

STATUS AND MANAGEMENT OF MOOSE IN THE NORTHWEST TERRITORIES, CANADA

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ABSTRACT: Moose are one of the most important sources of red meat to the people of the Northwest Territories who live within the treeline. Recent surveys have indicated low densities ranging from 0.05 to 0.15 moose/km² but apparently good reproduction and early survival of calves such that most calf/100 cow ratios in November/December are between 40 and 70 (range 24-82). Currently, the majority of the harvesting is done by native hunters who have no legal restrictions, but who follow their traditional management practises. These hunters have voluntarily maintained a no hunting corridor for big game along approximately one-third of the NWT highway system during the last seven years. Today we do not have good harvest data to assist our management. In the future, we hope to be involved in a cooperative harvest study resulting from the settlement of native land claims. Resolution of these land claims shall move us further into cooperative management regimes and will likely result in more local control of the moose resource.

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Moose (*Alces alces*) are one of the most important game species to those people of the Northwest Territories (NWT) who live within the treeline. As a source of protein, moose probably account for 30% of the fresh meat available to the inhabitants of the smaller communities where store-bought meat is extremely expensive (Brackett et al. 1985). The annual fall moose hunt is considered one of the major events of the year in many of the southern NWT communities. Many native people annually leave their communities and return to traditional hunting areas to hunt moose, whether they are employed in traditional resource harvesting or the wage economy (Treseder and Graf 1985). In fact, some of the smaller schools close for several weeks so that young children may also partake of this culturally important harvesting event.

DISTRIBUTION AND POPULATION DYNAMICS

Moose are found throughout the forested areas of the NWT south of the treeline which covers an area of close to one million square kilometres (Fig. 1). However, moose have been reported and harvested far into the tun-

dra in river valleys as far north as the Arctic coast (Kelsall 1972; Kelsall and Telfer 1974). In fact, one moose was reported shot by local hunters on Victoria Island. Personal sightings of moose in tundra valley habitats include an observation in March 1989 of six moose, including one short-yearling, in the upper Thelon River valley at the juncture of Hanbury and Thelon rivers (Fig. 1) (Graf and Shank, 1989).

It is the taiga sub-species *A.a. andersoni* which occurs over most of the NWT, but the larger tundra moose, *A.a. gigas*, may also occur in the Mackenzie Mountains which form the border with the Yukon Territory (Kelsall and Telfer 1974; Bubenik 1986). Only two moose from the NWT are listed in the Boone and Crockett Record Book (#'s 11 and 45 for the "Alaska-Yukon moose") and both were shot in the Mackenzie Mountains.

Overall, moose in the NWT are found only at low densities (0.05-0.15 moose/km², Table 1) when compared to other northern jurisdictions in the boreal forest; 0.22 moose/km² in northeastern Alberta (Hauge and Keith 1981), usually >0.20 in Saskatchewan (Stewart and Gauthier 1988) and 0.18-0.48 on the Tanana Flats in Alaska (Gasaway et al. 1983,

