

2000 PELLY RIVER AREA MOOSE SURVEY SUMMARY



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We conducted a moose survey in the Pelly River area during November-December 2000. The survey was jointly funded and conducted by the Yukon Department of Renewable Resources and the Selkirk First Nation. The survey area extended from Pelly Crossing eastward to the confluence of the north and south forks of the Macmillan River. The Hess River and Drury Lake represent the approximate northern and southern limits of the area (see attached Map 1). It covers a total area of about 14,638 square kilometers (km²), of which 13,666 km² (5277 square miles) is habitable moose range. The area encompasses Game Management Subzones (GMSs) 4-10 to 4-13, 4-15 to 4-19, and 4-41.

Portions of the study area have been previously surveyed for moose. Intensive surveys of the Dromedary Mountain and the Pelly Crossing areas were conducted in 1982 and 1995 respectively (see attached Map 2). A less intensive survey of the Faro region extended into the Tay Mt. and Anvil Lake areas in November-December, 1998. The early winter 2000 survey provided updated estimates of moose abundance, distribution and population composition for the Dromedary Mountain and Pelly Crossing areas surveyed previously, and gave us our first accurate picture of moose abundance and distribution in the remainder of the area.

Survey Methods

We used a new, more cost-effective survey technique recently developed by Jay Ver Hoef with the Alaska Department of Fish and Game, to estimate moose abundance in the area. A detailed description of the survey technique will be prepared and distributed at a later date. Briefly, however, the technique involves 4 steps. First, the survey area is divided into blocks or units measuring approximately 16 square kilometers each. We then use a fixed-wing aircraft with a pilot and 3 observers to fly over each of the units quickly and decide whether it is likely to contain few or lots of moose, based on local knowledge, number of moose seen, tracks, and habitat. Map 3 shows the distribution of high and low moose abundance units throughout the survey area.

Immediately after this initial search of the entire survey area is complete, we start the “census” portion of the survey. We use small, maneuverable, fixed-wing aircraft like Piper Supercubs, with a pilot and one observer for the census. We can not afford to count moose in every unit so we select a sample of the units where we expect to see lots of moose and a sample of those where we expect to see few moose. We search these selected units intensively and attempt to count every moose in them. During the 2000 Pelly survey, we tried to count all of the moose in 93 of the 925 units in the entire survey area. We assume that the units we do not search intensively have, on average, the same number of moose as the units we do search. From the sample counts, we estimate the total number of moose in the entire survey area. In this new survey technique we do not attempt to make any allowance for moose not seen during our intensive searches.

The weather proved to be exceptionally uncooperative during the early winter 2000 period, resulting in the survey stretching out over seven weeks (November 4 through December 22) instead of the 17 days of actual survey time required to complete the count. This considerable delay in the survey period resulted in substantial cost overruns.

Population Abundance and Trend

We estimate that there are currently about 3100 moose in the 2000 Pelly River survey area (see Table 1), which is high by Yukon standards. Based on Yukon wide average moose abundance, a similar size area elsewhere in the territory would likely contain about 2200 moose. Average moose density in the Pelly River survey area is approximately 210 moose for every 1000 km² (220 if you just consider suitable moose habitat). The Yukon wide average moose density is about 150 moose for every 1000 km². The relatively high moose abundance in the Pelly River survey area is likely due, in large part, to the excellent moose habitat in the region. The area contains a mosaic of various aged stands of regenerating forest resulting from past forest fires, mature spruce and pine, wet meadows, and subalpine willow zones. This is especially true of the eastern portion of the survey area, which generally has higher moose numbers than the western portion of the survey area.

It is difficult to make exact comparisons of moose abundance and distribution between the surveys conducted in 2000 and those in previous years because of differences in survey technique and area boundaries (See Map 2). Having acknowledged these limitations, our population estimates for the area of overlap between the 1995 and 2000 surveys indicate a 40 percent decline (from 497 to 293) in moose abundance over the 5-year period. While we believe that some decline in moose abundance has likely occurred in the area, we doubt it has been of the magnitude suggested by our estimates.

