SURVEILLANCE OF THE

BISON CONTROL AREA

DECEMBER 1994 - MARCH 1995

R. ANTONIAK AND C.C. GATES

DEPARTMENT OF RENEWABLE RESOURCES

GOVERNMENT OF THE NORTHWEST TERRITORIES

FORT SMITH, NWT

1995

Manuscript Report No. 84

ABSTRACT

In 1987, a Bison Control Area (BCA) and associated surveillance program were created in the southern Northwest Territories. The purpose of the program is to reduce the risk of infection of the Mackenzie and Nahanni wood bison populations with bovine tuberculosis and brucellosis. These diseases are present in bison herds in the Slave River Lowlands, and Wood Buffalo National Park.

Surveillance patrols along the northern BCA boundary were conducted regularly from December 14, 1994 until March 31, 1995. A comprehensive aerial survey was carried out in March 1995. Surveillance also included ground patrols by snowmobiles. Three bison sightings reported by the general public were investigated, but none was confirmed. One bison was located south of the northern boundary of the BCA during a routine aerial surveillance flight on March 7 and it was shot. A second animal near the eastern boundary of the BCA was harvested by a General Hunting License holder on October 13, 1994.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Brucellosis- and tuberculosis-infected bison herds exist in Wood Buffalo National Park, northern Alberta and the Slave River Lowlands (Tessaro et al. 1990). These reservoirs of cattle diseases threaten the disease-free status of the Mackenzie herd (Tessaro et al. 1993) and the presumed disease-free status of the Nahanni herd located near the Mackenzie Mountains (Gates et al. 1992). The disease reservoirs also present an obstacle to reintroducing other healthy herds in the region (Gates et al. 1992). The issue of how to deal with the diseased bison was reviewed by a Bison Disease Task Force in 1988, a federal Environmental Assessment and Review Process in 1990 and the Northern Buffalo Management Board in 1992-93. All indications point to no decisive action being taken to eliminate the diseases from the region.

The risk of infection of the healthy bison herds remains a chronic management problem (FEARO, 1990; Wobeser, 1992). In 1987, the Government of the Northwest Territories implemented a program to reduce the risk of contact between infected and disease-free bison, (Gates and Gray, 1992; and Gates, et. al., 1992). The program entailed defining an area from which bison are excluded through active management. The Bison Control Area (BCA) originally included lands south of the Mackenzie River, and north of the Mackenzie Highway between Mills Lake (near Fort Providence) and Hay River. The BCA was expanded in 1990 to encompass all lands 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 BCA encompasses 3,936,339 ha. Bison are designated as nuisance wildlife in the BCA under section 61 of the NWT Wildlife Regulations Act (Government of the Northwest Territories 1992). This regulation stipulates that any bison sighted in the BCA may be shot by an eligible NWT hunter. The objectives of the

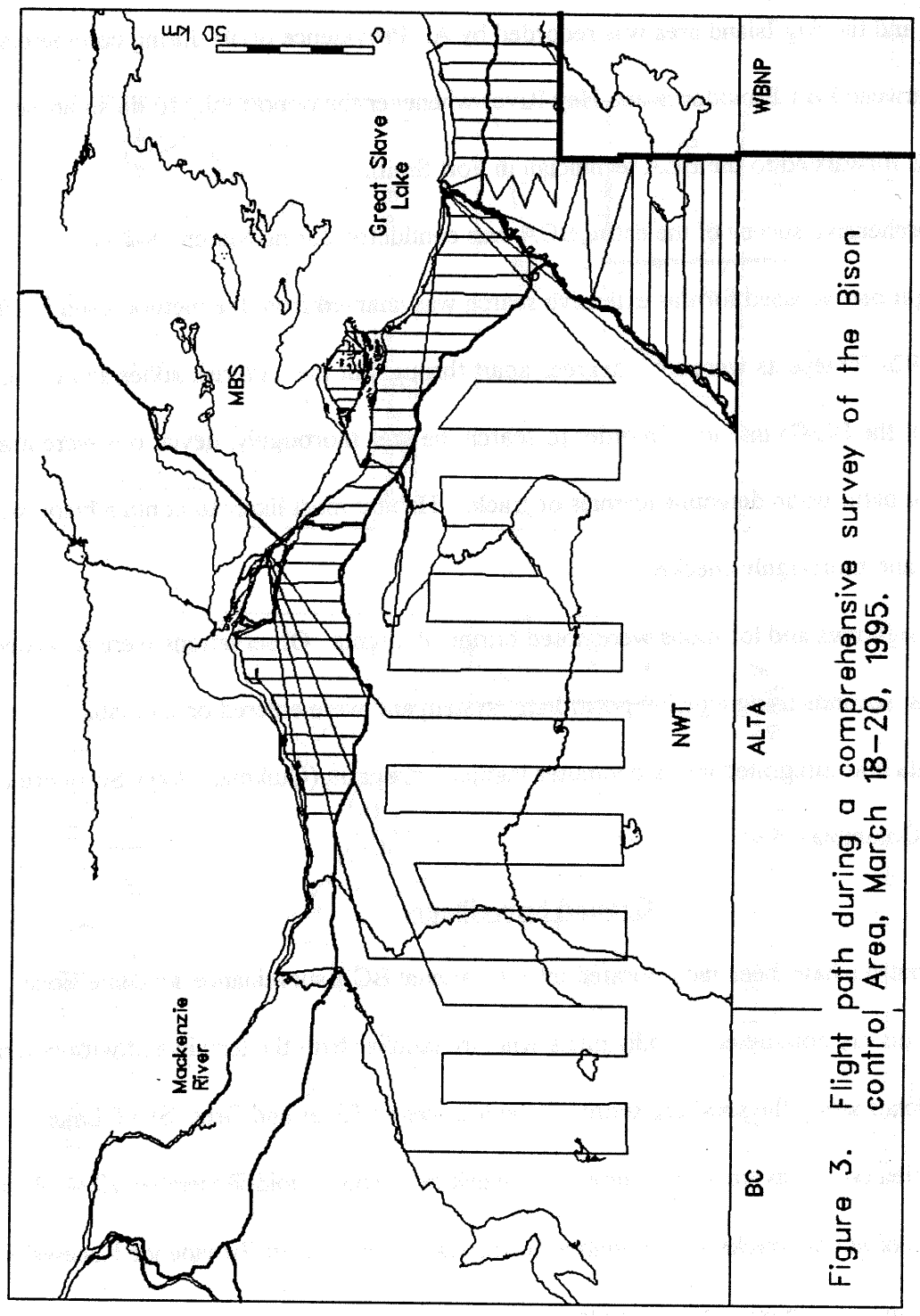


Figure 3. Flight path during a comprehensive survey of the Bison control Area, March 18–20, 1995.

Public Involvement

Communication and cooperation between communities and various agencies that deal with bison remains an important potential source of information on bison movements and detecting bison in and around the BCA. Members of the public were asked to report any bison they saw in the BCA to the Department of Renewable Resources. Signs are posted along highways at various entry points into the BCA (at the NWT/Alberta border crossing on the Mackenzie Highway, near Fort Providence and at Buffalo River) to alert travellers about the bison control program.

Wildlife management offices and First Nation's band offices situated in proximity to the BCA were contacted early in the winter to get updates on any bison sightings which may have been reported by local travellers or trappers. Communities contacted in Alberta included Assumption, High Level, and Fort Vermilion. In the NWT contact was made with people in Kakisa, Trout Lake, Liard and Fort Simpson.

RESULTS

In total, 153 hours were flown during 17 surveillance patrols in the BCA (Table 1). Of these, 33.8 hours were flown during an extensive survey in March and the remainder were flown during surveillance of the high risk area. Three short trips were also made into the interior of the BCA during routine surveillance of the high risk areas. Large mammals were regularly sighted in the BCA during aerial surveys. Locations of sightings are illustrated in Appendix A and listed in Appendix B. Moose (n=637) were the most common large mammals seen in the BCA. Woodland caribou (n=161) and wolves (n=60) were also commonly seen.

Only one bison was detected in the BCA. A lone cow was located south of the northern boundary of the BCA during a routine aerial surveillance flight on March 7 (Fig. 4).

Table 1. Summary of surveillance flights in the Bison Control Area during December 1994-March 1995.

Date	Hours Flown	Observers
Dec 14 1994	4.2	T. Chowns
Dec 20-22	12.6	R. Antoniak
Jan 9 1995	1.6	E. Krutko
Jan 12	2.0	T. Malewski
Jan 17-20	15.2	R. Antoniak/D. Bergerson
Jan 23	2.3	T. Chowns
Jan 26	1.8	T. Chowns
Jan 31-Feb 2	13.4	R. Antoniak/D. Bergerson
Feb 8	3.2	A. Helmer
Feb 14-15	13.9	R. Antoniak
Feb 24	1.4	E. Krutko/L. Antoine
Feb26-28	19.0	R. Antoniak
Mar 4-7	19.6	R. Antoniak
Mar 18-20	33.8	R. Antoniak/K. Williamson
Mar 26	3.0	T. Chowns
Mar 28	3.0	T. Chowns
Mar 30	3.0	T. Chowns
TOTAL	154.0 hrs	17 flights

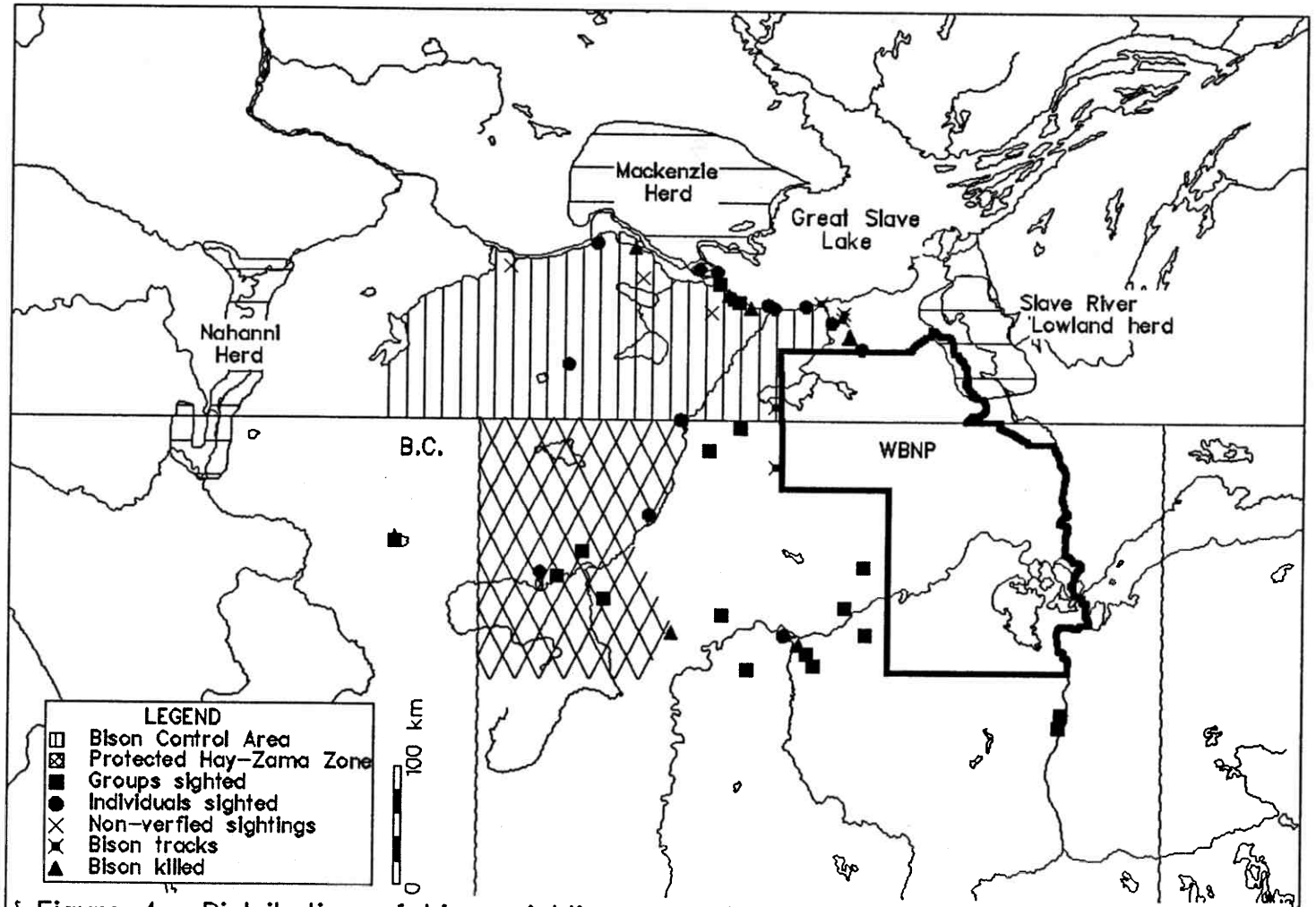


Figure 4. Distribution of bison sightings reported since 1976 in the region west of Wood Buffalo National Park and south of the Mackenzie River.

Her tracks were followed along the north shore for approximately two kilometres before they stopped and abruptly turned straight south across the Mackenzie River. The tracks continued across the highway and wandered along a fire protection line. She was found nearby in a narrow meadow. It was decided that it would be too difficult to attempt to drive the animal back across the river and two Fort Providence hunters, Walter and Charlie Landry, were contracted to track and shoot the animal.

A reconnaissance flight was made on the morning of March 8 to verify the animal's location and to allow the hunters to get a visual idea about access. The animal removed was a young cow that had several lacerations on its legs and hind quarters. The hunters suspected that it had been wounded by wolves. Although a full post-mortem evaluation was not carried out, blood samples were collected for testing and teeth were extracted for aging. Retropharyngeal lymph nodes were collected later from the head and were submitted for bacteriology and histopathology. There was no visual evidence of pathology upon gross examination of this tissue. Test results were not available at the time of writing. A decision was made to distribute the meat to dog owners as it was not suitable for human consumption.

Bison were observed along the north shore of Great Slave Lake throughout the winter (Appendix A). Distribution and herd sizes on the northern shoreline were also reported by Air Providence during commercial flights. The herd that was of particular concern throughout the winter resided on Big Island. The numbers of bison on the island fluctuated between 3 and 31 animals. A small herd of 11 was observed on a small island just off the southern shore of Big Island on January 17. When their movements were checked again on January 18 they had travelled into the interior of Big Island.

During the March 4-7 survey, a stop was made at the mouth of Tathlina Lake to speak to fishermen regarding any bison sign within the area this winter. They confirmed that no unusual signs or bison had been observed by the local people. This impromptu stop served two purposes, to gather local information and to inform the fishermen of our surveillance program within the BCA.

Thirty-five ground patrols were carried out by personnel using snowmachines (Table 2). Four individuals were hired for this purpose, two from Fort Providence and two from Hay River. Jim and Ken Thomas were hired out of Hay River and Allan Mercredi signed on as an alternate. The Hay River patrol travelled the shoreline between Hay River and the Kakisa River or to Burnt Point. Changes to the Hay River patrol staff were made in February when Ken Thomas and Alan Mercredi resigned. William Mitchell finished the February/March patrols with Jim Thomas. Daniel Squirrel and Albert Bonnetrouge were hired out of Fort Providence. They patrolled the shoreline between Fort Providence and Pointe Desmarais. Ground patrol personnel reported tracks of moose, wolves and caribou. No large mammals were actually seen during the ground patrols.

Reports concerning bison putatively sighted by members of the public in the BCA were received on three occasions. On January 12 a report was relayed from the Fort Simpson Renewable Resources Office of an apparent sighting of 6 bison on the Mackenzie River near the mouth of the Redknife River. A plane was dispatched from Fort Providence to search the area. No animals or tracks were located and it is believed that the sighting was a result of shadows from ice ridge formations on the river. On February 8, Art Look of Fort Providence phoned in to convey a message that Ted Landry's son, also of Fort Providence, had spotted bison crossing Mills Lake and they were heading in a southerly direction. Al Helmer, RRO II in Hay River, flew to the area to investigate. No animals were sighted. Tracks and cratering signs were apparent but only along the

Table 2. Summary of the ground patrols in the Bison Control Area during December1994-March 1995.

