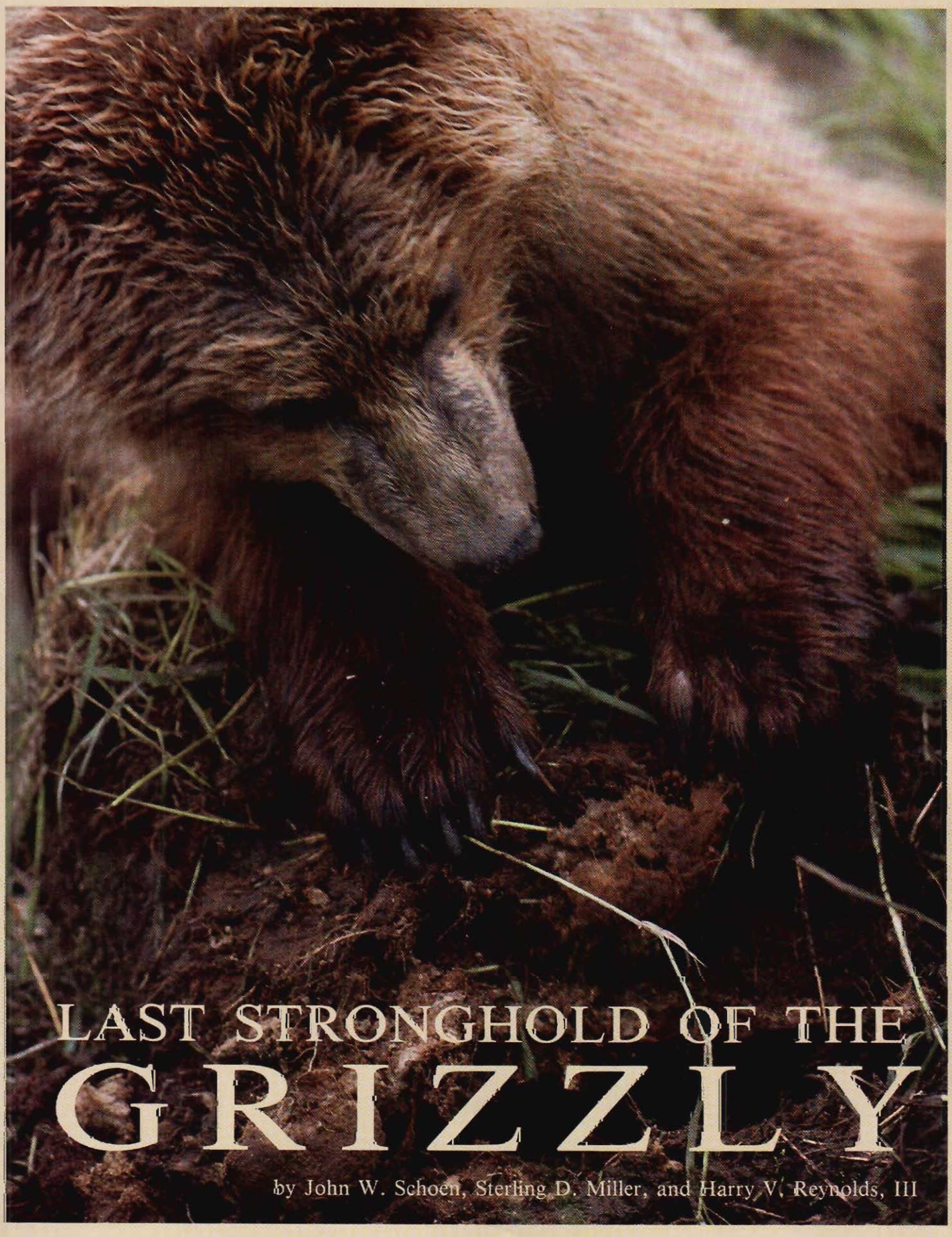


LAST STRONGHOLD OF THE GRIZZLY

by John W. Schoen, Sterling D. Miller, and Harry V. Reynolds, III

J. Hyde

J. Hyde

J. Hyde

J. Schoen

J. Hyde

Brown/grizzly bears find their greatest population density on Admiralty Island in southeast Alaska—almost one bear per square mile. There, on the island known by the local Tlingit Indians as *Kootznahoo*, or fortress of the bears, ancient bear trails, with oval depressions six to twelve inches deep, have made prominent marks on the landscape after thousands of years of use.

