

LATE WINTER HABITAT USE BY MOOSE

**SURVEY OF THE PELLY AND
MACMILLAN RIVER AREAS
MARCH 2001**



Prepared by:
Mark O'Donoghue

Yukon
Environment

2005

**LATE WINTER HABITAT USE BY MOOSE
SURVEY OF THE PELLY AND MACMILLAN RIVER AREAS
MARCH 2001**

**Fish and Wildlife Branch
SR-05-01
Yukon Department of Environment**

© 2005 Yukon Department of Environment

Copies available from:

Yukon Department of Environment
Fish and Wildlife Branch, V-5A
Box 2703, Whitehorse, Yukon Y1A 2C6
Phone (867) 667-5721, Fax (867) 393-6263
E-mail: environmentyukon@gov.yk.ca

Suggested citation:

O'DONOGHUE, M. 2005. Late winter habitat use by moose: Survey of the Pelly and Macmillan river areas March 2001. Yukon Fish and Wildlife Branch Report SR-05-01, Whitehorse, Yukon, Canada.

SUMMARY

- ❖ We conducted a late-winter survey of moose in a broad area along the Pelly and Macmillan rivers on 10-15 March 2001 using a Cessna 205 aircraft. The main purpose of this survey was to evaluate distribution and habitat use by moose in this area at the end of winter.
- ❖ Moose were concentrated in riparian forests along the major river and creek valleys and, to a lesser extent, in some old burned areas at lower elevations that had good regrowth of willows.
- ❖ The Macmillan River valley had the highest concentrations of moose, and it appears to be of regional importance as late-winter habitat for this part of the central Yukon.
- ❖ Wetland areas along the Stewart and Pelly rivers, and burned areas around and to the west of Tadru and Ess Lakes also showed good abundance of moose sign.

INTRODUCTION

This report summarises the results of the late-winter survey of moose in parts of the Upper Klondike Highway, Ddhaw Ghro, Lower Macmillan River, and Tatchun Moose Management Units (see Map #1), conducted on 10-15 March 2001. The main purpose of this survey was to evaluate late-winter habitat use by moose in this area, especially along the Macmillan and Pelly Rivers.

Previous Surveys

The Yukon Fish & Wildlife Branch has monitored populations of moose in the central Yukon since the mid-1970s, using a variety of methods. Selkirk First Nation has co-funded and participated in these surveys since 2000.

We conducted early-winter surveys to estimate moose abundance in the same area as this survey (see Map #1) in 2000, in the Pelly Crossing area in 1995, and in the Mayo area in early winter in 1988, 1993 and 1998, using the stratified random block method. The results of these surveys can be found in Yukon Fish & Wildlife Branch technical reports (Larsen, Markel & Ward 1989; Ward & Larsen 1994) and internal file reports.

We conducted late-winter recruitment surveys in the Mayo area from 1993 to 1999 (results in Ward & Larson 1994, Ward & Larson 1995, and Yukon Fish & Wildlife Branch file reports), which included parts of the Upper Klondike Highway and Ddhaw Ghro Moose Management Units. The intent of these surveys was to provide us with a measure of annual calf survival, which affects population trend from year to year. We could not calculate estimates of abundance from these surveys.

The late-winter distribution of moose in most of the survey area has never been surveyed.

STUDY AREA

The area flown over covered the parts of the regularly-monitored survey areas in the Upper Klondike Highway, Ddhaw Ghro, Lower Macmillan River, and Tatchun Moose Management Units (see Map #1) that are within the traditional territory of the Selkirk First Nation. Most of the survey area is within the watersheds of the Pelly and Macmillan rivers.

The survey area was about 12,636 km². Its borders run from about the Stewart River in the north to Moose and Earn lakes and the Tummel River in the east, to Tatchun Lake in the south, and the Klondike Highway and Lake Creek in the west (see Map #1).

