

RESEARCH ON
EFFECTS OF HUNTING ON POPULATION DYNAMICS OF BROWN BEARS
Katmai National Park and Preserve

- SCOPE OF WORK -

Geographic Area: Katmai National Park

Study Period: Approximately October 1984 through May 1988

Overview of Situation: The Alaska Peninsula has produced more than 25% of all brown bears harvested in Alaska since statehood. Current bear hunting seasons are approximately 3 weeks long and are alternately spring or fall each year, except in the Naknek drainage, where the season is open for 4 months each year: 2 months in spring and 2 months in fall. An objective of the long hunting season is to minimize the number of bears that enter settled areas in the drainage. Because bears are attracted into the Naknek drainage by salmon spawning, cannery operations, and a dump, the hunting affects bear populations over a far wider area. The current level of harvest has resulted in a declining mean age and apparently increased numbers in the population, probably a consequence of an increase in the number of subadult bears due to a reduction in the number of large adult males in the population. Proposals are currently under consideration to lengthen the hunting season in the Naknek drainage as well as other areas of the peninsula.

A primary purpose for designation of Katmai as a national park was the preservation of a socially regulated population of brown bears. Additionally, the Alaska National Interest Lands Conservation Act (ANILCA) requires the preservation of natural and healthy wildlife populations in the park. The park was thus intended by Congress to be a sanctuary for what is the largest unhunted population of coastal brown bears in existence. The opportunity to view brown bears has become a major source of enjoyment for park visitors.

Research in other areas has indicated that adult male bears play a major role in the social regulation of bear populations. Because these male bears travel widely, however, they are also more vulnerable to hunting, and because they are the largest bears in the population, they are selected by trophy hunters. Of concern to the National Park Service (NPS) is that hunting in areas adjacent to Katmai may lead to human-generated changes in the abundance or structure of the bear population in the park that are inconsistent with park management objectives and policies.

[illegible]

General Study Objectives:

The objective of this research is to evaluate the effects of hunting outside of Katmai on the social regulation and structure of the bear population within the park. A secondary objective is to evaluate the effects of hunting in Katmai National Preserve. The study will provide results that can be applied toward developing a program whereby the management objectives of both the State and the NPS can be effectively met. It will also help ensure that hunting in the preserve is consistent with the mandates of ANILCA and other legislation.

Methods:

A possible approach to quantifying harvest effects is to evaluate the susceptibility of various age classes of bears in the core of the park to harvest outside of the park by examining annual home ranges and movements. Population composition of bears aggregated at salmon-spawning streams in various locations may also be evaluated.

Snaring, immobilization, and radio-collaring or inconspicuously marking bears will be permitted, though not in the vicinity of intense visitor-use areas. The greatest possible amount of data should be obtained from each radio-collared bear. Specific capture techniques will be subject to approval by the NPS and will be carried out cooperatively with the NPS.

Experimental manipulation of the population will not be permitted within the park or preserve.

Investigators will be expected to conform to NPS policies concerning behavior toward bears and will employ practices that minimize the potential for conflicts with bears. Investigators will be permitted to carry firearms, subject to qualification and examination by the NPS.

Reports:

Progress reports will be submitted by December 31 in 1984, 1985, 1986, and 1987. A final report will be submitted by May 31, 1988. All reports will be submitted in 5 copies. A draft of the final report will be submitted in 3 copies for review by the NPS. The final report will include:

- (1) Documentation, analysis, and interpretation of the results of the above field study.
- (2) A review of literature pertinent to interpretation of the results.
- (3) A discussion of the broad management implications of the research, as well as management recommendations specific to Katmai.

Manuscripts for publications resulting from this study will be reviewed by the NPS prior to submission for publication. Thirty copies of each publication resulting from this study will be provided to the NPS. Financial support provided by the NPS will be acknowledged in each publication.

Investigators: Provide professional vitae for the principal investigator as part of the research proposal. Documentation must also be provided which shows that at least one member of the study team is experienced in snaring and immobilizing grizzly or brown bears.

**Research
Coordination:** NPS field representative to oversee and coordinate the study is Katherine L. Joep, Resource Management Specialist, Katmai National Park and Preserve.

