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Montgomery  
6/11

Mass. survey Report

Little Allen - Nisicki River area

T. Hoff

1974

## INTRODUCTION

A winter survey for moose was made between February 18th, 1974 and February 22nd, 1974, in two areas in the southern Yukon which were found to receive great hunting pressure by local moose hunters. An estimated 120 to 150 moose were shot here, which is 12% to 15% of the total Yukon 1973 harvest by resident hunters, even though the area of these two "hot spots" is less than 1% of the surface area of the Yukon Territory.

The first area is about 1,100 square miles in size and bordered by the Atlin Highway in the west, the Alaska Highway in the north, Teslin Lake in the east, and the B. C. - Yukon boundary in the south.

The second area surveyed is the Nisutlin River valley, which receives great hunting pressure from boats primarily between the Canol Road near Quiet Lake and the mouth of this river at Nisutlin Bay near Teslin. The total size of this valley, as far as willow flats go, is probably not larger than 50 square miles, but moose are drawn into it particularly in late winter from a much larger "hinterland."

## METHODS AND MATERIALS

This survey was done with a Bell helicopter (47 G3 - B2), piloted by Tim Carswell, Biologist M. Hoefs, and Technician G. Lortie served as observer and navigator respectively. The cost of this machine is \$165.00 per hour (this includes gas) and a total of 18.8 hours were used. A total of only about 15 hours were used for the survey reported on here, the remaining 3.8 hours was ferry time from Whitehorse as well as some patrol work during the return trip. The total costs involved were therefore about \$3,100.00, of which about \$2,500.00 was used for the moose survey discussed here. In addition, approximately \$100.00 was spent for food and lodging for pilot, engineer and Game Branch staff at Jake's Corner.

From previous surveys (Hoefs, 1973, 1974) it was known that 90% of the moose are in the valleys at this time of the year and observations made during this survey supports this assumption. For each of the three survey days, flight lines along valleys were laid out beforehand for a total of approximately 3 to 3.5 hours flying time, the remaining 1 to 2 hours flying time of each day was used to classify moose in certain concentration areas. The flight lines are shown on the accompanying map. The altitude flown at was about 500 feet, and the area surveyed covered a strip of about 1/2 mile in width. Besides moose we also reported fresh tracks in newly fallen snow, which gave us an idea as to the number of moose missed, as well as other animals seen. Jaws were collected from two winter killed moose.

### RESULTS

On February 19th, 1974, 69 moose were observed while flying the course plotted for day (1) with noted minor variations (see map). This total included 9 cows that were accompanied by a calf.

Concentration area (A) was randomly sampled for about an hour after the strip census was finished in order to classify moose. A total of 45 moose were located in this burned area near Snafu Lake consisting of 21 bulls, 21 cows and 4 calves. This intensive survey area is approximately 25 square miles in size and we can assume that all moose were brought up because of the intensity of searching and the type of terrain with sparse vegetation cover. The density in this area therefore works out to be almost 2 moose/mile<sup>2</sup>.

These 45 moose were not included in the 69 moose seen during transect surveys and have to be added to the day's total number.

Other animals observed during this survey included 2 mule deer, 1 wolverine, 1 red fox and 4 goshawks. The total flying time for this day was 5.7 hours.

On February 20th, 1974, 61 moose were observed while flying day (2) transect as marked on the map, with minor variations. After the transect survey, two small concentration areas (C) and (D) were checked closely for segregation of moose. A total of 32 moose were observed in these areas consisting of 8 bulls, 19 cows, and 5 calves.

Since fresh snow had fallen the previous night, this was an ideal day to also take notice of fresh moose tracks in the snow, which can be used as an estimation of the number of moose missed during our surveys.

Besides the 61 moose we observed 15 different sets of fresh tracks during the transect survey; but did not see the moose. It is therefore reasonable to assume that about 80% ( $\frac{61}{61+15}$ ) of the moose present on this 1/2 mile strip were actually located and accounted for. The area surveyed on this day had far less moose in it (compared to the February 19th, 1974 survey area), and long distances were completely empty of moose or trails.

In addition to moose, 3 goshawks, 3 eagles, 1 wolverine and 2 lynx were observed as well as a total of 16 caribou (2 bulls, 7 cows, 1 calf). The caribou were observed in the valley south of Squanga Lake. The total flying time for this day was 5.6 hours.

On February 21st, 1974, 33 moose were observed (and 19 fresh tracks) west of Teslin Lake in the remainder of the first survey area.

