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**ALASKAN POLAR BEAR HARVEST CHARACTERISTICS.**

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**ABSTRACT**

The Marine Mammal Protection Act (MMPA) of 1972 prohibits the hunting of all marine mammals, including polar bears, except that Natives dwelling on the Alaskan coast may take them for subsistence purposes or for creation of authentic Native handicrafts. Since 1980 the U.S. Fish and Wildlife Service has collected harvest data from Alaskan Eskimos to document the numbers, sex, age, chronology and location of the polar bear harvest. Hunters from 14 villages located along 1600 linear coastline miles harvested a minimum of 106 polar bears during the 1980/81 hunting period and 90 bears in the 1981/82 period.

Historically polar bears have played an important role in the lives of coastal dwelling Eskimos. Polar bears were traditionally harvested opportunistically and have occupied a special social, cultural and spiritual role in Eskimo society. It is believed that harvest rates never were excessive and that polar bears were, for the most part, excluded from commercial exploitation common to many other marine mammal populations during the 18th and 19th centuries. During the 1940's polar bear sports hunting began to capture national attention. Sports hunting interest continued to grow and peaked between 1960-72. During this period the State of Alaska regulated seasons and bag limits of the sports harvest. Subsistence hunters were limited to 2 polar bears per regulatory year, July 1 to June 30th, and all hunters were prohibited from harvesting cubs or females with cubs. The Marine Mammal Protection Act (MMPA) of 1972 prohibited the hunting of all marine mammals except by Alaska coastal dwelling natives who were permitted to continue to harvest marine mammals for subsistence purposes. The Act contained no limitations on the sex, age, or numbers of polar bears taken except that the animals must be harvested in a non-wasteful manner for subsistence purposes or for the creation of authentic handicrafts so long as the polar bear population was not found to be depleted. The hunter did not shoot all of these bears. The International Agreement on the Conservation of Polar Bears allows harvest by local people using traditional methods.

Mortality rates are critical to an understanding of polar bear population dynamics and welfare.

Harvest data which is consistent over time and provides an historic information bank is basic to population management.

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The objectives of continued monitoring of the polar bear harvest in Alaska are to document the timing and location of the harvest and the sex and age of harvested animals. Incidental hunter observations concerning the physical condition, methods of taking and meat utilization of polar bear were other noteworthy contributions.

#### STUDY AREA

The general study area located in northern and northwestern coastal Alaska between  $61^{\circ}$  -  $71^{\circ}$ N latitude and  $142^{\circ}$  -  $172^{\circ}$ W longitude is comprised of smaller spheres of influence located adjacent to 14 villages which have been known to harvest polar bears over the last 2 years. Approximately 1600 linear miles of coastline interface with the Beaufort, Chukchi and Bering Sea. St. Lawrence and Little Diomed Islands are included in the study area. Population sizes of the villages which harvest polar bear range from Barrow, 2715, to Little Diomed, 125. Climate of the area is typical of Arctic.

#### METHODS AND MATERIALS

Polar bear harvests were monitored by the U.S. Fish and Wildlife Service (FWS) in Alaskan coastal villages beginning in November 1980. Contracts were established with 6 individuals to assist in monitoring the harvest in 7 villages. A total of 13 villages were visited monthly. In the case of Kaktovik, information was jointly collected with personnel of the Arctic National Wildlife Refuge.

Alaska Department of Fish and Game (ADF&G) serialized metal interlocking tags and harvest certificates were utilized to mark skulls and hides and to record harvest data. Data recorded included name and address of hunter, date and location of the kill(s), sex and sex identifiers, skull measurements (length, width), hide size, specimens collected, transportation used and additional remarks.

Skull length and width were measured using 12 inch solid hinge Starrett calipers. Condylbasal and hide measurements were optional. Two vestigial premolars were extracted with 32 gauge stainless steel tooth elevators. Hunters were interviewed and recorded concerning the date, location and sex of the killed bear. Hunter interviews were the sole source of information when the hide and/or skull were not available.

Premolar teeth were decalcified, thin sectioned, stained and interpreted. Tooth sectioning was according to methods described by Goodwin and Ball, 1979. Lee Miller, ADF&G retired, interpreted the sections using techniques of Manning, 1971. All age estimates are for the year of life the bear had entered before death as opposed to completed years of life.

