LIVE TRAPPING MOOSE AT MINERAL LICKS IN ALBERTA

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Abstract: Moose (*Alces alces*) were live trapped in the Boreal Forest of Alberta in order to radio tag animals for a moose movement study. From 1970 to 1977 a total of 148 moose were captured during 1,272 trap-nights (11.6 captures/100 trap-nights). Seventeen moose (11.5 percent) escaped before they could be tagged. Escapes were attributed to trap malfunction and animals breaking out of the trap. One hundred and nineteen moose were immobilized in the trap by darting with an animal capture rifle. Immobilizing drugs used were sernylan on 11 moose, rompun on 1 moose and M99 on 107 moose. Mortality that was related to handling was 11.7 percent (6, 1 and 7 animals injected with sernylan, rompun and M99 respectively). The 9 traps were unbaited and were located adjacent to natural mineral licks in remote regions. Trapping was most successful in early June when captures were as high as 21.4/100 trap-nights.

For at least 100 years moose have been trapped for transplanting (Pimlott and Carberry 1958) and for tagging (Ritcey and Edwards 1956, LeResche and Lynch 1973). More recently helicopters have been used to capture moose for tagging (Simkin 1963, Haigh *et al.* 1978). Pimlott and Carberry (*op. cit.*) reviewed the history of moose trapping in North America, including reference to the 1878 transplant of moose to Newfoundland from Nova Scotia and New Brunswick. They also mentioned the trapping of moose in Quebec, Michigan, Wyoming and Alberta.

This paper discusses the results of live trapping moose in a remote area of the Boreal Forest of Alberta. The purpose of trapping was to install radio transmitters on moose for a study of moose movements and distribution.

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STUDY AREA

The study area was located 26 km east of the town of Swan Hills at 54°45' N latitude, 115° W longitude. The 390 km^2 area is semi-wilderness, with access along a single dirt road into the site. Travel about the study area was by all-terrain vehicle along 6 m-wide seismograph lines cleared in 3.2 km^2 grids.

Dominant vegetation on the uplands is white spruce (*Picea glauca*) and aspen (*Populus tremuloides*). Some white birch (*Betula papyrifera*) and lodgepole pine (*Pinus contorta*) are present in lesser amounts. About a third of the area is covered by lowland muskegs and sedge meadows containing black spruce (*P. mariana*) and tamarack (*Larix laricina*).

The understory in the uplands is dominated by green alder (*Alnus crispa*). Willow (*Salix* sp.) is abundant in the lowlands near waterways and along valley bottoms.

The moose population on the study area was estimated at 500 (1.5/km^2) (Lynch 1975). Other ungulates include a few mule deer (*Odocoileus hemionus*) and an occasional white-tailed deer (*O. virginianus*). Large predators include timber wolves (*Canus lupus*), coyotes (*C. latrans*), grizzly bears (*Ursus arctos* L.) and black bears (*U. americanus*).

METHODS

The moose traps were patterned after those of LeResche and Lynch (1973). They were constructed of mainly native materials and were about 20 m long by 3 m wide. The page wire covered walls of the traps were 2.4 m high. The original trap design

was changed by using a rolling log rather than hinges to swing the gates. In addition, structural improvements were made to the gates and a spring actuated trigger device released the heavy gates (Fig. 1). Nine traps were constructed on the study area, but all traps were not usually in operation at the same time. Traps were unbaited and were built on main trails leading to natural salt licks (Best *et al.* 1978).

Most traps were located in areas of semi-wilderness up to 20 km from the nearest road. Access was by all-terrain vehicle along seismograph lines and trails cut in the forest.

Once captured, moose were immobilized with drugs so they could be handled and radio collared. The immobilizing drug used on most animals was M99 and antagonist M50-50. A few moose were drugged with succinylcholine chloride or sernylan. Drugs were administered by darts shot from a Palmer powder-fired rifle.

RESULTS

A total of 148 moose were captured in 1,272 trap-nights from 1970 to 1977 (Table 1). The most captures in any one year occurred in 1975 when 32 moose were caught during 219 trap-nights. Fewer moose but greater trapping efficiency occurred in 1974 and 1977. The greatest trapping effort took place in 1976 when 27 moose were captured in 325 trap-nights (Table 1).