Subsequently the Nisutlin River basin was surveyed. Because of the large number of moose encountered, only half the distance from Teslin to the Canol Road (near Quiet Lake) could be covered. Going up the river, the east side was surveyed in great detail with an attempt to classify every moose seen. Shortage of gas only permitted us to survey up to the mouth of Thirty Mile Creek. While returning toward Teslin we surveyed the west side of the Nisutlin River valley and again tried to classify all moose seen. A total of 163 moose were counted on this 25 mile stretch of river valley. Portions of this area are very difficult to survey because of the vegetation cover which consists of sedge meadows alternating with very dense stands of tall willows, poplar forest and also spruce forests. Because of this, it is reasonable to assume that probably only 70% to 80% of the moose in the area were accounted for. Of the 163 moose seen, 19 could not be classified, 42 were bulls, 68 were cows, and 34 were calves. One cow had twins which is very unusual for this time of the year.

Three yearling bull moose were noted which still had their antlers. One had the complete set, while the other two had one antler each.

Other animals observed during this day's survey included 10 caribou, 1 owl, 1 goshawk, 1 falcon, 1 eagle, 2 ptarmigan and 18 goldeneyes on Teslin River.

The total flying time for this day was 6.4 hours.

#### DISCUSSION

The total number of moose in these two survey areas can be estimated reasonably well by dividing them up into "habitat types" and by considering the number of moose observed during our surveys in each of these habitat types.

The area between Teslin Lake and Little Atlin Lake is approximately 1100 square miles in size. Of these 1100 square miles, 50 are above the 4500 foot contour, and therefore of no use to moose, and approximately 30 square miles are made up of lakes. This leaves 1020 square miles of potential moose range, about 50% of it (520 square miles) is an old (1958) burn and makes up the western portion of this area; the other half (500 square miles) making up the eastern portion of this survey area along Teslin Lake (see map) is not burned and consists primarily of rather sterile pine and spruce forests, with only some good moose habitat along a few creeks and the shore of Teslin Lake.

Of the 520 square mile burned area, about 250 square miles were covered by our surveys of transects or detailed classified counts. The total number observed was 164 moose. On the basis of tracks, we assume that about 80% of the moose were located in this rather open country, giving a total of about 200 moose for this area, which works out to be an average density of 0.8 moose per square mile of habitat.

Within this 250 square mile surveyed area, densities varied greatly depending on altitude and habitat type. The greatest density was observed in the burnt intensive sampling area (A) near Snafu Lake, where 45 moose were actually observed in 24 square miles of habitat, given a density of 1.9 moose per square mile.

There is no doubt that we sampled the best habitat types in this burned area by flying the valleys, and the remaining unsampled 270 square miles will have a much lower density of moose.

It is assumed that this remaining burned area has an average density of 1 moose per 3 square miles, giving therefore an additional 90 moose in this 270 square mile area.

The unburned half of this survey area is only marginal as moose habitat, consisting largely of rather "sterile" pine forests.

43 moose were actually observed mainly along creeks, and another 13 along the shore of Teslin Lake. The shore line of Teslin Lake is fairly good moose habitat. Based on "fresh track" counts, we estimate that only 65% of the moose present were actually observed. Therefore 21 moose can be expected to have utilized the 24 miles of shore line surveyed, or a total of 40 moose can be expected to use the entire length of the Teslin Lake shore line of about 45 miles. Based on tracks, the 43 moose along creeks etc. represent probably about 65% of those actually present, giving a total of about 65 moose in the area surveyed.

About 80 square miles of a total of 500 was actually surveyed, but these 80 square miles are the best habitat site for moose. The remainder, 420 square miles, is marginal for moose by any standards and a density as low as 1 moose per 10 square miles must be considered optimistic. Therefore another 40 to 50 moose can be added to the total for inhabitants of this fairly large but poor area as far as moose habitat goes.

The total number of moose in the survey area therefore is conservatively estimated at:

200 moose in surveyed burn area
90 moose in unsurveyed burn area
40 moose along shore line of Teslin Lake
65 moose in surveyed unburned area
<u>50 moose in unsurveyed unburned area</u>
445 moose

A total of 96 moose in this area were classified, giving 34 bulls, 50 cows, and 12 calves. There are therefore 68 bulls per 100 cows, and only 24 calves per 100 cows, or only 12.5% calves of the total population. The heavy hunting pressure in this area will no doubt in part explain the unbalanced sex ratio in favour of cows. The low recruitment rate of calves is reason for concern and needs to be further investigated.

The moose densities of the Nisutlin River valley are the highest so far reported from the Yukon. We surveyed an area of approximately 30 miles in length and on the average 1.5 miles in width. It consisted of this river's flood-plain, which has a vegetation cover of sedge meadows, willow stands of varying heights and densities, stands of balsam poplar as well as white and some black spruce. There are also numerous shallow ponds and oxbow channels with considerable coverage of emerging and submerged aquatic vegetation.

