OLD CROW LATE-WINTER MOOSE SURVEY RESULTS 2003

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2003 Old Crow late-winter Moose Survey Results

Introduction:

This report summarizes the results of a moose survey conducted in the Old Crow area between 18-20 February 2003 (see Map 1). The purpose of the survey was to assess abundance, distribution and status of the local late-winter moose population in the Porcupine River area. This same general area was previously surveyed in October 1997 (Yukon Fish and Wildlife Branch 1997). Information from the 1997 survey was used in the development of the Vuntut Gwitchin First Nation community-based integrated fish and wildlife management plan. A moose survey in the Porcupine River area was identified as a high priority in the plan in response to local concerns about moose harvest and wolf predation (Yukon Territorial Government et al. 2002). Additional issues related to hunting practices and the status of the local moose population were also documented in the plan. These include the possible need for a 12-mile restricted moose hunting zone in the local Old Crow area for the benefit of elders, and limiting the cow moose harvest as a subsistence practice. The ability and/or limitations of the 2003 survey results to address these management issues are discussed.

The current survey was cooperatively planned, funded and conducted by the Vuntut Gwitchin First Nation and the Yukon Department of Environment.

Survey Area:

The survey area extended along the Porcupine River from west of Old Crow east to Berry Creek; and from Johnson and Little Flat creeks in the north, to Johnson Creek in the south (see attached Map 1). It includes portions of Game Management Subzones (GMSs) 1-19, 1-21, 1-22, 1-27, 1-31, 1-32, 1-44 and 1-45. The area is of relatively low elevation (at or below 760 meters or 2500 ft.), and covers a total area of about 3758 square kilometers (km^2), of which 3588 km^2 (95%) is habitable moose range. The area was modified during the survey to exclude an area north of Little Flat Creek that was not considered to be suitable late-winter moose habitat, and to include other areas of interest to the Vuntut Gwitchin First Nation.

Survey Methods:

Our survey method was similar to the stratification portion of the standard stratified random block survey technique described by Gasaway et al. (1986). In brief, we flew the survey using fixed-wing aircraft, a Cessna 185 and Cessna 206, with a pilot and navigator in front and two observers in the back. We flew lines within the survey boundary approximately one kilometer apart, at 90-150 meters above ground level and at approximately 160-180 kilometers per hour. In general we tried to maintain a search intensity of about 0.5 minutes per square kilometer.

When we saw moose, we classified them as either adults or calves. We were not able to age or sex adults (identify young or mature bulls from cows) because most of the bulls had already dropped their antlers before the February survey period. The proportion of calves is calculated to help determine if there are enough calves to replace adults dying in the population. This information helps us to evaluate if the moose population is stable, increasing or decreasing in size.

Due to the low search intensity of the stratification survey technique, we are not able to calculate a precise moose population or density estimate for the area. An index of overall moose abundance was obtained, however, from the number of moose seen per minute of survey time, using a regression model developed by Ward et al. (2000).

We also recorded all incidental observations of wolves and wolf-sign during the survey to help address Vuntut Gwitchin First Nation concerns about wolf abundance and predation on moose. We used Garmin Global Positioning System (GPS) receivers to record moose and other species observations as waypoints that could be downloaded later into a computer and displayed onto digital base maps using ArcView GIS software.

Weather conditions remained cold (-31° to -40°C), clear, and relatively calm during the survey period. Snow accumulation records from the Old Crow Airport indicated a recent 15-cm snowfall in the region during the first two weeks of February (38cm to 53cm between 1-15

February). High winds and blowing snow in the week just previous to the survey resulted in drifted and deep snow in some open burn areas and pond-complex habitats.

A combination of deeper snow conditions and cold temperatures during the 2003 survey may have had an effect on sightability of moose, and resulted in a lower overall search intensity. Late-winter movements of moose into areas with greater tree cover and less underlying snow potentially reduces their sightability from the air, and likely resulted in more moose being missed during the survey period. Flight lines in relatively large areas of deep or drifted snow were widened because old or lack of moose tracking indicated that moose had already moved out of the area. The necessity of flying the aircraft at higher speeds to keep the engine warm enough for safe operation also contributed to an overall reduction in the search intensity of the survey.