Shafts of bright sunlight pierce the thin overcast, and waves of cold mist swirl across the lush alpine ridge 3,200 feet above sea level. It is late June. Several hundred yards away, a dark form appears in the dull grayness, moving slowly and deliberately along the ridge. As the apparition comes closer, it penetrates the thick fog and reveals itself to be a large, dark brown female bear. Following closely behind her are two small cubs, born earlier that year in a rock cave 2,000 feet above sea level, on the steep west face of a mountain peak.

This family group is traveling a distinct trail of large, oval depressions, six to twelve inches deep and three feet apart, in the alpine tundra. These staggered depressions were first pressed into the tundra by bears following the retreat of the ice sheet 10,000 years ago. Since then, countless generations of their descendants have been stepping in the same tracks, and today, the depressions are near-permanent features of the landscape. Southeast Alaska has hundreds of such ridgeline trails, overlooking valleys of old-growth rain forest that stretch unbroken all the way to the coast.

The female guiding her cubs through the mist and down this ancient trail is a grizzly bear. She lives on Admiralty Island, the third largest island in southeast Alaska's Alexander Archipelago. The local Tlingit Indians call the island Kootznahoo, which means fortress of the bears. Admiralty remains a stronghold; recent censuses, based on a mark-and-recapture technique with radio-collared bears, suggest that the 1,709-square-mile island is home to more than 1,500 bears.

With nearly one bear per square mile, Admiralty Island may have the densest concentration of bears in the world. Grizzly density is also high—one bear per every one to four square miles—elsewhere along the southern coast, particularly on the Alaska Peninsula, the Kodiak archipelago, and the southeastern islands of Baranof and Chichagof. Not all parts of Alaska can support so many bears, however. On the coastal plains of the North Slope, there is only about one bear per 300 square miles. This remote country provides only marginal habitat, in contrast to Alaska's southern coast, where winters are shorter and food is generally easier to find and more abundant; indeed, at certain times of the year, food—in the form of spawning salmon—is spectacularly abundant, sometimes seeming to nearly boil from the water as bears cruise the streams in search of an easy meal.

Alaska's grizzlies are currently the focus of intensive study. From the western Brooks Range in the harsh far north to Admiralty in the more accommodating south, a distance of more than 1,000 miles, researchers have been following radio-collared bears from den to death. Alaska's human population has gone from little more than 70,000 just prior to World War II to more than 500,000 today. This population explosion poses a potential threat to the grizzly, and the hope of researchers such as ourselves is that by increasing our understanding of this symbol of the North American wilderness, we may help to determine what it needs to survive in a changing world.

For all Alaskan grizzly bears, life begins in a protective winter den sometime in January or February. In her warm den, safe from howling storms and the murderous intentions of other bears, the female bear gives birth to between one and four naked cubs (two are most common), each weighing less than one pound. The cubs nurse enthusiastically and gain weight rapidly until, upon emergence from the den in the spring, they weigh about fifteen pounds.

Adult grizzly bears, in contrast, neither eat, drink, urinate, nor defecate while in the den, maintaining themselves through metabolism of their fat stores. Biologists now consider the winter dormancy of bears to be hibernation, but unlike other hibernators, the bears' core temperature does not drop significantly. Bears are also easily awakened from their winter sleep, a fact not soon forgotten by biologists working in and around winter bear dens. During the mild winter of 1985-86, for example, many bears (30 percent of all radio-collared bears on Admiralty and Chichagof islands) abandoned their dens in early winter. Presumably, the unusual melting conditions made the dens uncomfortably wet. Later, when the temperature fell below freezing, the bears denned up again.