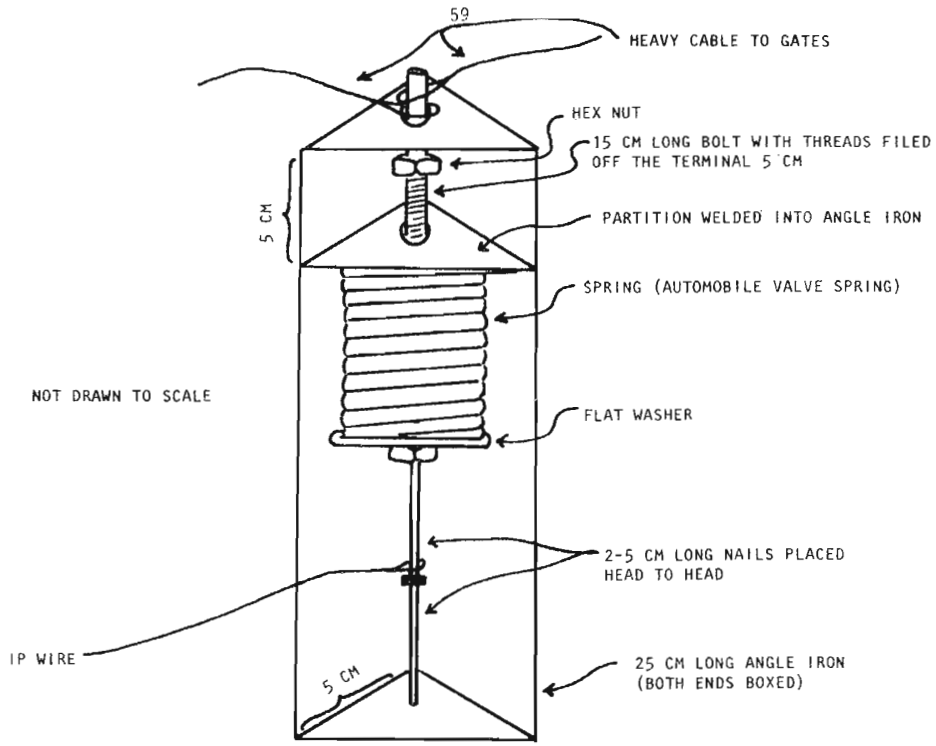

Fig. 1. Diagram of the triggering device used to release the heavy gates of moose traps. To set, the hex nut is screwed against the partition to compress the spring and raise the end of the bolt out through the hole in the top where the gate cables loop over the bolt end. The 2 nails are placed head to head so they support the pressure of the spring as the hex nut is backed off away from the partition. One end of the trip wire is looped around one of the nails near its head, the other end to the far side of the trap. Pressure on the trip wire collapses the nails. The horizontal pressure needed to collapse the nails may be adjusted by off-setting the alignment of the nail heads. The angle iron may be of any thickness but should approximate the dimensions shown in the diagram. The nails should be heavy enough so they won't bend against the pressure of the spring. Nails may be filed to achieve the desired length. The device is usually fastened with screws to a tree or pole in either vertical or horizontal position. Tape is used to keep the nail holding the trip wire from becoming lost. A short piece of cord is tied to the second nail to prevent its loss.

Table 1. Results of trapping moose from 1970 to 1977 in the Boreal Forest of Alberta.

Year	Captures	Trap-nights	Captures/100 trap-nights
1970	3	11	27.3
1971	14	102	13.7
1972	15	121	12.4
1973	28	309	9.1
1974	20	129	15.5
1975	32	219	14.6
1976	27	325	8.3
1977	9	56	16.1
Totals	148	1,272	11.6

Fig. 2 compares trapping success over 7 trapping periods from 15 May through 31 August when trapping took place. Success was greatest in early June, dropping off steadily until late July when it seemed to level off. Little trapping was done in May for fear of harming pregnant cows. Trapping success in May was low at 3.4 captures/100 trap-nights.

Fig. 3 compares the distribution of moose captures over time according to sex. Captures of both sexes peaked in June, but males seemed to peak earlier than females. Trapping males was most successful at the onset of trapping in the first week of June. Captures of females peaked 2-3 weeks later in the second half of June.

