. The respiration rate, heart rate, and body temperature also decline. A bear's respiration rate may drop to as low as eight breaths per minute. However, its body temperature does not drop as low as other, smaller hibernators because of its larger body size. Another difference is that bears do not have to wake up and feed on stored food like other smaller hibernators do. They rely on their fat reserves for all their energy.

New Mexico's black bears begin moving to their dens in mid October and may sleep for 4–6 months. In general, male black bears are the last to hibernate and the first to emerge in the spring. Females with new cubs are the last to emerge from their winter homes.
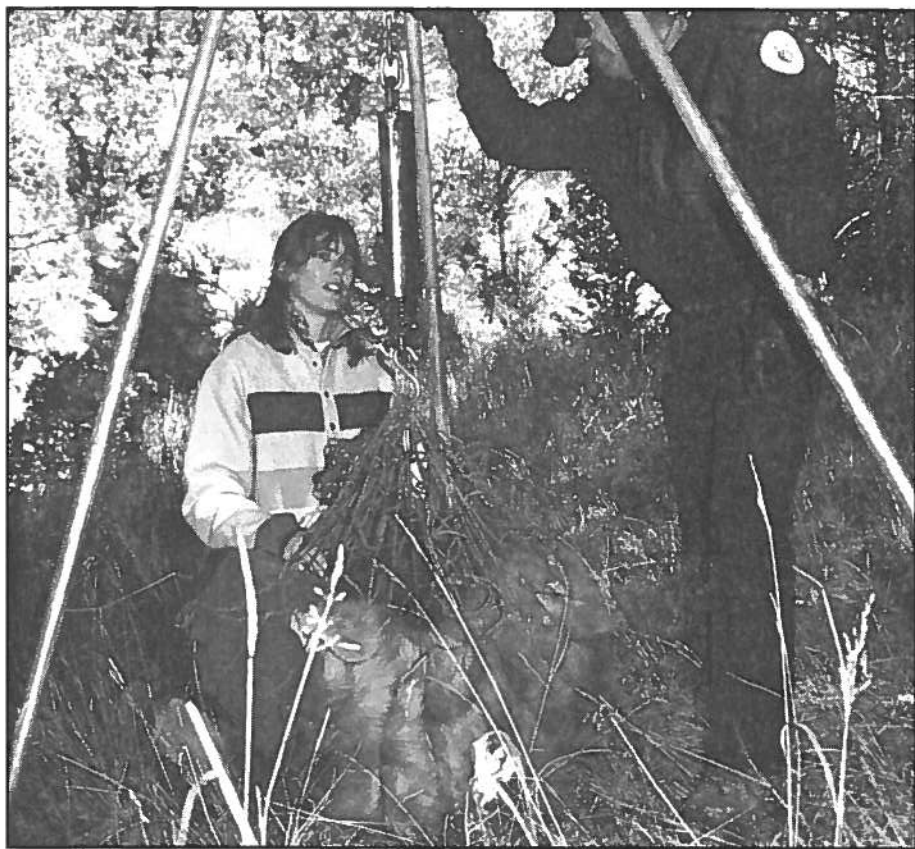
LEARNING ABOUT BEARS

Bear biologists weigh a bear, using a specially-designed tripod.

Ear tags now identify this bear, which is just waking up from tranquilizers.

Imagine trying to learn about black bears in the wild. These animals live alone, blend in with their surroundings, and are alert to the sounds and smells and movement around them. Finding them to study can be quite a challenge. Biologists often study these shy and elusive animals by fitting them with radio collars. How do researchers safely catch a bear to collar it?

Here is how New Mexico's biologists snare a bear:
The researchers anchor a quarter-inch cable to a stout tree that is at least eight inches in diameter and is not an aspen. (A bear can chew through an aspen!) The other end of the cable ends in a loop that acts as a noose. They carefully set the noose over a spring. Then they cover the snare and/or the spring with sticks, and arrange other sticks to guide the bears to the spring—almost as if they were laying a path for the bears. Finally, they hang bait in the tree to entice a bear to come near. When a bear steps on the spring, the noose tightens around its foot— strong enough to hold the bear but not tight enough to injure it.

When a bear is caught, the scientists tranquilize it and work fast. They snap on an ear tag with an identification number; they will also tattoo that number on the bear's lip. They measure and weigh the bear, judge how fat it is, and take a small

Biologists drawing blood samples and fitting radio collar.

To track a bear on its home range, this biologist listens for signals from its radio collar.

TAKING CARE OF THE BEAR

"The safety of the bear is very important," says Cicely Costello, a bear biologist. Snares are anchored to isolated trees. If the bear can reach another tree, the tree could get caught in the snare and cause the snare to twist too tightly on the foot. "We also make sure shade is available so that the bear is comfortable." Once the snare is set, she checks it once or twice a day.

When she and her colleagues "work up" a bear, they move quickly and carefully. They monitor its respiration and heart rate, making sure that the bear is OK while tranquilized. When they finish their work, they gather their equipment, back away, and watch until the bear wakes up and moves away back into the forest.

amount of blood for testing. Depending on the particular study, if the bear is a female, they will fit her with a radio collar. (Some males receive collars, too.) The collars emit radio signals that can be picked up with receivers from the ground or in a plane. Once the bear is released, biologists can follow the animal and learn about its movements, home range, and eating habits.

Trapping or snaring bears, especially wary females with cubs, can be tough. But once the animals have radio collars, scientists do not have to trap them anymore. They can follow the radio collar signals to their winter dens.

Finding dens can be a challenge in New Mexico. Dens can be far from roads and human settlements. Biologists begin monitoring bears closely in October, looking for a bear that is returning often to a certain site. When radio collar signals indicate the bear is staying in one spot, biologists figure that the bear has denned. They mark the site on the map, and then use snowmobiles, snowshoes, or skis to reach the den later in winter while the bear is in its deep sleep. The researchers carefully tranquilize the bear, replace its collar with one containing fresh batteries, count the cubs or yearlings and determine their sexes, and collect other data. When they are done, they usually leave the den opening as they found it, bare or covered in snow or with brush.

Data collected from hibernating bears has provided clues to several

BLACK BEAR? OR...

- Profile of face is straight
- No hump between its shoulders
- Average adult male weighs about 250 pounds (112.5 kg)
- Average adult female weighs about 130 pounds (58.5 kg)
- Average adult height is 3 feet (0.9 m)
- Average adult length is 4–6 feet (1.2–1.9 m)
- Adults easily climb trees
- Lives 18–25 years in the wild. *In areas where they are hunted, their life span averages 7–8 years.*
- Can live up to 30–40 years in captivity.

...GRIZZLY?

- Dished-in face with high brow
- Hump between its shoulders
- Average adult male weighs 450–500 pounds (202.5–225 kg)
- Average adult female weighs around 350 pounds (157.5 kg)
- Average adult height is 3–5 feet (0.9–1.6 m)
- Average adult length is 7–10 feet (2.2–3 m)
- Adults seldom able to climb trees
- Lives 18–30 years in the wild
- Can live 30–40 years in captivity
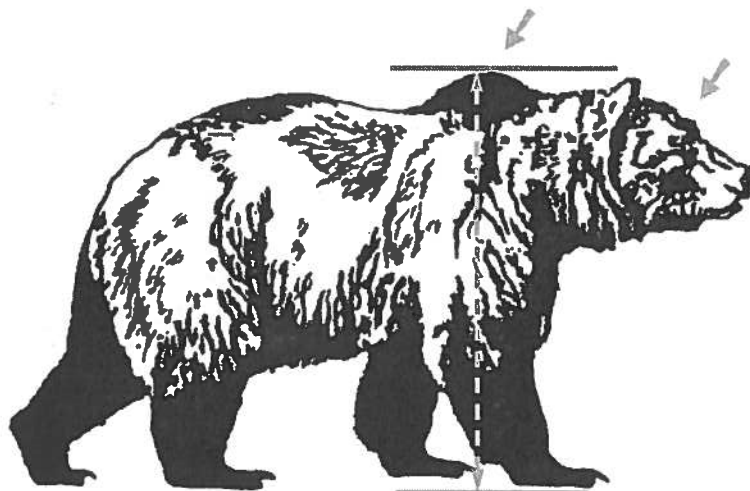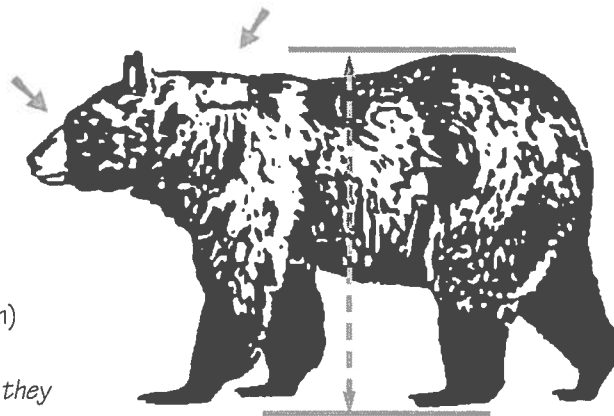
Gone from New Mexico; found in Montana, Wyoming, Washington and Alaska.

human ailments. For example, black bears may possess a clue that may help prevent bone disease in humans. Many humans develop osteoporosis as they get older and less active. Their inactivity causes bones to lose calcium and weaken. This happens in most mammals that are inactive for long periods of time, but it does not happen to black bears. Even after sleeping six months, their bones are as strong as the day they curled up for the winter. Researchers have found that although bone degeneration is occurring while bears hibernate, bears don't experience significant bone loss because they recycle the calcium and phosphorus right back into rebuilding bone. People and most mammals don't recycle calcium very well. If scientists can understand the metabolic pathways bears use to do this, they may be able to create a method for preventing osteoporosis in humans.

Sometimes bears wake up and move around in the winter. They may occasionally eat a little snow and urinate outside the den, but usually they don't eat or drink during hibernation. A bear may lose scores of pounds during the winter—15 to 30% of its body weight—without really defecating or urinating. Instead, a bear recycles its metabolic waste. The urea, which can be fatal at high levels, is broken down. The resulting nitrogen is used to build protein, which allows bears to maintain their muscle mass and organ tissues. Researchers are not exactly sure how the bear's kidneys are able to filter all the waste that is

BEAR FEET

Bears walk on their feet as humans do, with their soles flat on the ground—this is called *plantigrade*. Most other mammals, such as cats or dogs, walk on their toes—this is called *digitigrade*.

