SURVEILLANCE OF THE BISON FREE MANAGEMENT AREA, NORTHWEST TERRITORIES

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ABSTRACT

A Bison Free Management Area (BFMA) was established in the southern Northwest Territories in 1987 to reduce the risk of infection of the Mackenzie and Nahanni wood bison populations with bovine tuberculosis and brucellosis, diseases which are present in bison herds in the Slave River Lowlands, Wood Buffalo National Park and adjacent areas. Three methods were employed to determine the presence and distribution of bison in and around the BFMA: 1) aerial reconnaissance was carried out during the late winter months in 1988, 1989, 1990 and 1991; 2) public participation was requested employing written brochures, notices and highway signs; and 3) individuals and agencies travelling or working in the region were interviewed. No bison were detected in winter in the BFMA; however, movement of bison south across the Mackenzie River was indicated from reported sightings. Reports based on interviews indicated that bison are present at a low density throughout northern Alberta. Continued vigilance is warranted to manage the risk of infection of the two healthy herds.

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INTRODUCTION

A misguided decision to introduce more than 6,000 plains bison (*Bison bison bison*) into the protected range of the wood bison (*B. b. athabascae*) in Wood Buffalo National Park (WBNP) in the 1920s resulted in hybridization between the two subspecies and the introduction of two cattle diseases, tuberculosis (*Mycobacterium bovis*) and brucellosis (*Brucella abortus*), into bison herds in the region (Tessaro 1988). In 1963 and 1965 bison were captured from a small remnant herd of wood bison in northwestern WBNP to serve as nuclei for a wood bison recovery program. The 1963 salvage project provided 18 head, including 12 adult females, 4 adult males and 4 calves, which were released into the wilderness near Fort Providence, NWT. Before shipment the salvaged bison were tested twice for brucellosis and tuberculosis, with negative results. The released stock have since given rise to a healthy herd which exceeds 2000 head, occupying an area exceeding 8,000 km^2 (Gates and Larter 1990, Gates et al. 1991). Testing since 1982 indicates that brucellosis and tuberculosis are not present in the Mackenzie herd; sera from 163 bison have tested negative for brucellosis and pathology and histopathology on 51 bison has indicated that tuberculosis is absent (Tessaro and Gates in prep.).

Twenty-three bison captured in 1965 were shipped to Elk Island National Park in central Alberta. The herd established from that salvage project is now maintained at about 300 head and has provided brucellosis- and tuberculosis-free stock for several

reintroduction projects including the Nahanni herd. In 1980 and 1989, 28 and 12 bison, respectively, were released near Nahanni Butte, NWT. The Nahanni herd now numbers about 60 head which are assumed to be brucellosis- and tuberculosis-free.

The existence of diseased herds of bison in the Slave River Lowlands and in the vicinity of Wood Buffalo National Park poses an obstacle to the reintroduction of additional healthy herds (i.e., free of tuberculosis and brucellosis) in the region and jeopardizes the health of the two tuberculosis- and brucellosis-free herds re-established in the area. In addition, growth and expansion of resident diseased herds is unlikely to occur with the diseases remaining in them. The issue of eradication of the two diseases from infected herds was the subject of review by a specially appointed task force (Bison Disease Task Force 1988) and the federal Environment Assessment and Review Process (Northern Diseased Bison Environmental Assessment Panel 1990). The issue is currently being addressed by the Northern Buffalo Management Board, which will seek to develop a long term management solution to the problem.

In recognition of the continuing risk of infection of the re-established healthy herds in the NWT while a solution to the disease problem is being developed, the Government of the Northwest Territories implemented a project in 1988 intended to reduce the risk of contact between infected and disease-free bison. This report summarizes the results of that project to 1991.

METHODS

In December 1987, a zone was established south of the Mackenzie River and north of the Mackenzie Highway between Mills Lake, near Fort Providence, and Hay River, from which bison were to be excluded. The Bison Free Management Area (BFMA) was increased in size in 1990 to include the area north of the NWT border and south of the Mackenzie River, lying between the Trout River in the west and the Buffalo River and western boundary of WBNP in the east (Fig. 1). The management objectives of the project are to prevent the establishment of bison herds in the zone and to remove any bison which may be detected. The objectives serve the goal of reducing the risk of contact between bison infected with tuberculosis and brucellosis and healthy bison in the Mackenzie and Nahanni herds.

Three initiatives have been undertaken to detect the presence of bison in and around the BFMA.

Aerial Surveillance

Aerial surveillance was carried out during the January-March period when snow cover and seasonal light conditions are most favorable for detecting bison and signs of bison from the air. In 1988, 1989, and 1990, aerial surveillance assumed the form of spagetti reconnaissance which focused on the area along the south shoreline of the Mackenzie River and Great Slave Lake. One flight

