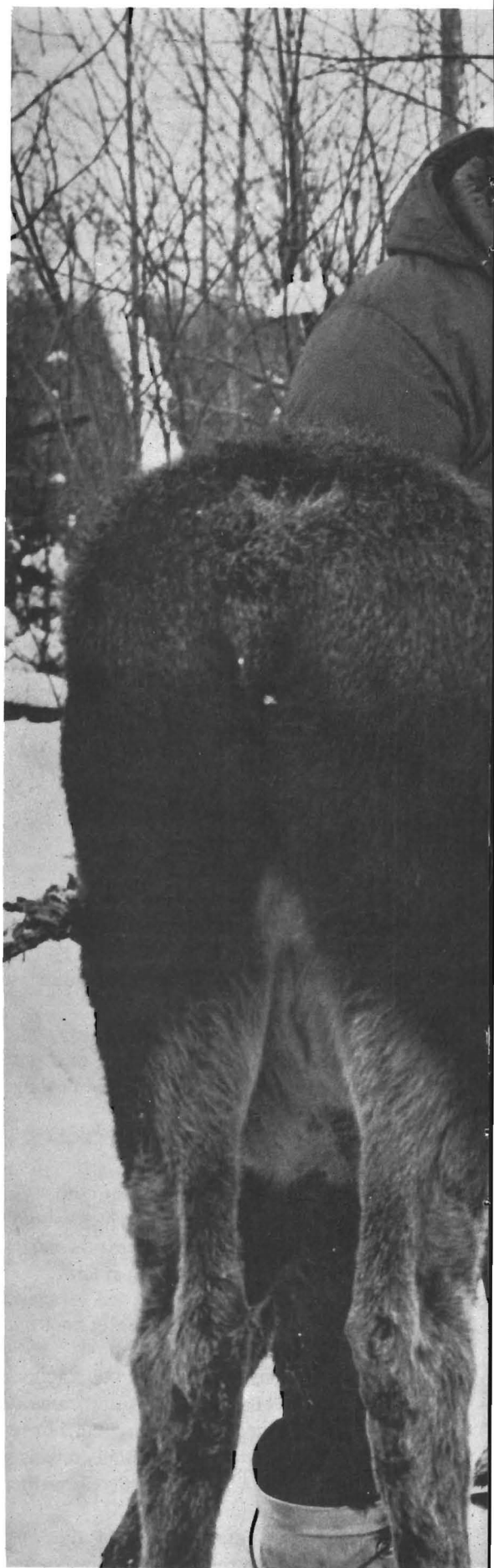


MOOSE HELPERS -- Robert LeResche, biologist in charge of the Kenai Moose Research Center, feeds pellets to Walter and Richard, moose helpers who provide detailed information on habits of this important game animal.

MOOSE LAB

KENAI RESEARCH CENTER STUDIES BROWSE, HABITS

by Robert LeResche
Game Biologist
Kenai Moose Research Center

Biologists at the Kenai Moose Research Center utilize a four-square-mile laboratory and a team of unique helpers in their quest for information on the food and social habits of one of Alaska's largest game animals.

The three helpers, Walter, Richard and Raquel, all 1 1/2 years of age, are particularly well qualified to help in this moose study. In fact, Walter, Richard and Raquel are moose. Tame and usually cooperative, the three youngsters provide valuable information which will aid the department's moose management program.

