



Harry V. Reynolds III

North Slope Grizzlies

by Harry V. Reynolds III

It is early April in the mountains of the Brooks Range but the land is still locked in the hold of winter. During December and January the sun did not break above the horizon and temperatures plummeted to -50 degrees F. Now the sun shines for 18 hours and the air has warmed to -20 degrees F. In this cold desert-like environment, as little as 10 inches of precipitation may fall yearly, and most is dropped as snow; prevailing winds may pack this snow to such hardness that a man can walk on it without leaving tracks. Beneath the snow, low arctic vegetation covers the lower slopes of ridges and mountains protected from the winter wind while scattered patches of willows occur along the river valleys. There are no trees north of the range's crest and many parts of the mountains are rocky and barren of all vegetation.

Beneath a 12 foot snowdrift, high on a steep mountain slope, a male grizzly bear (*Ursus arctos*) begins to move within his winter hibernation chamber. He has completed digging a tunnel

through the snow but for another 10 days will continue to use the den chamber during periods when the temperature drops.

After emerging from his den, he travels northward along the frozen rivers. Unless he can find a moose which died during winter or the remains of a caribou killed by wolves, there will be little to eat that is not covered by last winter's snow. Like other bears emerging from dens, he must depend largely on last summer's fat reserves until the snow melts. This may be the most difficult time of the year for the grizzly to find nourishment. Although the majority of his food is made up of grasses, sedges, roots, and berries, he occasionally kills on his own but, more often, appropriates kills made by other animals.

The northern lands in which it lives provide only marginal habitat for this grizzly. Long winters and short cool summers limit the growth of plants which are the mainstay of the bear's diet. When the snow begins to melt in May, the bear will dig for roots of vetch and Eskimo potato along the river valleys and



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south-facing hillsides. Later in the month, the snow will begin receding from the mountain slopes and foothills but will not disappear from the northern coastal plain until mid-June. Like other grizzlies in the North Slope population, he has been shaped by the harsh environment and has adapted to it.

There are relatively few bears in this vast wilderness of wetlands, rivers, and mountains which spans 640 miles from east to west and lies at only 21 degrees latitude south of the pole. On the North Slope, the density of the population is dependent on the quality of the habitat, which is shaped by the area's climate, topography, and vegetation. In the eastern and western Brooks Range, the availability of caribou from the Porcupine and Western Arctic caribou herds, respectively, also affect bear density. In places of good bear habitat, densities may reach 63 bears for every 1,000 square miles, but in poor habitat of the wet coastal plain south of Barrow, only an estimated three bears are present for every 1,000 square miles. If all available habitat is considered, some of which is rarely or never used, densities are one bear per 100 square miles.

Grizzlies of the North Slope are smaller than their southern relatives. In early summer, adult males weigh an average of 400 pounds, while an unusually large bear can reach 600 pounds. Females are much smaller, weighing about 220 pounds. By comparison, adult male grizzlies in Wyoming weigh from 500 to 1,100 pounds and records indicate that exceptionally large bears on the Alaska Peninsula have reached 1,300 pounds.

By early May, snow is beginning to melt on exposed ridges and the sun shines 24 hours a day. Females with one to three cubs begin to emerge from their winter dens. The cubs, born in the den in January, weigh no more than one pound at birth. Now they weigh close to 15 pounds a piece. Their weight gain during the next three years will be slow. By the time they are weaned,

perhaps as late as their fourth summer, they may approach three-quarters of their mother's weight.

By mid-June, arctic rivers are rushing through ice-choked channels and the first flowers are in bloom. The bears may move into Brooks Range valleys to graze on succulent shoots. Horsetails are an important food plant during this time of year, as is Richardson's saxifrage. In the foothills and coastal plain of the eastern and western Brooks Range, cows from the two largest caribou herds in the state migrate from their calving grounds each year during mid-June and early July. Grizzlies in those areas supplement their vegetative diets by scavenging or killing caribou cows and newly-born calves which move through their home ranges. The availability of caribou from the Western Arctic herd in the western Brooks Range and the Porcupine herd in the Arctic National Wildlife Refuge (ANWR) is responsible for the higher productive capacity that bears in these areas exhibit in comparison to other grizzlies of the North Slope.