Look for tracks like these—

BLACK BEAR
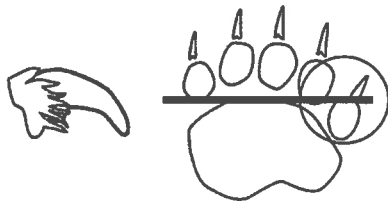Curved line at front of front pad

POLAR BEAR
Very hairy

GRIZZLY BEAR
Straighter line at front of front pad

Also look for scat deposited in piles of thick cords that are shaped like dog droppings but are full of plant material or insect parts.

Bears commonly lick their paws in late winter and early spring because their calloused foot pads and toe pads flake off during hibernation, and the newly exposed skin is not yet toughened up.

BEAR CLAW & PAW

produced. It is thought to be connected to symbiotic bacteria in the bear's gut and a finely-tuned process that transports the nitrogen through the bear's system as it is recycled. A better understanding of this process could help people who suffer from kidney diseases.

Another fascinating aspect of bears entering hibernation is their ability to 'bulk up' different organs and muscle groups with stored protein, which they need in addition to the fat stores. One byproduct of the breakdown of protein is water, which the bears in turn use to metabolize their fat. Bears get the calories they need from burning their stores of fat, and fat is mostly carbon and hydrogen. Some of the waste is carbon dioxide and water, which they exhale.

Another big mystery surrounding bears is what actually triggers hibernation and what causes bears to come out of it. Sleep researchers are interested in this as a way to perhaps provide a better understanding of a variety of sleep disorders in humans.

After a radio-collared bear emerges from its den, biologists can follow its movements and activity. They plot the bear's locations on topographic maps, then compare the locations with information about the habitat in that area. To classify bear habitats, they separate major types using aerial photographic surveys. For example, they can see where a clearing is, where a stream flows, where trees are particularly dense. Then they go to these areas on the ground and identify the plants growing in these major habitat areas. They also look for bear scat and analyze it to determine what the animals ate. In this way they can create a picture of what a bear does each day throughout the year. ■

PEOPLE AND BEARS

During times of drought and food shortages in the wild, bears may wander into back yards looking for something to eat. Garbage, compost piles, pet food, bird food, fallen fruit, bee hives are all attractants for bears.

Even though about 5,000 bears live in New Mexico, people seldom see these shy "shadows of the forest"—unless they are careless with their garbage or other food sources or they hunt. Around 6,000 hunters search for black bear in New Mexico each year; approximately 275 hunters take a bear each year. Wildlife managers monitor bears that live in hunting areas to make sure that the bear population can withstand the hunting. They also watch how much bear habitat is lost each year. Habitat loss—especially to roads and other human development—is the biggest problem that bears face. Wildlife managers actually consider black bears as relatively common in the right habitat.

Bears, like all wild animals, must share most of their habitat with humans. A third of New Mexico's bear habitat occurs on privately owned land and nearly a fifth occurs within about 3 miles of human-populated areas. People enter bear habitat to hike, ride horses, bird watch, fish, hunt, ski, and snowmobile. They also cut timber, graze cows and sheep, and operate mines in the same forests where black bears live.

Biologists and wildlife managers strive to understand how bears use their habitat and how they react to human presence. For example, by studying how bears use logged forests, biologists and managers can recommend logging practices that have less impact on bears or that can sometimes be beneficial to bears. For example, bears are more likely to return to a disturbed area if it is small, irregularly shaped, and trees are left along streams and roads. Bears also lose habitat when people build homes along lakes and in
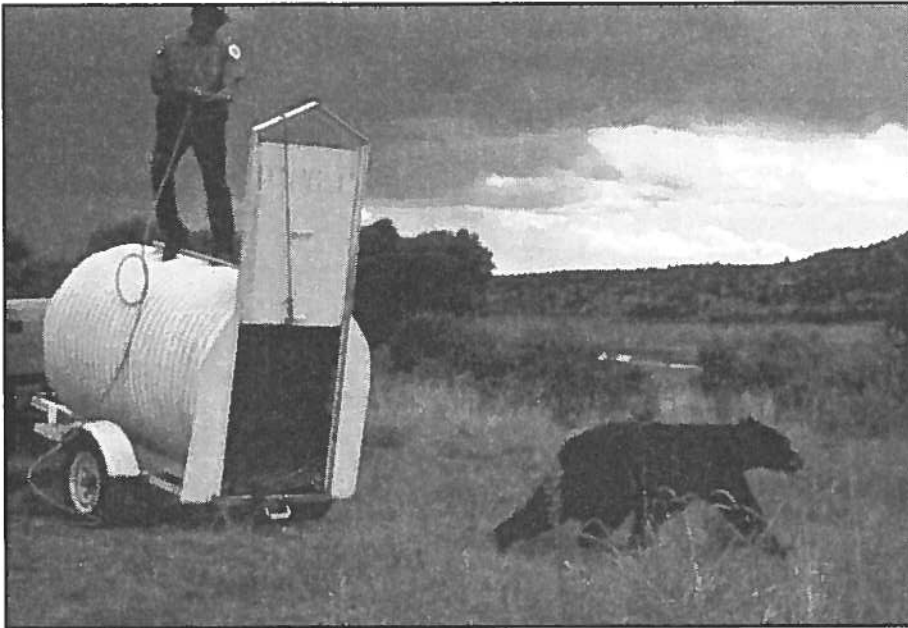
Department conservation officer releases a trapped black bear at the edge of a wilderness area.

Once black bears learn to associate food with humans, the prognosis for their survival is often grim.

Bears are one-time learners. They have evolved to learn to utilize food sources they discover one time in one place. If given the opportunity, they will return repeatedly until it is gone. They come back to the same place year after year around the same time just in case food is occurring there again.

—Carrie Hunt, bear biologist

forests. As people build, their roads cut off bear travel routes, break up home ranges, make intrusion into bear home ranges easier for visitors or hunters, and destroy natural sources of food. This process of breaking up the land with roads and development is often called "habitat fragmentation." Many bear populations in mountain ranges like the Sandia Mountains and Manzano Mountains are cut off from other areas they might be able to live in, by highways and housing developments. The Department of Game and Fish is involved with developing ways to allow for safe passage of wildlife across our highways. As more and more people live in New Mexico, the number of bears killed by cars has increased—especially in the summer in drought years when more bears are wandering widely searching for food.

SHARING THE BEAR'S FORESTS

FOR HOMEOWNERS
- Do not feed bears.
- Keep home sites free of garbage, bird feeders, pet food, and horse feed.
- If you must feed birds, bring the feeders in at night.
- If you have to keep garbage outside, use bear-proof lids and remove garbage at least weekly.
- Do not compost any food scraps.
- Ask local officials to fit all dumpsters with bear-proof lids.

FOR RECREATIONISTS
- Keep a clean camp.
- Hang food at least 8 feet (2.5 m) above the ground and 3 feet (0.9 m) from the tree; or keep it in a bear-proof container.
- Do not camp where you see sign of bear activity.
- When hiking—especially through dense cover—warn bears of your presence by making noise.
- Ask managing agencies to install bear-proof trash containers in campgrounds.
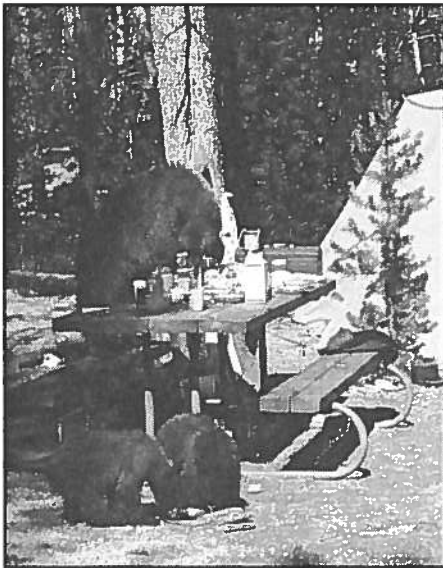
By leaving a clean camp and storing food properly, campers can help reduce the chances of bears getting into trouble.

People also provide new sources of food—ornamental shrubs, fruit trees and vegetable gardens, beehives, pet food, bird feeders, and garbage. It should be no surprise that bears sometimes appear on people's property and will take advantage of that easy food. Unfortunately, people often become upset if this occurs. When called about a "problem" bear, wildlife managers will trap the bear and try to relocate it. In drought years Department officers may try to relocate 200 nuisance bears. Young bears are more likely to remain in their new homes; adult bears usually return to their original home ranges, sometimes traveling more than 50 miles. If a bear continues to enter private property to find easy food, wildlife managers often have to kill it. During the very dry summer and fall of 2001, Department officers and private citizens were forced to kill

"OPERATION URSUS"

What is smaller than your fist, comes from a bear, and is worth thousands of dollars? A black bear gallbladder. These organs are used in traditional Asian medicines to treat gallstones, bruises, abscesses and cataracts.

The demand for bear parts has caused related species of bears to become endangered in Asia and Europe—and increased the pressure on black bears in North America. Although bear parts can be obtained through legal sales in some states, they are often obtained by poaching (killing out of season). Trade in bear parts is illegal in New Mexico.

Law enforcement officials believe that the trade in bear parts is closely tied to the trade in drugs, and as hard to stop. For example, investigators went undercover in the late 1990s to break up a $200 million animal parts industry in California. Within 18 months, bear gall bladders were once again for sale in San Francisco.

California officials report at least 3,000 black bears are poached in that state each year. The problem is spreading throughout the United States and into Canada. Poachers break the law and risk high fines and prison because black bears are abundant in North America compared to Asian bears that previously had provided the medicinal parts.