The study area consists mostly of rolling hills and plateaus, dissected by numerous creeks, in the drainages of the Macmillan, Pelly, Stewart and Yukon rivers. Most of the area is forest-covered with black and white spruce, lodgepole pine, aspen, and paper birch. River valleys typically have dense canopies of white spruce and balsam poplar. The lower Pelly and Stewart Rivers have steep grass and sage-covered benches paralleling fairly narrow river valleys in many places, while, further up these rivers and along the Macmillan River, the valleys widen out and the rivers are braided with frequent oxbows, sloughs, wetlands, and willow thickets. Willow and dwarf birch shrub habitats, alpine tundra, and unvegetated rocky areas typify the higher plateaus, scattered throughout the study area. The McArthur, Kalzas, and Wilkinson ranges are the highest mountains in the survey area, with some peaks close to 2,000 m. Old and recent burns occur throughout the study area (see Map #2).

METHODS

We used the same survey method as we use in the stratification portion of our early-winter “autocorrelation” moose surveys. This involves two steps:

1. The survey area is divided into uniform blocks 15-16 km² (5' longitude x 2' latitude) in size.
2. Observers in fixed-wing aircraft fly over all the blocks quickly, and they classify (“stratify”) them as having either high, medium, low, or very low moose abundance, based on local knowledge, number of moose seen, tracks, and habitat.

We classified all blocks in the survey area using this method, flying east-west over the centre line of each block, from 10-14 March 2001. We then re-classified each block according to its river habitat along selected stretches of the Macmillan and Pelly rivers on 15 March 2001, by flying up the Macmillan River to Russell Post, and then back down the Pelly River from the Earn River to Pelly Crossing.

WEATHER AND SNOW CONDITIONS

Temperatures ranged from -13°C to +5°C during the survey. Winds were generally moderate to strong (up to 55 km/hour) during the first 4 days of the survey, but they calmed down on 14-15 March. Light conditions were flat on 10-11 March, but good for the rest of the survey. There was fresh snow on 10 and 11 March. Snow depths ranged from 37-92 cm at the nearest stations measured (Pelly Farm, Mayo, Russell Lake, Edwards Lake) and were generally lower than the long-term average; water content in snow was estimated to be about 83% of normal in the Pelly River basin as a whole (D.I.A.N.D. 2001).

RESULTS

Coverage and Survey Intensity

We flew for a total of 28 hours, covering the whole area during the first 5 days of the survey, of which 22.2 hours was survey time and the other 5.8 hours was time spent ferrying to and from the airport in Pelly Crossing. We spent an average of 1.7 minutes in each survey block, or about 0.11 minutes per km². On the sixth day of the survey, we flew for 2.5 hours up the Macmillan River and back down the Pelly River, following the rivers rather than the centre lines of the survey blocks.

Classification of Moose Habitat in Survey Blocks

We classified 11 (1.4%) of the 804 survey blocks as blocks with high abundance of moose sign, 59 (7.3%) with medium abundance, 144 (17.9%) with low abundance, and 590 (73.4%) as blocks with very low abundance. Moose were concentrated in lowland habitats, mostly along the Macmillan and Pelly rivers and in some other major creek and river valleys (see Map #3). Habitat types with the highest abundance of moose and moose sign were the mixed spruce-balsam poplar forests adjacent to the Macmillan, Pelly, and Stewart rivers associated with dense riparian willow flats. There were some pockets of good moose sign in old (20-50-year-old) burned areas with good willow regrowth, especially in the area around and to the west of Tadru and Ess lakes. Upland habitats had very little sign of recent activity by moose.