A total of 17 moose (11.5 percent) escaped from the traps. Nine escapes were due to animals breaking out, 8 due to trap malfunctions. Twelve trap malfunctions were recorded during the 8 years of study. Causes of malfunctions included jammed gates (4), sprung (2), jammed trigger (2), broken trip wire (1), animal passed under trip wire (1), gate flipped off pole (1) and too large a crack between the gate and wall of the trap (1).

DISCUSSION

Traps longer than 20 m were difficult to work because of the long shots required with the dart gun at an often moving target. Shorter traps meant that the worker had to approach closer to the moose, hence adding to the animals' fear response. We tried to minimize the fear factor by approaching the trap downwind, using natural barriers as blinds, avoiding stepping on twigs or dry leaves and by wearing wool or flannel outer garments to reduce noise. This worked well and we were able to approach most traps unnoticed by the moose.

Most moose did not panic when the trap was approached, but would pace the far end. The degree of fear seemed to vary individually and a few animals ran hard into the far gate. By minimizing the disturbance factor we reduced the fear response in

the moose. Some moose showed no fear and occassionally an animal would charge, striking with its forelegs.

A total of 14 recaptures (9.4 percent of all captures) involving 11 animals were recorded. One female was recaptured 4 times. No other moose were recaptured more than once.

A total of 13 calves (8.8 percent of all captures) were trapped and tagged. One calf was immobilized with M99 while all others were restrained by hand without the use of drugs. All calves were accompanied by their dams. A few calves were seen outside the traps that held their dams.

Trapping success seemed to vary inversely with trapping effort (Table 1). This was attributed partly to the practise of operating only the better traps at certain times. In years when all traps were utilized trapping efficiency was less because the poorer traps added to the trap-nights without keeping pace with numbers of captures.

The decline in trapping success after mid-June may have been due in part to fewer animals using the trap sites as they were frightened from the area by the trapping experience. Licks at trap sites did not receive a great deal of use by moose until June when activity at the licks seemed to peak. This coincided with the peak in trapping success (Fig. 2), but it is not known to what extent trapping activity discouraged use of the area by moose.

Little was done to correlate trapping success with the complexities of weather factors. Some qualitative observations suggest that success was best during dry weather when barometric pressure was high and poorest during rainy weather. Rain seemed to restrict moose movements to the licks. Hawkins and Klimstra (1970) experienced similar results when they were trapping white-tailed deer in Illinois.

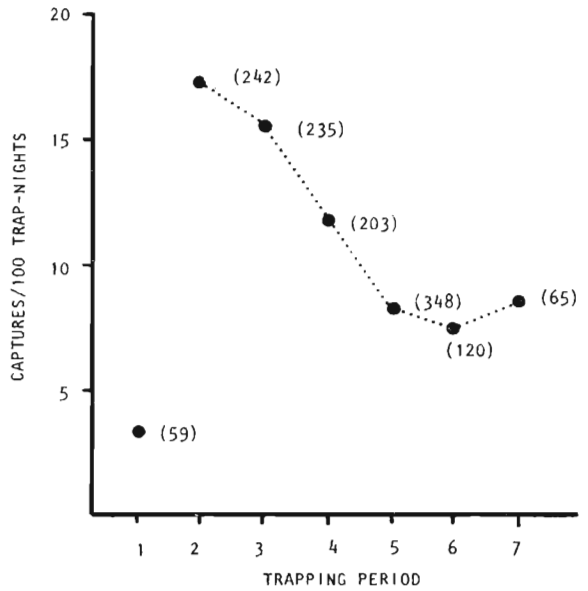

Fig. 2. Comparison of trapping success between 15-day trapping periods from 1 June to 31 August. Numbers of trap-nights are in parenthesis. Trapping periods were: May 16-31 (1), June 1-15 (2), June 16-30 (3), July 1-15 (4), July 16-31 (5), August 1-15 (4) and August 16-31 (7).