Many of the world's bears are now protected under the Convention for International Trade in Endangered Species (CITES)—even the American black bear. In July 1992, it was listed under Appendix II as a "look alike" species that is killed in lieu of killing the other, protected bears.
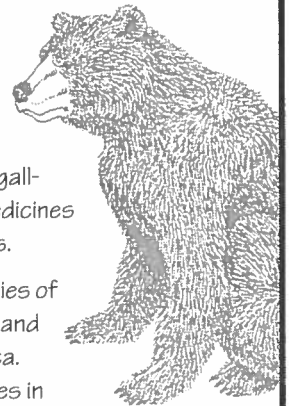
over 100 depredating bears. With all available habitat often occupied by other bears and zoos very reluctant to take in more bears, the Department is not left with many choices on what to do with bears that have lost their fear of humans. Conservation officers warn property owners that "feeding a bear equals killing a bear."

Bears are highly intelligent and can learn new behavior in reaction to an unpleasant experience. For example, bears can be trained with aversive conditioning to stay away from beehives even after they have dis-

covered this easy source of food. All the beekeeper has to do is erect an electric fence around the hives. One brief jolt from the fence, and the bear knows the easy food source is gone. Some biologists are experimenting with other kinds of aversive conditioning to help bears learn to stay away from ranches and camps. Researchers say that it is actually easier to modify the behavior of a bear than to retrain a dog.

C an New Mexico's growing human population coexist with bears? New Mexico has a healthy black bear population now, but if the population declines, it will be slow to build up again because bears are long-lived, mature late, and produce only one to three cubs every other year. Such a decline will not happen if everyone works to ensure that both bears and people can continue to thrive in New Mexico.

People can learn how to maintain their houses and camps to reduce the potential for problems with bears by reducing attractants that tempt bears and cause them to lose their fear of humans. Communities and campgrounds can purchase and install bear-proof dumpsters and trash containers. People also can learn that the sight of a bear on their property is something to be treasured. Our lives are richer when we share the land with wild creatures. Black bears are one of New Mexico's wildest wonders.

The New Mexico Department of Game and Fish publishes several pamphlets about bears, presents community programs, and trains teachers about wildlife at Project WILD workshops. Call or write:

Conservation Education
New Mexico Department of
Game and Fish
1 Wildlife Way
P.O. Box 25112
Santa Fe, NM 87504

505-476-8000
www.wildlife.state.nm.us

BEAR ACTIVITIES

BEAR FEAR

"You kill what you fear, and fear what you don't understand."

Grades
5-12

Subjects
Ethics, Science, Language Arts, Social Studies, Psychology

Skills
Description, evaluation, writing, discussion

Duration
Two class periods, minimum

OBJECTIVES

Students will be able to:

■ Recognize that lack of understanding or misinformation often leads to fear.

■ Realize that many things need not be feared but rather understood and respected.

■ Be aware of the need to question their information sources.

■ Discuss what impact carelessness can have on bears.

■ Describe how to prevent unnecessary problems with bears.

METHOD

Through writing, simulated experiences and discussion, students will evaluate information sources and attitude changes that occur when accurate information is provided.

BACKGROUND

You will need to become familiar with accurate information on black bear behavior and habitat (in this book, and in the references listed); with misinformation such as sensationalized stories from *Field & Stream, Outdoor Life* and *Man in the Wilderness*; and with anthropomorphic stories such as *Goldilocks and the Three Bears, The Jungle Book* and *Pooh Bear.*

MATERIALS

Spray bottle

Matches

Videos, magazine articles, and books that depict bears accurately and inaccurately

DVD/video that show bear behaving naturally and in sensationalized ways

Handouts of accurate information about bears

Recording of animal sounds

CD/tape player

Loud fan

PROCEDURE

Day One

1. Allow students five minutes to write down all the words they associate with:
   a. bears
   b. grizzly bear
   c. polar bear
   d. black bear
   e. panda bear
   f. teddy bear

2. Allow students five minutes to write a description of a black bear. Ask them to use words that will help the reader hear, see, feel and smell a bear. Also ask them not to worry about grammar, sentence structure, etc.

3. Share each student's description and discuss where the student's ideas came from.

4. Simulate an experience that can invite momentary fear based on inadequate information:

   a. Quickly blacken room.

   b. Start loud fan to cover up other noise.

   c. Play a tape with loud animal noises, such as bear growls, coyote or wolf howls.

   d. Squirt students with water.

5. Allow students five minutes to write a description of how they felt during this experience. Tell them that you are not interested in grammar, sentence structure, etc.

6. In a guided discussion, ask if the students felt uneasy, uncomfortable, momentary fear, anger, confusion. What are other things that make them feel the same way? (Examples might include lightning, water, snakes, spiders, bats.) Why? Then discuss why you conducted the simulation.

7. Repeat the simulation described in #4, except this time tell students beforehand what will happen.

8. Discuss their thoughts and feelings during this simulation and why they are different.

Day Two

1. Review the first day's activities in reverse, especially the simulation where they weren't prepared. Have students refer back to their bear descriptions.

2. Provide the students with various kinds of misinformation about bears and anthropomorphic representations. (See Background for suggestions.) Discuss the source and the nature of the misinformation; and what impacts this misinformation might have.

3. Then provide accurate information using available sources. Emphasize that black bears need to be respected, not feared. They naturally shy away from humans, but our carelessness can cause bears to lose that fear. Based on the experience of the last two days, ask students to develop an essay that compares and contrasts their attitudes on black bears.

4. Ask the students to write new descriptions based on what they now know. Include a paragraph about how people's attitudes and knowledge can affect their actions.

EXTENSION

Have students choose an animal or element of nature that they feel is feared unjustifiably (such as the mountain lion or the Mexican wolf) and research it to obtain information to try and change their attitudes.

"BARE" TALES VS. BEAR FACTS

Grades
5–9

Subjects
Science, Mathematics, Language Arts, Writing, Art, Reading

Skills
Inference, analysis, comparing similarities, discussion, drawing, synthesis, problem solving

Duration
Two class periods, minimum

OBJECTIVES

Students will be able to:

- Distinguish between feelings or reactions to bears based on myths or stereotypes, and feelings or reactions based on accurate information.
- Recognize that bears should be treated with respect, not fear.

METHOD

Students observe and compare the skulls of the extinct cave bear and of a black bear. Then they describe and list behaviors of the bears, and their attitudes and feelings about these bears. Students will draw a picture of how a cave bear and a black bear would have looked based on the size of the skulls.

BACKGROUND

Most people have developed false conceptions and attitudes concerning bear behavior. These conceptions and attitudes have been developed based on past experiences and education, depending on parental attitudes, stories, television, movies, etc. For this activity, familiarize yourself with the material in this book about black bears, and with the information that follows on the cave bear:

- Discovered in Zodith Cave of Gailenreuth in southern Germany in 1748.

- Scientific name: *ursus spelaeus,* which literally means "cave bear."
- Eventually found in caves throughout Europe, including Germany, France, Switzerland, Austria, Italy, Hungary, Russia, Belgium and England.
- Fed almost exclusively on vegetation such as succulent plants, berries, roots and tubers, and some small animals. Once described as the least carnivorous of carnivores.
- Adult male bear weighed around 800–900 pounds (360–405 kg).
- Appeared about 30,000 years ago; disappeared near the end of the last Ice Age, about 10,000 years ago.
- Extinction may have occurred because the bear couldn't adapt to a changing environment.

MATERIALS

Pictures, drawings, or models of cave bear and black bear skulls (found in the trunk)

Pictures or posters of black bears and cave bears

Colored markers

Butcher paper

PROCEDURE

1. Show a picture or the models of a cave bear skull and black bear skull to the class. Examine the features of each skull and

ask students to infer how each bear might have looked, with muscle and hair on each skull. What might it have eaten? (Look at tooth patterns, incisors, molars, etc.) How might it have behaved?

2. Divide the class into groups of four to five students. Give them information on the size of the skulls. Ask them to calculate and draw a life-size picture of both bears in profile, standing on all fours. Then ask them to describe the behavior of the bears and their own feelings about the animals.

3. Mount the drawings on the wall. Ask a representative from each group to present the drawings, behaviors, and feelings about the animals.

4. Give the students the factual information on both bears and ask them to compare the facts with their preconceived ideas.

EXTENSION

1. Calculate the size of the cave bear's footprint and compare it to the black bear's footprint. (You can make copies of black bear prints from the mold provided in the trunk.)

2. Using cave paintings and ancient stories, discuss how people in early cultures viewed the bears.

3. Write a fictional or factual article about the bears for a magazine or newspaper.

EVALUATION

1. Give the students a fictional paragraph about a black bear and ask them to retell or rewrite it factually.

2. Have the students return to their groups and revise their descriptions of the bears based on what they have learned.
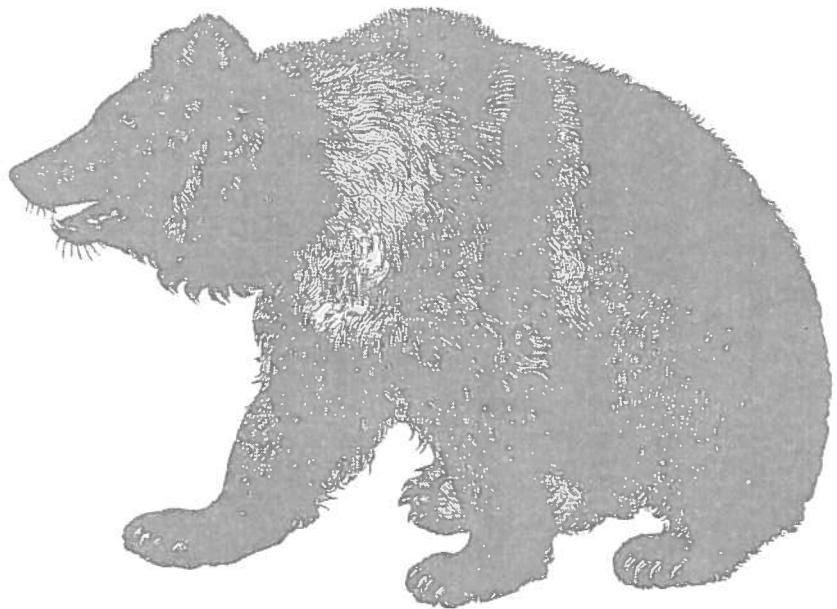
BEAR ISSUES

OBJECTIVES

Students will be able to: create, design and implement an opinion survey; analyze acquired data; describe basic principles of black bear ecology; and develop an audio-visual presentation.