In the 45 square mile area we observed 163 moose. If we assume that we saw about 75% of the moose in this valley, this will be optimistic, then there are about 220 moose wintering here, giving a density of almost 5 moose per square mile. There is no doubt that many of these moose will only spend the winter in this valley. The classification showed that there are 62 bulls per 100 cows, and 50 calves per 100 cows or 21% calves of the total population.

As in the other survey area, the unbalanced sex ratio in favour of cows can in part be explained by great hunting pressure on bulls. The high calf survival of 50 calves per 100 cows at this time of the year is very good by any standards and is twice as high as that observed in the other survey area west of Teslin Lake.

Considering that we only covered half the distance along the Nisutlin River to the Canol Road, it is reasonable to assume that about 400 moose winter in this valley, which is first class moose habitat.

#### CONCLUSION AND EVALUATION

The area between Teslin Lake and Little Atlin Lake has an estimated number of 450 moose. This estimate was done in late February after most of the winter mortality had taken place and after the legal hunting season was over. This estimate must therefore be considered as the minimum for the year.

We know from hunters' questionnaires that 22 moose (mainly bulls) were shot in the area during the 1973 season. Only 33% of the total number of hunters had returned their report at the cut-off date, and if the other 66% of the local hunters had a similar success rate, it is reasonable to assume that local hunters shot 66 moose in this area. Another 14 moose will have been taken at least, by trappers and by Indians hunting for meat, bringing the total moose harvest of the area to 80. These 80 moose were taken out of a total of at least 530 (450 + 80), which works out to be a harvest rate of about 15%. While 15% is usually within the allowable harvest range for moose, the very low recruitment rate of calves (12.5%) indicates the need for further study of this population. It is recommended that a short survey flight ( 5 hours) is made of the concentration areas shortly after the calving period. It is also recommended that - if this area is opened up for an antlerless moose season - it should only be for the purpose of getting reproductive data from hunters' specimens.

In the Nisutlin River we are dealing with very different conditions. The total wintering population is around 400, and there is a very large "hinterland" to draw from which includes such well known, high density moose areas, as the Wolf River and Wolf Lake district. In addition the productivity, or at least the calf survival of this population, is twice as good as that of the previous population.

During the 1973 season an estimated 45 moose were taken by resident hunters, perhaps another 15 may have been taken by trappers and Indians. This total of 60 moose (out of at least 460) works out to be a harvest rate of 13%, which is well below the maximum allowable harvest a population with such a reproductive performance could tolerate. If in any area at all, it is here that an antlerless season would be justified -- from the biological point of view.



MOOSE SURVEY to determine this year's calf crop 1974

On June 19, 1974 a survey was made of the areas surveyed last winter in the Tarfu-Snafu Lake country, between the Atlin Road in the west and Teslin Lake in the east, as well as the Nisutlin River valley. Only those areas were checked that were known to be "hot spots" based on last winter's surveys.

The survey was made with a Hughes 500 helicopter piloted by Daryl Bruns (Trans West) and 6.4 hours were used for this survey. This machine was not as good as a Bell B-1 helicopter for game surveys. It is too big and noisy, it is very uncomfortable to place three people in the front, and last not least it is considerable more expensive than a Bell B-1. In the future it should be avoided to use this machine for game surveys. For this census Biologist M. Hoefs served as observer and Technician Grant Lortie as navigator-observer.

The prime objectives of this survey was to establish sex ratios as well as cow to calf ratios after the calving period had terminated. During our winter surveys the cow to calf ratios in the Nisutlin River area was twice as high as in the Snafu-Tarfu Lake area and it was considered important to find out whether such a discrepancy in calf crop exists already after the calves are born or whether it is due to differential mortalities during the first year of life.

Unfortunately the objectives of this survey could not be accomplished. For various reasons surveys at this time are inaccurate. The sexes are separate, the bulls are using different, possibly higher ranges than the cows and an accurate cow to calf ratio can not be established because of the tendency of cows to hide their calves at this age. Also the leaves of poplars and willows are fully expanded at this time, thereby greatly reducing visibility. Perhaps a better time to establish sex ratios as well as productivity of a moose herd is in early November, immediately after the closing of the hunting season. By this time most leaves have dropped, the sexes are mixed, and winter mortality has not started yet.

In the Tarfu-Snafu Lake area only 20 moose were located as well as 6 caribou (on White Mt.). The composition of the moose was 2 bulls, 17 cows and yearlings and only 1 calf.

In the Nisutlin River flats a total of 48 moose were located, consisting of 21 bulls, 22 cows and 5 calves.