Moose Population Abundance and Distribution Results:

We saw 173 moose during the 2003 survey, which represents an observed density of about 48 moose per 1000 square kilometers of suitable moose habitat (see Table 1). Of the total moose seen, 143 (83%) were adults and 30 (17%) were calves. Normally, a minimum of about 10-15% calves is needed to maintain a stable moose population.

We used 25 hours and 19 minutes to survey the area, for a search intensity of 0.42 minutes per square kilometer of suitable moose habitat (Table 1). On average, we saw a moose about every 8 minutes and 47 seconds (0.11 moose per minute). Based on this rate of observing moose and the regression model developed by Ward et al. (2000), we estimate that there are about 119 moose per 1000 km^2 of moose habitat in the region. This translates to a population estimate of about 428 moose for the entire survey area. This is the mid-point of the 90% confidence range, which means that we are 90% sure that there are between 143 and 689 moose in the area (Table 1).

The 2003 density estimate is lower than the estimated density of 150 moose per 1000 km^2 that was derived from the 1997 early-winter survey results. Possible differences in seasonal moose distribution, visibility, and snow conditions between early and late-winter surveys, however, make it difficult to determine if the difference between the 1997 and 2003 estimates is due to a change in the moose population itself, or is related to survey timing. This density estimate is

also lower than the 200 moose per 1000 km^2 estimated for the northern Old Crow Flats and area west of Old Crow during summer, but considerably higher than the overall density of about 50 moose per 1000 km^2 estimated for most northern Yukon moose populations.

The majority (61%) of moose observed in 2003 was located in the southeast portion of the survey area. Late winter concentration areas were observed near the mouth of the Driftwood River and upstream along the Porcupine River, Choho Hill area, and in the high ground north of Cranberry Hill (see Map 2). Two other locations in the survey area with moderate concentrations of moose were the Old Crow Flats east of Chinaidlai Lake, and along Lord Creek. The remaining moose were scattered throughout the Old Crow Flats, along portions of the Porcupine River, or in the burn between the Driftwood River and Berry Creek.

Most moose groups were small, consisting of 1 or 2 moose (95%); with only four groups having 3 moose each, and one group with 4 moose. The majority (83%) of the 117 moose groups observed were relatively evenly distributed at low elevations between 700 and 1500 ft., and were generally associated with willow-shrub habitat along creek and river valley bottoms, and with the wetland-pond complex in the Old Crow Flats area. The remaining moose groups (17%) were primarily located in the hilly, open shrub and spruce habitat in the southeast corner of the study area between 1500 and 2000 ft.

Distribution of moose observed during the late-winter survey of 2003 differed from that of the early-winter 1997 survey in a number of ways. In 2003, moose were found in more widely scattered groups of fewer moose than were observed in 1997 (Yukon Fish and Wildlife Branch 1997). Four moose concentration areas identified in 1997 had numbers ranging from 36 to 110 moose each, whereas the five concentration areas identified in 2003 ranged from only 15 to 36 moose (Map 2). In February 2003, moose were primarily seen at lower elevations along rivers and creeks, and fewer moose were observed in the more open burn and wetland-pond complex habitats. Old or lack of moose tracking in the burn between the Driftwood River and Berry Creek, and in the portion of the Old Crow Flats south of Little Flat Creek in 2003, indicated that moose had been in these habitats earlier, but had moved out due to snow. This shift in distribution is not unexpected. Based on our experience in other areas, moose tend to aggregate

during the early winter period in larger post-rut groups at higher elevations or in open habitats such as burns or subalpine areas where they are easier to see. In late winter, moose tend to move down into denser forest cover types to avoid areas of deep snow, but are still able to find food. The use of dense forest cover in late winter often results in more moose being missed during the survey.

Despite the seasonal distribution differences between the two surveys, it appears that similar to slightly fewer numbers of moose were present in the Old Crow area in late winter 2003 than were seen in the vicinity in early winter 1997. We do not know, however, if the early-winter moose population remains in the general area and spreads out into late-winter habitats, or if there is some migration of moose in and out of the survey area by fall and early-winter.