We have several reasons for questioning the magnitude of the decline. First, we surveyed a very large area in 2000, and so only a fairly small number of blocks were sampled in the overlap area with the 1995 survey area. This resulted in a relatively low precision of our population estimate for the overlap area in 2000. Second, a 40 percent decline in moose abundance would likely be very obvious to local people spending time on the land. Although area residents have expressed concern about hunting pressure and harvest in the area, we have not received reports of a large-scale decline in moose abundance. Third, survey conditions were poor during the 2000 survey and we may have missed more moose than in 1995. Finally, recruitment data from both the 1995 and 2000 surveys are within the range normally associated with stable or increasing moose populations (see below). We intend to monitor this area carefully over the next few years to more accurately assess moose population abundance and trend.

Over the longer term, moose abundance in the central part of the survey area appears to have increased dramatically. In the Dromedary Mountain area, (Map 2) moose numbers have increased more than four-fold from about 226 when first surveyed in 1982 to about 1024 moose in 2000. This represents an average population growth rate of about 8.8% per year. We do not know why moose abundance has seen such strong growth in this area. It may be due to changes in habitat resulting from forest fires or lower predation pressure, but we have little or no evidence to support this speculation. We do not have long term moose population information for the remainder of the 2000 survey area.

Population Composition

Of the 3062 moose estimated to occupy the 2000 survey area, 781 are mature bulls (58 for every 100 mature cows), 1352 are mature cows, 402 are yearlings (30 for every 100 mature cows), and 450 are calves (33 for every 100 mature cows). We could not classify 77 animals to age and sex. Only two sets of twins (3 percent of cows with calves) were observed during the survey (see Table 1).

The overall cow: calf ratio observed during the 2000 survey (33 calves for every 100 mature cows) is within the range normally associated with stable to slowly increasing moose populations. We generally consider 25 and 30 calves for every 100 mature cows sufficient to maintain a stable moose population. The number of yearlings observed during the 2000 survey (30 yearlings for every 100 mature cows) is also indicative of a stable to slowly increasing moose population.

Calf recruitment in the western portion of the 2000 survey area (53 calves for every 100 mature cows) was substantially lower than the 91 calves for every 100 mature cows seen in the same area in 1995, but higher than seen elsewhere during the 2000 survey (33 calves per 100 mature cows averaged over the entire area). Yearling recruitment in the western portion of the 2000 survey area (28 yearlings for every 100 mature cows) was similar to that seen in the remainder of the area. These numbers are within the range normally associated with stable to rapidly increasing moose populations. It should be noted, however, that sample sizes were low for the western portion of the area and a single year of recruitment information may not be representative of longer-term average recruitment rates, which may be substantially higher or lower. Evidence from other areas surveyed suggests that recruitment rates were relatively low throughout Yukon in 2000.

The proportion of mature bulls in the overall 2000 survey area (58 for every 100 mature cows) is well above the level (30 mature bulls for every 100 mature cows) that we consider to be the minimum acceptable to ensure that all the cows are bred. The bull: cow ratio in the overlap area between the 1995 and 2000 has remained stable at 52 to 53 mature bulls for every 100 mature cows. The proportion of bulls in the Dromedary

Mountain survey area has increased from 37 bulls per 100 cows in 1982 to 79 bulls per 100 cows in 2000.

Harvest

Since 1995, the annual reported moose harvest¹ in the 2000 survey area has been relatively stable at between 50 and 60 moose per year (average = 56 moose per year). This is well below the allowable annual harvest for the area of between 100 and 130 moose per year, based on 3% to 4% of the total estimated moose population. In most cases, harvest rates within individual GMSs within the survey area are also well within allowable limits. The exception is GMS 4-41, where the annual harvest appears to be near the allowable limit, and should be monitored carefully. The inclusion of harvest by First Nations' members may also raise the total harvest to near allowable limits in GMS 4-11.