METHOD

Students identify a bear-related issue relevant to the community; develop and conduct a public opinion survey; analyze the data; develop an audio-visual presentation on the results.

BACKGROUND

Familiarize yourself with the black bear ecology information in this book and share it with your students.

MATERIALS

Copies of sample surveys
Audio-visual equipment as needed by the students

PROCEDURE

1. With your students, identify a bear-related issue affecting your community and discuss how this issue relates to black bear ecology.
2. Pair the students and ask each team to create and develop or adapt a public opinion survey. (See sample on next page.)
3. Perform the survey on a random group of students, teachers, parents, and—if desired—members of the community or neighborhood.
4. Analyze the results based on age groups and gender.
5. Differentiate between opinion and facts of black bear ecology.
6. Ask each team to develop a short audio-visual presentation on its results. (Teams can use PowerPoint, big charts and graphs, overhead transparencies, slides, DVD—whatever they choose and/or you have equipment for.)
7. Discuss the attitudes revealed in the results:
   - What is most striking among the yes/no responses?
   - How does age affect the response? Gender?
   - Which responses differed the most from reality? The least?
   - What are some possible explanations for these differences? Similarities?
   - How could you summarize the results of this part of the survey?
8. Discuss the knowledge revealed in the results:
   - What is most striking among the actual and perceived food sources of bears?
   - Which response differed the most from reality? The least?
   - What are some possible explanations for these differences? Similarities?
   - How could you summarize the results of this part of the survey?
   - What are some of the major differences between people's perception of bears & reality?

EXTENSION

Write a synopsis of the survey for publication in the school newspaper, local paper, or the state Project WILD newsletter.

BEAR ISSUES • *SAMPLE SURVEY*

Male ☐   Female ☐   Student ☐   Teacher/School Employee ☐

Child ☐   Teen ☐   Adult *(over 18 yrs.)* ☐   Community Member ☐   Other _____

1. Have you ever seen a bear in the wild?
   YES ___   NO___

   If YES, what was the bear doing?
   ____ Feeding on garbage, trash
   ____ In a housing area, moving through
   ____ Running away
   ____ In a bear trap

2. Are black bears dangerous to humans?
   ____ 1: No threat at all
   ____ 2: Somewhat of a threat
   ____ 3: Moderate threat
   ____ 4: Extremely threatening

3. Are black bears a danger to livestock?
   ____ 1: No threat at all
   ____ 2: Somewhat of a threat
   ____ 3: Moderate threat
   ____ 4: Extremely threatening

4. What is the status of black bears in
   New Mexico?
   Check all that apply:
   ____ Endangered
   ____ Threatened
   ____ Rare
   ____ Game animal open to hunting

5. What do black bears usually eat in New Mexico?
   Check all that apply:
   ____ Nuts
   ____ Berries
   ____ Flowers
   ____ Plants
   ____ Insects
   ____ Carrion (dead meat)
   ____ Live prey
   ____ Fruit

6. What is the major food of black bears?
   Choose one or two from the list above.

   _____

7. What causes bears to lose their natural shyness
   toward humans? Check all that apply:
   ____ Eating garbage
   ____ Beehives
   ____ Pet food
   ____ Horse feed
   ____ Hummingbird feeders
   ____ Hunting them
   ____ Being old
   ____ Being afraid
   ____ Being sick
   ____ Being startled
   ____ Having cubs
   ____ Children playing outside
   ____ Building houses in the forest

SLEEPY BEAR

OBJECTIVES

Students will be able to:

- Define hibernation and qualify it for bears.
- Equate hibernation with survival.
- List the characteristics and results of hibernation.

METHOD

Students measure their own heart rate, breath rate, and temperature before and after an active game and compare it to a bear's conservation of energy when it hibernates.

BACKGROUND

Familiarize yourself with the information in this book about hibernation (see pg. 12.) Prior to conducting this activity, you may wish to have students do the Project WILD activity, "How Many Bears Can Live in This Forest?" on pg. 39.

MATERIALS

Clock or timer

Small food items such as colored popcorn or pieces of granola bars, or pieces of paper to represent food

Envelopes, if you use paper "food"

Pencils

Data sheet to record heart and breath rates, temperature

Ear thermometers

Chart on transparency or PowerPoint *(optional)*

Overhead projector *(optional)*

PROCEDURE

1. Hide small food items around the classroom before the students enter the classroom.

2. Relax the students by playing soothing music and leading them in deep breathing exercises.

NOTE: For steps 3–4, have the students work in groups of three.
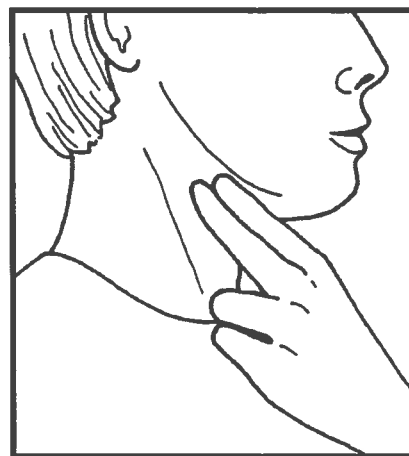
3. Show students how to take their heart rate—by placing their index and middle finger on the side of their neck below the jaw on the carotid artery (see below)—then have them count the rate for 20 seconds. Tell them to multiply that number by three and record it on their data sheet.

4. Show the students how to take their breath rate (by holding their hand in front of their faces), then have them count the rate for one minute and record the information.

5. The students can either take their temperature with a thermometer or simply feel their forehead and record "hot," "cool," "warm," etc.

6. After everything is recorded, have the students get up and run in place for one minute to warm up for the game.

7. Tell the students that food is hidden in the room. (Be sure to tell them if it is real and what it looks like, or if it is represented by pieces of paper.) Explain that they will have only two to four minutes to find the food. If they find any, they must either eat it (if it is real) or pretend to eat it (if it is paper) before they continue searching. Note: If using paper, give students an envelope for collecting the "food"; and instruct them to count to ten before looking for other "food."

8. Remind the students that bears are generally solitary and do not help each other find food. Then set the students loose for two to four minutes to search for "food."

9. Stop the students and immediately have them count their heart rate and record the information; then their breath rate and temperature.

10. Discuss the search by asking questions such as:
    • Who got food?
    • How much did you find?
    • If this was the only food you could eat, what would happen now that you have used it up?

11. Then discuss how this activity relates to bears and what happens if they don't find enough food before they begin to hibernate:
    • Do they keep looking?
    • Do they go to sleep anyway?
    • How might this affect them during the winter?

12. Compare the students' heart and breath rates and temperatures before and after they exercised. Discuss the meaning of the differences; lead them to the idea that less energy (food) is needed when we are resting. They may also notice differences between gender and size; if so, discuss possible reasons for these differences and what they might mean.

13. Ask students to describe examples in nature of animals that rest to survive with little or no food for long periods of time.

14. Define hibernation (the act of passing the winter or a portion of it in a state of sleep; also a torpid or resting state), and explain what hibernation means for bears. Discuss other characteristics of hibernation.

EVALUATION

1. Discuss what might possibly happen to bears in New Mexico if they didn't hibernate.

2. Discuss what bears do in the wintertime in Florida or Louisiana.

WHERE WERE YOU WHEN...

OBJECTIVES

Students will be able to:

■ Define and contrast home range and territory.

■ List or identify at least five factors affecting human and bear activity within home range.

METHOD

Students will plot their own home range and primary activity area, then compare it to the home range of a bear.

BACKGROUND

Familiarize yourself with the information about a black bear's home range on pgs. 8–9.

MATERIALS

Transparency or graphic showing city or town map, or one that you or a student made that shows local areas where students likely spend their time, one copy per student.

Markers for transparencies

Overhead projector or PowerPoint

Transparency or scanned copy of sample male and female black bear home ranges (pg. 9)

Basin map (in trunk). A basin map is a 3 x 3′ aerial photo of a watershed or a topographic map showing land forms and human structures.

PROCEDURE

1. Ask students to write down a list of the locations of their daily activities, then plot these locations on the map you have handed out. Ask them to connect the outermost points with a line.

2. Now ask them to draw another line that encloses an area where 75 percent of their activity occurs, and shade in this area.

3. Discuss "area" mathematically —e.g., how to determine the area of a square, triangle, circle or parabola.

4. In groups of about five, overlay the students' home ranges on an overhead projector. Discuss any factors that might affect those areas where they spend most of their time.

5. Compare students' maps with bear home range maps using these questions:
   • How similar are the activities of the bear and your activities?
   • How are they different?
   • From the information you've see here, can you construct a definition of a "home range"? Of a "territory"?

6. Ask students to define home range; compare it to the descriptions of home range and territory from Project WILD (next page). Through discussion, help students determine that bears are not territorial.

EXTENSION

1. As a group, construct a cardboard model of their home range and area of greatest activity. Use straws or toothpicks as separators; and assemble the layers from each group using a basin map as a reference point.

2. Compare ranges of female students with that of female bears; of male students with male bears. What differences do you see?