Classification of Moose Habitat along the Rivers

We re-classified 20 survey blocks and 12 comparable (5-minute longitude) river segments upriver of our survey blocks along the Macmillan River, and 21 blocks along the Pelly River, based on the

abundance of moose sign along the rivers. The Macmillan River had the highest amount of moose sign, and we classified 8 (25%) of the blocks and segments as high, 22 (69%) as medium, and 2 (6%) as low abundance (see Map #3). There was less sign of moose along the Pelly River, and we classified 4 (19%) of the blocks as low and 17 (81%) as very low abundance. The highest abundance of moose sign was along the Macmillan River, especially between Little Kalzas River and Moose River. The river valley along the Macmillan is characterised by dense, mature spruce and mixed spruce-poplar forests, with frequent willow thickets along back sloughs and old river channels. The Pelly River valley from the Earn River to the mouth of the Macmillan is wider with fewer willows along the river; downriver of the Macmillan, there is a steep bench to the north of the Pelly River, and frequent mature aspen forest to the south.

Observations of Moose

We saw a total of 138 moose (92 during the first 5 days covering the whole area, and 46 on the last day of the survey along the rivers), 127 of them adults and 11 of them (8%) calves (see Table 1). We could not determine the sex of most adults because the bulls had dropped their antlers and most moose were in forested cover, limiting our visibility. We saw an average of 0.07 moose per minute in the whole survey area, and 0.30 moose per minute along the rivers. We saw two moose kills, one on the Macmillan about 10 km upriver of the mouth of the Moose River, with a pack of 7 wolves still at the kill site, and another older kill on the Pelly River about 12 km upriver of the Macmillan.

Table 1. Observations of moose during the March 2001 survey in the Macmillan and Pelly River watersheds.			
	Days 1-5	Day 6	Total
Number of Adults Observed	85	42	127
Number of Calves Observed	7	4	11

DISCUSSION

Distribution of Moose

Most moose were located in the major river valleys, in mature spruce or mixed spruce-poplar forest. The riparian forests along the Macmillan River in particular appear to be of regional importance as late-winter habitat for moose in this part of the central Yukon. There was also good abundance of moose sign along the Pelly River above the mouth of the Macmillan, but moose tended to be further away from the river in the associated wetland areas. Several areas along the Stewart River, in the Devil's Elbow and Reid Lakes areas, also had abundant moose sign. There were some areas with good moose sign in the old burns in the Tadru and Ess lakes area as well. In the central Yukon, moose typically move up high into the subalpine shortly after rutting season in the fall, and stay there until mid-winter when they move to lower elevations, presumably because of deep snow depths in the mountains. Late-winter surveys in the Mayo area have shown that moose tend to concentrate along the rivers especially in years with higher than average snowfalls; the mature spruce canopies of riverine forests intercept snow, leading to softer and shallower than in more upland exposed habitats (Fraser & O'Donoghue 2001, O'Donoghue & Sinnott 2003, Sinnott & O'Donoghue 2003). During winters when snow depths are low, moose utilise more burned areas with good willow regeneration in late winter. Snow depths in the Pelly River watershed were below normal this winter, and we did find some moose in old burned areas. Most, however, were along the major rivers, especially the Macmillan, where mature forests adjacent to dense willow thickets apparently provide them with good travelling conditions, food, and thermal cover.

Ages of Moose

Our observation of only 8% calves during this survey is considerably lower than the 15% generally needed to replace adults dying in the population. However, this survey was aimed at determining the late-winter distribution of moose over a broad region, not at estimating the composition of the population. Cows with calves tend to remain spatially separated from areas with the densest concentrations of moose, and observed calf-cow ratios from low-intensity surveys such as this one are typically negatively biased. A survey of moose in this same region in November-December 2000 that was aimed at estimating population abundance and composition suggested that about 15% of the population was calves.

CONCLUSIONS AND RECOMMENDATIONS

- ❖ Moose concentrate along the major river valleys during late winter in the central Yukon, where the combination of shallower snow under mature forest canopies and dense willows in wetland areas provides them with optimal habitat.
- ❖ The Macmillan River valley is of particular importance as late-winter moose habitat for the whole region.
- ❖ We should conduct similar surveys during years of deep snowfall and in other parts of the Northern Tutchone region, to identify key wintering habitat for moose.