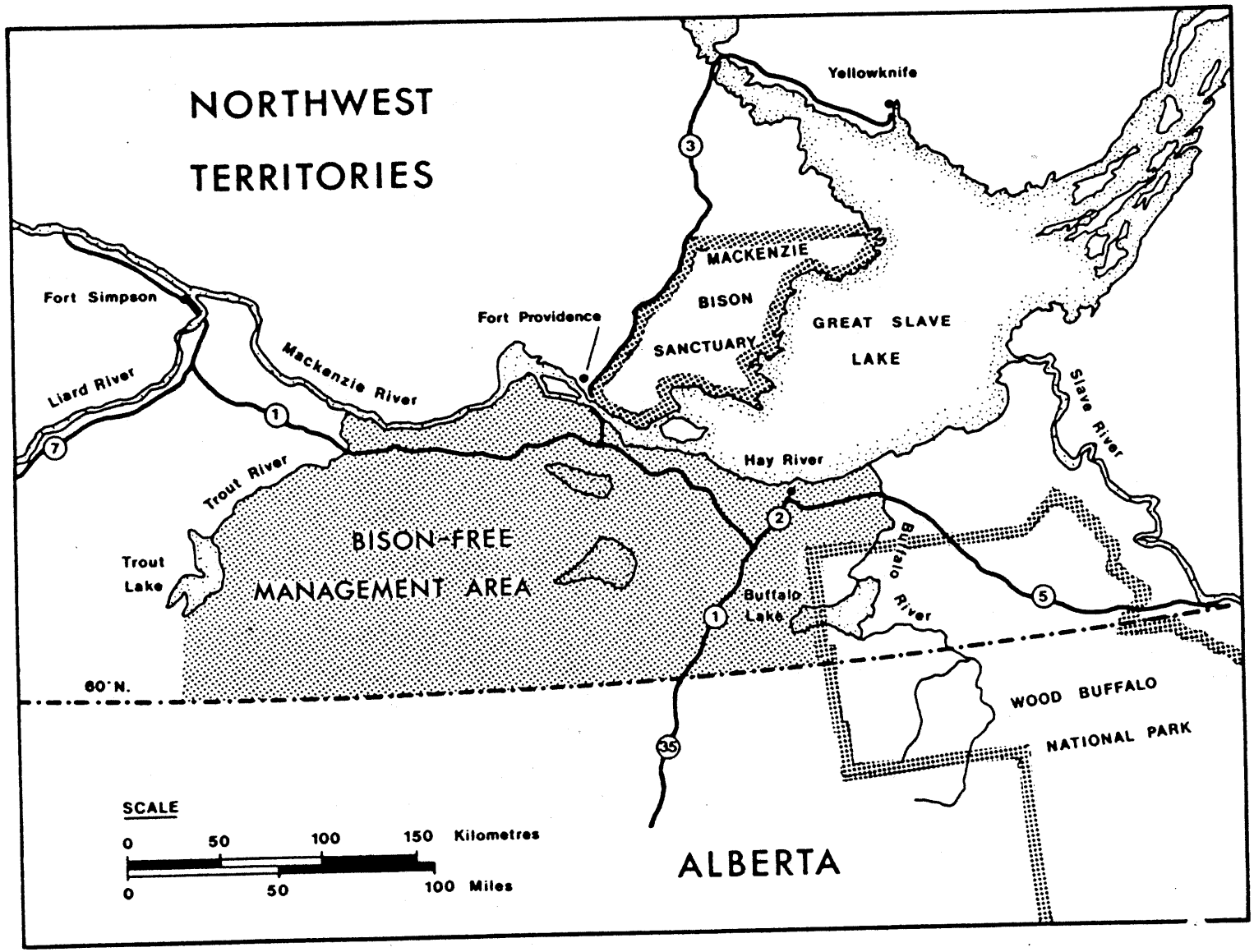


Figure 1. Location of the Bison Free Management Area (BFMA).

was carried out in March 1988, and two were conducted in February-March 1989 and 1990.

In 1991 three surveillance surveys were conducted during January-March in the expanded BFMA. Survey periods were January 23-February 11, February 21-March 4, and March 15-28. Two sections of the BFMA were searched for bison. The remainder of the area appears to provide no suitable winter habitat for bison (C.G. personal observation). The area between the Mackenzie River and Mackenzie Highway, hereafter referred to as the Fort Providence survey area, was searched using systematically spaced transects spaced at approximately 3 km intervals. This spacing allowed visual overlap for detecting animals and tracks between transects. The flight path was deviated from upon detecting animal signs; for example, tracks in the snow. Spagetti reconnaissance was used to survey the Hay River area which included the area between Kakisa River and Hay River, Hay River and Buffalo River along the south shoreline of Great Slave Lake, and the vicinity of Buffalo Lake. Flight paths are illustrated in Figures 2 through 8. Aerial reconnaissance was carried out only during clear sky conditions in order to maximize contrast for sighting tracks in snow. All sightings of large mammals were recorded on a 1:250,000 NTS map. Records were maintained on a database file (Dbase III+) integrated with a computer mapping program (Quikmap, version 2.50, Environmental Sciences Ltd, Sidney, B.C.).

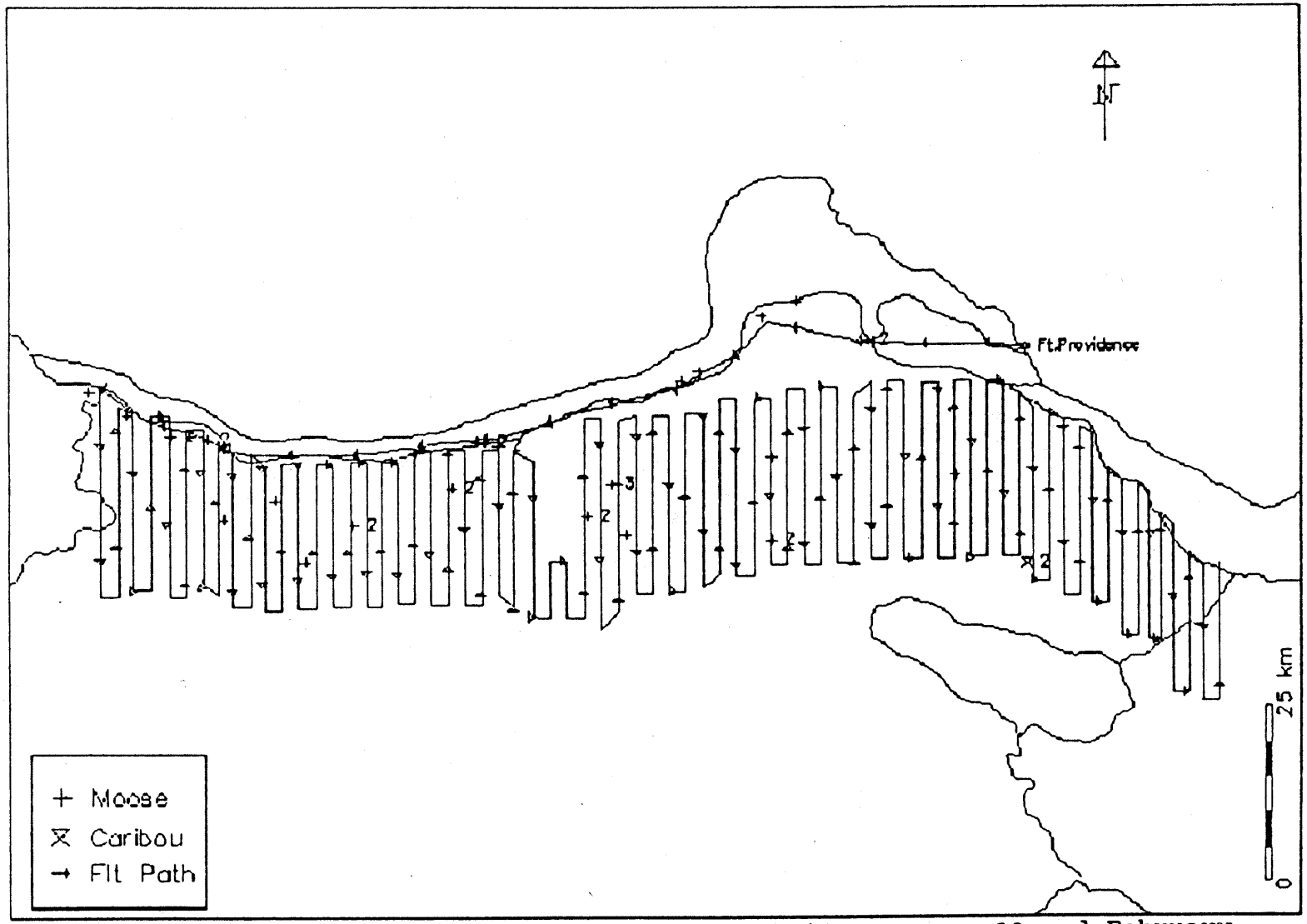


Figure 2. Reconnaissance flight path followed during January 23 and February 8-10, 1991, in the Fort Providence area.