Supplemental Information

Geography:

The 2,350-square-mile area of the Naknek drainage that lies within Katmai National Park consists of generally northwest-trending glacially carved valleys. The drainage is bounded on the east by the volcanoes of the Aleutian Range, with elevations up to 7,600 feet. The northernmost creek in the drainage is American Creek, which flows northwest out of the narrow valley containing Murray and Hammersly Lakes. Diverted by a broad, low terminal moraine, the creek flows south into Coville and then Grosvenor Lakes. The short Grosvenor River drains from Grosvenor Lake into the wide, braided Savonoski River which, along with tributaries such as the Ukak River, Ikagluik Creek, and Rainbow River, carries meltwater from the massive Aleutian Range glaciers into the Iliuk Arm of Naknek Lake. North of the Iliuk Arm, the Bay of Islands arm of the lake is separated from Grosvenor Lake by only a very low 1-mile-wide ridge. Just west of the gap in the moraine that separates the Iliuk Arm from the rest of Naknek Lake, Brooks River flows into the lake. Similar to American Creek, the headwaters of the Brooks drainage are diverted by a low moraine and flow north into Brooks Lake. The west end of Naknek Lake is dammed by a hummocky terminal moraine, breached only by the Naknek River, which flows 14 miles past King Salmon and across the flat lowlands to the town of Naknek on Bristol Bay.

The northwestern one-tenth of Katmai is a national preserve. A preserve is managed in the same manner as a park, except sport-hunting is permitted in accordance with hunting regulations set by the State. Creeks in the preserve drain into the Alagnak River and its major tributary, the Nonvianuk River. The largest lakes in the preserve are Kukaklek Lake and Nonvianuk Lake.

Immediately north of Katmai is McNeil River State Game Sanctuary. Southwest of the park is Becharof National Wildlife Refuge. Southeast of the park, across the 40-mile-wide Shelikof Strait, lies Kodiak Island.

Vegetation:

White spruce is the only conifer species in the Naknek drainage. Dense spruce forest occurs north and east of Brooks Lake, as well as on the north shore of the Bay of Islands. Open white spruce woodland, mixed with willow, birch, and other deciduous species, occurs on the broad moraines north and west of Naknek Lake, west of Brooks Lake, and west of American Creek. Flat bottomlands, such as above and below Murray and Hammersly Lakes, often contain dense thickets of alder. Alder, mixed with willow and birch, commonly occur on the slopes above lakes. Stands of balsam poplar occur locally along some rivers and lake-shores.

Beaver dams and ponds are common. Ponds and marshes occur in poorly drained areas. Extensive marshland occurs along the lower Savonoski River and between the Savonoski River and Bay of Islands.



A zone of alders often occurs just below timberline, which is at about 1,500-2,000 feet. Alpine tundra plants include ericaceous plants, including crowberries and blueberries, as well as dwarf birch, dwarf willow, lichens, sedges, and a variety of herbaceous plants. A limited area of alpine tundra occurs on Dumping Mountain, north of the east end of Brooks Lake. Broad, rolling expanses of lichen tundra, dotted with ponds, occur southeast and west of Murray Lake and north of Nonvianuk Lake. Mountains of the Aleutian Range, as well as Mount Katolinat (south of the Iliuk Arm) and most of the mountains northeast of Grosvenor Lake are rugged and precipitous, with cirque basins and perpetual snowfields. Large active glaciers blanket the Aleutian Range.

**Distribution
of Bears:**

Bears in the Katmai area den from November until March or April. When they emerge from hibernation, there are few sources of food until plants begin to green-up in April or May and moose calves are born in early June. Salmon returning to spawn enter the Naknek drainage in late June. For the remainder of the summer, the distribution of bears throughout the drainage largely reflects the pattern of salmon spawning. Brooks River is the first tributary in which the salmon arrive, and bears gather there through late June and July. During August, bears concentrate along the streams where salmon are spawning, including Idavain Creek, Margot Creek, American Creek, and numerous small streams. During September and October, bears gather at the few streams, including Brooks River and the Savonoski River, where salmon spawn during these months.