Date	Trip Origin	Patrol Personnel
Dec 14-16	HY	J. Thomas
Dec 19-22	JP	D. Squirrel
Dec 20-22	HY	J. Thomas
Dec 22-24	JP	A. Bonnetrouge
Jan 05-07	JP	A. Bonnetrouge
Jan 03-06	JP	D. Squirrel
Jan 10-13	JP	D. Squirrel/A. Bonnetrouge
Jan 11-13	HY	J. Thomas
Jan 16-20	JP	D. Squirrel
Jan 18-20	JP	A. Bonnetrouge
Jan 18-20	HY	J. Thomas/K. Thomas/A. Mercredi
Jan 23-25	JP	A. Bonnetrouge
Jan 23-27	JP	D. Squirrel
Jan 24-26	HY	J. Thomas/K. Thomas/A. Mercredi
Jan 31-Feb 02	JP	D. Squirrel
Jan 31-Feb 03	HY	J. Thomas
Feb 01-03	JP	A. Bonnetrouge
Feb 06-09	JP	D. Squirrel
Feb 08-10	JP	A. Bonnetrouge
Feb 13-15	JP	A. Bonnetrouge
Feb 13-17	JP	D. Squirrel
Feb 20-24	JP	D. Squirrel
Feb 22-24	HY	J. Thomas/W. Michell
Feb 21-23	JP	A. Bonnetrouge
Feb 27-Mar 03	JP	A. Bonnetrouge/D. Squirrel
Mar 06-08	JP	A. Bonnetrouge
Mar 06-10	JP	D. Squirrel
Mar 07-09	HY	J. Thomas/W. Michell
Mar 13-17	JP	D. Squirrel
Mar 14-16	JP	A. Bonnetrouge
Mar 20-24	JP	D. Squirrel
Mar 27-30	HY	J. Thomas/W. Michell
Mar 22 -24	JP	A. Bonnetrouge

north shoreline near Raspberry Point. No tracks led south, nor were tracks found on the southern shore of the Mackenzie River. Information was also obtained from Raff Smith of Hay River, on February 27 of a possible sighting of 6 bison on Six Mile Creek near Hay River seen by Kole Crook of Hay River in early January. The area was thoroughly searched using a grid flight pattern on February 28. No bison tracks or cratering signs were found although the area did hold a high density of moose. The Hay River Renewable Resources Office was contacted regarding this information. They had not received any official report, nor had they received word of bison in the vicinity from ground patrol personnel or other local residents. This area was searched intensively on subsequent surveillance flights.

A bison was harvested by a General Hunting License holder on October 13, 1994 near the eastern boundary of the BCA (Fig. 4). Blood and tissue samples were collected and sent to the Health of Animals Laboratory in Saskatoon for disease testing. Serology, bacteriology, and histopathology failed to detect evidence of brucellosis or tuberculosis.

People contacted in communities surrounding the BCA had no information on bison within or close to the BCA. However, all were willing to forward any future bison sightings and information. Jackie Gerwing, an Alberta Fish and Wildlife officer from High Level, provided current information on the distribution of the disease-free Hay/Zama Lakes wood bison herd near Assumption (Fig. 4). She also informed us that no bison had been seen by commercial fishermen operating on Bistcho Lake near the NWT/Alberta border.

Bison have been sighted on a regular basis in the Wentzel Lake area near the western boundary of WBNP and one was sited along the Wabasca River southwest of John D'or Prairie as reported by Trevor Miller, a wildlife officer in Fort Vermilion.

Throughout the course of the BCA project Parks Canada in Fort Smith was kept informed of aerial surveillance plans and any occurrences within the BCA. Their staff also took part in two surveillance flights on February 1st and February 15th.

DISCUSSION

The bison control program was established in 1987 and the area was expanded in 1990 to reduce the risk of disease transmission to the Mackenzie and Nahanni bison herds from bison populations in WBNP that are infected with bovine brucellosis and tuberculosis. Bison may move into the BCA from a number of sources, including populations in Wood Buffalo National Park, the Mackenzie herd, the Nahanni herd, the Hay/Zama herd, and from remnant herds in northern Alberta.

Bison dispersal is known to occur by two mechanisms, innate or random diffusion, and density dependent pressure-threshold dispersal (Gates and Larter 1990). Adult males tend to disperse in a random fashion, even when populations are at a low density, moving as individuals or in small groups into unoccupied habitat. This explanation is consistent with the pattern of scattered observations of single or small groups of bison in northern Alberta and the southern Northwest Territories (Fig. 4). Females are rarely found as singles, rather they tend to disperse in herds, it is believed largely in response to intraspecific competition for food. Both mechanism are operating in the Mackenzie bison range. High grazing pressure is evident in the core of the bison range where in 1990 and 1991, two thirds of annual forage production at Falaise Lake was grazed during the summer (Larter 1994).

Most bison found in the BCA have been males (Gates et al. 1992). The cow that was shot in 1995 likely was seeking refuge after being wounded by wolves and thus can be considered as an anomaly. However, a cow and calf were seen on another occasion in 1992 (Fig. 4).

Since the rate of emigration by either mechanism is a function of population size, the most significant potential source of immigrants into the BCA is the largest population, the Mackenzie herd. The rate of emigration is exacerbated by intraspecific competition for food. The Department of Renewable Resources is attempting to decrease grazing pressure through a habitat enhancement program using prescribed burning to increase the area and quality of meadows available to bison in the Fort Providence area.

In order to best achieve the goal of preventing the spread of diseases, it is crucial that park bison entering the BCA be eliminated and that the Mackenzie herd not be allowed to disperse south of the Mackenzie River. Since the pattern of range use has encompassed riparian meadows along the north shoreline of the Mackenzie river, intensive surveillance of the high risk zone of the BCA is necessary. This area was again heavily utilized this past winter by several herds, particularly the stretch of shoreline between Fort Providence and Slave Bay.

The shores of the Mackenzie generally flood each spring and this process naturally rejuvenates the vegetation. As water levels recede in the summer, lush sedge and grass swards are exposed and become attractive winter range. Several islands south of Big Island have similar riparian habitat, as do small sections of the southern Mackenzie River shoreline. This configuration of habitat patches thus creates a stepping stone effect and a corridor for bison to wander to the southern shore. Bison resided on Big Island for most of the winter and were spotted on 8 of the 10 flights flown over this area between December 14 and March 31.

Bison may cross the frozen Mackenzie River or Great Slave Lake at many locations where the ice surface is smooth. For example, in 1992, 11 bison crossed an expanse of 40 km of lake ice between Moose Point and Pointe du Roche. The single incident involving a bison crossing the

Mackenzie River in 1995 occurred near Fort Providence. The animal had an easy passage as this section of river had relatively smooth ice. Similar ice conditions formed in the South Channel amidst the islands below Big Island, but no bison crossed at this location.

Public information remains a vital method of obtaining information on the occurrence of bison in the BCA, despite the fact that not all reports lead to confirmed sightings. The importance of public support cannot be over-emphasized. Concerns with possible bison sightings were reported by members of the public on three occasions despite the fact there was limited advertising of the program.

We believe that the effectiveness of the 1994/95 BCA program was improved over previous years by the existence of an operational plan (Appendix E). The plan provided a clear framework for conducting surveillance patrols and systematically recording activities and observations. Good communication between WBNP personnel and the Department resulted in an effective working relationship between the two agencies.

RECOMMENDATIONS

1. Bison were not found in the BCA during the extensive survey conducted in March 1995. Nevertheless, surveys such as this one should be conducted to confirm that bison are **not present** in the BCA. The absence of bison should not be assumed.
2. The BCA technician should be trained to conduct post-mortem evaluation, including proper blood collection, tissue collection, recognizing gross pathology, and applied anatomy emphasizing organ structures and harvesting key lymph nodes.
3. The BCA technician should carry a prepared post-mortem sampling kit.
4. In so far as it would be possible, continuity of personnel from year to year is desirable. Once

trained in survey methods and post-mortem evaluation, the BCA technician becomes a valuable asset to the effectiveness and efficiency of the program.

5. Publicity was lacking in 1994/95. Advertisements are an indispensable means of obtaining public awareness and involvement and should be published annually.
6. Surveillance of the northern shore of the Mackenzie River between Mills Lake and Big Island should be included in routine monitoring flights, but not in ground patrols.
7. Ground patrol personnel should be trained in post-mortem evaluation methods.
8. Clearly, ground patrols are of limited effectiveness for detecting large mammals in the BCA and represent an inefficient use of funding. Ground patrols should be restricted to investigating reports or observations of suspicious signs seen from the air or of bison reported by the public or made during aerial reconnaissance. Ground patrol personnel should be prepared to kill any bison they encounter in the BCA.
9. Rather than solely participating in ground patrols, community involvement in aerial surveillance should be increased.

ACKNOWLEDGMENTS

Several individuals aided in the field work for the 1994-95 bison control area program. Without their support and dedicated efforts the operation would not have run so smoothly. Office staff in Hay River, Fort Smith and Fort Providence diligently handled administration aspects such as staffing, filing and pay records. Wildlife officers from Hay River and Fort Providence assisted on aerial surveillance flights when possible and shared their concerns and advice for continued success in future BCA management.

The GNWT's gratitude is also extended to all ground patrol members for their search efforts for bison along the southern Mackenzie shoreline during the 1994-95 season and to the two hunters involved in the March 7-8 bison removal.

Special thanks to Tom Chowns and Brett Elkin for their consultation during the bison removal process March 7-8, to Evelyn Krutko for her constant help throughout each visit to Fort Providence, and to Ted Malewski who piloted most of the flights in the BCA.

PERSONAL COMMUNICATIONS

Gerwing, Jacki	Fish and Wildlife, High Level, Alberta
Miller, Trevor	Fish and Wildlife, Fort Vermilion

LITERATURE CITED

Bison Disease Task Force. 1988. Evaluation of brucellosis and tuberculosis in northern Canada. Agriculture Canada and Parks Canada, Ottawa.

EARP. 1990. Northern diseased bison: report of the environmental assessment panel. Federal Environmental Assessment Review Office, Ottawa.

Gates, C.C., B. Elkin, L. Kearey, and T. Chowns. 1992. Surveillance of the bison free management area, Jan-Jun 1992. NWT Dept of Renewable Resources Manuscript Report No. 65.

Gates, C.C. and S. Gray. 1992. Surveillance of the bison free management area, NWT. NWT Dept. of Renewable Resources Manuscript Report No. 50.

Gates, C.C., T. Chowns, and H. Reynolds. 1992. Wood buffalo at the crossroads. In Foster, J., D. Harrison, I.S. McLaren and B. Champion, (eds.), Buffalo, Univ. of Alberta Press: pp. 137-165.

Government of the Northwest Territories. Dept. of Renewable Resources: NWT Wildlife Act. Section 61 (August 10, 1992), Yellowknife.

Larter, N.C. 1994. Plant-Herbivore Dynamics Associated with an Erupting Ungulate Populations:A Test of Hypotheses. Ph.D. Thesis. University of British Columbia. 136 p.

Larter, N.C. and Gates, C.C. 1990. Home ranges of wood bison in an expanding population. J. Mammalogy. 71(4) : 604-607.

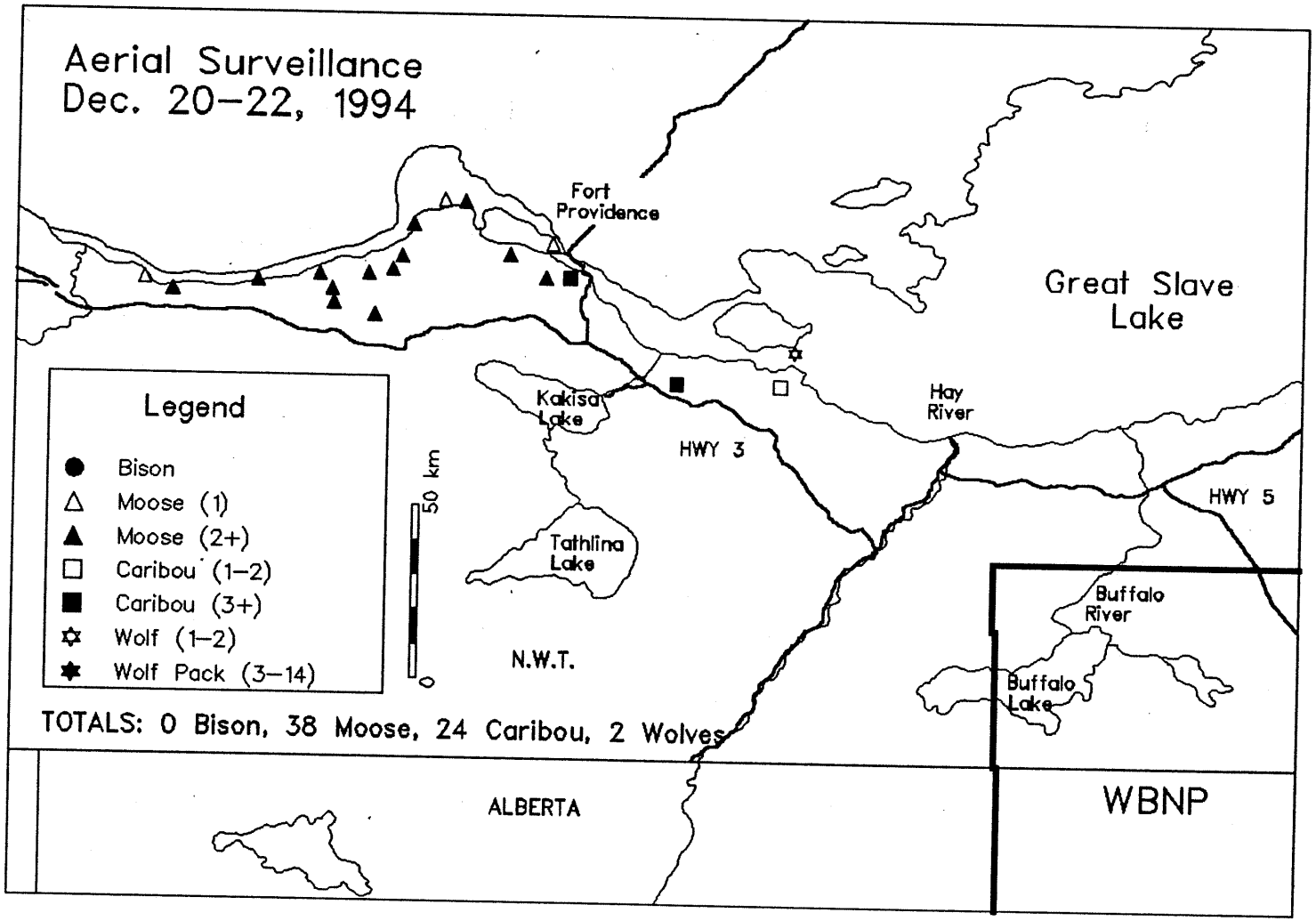
Tessaro, S.V., L.B. Forbes and C. Turcotte. 1990. A survey of brucellosis and tuberculosis in bison in and around Wood Buffalo National Park, Canada. Can. Vet. J. 31: 174-180.

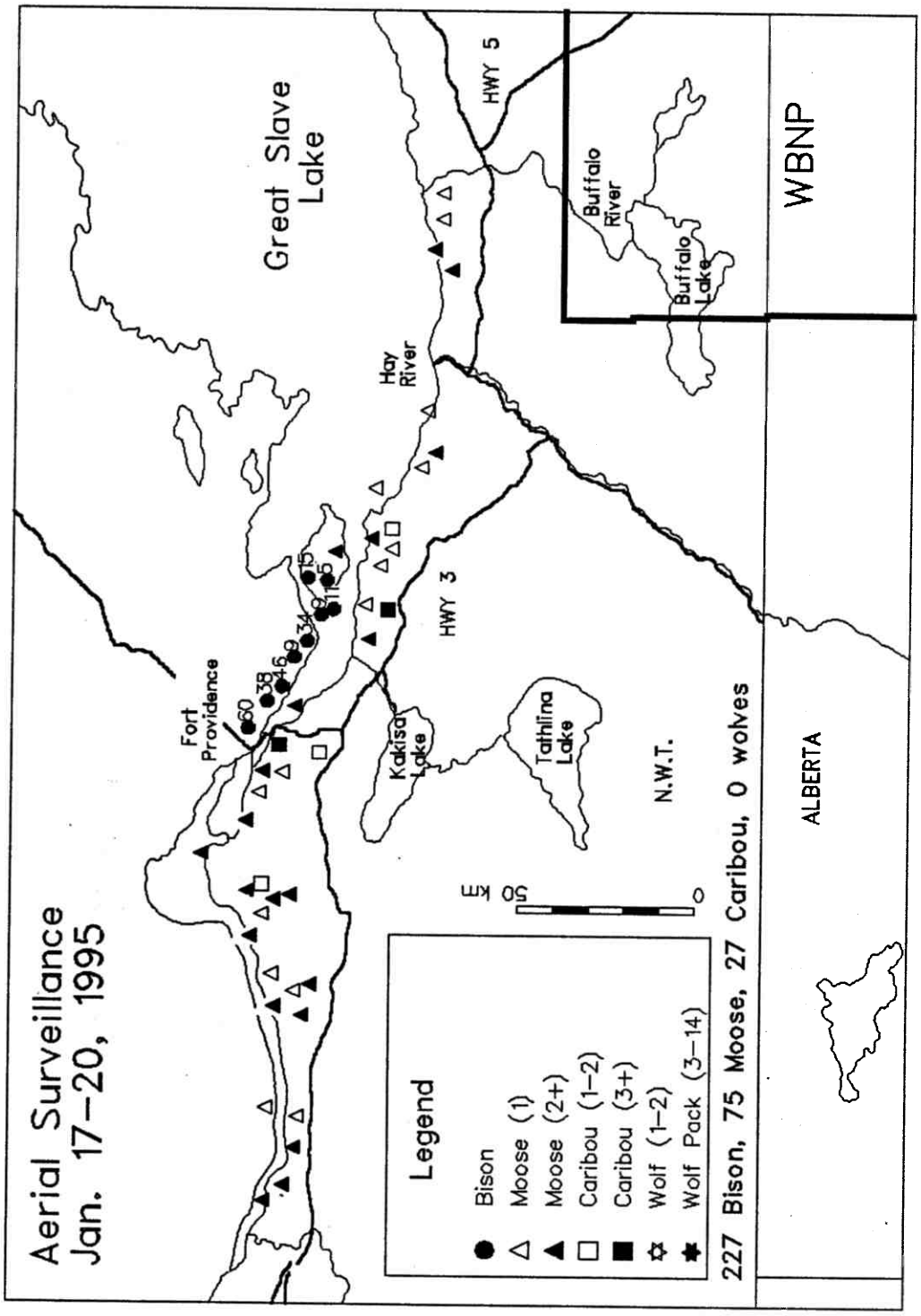
Tessaro, S.V., C.C. Gates, and L.B. Forbes. 1993. The brucellosis and tuberculosis status of wood bison in the Mackenzie Bison Sanctuary, NWT Canada. Can J Vet Res: pp. 231-235.