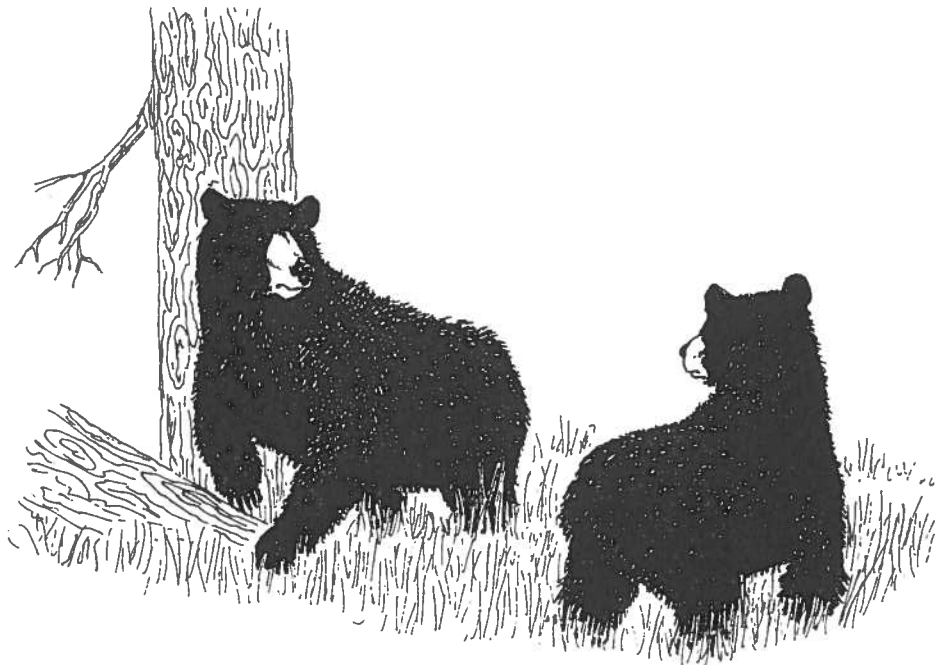## DEFINITIONS

Home range

The area in which an animal travels in the scope of normal activities; not to be confused with territory.

Territory

The concept of "ownership" or dominance over a unit of habitat; an area defended by an animal against others of the same species; used for breeding, feeding, or both.

Definitions from Project WILD, © 2002 Council for Environmental Education

BEAR WORDS

Grades
K–6

Subjects
Language Arts, Biology

Skills
Analysis, comparison, evaluation

Duration
One to two class periods

OBJECTIVES

Students will be able to: match definitions in bear vocabulary.

METHOD

Students play a game using word/definition cards.

BACKGROUND

Familiarize yourself with the definitions, listed on the next page, which will be used in the game. Choose 25 of the 30 definitions provided.

MATERIALS

Fifty cards; 25 with one vocabulary word written on each; 25 with matching definition on each
Score sheet
Clock or timer *(optional)*

PROCEDURE

1. Prepare the cards by writing the vocabulary words on the cards, one per card; and then writing the definitions on cards, one per card. In the upper right corner of each definition card, write its point value.

2. Discuss the rules:
   • The object is to match vocabulary cards with definition cards. You want to get rid of cards to avoid getting points at the end of the round.
   • Rounds continue, with cards being reshuffled as needed, until someone reaches 100 or until a specified time limit is reached.
   • Player with the lowest score wins.
   • You can make a match and place it on the table only during your turn, except during the initial deal.

3. Appoint a dealer to begin the activity; deal passes after each round.

4. Shuffle and deal all the cards.

5. Each player examines his or her cards for matching pairs, places them face up on the table, and reads them to the group who then decides if the match is accurate.

6. Play resumes with the person to the left of the dealer, who draws a card from the person to his or her right. If a match is made, the cards are placed face up and read again.

7. Play continues clockwise until someone has depleted his or her hand.

8. The remaining players count their cards and tally their points. For each unmatched card they hold, they add one point to that card's value.

EVALUATION

Discuss bears, using your new vocabulary.

DEFINITIONS

Adaptations (5)
Characteristics that plants or animals have to survive. The adaptation process involves genetic change that can be passed to the next generation.

Annulation (3)
The appearance of growth rings in a tooth; used to determine age.

Aversive conditioning (5)
Providing an unpleasant experience (a shock, a loud noise) to an animal each time it performs unwanted behavior so that the animal associates the unpleasantness with the behavior and stops the negative behavior.

Bear attractant (2)
Garbage, pet food, horse feed, hummingbird feeders.

Biologist (2)
A person who studies living organisms and their relationship to one another.

Black bear color phases (3)
Blond, tan, brown, cinnamon and black. Also white (Kermode) and silver-gray (glacier).

Carnivore (2)
An animal that has meat as a majority of its diet; or of the Order Carnivora of flesh-eating mammals.

Carrion (2)
The bodies of dead animals, usually found in nature in the process of decay.

Carrying capacity (5)
The number of animals of a given type that can be supported in a given area.

Conservation (5)
The use or preservation of natural resources in a way that assures their continuing availability to future generations.

Cub, sow, boar (2)
Young bear, female bear, male bear; respectively.

Endangered bear (2)
Any bear population threatened with extinction.

Estrus (3)
The period of time when the female bear will accept the male bear for breeding.

Food-conditioned bear (2)
A bear that lives close to humans and has made the strong association between people and food they provide directly or indirectly.

Forbs (3)
Broad-leaved plants (except grasses); commonly refers to herbs and non-woody plants.

Game and Fish Department or State Wildlife Agency (3)
State agency legally responsible for wildlife and its management.

Game animal (2)
Legal term for animals that may be managed and hunted only under regulations.

Habitat (3)
Where an animal lives; and the proper arrangement of food, water, shelter and space suitable to the animal's needs.

Herbivore (2)
An animal that eats only plants.

Home range (5)
The area in which an animal travels in the scope of normal activities to meet its needs, and which is not defended.

Interdependence (3)
The interrelationships of wildlife with one another and with the various elements of their environment.

Limiting factors (5)
Influences that affect the survival of an animal or population of animals.

Mast (5)
The fruits and berries produced by trees, shrubs and forbs. Examples include piñon nuts and acorns (hard mast); gooseberries and juniper berries (soft mast).

North American bears (3)
Polar bear, grizzly bear, black bear.

Omnivore (2)
An animal that eats both plant and animal matter.

Pattern behavior (5)
An animal's action and response to its environment; what it instinctively does.

Predation (3)
The act of one animal killing another animal for food.

Prehensile (5)
A hand or other body part that can grasp things.

Scat (3)
Animal fecal droppings.

Wild (5)
An undomesticated animal or organism; an animal foraging for its own food, shelter and other needs (without the assistance of humans) in an environment that serves as a suitable habitat.

How Big?

OBJECTIVES

Students will be able to: describe the sizes of the three major bear species of North America compared to their own body size.

METHOD

Students will draw life-size replicas of the polar, grizzly and black bear.

BACKGROUND

See "Black Bear or Grizzly?" on pg. 15, for size information on these two bears. Polar bear measurements are:

- average adult male weighs 1,150 pounds (517.5 kg)
- average adult male height is five feet (1.6 m)
- average adult length is eight feet (2.5 m)

MATERIALS

Pictures or silhouettes of polar, grizzly and black bear

Large sheets of paper or butcher paper

Graph paper *(optional)*

PROCEDURE

1. Post the information on bear sizes so that all the students can refer to it.
2. Divide the students into three groups; the polar bears, the grizzlies and the black bears.
3. Tell students that they have to make a life-size paper model of "their" bear. They can try drawing it freehand or they can use an opaque projector to enlarge a photograph or drawing. They can also color their bears with appropriate fur color and features.
4. Display the bears on the wall.
5. Draw an outline of each student in each group onto butcher paper using their shadow on a wall. Compare their height, weight and length to each bear variety.
6. Graph the results of all bear varieties and each student. Look for relationships such as height/weight, height/length, weight/length.
7. Ask each group to sit in front of its bear. You can ask the students to tell what they know about "their" bear, or you can discuss the bear as a group.
8. Conclude the activity by comparing all three bears.

EXTENSIONS

1. Draw pictures of the four elements of habitat (food, shelter, space, water) and glue them on the appropriate bear. Compare each bear's needs and its adaptations for survival in its environment.
2. Draw the actual size of a cave bear and compare it to present-day bears.
3. Prepare a Bill of Rights for bears to coexist and maintain their population with humans in New Mexico.

FOOT LOOSE

Grades
K–12

Subjects
Biology, Ecology, Art

Skills
Comparison, discussion, inference, research

Duration
One to two class periods, mimimum

OBJECTIVES

Students will be able to: identify bear tracks and place them in the appropriate habitat.

METHOD

Students cut out footprints and place them in appropriate habitat.

BACKGROUND

See information in this book, especially pg. 16 and the activity "How Big?," pg. 34.

MATERIALS

Full-size drawing of bear footprints or molds (in trunk)

Art materials, markers, paints, clay, pâpier-maché, construction paper, fast-acting plaster of Paris

Habitat chart (in trunk)

PROCEDURE

1. Post the information about habitat so that all the students can refer to it. Discuss the habitats of the grizzly, polar and black bear.

2. Provide students with copies of the bear prints.

3. Ask the students to construct habitats in which they will find their bear's footprints.

EVALUATION

What are the different needs of the different bears?

Front Paw 5" x 5"

Back Paw 5" x 7"

YEAR RINGS

OBJECTIVES

Students will be able to:

- Figure the age of a bear from the annulation rings in the teeth.
- Recognize forms of annulation in other species.
- Relate tooth annulation to the bear's summer food supply and winter hibernation.
- Create their own annulation (year ring) map.

METHOD

Students create their own annulation map; examine annulations in a bear's tooth; study other annulations in species; and discuss causes of annulation.

Grades
6–12

Subjects
Biology, Art

Skills
Analysis, comparison, discussion, drawing, graphing

Duration
One class period

BACKGROUND

Biologists can determine the age of a black bear by counting the rings in a cross-section of its premolar tooth. A set of two rings, one wide light band and one narrow dark band, equals one year. Each set of two rings is called an *annuli*. Biologists add one year for the bear's first year of life (before the tooth comes in). The wide light-colored band marks the spring and summer, and the narrow dark-colored band marks the fall and winter. Each band is called a *cementum*. Biologists speculate that the bear's diet or its endocrine system may contribute to the ring width and color. The ages of marine mammals, ungulates, and some other carnivores can be determined in the same way.
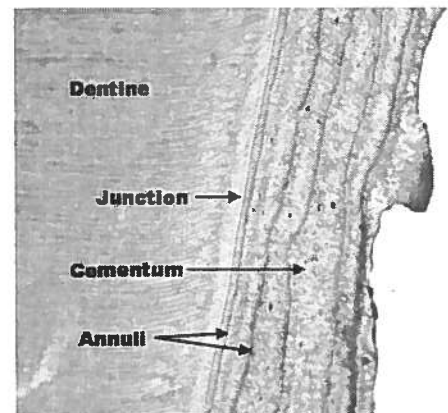
Cross-section of a small part of a bear's tooth, magnified about 100X.

