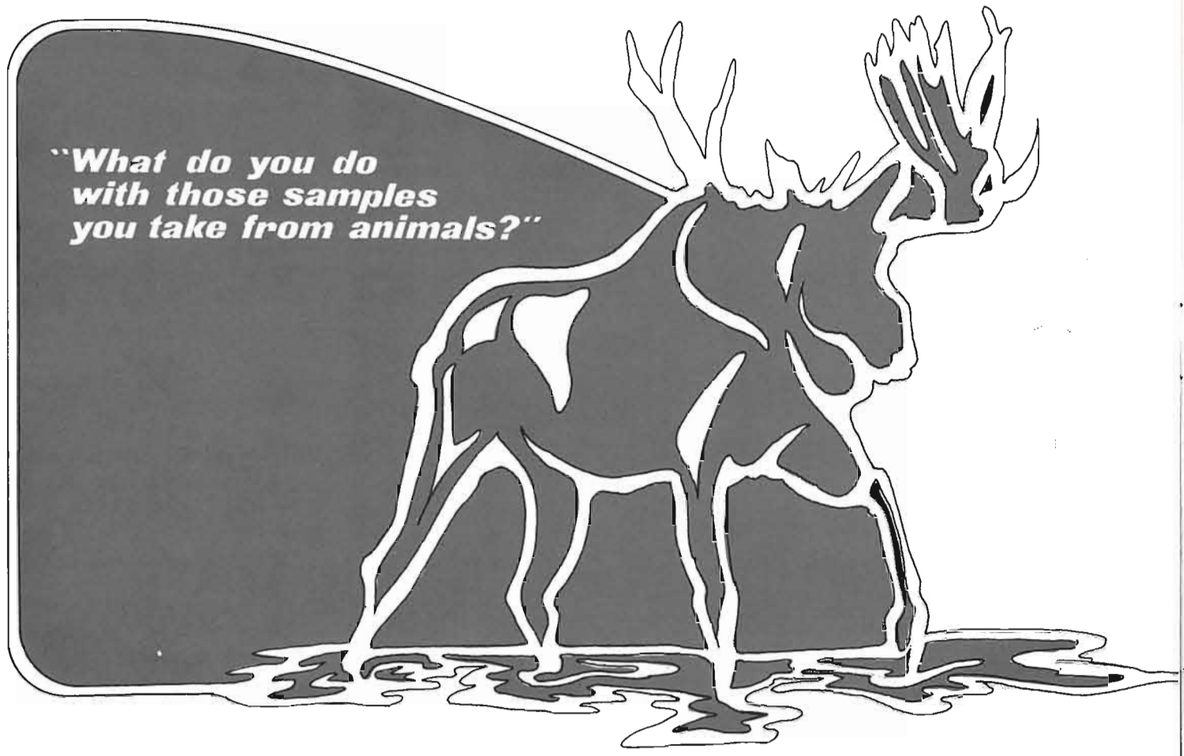

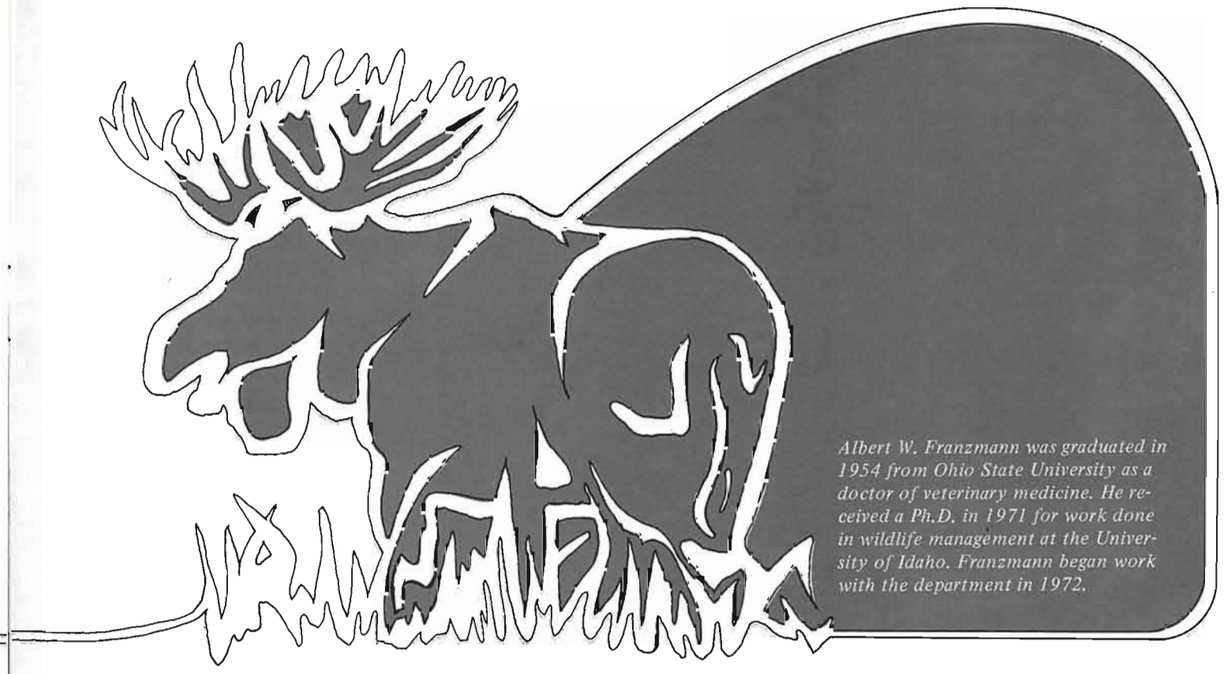

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The "WHY" of Moose Hair and Blood Sampling

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THE QUESTION IS often asked of wildlife biologists, "What do you do with all those samples you take from animals?" That is certainly a valid question and one that has many answers. To select only two examples, blood and hair have been collected from moose for the past several years in an attempt to determine if a moose living in a particular environment will reflect conditions and changes in that environment. Some changes can certainly be detected by examining such things as pregnancy rates, number of calves, yearlings, etc., but a more precise measurement of these changes is accomplished by monitoring the physiology of the animals in that environment by sampling blood chemistry and the minerals accumulated in the animal's hairs.

To apply the principle of physiological monitoring of populations, it is first necessary to determine what would be considered "normal" values under varying conditions such as sex, age, season, reproductive status, geographic location and body condition of the animal. One can readily see that it is necessary to have specimens from a large number of animals to determine what is "normal." When the need for a research center for moose was first seen, it was envisioned that the facility would provide this type of information in addition to other basic research needs. To fulfill these requirements the Kenai Moose Research Center (MRC) was established as a cooperative venture between the U. S. Fish and Wildlife Service and the Alaska Department of Fish and Game. Robert A. Rausch, Director of the department's Game Division, provided the impetus and guidance for the program. The research facility consists of four enclosures of one square mile each. It is located in the area of the 1974 Kenai burn, in the Kenai Peninsula lowlands. Each enclosure has a moose population with unique characteristics based on moose density, sex and age ratio, and habitat. At the center a variety of work has been conducted, including developing and testing new research techniques and studies on reproduction, productivity, behavior, population identity and physiology. The latter is the main concern of this article.

The MRC moose populations provided most of the base-line ("normal") blood and hair information because the animals within these pens could be trapped, immobilized and sampled year-round. In addition, samples have been obtained from other moose populations in the state during tagging operations, from hunter samples, and from road-kills. Nearly 1,600 blood samples were used to provide baseline data for moose, with nearly 700 of the samples from the Research Center.