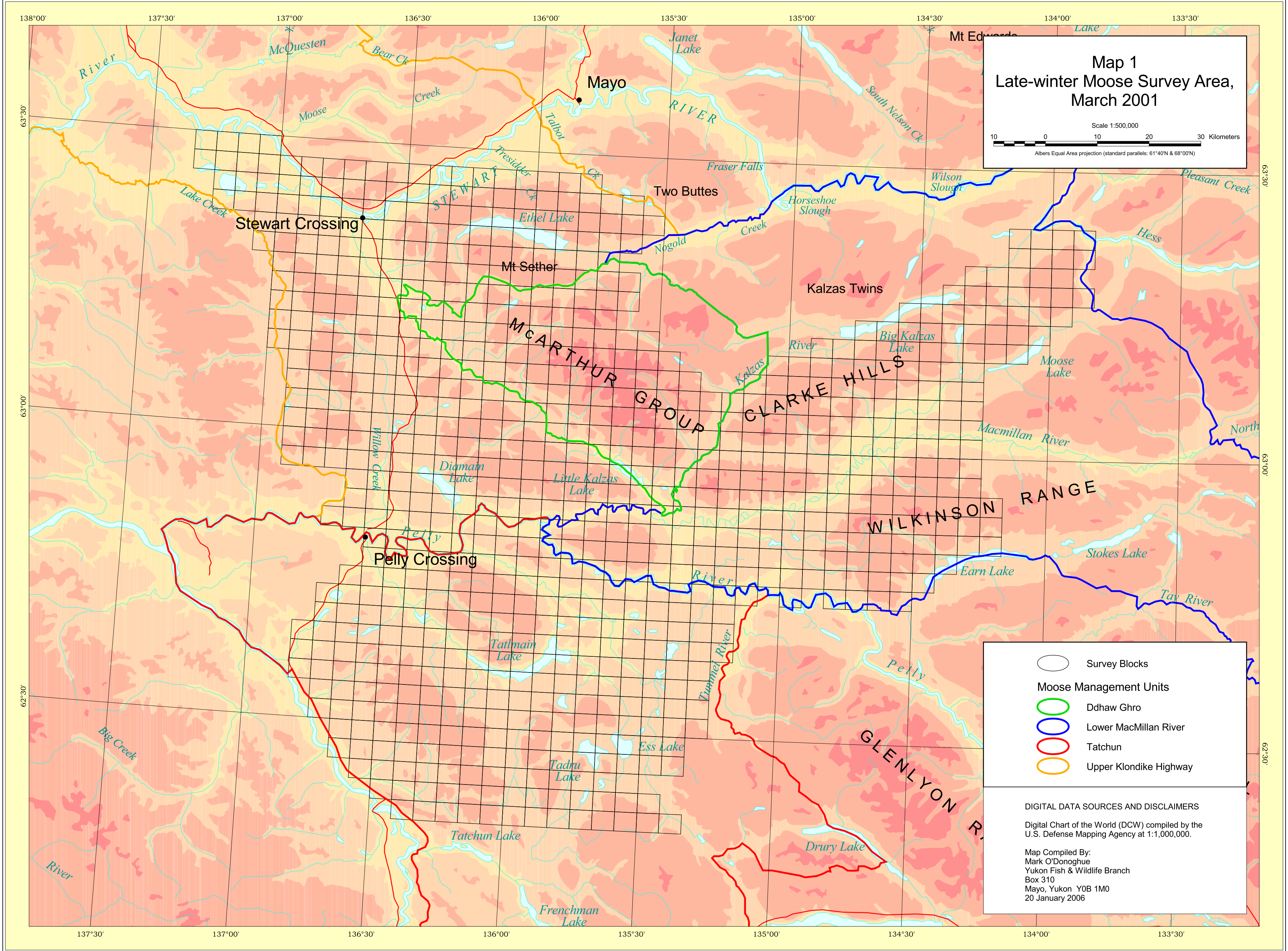
Acknowledgments

Selkirk First Nation provided the funding for this survey, and Darin Isaac, Robert Van Bibber, and Danny Van Bibber took part in the survey as observers. We thank Graham Lavery for safe, efficient flying in conditions that were sometimes marginal.

