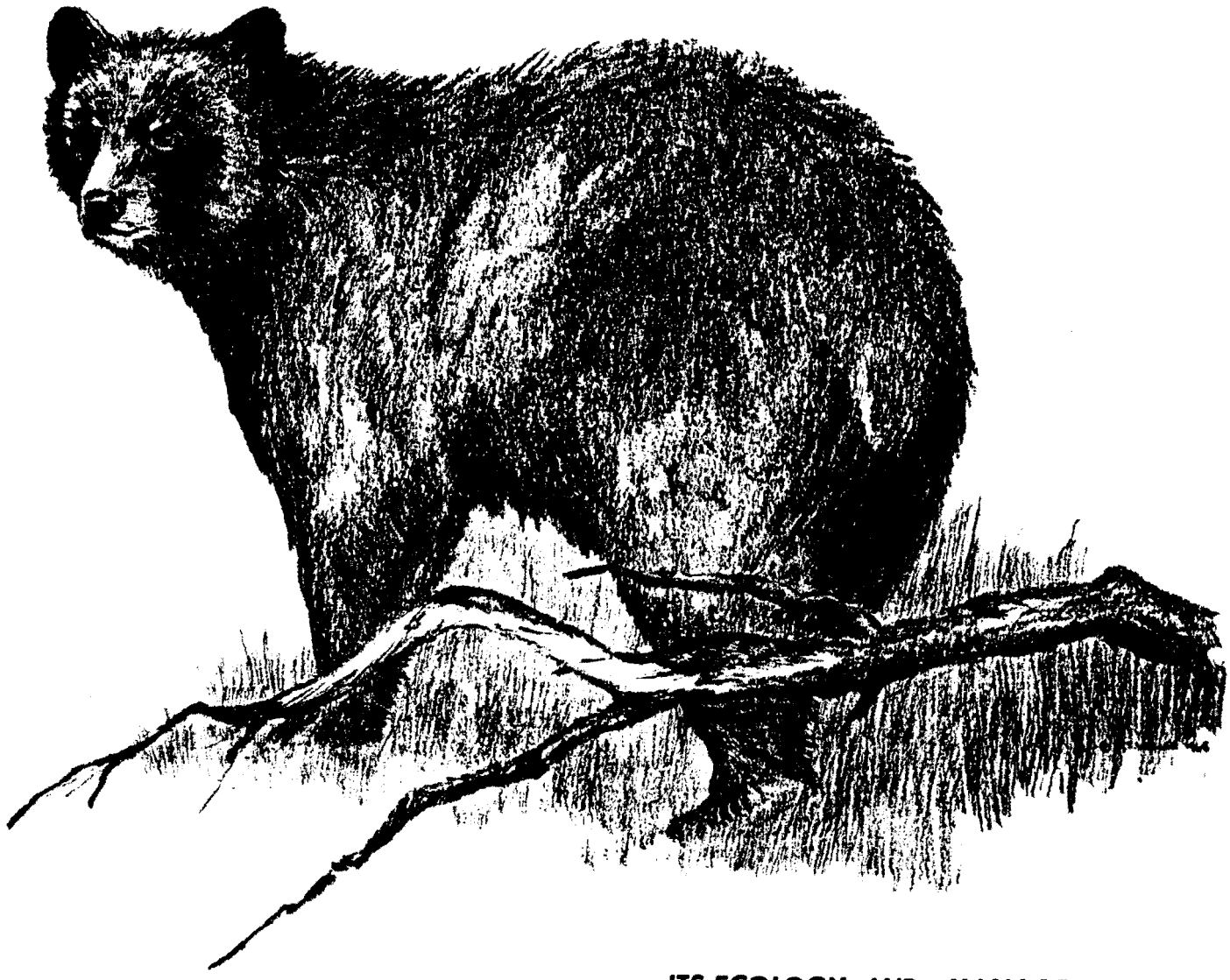
THE

BLACK BEAR

IN ALASKA



ITS ECOLOGY AND MANAGEMENT

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by

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THE BLACK BEAR IN ALASKA

In Alaska the black bear (Ursus americanus Pallas) is a common and important member of our native fauna. It is, however, one of our least understood big game species, and knowledge of its status, general biology and ecology is imprecise and dependent largely on cursory observations and understanding of the species elsewhere.