Up to 28 blood characteristics were measured. To accomplish this, samples were sent to various laboratories throughout the U. S. To handle this vast amount of data, it was necessary to use computers for information sorting, analysis and retrieval. From this data bank it is presently possible to obtain data such as the average blood calcium level of an adult pregnant female moose during March from the Copper River Delta and compare that average with moose having the same characteristics coming from the Kenai Peninsula, the Nelchina Basin, the Alaska Peninsula, the Anchorage area or the Research Center. It is also possible to gain considerable insight into the health and well-being of an entire adult moose population by comparing blood samples taken from its members with samples from animals whose health status is known. In this case the comparison is based on the blood characteristics that are the most closely related to the animals' health. Not all of the 28 characteristics are useful for such an evaluation. The knowledge of which ones can be used was discovered through studies carried out at the Research Center.

Comparing the physiologic status of a number of moose from different populations provides the biologist with additional evidence about the health or condition of the lesser known group. A ranking of populations can then be made and priorities for future study established. Currently, late winter information from the less healthy Research Center population and the healthy Copper River Delta populations provides the basis for comparison. Presently, samples must be made and compared during the late winter period in the annual moose physiological cycle. Hopefully, collections and comparisons can be expanded to other seasons as more information becomes available.

One of the difficulties associated with using blood as a health or condition monitor is that for the best results it must be obtained from live animals using specialized blood collecting equipment. This requires prior preparation and limits sampling by other than trained persons. Blood must also be properly handled and stored prior to analysis.

A search for biologic material that could be more easily collected, handled and stored from either living or dead moose was made at the Research Center with hair selected as a possible answer. Researchers in human and veterinary medicine

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Photo by Ed Klinkhart

WINTER FINERY — Numbered collars for aerial identification are part of monitoring program. Hair and blood samples provide valuable information on health of individuals and herd.

WHY SAMPLE ?

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have in the past used hair to monitor heavy metal contamination and mineral element intake. Samples of moose hair were collected and analyses for 18 elements were done by the Trace Element Center at Cleveland Metropolitan General Hospital by Dr. Arthur Flynn. It was obvious from early results that moose hair could not replace blood analysis for certain population evaluations, but it proved most useful in other ways.

During the analysis of over 1,400 hair samples from the Research Center and other Alaskan moose populations, certain patterns developed. The mineral constituents of the hair were significantly different in various areas and for different populations. Samples from moose populations in certain areas indicated extremely low values for certain essential mineral elements when compared to samples from domestic cattle "normals." This information was helpful but not conclusive since there were still no established hair element "normals" for moose. However, it was felt that if low hair mineral element levels could be associated with certain clinical signs of deficiency in a moose population, that would be a basis from which to begin.

Sampling moose in a certain area on the Kenai Peninsula demonstrated low hair element values throughout the year for copper, magnesium and manganese, all essential elements. Further investigation showed that the hoof overgrowth syndrome commonly called "swampfoot," which is periodically reported in moose on the Kenai Peninsula, was associated with a copper deficiency. Thus it was found that hair element analysis did have potential as a monitor of moose population mineral metabolism.

As additional samples from throughout the state are gathered, moose hair mineral values may prove to be a useful tool in determining where an animal may have come from or, possibly, where it did not come from. With varying moose seasons and special hunts in a number of game management units the ability to identify hair on the basis of geographic origin would enhance enforcement of harvest regulations. At present hair analysis is used in enforcement work through matching moose hair from different locations, such as a kill site and the truck or garage of a suspected poacher. It is possible to determine if hair from the two sites is or is not from the same moose.

Blood and hair values also provide information supporting other research, which may be useful in the future when comparative information is desired. As laboratory capabilities improve and advance, it is possible that other meaningful information may be obtained about a moose population. For this reason both frozen blood serum and hair "bank" duplicate collections are maintained. Samples collected today may be selected for future analyses which are not possible today.

Although this article outlines uses for only two specimens from moose, the information presented does perhaps give the reader a somewhat better understanding of some of the activities of the Game Division's research biologists. Through research man's knowledge of wildlife grows, and with it grows his ability to make intelligent and knowledgeable resource management decisions. ✶

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