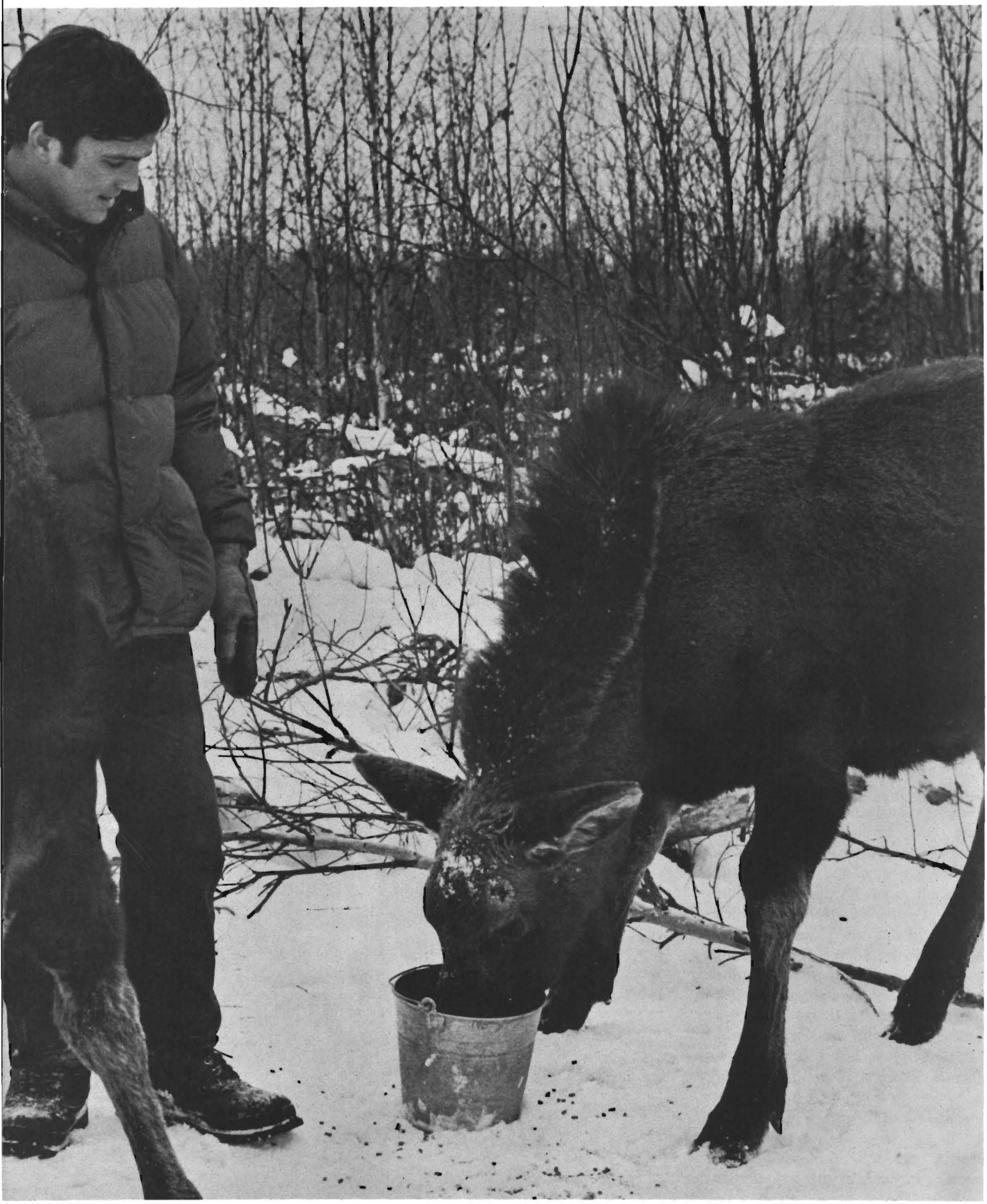
Actually, about 70 moose are enclosed in the Center's pens north of Sterling on the Kenai Peninsula. Cooperatively built and operated by the Department of Fish and Game and the Kenai National Moose Range, the Center is designed to provide a means of studying moose in their natural habitat under controlled conditions. Within the Center's four one-square-mile pens, biologists are learning what moose eat each day, where moose spend their time, how moose feeding affects the plants needed for food, how moose blood and milk constituents reflect health and condition of an animal and how difficult it is to count moose populations.

The Moose Research Center went into full-scale operation in May, 1969, after more than three years were spent cutting and setting 5,000 spruce posts and stringing and stretching 30 miles of woven-wire fencing across bogs in a portion of the 1947 Kenai burn.

The result: a four-square-mile outdoor laboratory, enclosed by eight-foot high fences, mapped by soil and vegetation types, and comprised of five 5-acre exclosures (to keep moose out), 20 moose traps and almost 1,000 browse-study plots.