GENERAL DESCRIPTION

So commonly is the black bear written about in children's stories and represented in zoos, that he is familiar to all. Bulky in build, he is quite variable in size dependent upon sex, age and time of year. As adults, males attain twice the size of females and may weigh as much as 500 pounds. Specimens exceeding 300 pounds are exceedingly rare, however, and the most common weight is between 100 and 200 pounds. Fall specimens weigh 20 to 30 per cent more than equivalent spring specimens (Erickson and Youatt, 1961).

The usual color of the black bear is jet black with a distinctive brown muzzle and small white chest patch. Several color variants occur, however, sometimes within a single litter. In the western contiguous states a light brown color phase is very common. This color phase is not generally encountered in Alaska. In more than adequate replacement, however, nature has awarded Alaska the unique blue or glacial phase and a rich, luxuriant-brown chocolate phase. The glacial phase is extremely rare and is principally confined in its distribution to the Alaska coastal areas lying between Cross Sound and Cape St. Elias in the Southeastern Gulf of Alaska.

Black bears of the chocolate color phase are frequently mistaken for brown bears or grizzly bears in Alaska. This is attested to by the fact that professionally guided hunters not infrequently present black bear hides to the Alaska Department of Fish and Game for sealing as brown or grizzly bears. To be sure, specimens in the field, unless observed at close range, may be easily confused.

Several criteria may be used to identify specimens in hand. Most positive identification is possible by examining the upper rear (3rd) molar teeth. In the black bear these are less than 1-1/4 inches (32 mm.) in length measured parallel to the gum line (the mesial distal measurement) while in the brown-grizzly bear the 3rd molar teeth exceed that length. Often, however, identification must be made on the basis of hide examination alone and here absolute identification may be difficult. The claws are perhaps the best criteria. Those of the black bear are shorter, more sharply curved, and less massive than those of the Brown-grizzly bear. Though quite variable in length, depending on the size of the animal and the degree of wear, claws of black bears seldom exceed 1-1/2 inches while those of the brown-grizzly are rarely less than 1-3/4 inches long. A less variable character, however, is that in the black bear, the hair of the paws extends almost to the claw tips, while in the brown-grizzly bear the claws are exposed at least 3/4 of an inch beyond the hairline. Black bear cubs of the year are readily distinguished from young brown-grizzlies: A distinctive feature of most of the latter is a characteristic white collar band which persists through most of the first summer of life.

Hall and Kelson (1959) recognize four sub-species of the black bear in Alaska. Included is the type species, (Ursus a. americanus Pallas) the most widely distributed of all the subforms. In Alaska, Ursus a. americanus occupies all of the inhabitated range except the Kenai Peninsula where Ursus a. perniger is recognized, and the coastal areas south of the Bering Glacier and west of the St. Elias and coast ranges. In the coast area of Southeastern Alaska Ursus a. emmonsii is designated to the north of Cross Sound and Lynn Canal, and Ursus a. pugnax to the south. Emmonsii is primarily recognition of the unique glacial or blue color phase reported infrequently, but exclusively, from this region.

The taxonomic classifications of the black bear appear in need of critical review. Some forms are described on the basis of only a few specimens and little consideration has been given to the fact that the species, even within restricted geographical areas, is highly variable in form, cranial features and pelage. (See for example the extensive descriptions and redescriptions cited by Hall and Kelson.)