During the 1980s, the annual reported moose harvest was generally around 30 moose per year but increased sharply during the early-mid 1990s (see attached Figure 1). Non-resident hunters are responsible for the majority of the observed increase in the harvest, and currently take about 60% of the reported moose harvest in the area.

Summary

In summary, we estimate that there are currently about 3100 moose in the 2000 Pelly River moose survey area. This is somewhat higher than Yukon-wide average moose abundance. Moose abundance in the previously surveyed Pelly Crossing area appears to have declined since 1995, but it has increased in the central part of the survey area since 1982. Recruitment data in all areas are indicative of a stable to increasing moose population. The reported harvest during the last half of the 1990s has been relatively stable and, in most cases, below the 3% to 4% allowable harvest levels. The total harvest in GMS 4-11 and 4-41 may, however, be at or near the allowable limits, and should be monitored carefully.

¹ The reported harvest does not include harvest by First Nations members

Other Wildlife

In addition to moose, we observed and recorded several other species during the survey. A total of 93 caribou were seen in small groups scattered throughout the survey area. One hundred and twenty four dark (Stone and/or Fannin) sheep were noted, mostly in the mountainous southeastern and south-central portions of the survey area. A lone, black wolf was seen near the Pelly River in the center of the survey area, and a lynx was seen along the Pelly River northeast of Glenlyon Lake. An unidentified hawk was recorded north of the Macmillan River and east of Kalzas Lake. Several other wildlife observations were made outside the survey area during ferry flights and driving between Pelly Crossing and Faro. A swan was observed on the Hess River, approximately 25 kilometers northwest of Mt. Armstrong. Eight mule deer were seen along the Klondike highway about 30 kilometers south of Pelly Crossing. Two fox were seen between Pelly Crossing and Five Finger Rapids.

Table 1. Summary of 2000 Pelly - Macmillan River area Moose Survey Results

POPULATION CHARACTERISTICS

Estimated Abundance ¹	
Total Moose (90% Confidence Range) ²	3062 (2511 to 3612 moose)
Density (Moose per 1000 km ² of moose habitat)	224
Estimated Composition (90% Confidence Range) ²	
Mature Bulls (≥ 30 months)	781 (563 to 998)
Mature Cows (≥ 30 months)	1352 (1072 to 1633)
Yearlings ³ (Approx. 18 months)	402 (257 to 547)
Calves (≤ 12 months)	450 (345 to 556)
Unknown Age/Sex	77 (8 to 156)
Estimated Ratios ⁴	
Mature Bulls per 100 Mature Cows	58
Yearlings per 100 Mature Cows	30
Calves per 100 Mature Cows	33
Mature Bulls: Percent of Total Population	26%
Mature Cows: Percent of Total Population	44%
Yearlings: Percent of Total Population	13%
Calves: Percent of Total Population	15%
Twinning Rate	3%

SURVEY CHARACTERISTICS

Stratification

Survey Dates	Nov. 4-16, 2000
Total Survey Area (km ²)	14638
Habitable Moose Range within Survey Area (km ²)	13666
Total Flight Time Used During Stratification (min)	2806
Survey Time Used During Stratification (min)	1676
Search Intensity (min. per km ²)	0.12
Moose Seen	700
Moose Seen per Minute	0.42

Census

Survey Dates	Nov. 14 – Dec. 22, 2000
Number of Sample Units Searched	93
Area Searched (km ²)	1473
Percentage of Habitable Moose Range Searched	10.8
Total Flight Time Used During Census (min)	6750
Survey Time Used During Census (min)	2826
Search Intensity (min. per km ²)	1.92
Number of Moose Seen	414
Moose Seen per Minute	0.15