The pens lie in country chosen for its commonness. It includes the lakes and

(cont'd. next page)



muskeg bogs of summer range, the dense shrubby hillsides characteristic of excellent post-burn winter range, and the copses of tall mature birch, aspen, and spruce so necessary for winter shelter. Conditions are natural inside the pens and the moose, in fact, don't seem to know that they are enclosed.

The first two pens were completed in January, 1967, and the others in August, 1969. There were 72 moose within the fence when its gates were closed; a density of 18 moose per square mile! This information, plus trapping success outside fencelines, plus results of aerial counts in the burn led us to conclude that in this area of prime habitat we had the densest moose population ever recorded. Densities over 400-500 square miles probably approach 15 moose per square mile in winter, spring and early summer and remain at nearly 12 from late summer through early winter.

Moose populations within the pens have stabilized since their confinement much as outside populations have since the early 1960s. During the three years since pens 1 and 2 were enclosed and the one year since pens 3 and 4 were shut off, the total moose population within the pens has remained unchanged. This population, like all animal populations, has been dynamic, with young being born and older animals dying each year. The lack of overall increase or decrease is good evidence that these moose are balanced with their current habitat: that except by manipulating habitat we could have no more moose (even given complete protection) or no fewer even given a harvest of the annual increment (a minimum of 3-4 per square mile).

Unfortunately, this moose eden is but a passing thing unless extensive habitat change (another fire for example) occurs. Browse plants are simply growing out of reach of the animals. Even with a density of up to 18 moose per square mile year-round, the animals seldom "hedge" browse plants enough to keep them available. Our data from measuring browse eaten on 980 eight-by-twenty-four-foot plots show that 12 moose per square mile consume less than 20 per cent of available food. In addition, studies of plant species eaten suggest that, at this density, moose are contributing to a decrease in habitat quality. Two highly preferred, digestible and nutritious foods -- willow and aspen -- have all but disappeared in some areas due to heavy browsing, while less nutritious birch and unpalatable spruce thrive.

Ed Klinkhart

The situation, then, is paradoxical. In the area of the Kenai 1947 burn we have the densest moose population ever recorded. Yet this population is too small to keep its browse from growing out of reach in extensive areas. Even with negligible moose harvest (200-400 animals annually out of at least

TRANQUILIZER SHOT -- LeResche prepares to shoot trapped moose with tranquilizer drug as part of research program.

1,500-2,000 animals produced annually) the population has not increased in probably six to eight years. Social and/or nutritional factors apparently prevent a population increase under the present habitat conditions and density of moose.

Several experiments at the Moose Research Center are designed to tell us the "whys" of such a situation and enable us to measure moose and habitat health in other parts of Alaska. Walter, Richard and Raquel patiently allow us to stand at their sides while they eat, sleep and carry on their normal activities. On an IBM sheet we mark the size of each bite (number of leaves in summer, length of twig in winter), plant species, plant height, previous feeding on that plant, how high the moose reaches for the bite, and diameter of the trunk and of the stem eaten. From thousands of such bites we can construct a picture of a moose's diet: by plant species, size, location and amount eaten. This method is obviously much superior to counting twigs after the fact.

Preliminary information has shown that moose eat many nonbrowse plants (for example, low-bush cranberry, lupine, wintergreen) to supplement their browse diet, and that in winters of light snow evergreen plants such as cranberry provide a significant portion of their diet. Estimates of pounds of food consumed per moose per day obtained by other methods vary greatly (from 12 to about 40) depending upon season, food quality and method of measuring. In fact, such figures are all but meaningless compared to the more specific data our three moose are providing us. What is eaten is much more important than how much when a maximum population eats only 20 per cent of available food.

Moose, like people, can be healthy or not so healthy depending upon their age, diet and many other factors. The capability to handle an individual moose at different times of the year has let us learn how to measure health factors, which are potentially very useful for evaluating moose and habitat in all areas of Alaska. To accomplish this, we first designed a trap -- a 100' x 12' pen with gates activated by a moose hitting a string -- and then borrowed some techniques from the medical profession.