DISTRIBUTION AND ABUNDANCE

The black bear is distributed over about three-fourths of Alaska. There are apparently no substantiated records of the species north of the Brooks Range, nor from the Seward Peninsula, the Kuskokwim Delta, the Alaska Peninsula south of the King Salmon River, the Kodiak Island group, or the larger islands in southeastern Alaska north of Frederick Sound. The distribution of the black bear on the islands in southeastern Alaska is particularly interesting. These areas were almost completely covered by ice during the late-pleistocene period and (re)invasion by mammals apparently occurred either from the Bering Sea-Interior Alaska refugium to the north or from the refugium south of the continental ice sheet (Klein, 1963). The black bear appears to have arrived from the south. Why it has failed to establish on the larger islands north of Frederick Sound poses an interesting question. Access to Admiralty Island seems possible, although a narrow expanse of open water may constitute a barrier. Black-brown bear strife seems an unlikely reason for the failure of black bears to spread to these islands since overlap of their ranges occurs in a number of other areas in Alaska. The black bear is a forest species, and in Alaska as elsewhere its distribution coincides closely with the distribution of forests. It has a decided preference, however, for "open" forests rather than heavy timber and maximum populations generally occur in areas of broken habitat types. Semi-open forest areas composed primarily of fruit-bearing pioneer shrubs and herbs, lush grasses and succulent forbs are particularly favored. Expansive open areas are generally avoided by black bears.

Very little is known of the abundance of the black bear in Alaska, or for that matter, elsewhere. Areas of high relative abundance are known to occur in a few places such as on Prince of Wales Island in southeastern Alaska. Elsewhere in the state black bear numbers are likely more sparse than in more southerly climes where longer foraging seasons and richer food complexes appear to favor greater densities. In such types, densities may exceed one bear per three square miles. An educated guess would place the number of black bears in Alaska at not less than 15,000.

POPULATION DYNAMICS

Information of the population dynamics of the black bear

in Alaska is sketchy but there is no evidence to suggest that the basic life history of the species differs significantly from what has been reported elsewhere.

Breeding records for captives and wild marked bears indicate that both sexes attain puberty at approximately 3-1/2 years (Baker, 1912; Erickson, 1964; Gerstell, 1939; and Winsatt, 1963). Breeding takes place throughout the range of the species from approximately mid-June through mid-July (Rausch, 1961). Although records are few, coitus has been observed in interior Alaska on June 19, (Bentley, per. comm.), in Michigan on July 4 (Erickson and Nellor, 1964) and in Ohio during June and July (Baker, 1912). During the breeding season the female exhibits a period of continuous heat (seasonally constant estrus) and remains in heat until bred (induced ovulation) (Erickson and Nellor, 1964).

Gestation lasts approximately seven months. There is, however, almost no active embryonic growth during the first half of pregnancy. Presumably this is due to a delay in the implanting of the embryo since the corpus luteum (indicative of a shed egg) is formed shortly after breeding (Erickson and Nellor, 1964). Implantation occurs approximately December 1 (Winsatt, 1964). Following first conception, breeding occurs during alternate years unless the cubs are lost or separated from the mother prior to or during the following breeding season (Baker, 1912; and Erickson, 1964). When with young the suckling stimulus presumably inhibits ovulation and this the alternate year breeding cycle (Cowan and Guiguet, 1956).

The birth and early life of a bear is one of nature's most remarkable phenomena. The young are born most generally during late January or February while the mother is winter-denned. At birth the cubs weigh only 8 to 10 ounces, the eyes are closed and they have little hair. The normal litter is two, but three is common and four not unusual. Productivity studies indicate a mean ovulation indicence of 2.4 eggs per breeding and a similar birth rate (Erickson, 1964). Summer and fall litters average slightly in excess of two cubs per litter (Erickson and Petrides, 1964; Schorger, 1949; and Spencer, 1955). These data suggest a high survival rate for cubs. Even more surprising is the fact that cubs as young as five months of age have been shown to be self-sufficient (Erickson, 1959).

Although normal weaning is complete by September when cubs

are about eight months of age, cubs and mothers generally den together (Erickson, 1964). Family breakup resumably occurs during the following spring, since summer and fall records indicate that family groups are not normally together as yearlings.

Maximum length of life (longevity) in the wilds is unknown though several captive bears have attained 24 and 25 years. It is unlikely that many wild specimens attain such an advanced age, however, for they are of course subject to mortality factors which captive animals never face.

