

S U M M A R Y

1993 WHITEHORSE NORTH MOOSE SURVEY

In November 1993, an area of 3,274.6 km² located just north of Whitehorse (Fig. 1) was aerially surveyed for moose. This survey block encompasses game management subzones 5-48, 5-49 and 5-50. This area was previously surveyed in 1982 enabling a comparison between the 1982 and 1993 survey results.

The intent of this survey was twofold:

1. The Whitehorse North survey area is one of a number of priority moose management areas scheduled to be surveyed regularly to determine moose population abundance, trend, distribution and sex/age composition.
2. To determine whether using small high performance airplanes was a cost-effective alternative to using helicopters for censusing moose.

The survey methodology used in 1982 followed the stratified random block sampling technique generally used in Yukon moose censuses. A helicopter (Bell 206) was used to survey all sample blocks at a search intensity of 2 min/km². In 1993 the survey was conducted using methods similar to those used in 1982, except that Pipers PA-18 and PA-12 were used instead of helicopters.

A sightability correction factor (SCF) is used to determine the proportion of moose missed during a survey, this is done by resurveying a portion of sample blocks at an intensity of 4 min/km² instead of the regular 2 min/km². If for example, 10% more moose are found during the more intensive searches, the SCF would be 0.1 and the total number of moose counted would be increased by 10% to account for moose not seen during the survey.

No SCF was calculated for the 1982 survey. During the 1993 survey an SCF was established by helicopter. To allow a valid comparison between the two surveys the 1982 population estimate was corrected using the mean of SCFs from previous surveys that were conducted using the same techniques.

The results of the 1993 Whitehorse North Moose survey are shown in Table 1. There were estimated to be 435±34% (90% C.I.) moose in the area in the fall of 1993. This translates to a density of 130 moose/1000 km². This figure is lower than the 544±24% (90% C.I.) moose estimated to be in the area in 1982 (170 moose/1000km²). Moose density found in 1993 is lower than the average density of moose in other areas surveyed to date in Yukon (173 moose/1000 km²) and it's slightly higher than average density of moose in the Yukon as a whole (approximately 127 moose/1000 km²).

Population composition during the 1982 survey was indicative of a decreasing population with almost no recruitment. An estimated 7 calves and .6 yearlings per 100 adult cows were recorded. A stable

or increasing moose population should have at least 30 yearlings per 100 adult cows. The estimated 43 adult bulls per 100 adult cows is well above the acceptable minimum ratio of 30 adult bulls per 100 adult cows.

In the 1993 survey the proportion of calves in the population (47 per 100 mature cows) indicates a stable or increasing population, but the proportion of yearlings (18 per 100 mature cows) is below that normally required to maintain a stable population. The unusually cold, wet spring and fall in 1992 may have been responsible for the poor calf survival which was witnessed throughout much of the territory in that year. (A low proportion of short yearlings (10% of total population) was observed in four other areas of the Yukon during the March, 1993 composition counts). There are 110 adult bulls per 100 adult cows which is unusually high.

The 1993 survey shows that a significant decrease in population size has occurred since 1982, ($P < 0.20$). There are more calves and yearlings but substantially fewer adult cows. The capacity of the moose population to recover from the observed decline since 1982 is hampered by the fact that adult cow moose have declined so drastically.

The mean annual harvest between 1979-1992 in the Whitehorse North survey area has been 12 moose. Based on the draft moose management guidelines, the sustainable annual harvest in the Whitehorse North area is approximately 13 moose (3% of estimated population in areas with densities of 150-350 moose per 1000 km). Efforts should be made to restrict the harvest of cows in this areas. Without a reduction in the adult cow harvest this population will likely not recover to previous levels.