Local knowledge suggests that some moose summering on southeastern portions of the flats and south of Old Crow probably move into the Richardson Mountains, and into the Keele Range at the headwaters of Lord and Johnson creeks to winter (Yukon Fish and Wildlife Branch 1997). A moose telemetry study conducted in the northern Richardson Mountains by Smits (1991) also documented some winter and summer migration of moose between the northeastern edge of the Old Crow survey area, and the North Slope and Bell River regions. The study found that some moose (3 of 6 moose that were collared) which summered on the North Slope migrated to the Driftwood River area as early as November and over-wintered in the vicinity (Smits 1991). One of 19 moose collared on the Bell River in October summered in the headwaters of the Driftwood River (May to September), but returned to the Bell River drainage for the fall and winter period. A radio-telemetry study would be needed to gain a more thorough understanding of seasonal moose movement and migration patterns in the Old Crow and Porcupine River area.

Harvest:

First nation hunters reported harvesting 21 moose in the Old Crow survey area in 2002. Almost all of the first nation harvest occurred in August and September (19 moose), but two moose were shot in February 2002. Most of the moose harvested in the Porcupine River area are by local first nation hunters. Between 1998 and 2002, an average of less than one moose per year was

reported by non-first nation hunters within the area (GMS 1-19, 1-21, 1-22, 1-27, 1-31, 1-32, 1-44 and 1-45).

Based on our current late-winter moose survey estimate, the 2002 harvest of 21 moose represents an annual harvest rate of about 4.9%. Using the higher moose population estimate from our early-winter 1997 survey, the harvest rate would be about 3.6% of the 575 to 600 moose estimated for the area (Yukon Fish and Wildlife Branch 1997). These harvest rates are higher than the 3% recommended in the North Yukon Fish and Wildlife Management Plan (Yukon Territorial Government et al. 2002), and are near the 5% maximum sustainable harvest rate identified in our moose management guidelines (Yukon Territorial Government 1996). For low-density northern moose populations, a more conservative rate of 2% to 3% is more prudent. Based on our 1997 early-winter moose population estimate, the 3% allowable harvest in the local Old Crow survey area would be about 18 moose per year. This rate assumes a bull-only harvest. Harvesting cows will generally result in a reduction in the sustainable harvest.

Wolf Observations:

Incidental to our moose observations, five wolves (4 grey and 1 black) were observed on the Driftwood River, and at least 2 wolves (both grey) were sighted along Berry Creek, although the wolf trail in the vicinity suggested 3 or more wolves were present in the area. Two wolf kill sites were also found; one on the edge of the flats southeast of Chinaidlai Lake, and one southeast of the mouth of the Driftwood River in the high ground just south of the Porcupine River.

An intensive wolf study conducted in the North Slope area between 1987 and 1988 (Yukon Territorial Government unpublished data) found that wolves observed below tree-line (Driftwood River and south of the Porcupine River), were territorial, responding to the higher density of moose found in this area. Wolves observed above tree-line (generally north of the Porcupine River), however, were non-territorial, and moved in response to the migrating Porcupine Caribou herd. Wolf and wolf-sign observed during the 2003 survey was primarily concentrated in the southeast portion of the study area (below tree-line), and likely represents territorial wolf packs utilizing the high number of moose that were also observed in this region during the survey.

The 2003 low-intensity moose survey was not designed to obtain detailed information on wolf abundance or their distribution. Given the limited nature of the information collected by the survey, we can only roughly estimate that two or possibly three packs of wolves, at most, were present in the study area. Late-winter locations of wolf and wolf-sign in the study area suggests that wolf density is related to territorial wolf packs, and is similar to the Yukon-wide average density of about one pack per 1000 km^2 (Al Baer, Yukon Department of Environment, personal communication).

Moose Concerns identified in the North Yukon Fish and Wildlife Management Plan:
The North Yukon Fish and Wildlife Management Plan identified three main issues that relate to the outcome of our moose survey: 1) status of the Porcupine River population, 2) creation of a 12-mile no-hunting zone around the Old Crow area for the benefit of elders and for ceremonial purposes, and 3) the hunting of cow moose for cultural and subsistence reasons (Yukon Territorial Government et al. 2002). We address each of these issues below to the extent that we are able, given the limitations of our survey information.