It appears that the moose spend the entire annual cycle in the Nisutlin area. The bull to cow ratio is almost exactly 50:50, which would indicate that the animal removal from the area of 50 to 80 moose has no effect in upsetting the natural balance of sex ratio. As already pointed the cow to calf ratios are inaccurate, and the low sample size obtained in the Tarfu-Snafu country does not allow a valid comparison.

Manfred Hoefs,  
Biologist.

MOOSE SURVEY REPORT

December 1974

LITTLE ATLIN - NISUTLIN DISTRICTS

G.M. LORTIE

Technician

LATE FALL (1974) MOOSE SURVEY -REPORT

INTRODUCTION:

During the first week of December 1974, a moose survey was conducted in that portion of Game Management Unit #9 east of the Atlin Road and in the Nisultin River and Wolf River Valleys.

The survey, undertaken from the 3rd to the 6th December inclusive, utilized a Bell 47G3 B2 helicopter piloted by Norman Rafuse of Trans North Turbo Air of Whitehorse. This machine proved excellent for this type of work. Observers were Len Mychasiw of the Watson Lake Office and Grant Lortie, Wildlife Technician of Whitehorse. A total of 15.7 hours of helicopter time was used.

Observation conditions were good, the overcast being high and local fog patches were restricted to valley bottoms in the vicinity of open water. Coverage of the terrain being utilized by moose was approximately 90%.

DATA:

TABLE I

Moose Classifications on that portion of GMU #9 lying east of the Atlin Road to Teslin Lake and south of the Alaska Highway to the B.C. boundary.

<u>Date</u>	<u>Hours</u>	<u>Cows</u>	<u>Calves</u>	<u>Bulls</u>	<u>Sum</u>
Dec.3	3.7	54	5	76	135
Dec.4	4.7	162	32	122	316
Dec.6	2.4	57	13*	51(8)**	121
	10.8	273	50	249	572
				+2 unclassified	

\* one pair of twins

\*\* of the 51, 8 recognizable as being 2 years of age or less.

TABLE 2

Moose classifications in the Nisutlin and Wolf River Valleys.

<u>Date</u>	<u>Hours</u>	<u>Cows</u>	<u>Calves</u>	<u>Bulls</u>	<u>Sum</u>
Dec.5	4.9	24	8	19	51

RESULTS:

(a) Eastern portion of GMU #9.

It became evident within 15 minutes of the survey that moose were concentrated at higher elevations, primarily above the 4000' contour and occurring in valley bottoms only near the heads of drainages. A fresh snowfall and occasional low level flights over valleys below the 4000' contour revealed no moose or their tracks. A small percentage of the observations were made of moose at lower elevations but these were always in unburned areas.

Further, ninety percent of the observations of moose were noted in burns. In unburned areas moose were located in the shrub zone near timberline, but these areas harboured fewer moose than similar elevations in burns.

Moose were strikingly segregated as to sex, the large mature bulls occurring alone or in small groups apart from other moose. Small bulls recognizable as being two years of age or less (by antler development) were inclined to associate with cows and calves.

Group sizes ranged from single animals of either sex to groups of either sex of two to eight animals. Mixed groups of ten or more animals varied in composition: Cows, calves, bulls; 5,0,6; 5,0,5; 3,0,9; 3,0,11; 2,0,11; and 9,1,4. In one burn, 74 moose were classified in approximately a 5-square mile area. Large bulls comprised 90% of the male segment in these large mixed groups.

As bulls of all ages had not yet shed their antlers, classifying animals over one year of age as to sex was easy and accurate. Because of the large sample (572 moose), the adult sex ratio of this population is considered very reliable. Two large bulls were noted as having only one antler.

Analysis of the data provides the following statistical summary:

Calf: Cow ratio -  $50/273 = 18\%$  of observed cows accompanied by a calf.

Calf: Total sample ratio -  $\frac{50}{273 + 249 + 50} = 8.7\%$

Pre-winter Productivity.

Adult Bull: Cow Sex ratio -  $\frac{249}{273} = \frac{911.3}{1000} = 91 \text{ bulls} : 100 \text{ cows}.$

Of the bull segment, eight of a sample of 51 could be recognized as being two years or age or less -  $8/51 = 16\%$ .

The total area of region surveyed is approximately 1100 square miles. Of this total perhaps 520 square miles was burnt in 1958.

A rough estimate of the moose population on the 1100 square miles is derived as follows. 572 moose were observed on uplands above the 4000' contour. An estimated 90% of the area above 4000' was surveyed.  $572 \text{ plus } 57 = 629$  moose occupying the total area about 4000' elevation. Lower lying areas in burns were devoid of moose or their recent sign. Small numbers of moose were observed in unburned areas below 4000', primarily in the timbered hills between Mt. Bryde and Teslin Lake. Below 4000', approximately 420 square miles is timbered, and compared to other habitat types in the region, marginal for moose. If one assumes an optimistic density of moose of one per ten square miles, 42 moose may be added to the total:  $629 \text{ plus } 42 = 671$  moose.