Literature Cited

- D.I.A.N.D. 2001. Yukon Territory snow survey bulletin and water supply forecast. April 1, 2001. Yukon Territory. Water Resources Division, Indian and Northern Affairs Canada, Northern Affairs Program, Whitehorse, Yukon.
- Fraser, V., & M. O'Donoghue. 2001. Mayo Moose Management Unit. Summary of late-winter 2001 moose survey. 2-5 March 2001. File Report, Yukon Fish & Wildlife Branch.
- Larsen, D. G., R. L. Markel, & R. M. P. Ward. 1989. Moose population characteristics in the Mayo and Pelly Crossing areas 1988-1989. Progress Report, Yukon Fish and Wildlife Branch.
- O'Donoghue, M., & K. Sinnott. 2003. Mayo Moose Management Unit. Summary of late-winter 2002 moose survey. 4-10 March 2002. File Report, Yukon Fish & Wildlife Branch.

- Sinnott, K., & M. O'Donoghue. 2003. Late-winter moose recruitment survey in the Mayo area. 11-13 March 2003. File Report, Yukon Fish & Wildlife Branch.
- Ward, R. M. P., & D. G. Larsen. 1994. Summary of 1993 moose surveys in the Big Salmon, Mayo, Aishihik-Onion Creek and Dawson areas. Survey Report SR-94-03, Yukon Fish and Wildlife Branch.
- Ward, R. M. P., & D. G. Larsen. 1995. Summary of 1992 moose surveys in the Aishihik, Onion Creek, Big Salmon, Mayo and Dawson areas. Progress Report PR-95-02, Yukon Fish and Wildlife Branch.



Map 1
Late-winter Moose Survey Area,
March 2001

Scale 1:500,000

10 0 10 20 30 Kilometers

Albers Equal Area projection (standard parallels: 61°40'N & 68°00'N)