Once a moose is trapped it is easily immobilized with drugs administered by a gun-fired hypodermic dart. Each animal so captured is tagged and collared for future identification, measured, weighed, relieved of a tooth (for aging) and then bled and (if a lactating cow) milked. The 50cc of blood collected are analyzed for almost 30 constituents, ranging from such well-known substances as total protein, calcium and phosphorus to more esoteric-sounding enzymes like serum glutamic oxalacetic transaminase. Results give us clues as to adequacy of nutrition and general health, degree of

(cont'd. on page 24)

CENTER CABIN--Fish and Game Department cabin provides comfortable living and working quarters for researchers working at the Kenai Moose Research Center.

READY TO GO -- Tranquilized moose, with collar and ear tags in place, is checked by LeResche before it is released to join herd in the research pens.

Moose Lab *(cont'd. from page 17)*

parasitic infection, and even genetic background. Correlated with age, weight, size and milk contents (protein, fats, lactose, and others), such values give us a good profile of the moose's present health. With similar information from enough individuals, we have a profile of a population's health and, by extension, of the quality of its food.

"I've been in this country 20 years and if I don't see a moose he isn't there."

"Well, we see 90 per cent of the moose we fly over, and there just aren't as many as you say."

"You've got to manage by what you see!"

Every game manager has heard infinite variations on this theme, and each of us has searched for a reply based on factual evidence. The Moose Research Center has allowed us to get this evidence, and the answer is surprising even to those of us who knew moose were hard to see. In April, 1970, eight men spent 312 man-hours over a two-week period in the pens, counting browse twigs on 980 plots. Known moose density in the pens at the time averaged about 12 animals per square mile.

During those 312 hours, these men saw 21 moose, most of them along the cleared fencelines. Thus, with unnatural openings to help, they saw only one moose each 15 hours -- and we know these workers were always in the same square mile with at least 12 moose! The burn, obviously, just does not lend itself to hunting on the ground.

"But what about spotting moose from aircraft -- and our aerial counts?" we wondered. A more sophisticated experiment gave us some surprising answers. Seven experienced moose counters and 12 inexperienced newspaper writers, sportsmen's representatives and advisory board members counted the moose within the pens using "Supercub" aircraft. Each man spent 15 minutes over each square mile (much longer than during normal counts). Percentages of moose seen were astonishingly low. Experienced observers, favored with good counting conditions, saw only 61 per cent of the moose flown over; in poorer snow cover, the "experts" saw only 40 per cent. Those with little previous experience counting game fared even more poorly. Eleven of them counting in good conditions averaged 44 per cent; whereas the one inexperienced observer flying in poor conditions saw only nine of the 48 moose, or 19 per cent.

And so the information comes in from our very large laboratory. At present we are working on answers to several other questions. How much browsing is needed to "hedge" a plant, and how much will kill it? How can we best measure food quality by chemical analyses of plants and rumen micro-organisms? How does moose density affect their social behavior and reproduction? How many times will a cow ovulate if there are too few bulls to insure her being bred the first time? At what age are calves self-sufficient? How do food quality and moose density affect the animals' average size?

In order to best solve these problems we have developed or tested many new techniques and evaluated many of our old ones, such as aerial counting. We are learning whether we can estimate moose numbers by counting their fecal pellet groups, what tags and collars are most visible and longest lasting, and what drugs are best suited for handling moose. We have a workable radio-tracking system, modified from one used by the U. S. Fish and Wildlife Service to track bears on Kodiak. We are testing freeze-branding as a means of permanent long-range identification of individuals. We are working on a simple way to classify browse over large areas, and a way to quantitatively record habitat changes.

Hopefully, the Moose Research Center, run cooperatively by state and federal agencies, will continue to provide the answers we need to properly manage Alaska's moose herds. ■

GAME DIRECTOR LEAVES

James A. Harper, Director of the Game Division, Department of Fish and Game, has resigned to take a position in Oregon.

"As director for the past two years, Harper reorganized the Game Division into the area biologist concept and realigned the division's programs to take full advantage of federal matching funds available to the state of Alaska," Commissioner Wallace H. Noerenberg said.

"Jim did an outstanding job for us and it was with regret that I accepted his resignation,"Noerenberg added.

Harper's new position is on the staff of the Director of Oregon State Game Commission. His resignation was effective Nov. 27.

Alaska FISH & GAME

TALES TRAILS

NOVEMBER-DECEMBER 1970

ALASKA DEPARTMENT OF FISH AND GAME