**Distribution of
Hunting in the
Naknek Drainage:**

Bear hunting in the Naknek drainage commonly occurs in the vicinity of King Salmon Creek, Big Creek, and the Naknek River. Several bears are attracted each summer to the dump just east of Naknek, as well as to the fish canneries located along the coast of Bristol Bay.

**Access Within
the Study Area:**

Most transportation in the area is by floatplane or boat. Because of the value of riparian habitat to wildlife, landing wheeled aircraft on gravel river bars is not encouraged and, in some areas, is prohibited. Hiking is often difficult due to dense vegetation and extensive marshes. However, hiking can be quite feasible on open tundra and is possible in other areas if a route is carefully selected. One of the few trails in the park climbs Dumping Mountain, north of the west end of Brooks Lake. Mount LaGorce (between the Iliuk Arm and the Bay of Islands in Naknek Lake) and Mount Katolinat (south of the Iliuk Arm) can be climbed easily.

Available Information:

Limited tagging and radio-tracking during the 1970's suggested that bears from the core of the park travel beyond park boundaries, where they may be harvested. Tag returns suggest that 6 to 10% of the bears at Brooks Camp, 35 miles within the park boundary, may be being legally harvested outside of the park each year (see attachment), but sample sizes are too small for definitive conclusions.

Publications that are relevant to the subject include the following:

Alaska Department of Fish and Game. 1981. Naknek-King Salmon brown bear management plan. Alaska Dept. of Fish and Game, King Salmon.

Bunnell, F. L., and D. E. N. Tait. 1978. Population dynamics of bears and their implications. Proc. Int. Symp. on Population Dynamics of Large Mammals. Logan, Utah.

Glenn, L. P., J. W. Lentfer, J. B. Faro, and L. H. Miller. 1976. Reproductive biology of female brown bears, Ursus arctos, McNeil River, Alaska. Proc. Int. Conf. on Bear Res. and Manage. 3:381-390.

Glenn, L. P., and L. H. Miller. 1980. Seasonal movements of an Alaska Peninsula brown bear population. Proc. Int. Conf. on Bear Res. and Manage. 4:307-312.

Katmai National Park. 1984. Bear management plan. National Park Service, King Salmon, Alaska.

Kemp, G. A. 1976. The dynamics and regulation of black bear (Ursus americanus) populations in northern Alberta. Proc. Int. Conf. on Bear Res. and Manage. 3:191-197.

McCullough, D. R. 1978. Population dynamics of the Yellowstone grizzly bear. Proc. Int. Symp. on Population Dynamics of Large Mammals. Logan, Utah.

Russell, R. H., J. W. Nolan, N. G. Woody, G. Anderson, and A. M. Pearson. 1978. A study of the grizzly bear (Ursus arctos) in Jasper National Park. Canadian Wildlife Service, Edmonton. 95pp.

Schoen, J. W., J. W. Lentfer, and L. Beier. 1983. Admiralty Island brown bear distribution. Proc. Int. Conf. on Bear Res. and Manage. 6 (in press).

Sellers, R., and M. McNay. 1984. Population status and management considerations of brown bear, caribou, moose and wolves on the Alaska Peninsula. Alaska Dept. of Fish and Game, King Salmon. 53pp.

Troyer, W. 1980. Distribution and densities of brown bear on various streams in Katmai National Monument. National Park Service, Anchorage. 16pp.

Troyer, W. 1980. Movements and dispersal of brown bear at Brooks River, Alaska. National Park Service, Anchorage. 26pp.

Young, B. F., and R. L. Ruff. 1982. Population dynamics and movements of black bears in east central Alberta. J. Wildl. Manage. 46(4):845-860.

Bear No.	Sex	Age when tagged	Age when killed
964	M	1½	
963	M	1½	2½ (between Big Cr. mouth and K.S.)
987	M	2½	
988	M	2½	
989	M	2½	
976	M	2½	3½ (Naknek dump)
1006	F	2½	
1004	F	2½	6½ (Pike Lake)
981	F	2½	9½ (Naknek River east of K.S.)
990	M	3½	5½ (King Salmon Cr.)
983	M	4½	
980	M	5½	6½ (King Salmon Cr.)
975	M	6½	
979	F	8½	
962	F	9½	
982	M	16½	