The sport harvest of moose for the region is conservatively estimated at 50 moose, giving a post-calving, pre-season population estimate of  $671 + 50 = 721$  moose.

Twelve caribou and seven wolves (5 greys and 2 blacks) were seen on 3 December, and one fox was seen on 4 December. Two species of ptarmigan and blue grouse were noted as well.

(b) Nisutlin and Wolf River Valleys.

Contrary to our expectations, no moose were seen in the Nisutlin River valley bottom. A few moose were seen on the river terraces but heavy timber precluded our doing a systematic survey on the side hills. Moose in these valleys are scattered at this time, being found from valley bottoms to timberline in both timber and burns, but found most frequently at elevations over 4000'. Group sizes in this area are much smaller than those observed west of Teslin Lake. Most observations were of single animals. Cow-calf pairs composed the bulk of observations of moose occurring in groups of two or more. Again, large bulls were found in segregated groups (2,2,3,3 and 4 bulls with one cow). Calf Cow Ratio  $8/24 = 30\%$  of cows accompanied by a calf. Calf to total sample ratio =  $8/24 + 19 + 8 = 16\%$  pre-winter productivity. Bull: Cow ratio -  $19/24 = 78/100 = 78$  bulls: 100 cows.

DISCUSSION:

(a) Eastern portion of GMU #9.

I suspect that the remarkable and unusual distribution of moose on this area is directly related to the unseasonable and prolonged warm weather this fall, and very low precipitation levels. Snow at higher elevations in this area is approximately one foot in depth on sheltered sites.

As shown by this survey and the one conducted in February 1974, a high density moose population occupies this area on a year-round basis. The distribution of moose at least from late fall thru' the winter is not uniform, the animals favouring that portion of the region burned in 1958. This population, then, is a result of, and is maintained to a great extent by this burn.

Within the burn, the successional flora varies considerably due to burn intensity, exposure, slope, soils, moisture levels and elevation, etc., but some generalizations are possible. To the east of a line between Mt. Bryde and Squanga Lake, second growth is primarily fire succession pine with deciduous shrub species occupying wetter sites and sites at elevations over 4500'. The original forest was almost pure lodge-pole pine grading into spruce forest on north and east <sup>facing</sup> young slopes. West of this valley, second growth is generally willow and other shrub species with young pine occurring on some sites originally forested by pine.

Moose observed on this survey occupied both successional communities to more or less the same degree.

An interpretation of the data indicates:

- (i) A very low productivity
- (ii) Exclusive of calves, 16% of the male segment of the population can be recognized as being two years of age or younger.
- (iii) An adult ratio of 91 bulls to 100 cows.
- (iv) Large numbers of moose occupying extensive burn areas regenerating to fire succession pine.

These interpretations, in the absence of detailed information on range quality and quantity, levels of range utilization and an assessment of mortality, would indicate that this moose population has stabilized and is not expanding.

Our earlier concerns on balancing the harvest with net productivity, in complete ignorance of natural causes of mortality, are, I think, unjustified. If indeed, the population has stabilized, as the gross assessment of age class structure indicates, it is not unreasonable to predict a natural decline in numbers in the next ten years as the burn advances to a climax condition. The transitory nature of second growth habitats such as this burn, and temporary population highs exemplified by this population, suggest that liberal harvest levels should prevail.

The validity of these speculations could be resolved by implementing the recommendations for the area outlined in the following section.

(b) Nisutlin and Wolf River Valleys.

Snow is deeper in this region as compared to the area west of Teslin Lake. The Nisutlin region is more homogeneous with regard to plant communities. The valleys are wide with extensive climax stands of open canopy black spruce, save for dense strands of white spruce, riparian willow and poplar immediately adjacent stream courses at low elevations. In the lower Nisutlin valley around Sidney Creek, old and repeatedly burned areas have achieved subclimax and climax stages in pine. At higher elevations in the Nisutlin Valley old burns are densely forested with mature willow.

Broad uplands between drainages are characterized by open black spruce muskegs. Throughout, an understory of varying density shrub species is characteristic.

The Red and Wolf River Valleys above Fish Lake are typically described in the above discussion, but climax pine forests with a poorly developed understory cover a larger percentage of the area. Relief of the area is much lower and gently rolling in aspect. Below Fish Lake, the Wolf River Valley is narrower, the east side having been burned to timberline on the west flank of the Englishmans Range as far south as Canyon Creek. This burn is evident on the west side of the valley as well, but not so extensive.

The entire area from Sidney Creek on the Nisutlin River, eastward to Fish Lake on the Wolf River, is covered with recent caribou sign with observations of small groups of caribou noted. Several hundred caribou presently occupy this area.