Alaskan grizzlies begin to emerge from their dens in late March; bears may continue to appear well into June. Dates of den emergence vary annually and regionally depending on spring snow conditions. Males are the first to emerge, followed by single females, females with older cubs, and finally females with newborn cubs. After several months in the den, the bears are lethargic and have to change their metabolism completely. For the first week or so, they may not eat at all, partly because they are so sluggish and partly because the ground is often still covered with snow at this time. As the bears' metabolism gets back to normal, they begin to wander away. Females with newborn cubs, however, usually continue to hang around and sleep in the den for several more weeks.

Life is a risky proposition for newborn grizzly bear cubs. The young animals leave the security of their natal dens at three to four months of age; from 30 to 40 percent will die during their first year. How many and which cubs survive depends on a variety of factors, including population density....experience of the mother....environmental conditions....and chance.

Life is a risky proposition for newborn grizzly bear cubs. The young animals leave the security of their natal dens at three to four months of age; from 30 to 40 percent will die during their first year. How many and which cubs survive depends on a variety of factors, including population density (cub mortality is highest on Admiralty Island, where the dense population seems to encourage attacks on cubs by adult bears), experience of the mother (young mothers appear to lose more cubs), environmental conditions (failure of food crops and inclement weather may increase cub mortality), and chance (accidents and disease). The well-known fierce protectiveness of grizzly mothers doubtless saves many cubs, but even this is not always sufficient to meet the challenges the cubs must face.

For all bears, green cubs and seasoned adults alike, departure from the den site signals the start of the important business of eating. In the next four to eight months, they must build up enough fat reserves to carry them through the next winter in another den.

In early spring, bears throughout the state feed mostly on vegetation, particularly the young, succulent shoots of sedges and grasses, which usually appear first along snow-free river banks and lake edges. In south-coastal Alaska, grizzly bears commonly graze along tidal wetlands. Throughout forested areas, south-facing avalanche slopes are important foraging habitats for bears in early spring. There, they dig for roots and feed on emerging green plants. Omnivores, grizzlies welcome meat in their diet, too. In northern portions of their range, they search for winter-killed moose and caribou; in south-coastal areas, they may scavenge carcasses of deer and marine mam-

mals and feed on eggs deposited by spawning herring on intertidal beds of seaweed.

Later in the spring, some grizzlies prey on newborn moose and caribou calves and, to some extent, deer fawns. In parts of interior Alaska, radiotelemetry studies have revealed that of all the moose calves that die in the first six weeks of life, more than half are killed by grizzlies. Some bears become very efficient predators indeed, capable of pulling down a full-grown moose.

Adult grizzlies, both males and females, will also attack and kill bear cubs. During the breeding season, we often see single bears following closely behind females with cubs along the narrow alpine ridges. On at least five occasions, grizzly mothers are known to have died defending their young. In one case, a radio-collared female was killed and eaten by an adult male while her yearling offspring escaped. In another, a female was killed and her offspring were never seen again.

Irene Vandermolen

Such encounters are not the norm, however. Individual bears will vigorously defend food caches and cubs against any threat, including other bears and, if necessary, humans. But in general, adult grizzly bears go out of their way to avoid each other and are seldom seen in aggregations. Notable exceptions would be sites of concentrated food resources, such as caribou calving areas, garbage dumps, and salmon streams. At McNeil Falls on the Alaska Peninsula, as many as 60 bears have been observed at one time at a single location along the river. The most dominant and aggressive bears usually command the most productive fishing spots. Bears use body language and other signals, including grunts and roars, to discourage others from coming too close to a prized location. When, occasionally, these signals are ignored by an interloper, a skirmish ensues, which may consist merely of a quick nip or whack or possibly a savage charge resulting in serious injury.

Apart from such temporary gatherings, bears seen together are apt to be either a mother and her cubs or subadult siblings. Young bears are generally weaned by their third spring, and by the time their fourth winter rolls around, most are on their own. Siblings may stay together for a year or two after weaning, sharing the same den. But as they approach breeding age, they adopt the more typical solitary grizzly life style.