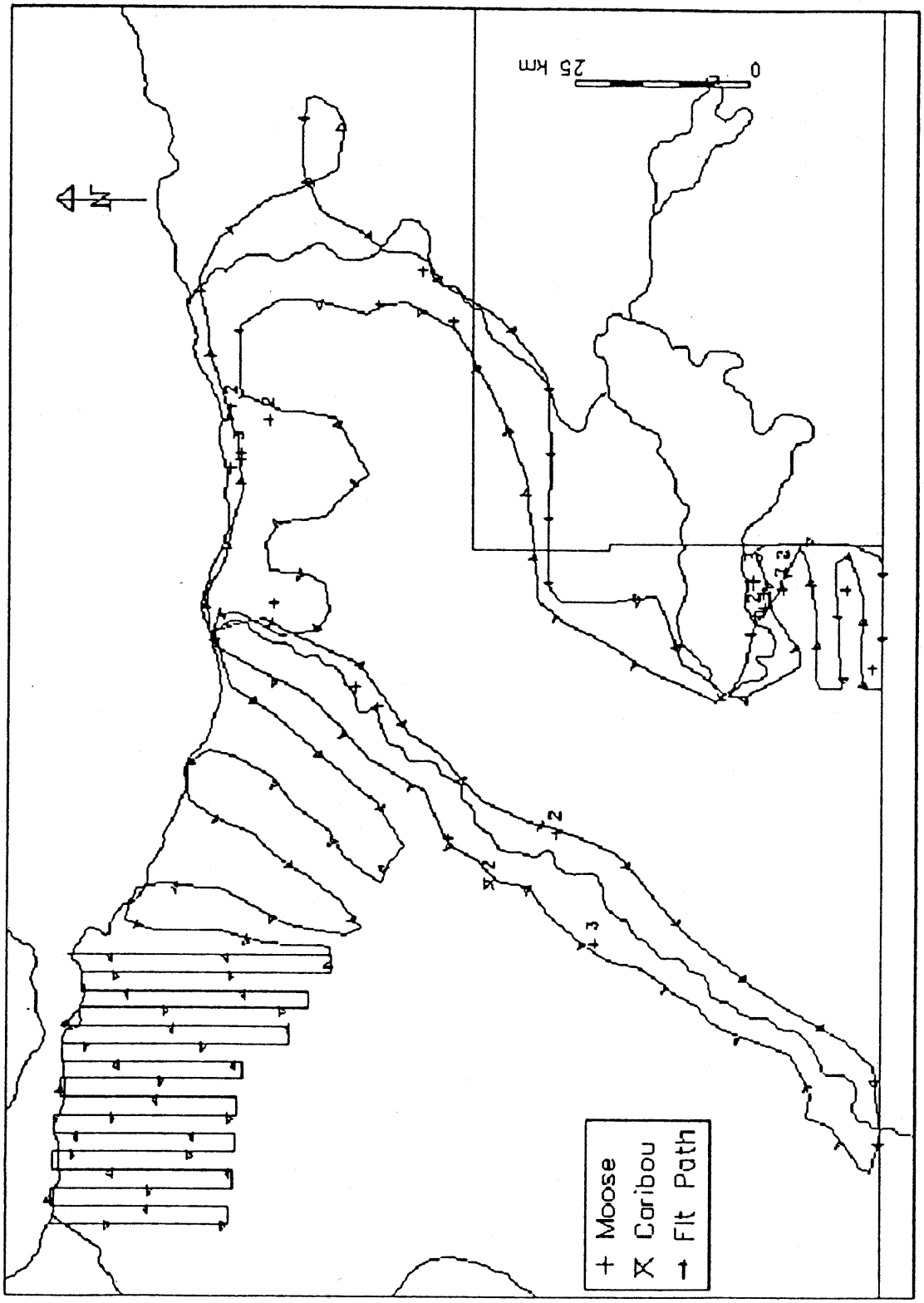


Figure 3. Reconnaissance flight path followed during January 30 and February 11, 1991, in the Hay River area.

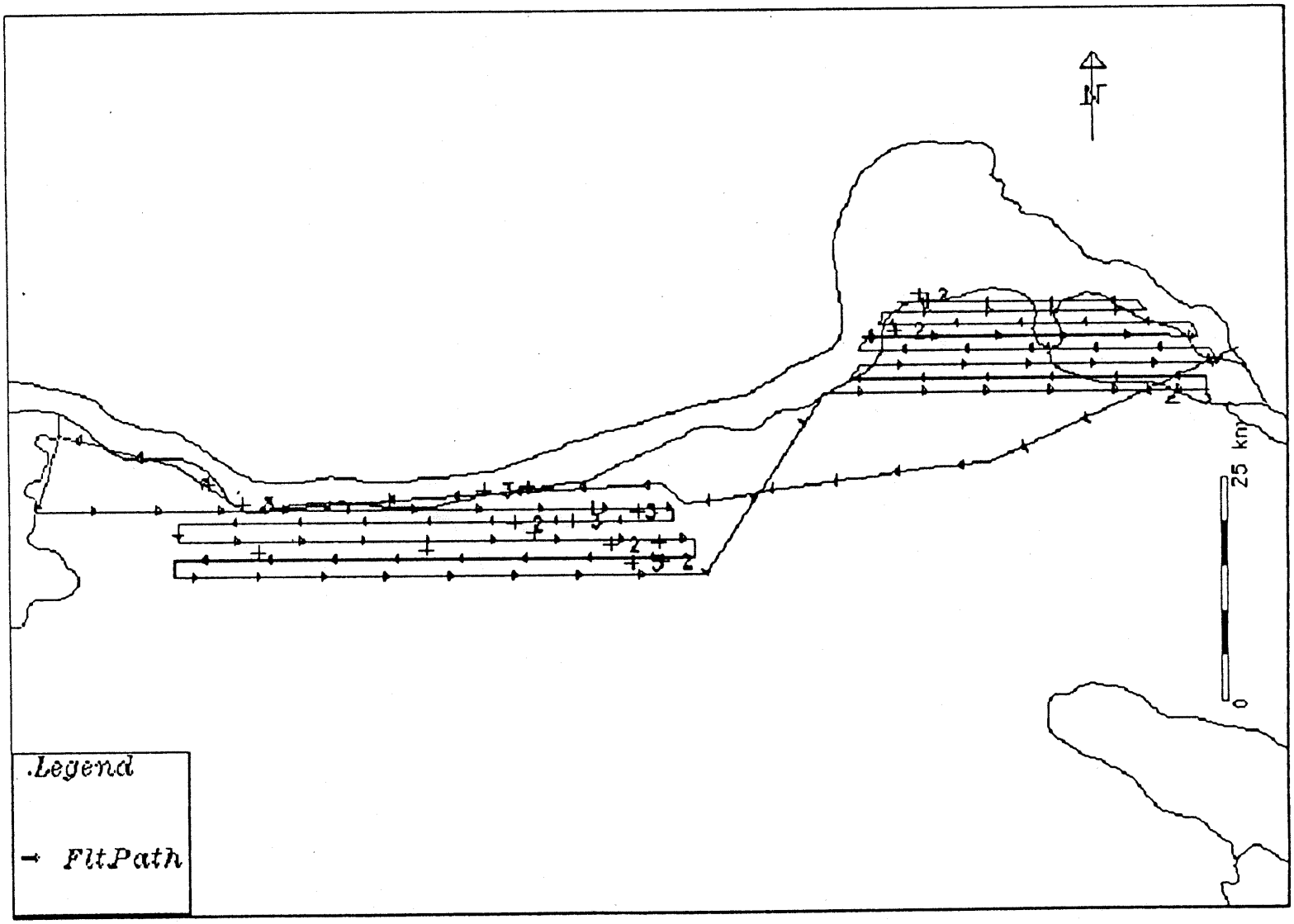


Figure 4. Reconnaissance flight path followed during February 22 and 23, 1991, in the Fort Providence area.