MATERIALS

Square piece of paper or paper plate, as large as possible, one per student

Markers, pens and pencils

Pictures of a cross-section of a bear's tooth (in trunk)

Bear tooth (in trunk)

Cross-section of tree trunk
(in trunk)

Fish scale slide or enlarged picture
(in trunk)

Overhead projector and trans-
parencies

PROCEDURE

1. Show the students how to make
   their own annulation maps:
   - Make a small dot in the mid-
     dle of your paper.
   - Make a line of dots to the
     right of the first dot; one dot
     per year until you reach your
     age. They do not have to be
     evenly spaced.
   - Place your pen on the first
     dot to the right of the center
     dot. Make a circle around the
     center dot. Place your pen on
     the second dot and draw a
     circle around the previous
     circle. Continue until you
     have used all your dots.

2. Explain to the students that the
   center ring represents their
   first year, and each consecutive
   ring represents another year.
   Ask them to think about which
   summer was their favorite. If
   they were nine years old that
   summer, tell them to color in
   the ninth ring with their favorite
   color.

3. Discuss why summers are
   important to bears and what
   would be a "good" summer.
   (They need to eat a lot of food,
   so a good summer would be a

summer with abundant rainfall
and food.)

4. Now, explain that bears have
   age rings in their bodies that
   are similar to the ones the stu-
   dents have made. Ask them
   what part of the body would
   have these rings? (Teeth) Show
   the tooth, if you have one avail-
   able, and then show the cross-
   section. Ask the students to
   count the rings and discuss any
   differences they observe; com-
   pare the differences statistically
   if more than one age is deter-
   mined or if more than one
   cross-section is used.

5. Discuss annulation and how
   hibernation and food supply
   affect the rings.

6. Show more pictures of teeth
   and ask the students to figure
   the age of the bears.

7. Ask students to think of other
   examples of species that show
   annulation rings. If available,
   show the cross-section of a
   tree and the fish scale.

8. Have the students finish their
   own annulation ring (year ring)
   map by coloring or marking
   each year's ring to represent a
   highlight of that year. For exam-
   ple, they could draw bicycles in
   the year they received a bike, or
   color the ring to match the
   bike.

9. Display the maps and encour-
   age the students to explain
   their year ring maps.

GREAT LIPS

OBJECTIVES

Students will be able to: define adaptation and give ten specific examples of adaptations for acquiring food and how these adaptations enhance the animal's ability to survive.

METHOD

Students observe bear feeding behavior in a video, then identify feeding adaptations in other animals.

BACKGROUND

Familiarize yourself with information in this book about adaptations black bears have for feeding (pgs. 6–7). In general, adaptations allow an organism an "edge" over other organisms by allowing it to compete for resources more efficiently. It will also likely survive in greater numbers than a less well-adapted counterpart, and reproduce more. This, in turn, means that the organism with the adaptation may, over time, become the predominant organism. This is differential reproduction and is the basis for Darwin's theory of evolution by natural selection.

MATERIALS

Video of bear feeding behavior (in trunk)

Video of other animals with specific adaptations (in trunk)
Video player
Pencils or pens
Writing paper

PROCEDURE

1. Show the bear video to the class once, then replay it as students write down what they observe about adaptations bears have for feeding. You may wish to draw attention to the prehensile lips of bears that allow them to pluck berries and gather other specialty foods.

2. Divide the students into pairs or small groups. Ask them to list ten specific feeding adaptations present in other animals.

3. As each group presents its list, make a master list to display in the class.

4. Show the video of other adaptations animals have for feeding.

EXTENSIONS

1. Watch the bear video again and ask students to identify adaptations that bears have for other activities.

2. Discuss the classic example of natural selection—the beak structure of Darwin's finches in the Galapagos Islands. (Information in trunk.)

How Many Bears Can Live in This Forest?

Grades
5–8

Subjects
Science, Environmental Education, Mathematics

Duration
One 20– to 45–minute session or longer

Group Size
10 to 45

Setting
Outdoors

Key Terms
Limiting factors, habitat, shelter, cover

OBJECTIVES

Students will be able to:
- Define a limiting factor.
- Describe how limiting factors affect animal populations.

METHOD

Students become "bears" to look for one or more components of habitat during this physically involved activity.

BACKGROUND

Black bears are the focus of this activity that illustrates the importance of suitable habitat for wildlife. The activity demonstrates the consequences for a population of bears if one or more habitat components is relatively scarce. When any element or factor in a habitat is inappropriate or exceeds the tolerance range for an animal or population, it directly affects the well-being of the animal(s) and may result in death or population reduction. This factor "limits" the animal or population. Limiting factors may include habitat components such as food, water, shelter, and appropriate space, as well as life history parameters such as disease, predation, and climatic conditions. Limiting factors also may be related to human activity such as development, pollution and hunting. Populations tend to increase in size until limited by one or more of these factors.

Black bear habitat limits black bear populations, especially through the influences of shelter, food supply, and the social tolerances or territoriality of the animal. Shelter or cover is a prime factor. Black bears need cover—for feeding, hiding, bedding, traveling, raising cubs and denning. With limits of space, adult bears will kill young bears or run them out of the area. These young bears must keep moving around either until they die or until they find an area vacated by the death of an adult.

When food supplies are reduced by factors such as climatic fluctuations, competition becomes more intense. Some adult bears might temporarily move to seldom-used areas of their home range, sometimes many miles away. They must live on what food is available in the area. These individuals may become thin and in poor condition for winter hibernation or, in the case of young bears, be forced from the area by more aggressive adults.

All possible conditions are not covered by the design of the activity. However, by this simple illustration it is possible for students to grasp quickly the essential nature of the concept of "limiting factors"—habitat components that affect the survival of an animal or restrict the numbers or range of an animal population.

Number of Cards to Make

Paper Color	Label	Represents	Number of Students in Group						
			10–15	16–20	21–25	26–30	31–35	36–40	41–45
Orange	N-20	Nuts, 20 lbs.	2	3	3	4	5	6	7
Orange	N-10	Nuts, 10 lbs.	8	13	17	21	25	29	33
Blue	B-20	Berries, 20 lbs.	2	3	3	4	5	6	7
Blue	B-10	Berries, 10 lbs.	8	13	17	21	25	29	33
Yellow	I-12	Insects, 12 lbs.	2	3	3	4	5	6	7
Yellow	I-12	Insects, 6 lbs.	8	13	17	21	25	29	33
Red	M-8	Meat, 8 lbs.	2	3	3	4	5	6	7
Red	M-4	Meat, 4 lbs.	8	13	17	21	25	29	33
Green	P-20	Plants, 20 lbs.	2	3	3	4	5	6	7
Green	P-10	Plants, 10 lbs.	8	13	17	21	25	29	33

MATERIALS

Five colors of construction paper
(a couple of sheets each of red,
yellow, green, blue, and orange)
or an equal amount of light
poster board or colored tokens

one black felt pen

envelopes (one per student)

pencils

one blindfold

five sheets green construction
paper (for extension)

PROCEDURE

1. Make a set of 2″ x 2″ cards from
the colored construction paper.
Use the chart on this page to
determine how many cards of
each color to make and what to
write on each one.

As shown in the chart, the color
of the card determines the type
of food it represents:

orange—nuts (acorns, pecans,
walnuts, hickory nuts)

blue—berries and fruit (black-
berries, elderberries, raspber-
ries, wild cherries)

yellow—insects (grub worms,
larvae, ants, termites)

red—meat (mice, rodents, pec-
caries, beaver, muskrats, young
deer)

green—plants (leaves, grasses,
herbs)

The number on each card repre-
sents the number of pounds of
food. For example, a card with
the label **M-4** represents 4
pounds of meat.

2. The following estimates of total
pounds of food needed for one
bear for 10 days are used for
this activity:

Nuts	*20 lbs.*	*(25%)*
Berries & fruit	*20 lbs.*	*(25%)*
Insects	*12 lbs.*	*(15%)*
Meat	*8 lbs.*	*(10%)*
Plants	*20 lbs.*	*(25%)*
	80 lbs.	*(100%)*

NOTE: These figures represent
the food of a typical black bear
in Arizona. The components of
an actual bear's diet will vary
between areas seasons, and
years. For example, a bear in
the state of Alaska would likely
eat more meat (fish) and fewer
nuts than a bear in Arizona. One
similarity among black bears
everywhere is that the majority
of their diet is normally made
up of vegetable material.

If the teacher follows the table
when making the food cards,
there should be less than 80
pounds of food per student, so
there is actually not enough

food in the area for all the "bears" to survive.

3. It is also possible to include water as a habitat component by making additional squares from light blue paper. To calculate how many water cards to make, multiply the number of students by 1.25 (round to the nearest whole number). For example, for a group of 20 students, make 20 x 1.25 = 25 water cards. Divide the water squares into five equal piles (or roughly equal), and mark each group with one of the following letters: R, L, ST, SP, and M. These letters represent all the places where a bear could find water: rivers, lakes, streams, springs and marshes.

4. In a fairly large open area (e.g., 50 x 50'), scatter the colored pieces of paper.

5. Do not tell the students what the colors, initials and numbers on the pieces of paper represent. Tell them only that the pieces of paper represent various kinds of bear food. Since bears are omnivores—they like a wide assortment of food—and the students should gather different colored squares to represent a variety of food.

6. Have the students write their names on an envelope, which will represent each student's "den site" and should be left on the ground (perhaps anchored with a rock) at the starting line on the field area's perimeter.

7. Have the students line up on the starting line, leaving their envelopes between their feet on the ground. Give them the following instructions: "You are now black bears. All bears are not alike, just as you and I are not exactly alike. Among you is a young male bear who has not yet found his own territory. Last week he met up with a larger male bear in the big bear's territory and before he could get away, he was hurt. He has a broken leg. (Assign one student as the injured bear and tell him or her to "hunt" by hopping on one leg.) Another bear is a young female who investigated a porcupine too closely and was blinded by the quills. (Assign one student as the blind bear; he or she must hunt blindfolded.) The third special bear is a mother bear with two fairly small cubs. She must gather twice as much food as the other bears. (Assign one student as the mother bear.)