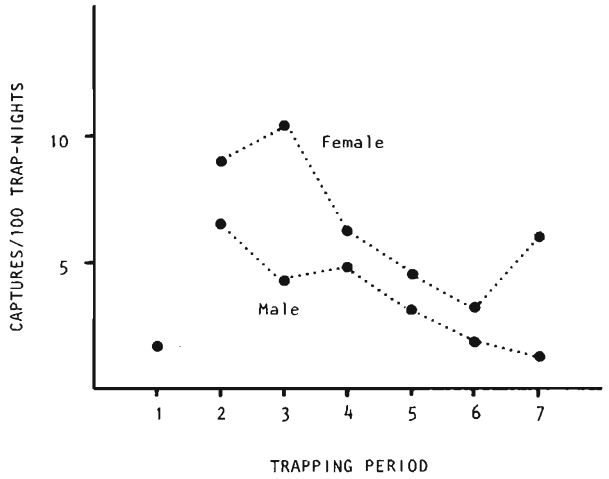

Fig. 3. This figure shows that trapping success was greatest during June. Captures of males peaked in early June while the peak in female captures was delayed by about 2 weeks. Refer to figure 2 for an explanation of trapping periods.

They recorded a negative correlation of trapping with temperature, relative humidity and rainfall.

Initial attempts at handling moose in traps were not very successful. Eleven moose were drugged with sernylan, but only 5 survived. Rompun was used on one animal and it did not survive. M99 was used on 107 moose and only 7 died as a result of handling. Mortality when using M99 would have been less except that some of the drug had exceeded its shelf life and had become less effective. This resulted in symptoms of underdosage in the animals and greatly increased their level of fear and excitement. These animals died displaying classic symptoms of capture myopathy (Morley Barrett, personal communication, Haigh *et al. op cit.*). One yearling male died after being left in a trap for 2-3 days when we failed to notice that the trap was occupied. One adult male broke a leg and had to be destroyed and one adult female broke its neck when it fell forward into the side of the trap. Some males damaged their velvet-covered antlers on the wire fence. This seemed to be more of a problem with yearlings and 2-year-olds than with more mature animals. Most moose received superficial scrapes over the eyes from rubbing on the fence.

We were satisfied with the operation of the traps but improvements were made whenever possible. Leads that were used to funnel moose to the traps were originally constructed of page wire. This was replaced by wooden poles when it became apparent that animals were becoming entangled in the wire. Inside the traps, a line of poles was nailed horizontally along the walls 1-2 m above the ground to reinforce the page wire. The best page wire that we used was made of Number 9 wire in 15.24 cm (6 in) squares. All cables connected to gate poles were strung outside so they would not fall into the trap when it was sprung. A few animals became tangled in gate wire before this modification was made. Trip wires were very light and no animals became entangled in them. The trigger device proved reliable and

was easy to set with an open-end wrench and socket set. The 2 vertical pins of the trigger were taped to the trip wire and an anchor cord respectively so they would not become lost when the trap was sprung. We found that dry fire killed poles worked best for gate construction because they were light, strong and resistant to decay. If wet logs were used in gates they were peeled and split lengthwise so they would dry and resist decay.

The cost to construct a trap was about $255.00. Materials that were needed were page wire (60 m for $200.00), trap trigger ($25.00) and miscellaneous hardware such as nails and staples ($30.00). Axes and chain saws were used to cut and prepare the logs and poles. Little effort was made to conceal the traps. Two men could construct a trap in about 16-18 hours.

A radio transmitter (trap monitor) was used at each trap to indicate when it was sprung. Monitors were set so they emitted their pulsed signal as long as the trap was not sprung. When no signal was heard we knew the trap was sprung or that the monitor had malfunctioned. Radio frequencies of trap monitors matched those of the telemetry receivers used for tracking moose, so duplication of radio receiving equipment was unnecessary.

Some other methods of capturing moose were considered for this study, but our traps were selected because they were inexpensive, easy to construct and because moose on the study area were attracted to salt licks where they were available for trapping. Only a few moose were needed for telemetry and trapping was carried out at the same time that animal tracking was taking place, so a separate crew of trappers was not necessary. Two men could easily handle the animals and reset the traps.

Twelve additional moose were captured by darting from a helicopter in December 1975 and March 1976. Four of 12 (33.3 percent) died as a result of the handling. This mortality was higher than that reported by Haigh *et al. op cit.* and R. Stuart

(personal communication) who successfully used the technique in Alberta and Saskatchewan respectively.

Three free-ranging moose were captured by darting in an area where logging was taking place. These animals were easily approached because they were used to human activity at the logging site. Two moose were darted with M99, the third with succinylcholine chloride. There was no mortality.

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