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MARINE MAMMAL INVESTIGATIONS IN NORTHWESTERN ALASKA

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The marine mammal investigations presently being conducted by the Alaska Department of Fish and Game, in the northwestern part of the State, are concerned with four species of phocid (hair or earless) seals and the walrus. The seals we are investigating include the bearded seal (Erignathus barbatus), harbor seal (Phoca vitulina), ringed seal (Pusa hispida) and ribbon seal (Histriophoca fasciata).

With the exception of the harbor seal, all of these animals are usually found in association with ice. Generally speaking, they are all migratory in this area.

The Pacific walrus (Odobenus rosmarus) is the animal with which we are primarily concerned. Until recently it was thought to have been an "endangered species." Although it no longer faces the threat of immediate extinction, the number of animals killed each year is substantial, and of great importance to the economy of certain villages. Of the marine mammals taken in northwest Alaska, the number of walrus killed each year most closely approaches the maximum sustained yield, at the present walrus population level.

The bearded seal probably sustains the next highest rate of hunter mortality, followed by the harbor seal and ringed seal. Unlike the bearded, ringed and ribbon seals, which are found throughout the Bering and Chukchi Seas, the harbor seal is a summer visitor which frequents coastal areas of the mainland and off-shore islands. The ringed seal is the most numerous, and is also taken in the largest numbers (12,000 to 15,000 per year). Small numbers of ribbon seals are taken each year, but they are not an important source of either meat or hides.

Since a detailed discussion of research findings is probably not of great interest to the participants of this conference, my presentation is primarily an attempt to introduce you to part of the marine mammal research program of the Alaska Department of Fish and Game.

Our research program, of necessity, is oriented toward management, but we are also definitely concerned with the accumulation of basic knowledge when the pursuit of this information does not lead too far afield.

Some of the objectives of our walrus investigations are to determine the age composition, age specific birth rates, and social organization of the female segment of the population; to determine annual recruitment, magnitude of the annual kills, and whether there are any apparent changes in herd composition and distribution. Of course there is also a continuing effort to acquire information concerning natural history, especially natural mortality.

Our seal investigations have been influenced by a recent increase in the commercial value of seal skins. As an example of this increased value, the price of good ringed seal skins has gone from $4.00 to $15.00 or

$20.00. The rise in value has greatly increased hunting effort, and the annual harvest.

The seal studies are being conducted to obtain current information about the magnitude, characteristics and value of the seal harvest in western Alaska; to investigate the life-history of the bearded seal, and attempt to determine the factors affecting seasonal movements, abundance and distribution. We are also investigating reproductive physiology of this seal, as well as the harbor and ribbon seals. Another objective is to obtain additional information about the major gooups of harbor seals in the State with the aim of determining population centers (if they exist) patterns of dispersal, and the apparent clinel differences in certain characteristics of reproductinn. We also cooperate with several organizations as far as supplying specimen material from the various marine mammals.

Since the walrus and bearded seal are the animals receiving the greatest share of our attention, the rest of the discussion will be concerned with them.

The first intensive studies of the Pacific walrus, undertaken by American workers, were those initiated by Brooks (1954), and Fay (1955). Brooks (loc. cit.) recognized and pointed out the major management problems, and it is those same problems which we are presently trying to resolve.

The walrus is the largest of our pinnipeds. Large adult males weigh between 3,500 and 4,000 pounds, and adult females range from 1,600 to 2,100 pounds. Their most important food items are the several kinds of clams found in the area.

Some female walrus are reproductively mature by age four, but most do not begin breeding until their fifth to eighth year.

Calves which vary in weight from about 75 to 150 pounds, are born most commonly during late April and early May. The lactation period lasts from 18 to 24 months.

Age of individual animals is determined on the basis of the number of annual rings observed in the cementum layer of the lower canine teeth. The reproductive history of females is determined by examining the overies for corpora lutea and corpora albicantia.

In addition to supplying us with information about the age when females mature, correlations of age and reproductive performance have shown that about 80 per cent of the cows produce calves every other year, 15 per cent every third year and the remainder less frequently. In the herd as a whole, the adult females produce a calf every 2.3 years, and the annual recruitment is approximately 14 per cent.

Our annual mortality rate and total population estimations are based on the frequency of, occurrence of the various age groups in the male segment of the harvest. It appears that annual mortality is between 12 and 13 per cent. The population estimate is based on our knowledge of the Alaskan kill, and rather fragmentary information concerning the harvest by Siberian hunters. Our estimates indicate a minimum population of 90,000

walrus. This is within the estimate of 78,000 to 113,000 walrus made by Kenyon (1958), based on aerial surveys.

I consider my estimate conservative because the mortality rate for the male segment of the population is used for calculating overall mortality, and at present, more males than females are taken. Also, age determination in the older animals is not entirely accurate because of the loss of annual rings. It can be assumed that if the older age classes were correctly represented, the derived mortality rate would be decreased.