Based on the numbers of moose and the proportion of calves seen during our 2003 late-winter survey, it is likely that the local moose population in the Porcupine River area is roughly stable. As previously mentioned, however, the 2003 and 1997 surveys provide only an index of relative moose abundance and distribution. Imprecise population estimates, combined with differences in survey timing, and a relatively high harvest rate, make it difficult to reliably determine moose population trend. To do this would require that we undertake more intensive and costly surveys. Radio-telemetry surveys would also be useful in determining seasonal movements in and out of the local area.

Most of the moose observed during the 1997 early-winter and 2003 late-winter surveys were located in the east half of the survey area, and very few were seen within 20 km (or about 12 miles) of the Old Crow town site. The sustainable harvest around the community, therefore, is likely very low, probably only 2 or 3 moose per year. Our survey results do not, however, allow us to make recommendations on the allocation of the sustainable harvest. This issue is best dealt

with through consultation between the local Renewable Resource Council and the Vuntut Gwitchin First Nation.

We are limited in our ability to comment on the impact of a cow harvest in the area because we were not able to collect mature bull to mature cow ratio information during our late-winter 2003 survey. In general, the harvest of cows reduces the ability of the population to produce calves to replace the adult moose that die each year. We normally assume that the harvest of a cow moose is equivalent to the harvest of three bulls. Consequently, the harvest of cow moose generally has a negative impact on the total annual allowable harvest.

Summary:

In summary, the 119 moose per 1000 km^2 calculated for the 2003 survey area is below the density of moose estimated for the Old Crow flats during summer, but higher than the average density estimated for most northern Yukon populations. Late-winter 2003 moose abundance in the Old Crow survey area was also somewhat lower than that observed for the same general area during the early-winter survey of 1997. We can not say with certainty, however, whether this difference is a result of survey timing, seasonal movement of moose out of the area in early winter; or if it represents an actual decline in the local moose population. The relatively healthy proportion of calves observed in 2003 suggests that the population should remain stable and possibly increase if adult mortality rates are similar to the 10-20% reported for other areas in the Yukon. The apparently high harvest rate also limits our ability to reliably predict moose population trend.

The local first nation harvest appears to exceed the 3% allowable harvest rate identified in the North Yukon Fish and Wildlife Management Plan. Only one year (2002) of first nation harvest data is available, however, and this, combined with imprecise moose population estimates makes it difficult to determine if the harvest is within or exceeds the sustainable limit. Given the potential for over-harvest of this population, we recommend that early-winter surveys be conducted in the area about every five years, combined with continued annual monitoring of the moose harvest.

Other Wildlife Sightings:

In addition to moose and wolves, we recorded the number or sign of other species observed during the 2003 survey. Thirty-three caribou and fresh tracking were seen on the south side of Choho Hill. Other fresh caribou tracks or cratering were located in the high ground northeast of Cranberry Hill and northeast of Choho Hill, as well as on a large lake 8 km east of Cadzow Lake, and along the Old Crow River west of Mt. Schaeffer. Other miscellaneous sightings include 9 ptarmigan in the southeast corner of the Flats; wolverine tracks north of Rat Indian Creek; and one unidentified small mammal seen along the north bank of the Porcupine River in the burn west of Old Crow. A lack of snowshoe hare in the Old Crow vicinity right now was commented on by one of the local observers (Donald Frost, personal communication).

Acknowledgements:

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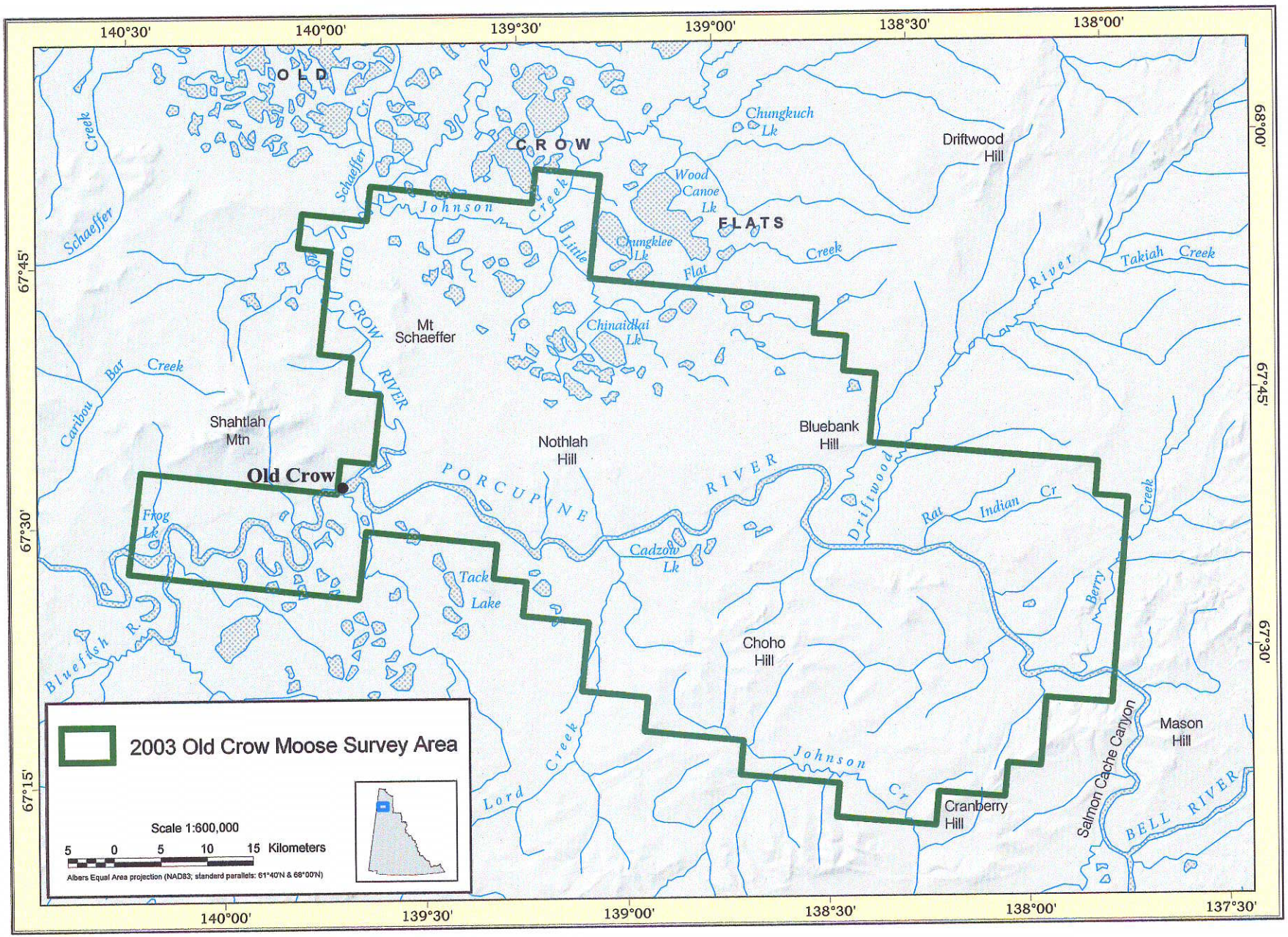
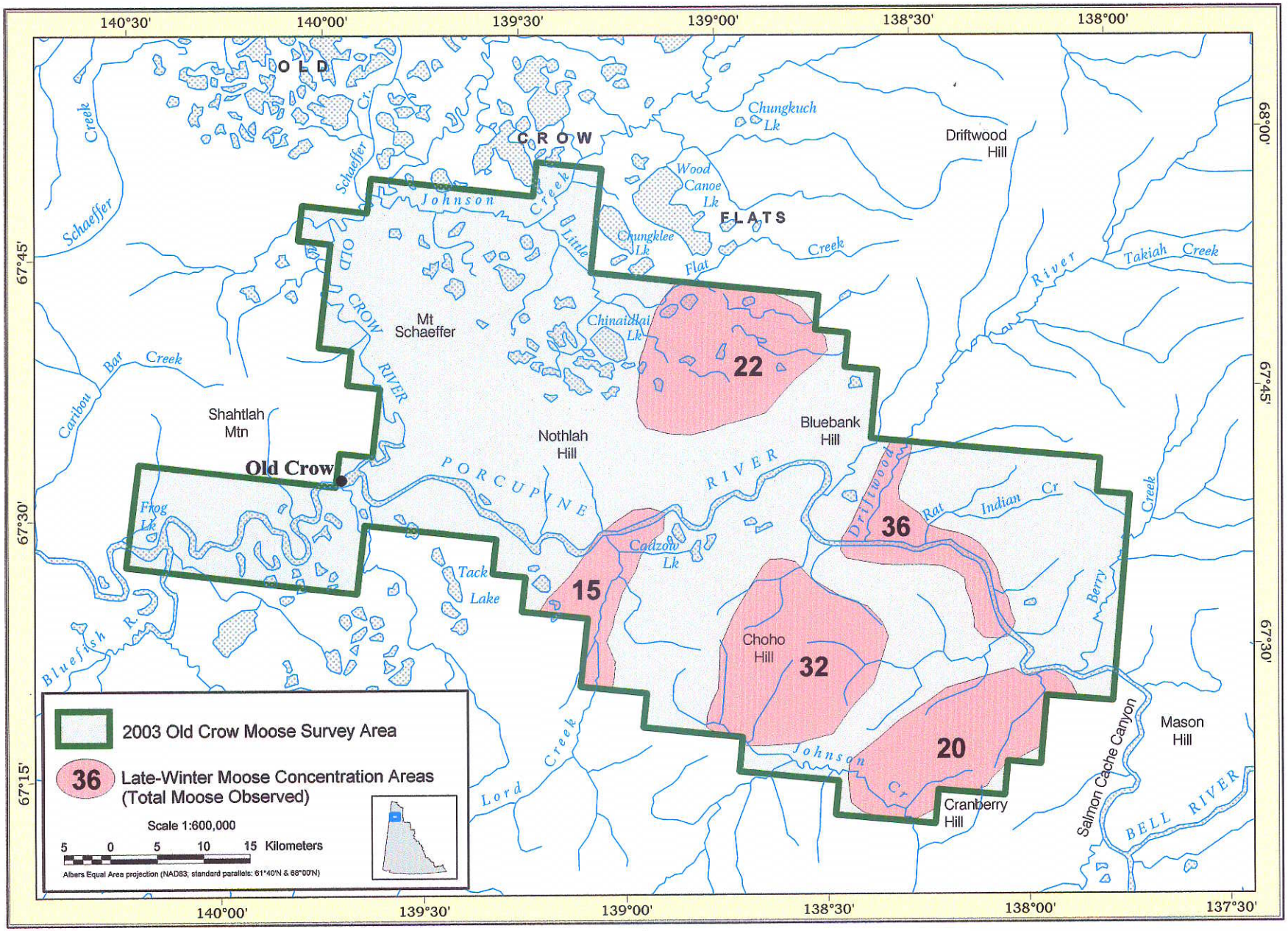
Table 1. 2003 Old Crow late-winter Moose Stratification Survey Results.

Population Characteristics	2003 late-winter Results
Observed Abundance	
Total Moose counted	173
Density: moose per 1000 Km^2 of habitat	48
Estimated Abundance[1] (90% Confidence Range)[2]	
Estimated Moose	428 (143 – 689)
Density: moose per 1000 Km^2 of habitat	119 (40 – 192)
Observed Composition	
Adults ($\geq$ 21 months)	143
Calves ($\geq$ 9 months)	30
Observed Ratios	
Adults: % of Total Moose Counted	83%
Calves: % of Total Moose Counted	17%
Calves per 100 Adults	21
Survey Characteristics	
Stratification Survey Dates	18 – 20 February, 2003
Total Study Area (Km^2)	3758.2
Habitable Area searched (Km^2)	3588.4
Time used in search (minutes)	1519
Search Intensity (min. per Km^2 of habitable area)	0.42
Moose seen per minute	0.11

[1]A regression equation (Ward et al. 2000) was used to calculate the estimated moose abundance.
[2] This means we are 90% sure that the true number and density of moose in the area lies within the range of moose numbers or density given in the brackets.



Map 1. 2003 Old Crow late-winter Moose Survey Area.



Map 2. 2003 Old Crow Survey late-winter Moose Concentration Areas.