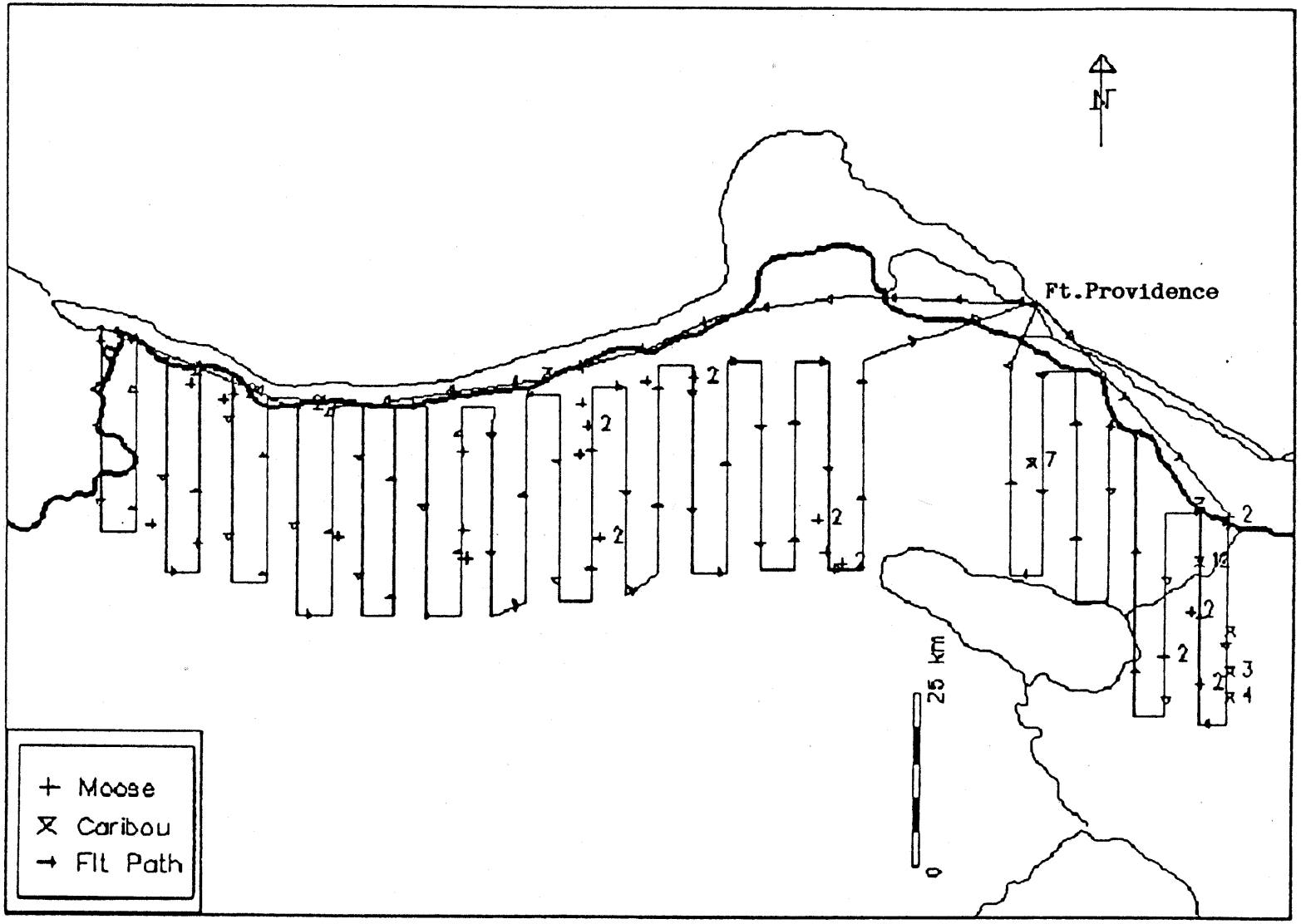


Figure 5. Reconnaissance flight path followed during March 2 and 3, 1991, in the Fort Providence area.

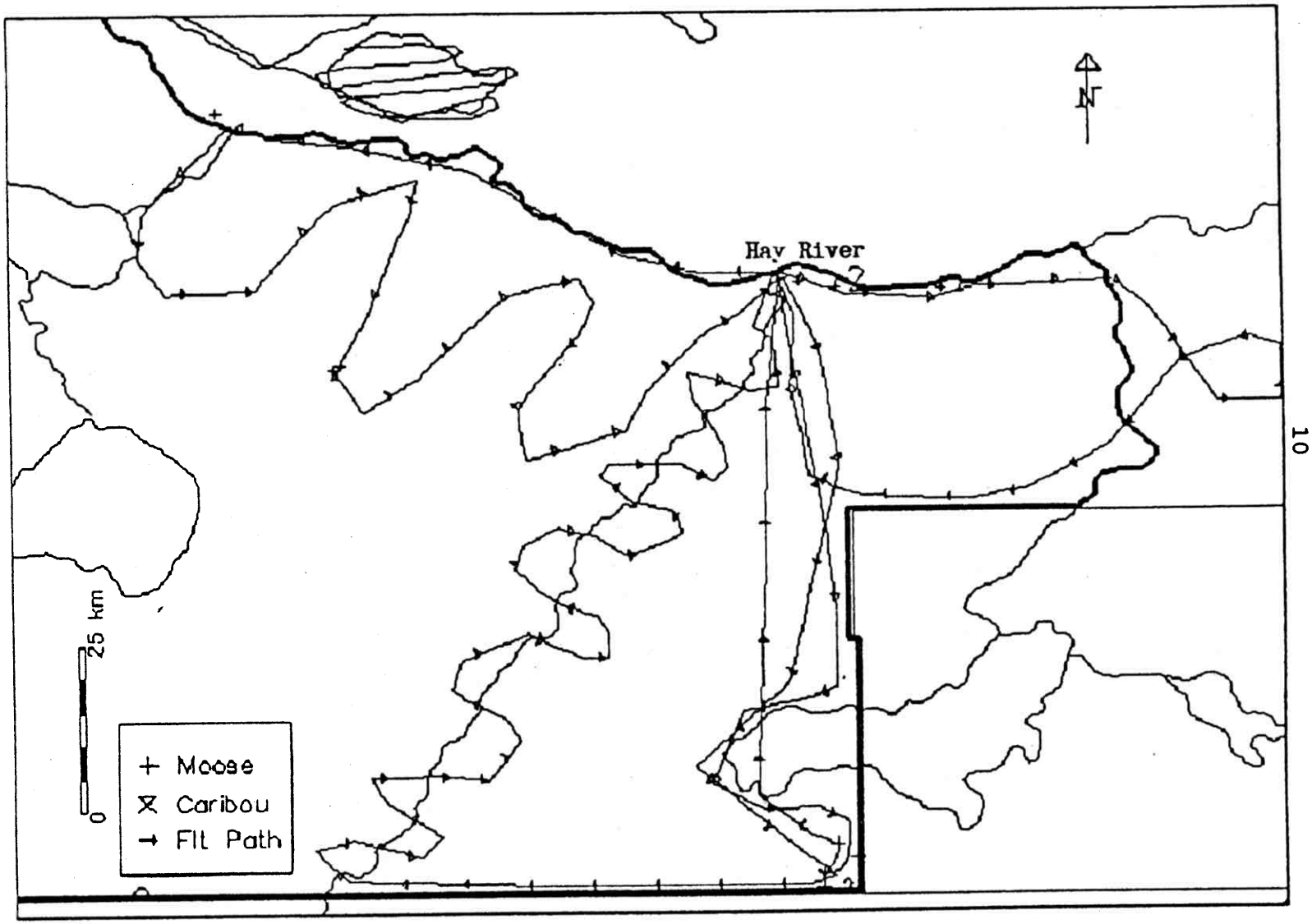


Figure 6. Reconnaissance flight path followed during February 21 to March 4, 1991, in the Hay River area.