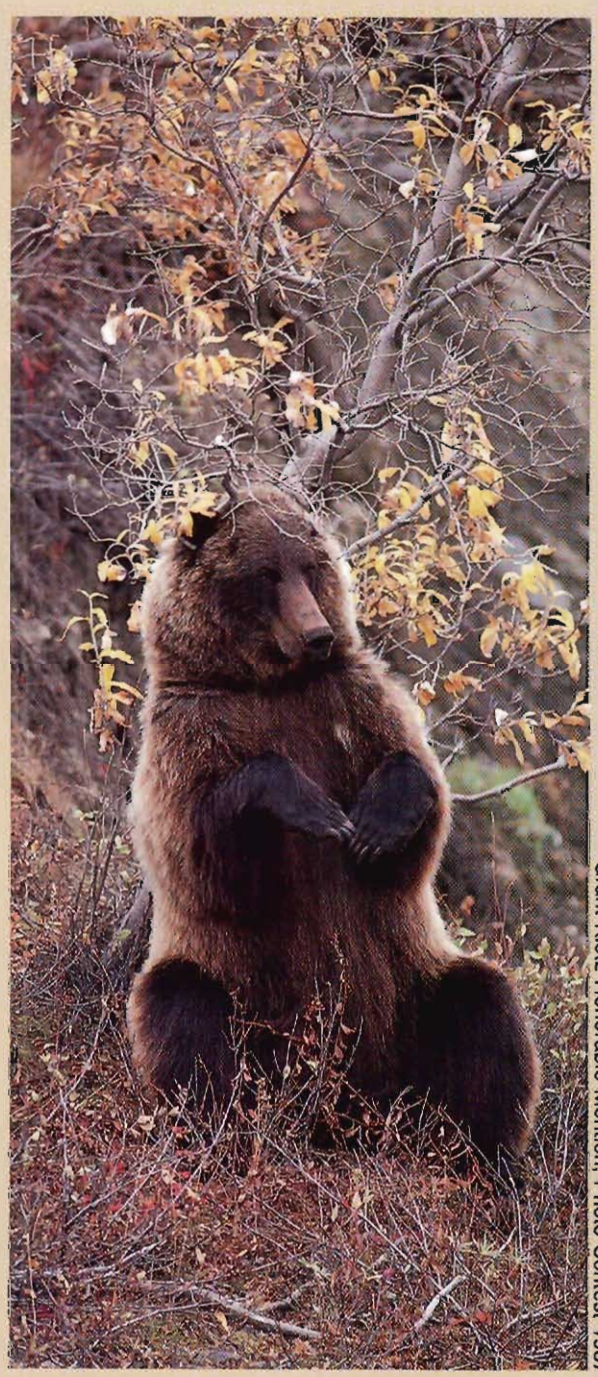
There is one activity, of course, that requires contact: mating. Alaska grizzlies breed between mid-May and July. In southern regions of the state, females may first breed as four- or five-year-olds, while farther north they may not breed until they are seven, eight, or even older. The female is receptive for ten to fourteen days and a male may stay with her throughout the entire period. If a cub dies during the May to July breeding season, its mother will quickly come into estrus. This may explain some of the infanticidal behavior of adult males.

During the breeding season, males travel widely looking for receptive females. Serious fighting between males often occurs at this time. These fights may produce numerous, deep, open wounds, and many mature males carry scars from battles of previous years.

When a male finds himself alone with a female, he may stay with her for a week or more—the bears need time to break down their antisocial tendencies and open the way for more amorous leanings. One June, we observed a radio-collared female keeping company with what we presumed to be the same male for several weeks. The pair remained within a relatively small patch of tidal wetland adjacent to a spruce forest. They frequently walked side by side, sometimes in a large circle, seemingly oblivious to everything around them.

Following copulation, the fertilized egg floats free in the uterus until the fall, when the mother retires to her den. Only then is the egg implanted into the uterus wall. A short two to three months later, the helpless young are born. Relative to the mother's weight, bear cubs are proportionately smaller at birth than most other mammals. The average interval between litters of cubs for female grizzlies in southern Alaska is three to five years and sometimes much longer in the north. This long interval, combined with the small average litter size, means the reproductive potential of grizzly bears is low. How serious the practical consequences of this low reproductive potential can be is painfully clear in the Yellowstone ecosystem. There, where perhaps 200 grizzlies remain, scientists have calculated that the annual loss of only one or two reproductively mature females may mean the difference between maintaining a stable grizzly population and movement towards extirpation.