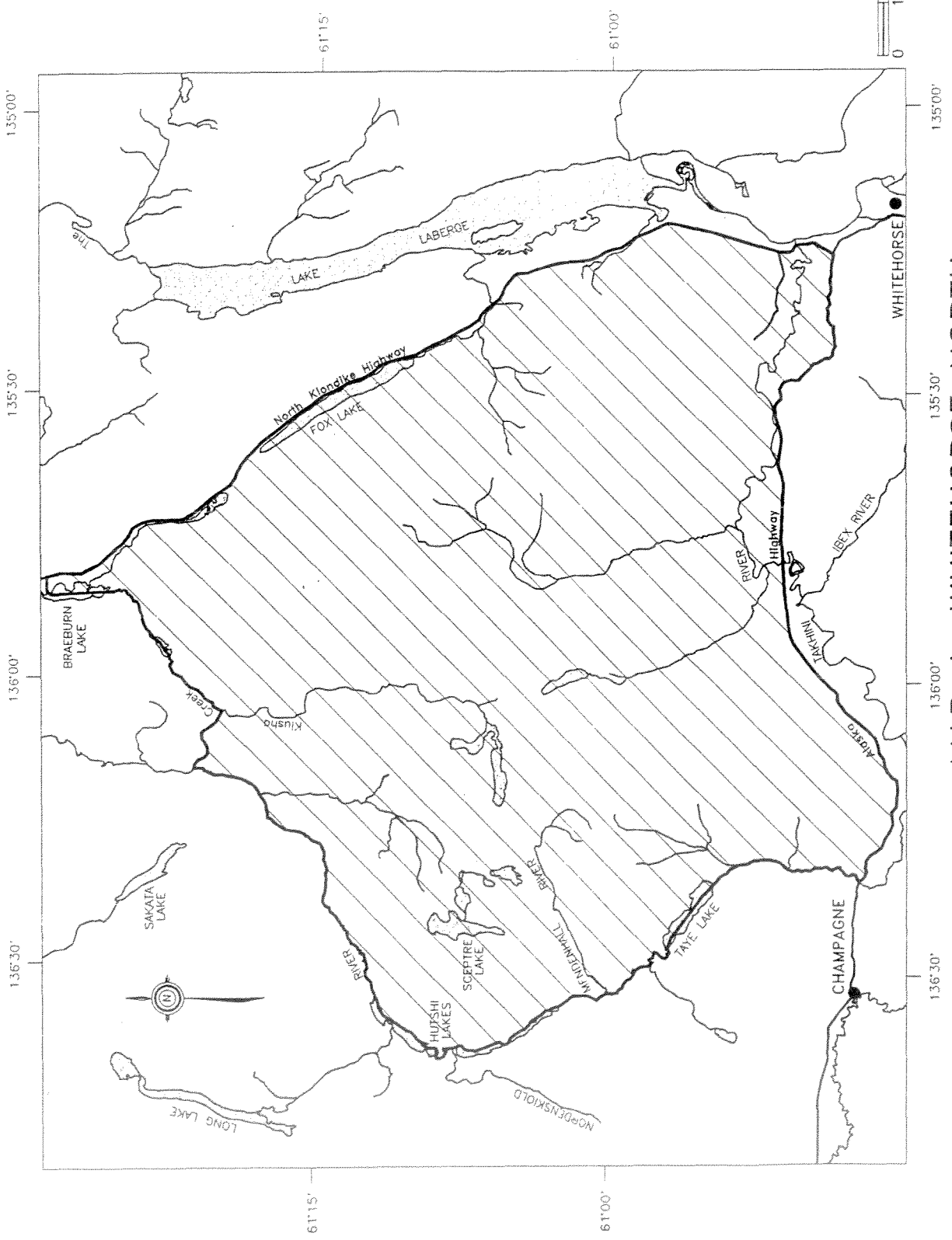
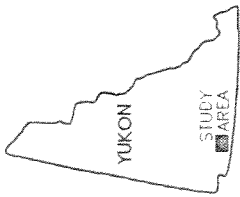
While further analysis will be required to fully evaluate the cost effectiveness of substituting fixed wing aircraft for helicopters for censusing moose populations initial assessment is not encouraging. Too many moose were missed by the fixed wing crews. As a result a larger proportion of the survey area would have to be surveyed in order to get an acceptable population estimate. This would severely reduce or eliminate the cost savings that were anticipated to be accrued through the substitution.

Table 1: Summary of results from the 1982 and 1993 Whitehorse North Moose Surveys.

<u>Population Characteristics</u>	<u>1982*</u>	<u>1993</u>
Estimated abundance (90% CI):	544±24% **	435±34%**
Density (moose/1000 km ²)	170	130
Estimated composition (90% CI):		
Adult Bulls (> 30 months)	145±22%	174±38%
Adult Cows (> 30 months)	341±29%	158±40%
Yearlings (> 18 months)	2±0%	28±95%
Calves (6 months)	22±65%	75±36%
Observed Composition (numbers seen):		
Adult Bulls	75	118
Adult Cows (non-antlered moose minus yearling bulls)	143	122
Yearling bulls	2	8
Calves	8	58
Twinning rate	0	9%
Estimated Ratios:		
Adult bulls/100 adult cows	43±31%	110±31%
Yearlings/100 adult cows	0.6±29%	18±92%
Calves/100 adult cows	7±66%	47±27%
Adult bulls/total population	28/100±22%	40/100±15%
Adult cows/total population	67/100±10%	36/100±19%
Yearlings/total population	0.4/100±23%	7/100±80%
Calves/total population	4/100±62%	17/100±23%
<u>Survey Characteristics</u>		
Survey dates	Nov. 21-24	Nov. 7-17
Stratification		
Area (km ²)	3,187.3	3,274.6
Survey time (minutes)	?	1,665
Search intensity (min./km ²)	0.33	0.51
Moose seen	66	63
Census		
Area searched (km ²)	1,431	1,242
% of area searched	44.9	37.9
Time surveying (min.)	?	2,536
Search intensity (min./km ²)	?	1.9
Moose seen	228	157
Moose seen/min. of search	?	0.06

* The estimated abundance has been corrected for sightability bias. Note that all other values for the 1982 survey have not been corrected for sightability bias and the indicated confidence intervals are therefore underestimates.

** Not significantly different; one-tailed T-test; $t=1.28$, d.f.= ∞ , $0.15 < p < 0.20$.



MAP 1: WHITEHORSE NORTH
1982 & 1993 MOOSE SURVEY AREA