RECOMMENDATIONS:

a) Eastern portion of GMU #9.

The interpretation of the data in the previous section leads to the following recommendations:

- (i) This moose range should be quantitatively and qualitatively evaluated. Present levels of utilization of the various successional communities by moose be investigated. Are moose dependent on fire succession pine as a winter staple?

- (ii) Determine whether the low productivity is a result of post-partum calf mortality, or the failure of cows to carry embryos to term due to nutritional deficiencies or other causes such as diseases or high parasite loads.
- (iii) Investigate causes of mortality. Gather age and sex data and determine the welfare status of winter-killed moose.
- (iv) Continue to evaluate reproductive data from hunter-killed females and collect jaws from both sexes.
- (v) Continue semi-annual surveys as an ongoing population assessment.

A follow-up on recommendation (i) would be to compare this burn with burns of similar age in the southern Yukon.

Do particular areas of the large 2500 square-mile burn north of Whitehorse support comparable moose populations? If not, why not?

b) Nisutlin and Wolf River Valleys.

- (i) As this survey produced such a small sample, a late February survey to assess production should be planned.

CONCLUSION:

A revised population estimate of not less than 700 moose currently occupy the eastern portion of GMU #9. This population appears top-heavy and stable with very low recruitment. Adult sex ratios determined are considered very reliable. This region, for purely academic as well as management purposes, warrants longer range study.

Moose in the Nisutlin Valley are not as sedentary as we suspected. Movement out of the valley bottom probably co-incides with the onset of the breeding season.

Further speculation on the moose population in GMU #9 is tempting, but until the larger questions posed in the recommendations are at least partially answered, I would hesitate to do so.

WINTER SURVEY FOR MOOSE  
IN THE NISUTLIN AREA  
1975/76

HOEFS

Moose survey in the Nisutlin River floodplains on January 22/1976.

A moose survey was conducted in the Nisutlin River basin to continue the annual monitoring of this population.

A Jet Range helicopter (T.N.T.) was used for about 3 hours survey time. The pilot was George Howell, and Mr. Hoefs and G. Lortie served as navigator and observer respectively. The weather was cloudy, calm and mild.

The Nisutlin floodplain was surveyed from Nisutlin Bay north to the mouth of Sidney Creek. An attempt was made to classify a good sample size by approaching closely to the moose to check for white patches of female moose. All moose had lost their antlers by this time.

A total of 138 moose were located in the area, consisting of 31 bulls, 44 cows and yearlings, 5 calves and 58 unidentified moose.

The bull:cow ratio was therefore 70:100,  
the calf:cow ratio was therefore 11:100,  
and the productivity (percentage of calves of total number)  
was only 3.6%.

This count was very disappointing in two respects, firstly a productivity as low as 3.0% is too low to replace adult mortality and is indicative of a declining population; secondly, the total number of 138 moose is much lower than expected, since 163 were observed on February 21, 1974 in only half the distance of floodplains (from Nisutlin Bay to 30-Mile Creek).

The following summary shows a comparison of the three surveys done in the area during the past 3 years.

<u>Date</u>	<u>Bull/Cow Ratio</u>	<u>Calf/Cow Ratio</u>	<u>Productivity</u>
February 1974 (n= 163)	62:100	50:100	21%
December 1974 (n = 51)	78:100	30:100	16%
January 1976 (n = 138)	70:100	11:100	4%

It may, however, be premature to draw any conclusion from this survey, regarding the performance of this moose herd, since this count was conducted at a different time. It is recommended that another flight be made in the latter part of February 1976 so that a more valid comparison can be made to the 1974 survey.

MOOSE SURVEY IN NISUTLIN RIVER FLOODPLAIN ON

FEBRUARY 18/76

A survey was made of the Nisutlin River floodplain with a Jet Ranger helicopter (T.N.T. - pilot Kim Carswell) for about 4.9 hours on February 18/76. About 3.5 hours were spent in the Nisutlin valley, the remainder was ferry time from Whitehorse. The weather was clear, calm and cold (-30 C); M. Hoefs served as navigator and recorder and Ron Butler assisted as observer and recorder.

The length of the floodplain covered ~~was~~ from the delta at Nisutlin Bay upstream to Mile 41 of the Canol Road, is the same distance that was covered during our June biological reconnaissance of the area.

On the way to Teslin we did a brief reconnaissance of the Mitchie Lake, Squanga Lake and Squanga Creek valleys. Some caribou signs were observed on the chain of lakes between Mitchie Lake and Squanga Lake. A high concentration of moose was observed along Squanga Creek starting from the Alaska Highway at Squanga Lake upstream to a Seaforth Lake (the lake Callison has a hunting camp). On this stretch of creek, not more than 16 miles long, we observed 36 moose and probably missed a few more. This area is fairly open, recently burnt and has many stands of low willows intermingled with sedge meadows. It is reasonable to estimate that the density of moose in this valley will be around 3 moose per square mile.