By mid-July, the breeding season in Alaska is beginning to wind down. Depending on the timing of local fish runs, coastal grizzly bears start searching for fish streams. By late summer, most grizzlies along the southern coast are exploiting the rich bounty of salmon returning from the sea to spawn in Alaska's rivers and streams. Bears are great individualists, and their different approaches to fishing exemplify this. Some bears are very patient, standing quietly in shallow eddies. (The best fishing holes are usually narrow, shallow tributaries, where fish are easi-



Grant Klotz Honorable Mention, Photo Contest 1987

Brown/grizzly bears of interior Alaska, like these photographed in Denali National Park, are smaller than bears to the south but inhabit larger home ranges, the largest ever recorded being 2,287 square miles.

ly caught.) There they efficiently trap fish against the stream bottom with their forepaws and then lift them out of the water with their massive jaws. Others are aggressive fishermen, running up and down the stream or even diving into the shallow water after the fish, sometimes with marginal results. A few bears will swim around in deep pools and dive for dead fish lying on the bottom. Some simply steal from other bears or scavenge partly eaten salmon carcasses along the stream bank. Along with such temperamental differences, experience plays a big role in the development of a bear's fishing skill; older bears tend to be more efficient.

J. Hyde

The salmon season is a time of plenty, and the largest grizzlies are those whose home ranges include this abundant, nutritious food resource. Females attain weights of 400 to 500 pounds, while adult males commonly weigh from 500 to 900 pounds. On the Alaska Peninsula and Kodiak Island, individuals occasionally top 1,200 pounds. In contrast, bears on the North Slope, where food is relatively scarce, weigh much less; males there average 380 to 450 pounds and females 200 to 240 pounds.

While northern bears are smaller than southern ones, their home ranges are much larger: females average 130 square miles on the North Slope versus 10 square miles on Admiralty Island. In all areas, males' home ranges are from two to four times larger than the females'. The largest home range ever recorded for an Alaskan grizzly was 2,287 square miles in south-central Alaska—almost twice the area of Rhode Island.

Once an adult bear establishes a home range (usually at about four to six years of age) it is generally faithful to that area in subsequent years. Young males are apt to wander in search of new horizons, while many subadult females stick

Biologists generally agree that the North American, European, and Asian brown and grizzly bears all belong to the same species, *Ursus arctos*. In popular usage in North America, however, a distinction is frequently made between the larger and usually darker colored "brown" bears of coastal areas and the commonly smaller and lighter colored "grizzly" bears of interior areas. In Alaska, the confusion between taxonomy and the public's perception has led to biologists using the term "brown/grizzly" when discussing this animal.

close to home, on ranges within or adjacent to their mothers'. Interestingly, the females' limited wanderlust may significantly affect their diet. For example, for four years in a row, when most of the Admiralty Island bears moved down to coastal areas to feed on salmon, four of our radio-collared females remained on their inland, high-elevation home ranges, feeding on succulent vegetation, roots, berries, and small mammals. Presumably, these females, having established home ranges near their mothers', were simply unaware of the productive fish streams only a few miles away.

In northern Alaska, the low density and large home range size combine to keep bears apart. In the south, however, the bears have to work a little harder to avoid each other. Intensive observations of twelve radio-collared bears on northern Admiralty Island have revealed that the animals space themselves out along the densely forested salmon streams. An extensive system of bear trails occurs along these streams, and here and there along the trails are distinctive "marking trees," which are scraped, bitten and rubbed in the same spot by the bears year after year. Perhaps these trees are signposts, enabling bears to tell when others are present and thus reducing the risk of conflicts.