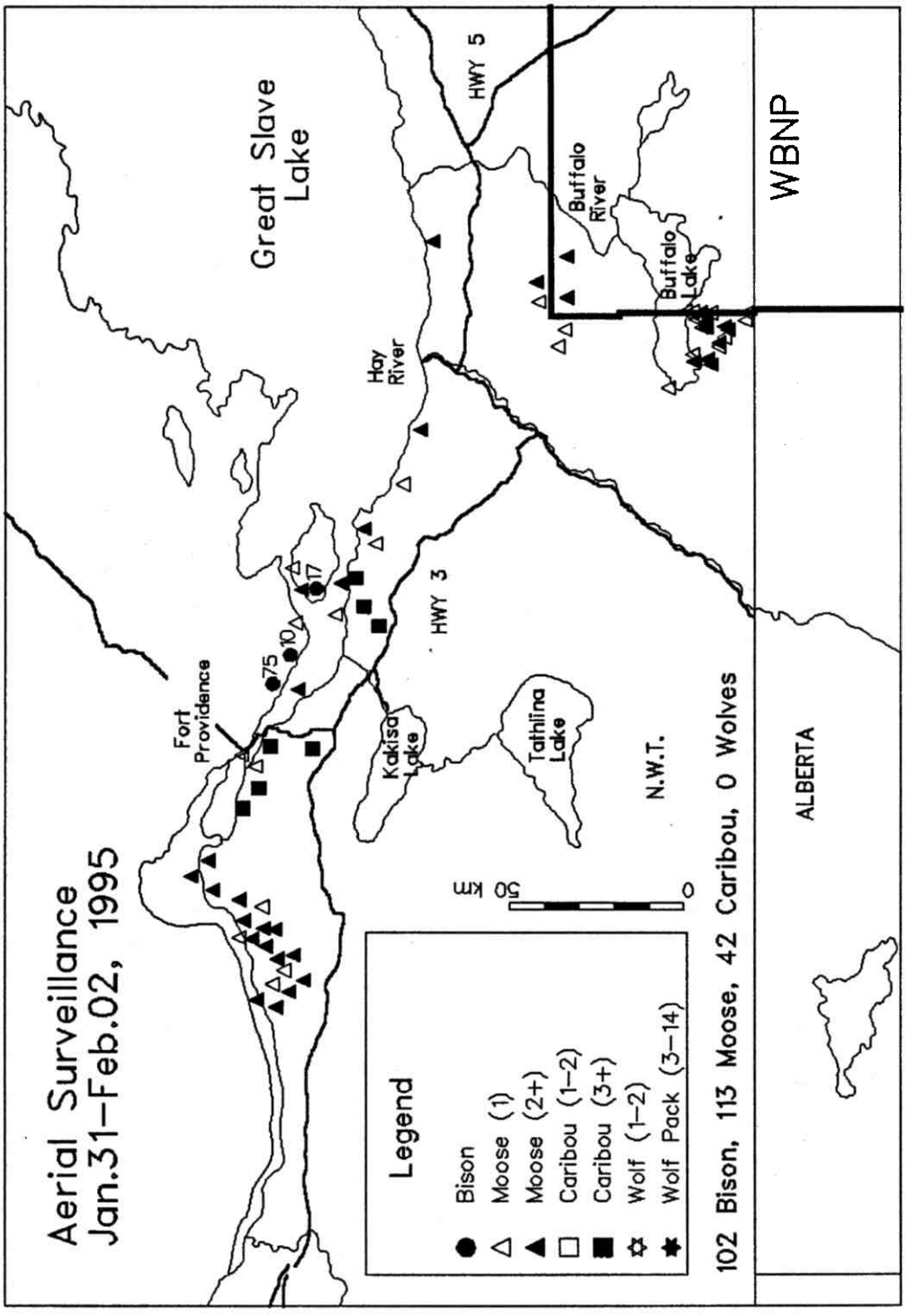
Wobeser, G. 1992. Disease in northern bison: what to do? A personal perspective. in Foster, J., D. Harrison, I.S. McLaren and B. Champion, (eds.), Buffalo, Univ. of Alberta Press: pp. 179-188.

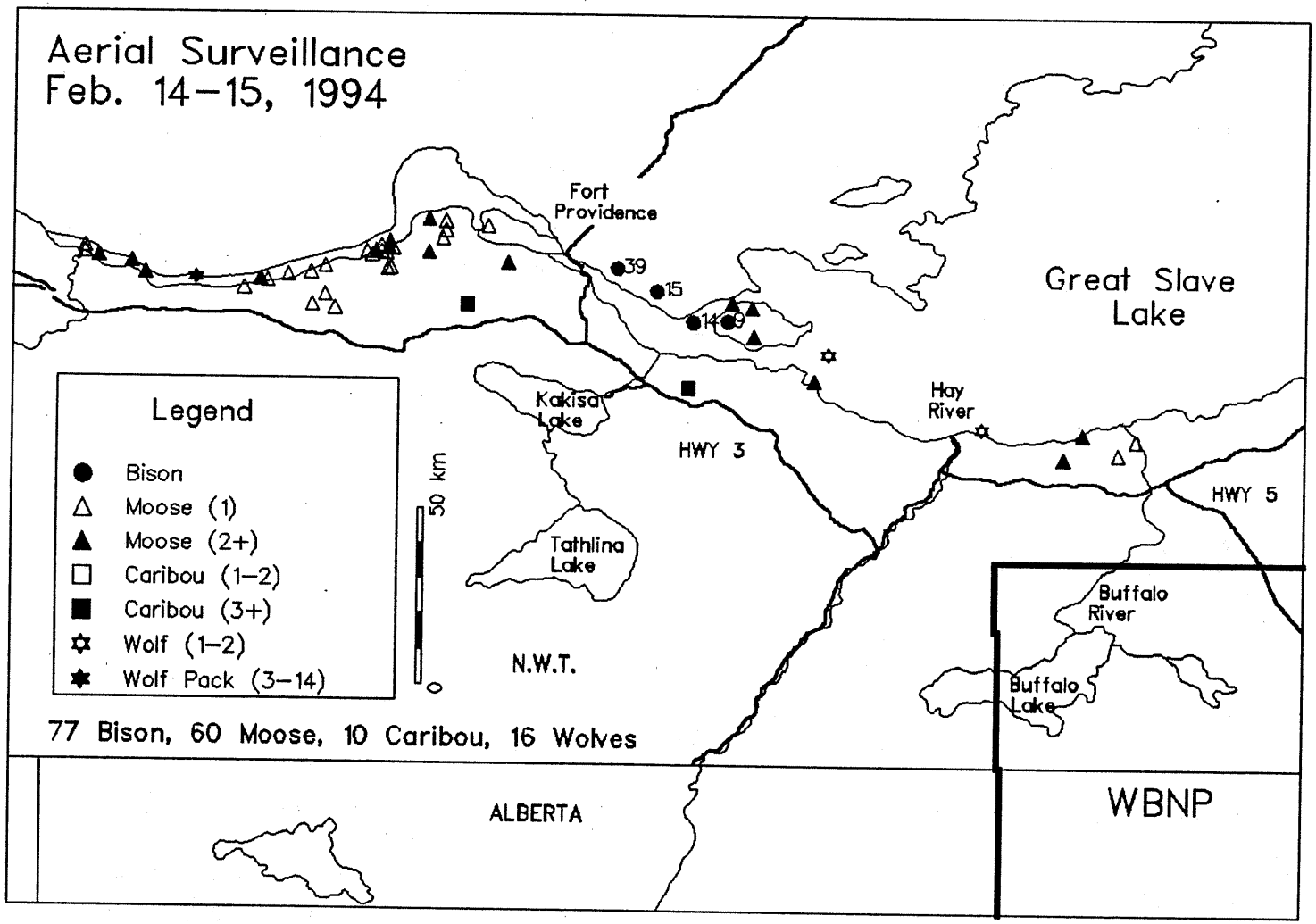
APPENDIX A

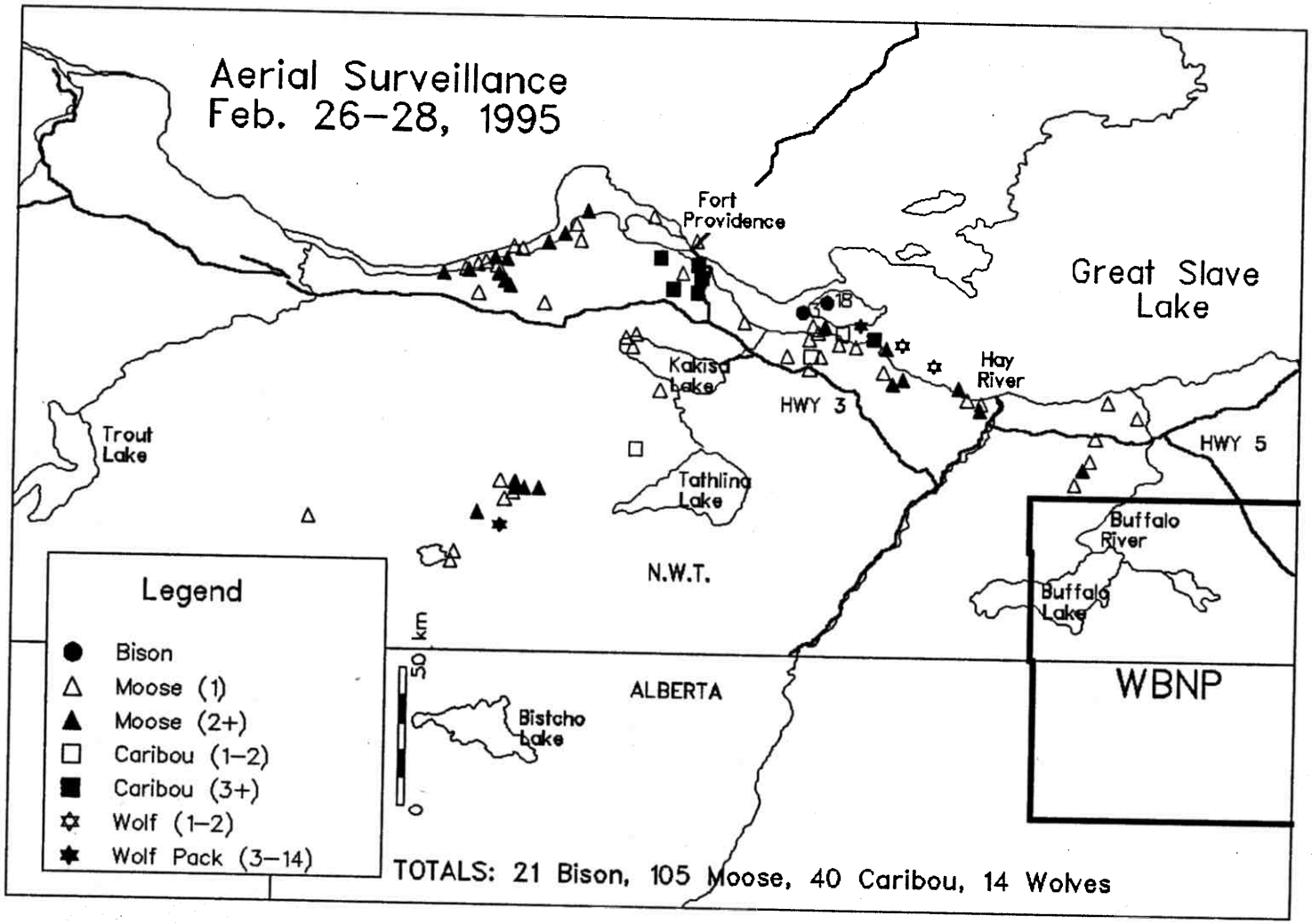
Observations of large mammals made during aerial surveillance in the Bison Control Area during December 1994 - March 1995

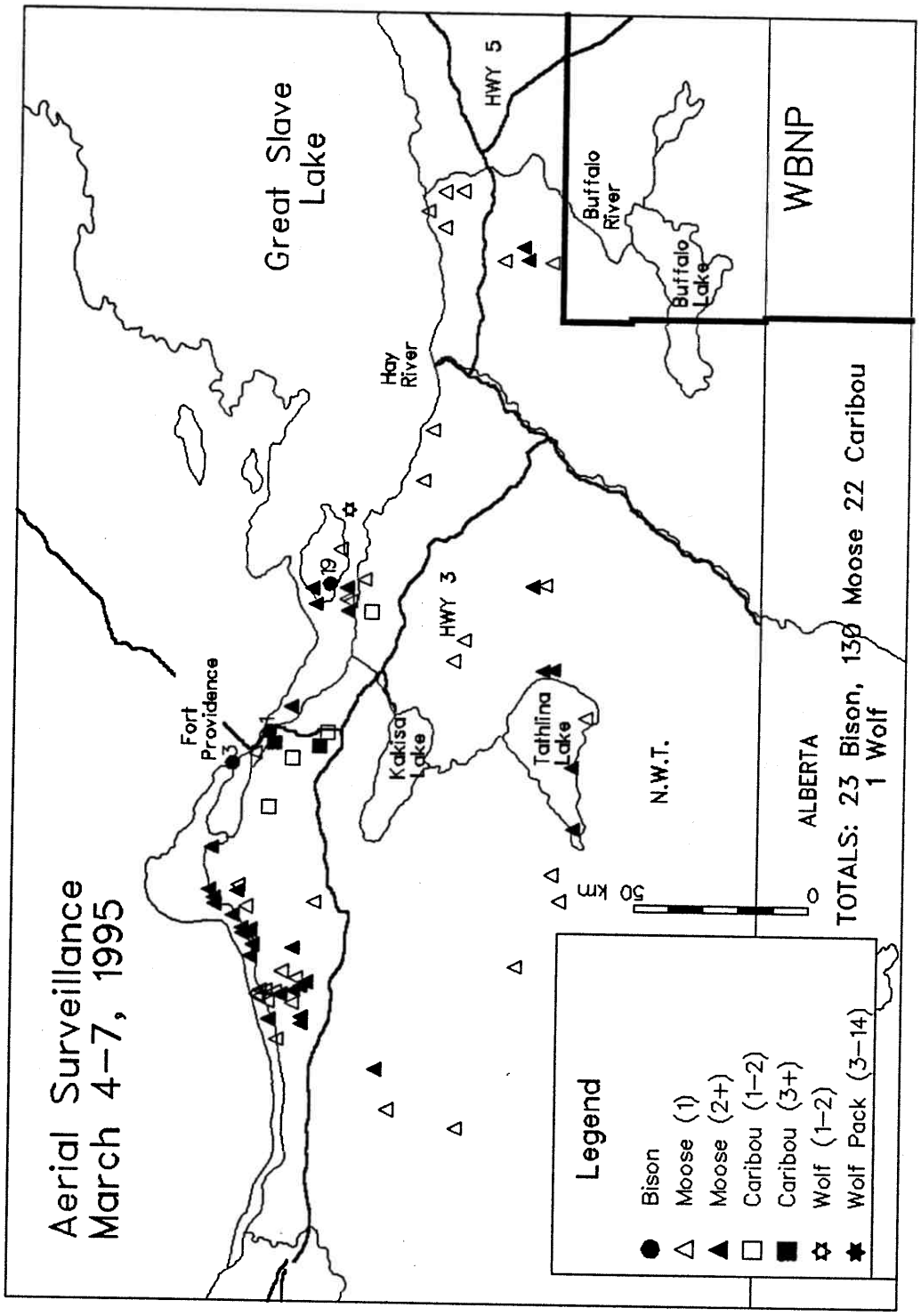

Aerial Surveillance
Dec. 20–22, 1994
Fort Providence
Great Slave Lake
Kakisa Lake
HWY 3
Hay River
HWY 5
Tathlina Lake
Buffalo River
Buffalo Lake
N.W.T.
ALBERTA
WBNP
Legend
Bison
Moose (1)
Moose (2+)
Caribou (1–2)
Caribou (3+)
Wolf (1–2)
Wolf Pack (3–14)
50 km
0
TOTALS: 0 Bison, 38 Moose, 24 Caribou, 2 Wolves