June also marks the height of the grizzly breeding season which lasts from late May to early July. Adult males travel extensively during this period in search of receptive females. Whether females will accept the attentions of a male depends on several factors. Those females which have weaned their offspring during spring come into estrus, or breeding condition, shortly afterwards. In addition, males often attempt to stalk and kill the young accompanied by females; newly-born cubs are especially vulnerable. If a female is unable to protect her offspring and the cubs are killed by a male prior to the breeding season, she will come into estrus within three weeks. Although the advantage of this behavior to the population is unclear, it may provide the individual male greater opportunity to breed and a better chance that his genes persist in the population.

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After a breeding pair separates, each bear may continue to search for new mates. On the North Slope of the Brooks Range where population density is low, more than one female may be attracted to a male. In such cases, the male's attention is usually focused on the most receptive female; the "rejected" female may move on in search of another male.

Although breeding takes place in midsummer, the embryo develops only for a short time and then undergoes a dormant phase until late November. This reproductive mechanism, called delayed implantation, allows fat reserves in females to increase

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throughout the summer season without the physiological drain of a developing embryo. Actual fetal growth lasts only two months until the cubs are born. Although the mother continues to maintain the low metabolic rate of winter dormancy within the hibernation den, she periodically awakens to suckle her helpless young.

The bears of the North Slope have a low reproductive rate. Females produce young for the first time at an average age of seven years, but some do not have cubs until they are 11 or 12. Also, on the average, they have litters every 4.2 years, so that even if a female is productive until the age of 22, she would have an average of fewer than seven young during her lifetime, if they all survived. This compares with a theoretical production of more than 13 young for female grizzlies from Wyoming or the Alaska Peninsula. In order to compensate for this low productivity, females often do not leave their offspring until their fourth spring. This long period of maternal care provides these young with better chances of survival: they are more familiar with the habitat within their mother's home range; they have a better capability to avoid confrontation with larger, more aggressive bears; they have greater experience in den site selection and foraging strategies; and their period of greatest body growth has occurred so that more nutritional intake can be used to prepare for winter dormancy and sexual maturation.

Individual grizzly bears do not have territories which they

protect from trespass by all other grizzlies. A grizzly's home range, or the area in which it lives, is usually included in the home ranges of a number of other bears. However, excluding family groups, grizzlies are usually solitary except during the breeding season or at a food source. In these mountains, adult males have home ranges as large as 1,000 square miles. Females have ranges from 40 to 340 square miles. Sows with cubs of the year have the smallest ranges, but, as the young grow and food demands for the family increase, the size of the range increases.

Within any home range the actual area which a bear uses for foraging, denning, and breeding is relatively small and is often restricted to river valleys, a few tributary drainages, or ridge slopes. Because of the rugged and unproductive nature of much of mountainous country, only a fraction of such land can provide the types of habitat necessary for the grizzlies' livelihood.

By late summer, ripening berries become a major food source for Brooks Range bears. Grizzlies are seen along the gravel bars of the river valleys feeding on soapberries. Another major food source during this season is arctic ground squirrels. Grizzlies move to river bars and well-drained ridges and excavate colonies of these rodents. Moose or caribou disabled by fighting during the rut may also be killed by bears. When a large mammal is killed, an individual grizzly will eat his fill, bury the remains with grass, willows, or other vegetation, and lie on or nearby the carcass to protect it from other bears or scavengers. If a grizzly makes such a kill late in the fall, he may stay with the remains until consumed, long after the usual time for hibernation.

Cold temperatures and snow arrive in the area by mid-September and following the first major storm in October, the bears begin to den. In the Brooks Range, grizzlies most frequently den on south-facing slopes after the top soil layers have frozen hard enough to provide support for the structure. Good den sites have certain characteristics: the soil must be well drained, the permafrost layer must be at least three feet below the surface, and there must be a supply of vegetation nearby. Dug dens consist of a tunnel sloping upward to a chamber about four feet in diameter. The bear scrapes vegetation from nearby slopes and drags it into the den to form a sleeping mat. Sometimes grass and woody shrubs are used to fill a portion of the den entrance. This construction serves to provide a warm microclimate for protection against wintry elements and helps to limit the energy expended by bears to maintain body functions and thus limits weight loss during hibernation. Because the den entrance is small and at a lower level than the bed, after the entrance is covered by snow, there is very little heat loss to the outside. In addition, the nest of vegetative bed material in the den chamber may be up to 16 inches thick, providing an insulative layer between the bear and the frozen earth.