The Nisutlin River was surveyed by flying upstream along its east side and returning along its west shore. Wherever the floodplain was very wide circles were made to cover all willows and poplar stands

and sedge meadows. We flew at an altitude of about 200 ft. No attempt was made to separate male from female moose, but records were made of the number of calves observed unless the moose were under dense cover. Notes were also made on the number of fresh tracks in locations where the moose themselves could not be seen.

The highest moose density was observed in the willow stands in the Nisutlin delta area. This delta habitat is not larger than perhaps 10 square miles in size and we observed 64 moose in it. Because of the dense cover of some willow stands we will have missed a few additional moose, so that the total moose population utilizing the delta can be expected to be between 70 and 80 animals. This late winter density of 7 to 8 moose per square mile appears to be the highest ever observed anywhere in the Yukon.

Moose densities along the remainder of the river surveyed were considerable lower, even though they are still among the best in the Yukon. Beyond the delta upstream to Mile 41 camp site we observed 103 moose and recorded an additional 135 fresh tracks in areas where the moose could not be located because of heavy timber or dense cover. It can therefore be estimated that a minimum of about 250 moose use the floodplain upstream from the delta and a minimum of about 300 to 350 moose use the entire lower Nisutlin floodplain at this time.

Considering the "air distance" of the floodplain surveyed, which is around 45 miles, and the estimated number of moose of 300 to 350, then the density per air mile of floodplain works out to be 7 moose per mile of floodplain, which is higher than that of

the Liard and is comparable to that of the lower Rancheria River.

It was not possible to accurately determine the number of calves in the total number of moose observed, since many of them were running under tall timber or in heavy willows. We estimate that about 120 moose were evaluated and of these 16 were cows accompanied by 17 calves. One cow was leading twins. The ratio of calves to adults in this sample size was therefore 17/103 or about 17%.

One young bull in the delta area still had his antlers.

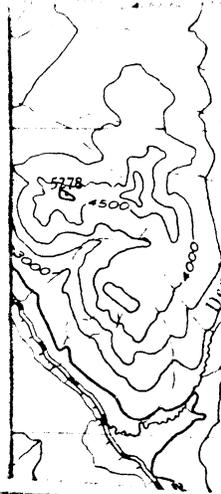
Near the northern boundary of our survey area, east of Quiet Lake, we flew to 3 larger lakes located to the east of about 3500 foot elevation to check whether all moose are down in the river valley at this time. We found occasional moose tracks all the way to timber line indicating that the total number of moose using the Nisutlin River watershed will be considerable higher than the estimates given above.

No wolves were observed during this survey, but two fairly old kills were located, one just north of the "Oxbow" and one 4 miles upstream of "30-mile Slough".

Manfred Hoefs,  
Asst. Director.



Goose survey in G.M.Z. 9  
December 15/76.



Introduction:

During the 1976 Antlerless moose season, the Little Atlin check station results indicated an apparent increase in the productivity of the moose population on the eastern half of G.M.Z. #9.

On 15 December, 1976, a survey was taken to investigate this population and gather data comparable to that gathered on a December 1974 survey (report on file, Y.T.G. Game Branch). Survey time was 5.6 hours in a Bell Jet Ranger piloted by George Howell of TransNorth Turbo Air. Branch observers were Hoefs, Russell and Lortie.

Observation conditions were excellent with the coverage of terrain occupied by moose being less than 50%.

In addition, notes were taken on the vegetation and local environment of observed groups of moose. (Table IV).

Data:

Table I: Classification Counts on Little Atlin burn (15 Dec.1976).

	Hours	Cows	Calves	Bulls	Unclass.	Sum
1976	4.2	230	41	109	8	388
1974	10.8	273	50	249	2	574

Results:

All of the moose were observed in burned areas. Group compositions and the segregation of large bulls noted in 1974 were again evident. Group sizes in 1976 were smaller and the animals were more dispersed, with some found at lower elevations, having moved down from subalpine areas.

Table II	1974	1976
Calf: Cow ratio	50/273= 18%	41/230 = 18%
Calf: Total Sample ratio	50/574= 8.7%	41/388 = 10.6%
Bull: Cow ratio	249/273= 91♂♂: 100♀♀	109/273 = 47♂♂:100♀♀

Discussion:

The Calf:Cow ratio of 18 calves/100 cows is identical to that found in December of 1974 and indicates that productivity in this population has not increased as suspected.