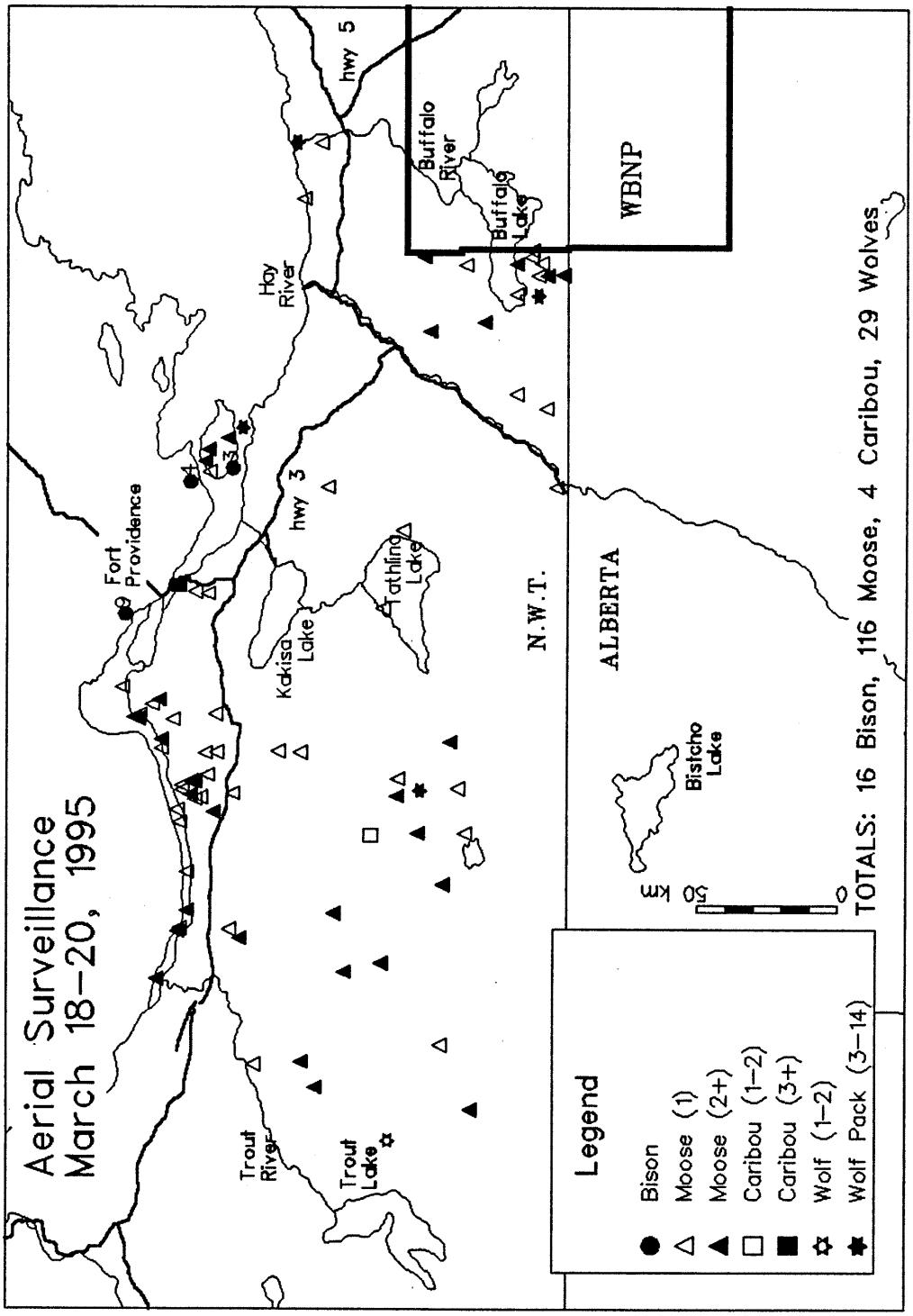

Aerial Surveillance
Jan. 17–20, 1995
Great Slave Lake
HWY 5
Buffalo River
Buffalo Lake
WBNP
Hay River
HWY 3
Fort Providence
Kakisa Lake
Tathlina Lake
N.W.T.
ALBERTA
50 km
0
60
38
46
9
34
8
11
5
15
Legend
Bison
Moose (1)
Moose (2+)
Caribou (1–2)
Caribou (3+)
Wolf (1–2)
Wolf Pack (3–14)
227 Bison, 75 Moose, 27 Caribou, 0 wolves

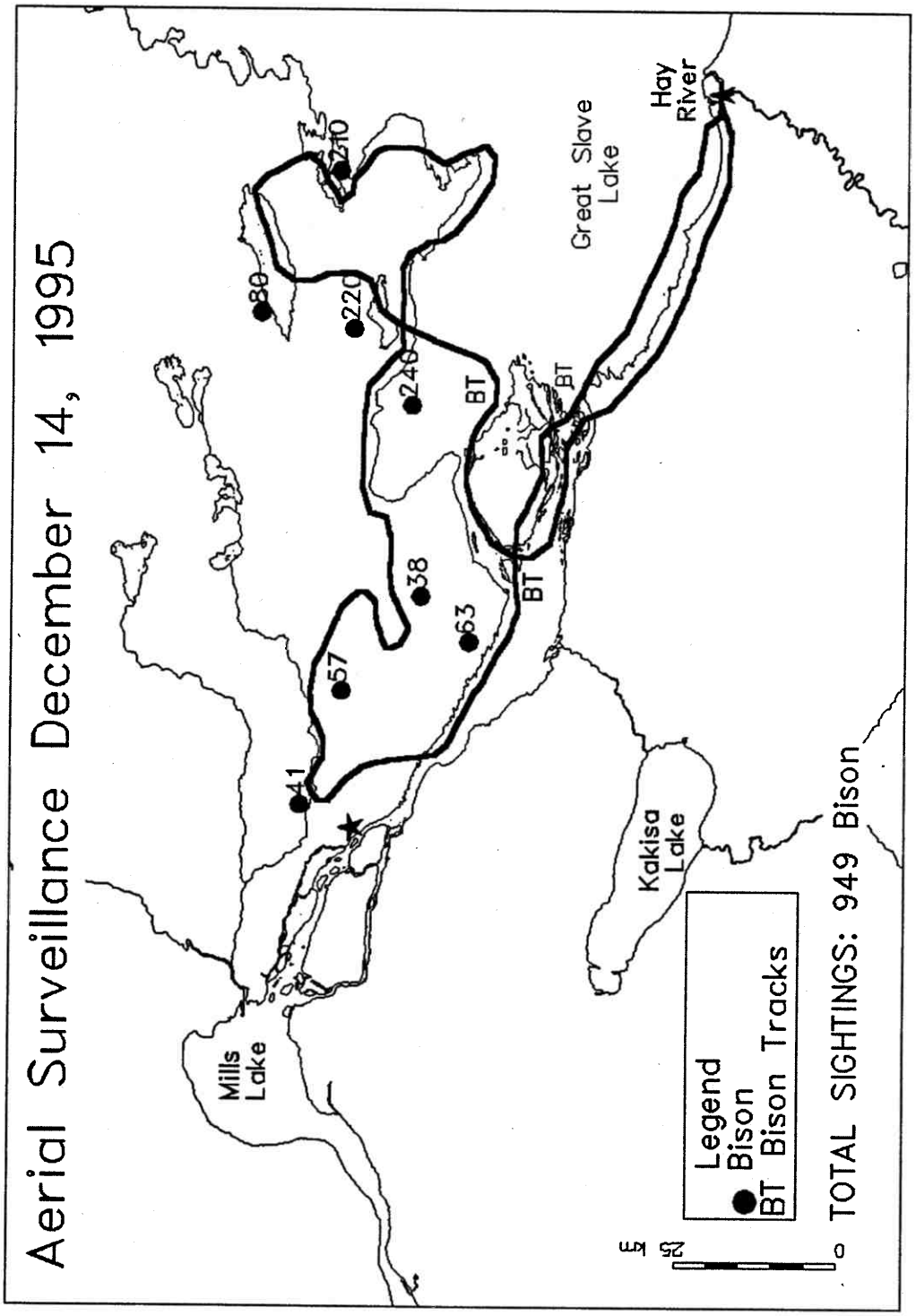

Aerial Surveillance
Jan.31–Feb.02, 1995
Great Slave Lake
Fort Providence
Hay River
HWY 5
HWY 3
Buffalo River
Buffalo Lake
Kakisa Lake
Tathlina Lake
N.W.T.
ALBERTA
WBNP
75
10
17
50 km
0
Legend
Bison
Moose (1)
Moose (2+)
Caribou (1–2)
Caribou (3+)
Wolf (1–2)
Wolf Pack (3–14)
102 Bison, 113 Moose, 42 Caribou, 0 Wolves

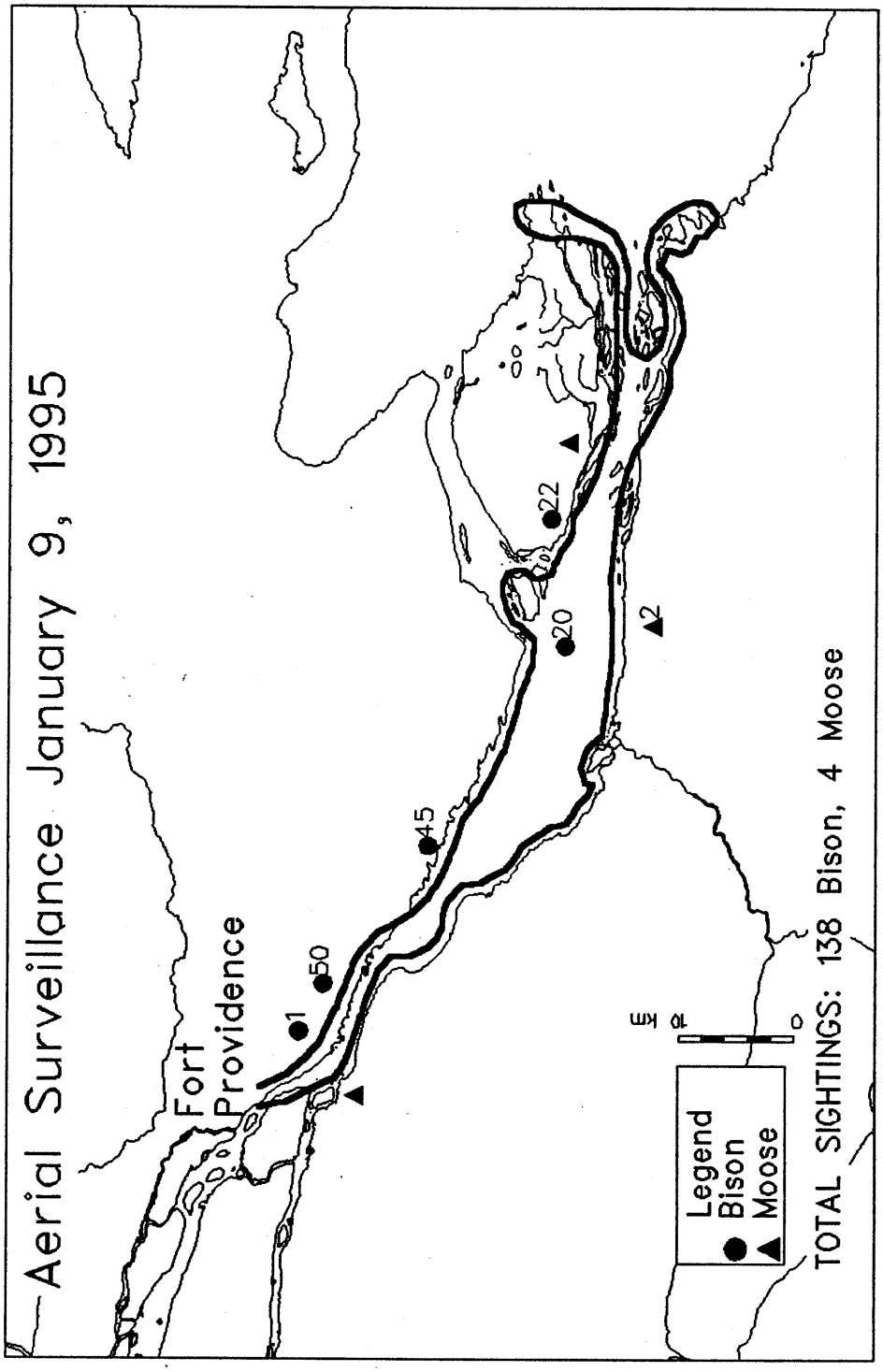

Aerial Surveillance
Feb. 14–15, 1994
Fort Providence
39
15
14
9
Great Slave Lake
Kakisa Lake
HWY 3
Hay River
HWY 5
Tathlina Lake
Buffalo River
Buffalo Lake
Legend
Bison
Moose (1)
Moose (2+)
Caribou (1–2)
Caribou (3+)
Wolf (1–2)
Wolf Pack (3–14)
50 km
0
N.W.T.
77 Bison, 60 Moose, 10 Caribou, 16 Wolves
ALBERTA
WBNP

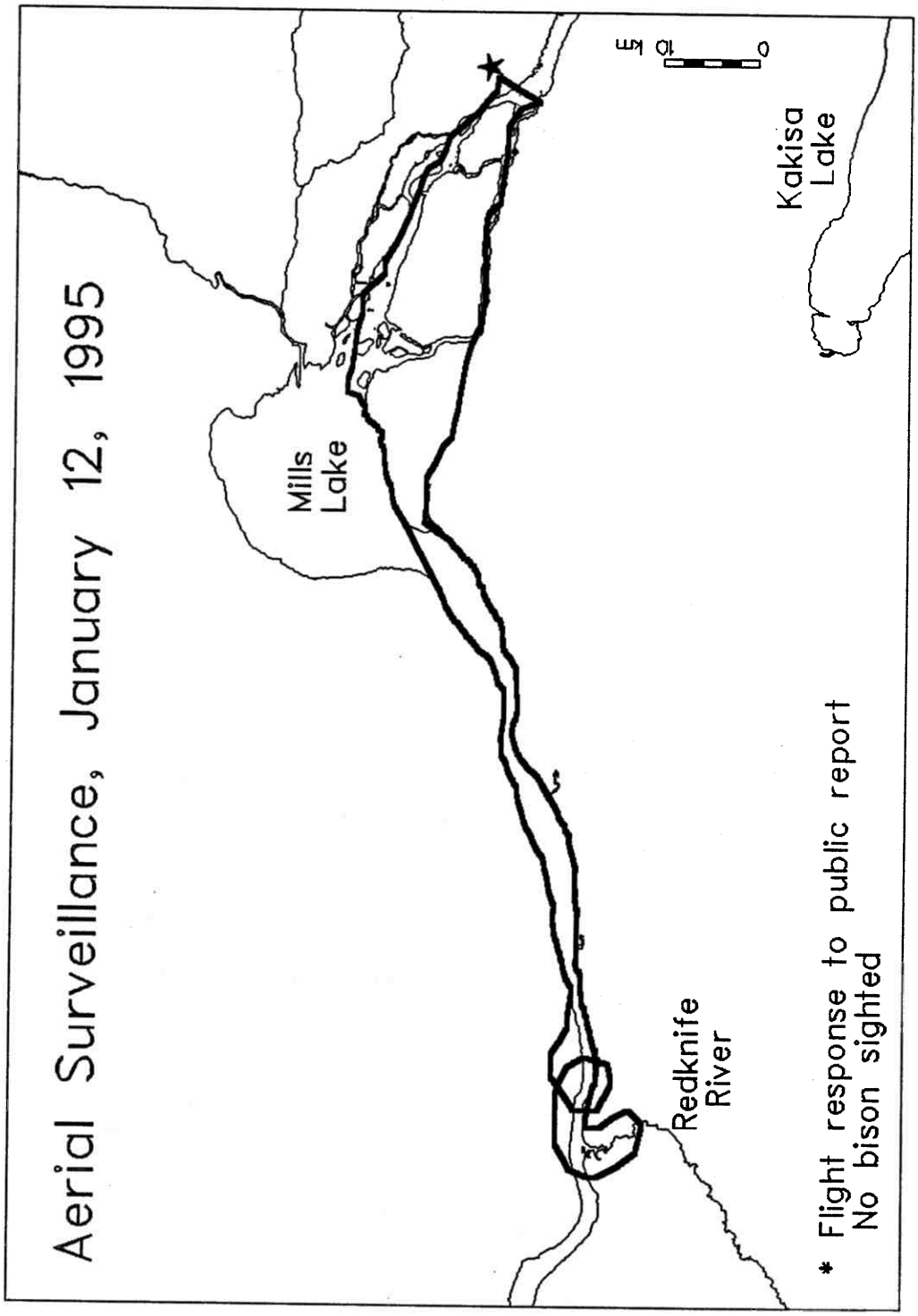

Aerial Surveillance
Feb. 26–28, 1995
Fort Providence
Great Slave Lake
18
Kakisa Lake
Hay River
HWY 3
HWY 5
Trout Lake
Tathlina Lake
N.W.T.
Buffalo River
Buffalo Lake
WBNP
ALBERTA
Bistcho Lake
Legend
Bison
Moose (1)
Moose (2+)
Caribou (1–2)
Caribou (3+)
Wolf (1–2)
Wolf Pack (3–14)
km
50
0
TOTALS: 21 Bison, 105 Moose, 40 Caribou, 14 Wolves