New dens are constructed each year because old dens usually collapse during the spring thaw. Most grizzlies enter dens within a two-to-six-day period in early October. Pregnant females den earliest, followed by adult females and subadults of both sexes. A few bears, most likely adult males, are active until early

November. After the onset of denning, bears may occasionally leave their dens for short periods but most remain inactive throughout the long dark winter until the sun returns in the spring and another cycle of seasons begins.

In the Arctic, the sparse population density and low reproductive rates which are characteristic of all grizzly populations are even more pronounced. As a result, grizzly populations here are much more vulnerable to any changes affecting their ecosystem. Although healthy grizzly populations still exist within the remote mountain valleys, foothills, and coastal plain of the North Slope, they are no longer isolated from the presence of man. Increased access to previously remote areas places bear populations at greater risk. Bear populations can be influenced by human development indirectly through habitat loss and fragmentation, or directly through increased mortality.

The actual area of habitat lost to grizzlies due to any one development is usually relatively small, but the potential of human-bear encounters associated with such development can be more serious. For example, the acreage occupied by a construction camp in a bear's home range would have negligible effect on the amount of vegetation available to the bear. But many bears are attracted to camp odors, thus increasing their interactions with humans. This often leads to a situation in which a bear repeatedly endangers human safety and must eventually be shot. Similarly, the more extensive a network of roads or developments is, the more likely will be human contact with wide-ranging bears. Land managers and industry can reduce the possibility of such encounters becoming fatal to bears by requiring fencing of development sites to exclude bears, by completely incinerating refuse to reduce the attraction of dumps to bears, and by consolidating roads and development sites and placing them in least preferred habitats. Education of workers and recreational users about their responsibility to avoid conflicts is important; stringent enforcement of regulations against feeding bears is essential. In the Prudhoe Bay area, Alaska Department of Fish and Game (ADF&G) studies, supported by oil industry, are presently assessing the effectiveness of these and other measures in reducing conflict between humans and bears in the Prudhoe Bay oilfields.

Direct human-caused mortality includes those bears killed by hunters, those killed in defense of life or property, and those killed illegally. Bears are more vulnerable to hunters on the North Slope than in most other areas because visibility is good, there is a lack of hiding cover, and access along many of the river courses is relatively easy. Access has also increased as a result of construction of the Dalton Highway to Prudhoe Bay. The effects of hunting mortality have been kept within broad sustainable limits for North Slope populations through changes in harvest regulations, which are based on harvest records and information from grizzly bear population research. As access to the North Slope continues to increase, more intensive manage-



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ment may become necessary. Even so, of the threats to population well-being, hunting mortality is the easiest to deal with, since it can be managed by changing regulations.

Diminishing the number of bears killed by poaching or in defense of life or property is more difficult. Like humans, grizzlies are at the top of the food chain and often compete with man for the same resources or habitat. They travel over vast areas, use a wide range of foods, and are opportunists when it comes to taking advantage of food resources. This brings bears in conflict with man when bears attempt to take advantage of the good smells they detect, whether emanating from a berry patch, a hunter's recently killed moose, or a mess hall at a highway camp. If bears are not rewarded by obtaining food during contacts with man, situations in which bears must be destroyed to protect human safety are less likely to develop. (An ADF&G brochure entitled "Bear Facts" outlines methods of avoiding confrontations with bears.)

Assuring that grizzly bear populations remain an integral part of North Slope ecosystems will be a challenge for Alaska's future. As a society, we value all wild species and affirm the importance of maintaining them where they now occur. Since the early 1970s, ADF&G has conducted research on this region's grizzlies. With cooperation and support from the National Park Service, Bureau of Land Management, private industry, and others, we have gained a greater understanding of basic biological facts about the workings of grizzly bear populations. However, in order to respond to the pressures which increasing human presence will place on North Slope grizzlies, we will need to know more. Explicit knowledge of the inner workings of specific populations will be necessary to avoid or mitigate the impacts related to development. By gaining a better understanding of what grizzly populations require from their environment, man can help to maintain the ecological system of which these bears are an integral part. Only with the commitment by the public and industry to minimize the effects of our presence can we assure that grizzlies continue to roam the North Slope for centuries to come.

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