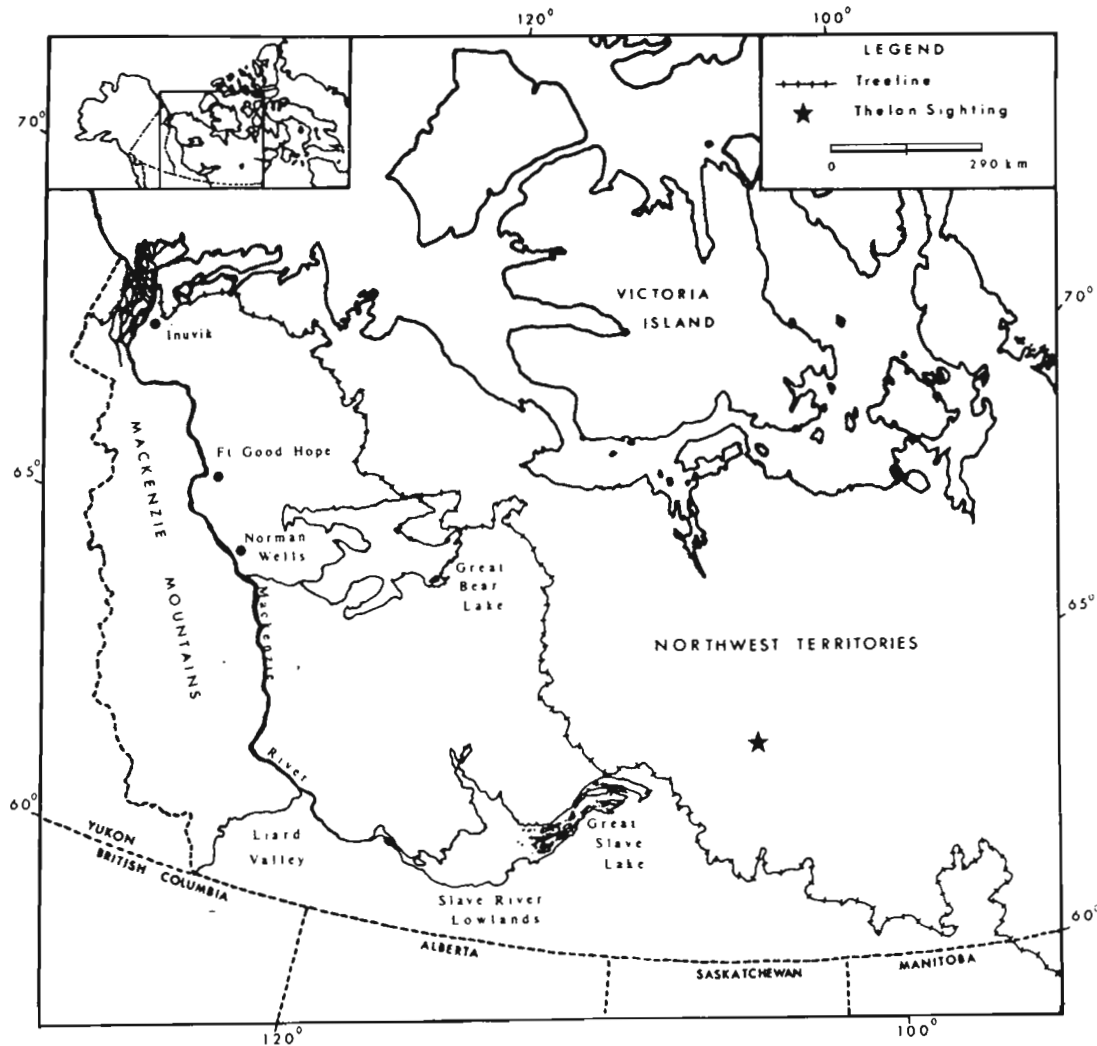


Fig 1. The western portion of the Northwest Territories of Canada which encompasses all of the NWT moose habitat.

Jennings 1985). The adjacent Yukon Territory has recently estimated some lower densities of 0.19 and 0.14 at Francis Lake (Jingfors 1988) and at Liard East (Jingfors and Markel 1987) respectively.

Earlier surveys in the NWT used inconsistent and sometimes less than rigorous techniques, with estimated densities ranging from 0.03-0.09 moose/km² (summarized in Treseder and Graf 1985). Many of these areas have been resurveyed in the last five years (Table 1) using the more dependable stratified, random block survey technique as recommended by Gasaway *et al.* (1986) and others. All recent surveys have been carried out in early winter

as soon as snow cover is sufficient. Fixed-wing aircraft are used for the reconnaissance flights and then a helicopter is used for counting the moose within the selected sample units. In most cases the estimated densities were found to be similar or slightly higher and the NWT upper range can now be increased to 0.15 moose/km². Strata densities have ranged from 0.03-0.42 moose/km². These surveys have sampled what is considered much of our good, productive moose habitat. Most communities have "moose vacuums" around them probably caused by overharvesting as hunters have better access from an increased number of roads and trails.

Table 1: Estimated densities of moose based on November surveys carried out in the Northwest Territories. (N= the number of blocks surveyed, followed in brackets by the percentage of blocks that were surveyed; CV= population coefficient of variation= population standard error/ population estimate; SRL= Slave River Lowlands; GSL= Great Slave Lake).

Area & (Reference)	Date (Year)	"N"	Density (Per km ²)	Density Range	CV
Liard (1)	1985	22(23)	0.12	.08-.28	0.17
Liard (1)	1986	38(17)	0.07	.06-.27	0.22
South SRL (2)	1986	39(16)	0.11	.07-.38	0.19
North SRL (3)	1987/88	49(23)	0.14	.07-.39	0.10
North GSL (4)	1989	20(18)	0.03	.03-.10	0.57
Norman Wells (5)	1984	35(25)	0.15	.08-.42	0.11
Norman Wells (6)	1989	35(27)	0.15	.12-.33	0.19
Ft. Good Hope (5)	1984	31(29)	0.13	.08-.20	0.10
S.E. Inuvik (7)	1986	39(70)	0.05	.04-.27	0.04
N.E. Inuvik (8)	1988	66(34)	0.06	.04-.34	0.15