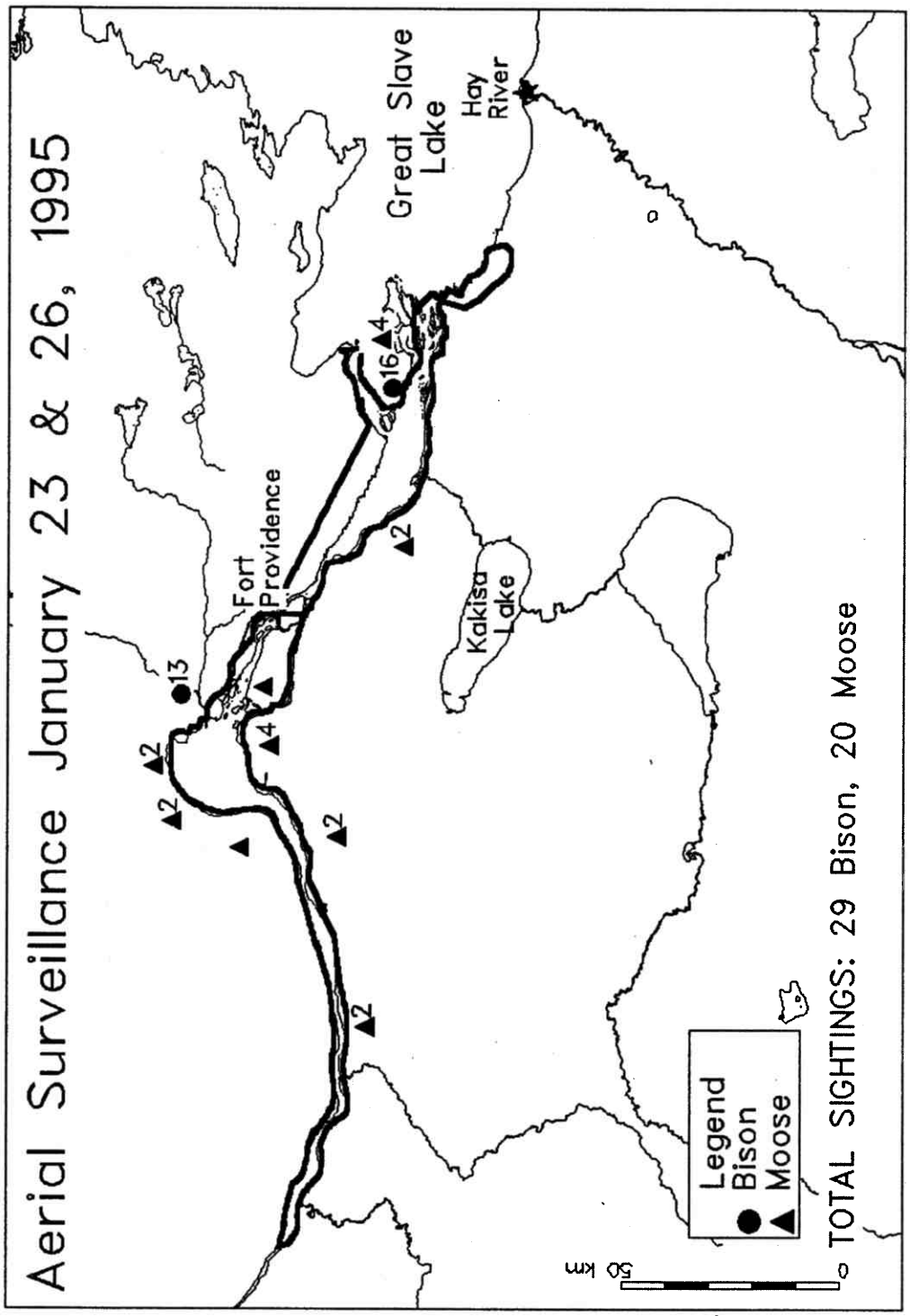


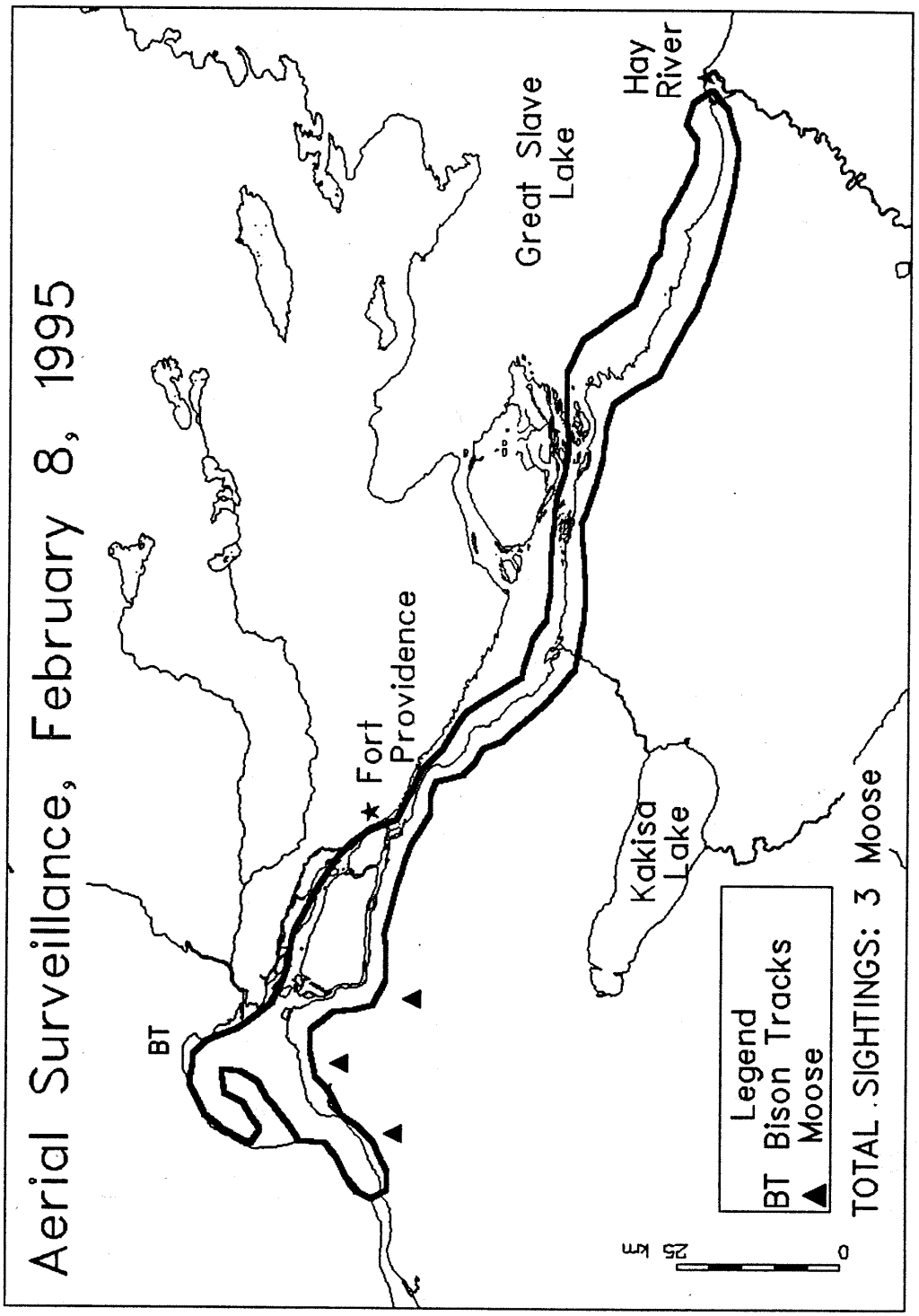

Aerial Surveillance
March 18–20, 1995
Fort Providence
Hay River
hwy 5
hwy 3
Buffalo River
Buffalo Lake
WBNP
Kakisa Lake
Tathlina Lake
N.W.T.
ALBERTA
Bistcho Lake
Trout River
Trout Lake
50 km
0
Legend
Bison
Moose (1)
Moose (2+)
Caribou (1–2)
Caribou (3+)
Wolf (1–2)
Wolf Pack (3–14)
TOTALS: 16 Bison, 116 Moose, 4 Caribou, 29 Wolves

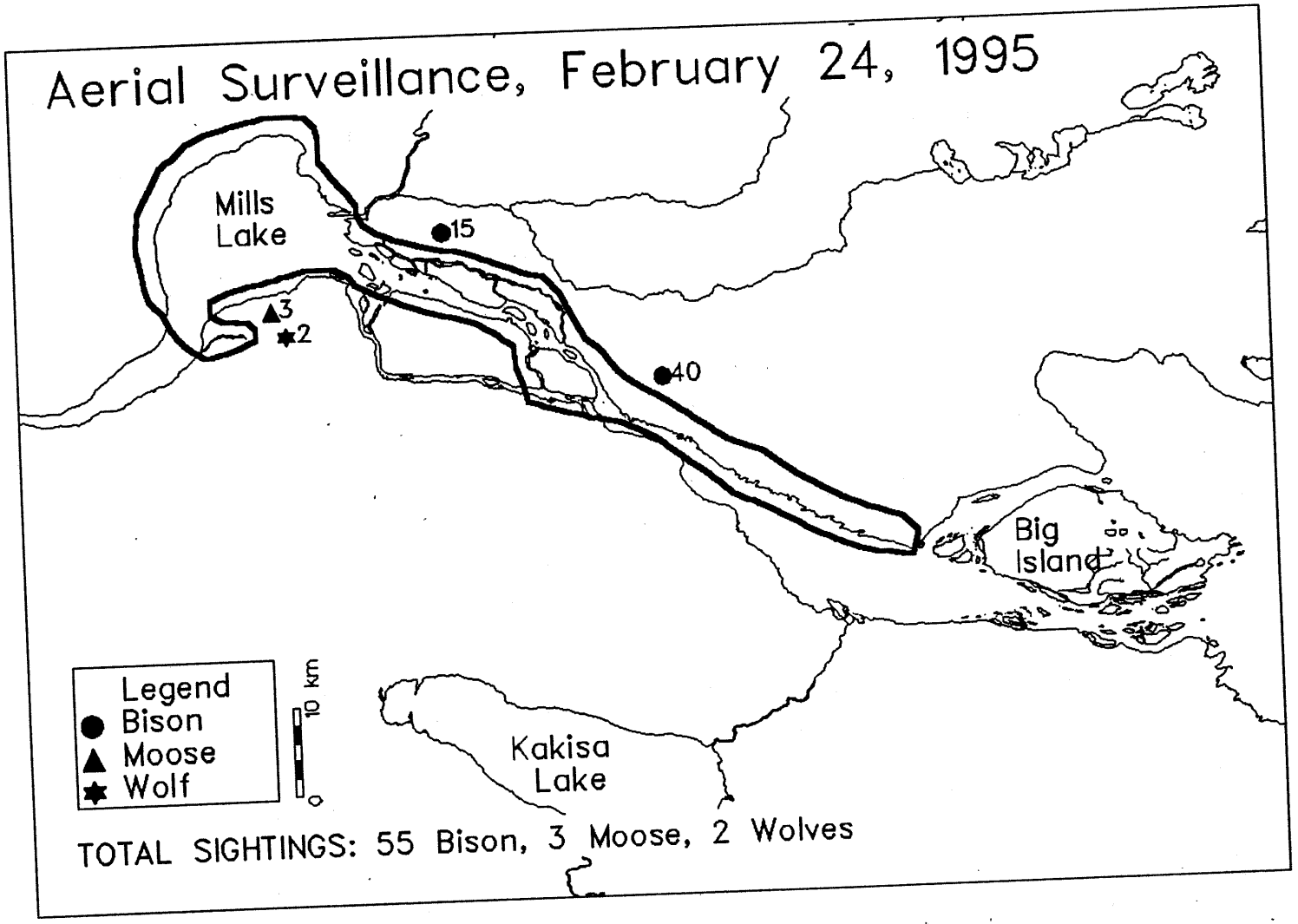

Aerial Surveillance December 14, 1995
Mills Lake
Kakisa Lake
Great Slave Lake
Hay River
41
57
38
63
80
220
240
210
BT
BT
BT
Legend
Bison
BT Bison Tracks
0
25
50 km
TOTAL SIGHTINGS: 949 Bison

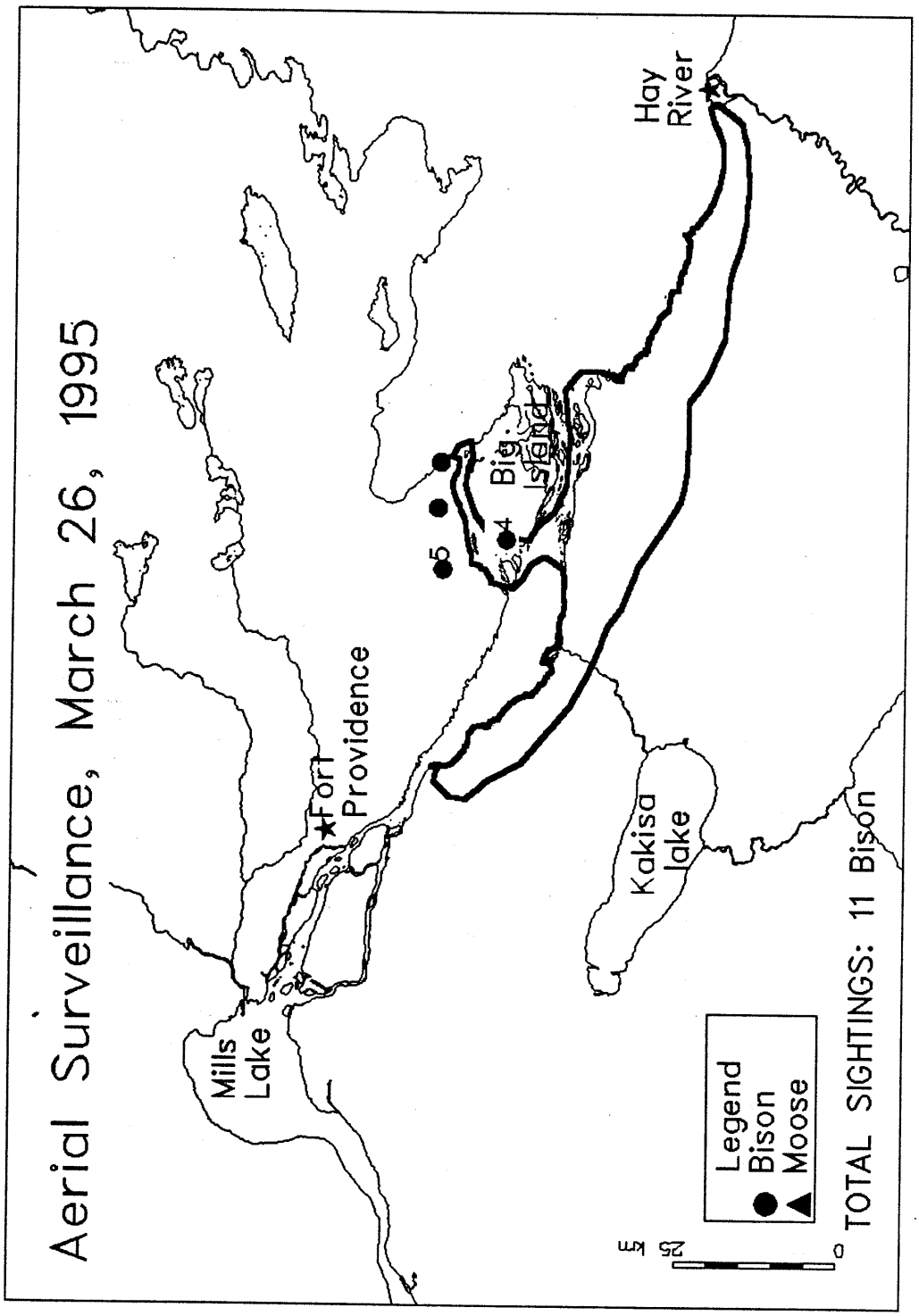

Aerial Surveillance January 9, 1995
Fort Providence
1
50
45
20
22
2
0
10 km
Legend
Bison
Moose
TOTAL SIGHTINGS: 138 Bison, 4 Moose