8. Students must walk into the "forest." Bears do not run down their food; they gather it. When students find a colored square, they should pick it up (one at a time) and return it to their "den" before picking up another colored square. (Bears would not actually return to their den to eat; they would eat food as they find it.)

9. When all the colored squares have been picked up, the food gathering is over. Have students pick up their den envelopes containing the food they gathered and return to class.

10. Explain what the colors and numbers represent. Each color is a kind of food and the numbers represent pounds of food eaten. Ask students to add up the total number of pounds of food they gathered—whether it is nuts, meat, insects, berries or plant material. Have students write the total weight on the outside of their envelopes.

11. Using a chalkboard, list "blind," "injured" and "mother." Ask the blind bear how much food she acquired. Write the amount after the word "blind." Ask the injured bear and the mother bear how much they acquired and record the information. Ask the other students how much food they found and record each response on the chalkboard. Tell the students each bear needs 80 pounds to survive. Which bears survived? Is there enough to feed all the bears? How many pounds did the blind bear collect? Will she survive? What about the mother bear? Did she get twice the amount needed to survive? What will happen to her cubs? Will she feed her cubs first or herself? Why? What would happen to her if she fed the cubs? What if she ate first? If the cubs die, can she have more cubs in the future, and perhaps richer, years? (The mother bear will eat first and the cubs will get whatever, if any, is left. The mother must survive; she is the hope for a continued bear population. She can have more cubs in her life; only one needs

to survive for the population to remain static.)

12. If the water squares are included, each student should have picked up at least one square representing a water source or that bear will not survive. Water can be a limiting factor and is an essential component of habitat.

13. Ask students to record how many pounds of each of the five categories of food they gathered. Next, ask each student to convert those numbers into percentages of the total poundage of food each gathered. Provide the students with the background information about black bears so that they can compare their percentages with the typical percentages eaten by black bears in Arizona. Ask students to guess how healthy their bears would be. How do the bears' requirements for a diet seem to compare with the needs of humans for a balanced and nutritious diet?

14. Ask the students to arrive at a class total for all the pounds of food they gathered as bears. Divide the total by the 80 pounds needed by an individual bear (approximately) in order to survive in a 10-day period. How many bears could the habitat support? Why then did only____bears survive when your class did this activity? Is that realistic? What percentage of the bears survived? What percentage would have survived had the food been evenly divided? In each case, what

percentage would not survive?

15. Ask the students to determine the amount of food tokens that must be added to support all of the bears in this activity. If sufficient food were available for all of the bears, would the population likely increase the following year? Have the students support their answers. Other than food, what factors, natural or human-related, might also limit the growth of the bear population? How would each of these factors affect the bear population? Could the bear population increase indefinitely if unlimited food were available? Why or why not?

16. Drawing on their discussion, ask the students to try to define the term "limiting factor." Have them suggest examples of limiting factors, cultural and natural, that would be likely to actually influence the survival of other animals and their populations.

EXTENSIONS

1. Cut paper or poster board into 2 x 2" squares. Make five squares per student. For example, with a class of 30 students, you would make 150 squares. Divide all the squares into five equal piles and mark the cards in each pile with one of the following letters: **B, T, D, H** and **F.** These represent: **B** = Bedding sites, **T** = Travel ways, **D** = Dens, **H** = Hiding cover, and **F** = Feeding sites.

For this activity, these terms are defined as follows:

Bedding sites: Black bears are usually active in early morning and late evening, and bedded most of the rest of the day and night. Bedding sites are usually in areas of dense vegetation, steep topography, or large trees where the bears feel secure.

Travel ways: Bears require corridors of cover (made up of thick vegetation or steep topography) to enable them to travel between areas of food, water and shelter within their home range.

Dens: Black bears use dens as shelter for hibernation from November to April in each year. Bears have been found denning in hollow logs, caves, holes dug into hillsides, under buildings on top of the ground, and even in culvert pipes. Bears often prepare and may use more than one den; they may change dens during the winter because of disturbance or a leaky den. Bears seldom re-use dens from year to year.

Hiding cover: Black bears evolved as animals that escape danger from predators and other bears by hiding in thick cover.

Feeding sites: Bears often will use areas with less cover than hiding areas or bedding sites for feeding. Feeding sites are, however, often found close to thick hiding cover to allow the bear to quickly escape danger, if necessary.

NOTE: This information is based on actual research data from a study in Arizona. These components of shelter may vary slightly in different parts of North America.

2. In a fairly large open area (e.g., 50 x 50′), scatter the colored pieces of paper.

3. Have the students line up along one side of the area. Tell them that they are to become "bears" for this activity. Review the concept of habitat—that a bear would need shelter, food, water, and space in a suitable arrangement in order to survive. Do not tell the students what the letters on the squares of paper represent. Tell them only that the squares represent one element or component of bear habitat.

4. Direct the students to move as individual "bears" into the area. Each bear must pick up as many of the components of habitat as possible. Some competitive activity is acceptable as long as it is under control. Bears are territorial. Remember that if bears fight, which they seldom do, they can become injured and unable to successfully meet their needs for survival.

5. When the students have picked up all of the squares of paper in the area, have them return to the classroom or be seated in any comfortable area. Ask the students to separate their squares of paper into piles according to the letter on each. Using a chalkboard or large pad for a visual reference, ask the students to predict what the letters on the green cards represent—giving them the clue that each is an element of cover or shelter for a black bear. What kinds of shelter would a bear need? What do those initials represent? Record how many bears acquired at least one of each kind of shelter. How many got only four kinds? Three? Two? How many got only one kind of shelter? For this activity, only those bears with at least one of each kind of necessary shelter can survive through one year.

6. Shelter is a very important part of a bear's habitat. A bear needs shelter in which to search for food and water. Bears also need shelter for traveling through their home range as well as shelter for bedding, hiding and denning. Ask students why a den is important. (The bear could live from April through October but would not have a secure place to hibernate and might not survive the winter.) Ask the students what would happen if a bear did not have travel ways? (Without travel ways, home ranges become fragmented and bears are not able to reach needed food, water or other shelter. Without suitable habitat, bears move into marginal habitats and get into trouble with people.)

7. In this activity, how many bears survived? What was a limiting factor for this population of bears? (Shelter.) What other things could possibly become limiting factors? (Water and space—or territory—are two examples.) Could food be a limiting factor for bears? (Yes, however, bears are omnivores and can use many sources of food.)

8. Ask the students to summarize what they have learned about the importance of suitable habitat for bears' survival. How are the bears' habitat needs similar to and different from the needs of other animals?

EVALUATION

Define limiting factor.

a. Describe some of the factors that may limit the survival of an animal.

b. What might be the consequences to the individual animal and to its population if one of these limiting factors were no longer limiting?

GLOSSARY

attitude
A positive or negative feeling about something.

boar
An adult male bear.

carnivore
An animal whose diet consists primarily of animal matter, such as a mountain lion, river otter or an eagle.

carrying capacity
The largest number of organisms of a given species that an area of habitat can support on a year-round basis.

conservation area
An area of wildlife habitat that is large enough to meet the needs of a population of a particular species and is targeted for protection and preservation.

cub
A young animal like a bear or mountain lion that is less than one year old.

digitigrade
An animal that walks on its toes, such as a dog, a cat or a horse.

emigration
The movement of organisms out of an area.

endangered
A species that is in danger of becoming extinct throughout its natural range.

foraging
A type of feeding behavior whereby an animal, such as a black bear, meanders through an area feeding on appropriate food items it comes across.

genus
A group of species with common characteristics.

habitat
A natural area that provides the basic requirements an organism needs to survive.

habitat corridor
An area of land or water that connects isolated areas of wildlife habitat.

habitat fragmentation
The process of breaking larger areas of habitat into smaller pieces, often as a result of human development activities such as road building and urbanization.

habitat loss
The permanent alteration or conversion of natural habitat for human use.

habitat mosiac
The combination of different habitats a wide-ranging species, such as black bears, need in order to survive.

herbivore
An animal whose diet consists primarily of plant matter, such as a rabbit, a deer or a mouse.

home range
The area of habitat regularly used by an animal during a year.

immigration
The movement of organisms into an area.

indicator species
A species whose population size and health is used to gauge the overall health of an ecosystem. For example, if an area supports a healthy, adequately sized population of black bears, the ecosystem in that area is considered to be healthy.

limiting factor
Factors such as food, water, shelter and space that determine the maximum number of organisms that can survive in a given habitat.

marginal habitat
A habitat that provides minimal or less than ideal amounts of food, water, shelter, space and other habitat requirements for a particular species.

mortality
Death.

omnivore
An animal whose diet consists of a mixture of plant and animal matter, such as a raccoon, a human or a black bear.

optimal habitat
A habitat that provides enough food, water, shelter, space and other habitat requirements to support a healthy population of a particular species of organism.

plantigrade
An animal that walks on the flat soles of its feet, such as a bear, a human or a chimpanzee.

population
A group of organisms of the same species living in the same area.

roadkill
An animal killed by a car, train or other moving vehicle on a road.

sow
An adult female bear.

species
A group of organisms that can breed and produce fertile offspring.

subspecies
A geographically isolated subgroup of a species that has developed unique, distinguishing traits.

threatened species
A species that is likely to become endangered in the near future.

umbrella species
A species of animal that utilizes large natural areas of habitat containing many different kinds of plant and animal species. Thus, if a habitat for the umbrella species is protected, habitat for many other species of organisms is protected as well.

yearling
A young animal that is between one and two years old.

FOR MORE INFORMATION

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Bears: Behavior, Ecology, Conservation, by Erwin Bauer. (1996). 160 p. All North American bear species. Authoritative text. Great photos by Erwin and Peggy Bauer.

The Grizzly Bears of Yellowstone: Their Ecology in the Yellowstone Ecosystem, 1959-1992, by John Craighead, Jay Sumner, and John Mitchell. (1995). 535 p. Many maps, graphs, illustrations, black and white photos, and great color photos by John Craighead.