1. Ray Case- unpubl. data.

3. Graf and Case (1990b)

5. Jingfors *et al.* (1987)

7. Stenhouse and Kutny- unpubl.data

2. Graf and Case (1990a)

4. Case and Graf- unpubl. data

6. Paul Latour- unpubl. data.

8. Jingfors and Kutny (1989)

Although moose densities appear low, indices of reproductive rates and survival to early winter are relatively high. Our November estimates of calves per 100 cows range from 24 to 82 (Table 2). These ratios suggest there are no immediate problems with early calf production and survival except perhaps in the far northern edge of the distribution (N.E. Inuvik) and the area north of Great Slave Lake, the two areas of those surveyed which are closest to the treeline (Fig. 1).

HARVEST, MANAGEMENT AND REGULATIONS

In the NWT the government cannot restrict the taking of game for food by native Canadians unless that particular species of game has been declared in danger of becoming extinct (Government of Canada 1960 and

1964). The Government of the NWT has expanded the definition of "native" to include not only Inuit and Indian (Dene) of pure blood but also people of mixed blood (Metis). For a period during the 1950's, the Government of Canada did restrict the taking of moose in the NWT by natives to one moose per family per year although moose had never been declared endangered. During this same period, there was no hunting of moose allowed by non-native Canadians. However, native hunters may now take any number, sex or age of moose at all times of the year and thus follow their traditional ways of hunting and managing moose. Licensed non- native Canadians living in the Northwest Territories for more than two years may annually take one moose of any sex from September 1 to January 31. Licensed non-resident trophy hunters may

Table 2. A comparison of November aerial surveys of estimated moose population characteristics in the Northwest Territories. The twinning rate is calculated as the proportion of cows with twins to total cows with calves. The bulls include yearling bulls and all ratios are per 100 cows \geq 18 months of age except where indicated. Ninety percent confidence intervals as a percentage of the total are given when available. (N= number of moose observed; NA= data not available).

Area & (Reference)	Survey (Year)	"N"	BULLS/	Calves/	Twin	Yearl./
Liard Valley (1)	1985	73	77	75.0	37.5	NA
Liard Valley (1)	1986	95	121	100.0	46.5	NA
South SRL* (2)	1986	131	67 \pm 33%	63.5 \pm 34%	22.2	41.5
North SRL (3)	1987/88	287	110 \pm 34%	71.6 \pm 18%	33.9	NA
North GSL (4)	1989	21	78 \pm 54%	45.2 \pm 38%	50.0	NA
Norman Wells (5)	1984	150	76 \pm 32%	44.0 \pm 32%	9.7	6.0
Norman Wells* (6)	1989	NA	100	57.0	11.0	42.0
Ft. Good Hope (5)	1984	125	79 \pm 52%	61.0 \pm 18%	18.2	12.0
S.E. Inuvik (7)	1986	132	110	44.0	26.6	57.7
N.E. Inuvik* (8)	1988	109	69 \pm 36%	24.5 \pm 36%	0.0	62.0 \pm 49%

* - based on cows \geq 30 months of age

1. Ray Case- unpubl. data.

2. Graf and Case (1990a)

3. Graf and Case (1990b)

4. Case and Graf- unpubl. data.

5. Jingfors *et al.* (1987)

6. Paul Latour- unpubl. data.

7. Stenhouse and Kutny- unpubl. data

8. Jingfors and Kutny (1989)

take one bull each year in the Mackenzie Mountains and must hunt from September 1 to October 31 through a licensed outfitter.

Historic moose harvest data from the NWT should be used with great care. Recent resident hunting information is accurate as it is based on questionnaires sent out to 100% of the hunters who purchase moose tags. Between 1982/83 and 1988/89, the annual resident harvest estimate has ranged from 107 to 209 [(mean= 160 \pm 31.5 (S.D.)) taken each year. Questionnaire return rates have been high, ranging from 72 to 91% (NWT Ren.Res. files). Non- resident data is considered accurate as it involves mandatory reporting by all outfitters. Between 1982/83 and 1988/89 the harvest has ranged from 10-39 [(mean= 20 \pm 9.4 (S.D.)) (NWT Ren.Res. files). Unfortunately for moose management, the harvest by

native people which probably accounts for 80-90% of the total harvest is the least rigorously collected data. Throughout most of the areas in which moose are found, the only harvest information is from a questionnaire which a native person may be asked to complete when they come into a government office each year to renew their hunting license. The form covers all wildlife harvested. This process has continually provided a low response rate and therefore data of questionable veracity. Certainly the data could never be extrapolated to provide a total estimated harvest and so are used only intermittently as minimum numbers.