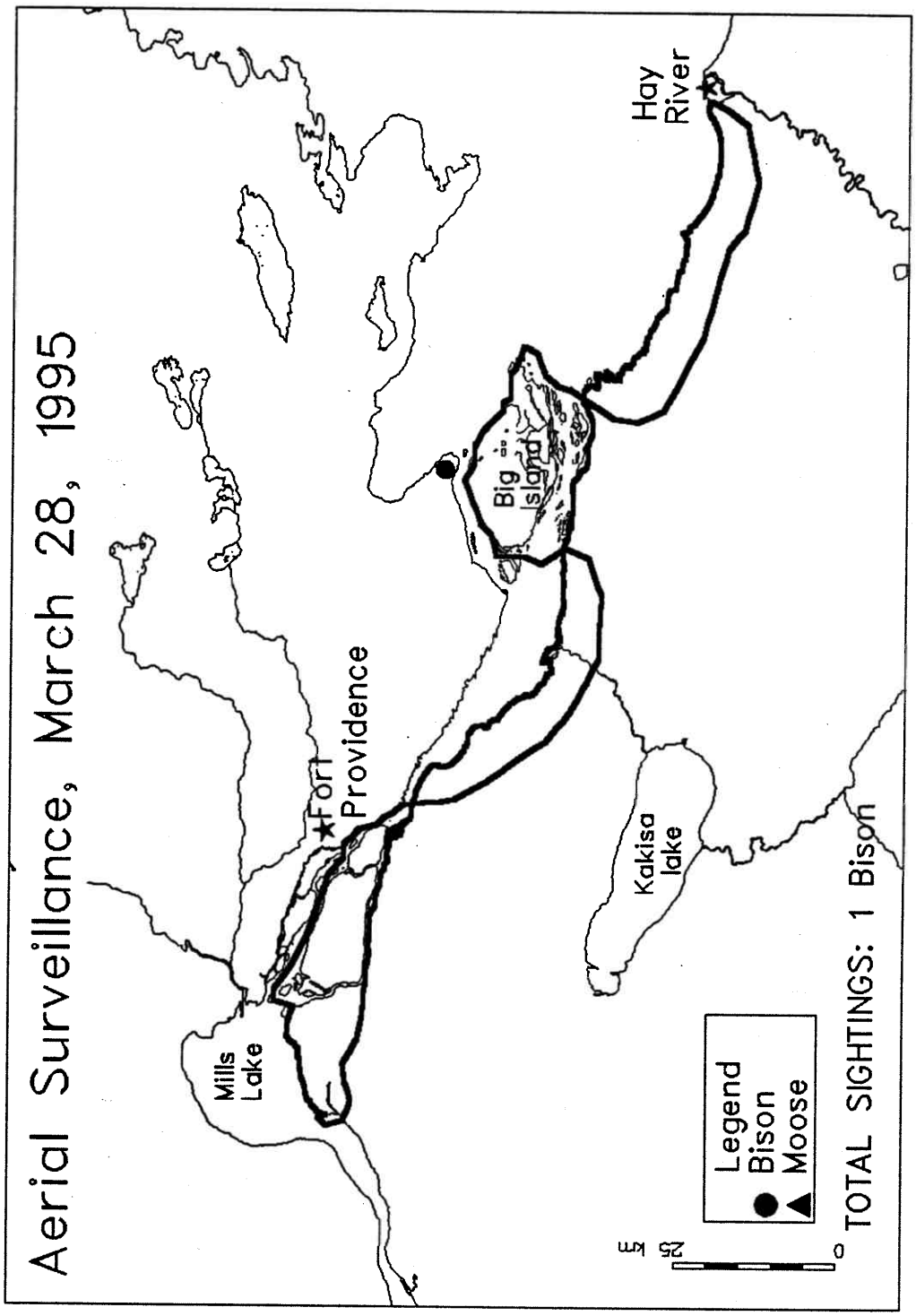

Aerial Surveillance, January 12, 1995
Mills Lake
Kakisa Lake
Redknife River
km
10
0
* Flight response to public report
No bison sighted

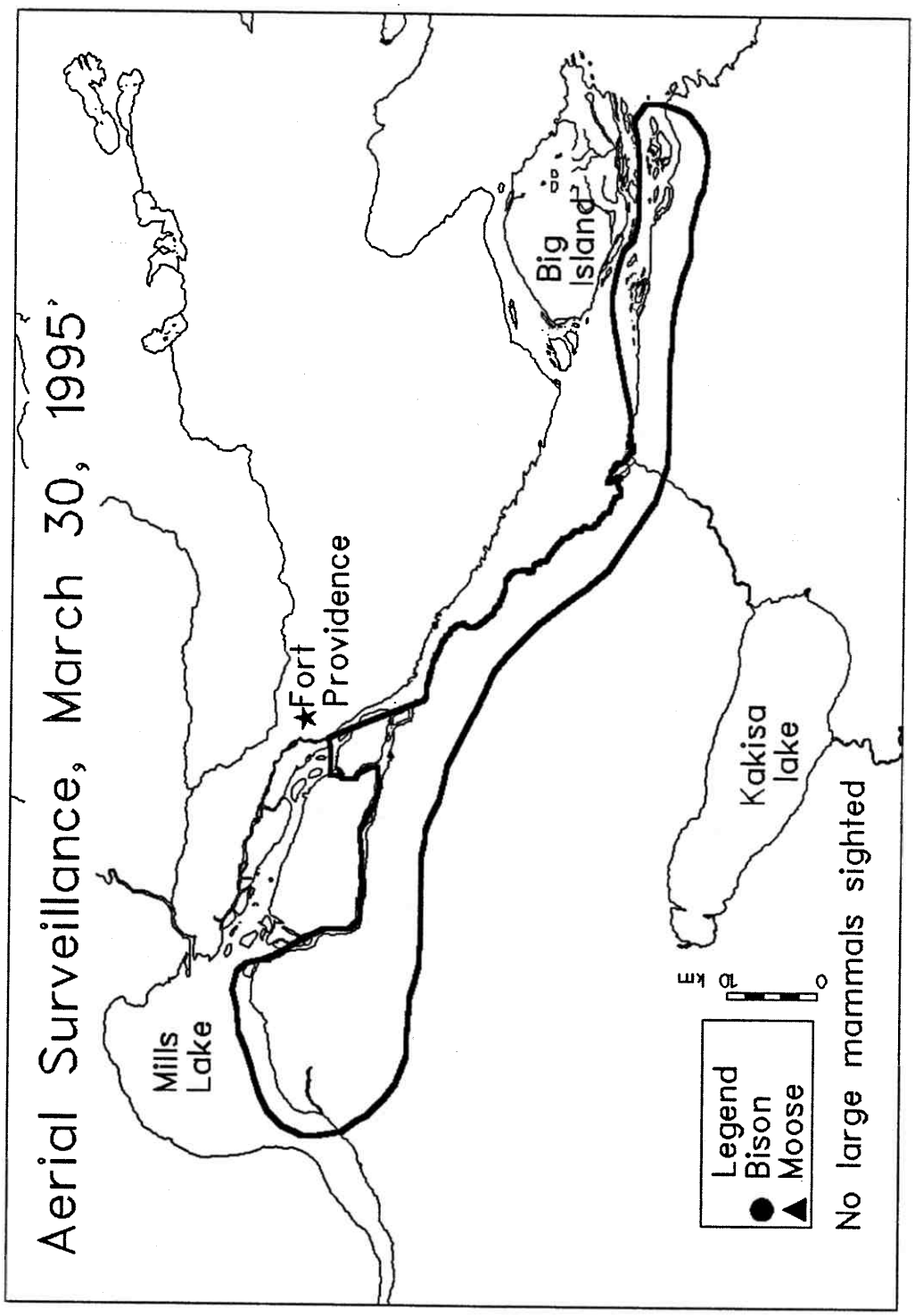

Aerial Surveillance January 23 & 26, 1995
Great Slave Lake
Hay River
Fort Providence
Kakisa Lake
Legend
Bison
Moose
50 km
TOTAL SIGHTINGS: 29 Bison, 20 Moose


Aerial Surveillance, February 8, 1995
BT
Fort Providence
Great Slave Lake
Hay River
Kakisa Lake
Legend
BT Bison Tracks
Moose
TOTAL SIGHTINGS: 3 Moose
0
25
50 km

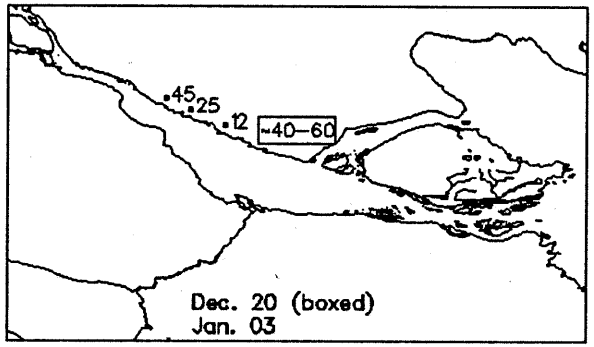

Aerial Surveillance, February 24, 1995
Mills Lake
15
3
2
40
Big Island
Legend
Bison
Moose
Wolf
10 km
0
Kakisa Lake
TOTAL SIGHTINGS: 55 Bison, 3 Moose, 2 Wolves

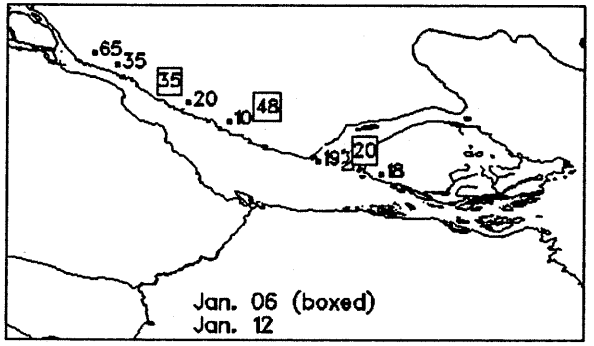

Aerial Surveillance, March 26, 1995
Hay River
Big Island
4
5
Fort Providence
Mills Lake
Kakisa lake
Legend
Bison
Moose
25 km
0
TOTAL SIGHTINGS: 11 Bison

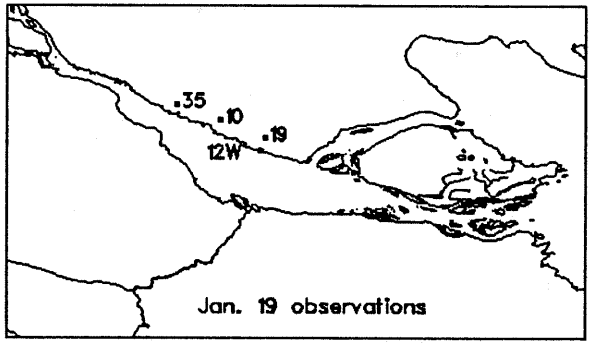

Aerial Surveillance, March 28, 1995
Hay River
Big Island
Fort Providence
Mills Lake
Kakisa lake
Legend
Bison
Moose
0
25 km
TOTAL SIGHTINGS: 1 Bison

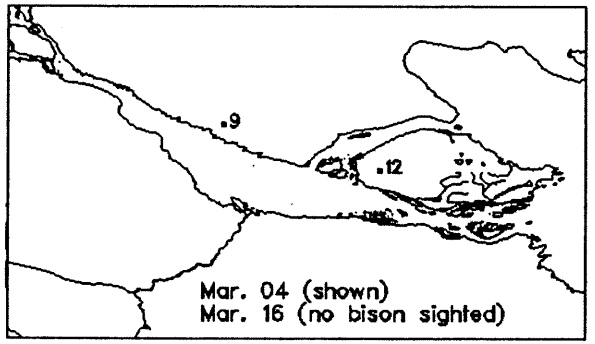

Aerial Surveillance, March 30, 1995'
Mills Lake
★Fort Providence
Big Island
Kakisa lake
Legend
Bison
Moose
No large mammals sighted

Bison Observations by Air Providence









APPENDIX B

Locations of moose, caribou, wolves and bison recorded during surveillance flights in and near the Bison Control Area during December 1994 - March 1995.

Surveillance Flight, December 20-22, 1994

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
60 56 97	116 36 91		2	-	-
61 03 45	116 34 61	-	-	2	-
61 57 41	117 06 38	-	17	-	-
61 18 59	117 41 33	1	-	-	-
61 13 43	117 43 11	2	5	-	-
61 17 16	117 53 19	2	-	-	-
61 13 48	118 09 17	-	-	kill site (beaver)	-
61 21 46	118 20 15	2	-	-	-
61 25 21	118 06 07	4	-	-	-
61 16 52	118 23 34	6	-	-	-
61 20 26	118 23 13	-	-	kill site (moose)	-
61 14 45	118 25 58	2	-	-	-
61 07 45	118 30 54	2	-	-	-
61 14 07	118 32 50	3	-	-	-
61 09 30	118 42 07	2	-	-	-
61 11 35	118 43 01	2	-	-	-
61 13 52	118 46 21	2	-	-	-
61 12 56	119 03 38	4	-	-	-
61 11 18	119 26 55	2	-	-	-
61 12 58	119 35 03	1	-	-	-
61 24 33	119 11 52	1	-	-	-
	TOTALS	38	24	2	0

Surveillance Flight, January 17, 1995

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
60 50 50	115 12 04	1	-	-	-
60 49 07	115 02 52	1	-	-	-
60 49 43	115 25 55	2	-	-	-
60 50 16	115 18 29	2	-	-	-
60 51 10	116 02 60	1	-	-	-
60 49 23	116 12 41	1	-	-	-
60 49 57	116 14 34	3	-	-	-
60 52 07	116 18 47	1	-	-	-
60 58 09	116 27 04	1	-	-	-
60 59 37	116 38 34	1	-	-	-
60 59 42	116 38 38	2	-	-	-
60 56 33	116 35 55	-	2	-	-
60 56 34	116 41 14	1	-	-	-
60 58 15	116 45 58	1	-	-	-
60 57 00	116 58 13	-	16	-	-
61 01 21	116 59 03	1	-	-	-
61 05 13	116 42 16	4	-	-	-
61 05 28	116 57 12	-	-	-	11
61 06 35	116 50 13	-	-	-	15
61 09 27	116 49 40	-	-	-	5
61 18 20	117 31 36	-	-	-	60
61 15 28	117 23 46	-	-	-	38
61 13 10	117 19 51	-	-	-	46
61 11 27	117 11 28	-	-	-	9
61 09 27	117 07 00	-	-	-	34
61 07 23	116 59 48	-	-	-	9
61 02 10	117 07 54	2	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 11 22	117 25 13	1	-	-	-
61 12 19	117 27 23	2	-	-	-
61 07 22	117 38 02	-	2	-	-
61 13 36	117 35 59	-	2	-	-
61 14 21	117 37 44	-	3	-	-
61 16 33	117 36 48	2	-	-	-
61 13 05	117 43 27	1	-	-	-
61169298	117 49 14	1	-	-	-
61 18 35	117 56 58	2	-	-	-
61 16 01	118 14 16	-	2	-	-
61 18 18	118 16 05	2	-	-	-
61 25 19	118 06 04	3	-	-	-
61 21 56	118 21 05	4 hunter kill	-	-	-
61 15 00	118 17 21	2	-	-	-
61 11 49	118 17 15	2	-	-	-
61 16 01	118 22 38	1	-	-	-
61 19 11	118269483	1	-	-	-
61 17 44	118 28 42	3	-	-	-
61 14 53	118 26 24	1	-	-	-
61 14 28	118 39 02	1	-	-	-
61 09 21	118 39 50	1	-	-	-
61 08 35	118 41 57	3	-	-	-
61 08 26	118 42 47	2	-	-	-
61 11 09	118 43 58	1	-	-	-
61 14 06	118 47 50	1	-	-	-
61 09 54	118 50 32	2	-	-	-
61 15 30	118 48 29	2	-	-	-
61 10 22	119 18 53	1	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 13 52	119 16 59	1	-	-	-
61 14 00	119 34 57	6	-	-	-
61 15 30	119 41 47	3	-	-	-
61 12 59	119 27 05	2	-	-	-
	TOTALS	75+4kill	27	0	227

Surveillance Flight, January 31-February 2, 1995

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 23 10	118 19 54	2	-	-	-
61 18 25	118 29 01	1	-	-	-
61 15 52	118 46 13	2	-	-	-
61 10 18	118 47 05	2	-	-	-
61 12 28	118 45 28	1	-	-	-
61 14 16	118 47 42	2	-	-	-
61 12 22	118 47 40	3	-	-	-
61 10 55	118 43 54	6	-	-	-
61 08 42	118 40 46	2	-	-	-
61 11 49	118 37 36	1	-	-	-
61 17 03	118 29 24	2	-	-	-
61 14 28	118 31 12	2	-	-	-
61 12 46	118 34 39	3	-	-	-
61 10 08	118 33 32	3	-	-	-
61 12 59	118 26 33	2	-	-	-
61 14 51	118 26 30	4	-	-	-
61 18 06	118 24 56	3	-	-	-
61 18 29	118 18 25	2	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 14 23	118 23 57	1	-	-	-
61 23 58	118 12 13	2	-	-	-
61 24 55	118 06 06	3	-	-	-
61 24 53	118 08 15	1	-	-	-
61 18 19	117 52 55	-	7	-	-
61 15 35	117 47 50	-	5	-	-
61 15 57	117 42 06	1	-	-	-
61 18 07	117 38 40	1	-	-	-
61 13 41	117 36 12	-	4	-	-
61 07 37	117 35 19	-	4	-	-
60 57 04	117 03 16	-	9	-	-
60 59 22	116 57 48	-	2	-	-
61 02 16	116 49 34	-	3	-	-
61 02 16	116 49 34	4	-	-	-
60 57 57	116 39 58	1	-	-	-
60 59 42	116 37 40	3	-	-	-
61 03 07	117 0012	1	-	-	-
61 09 34	117 21 58	2	-	-	-
60 51 06	116 04 02	3	-	-	-
60 52 31	116 22 08	1	-	-	-
61 06 44	116 52 55	-	-	-	17
61 09 08	116 50 26	1	-	-	-
61 08 56	116 53 11	2	-	-	-
61 10 45	117 11 18	-	-	-	10
61 13 20	117 18 60	-	-	-	75
61 08 40	117 01 17	1	-	-	-
60 49 53	115 16 41	2	-	-	-
60 32 53	115 28 26	3	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
60 28 10	115 21 19	3	-	-	-
60 32 31	115 33 49	1	-	-	-
60 28 10	115 32 30	4	-	-	-
60 28 30	115 41 16	1	-	-	-
60 09 46	115 36 11	1	-	-	-
60 08 46	115 36 25	1	-	-	-
60 07 35	115 36 39	3	-	-	-
60 07 24	115 38 09	1	-	-	-
60 08 19	115 38 34	1	-	-	-
60 07 26	115 40 36	1	-	-	-
60 06 43	115 39 57	1	-	-	-
60 05 56	115 36 36	1	-	-	-
60 06 52	115 39 21	3	-	-	-
60 06 45	115 40 46	2	-	-	-
60 06 01	115 51 02	3	-	-	-
60 04 47	115 44 53	2	-	-	-
60 03 48	115 40 27	2	-	-	-
60 00 17	115 36 32	1	-	-	-
60 00 38	115 38 54	1	-	-	-
60 03 17	115 41 29	2	-	-	-
60 03 54	115 43 25	1	-	-	-
60 04 46	115 45 43	1	-	-	-
60 06 31	115 49 18	4	-	-	-
60 08 53	115 48 08	2	-	-	-
60 08 35	115 49 50	1	-	-	-
60 12 28	115 57 14	2	-	-	-
60 29 39	115 45 45	1	-	-	-
	TOTALS	113	42	0	102

