YUKON MOOSE INVENTORY RESULTS

- a summary of 1980-1986 surveys

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Introduction

To properly manage wildlife populations, good information on abundance (numbers) and composition (age/sex ratios) is important. Intensive aerial surveys of moose have been carried out to collect this type of information since 1980. Between 1980-1984, survey effort was concentrated in southwestern Yukon (particularly Game Management Zone 7 and 9) where hunting pressure was also the heaviest. In 1986, moose surveys were extended outside this area to begin a more Yukon-wide inventory program.

This report describes when, how, and why surveys are done in particular areas. It also briefly summarizes survey results from 1980 to 1986.

1. When are surveys done?

Moose surveys are done in early winter (November) when the animals tend to aggregate in mixed groups in open areas. New snow and the lack of leaves on trees and shrubs makes it much easier to spot moose from the air. The bull moose still have their antlers in November which helps us distinguish between sexes. Surveys in late winter or spring are not nearly as effective as moose move into areas of heavier cover where they are more difficult to see and, since most bulls have lost their antlers, composition counts become less reliable.

2. How are surveys done?

A survey area usually between 1000-1500 square miles is divided into smaller blocks (or sample units) that average 5-7 square miles. A crew of four (pilot, navigator and two observers) in a small airplane (Cessna 185, Maule or similar) will first fly quickly through the entire area and record observations of moose or moose tracks. This information is then used to stratify (divide) the whole survey area into blocks of low, medium or high moose density to reduce the variability of the final estimate. Immediately after this stratification, the survey crew will use a helicopter to intensively search for moose in a number of randomly selected blocks. Most of the high and medium density blocks are

covered; these usually represent between 15-20% of the entire survey area and 75-85% of the animals sighted. A sample of low density blocks is also searched intensively. From the information, we can estimate the total number of moose in the survey area as well as the composition of the population, ie. the proportion of adult bulls, cows, yearlings and calves present. If our estimate is based on a representative sample of the total population, we do not need to find and count every individual to get an idea of how many animals are in a particular area. Besides, it would be much too expensive.

3. How reliable are the surveys?

This survey technique has been used successfully in many northern areas, including Alaska, Yukon and NWT. While moose can often be difficult to spot, particularly in heavily timbered areas, the use of a helicopter in early winter to survey small areas very intensively makes our counts more reliable. This reliability is expressed using confidence limits (90%) around the estimate. For instance, we may conclude there were 500 $\pm$ 100 moose in an area which is the same as saying we are confident, 90% of the time, there were between 400-600 moose in the area and that our best estimate is 500 moose. The quality of the surveys will also depend on the experience of the observers and their ability to spot, and classify, moose from the air. The survey crews now used in southern Yukon have several thousand hours of flying experience between them. Whenever possible, we also try to include local residents in the survey crews. In 1986, several residents from Teslin (Leon Jules, David Keenan, Jim and Minnie Clark) and Watson Lake (Sam Donnessey) helped out during the moose surveys.

4. What do surveys mean?

Survey data provide a regional perspective of moose distribution which is helpful when trying to predict land use impacts and the overall importance of localized hunting. Information from the moose surveys is used to calculate a harvestable surplus that we can later match the hunter harvest to. While this is the ultimate management objective, several things can be said about a population just by looking at

composition (age/sex) data. For example, a large proportion of calves and yearlings in the population suggests good survival and recruitment and possibly an increasing population. In areas that are hunted heavily for adult bulls, a skewed sex ratio in favour of cows may eventually affect calf production. In the Yukon, we like to maintain a ratio of at least 30 bulls/100 cows to ensure that all cows have a chance of being bred.

Repeated surveys (eg. every five years) of the same area are necessary to determine population trend, ie. whether the population is increasing, decreasing, or stable over time. A comparison of several population estimates over time also provides for a more accurate measure of harvestable surplus. The surplus will depend on the number of moose desired in an area. If the objective is to keep the population stable at this present level, then the "surplus" animals are simply the extra animals present after recruitment has balanced adult mortality, i.e. after surviving calves have replaced those adults dying. If the objective is to increase the population from its present level, the harvestable surplus would be reduced or eliminated until the desired population level was reached.