Mortality factors affecting bear populations are for the most part unidentified. In accessible and inhabited areas, hunting and other human activities are doubtless the most significant mortality sources. Relatively unexploited populations such as occur in Alaska appear naturally limited by other, as yet unidentified, factors. Over-wintering loss in dens appears a likely possiblity since reports of natural mortalities are almost non-existent.

FOODS, PREDATORY HABITS AND CANNIBALISM

The diet of the black bear in Alaska is imprecisely known and is perhaps quite variable in various portions of the state. Studies elsewhere show the black bear to be highly omnivorous.

In the spring, grass and other early-appearing herbaceous plants appear to constitute the bulk of the diet. With the approach of summer these foods are supplemented by a variety of fruit-producing plants and shrubs. It is interesting to note that even when feeding on plants such as strawberries a major portion of the food consumed consists of leaves and other plant parts. In the early fall and varying with location the black bear generally has an abundant variety of berry and fleshy fruits as forage---crowberries, cranberries, raspberries, blueberries and others. During late fall, foods are less plentiful unless food sources such as fish or mast (nut) crops are available. At this season, as in the spring, grass is apparently the staple food.

As a rule, animal matter constitutes a minor portion of the black bear's total food intake. In specific instances, however, such as on Prince of Wales Island in southeastern Alaska, fish

may constitute a major portion of the diet. Invertebrates (particularly insects) and, along coast areas, mussels, are also actively sought by bears (Cowan and Guiguet, 1956). Carrion is normally taken as opportunity affords. However, contrary to popular view, there is strong evidence that putrid flesh is generally eaten only when other foods are unavailable (Erickson, 1957).

For the most part, the black bear is of little consequence as a predator. The very young of big game animals, as deer and moose, are taken as opportunity affords and there are occasional losses of livestock, particularly pigs and calves, and on rare occasions even horses. Livestock losses seem for the most part due to individual bears however, and local control measures are usually easily applied.

Bears often frequent garbage dumps in populated areas and these animals are sometimes encouraged as tourist attractions. Such displays have their drawbacks, and recent evidence suggests that dump bears are frequently a source of troublesome animals (Erickson and Petrides, 1964). Not only do raids on human dwellings result but a wasteful mortality of these nuisance animals also ensues.

In light of this, it behooves one when in bear country to be fastidious in disposing of garbage in order to avoid difficulties with bears. If possible garbage should be burned or buried (or preferably both) at sites well removed from camping areas. Disposal areas, particularly regular dumping areas should if possible be placed well out in the open since black bears appear reluctant to venture far from wooded cover.

As with most bears, the black bear is cannibalistic on occasion. For the most part this is simply scavenging upon the carcasses of dead bears. Nonetheless there are records of older bears killing and consuming cubs.

Perhaps discussion of black bear predator habits would be incomplete without some reference to attacks upon man. Unprovoked attacks are remarkably infrequent in the wilds despite widespread reports to the contrary. There are, however, frequent maimings of persons by bears at garbage dumps and in park areas, and occasional attacks by wounded bears or by females with cubs. Documented unprovoked attacks resulting in human deaths number less than a half dozen (Whitlock, 1950; Morris-Elye, 1951). It

was unusual that four attacks were made on persons in the Fairbanks area during July and August, 1963. Reasons for these attacks were not identified but an investigation by the Alaska Department of Fish and Game (Erickson and Rausch, 1964) discounted hunger, rabies and population stress as logical explanations. It appears significant though that where identifications were made, the attack animals were in all cases males.

PARASITES, DISEASES AND PATHOLOGICAL CONDITIONS

Twenty-five species of parasites are known to infect the black bear. Ectoparasite infestations appear quite rare but include ticks, lice and fleas. Infestations are generally low.

Endoparasites are more common and include trichinae, round worms, tapeworms, lungworms, eyeworms, hookworms and filariid worms. All are rare except trichinae, ascarids and microfilariids. Horstman (1949) reports that of the parasites infesting bears, four are of public health importance: trichinae, the broad tapeworm, the hydatid worm and the wood tick. To this list he adds the common stomach worm, the salmon poisoning fluke and the dog hookworm as being of veterinary (domestic animal) importance.