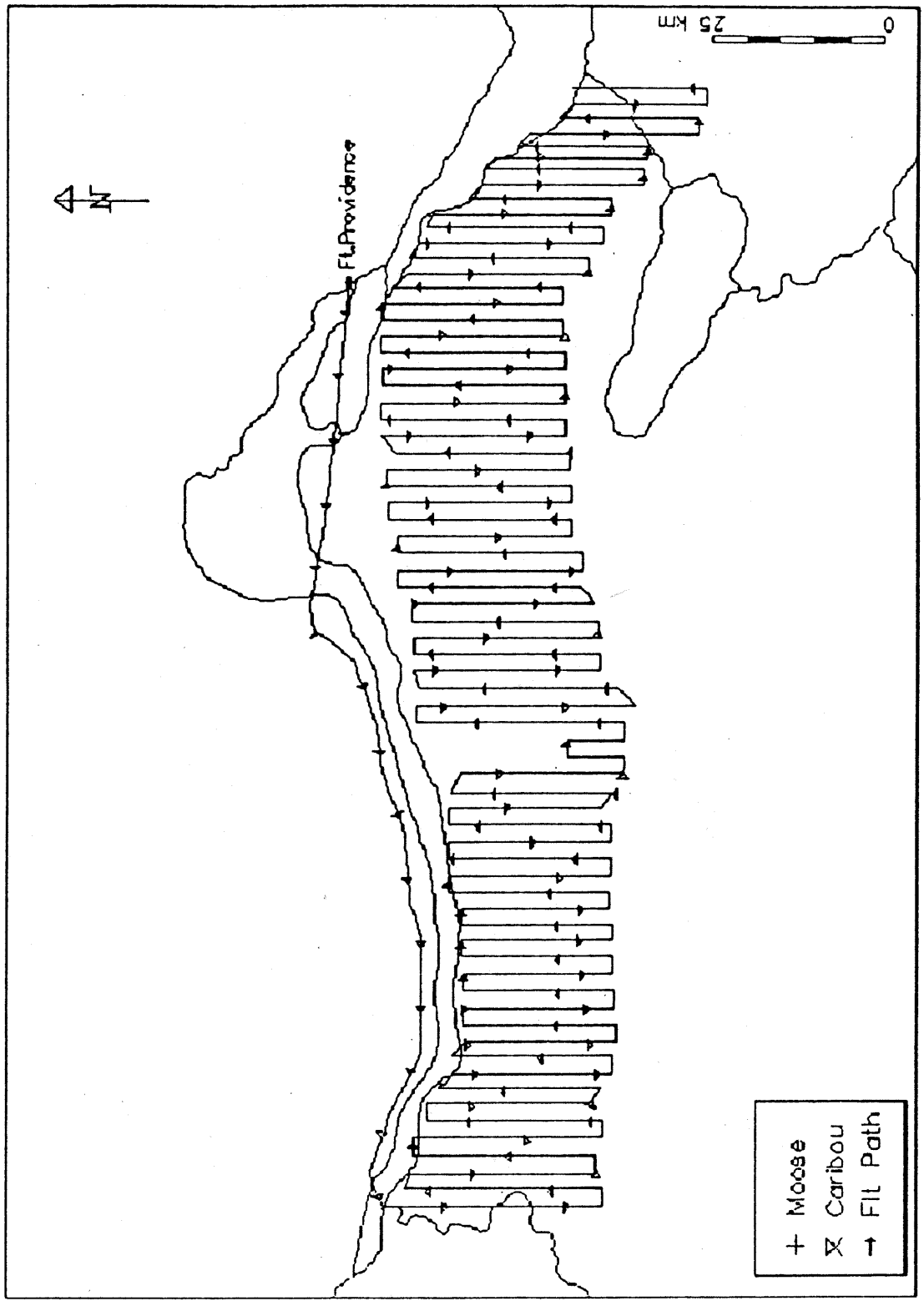


Figure 7. Reconnaissance flight path followed during March 15 and 25, 1991, in the Fort Providence area.

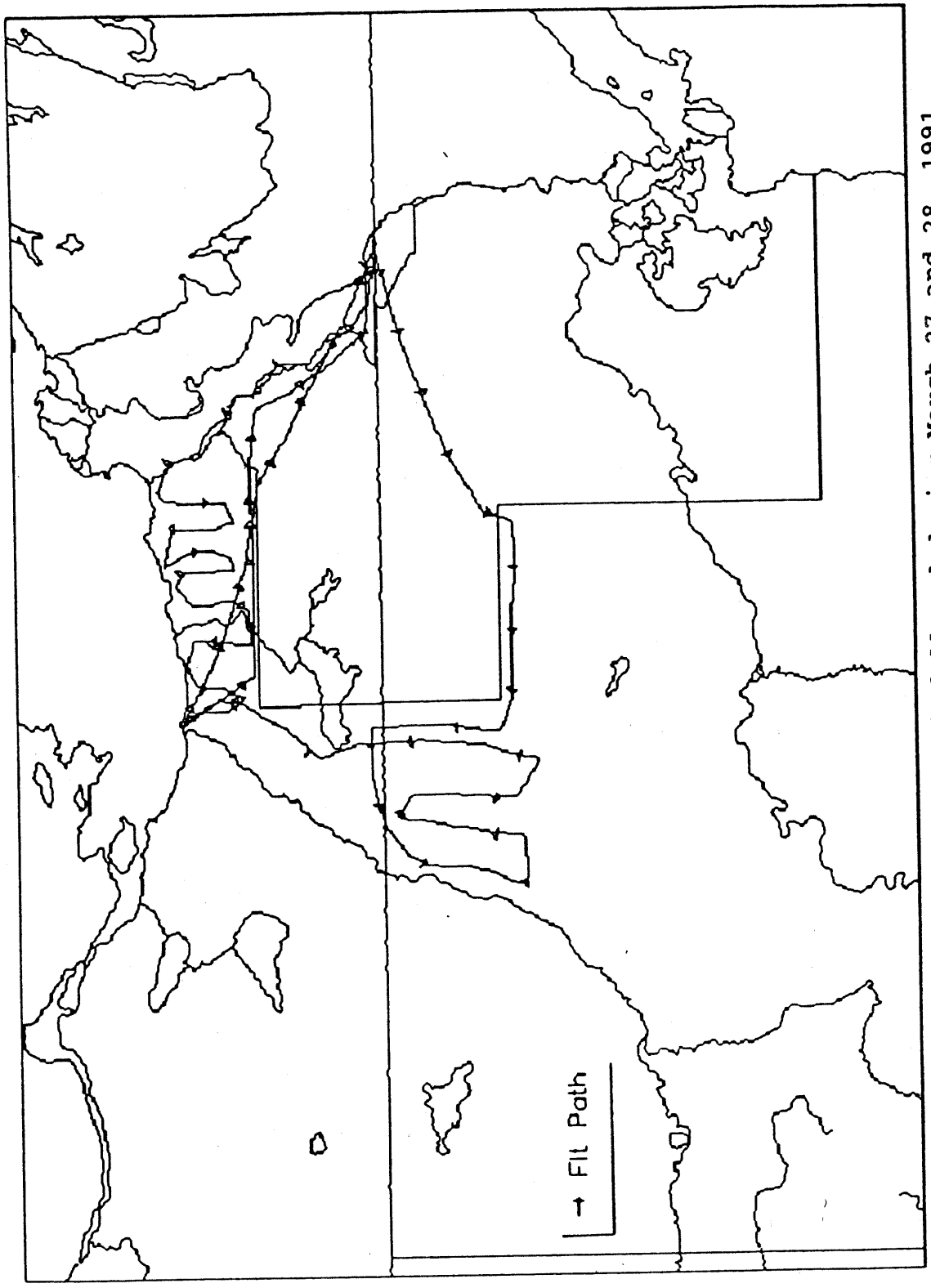


Figure 8. Reconnaissance flight path followed during March 27 and 28, 1991, in the Hay River area.