Bear Attacks: Their Causes and Avoidance, by Stephen Herrero. Revised edition (2002). 296 p. Despite its title, this book is a helpful introduction to the natural history and behavior of the bear by a long-term wildlife researcher in the field. With useful tips on "avoidance." Includes a few black and white photos.

Backcountry Basics: A Definitive Guide to Avoiding Unpleasant Encounters, by Dave Smith (1997). 112 p. Detail-ed, comprehensive, practical information on how to travel and camp safely in bear country. Separates bear facts from anecdotal fallacies.

Spirit Bear: Encounters with the White Bear of the Western Rainforest, by Charles Russell. (1994). 144 p. Kermode subspecies of the black bear. Personal account by one of the people most familiar with bear behavior. Factual observations. Great photos.

Great Bear Almanac, by Gary Brown. (1993). 325 p. Bear species of the world, concentrating on North America. It includes many lists of interesting facts, often comparing the species. Few photos.

Bearman: Exploring the World of Black Bears, by Laurence Pringle. (1989). 42 p. For junior readers. Excellent summary of bear life in Minnesota as discovered by long-time researcher Lynn Rogers. Winner of the John Burroughs Award for nature books for young readers. Great photos.

Black Bears: a Techical and Hunting Guidebook, by Bob McGuire. (1983). 189 p. For hunters—describes successful hunting techniques. Avoids hype and manufactured danger that often accompany hunting stories. Black and white photos.

Polar Bears, by Ian Stirling. (1988). 220 p. The authoritative text on the species. Great photos.

A Shadow in the Forest: Idaho's Black Bear, by John Beecham and Jeff Rohlman (1994). Moscow, ID: University of Idaho

WILD About Bears, by Idaho Department of Fish and Game (1994).

Bears for Kids, by Jeff Fair. (1991). 48 p. For young readers. On black bears. Great photos.

A Field Guide to Mammal Tracking in North America, James C. Halfpenny, (1986). 176 p. One of the best guides to mammal tracking.

Tracking & the Art of Seeing: How To Read Animal Tracks & Signs, by Paul Rezendes, (1995). 320 p. Amazing details, photographs (including scat!), illustrations for over 50 species in North Ameri-ca including black and brown bears.

■ Bear Web Sites

www.bear.org North American Bear Center, Ely, MN.

www.bearstudy.org Wildlife Research Institute, Ely, MN.

www.beartrust.org Bear Trust International, Missoula, MT.

www.bearden.org American Zoo and Aquarium Association's Bear Taxon Advisory Group, Wichita, KS.

www.bear-tracker.com Kim Cabrera's online field guide to animal tracks and tracking.

www.bearsmart.com The Get Bear Smart Society, working to prevent negative human-bear encounters, Whistler, B.C., Canada.

www.lwwf.org Living with Wildlife Foundation, Swan Valley, MT.

■ Journals

For information on current bear research look in these peer-reviewed journals:

BioScience
International Conference of Bear Research and Management
Journal of Mammology
Journal of Wildlife Management
Ursus
Wildlife Monographs
Wildlife Society Bulletin

RESOURCES

■ Children's Books

These fiction and non-fiction picture books and chapter books contain realistic interpretations of black bear life histories, experiences and behaviors.

Ahlstrom, M. 1985. *The Black Bear,* Crestwood House, Mankato, MN.

Alborough, J. 1995. *It's The Bear,* Candlewick Press, Boston, MA.

Bailey, B. 1975. *Wonders of the World of Bears,* Dodd, Mead, New York, NY.

Brenner, B. and Garelick, M. 1989. *Two Orphan Cubs,* Walker, New York, NY.

Bullaty, S. and Lomeo, A. 1983. *The Baby Bears,* Golden Press, New York, NY.

Charman, A. 1989. *The Book of Bears,* Gallery Books, New York, NY.

Crewe, S. and Morton, R. 1997. *The Bear,* Raintree Steck-Vaughn, Austin, TX.

Eberle, I. 1966. *Bears Live Here,* Doubleday, New York, NY.

Fair, J. 1991. *Black Bears: Black Bear Magic for Kids,* Gareth Stevens Children's Books, Milwaukee, WI.

Ford, B. 1981. *Black Bear: The Spirit of the Wilderness,* Houghton Mifflin, Boston, MA.

Freschet, B. 1977. *Little Black Bear Goes for a Walk,* Scribner, New York, NY.

Freschet, B. 1981. *Black Bear Baby,* Putnam, New York, NY.

George, J.C. 1967. *The Moon of the Bears,* Thomas Y. Crowell, New York, NY.

Helmer, D.S. 1997. *Black Bears,* The Rosen Publishing Groups' Power Kids Press, New York, NY.

Karpfinger, B. et al. 1992. *The Wonder of Black Bears,* Gareth Stevens Publishing, Milwaukee, WI.

Kratt, M. and Kratt, C. 1997. *Kratt's Creatures: Where're the Bears?,* Scholastic, New York, NY.

Laycock, G. 1967. *Big Nick: The Story of a Remarkable Black Bear,* Norton, New York, NY.

Liers, E. 1962. *A Black Bear's Story,* Viking, New York, NY.

McCloskey, R. 1948. *Blueberries for Sal,* Viking Penguin, New York, NY.

McClung, R.M. 1956. *Major, The Story of a Black Bear,* W. Morrow, New York, NY.

Murphy, J. and Greene, J. 1993. *Backyard Bear,* Scholastic, Inc., New York, NY.

Pfeffer, P. 1985. *Bears, Big and Little,* Young Discovery Library, New York, NY.

Pringle, L. 1989. *Bearman: Exploring the World of Black Bears,* Schribner, New York, NY.

Robinson, F. and Losa, A. 1992. *Real Bears and Alligators,* Children's Press, Chicago, IL.

Shepard, P. and Sanders, B. 1985. *The Sacred Paw,* Viking Press, New York, NY.

Stirling, I. 1992. *Bears,* Sierra Club Wildlife Library, San Francisco, CA.

Van Wormer, J. 1974. *The Black Bear Book,* Caxton Printers, Caldwell, ID.

Ward, L. 1952. *The Biggest Bear,* Houghton Mifflin, Boston, MA.

Whitehead, R. 1966. *The First Book of Bears,* Franklin Watts, New York, NY.

■ Catalog Resource

Black bear children's books, videos, instructional aids and curriculum guides are available from **Acorn Naturalists,** an educational supply company.

Phone: 1-800-422-8886
Fax: 1-800-452-2802,
www.acornnaturalists.com

▣ BOOKS

Bears: Behaviour, Ecology and Conservation, by Bauer and Bauer.

Bears for Kids, by Fair.

Black Bear: Seasons in the Wild, by Anderson.

Black Bear Reflections, by Jenkins.

Giving Voice to Bear: North American Indian Myths, Rituals and Images of the Bear, by Rockwell.

Bears, Sierra Club Wildlife Library, by Stirling and Lang.

The Everywhere Bear, Stories and Activities, by Robinson.

Outwitting Bears: The Essential Handbook for Living with Bears, by Brown.

Our Wild World Series: Black Bears, by Feeney.

▣ VIDEOS

Eyewitness Bear, Video: 35 minutes.

Bears, Imax Video: 40 minutes.

ACKNOWLEDGMENTS

ACTIVITY CORRELATIONS

State of New Mexico Public
Education Department

*Content Standards and
Benchmarks*

ACTIVITY	Science
Bear Fear *Pg. 22*	
"Bare" Tales vs. Bear Facts *Pg. 24*	Strand I, Standard I, Benchmark I–II. Strand II, Standard II, 5–8 Benchmark I.
Bear Issues *Pg. 26*	
Sleepy Bear *Pg. 28*	Strand I, Standard I, 5–8 Benchmark I–II. Strand II, Standard II, 5–8 Benchmark I–II.
Where Were You When... *Pg. 30*	Strand II, Standard II, 5–8 Benchmark I.
Bear Words *Pg. 32*	Strand II, Standard II, 5–8 Benchmark I.
How Big? *Pg. 34*	Strand II, Standard II, 5–8 Benchmark I.
Foot Loose *Pg. 35*	Strand II, Standard II, 5–8 Benchmark I.
Year Rings *Pg. 36*	Strand II, Standard II, 5–8 Benchmark I.
Great Lips *Pg. 38*	Strand II, Standard II, 5–8 Benchmark I.
How Many Bears Can Live in This Forest? *Pg. 39*	Strand II, Standard II, 5–8 Benchmark I.

Mathematics	Language Arts	Art
	Standard I: Benchmark I A–D, Content Standard II B–C.	
Strand I: Number and Operations, Standard I, Benchmark II–III. Strand IV: Measurement, Standard I, Benchmark I–II.	Content Standard II, Benchmark II–B.	
	Strand: Reading and Listening for Comprehension, 5–8 Benchmark I–A, I–B, I–C. Strand: Writing and Speaking for Expression, 5–8 Benchmark II–A.	
Strand I: Number and Operations, Standard I, 5–8 Benchmark II–III. Strand: Measurement, Standard I, 5–8 Benchmark I–II.		
Strand: Geometry, Standard I, 5–8 Benchmark IV. Strand: Measurement, Standard I: Benchmark II.		
	Strand: Reading and Listening for Comprehension, Standard I, 5–8 Benchmark I–D.	
Strand: Measurement, Standard I, 5–8 Benchmark I. Strand: Data Analysis and Probability, Standard I, 5–8 Benchmark I.		
		Standard 1, Visual Arts, Benchmark A. Standard 2, Visual Arts, Benchmark B. Standard 3, Visual Arts, Benchmark B.
Strand: Measurement, Standard I, 5–8 Benchmark I. Strand: Data Analysis and Probability, Standard I, 5–8 Benchmark I.		
	Strand: Reading and Listening for Comprehension, Standard I, 5–8 Benchmark I–A, B, C. Strand: Writing and Speaking for Expression, Standard II, 5–8 Benchmark II–A, C.	
Strand: Algebra, Standard I, 5–8 Benchmark III.		