The calf to total sample ratio increased from 8.7% (1974) to 10.6% in 1976. This increase in the proportion of calves in the total population is a result of a large decline in the male segment.

The 1974 bull:cow ratio was 91♂♂/100♀♀ - and in 1976 47♂♂/100♀♀. In addition, more younger bulls were evident this year. While it is possible that some bulls may have lost their antlers - only four mature bulls were noted carrying one antler. The misidentification of mature moose is felt to be a minor factor and the cause of the decrease in the bull:cow ratio is unknown. Harvest levels have remained unchanged over the two years. Are old ♂♂ more susceptible to predation or winter kill than ♀♀ of the same age?

The 1974 survey utilized a Bell B2 helicopter at a survey speed of 50 MPH for 10.8 hours of survey time.

$10.8 \times 60 \times 5/6 = 540$  miles flown with 574 moose  
observed -  $540/574 = 0.94$  miles flown/moose

In 1976 we used a Bell Jet Ranger for 4.2 hours of survey time at an average speed of 100 MPH.

$4.2 \times 60 \times 10/6 = 418$  miles flown with 388 moose  
observed -  $418/388 = 1.07$  miles flown/moose

These comparative figures would indicate a 12-15% decline in the population over the two years, the cause of which, as stated previously, is unknown.

These findings indicate that the recommendations of the 1974 survey report and the research proposal of February 1975 be implemented.

Table III

## Flight Report

15 December 1976

Pilot: G. Howell

Weather: Sunny and clear.

Observers: Hoefs, Russell &amp; Lortie

Obsv'n. Cond.: Excellent.

Helicopter: Jet Ranger

% Coverage: 50%

C-GTNH

Hours: 5.6 hours.

Obsv'n. #	♂♂	♀♀ & Yrlings.	Calf	Remarks
1	2,2,	1,1,		
2	1,1,1,2,	1,1,1,1,2,	1,	
3	1,1,4,1	5,3,3,1,1, 1,2,	1,	
4	1,	3,2,1,1,1,	1,1,1,	2 unident.
5	8,3,4,1,	3,1,1,3,1, 1,1,1,1,	1,2,1,1,1,	Resting
6	1,3,4,	1,1,1,1,2, 5,1,1,	1,1,2,	
7	3,	4,1,1,2,3,	1,1,	
8	3,4,	1,1,1,1,1,2, 1,1,	1,1,	2 unident.
9	1,1,6,1,	2,1,3,2,3,5,	2,	1200 hrs.
10	2,3,3,	1,1,6,1,	1,1,	
11	2,3,1,1,1,	1,2,1,1,2,3, 1,1,2,2,1,1,	1,1,	1 unident.
12	1,1,1,1,1,1,1, 2,2,1,1,1,	1,1,1,1,6,2, 1,3,1,2,2,	1,1,2,	6 wolves (black)
13	1,			
14		1,		3 unident.
15		3,		
16	1,	1,1,1,1,1,1, 1,2,	1,1,1,1,	Standing
17	1,6,2,1,1,	1,3,1,4,1,2, 1,2,2,1,4,1, 2,1,1,1,	1,1,1,1,1,	
18	1,3,2,1,1,1, 1,1,	6,1,1,1,9,1, 3,3,1,3,1,2,4,	1,1,	
19	1,2,	6,1,		
20		2,1,	1,	
21	1,			1445 hrs.
	109	230	41	

Table IV Description of Observation Areas

Observation #	Avg. Elev. (Feet)	Aspect	Slope %	Tree Crown Closure %	Shrub Crown Closure %	Remarks
1	4150	SE	10	0	0-5	rolling, burn
2	4000	NW	10	0	7.5	in draws, lots snags
3	3950	NE-N-W	0-5	0-10 0	25	treed draws & burnt ridges
4	4000	W-E	5	0	15	some regeneration, burn
5	4150	N-NW-W	10	0	0-15	head of valley
6	3800	SW	5	0	15	head of valley
7	3500	SW	5	0-10	20	edge of burn
8	3000	NE	5	very patchy	20	valley floor
9	3500	SW	15	restricted to water courses	25	sidehill
10	3700	W	10	0	5-50	side slope-draw
11	4150	NE-E-SE	15	0	25	side valley
12	3800	S	15	0	5	sidehill
13	4500	S	-	0	40	subalpine
14	2400	-	-	0	10	valley floor
15	4000	N	10-15	0	5	sidehill
16	4200	SW	10	5	5	sidehill
17	3250	N-NE	20	5-10	15-20	edge burn
18	3100	W-SW	5	0	5	flats adjacent lake
19	3000	NW	10	0	15	head valley
20	3600	NE	20	0	10	sidehill
21	2400	-	-	5-10 regen.	10	valley floor