○ Survey Blocks

Moose Management Units

○ Ddhaw Ghro

○ Lower MacMillan River

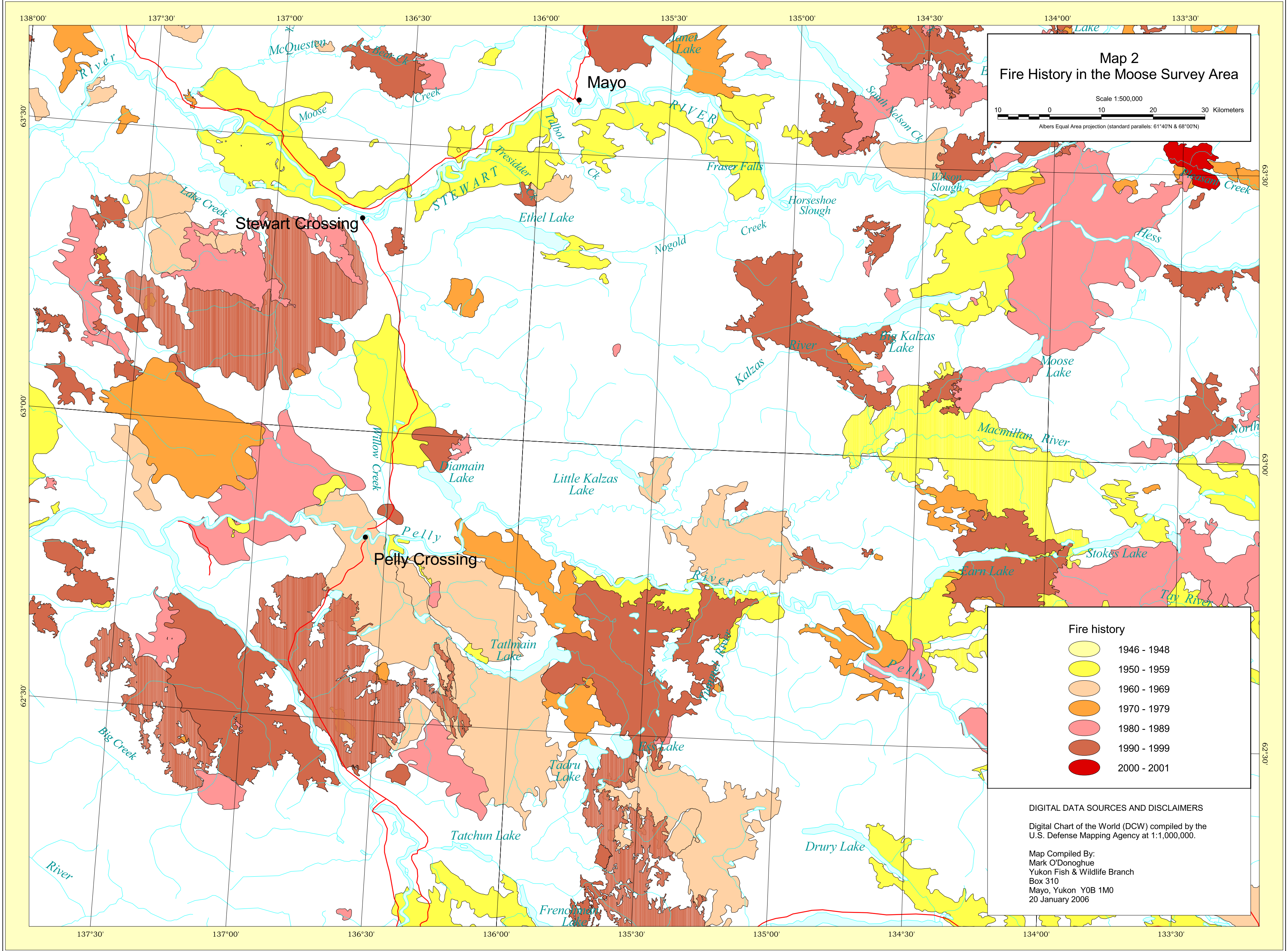
○ Tatchun

○ Upper Klondike Highway

DIGITAL DATA SOURCES AND DISCLAIMERS

Digital Chart of the World (DCW) compiled by the U.S. Defense Mapping Agency at 1:1,000,000.

Map Compiled By:
 Mark O'Donoghue
 Yukon Fish & Wildlife Branch
 Box 310
 Mayo, Yukon Y0B 1M0
 20 January 2006