Of the above, trichinae give most cause for public concern. The propensity of bears to forage at dumps affords ample opportunity for bears to be infected by this parasite which is a further reason for discouraging bears from frequenting these areas. Fortunately, it is quite general knowledge that bear flesh should be well cooked before being eaten as protection against trichinae. On the other hand freezing, even for a long period, does not always destroy trichinae (Abs & Schmidt, 1954).

In Alaska cases of trichinosis contracted from eating black bear flesh have been reported from Bethel and Nenana (Maynard and Frank, 1962). Other cases have been reported from eating brown bear and polar bear flesh. The frequency of infestation in unknown generally, but Rausch et al. (1956) found 5 of 23 black bears from southcentral Alaska infected and King et al. (1960) found 3 infestations among 49 bears examined in New York.

Except for dental and skeletal disorders, the diseases reported for black bears are remarkably few. Skeletal disorders appear for the most part due to injuries, often human-induced.

Some appear due to fighting. It is apparent, however, that the black bear possesses a remarkable ability to withstand infection and to mend fractured bones and even to recover from amputations (Erickson, 1959).

Dental diseases in the black bear are common and are to be observed regularly in older animals. Canine teeth are frequently broken and many teeth are darkly stained and appear decayed. A detailed study of this condition by Colyer (1936) led him to conclude, however, that dental caries do not occur in bears but Rausch (1961) does not rule out the possibility of dental caries, and Hall (1940) reported caries among 8 of 360 bear skulls which he examined.

Periodontal disease is frequently encountered in black bears, particularly among older specimens. Rausch (1961) observed 11 of 14 aged animals so afflicted, as compared to only 7 of 35 prime-aged animals. No young age classes were noted to be infested. He reports injuries to single teeth as apparently giving access to the infection.

Among other diseases reported in the black bear are liposarcoma tumors of the uterine horns (Rausch, 1961), tumors on the eyelid and scrotum (King, et al., 1960), and bronchopheumonia (Rausch, 1961). Abscesses or pustules have also been reported for a number of bears and have been frequently observed by the author but they appear to be of no health significance (King et al., 1960).

BEHAVIOR

Surprisingly, the black bear appears to be a homebody. Marking studies show that individual animals may spend the greater portion of their lives within five miles of their birth sites. Males have been found to range more widely than females and dispersal of young appears limited in extent. On the other hand, a few bears transplanted long distances have shown a remarkable ability to return to their home ranges. There is one record of a bear returning 96 miles to the area of original capture. Such instances appear unusual however, and most transplanted bears appear content to re-establish in new areas, provided that releases are in suitable habitats.

There is no evidence that bears attempt to protect a

territory as their own. Aggregations of bears commonly occur at favored foraging sites such as can frequently be observed at dumps, and except for slight annoyance when at close quarters aggression appears limited. It appears, however, that females with young cubs avoid other bears. An interesting example of this was the finding that bears visiting garbage dumps in Michigan seldom included sows and cubs.

By nature, the black bear is principally nocturnal, and in the truly wild state is ordinarily quite wary of man. This charasteristic, as well as the fact that the species appears reluctant to venture far from the shelter of wooded cover, is perhaps the primary reason that the black bear has managed to persist over most of its former range, in marked contrast to the virtual extinction of the grizzly bear from the contiguous states and much of Canada and South America.

Females with cubs and young bears appear especially wary, and it is even quite unusual for females to protect cubs from man (Erickson, 1957). Despite this, the black bear falls easy prey to the steel trap which suggests a lesser cunning than has often been attributed to the species. Where necessary, therefore, control of the species in accessible areas is not generally difficult.

HIBERNATION

The winter-denning period of the black bear is variable as to time and duration depending upon location and the animal's physical condition. In southern portions of the United States and in Mexico black bears, except for females bearing young, may not den at all or only for short periods (Baker, 1956). By contrast, in interior Alaska black bears may spend almost half of their total lives in winter dens. Here denning generally begins in late October and extends through April or later.