Surveillance Flight, February 14-15, 1995

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 19 25	118 26 15	2	-	-	-
61 18 37	118 28 28	1	-	-	-
61 17 52	118 32 50	1	-	-	-
61 14 07	118 54 22	1	-	-	-
61 13 32	119 19 40	-	-	13	-
61 14 17	119 33 39	6	-	-	-
61 16 04	119 37 31	2	-	-	-
61 16 59	119 46 42	2	-	-	-
61 18 24	119 50 20	1	-	-	-
61 17 30	119 50 37	1	-	-	-
61 13 33	119 19 36	1	-	-	-
61 13 18	119 02 03	2	-	-	-
61 11 56	119 06 26	1	-	-	-
61 13 16	119 00 08	1	-	-	-
61 09 30	118 47 35	1	-	-	-
61 14 28	118 47 54	1	-	-	-
61 15 26	118 44 10	1	-	-	-
61 11 07	118 44 07	1	-	-	-
61 08 59	118 41 17	1	-	-	-
61 17 12	118 31 13	1	-	-	-
61 18 00	118 30 05	2	-	-	-
61 17 32	118 27 15	1	-	-	-
61 18 17	118 26 47	2	-	-	-
61 18 19	118 25 30	1	-	-	-
61 15 15	118 26 06	1	-	-	-
61 15 11	118 27 07	1	-	-	-
61 17 50	118 28 40	1	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 17 52	118 15 42	2	-	-	-
61 19 55	118 11 45	1	-	-	-
61 21 12	118 10 54	1	-	-	-
61 22 50	118 15 42	2	-	-	-
61 22 35	118 10 50	1	-	-	-
61 21 52	117 09 11	1	-	-	-
61 16 17	117 53 18	2	-	-	-
61 09 39	117 64 39	-	3	-	-
60 57 17	117 03 14	-	7	-	-
61 00 25	116 27 09	-	-	2	-
61 15 28	116 23 13	-	-	-	39
61 12 02	117 12 02	-	-	-	15
61 10 18	117 01 58	-	-	-	14
61 10 18	116 51 21	3	-	-	-
61 09 27	116 45 45	2	-	-	-
61 07 26	116 52 28	-	-	-	9
61 05 09	116 45 12	2	-	-	-
60 58 29	116 28 20	2	-	-	-
60 51 10	115 41 47	-	-	1 coyote	-
60 47 26	115 04 25	1	-	-	-
60 49 36	114 59 26	1	-	-	-
60 50 30	115 14 02	2	-	-	-
	TOTALS	60	10	16	77

Surveillance Flight, February 26-28, 1995

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 23 47	117 51 54	2	-	-	-
61 24 43	118 14 58	2	-	-	-
61 20 13	118 22 59	4	-	-	-
61 18 32	118 28 25	5	-	-	-
61 17 16	118 37 32	1	-	-	-
61 17 35	118 40 48	1	-	-	-
61 15 22	118 47 22	2	-	-	-
61 14 36	118 50 24	1	-	-	-
61 14 05	118 53 14	1	-	-	-
61 13 04	118 56 35	2	-	-	-
61 12 26	119 05 16	2	-	-	-
60 24 30	119 51 13	1	-	-	-
60 16 14	119 01 18	1	-	-	-
60 18 06	118 59 55	1	-	-	-
60 25 43	118 52 08	3	-	-	-
60 25 11	118 50 42	-	-	3	-
60 28 35	118 42 28	1	-	-	-
60 29 43	118 39 46	1	-	-	-
60 30 45	118 38 18	2	-	-	-
60 30 45	118 38 18	2	-	-	-
60 30 38	118 35 39	2	-	-	-
60 31 46	118 38 40	2	-	-	-
60 31 60	118 44 02	1	-	-	-
60 30 47	118 30 24	4	-	-	-
60 38 41	117 56 43	-	1	-	-
60 58 32	117 58 28	1	-	-	-
61 00 28	118 01 03	1	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 01 04	118 57 09	1	-	-	-
61 13 04	117 41 20	1	-	-	-
61 13 10	118 57 29	1	-	-	-
61 08 39	118 52 56	1	-	-	-
61 11 03	118 43 44	2	-	-	-
61 12 27	118 46 01	2	-	-	-
61 13 56	118 46 30	1	-	-	-
61 15 08	118 43 14	3	-	-	-
61 10 14	118 41 59	5	-	-	-
61 16 36	118 29 42	1	-	-	-
61 06 47	118 29 46	1	-	-	-
61 20 02	118 23 21	1	-	-	-
61 22 06	118 18 58	1	-	-	-
61 15 48	117 49 26	-	3	-	-
61 08 49	117 45 03	-	4	-	-
61 14 36	117 35 33	-	8	-	-
61 10 12	117 32 40	-	7	-	-
61 08 49	117 33 16	-	4	-	-
61 03 46	117 19 30	1	-	-	-
60 57 12	117 04 00	1	2	-	-
61 02 09	116 29 25	-	9	-	-
61 01 57	116 53 23	1	2	-	-
60 59 42	116 46 09	1	-	-	-
60 59 22	116 40 13	1	-	-	-
61 00 31	116 38 23	1	-	-	-
60 56 28	118 38 27	1	-	-	-
60 54 46	116 38 16	1	-	-	-
60 54 20	116 30 21	1	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	bison
60 52 58	116 23 28	2	-	-	-
60 52 12	116 27 09	2	-	-	-
60 52 53	116 14 30	-	-	1	-
60 51 33	116 04 02	2	-	-	-
60 47 15	115 56 26	2	-	-	-
60 58 47	116 28 53	-	-	1	-
60 58 59	116 29 18	3	-	-	-
61 03 09	116 51 07	3	-	-	-
61 03 10	116 55 18	1	-	-	-
61 07 38	116 58 60	2	-	-	-
61 06 18	116 54 42	-	-	-	3
61 07 58	116 50 31	-	-	-	18
61 04 02	116 43 30	2	-	-	-
61 02 13	116 41 24	-	-	9	-
61 19 10	117 36 21	1	-	-	-
60 46 19	115 01 17	1	-	-	-
60 33 04	115 22 35	1	-	-	-
60 36 02	115 19 49	2	-	-	-
60 37 42	115 17 36	1	-	-	-
60 42 13	115 15 25	1	-	-	-
60 49 15	115 11 23	1	-	-	-
60 49 21	116 00 34	1	-	-	-
60 48 45	115 55 59	1	-	-	-
	TOTALS	105	40	14	21

Surveillance Flight, March 4-6, 1995

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	son
60 50 59	115 13 18	1	-	-	-
60 51 43	115 07 29	1	-	-	-
60 49 09	115 02 08	1	-	-	-
60 46 18	115 01 40	1	-	-	-
60 32 19	115 21 24	1	-	-	-
60 35 48	115 20 46	2	-	-	-
60 36 52	115 17 07	2	-	-	-
60 39 47	115 21 11	1	-	-	-
60 49 02	115 11 50	1	-	-	-
60 50 32	116 08 23	1	-	-	-
60 51 59	116 22 18	1	-	-	-
61 00 43	116 50 01	1	-	-	-
61 03 24	116 55 26	1	-	-	-
61 03 08	116 30 39	-	-	1	-
61 22 21	117 42 47	-	-	-	3
61 11 40	117 25 36	2	-	-	-
61 08 06	116 57 03	5	-	-	-
61 06 00	116 51 21	-	-	-	19
61 08 35	116 52 28	3	-	-	-
61 04 20	116 41 46	1	-	-	-
61 24 55	118 06 06	3	-	-	-
61 03 25	116 52 11	3	-	-	-
61 02 51	116 56 04	1	-	-	-
61 02 43	116 56 56	-	2	-	-
61 03 06	116 58 34	2	-	-	-
61 06 01	117 32 23	-	2	-	-
61 07 14	117 36 11	-	6	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 13 35	117 35 28	-	2	-	-
61 14 06	117 35 39	-	8	-	-
61 17 03	117 38 25	1	-	-	-
61 14 47	117 53 14	-	2	-	-
61 23 56	118 16 41	3	-	-	-
61 23 11	118 18 52	2	-	-	-
61 23 06	118 20 19	2	-	-	-
61 23 34	118 04 58	2	-	-	-
61 19 37	118 16 57	2	-	-	-
61 19 22	118 15 16	1	-	-	-
61 17 28	118 27 28	2	-	-	-
61 18 11	118 20 58	1	-	-	-
61 17 57	118 28 05	10	-	-	-
61 17 09	118 31 20	2	-	-	-
61 18 54	118 27 05	3	-	-	-
61 17 23	118 34 46	2	-	-	-
61 10 53	118 32 22	2	-	-	-
61 12 30	118 38 44	1	-	-	-
61 15 55	118 44 05	1	-	-	-
61 08 44	118 41 47	3	-	-	-
61 09 44	118 42 47	4	-	-	-
61 10 45	118 44 19	3	-	-	-
61 10 21	118 40 36	1	-	-	-
61 12 37	118 45 07	3	-	-	-
61 13 33	118 44 31	1	-	-	-
61 14 41	118 47 12	1	-	-	-
61 14 54	118 44 17	1	-	-	-
61 16 06	118 46 12	1	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 10 56	118 47 38	1	-	-	-
61 09 34	118 53 31	2	-	-	-
61 11 31	118 51 33	3	-	-	-
61 13 13	118 57 54	1	-	-	-
61 14 27	118 52 06	2	-	-	-
61 16 23	118 45 13	1	-	-	-
61 18 38	118 28 27	2	-	-	-
61 20 20	118 23 26	2	-	-	-
60 58 59	119 01 15	1	-	-	-
60 58 09	119 05 36	3	-	-	-
60 56 07	119 17 00	1	-	-	-
60 45 39	119 04 04	1	-	-	-
60 36 31	118 36 50	1	-	-	-
60 29 50	118 18 32	1	-	-	-
60 28 51	118 13 25	1	-	-	-
60 27 58	117 58 34	2	-	-	-
60 28 18	117 41 14	3	-	-	-
60 26 11	117 27 46	1	-	-	-
60 30 25	117 14 20	4	-	-	-
60 32 01	117 14 38	2	-	-	-
60 31 51	116 50 51	1	-	-	-
60 33 47	116 51 18	2	-	-	-
60 44 22	117 06 23	1	-	-	-
60 46 44	117 12 16	1	-	-	-
61 14 56	117 32 18	-	-	-	1
	TOTALS	130	22	1	23

Surveillance Flight, March 18-20, 1995

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 22 22	117 38 50	-	-	-	9
61 21 56	118 20 22	2	-	-	-
61 14 19	118 52 09	-	-	-	-
61 13 56	118 56 50	1	-	-	-
61 12 44	119 13 58	1	-	-	-
61 12 45	119 27 20	2	-	-	-
61 13 58	119 33 10	1	-	-	-
61 14 20	119 34 29	7	-	-	-
61 18 27	119 50 58	6	-	-	-
60 59 22	120 20 55	1	-	-	-
60 33 37	120 47 18	-	-	1	-
60 17 42	120 35 91	2	-	-	-
60 47 33	120 28 49	2	-	-	-
60 50 22	120 20 09	2	-	-	-
60 23 36	120 13 52	1	-	-	-
60 42 11	119 48 27	2	-	-	-
61 02 27	119 36 56	2	-	-	-
61 04 18	119 33 32	1	-	-	-
61 09 56	118 48 03	1	-	-	-
61 10 59	118 42 23	3	-	-	-
61 07 32	118 52 55	4	-	-	-
61 03 48	118 46 49	1	-	-	-
61 13 31	118 45 29	1	-	-	-
61 11 51	118 46 56	2	-	-	-
61 11 12	118 48 38	1	-	-	-
61 08 35	118 40 19	1	-	-	-
61 11 40	118 42 21	1	-	-	-

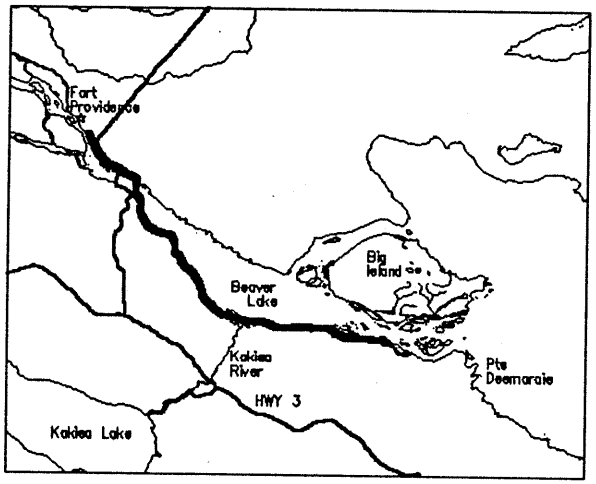
Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
61 13 26	118 43 56	1	-	-	-
61 09 08	118 32 24	1	-	-	-
61 06 49	118 32 14	1	-	-	-
61 17 35	118 31 05	1	-	-	-
61 17 30	118 27 54	3	-	-	-
61 15 25	118 21 06	1	-	-	-
61 07 03	118 18 53	1	-	-	-
61 19 18	118 15 36	1	-	-	-
61 21 53	118 19 08	1	-	-	-
61 22 58	118 20 11	2	-	-	-
61 25 10	118 09 33	1	-	-	-
61 17 58	118 14 04	2	-	-	-
61 14 15	117 34 22	-	3	-	-
61 11 10	117 36 19	1	-	-	-
61 08 41	117 37 11	1	-	-	-
60 44 03	119 28 11	3	-	-	-
60 23 03	119 17 57	4	-	-	-
60 18 49	119 00 27	1	-	-	-
60 28 05	119 00 11	3	-	-	-
60 36 54	119 01 16	-	1	-	-
60 34 59	118 45 33	2	-	-	-
60 32 06	118 47 19	2	-	-	-
60 30 38	118 45 57	-	-	3	-
60 20 10	118 44 33	1	-	-	-
60 21 48	118 28 24	2	-	-	-
60 31 48	118 41 18	1	-	-	-
60 50 33	118 32 21	1	-	-	-
60 54 48	118 31 45	1	-	-	-

Latitude (DMS)	Longitude (DMS)	Moose	Caribou	Wolves	Bison
60 01 12	116 59 40	1	-	-	-
59 59 58	115 27 35	2	-	-	-
60 02 59	115 46 02	1	-	-	-
60 03 10	116 32 18	1	-	-	-
60 05 56	115 50 19	-	-	12	-
60 05 47	115 49 39	1	-	-	-
60 06 06	115 39 50	1	-	-	-
60 06 01	115 37 14	1	-	-	-
60 09 03	115 42 15	2	-	-	-
60 08 59	115 52 37	1	-	-	-
60 09 03	116 27 11	1	-	-	-
60 15 21	116 02 25	2	-	-	-
60 17 59	115 38 15	1	-	-	-
60 25 50	116 05 25	2	-	-	-
60 26 59	115 39 43	2	-	-	-
60 51 27	114 59 54	-	-	6	-
60 46 51	115 00 10	1	-	-	-
60 50 04	115 19 47	1	-	-	-
61 02 53	116 42 10	-	-	7	-
61 05 01	116 46 41	3	-	-	-
61 11 50	116 51 37	-	-	-	4
61 09 21	116 50 49	2	-	-	-
61 08 20	116 54 35	1	-	-	-
61 06 58	116 54 21	-	-	-	3
60 34 49	117 41 49	1	-	-	-
60 30 53	117 14 25	1	-	-	-
60 45 21	116 59 31	-	-	-	-
	TOTALS	116	4	29	16

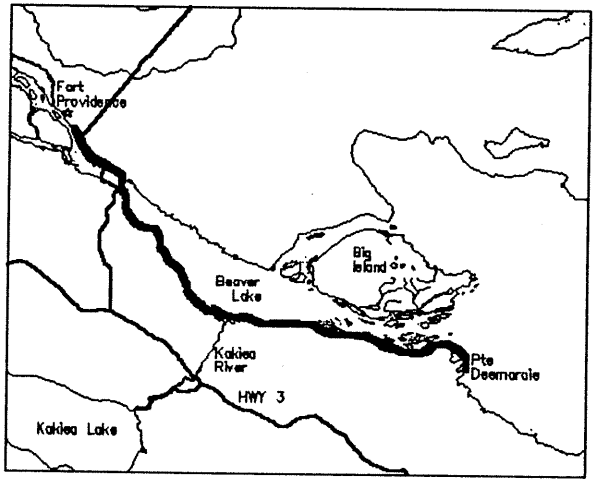
APPENDIX C

Routes followed during ground patrols in the Bison Control Area during December 1995 - March 1995.