Autumn comes early to Alaska and with it, the bears' last chance to fatten up for the winter. In northern portions of the state, bears feed extensively on ground squirrels, soapberries, blueberries, and occasionally carrion. Berries are especially rich in carbohydrates, which convert quickly and easily to fat. Grizzlies also kill moose and caribou injured during the rut. Farther south, they may fish late salmon runs—sometimes even into December, well after the first snowfall. Usually, however, most bears leave the fish streams in September, moving upward in search of late berry crops, particularly devil's club, currants, and blueberries.

Cold temperatures and snow begin to arrive in northern Alaska by mid-September. Following the first major storms in October, bears start to den. Unlike the black bear, which readily climbs trees and can enter hollow trees, through holes high off the ground, the heavier grizzly, with its straighter claws, climbs with difficulty and so must den at ground level. In the north, most grizzlies dig their dens on steep, south-facing slopes after the topsoil has frozen hard enough to provide support. A typical den consists of an upward-sloping tunnel ending in a chamber about four feet in diameter. Bears commonly build a nest of vegetation on the floor of the chamber. The den, which is usually buried under deep snow as winter progresses, provides a warm microclimate in which the bear can hibernate comfortably, while outside, temperatures may fall below -50°F. These kinds of dens usually collapse in the spring thaw and are not used again.

In south-coastal regions, bears excavate their dens on steep, high-elevation slopes, often under a large spruce tree or right into the base of a large snag. On Admiralty, where natural rock caves are abundant, they are the preferred den sites. The ceilings of some rock dens have been rubbed smooth by centuries of use by bears.

Pregnant females, followed by females with cubs, are the first to enter fall dens—usually during the first two weeks of October. Single females den next, followed by males. With the exception of females with cubs or subadult siblings, bears usually den alone. By late November to mid-December, most of Alaska's grizzly bears have retired to await the coming of a new year and a new generation.

The grizzly is a sensitive indicator of man's effect on his environment. Almost everywhere in the original range of this species, the increased presence of humans has directly correlated with the extirpation or significant reduction of local bear populations. The decline of the grizzly over most of North America can be traced to human ignorance or, where important grizzly habitats overlap valuable economic resources, unwillingness to accommodate the ecological and behavioral requirements of the bear. As the landscape is subdivided and resources allocated to a variety of uses, usually little consideration is given to assuring the long-term survival of the grizzly. Some scientists believe that in the isolated Yellowstone ecosystem, the grizzly may well not survive another century.

In Alaska, grizzlies are still abundant, fishing the same streams and traveling the same age-old trails as their ancestors did thousands of years ago. But many of the same pressures that led to the species' disappearance elsewhere are becoming evident in Alaska. Accompanying the tremendous increase in the human population has been a boom in oil and gas drilling, logging, mining, agriculture, road building, and recreation (including hunting) in parts of the state formerly only little used by humans. Also, throughout Alaska, both state and federal governments are transferring large areas of public lands to private ownership.

Of the many human activities that pose at least a potential threat to the bears, extensive timber operations are of particular concern. In southeast Alaska, for example, logging on both public and private lands affects thousands of acres of grizzly habitat annually, making formerly undeveloped watersheds more accessible to humans.

Another important source of human-caused mortality of Alaskan bears is improper garbage disposal, which attracts bears into field camps and small communities. As the bears become habituated to humans, they become a threat to life and property. In the end, such bears are usually destroyed. Inevitably, the more opportunity people have to interact with bears, the more bears will be killed: some illegally, some by people defending themselves or their property against aggressive bears, and some in the course of legal sport hunting. Only the last can be effectively regulated.

(Continued on page 33.)

Grizzly Bears

(Continued from page 7.)

We still have the potential to provide the kind of enlightened management that the bears will need to survive. For example, we can encourage or require logging camps, mine developers, and small communities to install fuel-fired incinerators; this would significantly reduce the need to destroy "problem" (garbage-habituated) bears. Road development in important bear habitat could be minimized, and a few key watersheds could even be withheld from development entirely. But proper management of the human-bear relationship will not be established without farsighted planning, considerable effort, and, in some cases, relinquished opportunities for short-term economic gains. In all likelihood, the future of the grizzly bear in Alaska, and elsewhere, will depend more on creative people management than on wildlife management.