In Game Management Zones 7 and 9 (south of the Alaska Highway), repeated surveys between 1981-86 have documented changes in population size and associated calf/cow ratios. These populations have either declined (Haines Junction and Carcross) or remained stable (Whitehorse South and Teslin Burn) with ratios of between 7 and 39 calves per 100 cows in early winter. Approximately 50 calves/100 cows would be required for these populations to increase. In the Haines Junction and Carcross areas there is currently no harvestable surplus and harvest management will have to be reviewed.

Moose surveys in 1986 were expanded outside of the general Whitehorse area and included areas along the Nisutlin River and near Watson Lake. The results (see Table) show low densities, typical of most northern moose populations. On the positive side are signs of good calf survival and yearling recruitment which suggest that predators may not be taking as many moose in these areas as they were in GMZ's 7 and 9.

5. What areas will be selected in 1987?

In 1987, moose surveys are planned in two areas near Ross River: along the Campbell Highway near Francis Lake and along the North Canol near Sheldon Lakes. The survey areas are selected based on hunting pressure documented from harvest questionnaires. In the Yukon, most of the moose hunting pressure is concentrated in areas of easy access near settlements and along roads and rivers which make up only a small portion of the Territory. For instance, about one third of the resident hunters road hunt for moose. This localized hunting in addition to other natural causes of mortality can severely limit moose population growth and will undoubtedly result in poor hunter success. This seems to be the case along roads such as the South Canol which has some excellent moose habitat but very few moose.

The objective of the inventory program is to survey moose in areas that are potentially overharvested and match the harvest to sustainable yields. If there is no harvestable surplus, local hunting restrictions become necessary and hunters would be encouraged to use other areas, that have surplus moose. The Yukon-wide inventory program would move to Mayo and Dawson in 1988 and be completed by 1990.

Equally important to gathering data on moose numbers is the collection of good harvest data, both from native and non-native users. A cooperative program to collect native harvest data on key game species is being initiated and would involve local field-workers interviewing active hunters in the communities. The harvest by non-native users is reported through annual questionnaires sent out through the mail to all licensed hunters.

6. Cost/Benefit

The cost of a complete moose survey over a 1000-square mile area (eg. Whitehorse South) is approximately 30,000 dollars with about 80% of the cost attributed to aircraft charters. While the use of helicopters increase the cost, their use also increases the reliability and quality of the survey. A good survey repeated every 4-5 years will, in

conjunction with accurate harvest data, provide the wildlife manager with enough information to evaluate population condition. This information, combined with active management programs (hunting restrictions, habitat enhancement, predator control, etc.) will ensure populations are thriving and used wisely.

Survey costs represent only a fraction of the total value of the moose resource. In addition to being a priority species for subsistence use, about two thirds of all recreational hunting days for big game species can be attributed to moose. In economic terms, an annual harvest of 800 - 1000 moose by residents in the Yukon represents the equivalent of one million dollars in meat value alone. The annual harvest of 150 moose by guided non-residents, combined with hunts for other big game, generate $3 million annually by the Yukon outfitting industry.

MOOSE SURVEY RESULTS IN SOUTHERN YUKON

	Kluane Block	Aishihik	Whrse. North	Whitehorse South				Carcross	
	1450 mi.²	1400 mi.²	1200 mi.²	1600 mi.²		980 mi.²		350 mi.²	
Year(s) of Survey	1981	1981	1982	1981	1982	1983	1986	1980	1983
Total Moose/100 Mi.²	30	27	44	51	51	66	73	100	48
Bulls / 100 Cows	54	66	45	37	27	42	27	63	52
Yrlgs. / 100 Cows	27	31	1	22	6	5	18	25	9
Calves / 100 Cows	17	23	6	18	24	30	31	23	4

	Haines Junction				Teslin Burn			Nisutlin	Liard West	Liard East
	1200 mi.²		950 mi.²		1850 mi.²	430 mi.²	1000 mi.²	1640 mi.²	2800 mi.²	860 mi.²
Year(s) of Survey	1981	1982	1983	1984	1982	1983	1984	1986	1983	1986
Total Moose/100 Mi.²	66	53	36	35	105	110	105	34	30	35
Bulls / 100 Cows	35	32	32	45	46	29	66	89	75	79
Yrlgs. / 100 Cows	23	2	1	1	9	2	13	36	18	37
Calves / 100 Cows	28	11	7	17	14	31	39	49	18	51