Personal Interviews and Reported Sightings

Information on the occurrence of bison in the BFMA and in adjacent areas in northern Alberta was solicited from individuals known to be familiar with the areas, and from other individuals making sightings of whom we heard. Additional information was found in the Wood Bison Recovery Team submission to the Northern Diseased Bison Environmental Assessment Panel (1990). Location data were recorded on a database file and plotted on a distribution map.

Advertising and Signage

In April 1991 the Department of Renewable Resources published an information brochure and a notice bulletin which were circulated to Renewable Resources offices and to the NWT/Alberta border crossing office (Appendix A). The public was requested to report sightings of bison in the BFMA to a Renewable Resource or RCMP office.

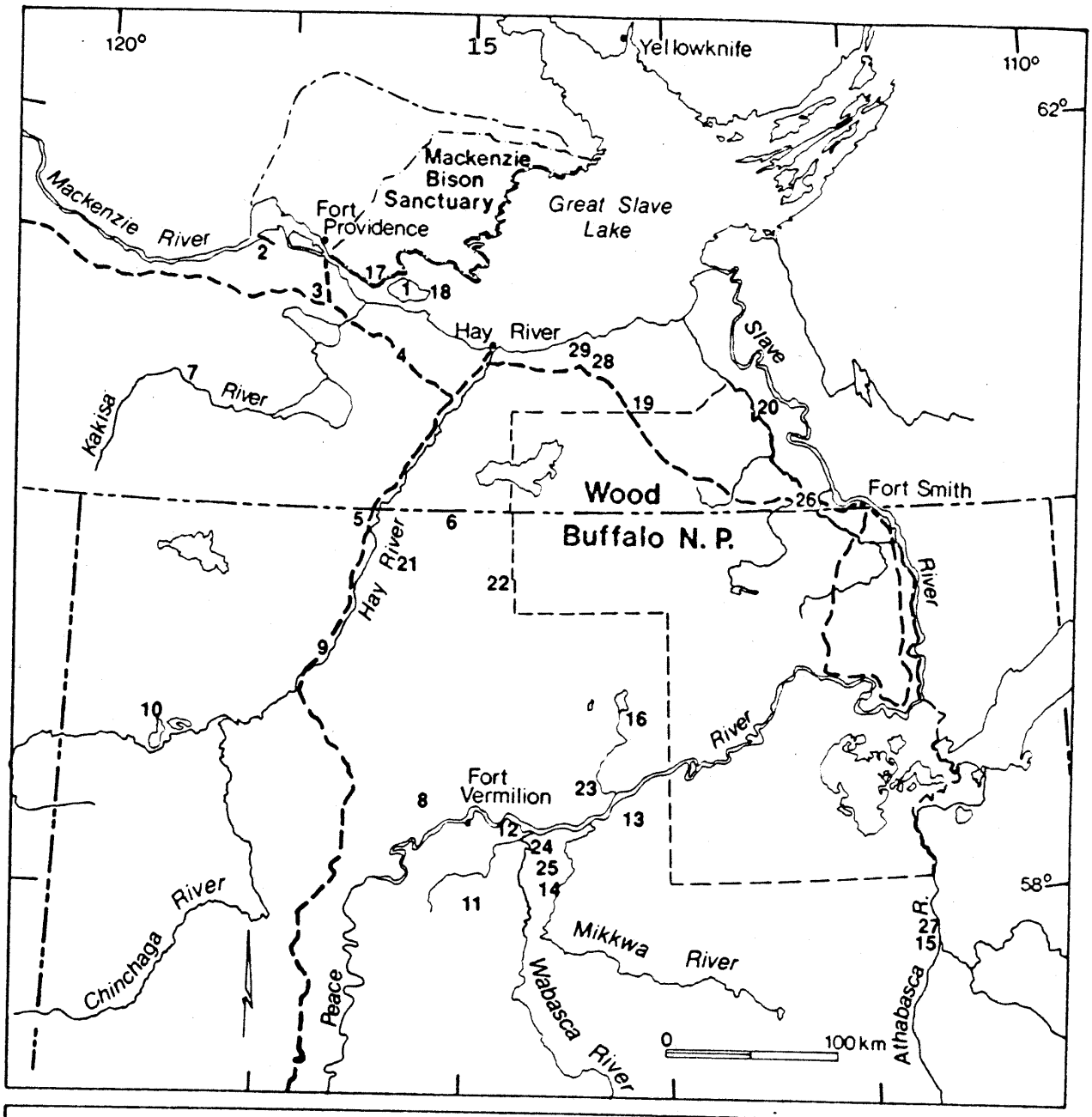
Highway signs were strategically positioned in May 1991 at four locations between the NWT/Alberta border and the Mackenzie River. The signs were located in pairs, one sign on each side of the highway. They requested travellers to report bison sighted in the BFMA.

RESULTS

Bison and bison signs were not detected in the BFMA with late winter aerial reconnaissance in 1988, 1989, 1990 or 1991. Among large mammals observed in 1991, moose was the most common species (n=199), caribou were less frequently seen (n=37) and wolves were rare (n=5). Location data for sightings of large mammals are presented in Appendix B. Bison were observed throughout the winter in wet meadows along the north shore of the Mackenzie River scattered in small herds between Mills Lake in the west and Moose Point in the east.

Bison and bison signs were reported in and near the BFMA by several people (Figure 9). Most sightings were made during the snow-free seasons. Bison have been reported three times on the south shore of the Mackenzie River or on islands in the river's mouth. Three sightings have been reported in the BFMA, only one of which could be confirmed (J. Van Camp pers. comm.). Several sightings were reported near the NWT/Alberta border, mainly in the Hay River drainage and travel corridor. Other sightings were reported in the Peace River corridor adjacent to WBNP, and near the Firebag River north of Fort McKay, Alberta.

No additional reports of bison in the BFMA had been reported at the time of writing since the public participation campaign was initiated in May 1991 .