In certain areas of the NWT cooperative harvest studies have been conducted. Some data from areas within the range of moose show rather lower use than anticipated and the

participation rates of the hunters in the harvest study are often too low to draw final conclusions. Overall, the native harvest is estimated between one and two thousand moose per year.

In 1983 a big game, non-hunting corridor was instituted over one-third of the major highway system of the NWT. This corridor evolved because the native hunters in the local areas were concerned that moose would be over-harvested along a newly opened highway. Resident hunters were restricted under legal regulations but native hunters, who harvest most of the moose in the NWT, voluntarily stopped their hunting along the highway. This was done with the understanding that if native hunting should occur in the corridor then the legislation restricting resident hunters would be repealed. To date, there has been good cooperation from all hunters and these regulations remain in place.

THE FUTURE

Two situations are changing in the NWT which may dramatically affect our management of moose. First, in April 1987 the NWT Department of Renewable Resources took over Forestry and Fire Management from the federal government. This integration of mandates has allowed our wildlife staff to have more meaningful input into forest cutting practices and the management of fire. In turn, this has led to new research initiatives investigating the impact of fire on moose, furbearers and the ecosystem as a whole. The second situation, which continues to change weekly, is the imminent settlement of aboriginal land claims in the forested area of the NWT. An Agreement-in-Principle (AIP) had been accepted by the negotiators (INDIAN AND NORTHERN AFFAIRS DEPT. 1990) but has just been rejected by some of the beneficiaries. It appears now that some regions within the claim area may yet settle their claim by independently accepting terms close to those listed in the original AIP. Under the

original document a cooperative wildlife management board system similar to that now operating in Alaska would be established. This system would involve local community wildlife councils, regional wildlife boards and a claim area wildlife management board. In 1986, the Government of the NWT, following the spirit of the land claims process, established the Denendeh Conservation Board (DCB) to promote cooperative management. Today, the DCB makes recommendations to the Minister of Renewable Resources regarding the management of moose and other wildlife in the claim area.

There are several items in the original AIP which could affect management of moose. A harvest study **must** be conducted to establish a minimum needs level for the native users of wildlife. This data base alone, with local help to interpret the information, would provide managers and the DCB with much needed help to determine the direction moose management should take in the future. A second clause which would affect moose managers directly is the requirement for government to provide an estimate of the total allowable harvest for each species in each area. This clause will demand that we increase the intensity of our moose studies.

The third, and perhaps most important, factor which **could** change as a result of the settlement of land claims, is that the Minister, on recommendation from the wildlife management board, may limit the harvest of moose and other wildlife in the claim area. Currently this may be done only for those species which are legally declared endangered. This does not include moose. Thus, future management could involve the legal establishment of bulls only areas or even non-hunting areas - if the majority of the local users and the boards agreed.

NWT moose management in the 1990's will probably evolve into a much more local concern than exists today. Each community will likely have more control over how the

moose resource is allocated and managed leading us to a more co-operative management regime. Our Department will need to establish moose management areas (or perhaps wildlife management areas) for each community. Such localized management should facilitate the successful integration of wildlife, fire and forestry management.

MANAGEMENT REQUIREMENTS FOR RESEARCH AND MONITORING

The need for harvest studies was high on the priority list in the past (Treseder and Graf 1985) and is the highest priority now. Establishing a total allowable harvest, as required under the land claim, would require gathering more information on the effects of wolf (*Canis lupus*) and black bear (*Ursus americanus*) predation, on the effects of winter stress and nutrition on reproduction and survival of adults and calves and on the effects of hunting. This additional information should help explain why moose densities in the NWT are low.

Any management or regulatory changes will be accompanied by a monitoring process to determine the effects of these management interventions; an adaptive management approach (Walters 1986). We shall use such opportunities and other natural happenings to also examine:

- the relative importance of dispersal and increased reproduction in the response of NWT moose to fire created early successional habitats.
- the effects of changing abundances of alternative prey, in particular our free-ranging, threatened wood bison (*Bison bison athabascae*) but also the two caribou subspecies: the barren-ground (*Rangifer tarandus groenlandicus*) and the woodland (*R.t.caribou*).
- the amount of seasonal movements occurring in some community hunting areas.

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