Only reliable sex and age data are included in the text. Data for which sex, age are deficient have been omitted from analysis.

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The documented minimum polar bear harvest by Eskimo hunters in Alaska for the 1981 and 1982 hunting seasons were 106 and 90, respectively. In addition, a minimum of 21 bears were harvested from January 1 to July 30, 1980 as documented by ADF&G records and have been included in the sample (Table 3). The resulting grouped sample size is 217 bears. Of this total 134 (61.8%) represent bears for which complete sex and age information was obtained; 52 (23.9%) represent bears for which adequate sex and/or age class information was obtained; 31 animals (14.3%) and represents bears known to have been killed for which sex and age information is unknown.

Of the group for which complete sex and age information is available 53 (39.6%) were females and 81 (60.4%) were males. The sex ratio of killed bears versus captured by Lentfer 1967-76 bears was significantly different. Males averaged 5.8 years. The mean age of females was 9.0. The mean age of 933 captured males and females from 1967-76 was 5.2 and 6.5 years respectively.

The kill sample consisted of 27 percent litter members (cubs, yearlings, and 2-year olds), 31 percent females greater than 3 years of age and 42 percent males greater than 3 years of age. This represents a higher percentage of adult males and slightly reduced percentage of adult females and litter mates than recorded by Lentfer and Amstrup.

Chi-square contingency tables analysis for specific age classes was conducted. Expected values were derived from 933 polar bears captured by Lentfer, 1967-76. A significant negative correlation was determined for female cubs, female subadults and females age 6-10 years. A significant positive correlation was determined for subadult and adult males and females 10 years or older.

Lentfer believed his mark/recapture data might have underrepresented the actual population structure of certain sex/age classes. Relatively few cubs compared to yearlings were recorded as were 7 and 8 year of life females because new family groups were in maternity dens during the early part of the study period. Lentfer believed the small number of 4th year of life males perhaps indicated dispersion of subadult animals after family breakup. Mature females and young might have been overrepresented because family groups rather than single bears were captured for marking if the option existed.

The Chi squared analysis may show a greater frequency of adult males being harvested and somewhat underestimated frequency of harvest for adult females.

More data will be required before conclusions may be drawn.

Polar bears were harvested during each month of the year except September from January 1980 to April 1982. Of 197 harvested bears sampled, 123 (62.4%) were harvested during November, December and January. Forty-five bears (22.8%) were harvested in October and November. The chronology of this harvest differs markedly from that of the sports hunting era which, by regulation, concentrated the harvest during the months of February through April. The regulation was designed to reduce the chances of harvesting pregnant females or subadult females.

In the fall North Slope villages have the first opportunity to take polar bears as the ice platform brings polar bears into proximity of shore. Of 16 bears taken in October, Kaktovik harvested 12 (75%), Wainwright harvested 3 (18.8%) and Pt. Hope harvested 1 (6.2%). Of the November harvest, Kaktovik, Wainwright, Barrow and Wales accounted for 27 (93%). Little Diomedé killed 2 bears in November to complete the November harvest. North Slope villages appear to be the primary villages harvesting bears (78.3%) during October and November. This is the period when most pregnant females enter dens in Alaska. It is important to note that if this finding is consistent over time the more southern villages are not killing that years denning candidate females.

The southern villages of Shismaref, Wales and Savoonga harvest more bears during December and January than any other 2 months of the year (Figures 5, 6). A major difference in harvest chronology is apparent for Savoonga. In the 1980-81 season the majority of the harvest occurred during March while polar bears were taken during January, February and April in lesser numbers. In 1981-82 the preponderance of the harvest occurred in December and January, 2 months earlier than the preceding year.

Hunter numbers/relative success data showed that of the 124 hunters which killed 217 polar bear during 1981-82, 37 (29.8%) > 1, of these 27 (73.8%) > 2.

Coastal Eskimos in Alaska conventionally harvest polar bears with the aid of snowmachines (145/162) 89.5%. Of the recorded harvest only a small number were taken by other means. The second most frequent mode of transportation used to take polar bears is by boat. A small number (11), 68% of bears were recorded as having been sighted and killed from boats while other means account for the remainder.

#### SUMMARIZATION

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