John W. Schoen, Sterling D. Miller, and Harry V. Reynolds III serve as Game Biologists for the Division of Game, ADF&G, in Juneau, Anchorage, and Fairbanks respectively.

This article first appeared in ***Natural History*** *(January 1987). The content of that article is presented here with permission from* ***Natural History,*** *Vol. 96, No. 1;*

Satisfaction

(Continued from page 25.)

of the valley.

As I got close to the edge of the little muskeg, I noticed faint tracks ahead on a little knoll. The animal was either traveling in the same direction as I or coming from where I was going. A closer look showed the tracks were made by a marten as it bounded toward the middle of the muskeg. The pairs of footprints, two to three feet apart, exhibited a pattern I had learned to recognize as having been made by members of the weasel "family."

As I followed the tracks into the muskeg my interest picked up. The tracks turned and led straight for a little pine tree. For some reason the marten seemed aware that this particular tree held something special. I already knew that tree was no ordinary lodgepole pine in a muskeg. I could see where the tracks disappeared under the branches at the base of the tree, and I started to run.

My anticipation was almost overwhelming as I peered around the tree. About two feet off the ground, a small box had been nailed to the tree trunk. From the inside, a bushy black tail curled out and over the corner. I had caught a marten! I parted the branches, ignoring the snow that fell on my head and shoulders, and knelt down by the box. Carefully, I pulled the animal and trap out the top.

Kneeling in the dim light under the tree, I held the marten close to my face against the darkening sky showing through a hole in the boughs. It was a beautiful lemon-colored male with a fine winter coat. From that moment, his "coat of gold" was etched into my mind for all time.

Through a combination of my wits, a bit of luck, and a fatal mistake, this little marten and I had come together. I tried to mentally reconstruct what had happened in the 24 hours since I had set the trap. The marten's tracks were fresh in the new snow and its body was cold but not frozen. That meant it had come to the trap in the early morning hours. The tracks told me the lure of the salmon head had enticed this little predator from over 50 feet away, as his trail had turned on the knoll and then led straight to the tree.

I was pleased with myself because my plan had worked perfectly. Positioning the box correctly was important to its success. By placing the box vertically on the trunk, I made sure that any animal wanting to get at the bait would have to climb the tree and drop in from the top where the entrance was carefully guarded by a "Conibar"body trap. Birds would not get into the trap because the bait was hidden at the bottom, and mice or other small creatures could not eat the bait since it was above ground. The overhanging branches prevented snow from filling the box just as the tree canopy protected the trail. This kept the set operative even during severe storms.

When the marten entered the hole, the trap did its job well. As the animal dropped, the "Conibar" straddled the shoulders—and instantly half of the trap closed over the ribs while the other side snapped around the neck. This marten died in a matter of seconds, and I was pleased that not only had my device worked exactly as it was supposed to, but also with a minimum of pain to the animal.

I checked the bait to make sure it was okay while reflecting for a minute on the benefits of this particular salmon bait. Back in August, I had caught that 12 lb. silver on a camping trip with friends. The fresh-run fish was fun to catch and we were pleased with the meal of rich red fillets. My English pointer was pleased as well, because he got to savor cooked salmon fins and bones "au jus." And now the head of that fine fish, carefully saved for five months for this very purpose, had brought me a nice marten in December. It was satisfying to know the fish had been used several times over and my satisfaction had not simply ended when the fish was caught.

I quickly reset the trap, picked up my treasure, and headed back down the trail. Even though the forest was fading into darkness, I was oblivious to everything but the dim trail under my boots. I was thinking about a hat. An American Sable hat—and half of it was right here between my mittens.

Tomorrow, perhaps next year, I might be lucky enough to catch another marten exactly like this one. Southeast marten come in as many colors as a king salmon has spots and it can be difficult to get two or three animals the same color. When that day comes, I'll have my nice warm hat. Whenever I wear it, I will think about this fine day in the woods and this beautiful animal taken under a little pine tree high in a mountain valley.

Steven R. Peterson serves as Game Research Chief, Division of Game, ADF&G, Juneau.

Alaska Fish & Game

November-December 1987

$2.00