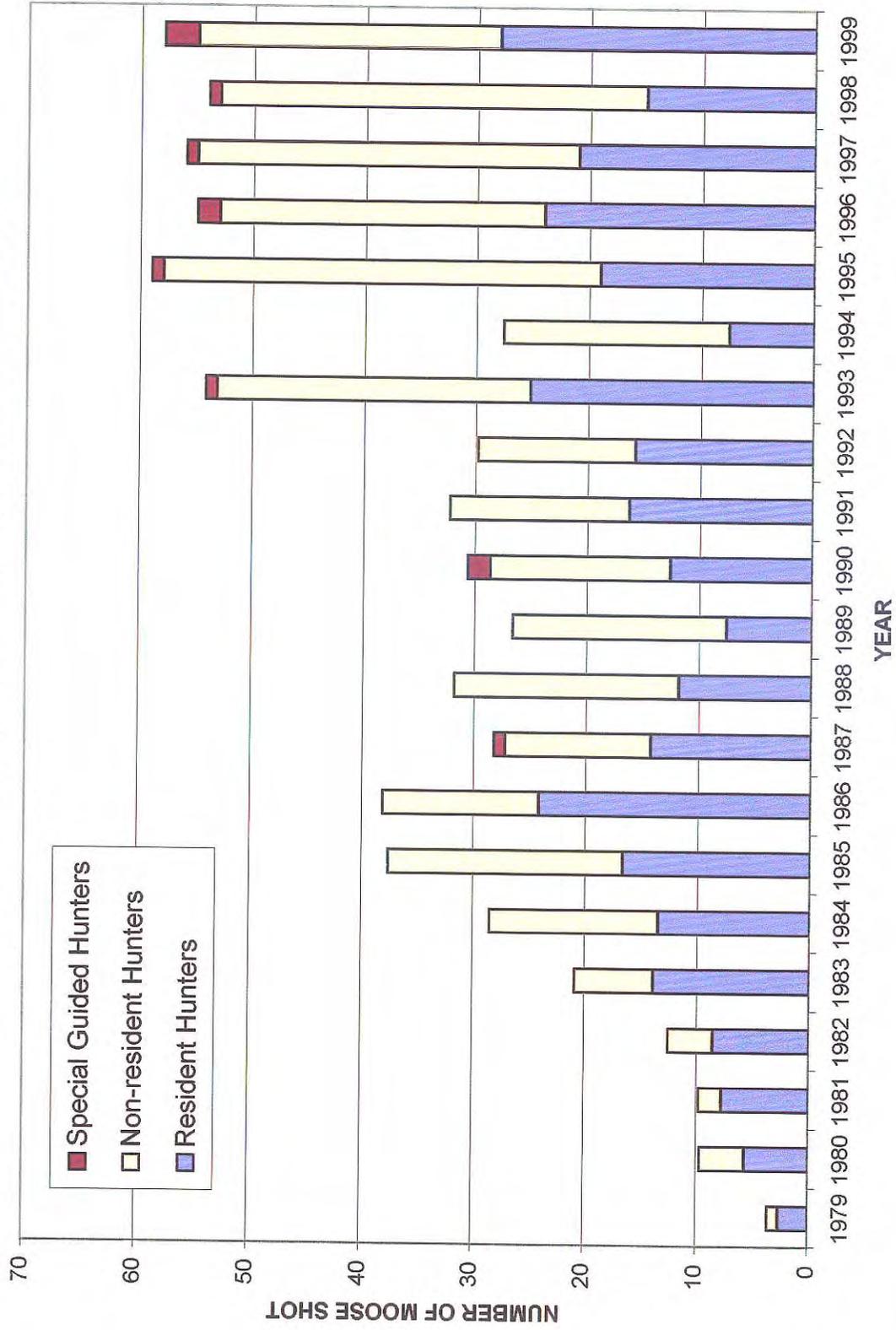
¹ No correction for moose missed during the survey (SCF) is included in the estimates