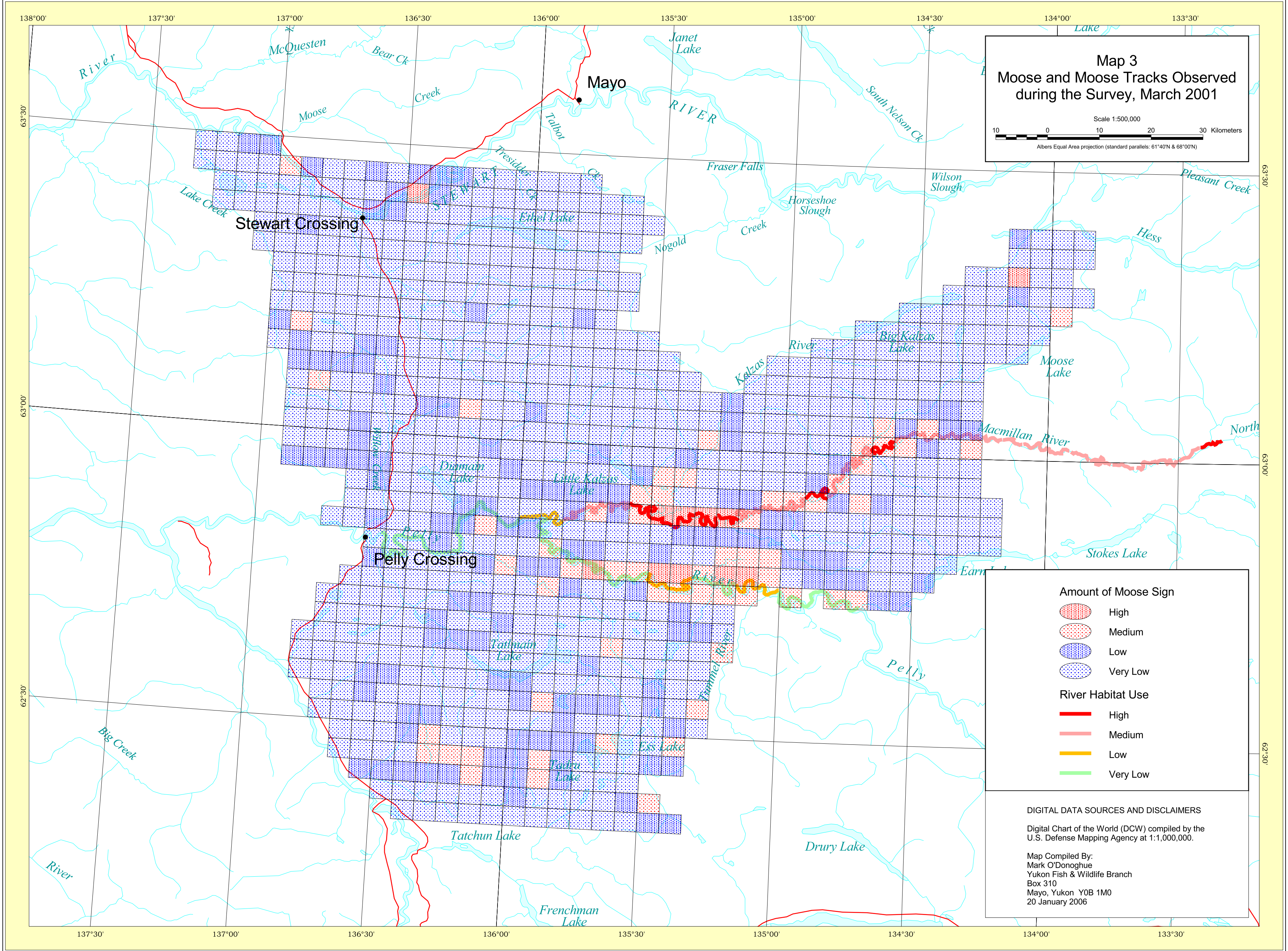
Map 2
Fire History in the Moose Survey Area
 Scale 1:500,000
 10 0 10 20 30 Kilometers
 Albers Equal Area projection (standard parallels: 61°40'N & 68°00'N)

- Fire history**
- 1946 - 1948
 - 1950 - 1959
 - 1960 - 1969
 - 1970 - 1979
 - 1980 - 1989
 - 1990 - 1999
 - 2000 - 2001

DIGITAL DATA SOURCES AND DISCLAIMERS

Digital Chart of the World (DCW) compiled by the U.S. Defense Mapping Agency at 1:1,000,000.

Map Compiled By:
 Mark O'Donoghue
 Yukon Fish & Wildlife Branch
 Box 310
 Mayo, Yukon Y0B 1M0
 20 January 2006



Map 3
Moose and Moose Tracks Observed
during the Survey, March 2001

Scale 1:500,000
 10 0 10 20 30 Kilometers
 Albers Equal Area projection (standard parallels: 61°40'N & 68°00'N)

Amount of Moose Sign

- High
- Medium
- Low
- Very Low

River Habitat Use

- High
- Medium
- Low
- Very Low

DIGITAL DATA SOURCES AND DISCLAIMERS

Digital Chart of the World (DCW) compiled by the U.S. Defense Mapping Agency at 1:1,000,000.

Map Compiled By:
 Mark O'Donoghue
 Yukon Fish & Wildlife Branch
 Box 310
 Mayo, Yukon Y0B 1M0
 20 January 2006