LEGEND (Map number, Description, Date, Reference)

1 2 bulls, Aug. 1982, Canadian Coast Guard
2 4 bulls, Sept. 1986, L. Antoine
3 2 bulls, Sept. 1986, 2 hunters
4 3 bulls, May 1989, Tourists
5 1 bull, Dec. 1988, Renewable Resource Officer
6 small herd (cows & calves), Aug. 1981, Alta. Forest Service
7 1 bull, 1976, J. Van Camp
8 5 bulls, 1982, Gainer (1985)
9 2 bulls, 1980, R. Gainer
1 bull, 1983, R. Gainer
2 bulls, winter 1982, R. Garlic
10 1 bull, Mar. 1984, H. Reynolds
11 5 bison, 1984, C. Friesen, R. Gainer (1985)
12 1 bull, 1984, Mr. Roberts
13 20 bison, - , Gainer (1985)
14 23 bison, (adults), Feb. 1988, S. Tessaro
17 bison, Mar. 1989, S. Tessaro, R. McFetridge
15 20 bison, Jan. 1984, Tessaro (1987)
16 24 bison, Feb. 1988, S. Tessaro
19 bison, Mar. 1989, S. Tessaro, R. McFetridge
17 3 - 4 groups of 5 - 15 bison, Mar. 1991, T. Malewski
18 1 bull, Nov. 1988, L. Buckmaster
19 2 bulls, Sept. 1987, C. Roy, Mr. Mandeville
20 4 groups totalling 60 bison, Mar. 1991, S. Gray
21 10 - 12 bison, Aug. 1990, L. Schamerhorne
22 bison tracks and sign, Sept. 1990, Stan Beaulieu
23 19 bison, Feb. 1990, Dave Moyles
24 8 bison shot, Mar. 1990, D. Moyles
25 200 bison, winter 1990, Ken Orich, Alta. Forest Service
26 52 bison killed, 2-5 diseased, Oct. 1990, W. Schaeffer
27 65 bison, fall 1990, W. Schaeffer
42 bison, winter 1991, W. Schaeffer
28 bison tracks and feces, July 1989, A. Helmer, Renewable Resource Officer
29 bison tracks and feces, July 1990, A. Helmer

Figure 9. Locations of bison sightings or signs reported or recorded since 1976 in the area west of WBNP and south of the Mackenzie River.

DISCUSSION

Limited habitat capability for bison in the BFMA likely prevents the establishment of breeding herds in the area. The area is dominated by large, open, acidic fens and large, forest tracts which offer little in the way of winter forage for bison. Conversely, the only significant barrier to bison movements through the area is the Mackenzie River and Great Slave Lake. The Mackenzie River evidently does not form an absolute barrier to movement as bison have been seen on it's south shore and on islands in the river's mouth in recent years. As the Mackenzie population continues to grow and expand it's range, it can reasonably be expected that the number of bison moving out of the current area of distribution will increase. Of particular concern are mature male bison which are known to move long distances before or during the rut, singly or in pairs, rarely in larger herds (Larter and Gates 1990).

The disease status of most bison in northern Alberta is unknown, but testing on three herds near Fort Vermillion indicated that the diseases tuberculosis and brucellosis were present (Wood Bison Recovery Team 1990). The lingering presence of bison in northern Alberta west of WBNP continues to pose the risk of disease transmission to healthy bison herds and precludes attempts to re-establish other healthy herds in the region. During the winter bison are obliged to feed in open areas which support a limited number of suitable forage species (Larter and Gates 1991). The

signs bison leave in snow cover are readily distinguishable from signs made by other native ungulates. Although bison can be detected readily during the winter period, many observations of bison in and around the BFMA have been reported during snow free months.

Since the usefulness of aerial reconnaissance is severely limited in the absence of snow, the best means of obtaining information on bison is from people who travel in the area during the snow-free period. While this is useful for recording the general presence of bison and the distribution of sightings, an effective buffer zone cannot be maintained solely based on opportunistic reports, no matter how recent they might be. Other means must be sought to reduce or eliminate the risk of disease transmission to the Mackenzie and Nahanni bison herds.

RECOMMENDATIONS

1. Given the problem of detecting bison in the absence of snow, efforts should continue to broaden public participation in reporting bison observed in the BFMA.
2. Aerial surveillance of the BFMA should continue during the winter to assist in preventing the establishment of breeding herds in the area.
3. The Government of Alberta and northern Alberta residents should be solicited to make them more aware of the potential for bison moving into the southern NWT from their jurisdiction and to encourage development of a solution to the problem.
4. Reconnaissance should be done in northern Alberta to determine the distribution of bison.
5. Disease testing should be done on as many bison as possible in northern Alberta in order to determine the distribution of infected stock.

ACKNOWLEDGMENTS

We wish to thank M. Doleman for providing assistance in use of the Quikmap program. Many people assisted in providing information on the location of bison signs and sightings; all are acknowledged in the legend for Figure 9.

PERSONAL COMMUNICATIONS

Van Camp, J. Fort Smith, NWT.

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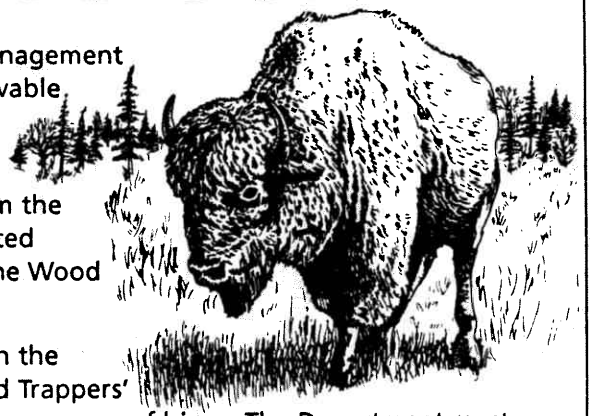
APPENDIX A

PAMPHLET AND NOTICE CONCERNING THE BISON FREE MANAGEMENT AREA

NOTICE

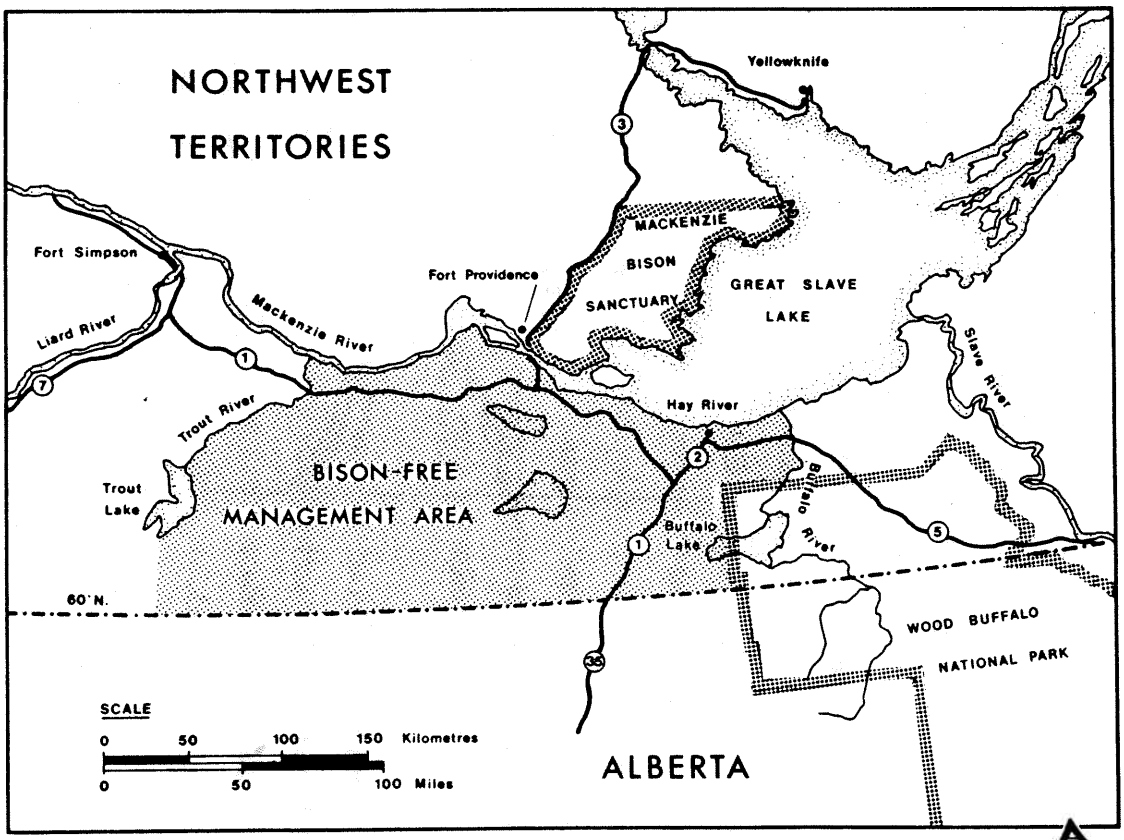
IF YOU SEE A BISON ...