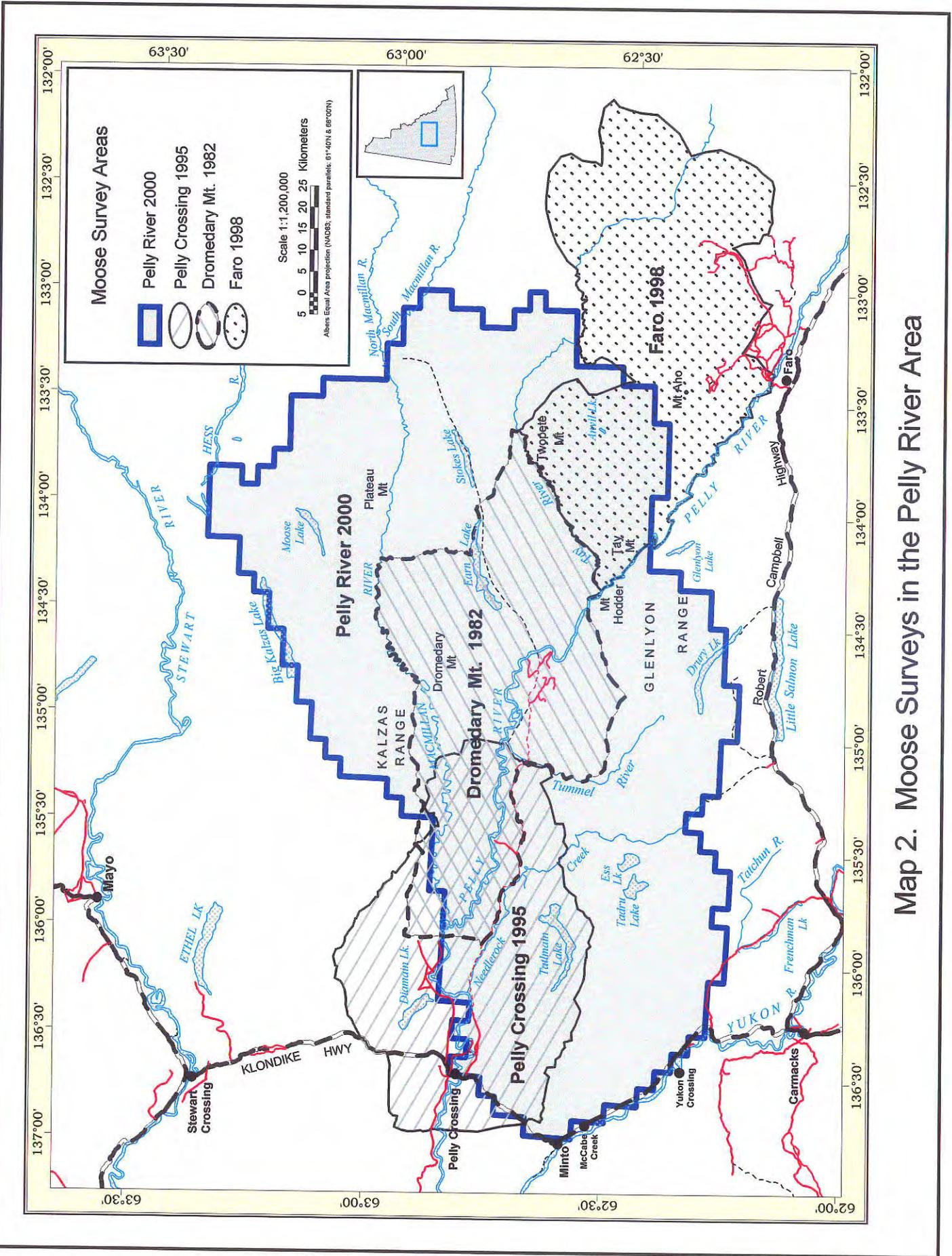
² This means that we are 90% sure that there are between 2511 and 3612 moose in the survey area and our best estimate of the population is 3062 moose.