Many misconceptions persist as to the reason bears enter so-called hibernation. Doubtless it is a unique scheme, shared with many other animal forms, which permits them to survive during critical periods and without which they would be unable to occupy much of their present range. Most, if not all, hibernators or psuedo-hibernators, den not as a response to cold or wintry conditions alone, but rather to fasting concomitant with

these conditions (Lyman and Chatfield, 1955). For example, captive bears generally remain active when fed but will promptly den when feeding is discontinued (Erickson and Youatt, 1961).

Denning is not always an uninterrupted sleep. Warm weather, particularly if flooding of dens results, is often associated with bears leaving dens for a period, and even in the depth of winter reports of bears moving about are not uncommon.

There appears to be little basis for the belief that bears den early or late depending on the general abundance of food in summer and early fall. It is reasonable to assume, however, that the condition in which bears enter hibernation may influence the length of the denning period and that physical condition and the length of denning period could well be an important factor in over-winter survival.

Denning locations reported for black bears show a diversity of sites, but most appear to favor holes in hillsides or excavations beneath logs and other large objects. Other sites include hollow logs and trees, rock caves and the like. A few bears overwinter with little or no shelter at all. Others expend considerable effort in constructing dens and about half line dens with leaves, ferns and other materials (Erickson, 1964). This has more frequently been observed for females than for males but this tendency may be due to the fact that females den earlier when such material is more readily available. Many bears appear also to spend a number of days in and about dens before actually entering hibernation.

PHYSIOLOGICAL CONDITIONS

Of particular interest to a number of investigators have been studies of the physiological functions of bears during the hibernating period. Among other things, these studies show that during the period of torpor the body temperature of the black bear is depressed 3 to 5 degrees Fahrenheit from the 98.6° temperature normal during active periods (Erickson and Youatt, 1961; Hock, 1951; Rausch, 1961). This slight temperature depression is insufficient to classify the black bear as a true hibernator such as, for example, the familiar parka squirrel whose body temperature during torpor falls to a point just above freezing. Nonetheless this slightly reduced metabolic state is sufficient to affect other body processes, and a substantial

energy saving can be assumed. Despite this, hibernating bears sustain 20-25 per cent over-wintering weight losses in the northern portions of their range (Erickson and Youatt, 1961) and females bearing young perhaps even more.

Blood factors, in particular, have been found to be markedly affected during the period of torpor. Circulating red blood cells, packed cell volume, hemoglobin and total protein increase at this time and white blood cells and blood sugar decrease. The significance of these changes is uncertain, but similar changes have been noted for other hibernators (Lyman and Chatfield, 1955).

Analysis of black bear milk shows it to be among the richest of milks. It is especially high in total solids (21-27%) and fats (13-22%) (Erickson et al., 1964). It is reported as sweet in taste with no evidence of saltiness and having a tactual quality indicative of relatively high solids. In appearance it is creamy and more viscous than fresh bovine milk. Microscopically many large fat globules are evident. Lactation in the black bear is not profuse and has largely ceased by September.

MANAGEMENT

Biologically the black bear is among the continent's least known big game animals. This is paradoxical in view of widespread interest in the species, and the high esteem in which it is held by sportsmen as well as the fact that attempts are often made to control his numbers. Explanation perhaps rests with greater than normal difficulties associated with studying the species. Recent successes in marking and handling studies have, however, resulted in much new information.

The present state of our knowledge suggests that black bear populations may be exploited at approximately a 20 per cent level on a sustained yield basis. Greater exploitation rates are possible if harvests favor males. It appears unlikely that there is reason for early concern for the species' welfare in Alaska. Rather, possible reductions of brown-grizzly bear populations, and the breaking up of expansive older-age forest areas, may favor black bear increases. In any event, experience elsewhere suggests that the black bear is fully capable of holding his own, short of full-scale persecution or the elimination of a suitable habitat.

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In view of the general lack of technical contribution on the black bear in Alaska, the following bibliography is presented for those wishing to seek additional information on the species. The bibliography is not complete but does include most of the important contributions to our understanding of the species and presents as well all papers known to the author on the black bear in Alaska.

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