The public is requested to assist in a Bison Management program sponsored by the Department of Renewable Resources.

A Bison-Free Management Area has been designated to reduce the risk of wood bison from the Mackenzie Bison Sanctuary area becoming infected with diseases carried by hybridized bison from the Wood Buffalo National Park and surrounding area.

The Department of Renewable Resources with the participation of the Fort Providence Hunters' and Trappers' Association, is actively surveying this area for the presence of bison. The Department must remove bison from this area for testing.



If you see a bison within this area, please note the location and report it to a Renewable Resource Office or the RCMP as soon as possible.

MARCH 1991

APPENDIX B

LOCATIONS OF MOOSE, CARIBOU AND BISON SIGHTED DURING SURVEILLANCE FLIGHTS IN JANUARY-MARCH 1991

UTM coordinates for wildlife sighted in Trout River & Fort Providence area, 23 January - 11 February 1991

UTM Locations North	East	Moose	Caribou
6789000	347250	1	
6794260	354600	1	
6792260	357100	2	
6791450	361800	2	
6773100	373300	1	
6778250	379900	1	
6788000	380275	2	
6790000	396600	2	
6799300	398475	2	
6775750	414175	1	
6798125	421750	1	
6799150	424300	1	
6806750	432100	1	
6809100	436500	1	
6803450	445250	2	
6783750	456250	1	
6795400	352000	1	
6794740	356500	1	
6792200	359800	1	
6792200	369850	1	
6779650	363300	1	
6790000	363750	1	
6787500	380550	1	
6789050	387950	1	
6783300	392250	2	
6790000	395600	1	
6778770	409500	2	
6783300	412500	3	
6774550	432750	2	
6786750	433000	1	
6770500	465250		2
6765700	506125	2	

Totals Moose = 43 Caribou = 2

UTM coordinates for wildlife sighted in Hay River/Buffalo Lake Area, 23 January - 11 February 1991

UTM Locations North	East	Moose	Caribou	UTM Locations North	East	Moose	Caribou
6691730	527000	3		6668500	570000	1	
6712500	540000	1		6663200	562900	1	
6706850	534150		2	6657250	572950	1	
6697550	540800	2		6668400	570500	1	
6744250	586250	1		6668750	572240	1	
6743000	587450	1		6718000	612260	1	
6726000	558900	1		6713700	606000	1	
6723750	607700	1		6668750	569300	2	
6722800	556600	1		6668500	570000	1	
6737750	569250	1		6663200	562900	1	
6742900	588100	3		6657250	572950	1	
6744500	594125	2		6668400	570500	1	
6738990	592600	2		6668750	572240	1	
6718000	612260	1		6665900	572750	2	
6713700	606000	1		6665650	575200	2	
6668750	569300	1		6670000	573700	3	

Totals: Moose = 43 Caribou = 2

UTM coodinates for wildlife sighted in Trout River & Fort Providence area, 21 February - 4 March 1991

UTM Locations North	East	Moose	Caribou
6791250	362750	1	
6778750	366200	3	
6789850	380450	1	
6785650	398500	3	
6786500	405100	3	
6782900	407050	1	
6782700	402200	2	
6780750	407200	2	
6780700	404400	3	
6783225	367500	1	
6782950	383950	1	
6789450	389800	3	
6789500	394250	1	
6786950	400500	1	
6785500	392650	2	
6784500	394700	1	
6805050	428600	1	
6805800	430950	2	
6809750	433500	2	
6809100	434200	1	
6797650	458100	(3 wolves)	
6778250	495750	(2 bison)	
6777600	497450	(3 bison)	
6778500	499100	1	
6777750	502650	1	
6770250	519300	2	
6798500	345750	1	
6771700	351250	1	
6790250	362200	2	
6787750	375000	1	
6769450	391250	1	
6765400	391250	1	
6792000	402550	(1 wolf)	
6780250	406300	1	
6790950	421450	2	
6765550	437950	1	
6772000	486750	(1 wolf)	
6763500	486100		12
6753600	490250		1
6747750	490250		3
6744250	490250		4
6791700	357500	1	
6768650	357000	1	
6789250	360950	1	
6788200	370500	2	
6788300	376900	1	
6787500	406800	1	
6784200	407450	2	
6768100	408600	2	
6790700	415100	1	
6770000	437000	2	
6763700	440000	2	
6777950	464700		7
6783300	474800	1	
6770000	490000	2	
6750000	481650	2	
6756250	485150	2	
6746300	486450	2	
6769000	375150	1	
6780750	391250	1	

Totals: Moose = 77 Caribou = 27 Wolves = 5 Bison = 5

UTM coordinates for wildlife sighted in Hay River/Buffalo Lake Area, 21 February - 4 March 1991.

UTM Locations North	East	Moose	Caribou	UTM Locations North	East	Moose	Caribou
6770950	489300	1		6744800	574050	2	
6731750	505200	1		6744750	588500	2	
6732450	506050	1		6659750	575200	1	
6669400	524950	1		6657750	575200	1	
6745550	568950	1		6653050	573400	2	

Totals: Moose = 13

UTM coordinates for wildlife sighted in the Trout River/Fort Providence area, 15 - 28 March 1991.

UTM Locations North	East	Moose	Caribou	UTM Locations North	East	Moose	Caribou
6779600	446750		3	6796350	363000	1	
6797800	347100	1		6792050	373250	1	
6785900	345600	1		6777000	380175	1	
6795100	357250	2		6781500	381600	1	
6770750	396800	2		6783800	410000	1	
6764500	397050	2		6780450	410000	1	
6793000	410550	1		6786650	413000	1	
6780750	410550	1		6775900	417900	1	
6791400	418950	1		6774600	417900	1	
6786760	346450	1		6779050	434500	1	
6772800	353950	1		6778250	434500	1	
6792650	361850	1		6791650	439650	1	
6792050	361850	1		6779250	460790		3
6791400	361850	1		6773600	468200	1	
6792000	362550	1		6770550	489250	1	
6791500	362550	1		6770300	490000	1	
6796800	362600	1					

Totals: Moose = 34 Caribou = 6