³ Total number of yearlings assumed to equal 2x estimated number of yearling bulls in the population

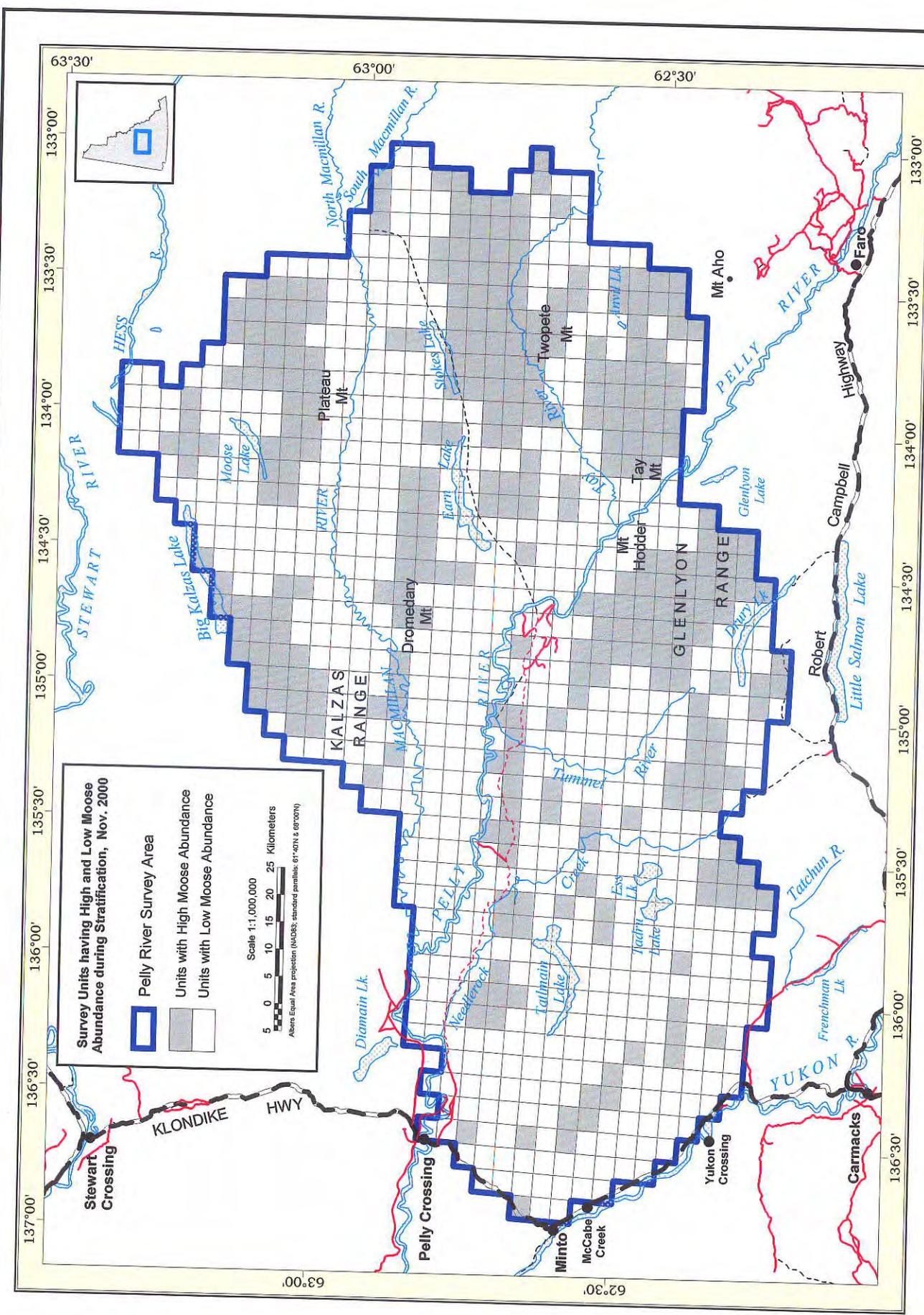
⁴ Estimated ratios based on number of classified individuals (unknown age/sex excluded)

Figure 1: Annual Reported Moose Harvest in 2000 Pelly Moose Survey Area
 (Note: Does not include harvest by First Nations members)





Map 2. Moose Surveys in the Pelly River Area



Map 3. Moose Distribution during Stratification of the Pelly River Survey Area, 2000