Fort Providence BCA Ground Patrols
Albert Bonnetrouge

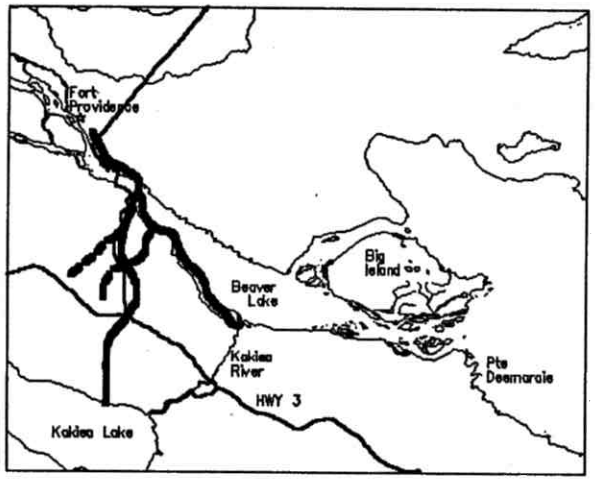


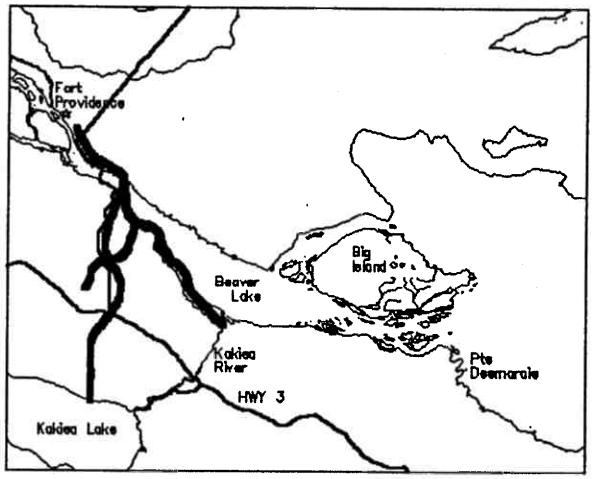
Dec 22–24
Jan 5–7
Jan 10–13
Jan 18–20
Jan 23–25
Feb 13–15
Feb 21–23
Feb 27–Mar 3
Mar 6–8
Mar 14–16
Mar 22–24



Feb 1–3
Feb 8–10

Fort Providence BCA Ground Patrols
Daniel Squirrel





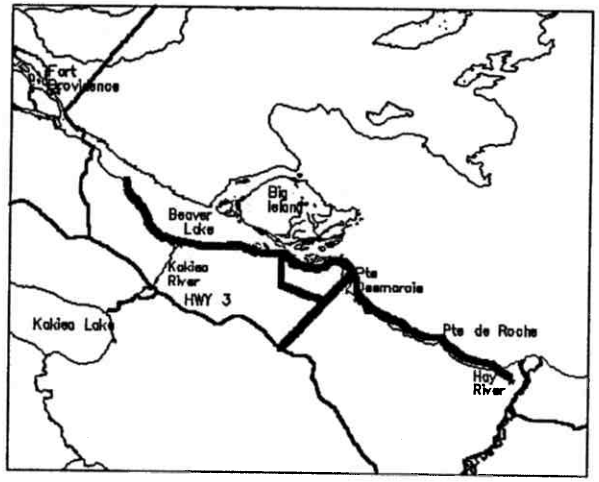
Dec 19–22
Feb 27–Mar 3
Mar 06–10

Jan 3–6
Jan 10–13
Jan 16–20
Jan 23–27

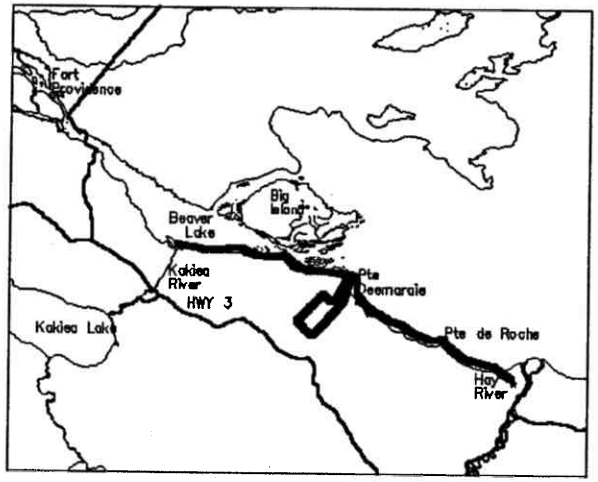
Jan 31–02
Mar 13–17
Mar 20–24

Feb 6–9
Feb 13–17
Feb 20–24

Hay River BCA Ground Patrols
Jim Thomas (*with William Michell)

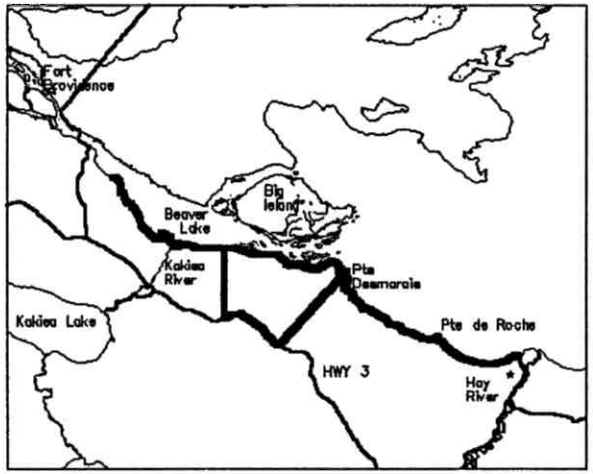


Dec 14–16,
Dec 20–22,
Jan 31–Feb 3
Feb 22–24*
Mar 7–9*

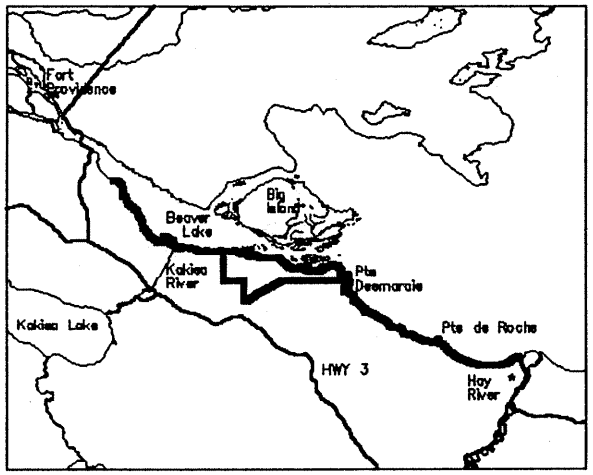


Jan 11–13
Mar 28–30*

Hay River BCA Ground Patrols



Jim & Ken Thomas
Allen Mercredi
Jan 18–20



Jim & Ken Thomas
Allen Mercredi
Jan 24–26

APPENDIX D

Checkpoint form sample, used to record data on aerial surveillance flights.

Northwest Territories

BISON CONTROL AREA
AERIAL PATROL FORM

DATE _____ ZONE OR AREA _____

RECORDING OFFICER _____

CREW MEMBERS _____

_____

_____

WEATHER: Temperature (start/finish) _____/_____

Cloud% (start/finish) _____/_____

Snow cover % _____

Days since last snowfall _____

CHECK POINT OR UTM LOCATION	TIME	OBSERVATION

APPENDIX E

Copy of the operational plan for the bison control program and a copy of the WBNP contribution agreement for 1994-95.

BISON CONTROL AREA OPERATIONAL PLAN - 1994-95

BACKGROUND

The Government of the Northwest Territories implemented a Bison Free Management Area in 1987 as a buffer zone between bison populations in Wood Buffalo National Park, the Slave River Lowlands, and northern Alberta that are infected with bovine tuberculosis and brucellosis and the Mackenzie and Nahanni/Liard herds which are not infected with these diseases. The renamed Bison Control Area is recognized in law, and is consistent with the goals of the Wildlife Management Division of the Department of Renewable Resources which seek to i) ensure that viable populations of wildlife species exist in their natural habitats and ii) encourage participation by northern residents in wildlife management.

During the winters of 1992-93 and 1993-944, large numbers of bison were located along the north shore of the Mackenzie River, posing an increased risk of movement into the BCA and increased threat of disease transmission to the Mackenzie bison population. Surveillance for bison in the BCA was modified to address this increased risk, with regular aerial and ground surveillance conducted in high-risk areas. Contingency plans have been established to contain, drive back, or destroy bison in the event that large numbers enter the BCA from the Mackenzie population in addition to measures regularly undertaken to locate and destroy small numbers or individual bison that may be found in other areas in the BCA. Necessary increased surveillance resulted in expenditure of $110,000. during the 1993-94 fiscal year.

Measures to manage the risk of disease transmission to the Mackenzie and Nahanni/Liard bison herds must be maintained until the disease organisms are eradicated from bison in infected herds. If the Mackenzie herd becomes infected with brucellosis and tuberculosis, the size and complexity of the diseased bison problem will have increased unacceptably and would render this herd unavailable as a source of founding stock for further reintroductions to former ranges under the Wood Bison Recovery Program. Considerable benefit is currently derived from tourism and controlled hunting of the Mackenzie herd in the form of recreational viewing, hunting opportunities, meat, and incomes earned by community based businesses and guides. These benefits would be adversely affected with the spread of the diseases to the Mackenzie herd.

ACTION PLAN

For the BCA to be effective it must be patrolled on a regular basis with any animals present removed as quickly as possible. The most practical means of surveillance is a combination of regular aerial and ground-based surveys during the winter when tracks and animals are most readily observable, and ice cover increases the chances of bison crossing the Mackenzie River. Large aggregations of bison on the north shore of the river during winter 1992-93 and 1993-94 are expected to also occur this winter, which will require intensive aerial surveillance and ground patrols in the adjacent area. Bison are also occassionally seen in boundary areas of Wood Buffalo National Park and Alberta. Residents of regional com[illegible]ities will again be involved and employed in BCA surveillance and removal operations.

OPERATIONAL BUDGET

The following budget applies to the 1994-95 financial year.

GNWT Reserved funding for removal of bison from the zone (only to be used if bison are removed from the BCA)	$40,000.
Ground patrols by snowmachine, using local resident employment	$25,000.
Aerial surveillance of high probability areas (15 December-15 March)	$48,000.
Comprehensive aerial survey of BCA in late March 1995	$10,000.
Project Technician	$12,000.
Snowmachine and toboggan purchase	$15,000.
Federal government commitment to BCA monitoring and maintenance	($55,000)
Total GNWT commitment	$95,000.

of the Mackenzie River and Great Slave Lake lying within the BCA should be covered during an outbound or inbound leg of the reconnaissance flight.

Secondly, random flights will be carried out, within the limitation of the budget, to check on the distribution of bison in high risk areas such as in the vicinity of Big Island. Once in January and again in March a flight will be extended into the Trout Lake area to interview residents and carry out reconnaissance in areas where bison have previously been reported.

Thirdly, commercial and GNWT agency charterd pilots flying in the high risk areas will be requested to note the presence and distribution of bison, particularly along the north shore of the Mackenzie River and in the vicinity of Big Island.

Fourth, a late March survey will be carried out in the southern and central BCA in areas not regularly looked at earlier in the program.

Observers will record on the attached form the time each checkpoint is passed, the locations of sightings of all large mammals and tracks left by bison or that might have been made by bison. Locations will be recorded using a global positioning system in Universal Treansverse Mercator units (UTM), or degrees, minutes seconds (**not in decimal notation**). Flight paths will be marked on Figures 2 or 3, depending on the zone. The flight map and BCA aerial patrol form will be faxed to the Bison Control Area Technician in Ft. Smith as soon as possible after the flight.

Ground Patrols:
Ground patrols will be carried out by snowmachines along the south shore of the Mackenzie River between Ft. Providence and Kakisa River and between Hay River and Kakisa River along the shore of Great Slave Lake. These patrols will be done by local trappers during three day periods every 7-10 days, or more frequently as required. At the end of each patrol observers are required to report the route travelled, dates and hours worked, all observations of tracks and sightings of large mammals marked on a 1:250,000 map. If single bison or small groups (2-3 animals) of bison are seen in the BCA they should be culled immediately by ground patrol personnel and reported as soon as possible to the DRR office in Hay River. Larger groups should be reported as soon as possible to the DRR office in Hay River.

Removals:
Any bison or bison tracks seen in the BCA must be reported as soon as possible to the nearest Renewable Resources Office from where the information will be relayed to the Area Superintendent, the Bison Ecologist and the Wildlife Disease Specialist and the BCA Technician. An appropriate course of action will be determined based on the circumstances. Options include hazing the animals north across the Mackenzie River, culling by helicopter or culling by ground based crews, informing an eligible hunter(s) about the location of the bison. Whenever possible personnel trained in post-mortem techniques should be invited to participate in any kills. Samples required include blood serum, frozen and fixed tissues from major organs, and a specific number and type of lymph nodes. Samples will be sent to the Animal Pathology Laboratory, Agriculture and Agri-foods Canada, Saskatoon, Saskatchewan for analysis.

Community and Inter-agency Consultation:
In accordance with the joint GNWT/Parks Canada agreement, Parks Canada will be provided opportunities to accompany aerial patrols in the BCA. Information on the possible occurrence of bison near the BCA in Alberta and in Wood Buffalo National Park will be sought from other agencies including the Alberta Forest Service (High Level, Fort McMurray), Alberta Fish and Wildlife Division (Fort Vermillion, High Level), and Parks Canada. Contact will be made with residents of several communities to seek information on recent and current distribution of bison in northern Alberta and in the BCA. These communities will include Trout Lake, Kakisa, Assumption, Steen River, Indian Cabins, High Level and Fort Vermillion.

CONTRIBUTION AGREEMENT

THIS AGREEMENT made this 28 day of November A.D. 1994.

BETWEEN:

THE GOVERNMENT OF THE NORTHWEST TERRITORIES as represented by the Assistant Deputy Minister of Renewable Resources (hereinafter referred to as the "Assistant Deputy Minister")

AND

PARKS CANADA as represented by the Superintendent of Wood Buffalo National Park (hereinafter referred to as the "Superintendent")

WHEREAS the Government of the Northwest Territories established a Bison Control Area (BCA) as an interim measure to prevent the spread of bovine brucellosis and tuberculosis from bison in Wood Buffalo National Park to non-infected bison in the Mackenzie and Nahanni herds,

AND WHEREAS Parks Canada has agreed to contribute funding for the operation of the BCA in 1994/95,

NOW THEREFORE, in consideration of the terms and covenants contained herein, the parties hereto agree as follows:

1. Parks Canada will provide a contribution of $55,000 (CAN) to the Government of the Northwest Territories by December 31, 1994 to be used to support operations in the BCA in the fiscal year 1994/95.

2. The Bison Control Area surveillance and removal program will include:

   i) Aerial surveillance missions undertaken to locate bison within the BCA;
   ii) Air or ground based operations undertaken to destroy bison in the BCA,
   iii) Sampling and testing of destroyed bison to detect bovine brucellosis and tuberculosis,
   iv) Parks Canada will have opportunities to accompany aerial surveys in the BCA,

3. Eligible expenses for the purpose of this agreement are those incurred directly in the performance of the tasks contained in 2.

4. Officers of Parks Canada or its designated agent will be entitled, upon request, to examine the accounts and records of the Department of Renewable Resources or to obtain other information deemed necessary by Parks Canada in the circumstances to ensure proper utilization of funds in the BCA program.

5. Government of the Northwest Territories will supply a report by March 31, 1995 showing bison, bison movements, number of bison seen and locations.

6. This agreement will be in effect from the date of signing until March 31, 1995.

7. Funds not spent in accordance with this agreement are repayable to Parks Canada.

IN WITNESS WHEREOF, the parties have set their hands and seals on the date first above-mentioned.

R. McLeod

Robert McLeod
Assistant Deputy Minister
Department of Renewable Resources

Dated: 13/12/94

Candice Handley

Witness

Josie Weninger

Josie Weninger
Superintendent
Wood Buffalo National Park

Dated: November 28, 1994

Witness