We will touch on the walrus investigations again when we discuss our management program.

The bearded seal is the most desired of the various kinds of seals taken by the Eskimo hunters. It is a large animal weighing in excess of 600 pounds during the winter, and measuring about 90 inches in length. During the spring and summer, when these seals are in lean condition, the carcass is composed of about one-third usable meat, one-third hide and blubber, and one-third bone and viscera. The amount of meat from one of these seals is roughly equal to that obtained from five or six adult ringed seals which weigh about 150 pounds and yield 45 or 50 pounds of meat.

From an ecological point of view, the bearded seal is an intermediate between the other phocid seals and the walrus. It is primarily a benthic feeder subsisting mainly on shrimp, small crabs and annelid worms. It will occasionally utilize clams, and also some of the food items commonly taken by the ringed seals.

The females mature at age six, and the males at age seven. Mating occurs between mid-April and mid-May, and is followed by a period of delayed implantation lasting from two and one-half to three and one-half months. Implantation occurs over a relatively short period of time, around the first of August. Pups are born in April.

Most newborn pups are between 65 and 85 pounds. At the end of the nursing period which lasts from 12 to 18 days, they have increased in weight to between 180 and 210 pounds. Length at the time they are weaned is about 63 inches, or 69 per cent of their adult length.

As with the walrus, most female bearded seals produce pups every other year, although in many instances they bear young two years in succession as in ringed and harbor seals. Although most recently post-parturient females do not ovulate, those which have given birth before or during the early part of the rut may ovulate and become pregnant again.

One of the main problems regarding walrus management is that of accurately determining the number of animals which are killed each year. In addition to the retrieved harvest, many animals are killed and lost, wounded and escape, or are orphaned as calves. Most investigators feel that orphaned calves younger than one year probably die.

Walrus are taken throughout western Alaska from Nunivak Island to Barrow. However, the major part of the harvest is taken at only a few villages; principally those on St. Lawrence, King and Little Diomede Islands, and occasionally at Wainwright and Barrow.

During the most productive hunting season biologists are stationed at these locations, particularly the sites where female walrus occur in large numbers. These men record the retrieved harvest. They also record composition of the herds and observe hunting methods and efficiency. Considering all types of loss, the number of walrus harvested is about half the number actually killed. In recent years the Alaskan harvest has been between 1,000 and 2,000 animals, and the total kills between 2,000 and 4,000.

With bearded seals there are very few orphaned pups, primarily because of the short period of dependence. However, these seals usually sink when killed (except pregnant females). With bearded seals, hunting loss exceeds the harvest. The recent harvest throughout western Alaska has been estimated at approximately 3,000 animals, and the total kills between 7,000 and 9,000.

The kind and amount of hunting pressure probably does not greatly affect the seal population because the animals occur throughout the northern Bering and Chukchi Seas. In addition, they are usually solitary or occur in small groups (the walrus form large herds), are moderately wary, and relatively inaccessible. Hunting is restricted to the coast along the mainland and around the off-shore islands. At some locations they are not hunted if walrus are to be had.

Most of the loss in hunting bearded seals is probably unavoidable, but there are several ways to reduce the number of walrus killed. Our present walrus management program is not aimed at curtailing the actual retrieved harvest, as this has not been excessive. The total kill of walrus is being reduced by shifting the sex composition of the harvest from one of primarily females to one of males, by encouraging more efficient hunting methods, by eliminating the hunting of females for ivory alone, and by promoting more complete utilization of the animals taken.

These management objectives are being accomplished in several ways. The most effective step was taken when a bag limit of seven cows per resident hunter was established in 1960. This limit was further reduced to five females per hunter in 1961. This regulation has changed the sex ratio of the harvests from one composed of more than 50 per cent adult cows, to the recent harvests composed of between 25 and 35 per cent cows.

A second regulation requiring a permit for the purchase, sale, barter or export of raw ivory has been effective both in curtailing the ready market for this commodity, and in insuring that it will be utilized more advantageously (thus bringing a higher return).

Encouragement of conservative hunting methods is being accomplished primarily through an informal education and information program centered around village meetings, and augmented by stationing informed personnel at the important hunting sites. One of the prime objectives along this line is to eliminate the killing of animals in the water.

The ramifications of encouraging more complete utilization of the animals killed, are interesting. Usually, commercial exploitation results in increased harvests. As it was demonstrated this spring, using the equipment presently employed small scale commercial exploitation of walrus for meat and skins can actually reduce the harvest. This is because

the necessary butchering and transportation of large quantities of meat decreases the time that is spent in hunting.

Fay (1957; Table 1, P. 437) estimated that the population of Pacific walrus prior to 1860 had to approximate 200,000 animals in order to sustain the large harvests that were made by American whalers. It can probably be safely stated that the walrus habitat has changed little if any since that time. There is no reason to believe that, with proper management, our present herds could not be greatly increased without decreasing the harvest.

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